Criteria for Selection and Design of Residential Slabs-on-Ground

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Federal
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REPORT NO. 33
TO THE
Federal Housing Administration

Criteria for Selection and Design of Residential Slabs-on-Ground

PREPARED BY
A SPECIAL ADVISORY COMMITTEE
OF THE
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DIVISION OF ENGINEERING
NATIONAL RESEARCH COUNCIL

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FOREWORD

This report was prepared by a Special Advisory Committee of the Building Research Advisory Board of the Division of Engineering of the National Research Council. It has been reviewed, accepted, and approved for transmittal to the Federal Housing Administration by a Review Subcommittee of the Board, acting on behalf of the Board.

In so doing, and with the concurrence of the Special Advisory Committee Chairman, the Board recommends to FHA that, in furtherance of the aims of this report, it consider the development and publication of perhaps ten or more standard designs for what the report describes as Type III slabs. Although this report provides adequate guides to design of these slabs (for expansive and compressible soils) and tables to expedite such design, this additional simplification could prove of great value to the man in the field—i.e., he would have available to him the choice of electing to use a standard design which will in all respects meet or exceed his requirements, or of using the recommended design procedures which, although superior in the sense of permitting a design of greater cost effectiveness, would entail greater effort on his part.

The Board is pleased to acknowledge the work of the Committee in developing this extensive report. It also acknowledges the assistance given the Committee by the professional staff members of the Federal Housing Administration who provided valuable technical liaison, and all those who gave assistance to the Committee through either correspondence or personal contact, in particular, the professional staffs of the Portland Cement Association and the National Association of Home Builders.

ROBINSON NEWCOMB, Chairman
Building Research Advisory Board

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I

INTRODUCTION

1.0 STATEMENT OF THE PROBLEM

These Criteria for Selection and Design of Residential Slabs-on-Ground were developed by the Building Research Advisory Board (BRAB) under contract between the Federal Housing Administration and the National Academy of Sciences.

The original FHA request for advisory services under this contract dates from 27 February 1957 and called for the following:

A determination of criteria for proper design and construction of heated and unheated slabs-on-ground to ensure structural soundness, including

a. Maximum dimension in which any unreinforced slab-on-ground may be constructed to safely avoid harmful cracking of the slab due to shrinkage and temperature change, and amounts of reinforcement necessary for slabs of greater length

b. Standards of construction for heated and unheated slabs-on-ground that will ensure structural soundness in areas of expansive soils

c. A definitive program of research or investigation, that may be expected to produce remaining needed knowledge.

All aspects of the charge were accepted; however, the Board, as well as its several committees which have provided the requested advice, have long agreed that the term "structural soundness" has a commonly accepted meaning which, if used in this context, would imply that all residential slabs perform a purely structural function and that only their performance in this respect was of concern. Such is not the case, and for this reason the Board and its several Committees have chosen to address themselves to attainment of "satisfactory performance" of the floor/foundation system as a whole, rather than "structural soundness" per se. This report, therefore, has been developed on the basis of this interpretation of the overall function of slabs-on-ground.

2.0 REPORT ORGANIZATION

This report consists of three sections. The first two, this Introduction and the Conclusions and Recommendations of the Special Advisory Committee, constitute a complete report in which the problem is defined and the needed answers are supplied.

The third section, comprising three parts, contains supporting information, i.e., the reasoning behind the recommendations of the Committee, together with pertinent data, analyses of the various factors affecting slab design, necessary deriviations of analytical approaches, and guides to use of the latter. Specifically: In Part A, the processes of slab selection and design are discussed; in Part B, quality control in construction is covered; and in Part C, soil behavior, data on soil classification, and standards are explained.

3.0 BACKGROUND

3.1 History

Concrete slabs-on-ground have been used as a primary floor surface for many years in residential construction. During and since the large home-building expansion of World War II and subsequent years, many slab and slab foundation types have emerged, largely as a result of invention rather than design. Many of these slab types continue to be known and applied only within rather limited geographic areas, while others have gained wide, if not nationwide, acceptance. There is very little documentation either of the evolvement of the many slab types used and in use or of the difficulties encountered; however, it is known that, with many, difficulties have occurred. Some troubles doubtless could be attributed to basic flaws in concept or construction, while others resulted from transplanting an otherwise satisfactory slab type to a different environment, to long-term cyclical changes in environment, or to use with a residential structure of different size, shape, or type of superstructure than that used when good experience was recorded.

After long study of both developments and problems, it would seem simply that, as builders were rewarded with success of a given slab type, that type frequently spread in use—sometimes with continued success and sometimes with unfortunate results. Indeed, in the early days of BRAB's study of slab problems, success seemed to some to warrant less stringent requirements even for entirely untried applications, and problems seemed to others to warrant more stringent requirements even for applications where experience had been satisfactory.

Residential construction was and largely continues to be an inexact science, and this applies no less to slab foundation systems. The result frequently has been a failure to recognize, or an inability to cope with, the often vast differences in soil, climate, construction, and other variables as one moves from building site to building site in different geographic areas of the nation and even within the same limited geographic area. There obviously has been all too little effort to document experience and to codify either slab types, or the selection, specification and/or design procedures used.

The first BRAB study of slabs-on-ground which treated structurally related problems dates to 1955, and the series of reports leading to this document, from September 1957. The basis for this latter series is presented under the problem statement above. An Interim Report was published in March 1959 to allow time for comment and further research and field study, and a final report was published in September 1962.

This first revision of the 1962 final report incorporates further information developed through field study particularly in expansive soil areas, information developed by FHA and presented to the Committee, and new procedures for treating slabs on compressible soils.

3.2 Need for This Study

The long and extensive efforts discussed above made it abundantly apparent that economy and serviceability can be designed into a slab in an acceptable manner only by considering the total effect of soil, slab, and superstructure in a single complex relationship. This means there likely will always be the need to refine procedures for determining the variables, relating the influence of each to the others, and providing a method for the final selection or design of the slab—particularly if there is to be continued latitude for the introduction and analysis of innovations under stable as well as unstable soil conditions.

3.3 Study Scope

This report deals only with slab-on-ground construction for light residential structures. It provides recommendations which, it is believed, will assure sound residential slabs by defining the conditions and appropriate limitations of use in accordance with the variables encountered. Included are the dimensions to which a heated or unheated slab may be constructed without reinforcement and yet avoid harmful cracking due to shrinkage and temperature change; the amounts of reinforcement required for slabs of greater length; the structural requirements of slabs which are to be placed on expansive or compressible soil; and, lastly, the research needed to fill remaining known gaps in knowledge concerning influences upon and means of achieving satisfactory residential-slab performance at the most reasonable price possible.

3.4 Study Limitations

This report, and the recommendations contained herein, have been limited to providing assurance of satisfactory performance of slabs-on-ground to be used for the habitable portions of houses, and not for drives, garages or carports, basements, or other appurtenances. When other matters are treated in this report, consideration is limited strictly to their influence on the overall design of the house slab. Thus, such closely allied subjects as thermal insulation, vapor barriers, termite and decay protection, etc., while recognized as important to slab performance, are commented on only as they influence the design of the slab per se.[1]

4.0 USE OF THIS REPORT

This report provides, in a systematic manner, recommended criteria necessary for the selection of the appropriate slab type for each type of foundation soil and geographic location. It also provides recommended design criteria and construction requirements for each type of slab as it relates to the type of superstructure construction involved.

Analysis has shown that four basic slab types will serve most functional needs, as well as needs imposed by the different soil and climatic conditions likely to be encountered. These are designated as:

Type I: Unreinforced
Type II: Lightly reinforced against shrinkage and temperature cracking
Type III: Reinforced and stiffened
Type IV: Structural (not directly supported on the ground).

[1]Building Research Advisory Board, National Academy of Sciences - National Research Council publications concerning slab-on-ground construction include:

No. 1077 Design Criteria for Residential Slabs-On-Ground, Final Report. 1962.

No. 838 Ducts Encased in and under Concrete Slabs-On-Ground. 1961.

No. 707 Protection from Moisture for Slab-On-Ground Construction and Habitable Spaces below Grade. 1959.

No. 657 Interim Report—Design Criteria for Residential Slabs-On-Ground. 1959.

No. 596 Effectiveness of Concrete Admixtures in Controlling Transmission of Moisture Through Slabs-On-Ground. 1958.

No. 445 Vapor-Barrier Materials for Use with Slab-On-Ground Construction and as Ground Cover in Crawl Spaces. 1960.

No. 448-A Protection Against Decay and Termites in Residential Construction, and Addendum. 1958.

No. 385 Slab-On-Ground Construction for Residences. 1955.

Once the site characteristics have been ascertained and type of superstructure construction (frame, masonry, etc.) of a residence has been set, slab type selection and/or design for Types I, II, and III proceeds, in terms of soil properties and climate conditions, as follows:

a. In the great majority of cases, a slab of Type I or II will be found satisfactory. Such slabs are the least expensive and are, generally speaking, simple to construct. Performance depends more on quality control than on design; hence, a set of standards and specifications is recommended for such slabs. Here the effort has been to select slab types developed in practice and used with success, and principally needing codification and limitation on use.

b. In instances where Type III slabs become necessary because of poor soil conditions or a climate which produces alternating periods of drought and excessive soil moisture, the successful performance of the slab depends equally on design and quality control.

For Type III slabs, design criteria and guides to their use are recommended. In terms of the type of superstructure construction (frame, masonry, etc.), a maximum allowable differential slab movement is accepted. Then a procedure is followed for determination, in terms of the severity of soil and climatic conditions, of the area over which the slab can reasonably be expected to have effective support. In areas of more severe climate, a stiffer and stronger slab will be required, i.e., one which will not exceed the maximum allowable differential settlement even if supported over only a reduced portion of its area.

Following the determination of allowable deflection (differential movement or settlement) and support conditions, the dimensioning (for stiffness) and reinforcing (for strength) of the slab are determined through an empirical design procedure which is derived and presented in detail.

Only one slab configuration is used—the waffle slab with which there has been most experience and which, therefore, is most in need of attention.

c. For those rare cases where Type IV slabs become necessary, it is recommended that they be designed in accordance with the most recent ACI code. Such slabs are not supported on the soil but on piles, piers, footings, or similar supports, and are, therefore, normal structural slabs. Since design would conform to the structural-design procedures covered by the ACI code, there is no reason for a design presentation here.

Thus the designer, with the aid of this report—given the soil properties, climatic conditions, and superstructure construction—can determine the type of slab appropriate for use, execute a reasonable design where necessary, and provide needed materials and construction specifications.

Finally, nothing contained in this report should be construed to militate against the introduction or use of either existing or newly devised slab types or precedures. However, such variances will need to be evaluated in light of the recommendations presented herein (see also pp. 10 and 22).

II

CONCLUSIONS AND RECOMMENDATIONS

The recommendations which follow are, in the opinion of the Committee, based on the best information and engineering judgment available concerning the problems posed, for use until such time as additional research and experience data indicate the need for further revision.

The Advisory Committee has developed procedures for selection and specification, or, when necessary, design of given slab types. These, it believes, constitute an engineering approach which is as rigorous as current knowledge will permit. It is recognized that experience and the state of engineering knowledge are such that precise answers to many of the problems posed must of necessity be considered beyond attainment in the immediate foreseeable future. Nevertheless, the approach recommended herein is considered to be sufficiently valid to warrant application now.

For the future, the Committee has developed and recommends a program of research which it believes will provide much of the data needed for the ultimate solution of the problems under study. To permit future refinement of the approach developed, the Committee recommends that FHA implement and/or encourage others to implement these research recommendations. As data are developed which can provide a valid basis for further revision, the Committee requests that opportunity be provided for appropriate revision of recommendations.

Many variables affecting finished-slab performance must be considered when selecting a slab type and when specifying or executing a slab design. As stated in the Introduction, to aid in the selection of a slab type, the Committee has delineated four major types which it believes provide a range adequate for all combinations of variables that may occur. As previously indicated, these are

Type I: Unreinforced
Type II: Lightly reinforced against shrinkage and temperature cracking
Type III: Reinforced and stiffened
Type IV: Structural (not directly supported on ground).

The Committee recommends the procedure below (para. 1.1) for the selection of slab type and for materials specification or slab design. Use of these procedures of course should be tempered throughout with engineering judgment and experience, and, again, nothing said here should be construed to imply that FHA should not consider innovations in either slab design or analytical procedures which may be offered as alternatives, as long as the basic principles stated herein are satisfied.

1.0 SLAB SELECTION AND/OR DESIGN PROCEDURE

1.1 Selection of Slab Type

Step 1 — Conduct a soil investigation of the building site to determine:

a. Types of soil on the site
b. Thickness and distribution of each type of soil
c. Consistency of clay soils and density of granular soils.

Unless competent engineering advice is offered to the contrary—such as may be derived from documented soil histories of the area, or, in the case of large developments, a full site investigation—at least one test boring should be performed per slab site. When this boring reveals unusual conditions, such as the presence of organic soils, soft or loose soils, highly plastic soils, or rock, additional borings are recommended as necessary. These borings can be made with simple tools and should extend at least 15 feet below existing ground or below the bottom of the slab (whichever has a lower elevation), or to solid rock. A record of soil classification, depth, and moisture content should be kept. Where CL, OL, CH, or OH soils are encountered, the unconfined compressive strength (q_u) should also be obtained by laboratory testing, unless q_u obviously exceeds 7.5w (Step 2a, p. 15).

Step 2 — Determine, from the map of Fig. 1, p. 38, the climatic rating (C_w) for the area within which the building site is located.

Step 3 — Determine, from Table I, below, the slab type recommended for each soil type on the building site, i.e., Type I, II, III, or IV.

TABLE I Slab-Type Recommendations Based on Soil and Climatic Conditions

Soil Type[1]	Minimum Density[2] or PI or q_u	Climatic Rating[3]	Recommended Slab Type[4]
GW, GP	All Densities	All	I
GM, GC, SW, SP, SM, SC, ML, MH	Dense or medium dense	All	I
GM, GC, SW, SP, SM, SC, ML, MH	Loose	All	II[5]
CL, OL, CH, OH	PI < 15 and $q_u/w \geq 7.5$	All	II
	PI > 15 and $q_u/w \geq 7.5$	$c_w \geq 45$	II
		$c_w < 45$	III
	$7.5 > q_u/w > 2.5$	All	III
	$q_u/w < 2.5$	All	IV
Pt	All	All	IV

[1]As classified under the Unified Soil Classification System (Appendix D, p. 289).
[2]Unconfined compression strength of undisturbed sample.
[3]From Fig. 1, p. 38.
[4]Minimum requirement believed adequate for particular condition.
[5]Type I slab may be used if soil is densified by compaction to its entire depth before placement of concrete slab.

Subsequent procedure for each type appears below.

1.2 Procedure When Type I Is Recommended

If a Type I slab is recommended for all soils found on the site, proceed as follows:

Step 1 — Determine whether heating coils or ducts are to be embedded in the slab. Heating coils should not be embedded in Type I slabs. Heating ducts, however, may be used provided the slab over the duct is reinforced for 19 inches on either side of its long axis (or to the slab edge if closer) with 6 x 6 - 10/10 Welded Wire Fabric (WWF) reinforcement.

Step 2 — Determine slab dimensions. If the maximum dimension is greater than 32 feet, divide the slab into squares or rectangles using weakened plane joints (4.5, p. 41), each with maximum dimensions not exceeding 32 feet (the maximum dimension meaning the longest side of a rectangular unit); or use a Type II slab.

Step 3 — Determine the location and weight per lineal foot of partitions. Type I slabs cannot accommodate partition loads over 500 plf. If partition loads are greater than 500 plf, they should be supported on separate foundations and isolated from the slab, as shown in Fig. 3, p. 42.

Step 4 — Determine extent and size of openings in the slab, and provide 6 x 6 - 10/10 WWF reinforcement for 25 inches around all openings 12 inches or more in width.

Step 5 — Provide weakened plane joints at the junction of irregular shapes to divide the slab into squares or rectangles with maximum dimensions not greater than 32 feet.

Step 6 — Determine whether the top surface of the slab will contain irregularities in its horizontal plane. Where the vertical difference is 1-1/2 inches or less, as for bathrooms, the uniform 4-inch slab thickness should be maintained by tapering the underside of the higher slab plane, beginning 24 inches away from the vertical displacement. For vertical differences greater than 1-1/2 inches, the slab thickness should be maintained and, in addition, the irregularity should be reinforced for 25 inches on either side with 6 x 6 - 6/6 WWF reinforcement.

Step 7 — Determine the location and amount of concentrated loads, such as those of chimneys. These loads should be supported on independent footings which rest on suitable unyielding foundation soil, and should be independent of the slab (Fig. 3, p. 42). These footings should be designed in accordance with ACI Building Code Requirements[1] for footings, using the same bearing pressure as for other foundations of the residence.

Step 8 — Determine the number of weakened plane joints required by Steps 2 and 5 above. Locate these joints, preferably under partitions or like elements, where the resulting crack will be least objectionable. Where reinforcement is to be provided for other reasons, it should not be carried across the joint; instead, provide a properly designed joint in the feature requiring reinforcement, or locate the weakened plane joint where it will not cross the reinforcement.

Step 9 — Determine the degree of compaction needed over the entire slab site (Fig. 22, p. 128).

1.3 Procedure When Type II Is Recommended

If a Type II slab is recommended, determine the depth of the soil needing this type of slab. Where this soil is underlain by soils suitable to Type I slabs to at least 10 feet, or to rock, consideration may be given to removing the unsuitable soil and replacing it with a suitable nonplastic fill material properly placed, so that a Type I slab can be used. If this is not feasible or desirable, proceed as follows:

Step 1 — Determine the maximum dimension of the slab between design joints. Provide minimum reinforcement midway in the slab as follows:

0 to 45 feet—not less than 6x6 - 10/10 WWF
45 to 60 feet—not less than 6x6 - 8/8 WWF
60 to 75 feet—not less than 6x6 - 6/6 WWF.

Step 2 — Determine the location and weight per lineal foot of partitions. Type II slabs cannot accommodate partition loads over 500 plf without additional reinforcement. If partition loads are

[1]Appendix C, Reference 1 (or later edition, if any).

greater than 500 plf, an additional layer of WWF reinforcement is required for the full length of the partition and extending 25 inches on either side.

Step 3 — Determine extent and size of openings in the slab. Provide an additional layer of 6x6 - 6/6 WWF reinforcement for 25 inches around all openings 12 inches or more in width.

Step 4 — Determine the location and amounts of concentrated loads such as those of chimneys. These loads should be supported on independent footings which rest on suitable unyielding foundation soil and should be independent of the slab (Fig. 3, p. 42). These footings should be designed in accordance with ACI Building Code Requirements for footings using the same bearing pressure as for other foundations of the residence.

Step 5 — Determine whether the top surface of the slab will contain irregularities in its horizontal plane. Where the vertical difference is 1-1/2 inches or less, as for bathrooms, the uniform 4-inch slab thickness should be maintained by tapering the underside of the higher slab plane, beginning 24 inches away from the vertical displacement. For vertical differences greater than 1-1/2 inches, the slab thickness should be maintained and, in addition, the irregularity should be reinforced for 25 inches on either side with an additional layer of 6x6 - 6/6 WWF reinforcement.

Step 6 — Determine degree of compaction needed over the entire site (Fig. 22, p. 128).

1.4 Procedure When Type III Is Recommended

Investigate the possibility of removing the soil (to a depth of at least 15 feet) which requires the use of a Type III slab and replacing it with a soil of better consistency so that a slab of Type II or Type I can be used. If this is not feasible or desirable, proceed as follows:

Step 1 — Estimate the total average dead and live load on the slab.

a. Estimate the per-square-foot dead load (w_d) of the slab itself from the empirical formula

$$w_d = (2L + 30) \text{ psf}$$

where L is the long side of the rectangular slab in feet.

b. Compute the total superstructure load (w_s), allowing for a live load of 30 psf of floor area and 10 psf of roof area, and introducing all superstructure dead loads with their true values.

c. Set average total load ($w = w_d + w_s$).

Step 2 — On the slab site, determine the following parameters:

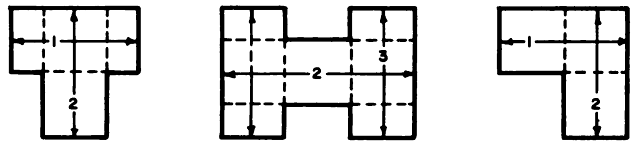
a. The lowest unconfined compressive strength (q_u) obtained from undisturbed samples within the top 15 feet of soil immediately below the lowest point of the slab. (If q_u obviously exceeds 7.5 times the average dead and live load (w) on the slab, its determination is not necessary. However, verify that $q_u/w \geq 2.5$, because if $q_u/w < 2.5$, a Type IV slab will be necessary—Table I, p. 11.)

b. The plasticity index (PI), which is taken equal to the effective PI determined as specified in para. 7.8.1a, p. 65. (If, instead of PI, the PVC meter reading or percentage swell of the soil is used to evaluate sensitivity of soil to moisture change, then the effective value of the PVC meter reading or the percentage swell should be determined as specified in para. 7.8.1 b and c, p. 67.)

Step 3 — Determine from Fig. 6, p. 53, the support index (C) in terms of the climatic rating (C_w) obtained from the map of Fig. 1, p. 38, and the PI determined in Step 2b above. Wherever special field conditions prevent variations in soil moisture from being as severe as would otherwise be indicated by the climatic rating (C_w) for that given geographic locality, equate C to the modified support index (C_m) given by the empirical equation $C_m = 0.5\ (1 + C)$ of para. 7.4, pp. 54 and 56. In the case of compressible soils ($7.5 > q_u/w \geq 2.5$), equate C to the reduced support index (C_r) as determined in para. 7.5, p. 56. In computing the ratio q_u/w, use the tentative empirical value for w obtained as in Step 1a above.

Step 4 — Obtain from Table III, p. 50, the maximum allowable deflection ratio (Δ/L) for the contemplated type of superstructure.

Step 5 — Divide slabs of irregular shape into overlapping rectangles in such fashion that the resulting exterior boundary provides complete congruence with the slab perimeter—e.g.,



Then, design each of the derived composing rectangles as described below.[1]

If the support index (C), determined as in Step 3 above, is ≤ 0.9, proceed with Steps 6 through 12. If the support index (C), determined as in Step 3 above, is > 0.9, proceed with Steps 6a through 9a, 11a, and 12.

Step 6 — Determine the effective load ($\bar{w}$) along the long (L) and short (L′) dimensions of the slab, i.e.,

$$\bar{w} = w\,\varphi\,(1 - C) \text{ for L dimension}$$

$$\bar{w} = w(1 - C) \text{ for L}' \text{ dimension}$$

where $\varphi = 0.5$ or $1.4 - 0.4\,(L/L')$, whichever is greater.

Step 6a — Determine the effective load ($\bar{w}$) along the long (L) and short (L′) dimensions of the slab from the expressions

$$\bar{w} = 0.1\,w\,\varphi \text{ for L-dimension}$$

$$\bar{w} = 0.1\,w \text{ for L}'\text{-dimension}$$

where $\varphi = 0.5$ or $1.4 - 0.4(L/L')$, whichever is greater.

Step 7 — Select a layout for the stiffening beams. Beams should be spaced equidistant along each slab side, not to exceed a 15-foot clear spacing, and, preferably, a spacing between 9 and 12 feet. However, corresponding beams of overlapping rectangles of irregularly shaped slabs should coincide, even though some variation in spacing may result. In any event, the spacing of beams along any side should be kept as nearly equal as possible.

[1] See 5.0, pp. 21-22.

Step 7a — For the $\bar{w}$-values of Step 6a above, design for slab dimensions and reinforcement in accordance with Steps 7 through 9 (pp. 16-19), obtaining values of d, b_s, and A_s for beams both in the long (L) and short (L′) dimensions.

Step 8 — Select basic dimension. In cases where L/L′ exceeds 2, beams along the short dimension can be designed with smaller depth than in the long dimension, provided there are definite cost or construction advantages and design computations have been adjusted properly. Select a trial ratio (L/d) using the following rule of thumb:

For a $\bar{w}$ along the long dimension (L) < 25 psf, $L/d > 20$

For a $\bar{w}$ along the long dimension (L) ≥ 25 but < 50 psf, L/d = 17 to 20

For a $\bar{w}$ along the long dimension (L) ≥ 50 but < 150 psf, L/d = 14 to 18.

Select tentative design values for beam widths B and B′ (L and L′, respectively). Initial values for B and B′ may be taken as 8 inches. Beam widths preferably should not be less than 8 inches nor more than 14 inches.

Step 8a — Determine depth (d), width (b_s), bottom steel (A_s), and additional top steel (A_s') for each beam from the following relationships:

$$b_s = b_s \text{ (as determined in Step 7a)}$$

$$d = 2 \text{ in.} + 10(1 - C)(d - 2 \text{ in.})$$

$$A_s = 10(1 - C)A_s$$

$$A_s' = 10(1 - C)A_s - 0.65 \text{ in.}^2$$

where the values of d and A_s in the right-hand side of these expressions are obtained from the computations of Step 7a above.

Step 9 — When designing for steel (for slabs with $q_u/w \geq 7.5$):

a. Compute the depth ratio (ℓ/d) in the long and in the short direction of the slab, i.e., L/d and L′/d, respectively.

b. Compute the load index [$\bar{w}$ (ℓ'/b)] in the long and in the short direction of the slab, i.e., $\bar{w}$(L'/B) and $\bar{w}$(L/B'), respectively.

c. Determine the required steel ratios (p) for both long and short directions of the slab. Using the value of the load index [$\bar{w}$(ℓ'/b)], enter the appropriate graph, i.e., Fig. 14, 15, or 16, depending on the value of Δ/L for the slab under design. For this load index and the value of ℓ/d, determine the required steel ratios (p), first in the long direction in terms of $\bar{w}$(L'/B) and L/d, and then in the short direction in terms of $\bar{w}$(L/B') and L'/d. If the slab is supported on compressible soil ($2.5 < q_u/w < 7.5$), modify the design for steel reinforcement in accordance with 7.9.3, p. 91.

If the steel ratios (p) as obtained above correspond to a point above the "limiting line" or above the "shear line" (Fig. 14, 15, or 16), the tentative values for d, B, and B' adopted in Step 8 should be revised and the steel ratios determined for the revised values of d, B, and B'.

If the steel ratio (p) in either the long or the short direction is determined to be less than 0.3%, the mimimum percentage of steel (0.3%) should be used in computing required steel.

To optimize the design empirically, follow the guidelines provided under Step 9a and b, pp. 81-82.

d. Compute the cross-sectional area of steel required for the bottom of stiffening beams, from

$$A_s = pb_sd$$

using the p-value which corresponds to the direction of the beam under design.

Compute the cross-sectional area of the steel required for the top of each stiffening beam, from

$$A'_s = A_s - 0.65 \text{ in.}^2$$

e. Adjust for unequal beam spacing.

If, in the case of irregular slabs, the beams within a particular rectangular slab are not equidistant, adjust the steel computed as above to the unequal spacing of beams. Accomplish this by computing the average beam spacing; then increase the steel in beams spaced at a larger distance by an amount equal to the ratio of the true spacing over the average spacing. If the steel ratio (p) corresponding to a beam is located within 0.0015 of the v = 75 psi-curve (i.e., if the shear condition is almost critical), then, in adjusting the steel for spacing of beams, there must be an increase of both the steel and the width (b_s) of all those beams which are at more than average spacing. Otherwise, an increase of the steel alone will be sufficient.

f. Reinforcement of the top slab of Type III slabs should comprise: No. 3 bars each way at 12 inches on center (o.c.) if the maximum clear spacing between stiffening beams does not exceed 12 feet, and No. 3 bars at 10 inches o.c. each way in all bays when the clear spacing of stiffening beams exceeds 12 feet, irrespective of the direction of spacing.

Top slab thickness should be 4 inches. If this thickness is made 5 inches, the reinforcement can be reduced to No. 3 bars at 12 inches o.c. each way for all bays, irrespective of the spacing of stiffening beams.

g. The limitations of 7.10.2, p. 92, apply to reinforcing steel, beam stirrups for positioning longitudinal steel, and positioning of steel.

Step 9a — If the required bottom steel (A_s), as computed in Step 8a above, is smaller than 0.65 in.^{2}, then

a. There is no need for additional top reinforcement (A_s') and the computation for A_s' in Step 8 may be eliminated.

b. The top slab reinforcement can be reduced in each direction to $0.18A_s$ per foot of slab length. However, reinforcement cannot be less than that provided by bars placed at 12 inches o.c. If WWF is used, reinforcement can be further reduced to $0.15\ A_s$. In any case, this reduced top slab reinforcement should not be less than the WWF reinforcement specified for Type II slabs in Step 1 of para. 1.3, pp 13-14.

Step 10 — Check dead weight of the designed slab. If it deviates from the estimated dead load (w_d) by an amount which alters the total slab and superstructure load (w) by more than 5%, adjust the design for the actual slab dead weight and redesign.

Step 11 — Structurally design those slab bays between stiffening beams which receive concentrated or unduly heavy loads (para. 4.7).

Step 11a — Apply Steps 2, 4, and 5 for Type II slabs (para. 1.3, pp. 13-14) to provide for unduly heavy partition loads (Step 2), significant concentrated loads (Step 4), or irregularities in slab surface (Step 5) whenever such conditions prevail.

Step 12 — Provide for uniform compaction over the entire slab site, in accordance with Fig. 22, p. 128.

1.5 Procedure When Type IV Is Recommended

If a slab of Type IV is recommended, the ACI Building Code Requirements should be used for all Reinforced Concrete design associated with this construction.

2.0 HEATED AND UNHEATED SLABS

Only unheated slabs should be constructed without reinforcement, and then only on suitable soils. Since heated slabs will be subjected to stresses which are conducive to excessive and objectionable cracking, a residential slab which is to be heated by the inclusion of coils should be provided with minimum reinforcement as follows:

0 to 45 feet—not less than 6x6 - 10/10 WWF
45 to 60 feet—not less than 6x6 - 8/8 WWF
60 to 75 feet—not less than 6x6 - 6/6 WWF.

Also, when heating ducts are to be embedded in or placed under the slab, the slab over the duct and extending for 19 inches on either side of the long axis of the duct (or to the slab edge if closer) should be reinforced with not less than 6x6 - 6/6 WWF reinforcement. Further, heating coils and ducts should be encased in not less than 2 inches of concrete.

3.0 NONRECTANGULAR SLABS

Certain special situations also require that slabs be reinforced. When slabs are of irregular shape, or where soil conditions are less adequate than for a Type I slab, or where other conditions for Type I slabs are not met, the slab should be provided with reinforcement in accordance with para. 2.0, above, as a minimum. Where Type I and II slabs have irregular outlines, as in the case of T- or L-shaped plans, these should be divided into squares or rectangles by the use of weakened plane joints. In Type II slabs, the WWF reinforcement should be continuous through the weakened plane joint. In Type I slabs, however, 25-inch-wide WWF strips should be placed at each side but not carried across the weakened plane joint making the division. In fact, regardless of the reason for using WWF reinforcement in Type I slabs, it should never be carried across weakened plane joints. Whenever ducts or partitions pass through or over a weakened plane joint, a properly designed joint should be provided in the duct or partition.

4.0 SLABS ON UNSTABLE SOILS

Expansive soils should not be singled out as the only problem area in residential slab construction. While it is recognized that the more readily apparent problems occur with these soils, all soils require and should receive careful consideration and evaluation, including compressible and poorly compacted soils. The criteria of 1.0 above provide for proper slab application on unstable soils consistent with present knowledge.

5.0 SLABS OF UNUSUAL CONFIGURATION

It is not possible to evolve simplified slab design methods such as are presented herein, which will permit resolution of all problems which might be encountered in residential construction.

For example, the irregular slab configurations shown under Step 5, pp. 15-16, are but a few of those which are possible. It must recognized that, by designing of overlapping slab rectangles, full consideration will not be given the added and often eccentric loads that will be applied by virtue of upward or downward pressure on those portions of rectangles which do not actually overlap. Therefore, even though consideration has been given for general conditions in the design method recommended, i.e., modest areas of "no overlaps," when these areas of "no overlap" are large and/or eccentricities are pronounced, special care will be needed lest underdesign result.

Also, where a planned carport will constitute an actual extension of the residence, the carport slab should either be considered to be integral with the house slab and the total slab designed, or be designed and constructed as an independent slab with proper construction joints to permit movement between the two slabs and superstructures at all points of juncture. If an unbroken roof line is desired, the former solution would add significantly to cost, whereas the latter would be virtually impossible to achieve. If the carport is to have perimeter walls which can be made, in conjunction with house walls, to impart rigidity to the entire house-plus-carport slab, it may well be possible to achieve a design which would simply necessitate extending same-size beams from house to carport. However, any such solution would need to flow from a careful analysis. Such specialized analyses are beyond the scope of this report.

As stated on pp. 9-10, it is the basic principles set forth herein which should be satisfied. The absence of coverage of all conceivable problems neither invalidates the approach recommended nor does it imply adequacy when actual conditions obviously strain the credibility of the design methods presented.

6.0 QUALITY CONTROL PRACTICES

Design alone cannot ensure satisfactory performance of residential slabs-on-ground. Quality control practices are a necessary adjunct to any overall procedure for ensuring satisfactory slab performance. These practices, as outlined in Part B, should be considered as guides for use in conjunction with the design procedure recommended above.

III

RESEARCH RECOMMENDATIONS

1.0 GENERAL

Obtaining basic information necessary to assure economical and sound slab-on-ground construction entails: acquiring fundamental knowledge; conducting field investigations; performing laboratory investigations directed toward correlating fundamental knowledge and field data; developing practical methods of applying the knowledge gained and discoveries made.

In the field of residential construction, potential difficulties, which develop from irregular distribution of loads and unstable soil conditions, are often ignored because of the relatively light loads involved. While much work has been done in the field of residential construction, it has hitherto been primarily concerned with solving current problems rather than developing basic data.

The recommendations contained and discussed herein represent an effort to direct attention to a research program designed to produce needed data.

2.0 SOILS RESEARCH

2.1 Investigation of Granular Mats or Stabilized Soil Mats

A study should be conducted of the effectiveness of granular mats or soil-cement, soil-lime, or other chemically stabilized soil mats, in minimizing differential settlements and maintaining a more constant moisture content in soil under residential slabs-on-ground. Mats of various thicknesses and gradations should be investigated through full-scale studies in the field; these should extend over periods of time long enough for test houses to undergo several cycles of seasonal wetting and drying, in order properly to evaluate results, and to demonstrate the nature and extent of the inherent advantages of various types of mat.

2.2 Soil/Moisture Relationships

A basic laboratory investigation should be undertaken to determine the physicochemical relationship between soil and water. Only when this relationship is understood can problems in such areas as volume change, swelling pressures, thermal osmosis, and stabilization be studied with reasonable assurance of success. Such an investigation would undoubtedly be a long-term project. Support of existing research in this area is preferable to initiation of new studies.

2.3 Swelling Properties of Clay Soils

The nature of volume change of clay soils needs to be better understood. Specifically needed are means of predicting the amount and rate of such change as they affect both slab design and performance. The PVC meter has been of great help, yet further laboratory and field investigations are needed, to evolve even better and more economical methods of determining whether a particular soil will swell, the amount of swell that can be expected, and whether, under specific climatic conditions, detrimental movement is likely to result. It would provide information relevant to the C-factors shown in Fig. 6, p. 53 of this report, and would permit a realistic adjustment of these factors. Data obtained from the research recommended under 2.2 above would greatly assist investigators in this area.

2.4 Stabilization of Soils for Residential Construction

A panel of experts in soil stabilization should periodically review all investigations under way for stabilizing soils for highway and airport construction, in order to determine which may be applicable to residential construction. The panel should maintain a recommended research program outline incorporating any laboratory and field investigations offering promise of success with residential slabs-on-ground.

2.5 Identification of Problem Soil Areas

A field investigation should be made to locate and map swelling soils in areas of current and likely residential construction. Such mapping should include plasticity indices and the effect on these soils of local long-range climatic variations.

3.0 SLAB RESEARCH

Closely associated with the matter of volume change in soil is the ability of a slab to accommodate these changes. Present hypotheses are less than entirely satisfactory. While much is known about the properties of concrete and reinforcement, the available information is primarily related to heavier construction and loadings; little factual knowledge is available concerning the performance of thin, lightly loaded concrete slabs.

3.1 Field Investigation

Field investigation of both cracked and uncracked slabs should continue. Careful observation of actual performance should be made in relation to site conditions; this could be expected to provide valuable data with which to refine slab design procedures. The amount of deflection in slabs should be noted, along with the apparent effect on other portions of the house, in order to establish limits which will result in minimizing damage.

3.2 Cracking of Slabs

A study should be made of the number and width of cracks which may occur in fabric-reinforced and unreinforced 4-inch slabs of various lengths from 20 to 75 feet and concrete of various qualities, when the slab is placed on soils offering varying degrees of resistance to slab shrinkage. In each instance, a control slab should be used which is subjected to as near zero resistance as can be obtained. It is suggested that the Portland Cement Association be requested to undertake this study as a service to the public and the industry.

3.3 Effect of Partition Loads on Unreinforced Slabs

An investigation should be made of the effect of partition loads on the expansion and contraction of unreinforced slabs which are placed on various soils and exposed to anticipated temperature ranges.

3.4 Maximum Deformation of Unreinforced Slabs

Research should be conducted to determine the amount of deflection that unreinforced slabs can accommodate without serious cracking. This investigation, starting with uniform contact provided over the entire slab area, should entail inducing differential settlements slowly and in increments until cracks appear—the total investigation procedure and results being related to the creep characteristics of concrete. It is suggested that the Portland Cement Association might wish to undertake this investigation in conjunction with Research Recommendation 3.2 above.

3.5 Effective Stiffness of Stiffened Slabs

Research is needed to determine the effective stiffness of reinforced rib-stiffened slabs for ribs of various sizes and spacings, and for different steel ratios. Such research should produce data of use in refining the basic assumptions made in this report for stiffened slabs.

3.6 Effect of Slab Stiffness on Superstructure

Studies should be made which relate the effect of various degrees of flexural and torsional stiffness on the superstructure. Controlled test models should be carefully instrumented and subjected to various degrees and distributions of reactive forces from below, and the measured stresses and deflections should be compared with the theoretically based design calculations.

3.7 Controlled Design and Construction

A long-range program of controlled construction and periodic observation of slabs under actual use conditions should be undertaken. Slabs should be progressively designed toward failure. Careful control and recording of critical data will be necessary so that a rational analysis can be made. It is envisioned that a program of this kind will require the cooperation of builders and homeowners, with provision for relieving the homeowners of any resulting financial loss.

3.8 Investigation of Other Stiffened-Slab Designs

Various stiffened-slab cross sections should be investigated. Such designs as Hollow Box, Inverted Pyramid, and X-Keel deserve consideration for application on the more unstable soils. It appears possible that these slab types could be substituted for structural slabs, if economic advantages can be demonstrated and design procedures established. On the basis of preliminary investigations which have already been conducted, it can be anticipated that substantial expenditures of time and money will be required for such work.

3.9 Investigation of Prestressed and Precast Slabs

Prestressed concrete, whether pretensioned or posttensioned, and precast concrete slabs-on-ground offer many potential advantages for use in residential construction. The value of these potential advantages cannot be assessed until many questions relating to placement techniques and procedures, quality control, exposure to the elements and time can be fully investigated. This is particularly true in regard to posttensioned concrete and precast concrete. Thorough investigation should be encouraged and pursued as a necessary prerequisite to any large-scale adoption of such slabs and before efforts to devise standard design criteria and procedures are initiated. Some field use of posttensioned slabs is currently in progress; this work should be followed closely and experience data obtained.

Use of lightweight aggregates and nylon tendons for prestressed concrete should also be given consideration in any research program relating to use of prestressed concrete for residential slabs-on-ground.

4.0 PRIORITY

Because the objective is to develop a rigorous design procedure for residential slabs-on-ground, it is worth pointing out that the recommendation under 3.1, pp. 25-26, Field Investigation (of actual performance), is most apt to produce immediately useful results at least cost. Therefore, priorities should be set up with this consideration in mind. Some work has already been done as a result of this recommendation appearing in earlier editions of this report—more is needed.

IV

SUPPLEMENTARY INFORMATION

The basic premise underlying the conclusions and recommendations of this report is that residential slabs-on-ground cannot be considered nor designed as an entity, separate from natural and man-made surroundings. If maximum economy and performance are to be realized, slab design should be interrelated with site conditions, type of superstructure, and quality control in erection. Sites with sensitive soils subject to volume changes, and sites in areas where climatic conditions develop great variance in soil moisture, make necessary the use of stiffer and stronger slabs than sites with less sensitive soils and steadier climate. Slabs which do not support walls and load-bearing partitions can be allowed to have larger differential settlements than slabs which do. Also, the required rigidity of a slab depends directly on the type of superstructure carried, i.e., the more unyielding the superstructure, the less differential slab settlement can be accommodated without damage to the superstructure. Finally, the performance of the slab, in accordance with the conditions provided by its design and/or specifications, will depend greatly upon the quality of materials used.

In the pages which follow, factors which influence slabs-on-ground performance are analyzed and procedures are set forth for the systematic introduction of these parameters into the selection and specification or design of specific slab types. Background information related to these parameters, especially fundamental information on soil behavior and quality control, appears at the end of this report, which it can be referred to without causing discontinuities in the presentation of the analytical and design procedures. All this information is intended to amplify and clarify the recommendations set forth in Section II.

PART A: Selection and Design of Slabs

1.0 FUNCTIONS OF SLABS-ON-GROUND

Slabs-on-ground constitute an element of residential construction performing in at least the first and frequently both of the following two capacities: as a separating element between the ground and habitable space; as a structural element receiving part or all of the loads of and on the superstructure and transmitting such loads to the foundation soil. While slabs-on-ground act in the former capacity at all times, the degree to which they function in the latter capacity depends upon engineering definition.

Wherever a slab-on-ground acts simply as a separator between living space and ground, it carries no load-bearing or large load-producing elements of the superstructure. In this case, satisfactory performance may be defined to include no unsightly cracks, and no large differential settlements which may be functionally or aesthetically objectionable, such as a noticeable "out-of-plumb" condition affecting trafficability or equipment and building elements supported on the slab, an exposure of the foundation, and/or an effect upon the performance of any mechanical/electrical services which pass through the slab. Such a slab, however, can, with proper details, be allowed to settle to some degree without detriment either to structure, services, or aesthetic considerations.

Wherever a slab also acts as a structural element, transferring the substantive superstructure loads to the foundation soil, of necessity it must be able to do so satisfactorily. In this case, the differential settlement of the slab, unless confined within prescribed limits, may have critical consequences for the superstructure—for example, if a wall is supported on a slab which settles unevenly, it may rack or crack. Therefore, a slab which receives superstructure loads should be made stiff enough to support such loads without excessive deflection or uneven settlements; this requires that it behave as nearly as necessary like a monolithic rigid body which, if it should settle, will do so uniformly.

Stating these two situations in another way, slabs to be treated solely as separators must be founded on firm ground and soil not subject to substantial changes in volume as a result of changes in water or moisture content. The separate structural supports must similarly be well founded. In those areas where either or both are not possible, slabs may as well be made monolithic with the foundation and thus act both as separators and as receivers of all imposed loads for transmittal to the ground.

Even though those instances where a structural or monolithic slab and foundation system will be needed are limited in number, they are the most demanding of attention and design effort. This circumstance is reflected in this report in the disproportionately large number of pages devoted to the analysis and design of slabs which act both as separators and as structural elements, even though the need for such slabs is limited to a small percentage of all residential construction in the nation.

2.0 FUNDAMENTAL FACTORS OF SLAB DESIGN AND CONSTRUCTION

The design of slabs-on-ground consists of three basic operations, namely:

a. Selection of slab type to be used

b. Dimensioning the slab (layout)

c. Reinforcing the slab (wherever necessary).

To perform these operations successfully under a specific set of conditions, the designer must analyze many factors which directly or indirectly influence his decisions. Those assuming dominant importance in the great majority of cases are:

a. Soil properties of the ground on which the slab is to be supported

b. Climate at the building site

c. Type of superstructure (for slabs which transmit superstructure loads to the foundation)

d. Quality control in materials use and in construction.

These four principal factors are, for this report, the bases on which procedures are developed for selection, and specification or design, of slabs-on-ground. The first three (soil, climate, and superstructure) are presented and analyzed below, in relation to slab selection, and specification or design; the fourth and equally important factor of quality control will be presented independently in Part B of this section.

3.0 SELECTION OF SLAB TYPE

The slab appropriate to any given set of conditions should be adequate in terms of performance and economy. Below is a description of each of the four types, under one or another of which almost all slabs encountered in practice can be classified. Selection of the appropriate type to be applied in each case depends on only two of the four fundamental factors—soil and climate. The impact of these factors on slab-type selection is analyzed following the descriptions.

3.1 Types of Slab-On-Ground

3.1.1 Slab Type I

This 4-inch-thick slab, intended for use on firm ground which will develop no change in volume with time, is cast directly on a properly prepared building site and slab base and carries no reinforcement over its entire area. Its use is limited to that of separator between ground and living space. Its maximum dimensions are limited by the need to avoid shrinkage cracking. Successful performance depends on compliance with a set of specifications.

3.1.2 Slab Type II

Also limited to the function of separating ground from living space, this 4-inch-thick slab, which may be of larger dimension than Type I, is applicable to ground which may undergo small movements (shrinkage and expansion) with weather changes and under loading. To withstand these small movements as well as to accommodate the stresses of drying shrinkage and thermal change without serious damage, it is provided with light reinforcement. Successful performance depends on compliance with a set of specifications.

3.1.3 Slab Type III

Unlike Types I and II, this slab receives and transmits all superstructure loads to the foundation soil. It is used with soils which in all likelihood will undergo substantial volume change with time. Use of spread footings for the foundation is not advisable on such ground; therefore, loads are distributed by the slab over its entire ground-support area. This reduces the bearing stresses on the ground and also forces the foundation, the slab, and the superstructure to act as a monolithic structure (somewhat like a rigid boulder in a soft mass of ground). To assure that the slab will actually behave in this manner, the designer must impart to the slab the necessary rigidity and strength. Hence, slabs of this type need to be carefully analyzed and designed so that dimensions (for stiffness) and reinforcement (for strength) will be accurately determined and provided.

3.1.4 Slab Type IV

This slab also receives and transmits all superstructure loads to the foundation soil. Unlike Type III, however, this slab does not itself rest on the ground. Rather, it is supported on beams which are in turn carried by caissons, piles, footings, or similar special foundations carrying the loads to solid ground well below the level of the slab. It is used on very poor soils which are extremely sensitive to weather, have negligible bearing capacity, or are high in organic-materials content. This type is designed in the same manner as structural floor slabs of concrete, in accordance with the ACI code.

Each of the four types discussed above is considered minimal for the condition described. Obviously, a slab type of greater capability can be selected—e.g., Type II instead of Type I; however, any decision in this respect should be predicated on the desire to improve quality of performance within predetermined economic limits.

3.2 Soil Investigation

The importance of determining the nature and properties of the soil on the site where a residential slab is to be used cannot be overemphasized; proper identification of the foundation soil is a critical factor in slab selection.

For purposes of this report, the Unified Soil Classification System has been adopted.[1] Details and specifics relating to soils are provided in Part C of this section; here, only the basic specifications on minimum requirements for soil investigation are given.

Unless competent engineering advice indicates otherwise (see also Step 1, p. 10), it is advisable to perform at least one test boring on each slab site. When the boring reveals unusual conditions, such as organic soils, soft or loose soils, highly plastic soils, or rock, additional borings should be made. These test borings can be made with simple tools, the important thing being to determine soil types and extent of each to a depth of at least 15 feet, or to a solid layer of rock.[2] A record of the class of soil, its depth, consistency, and moisture content should be kept. Where CL, OL, CH, or OH soils are encountered, it is also necessary, for the appropriate selection of slab type, to determine the unconfined compressive strength (q_u). It may be helpful in the site investigation to examine existing residences in the immediate area, but it must first be determined that the same conditions prevail with respect to soil type, topography, and construction type; also, that the existing structures examined are old enough to have experienced the design range of climatic variations likely to occur in the area.

3.3 Climatic Rating

Along with soil classification, climate is the other important factor in the selection of slab type. Climate affects the behavior of a slab-on-ground primarily through changes in the moisture content of the soil underlying the slab. If there are wide variations in the amount of moisture in the supporting soil, and if this soil is water-content sensitive, expanding as it absorbs water and shrinking with its loss, then the slab is subjected to a sequence of uplift (as the soil swells)

[1]See Appendix D, p. 289.

[2]Bucket augers or helical-blade augers are usually satisfactory, since pieces of undisturbed soil can often be obtained.

and settling (as the soil shrinks). Whenever a time of high water content is followed by drought, the moisture at and beneath the perimeter of the slab will generally evaporate much more rapidly than that under its center, where it is trapped and sealed from direct exposure. Moisture will often remain under the slab center even after extended periods of drought (one year or several years), and/or accumulate there due to capillary action as well as migration, even though the soil around the periphery has dried to a considerable depth. A similar but opposite phenomenon develops when the ground moves from low to high moisture content. Particularly if prolonged periods of alternating drought and wetting occur, considerable difference in moisture content can develop between one and another of the various points underlying a slab. If the soil happens to be such that substantial change in volume will occur with change in moisture content, one of the following two conditions may ensue:

a. If the slab is relatively flexible, it will follow the uneven contour of the soil which will result from the uneven change of volume; the superstructure, if it rests on the slab, then will be exposed to distortions which may cause damage.

b. If the slab is sufficiently rigid, it will refuse to follow the uneven contour of the ground. As a result, higher soil pressure will develop on the slab over the high plateaus, with greatly reduced pressure over the valleys. The slab will be subjected to bending as it endeavors to accommodate to the uneven contour, and the soil may deform in areas of high bearing pressure, transferring load to adjoining areas. If the slab carries the superstructure, the latter thus will be provided protection against damage.

Obviously, it is difficult to assign exact values to the amount of precipitation, its variation in occurrence, or its effect on soil underlying slabs-on-ground. The important consideration is whether or not climatic conditions will be likely to change the moisture content of the soil during and after construction. Involved may be such matters as freezing, which, in some soils, will cause volume change through the formation of ice lenses; or the presence of trees and shrubbery in the immediate proximity of the slab perimeter, which will affect soil moisture content by providing a shield from natural precipitation and by extracting moisture during growth.

Studies of weather data disclose at least five variables affecting consistency of climate. They are:

a. Yearly annual precipitation

b. Degree of uniformity through the year in distribution of precipitation

c. Number of times precipitation occurs

d. Duration of each occurrence

e. Amount of precipitation at each occurrence.

In a study of drought hazards to crops,[1] a relationship was noted between soil grain size and moisture availability as affected by rainfall. Even though the principal concern of this study was something other than soil moisture retention, its findings bear out the accepted premise that, the finer the soil grain size, the slower the loss or gain of total moisture.

U.S. Weather Bureau studies have further disclosed a strong inverse correlation between two factors: the amount of rainfall for any particular period and the number of occurrences. Without detailed explanation of how these values are obtained, it suffices, for purposes of this report, that the frequency function provides an excellent measure of the potential for soil activity; for it gives a sound indication of the likelihood of extended periods during which the normal soil-moisture balance may be upset through evaporation by reason of low rainfall, or through concentration in fewer-than-normal occurrences. In either instance, cohesive soils can be expected to shrink during dry periods. Upon restoration of the normal rainfall pattern, cohesive soils can be expected to swell.

The rate at which moisture is lost or gained by soils is not at this time thoroughly understood. It is generally accepted, however, that air movement accelerates loss of soil moisture. Since air movement is independent of rainfall, it can be assumed to increase loss of soil moisture, especially during extended periods of little or no precipitation.

While it is recognized that other factors such as temperature and relative humidity also influence loss or gain of soil moisture, the effects exerted are comparatively unimportant.

On the basis of U.S. Weather Bureau data, a climatic rating (C_W) has been assigned to all points in the continental United States,

[1]Gerald L. Barger and H. C. S. Thom, "Evaluation of Drought Hazard," Agronomy Journal, Vol. 41, No. 11, November 1949, pp. 519-526.

as shown in Fig. 1, p. 38. The C_W for any particular locality not directly on an isoline can be determined simply by interpolation to the nearest whole number; for example, Jackson, Mississppi, would be assigned a C_W of about 37, while for Columbia, Missouri, C_W would be about 33.

3.4 Correlation of Climate and Soil for Selection of Slab

Once the foundation soil of a slab is classified, and the severity of the climate at the site is identified with the help of Fig. 1, the proper slab type can be selected. When the soil is basically cohesionless, selection of slab type depends exclusively on the density and consistency of the foundation soil, without regard to climate. Thus, a Type I slab can be successfully used on all gravelly soils (GW, GP) under all climatic conditions. It can also be used on all sandy soils with or without silts and clays (GM, GC), as well as on silts (ML, MH), provided they are classified as medium or dense. Table VI, p. 142, provides a quantitative measure of the various densities of cohesionless soils in terms of the number of blows required to drive a standard 2-inch OD sampler 1 foot into the ground by means of a standard 140-lb hammer falling 30 inches.[1]

Whenever cohesionless soils or soils of low plasticity (GM, GC, SW, SP, SM, SC, ML, MH) are present in loose condition, a Type II slab is the more suitable (regardless of climatic conditions), since such soils in loose condition are subject to a limited degree of uneven settlement after the erection of the superstructure.

Light reinforcement, therefore, will be required to protect the slab from cracking.

A Type II slab can also be used over clay (CL) or organic soils (OL) when the plasticity index rating is less than 15 and the ratio q_u/w (where w is the average total slab dead and live load, and q_u is the unconfined compressive strength of the soil) is more than 7.5, thus permitting superstructure loads to be supportable directly on spread footings. Where PI > 15 but the soil is relatively firm ($q_u/w > 7.5$), a Type II slab is still adequate provided the climate is optimum, i.e., the climatic rating (C_W) is at least 45.

Type III slabs have a limited application, in the sense that they are needed only where clays or organic soils (CL, OL, CH, OH)

[1]ASTM Designation D 1586-64T (or most recent edition), Standard Penetration Test. Philadelphia: American Society for Testing and Materials.

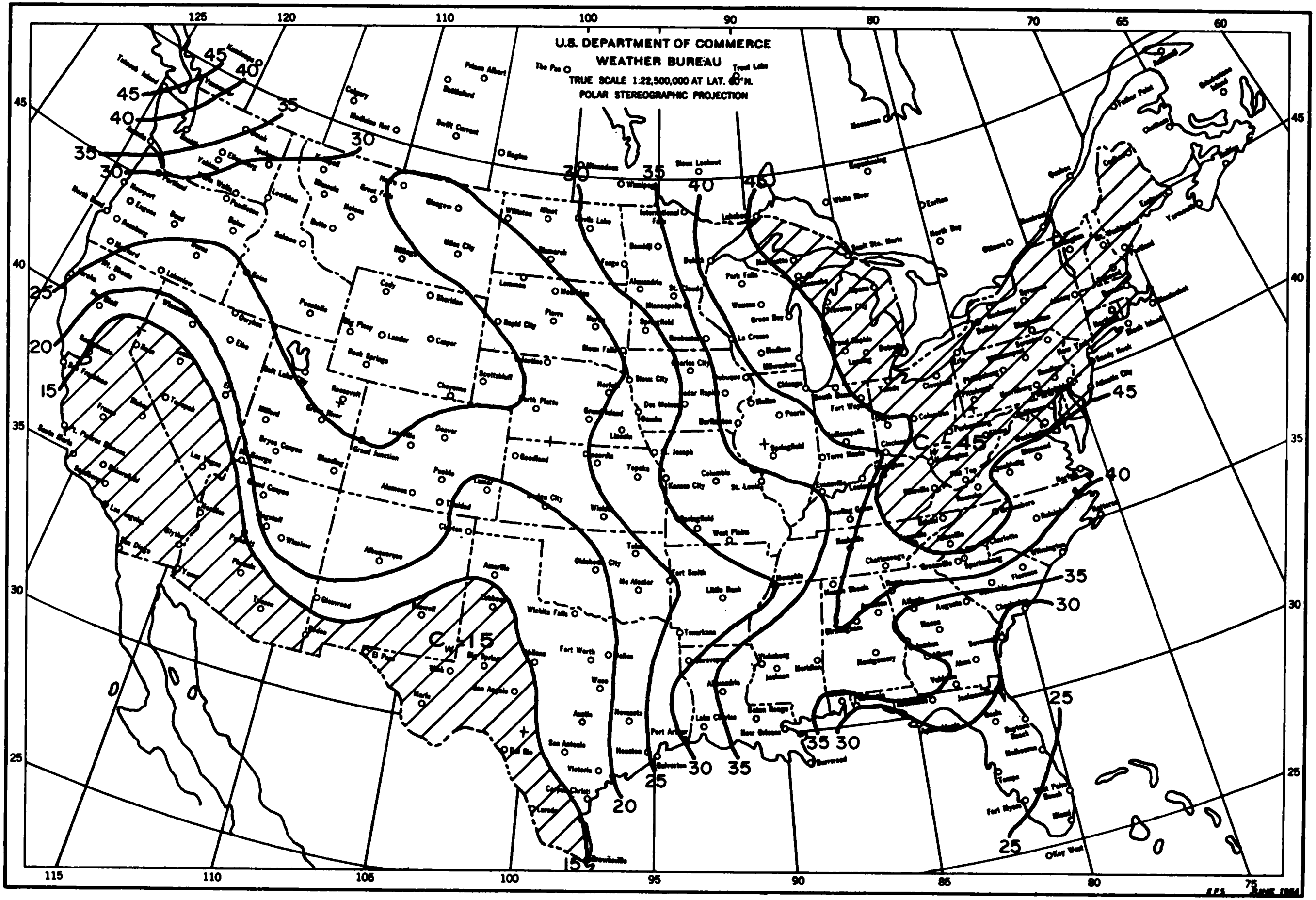


FIG. 1 Climatic Ratings (C_W) for Continental United States

occur in localities having a climate which is less than ideal (i.e., $C_w < 45$), or where the average load (w) is high relative to the unconfined strength (q_u) of the supporting soil ($q_u/w < 7.5$).

When CL, OL, CH, and OH soils having a low compressive bearing capacity ($q_u/w < 2.5$) are encountered, a Type IV slab resting on special foundations should be used.

Table I, p. 11, correlates the various combinations of soil type and climate and classifies them with respect to the type of slab recommended for use.

4.0 CRITERIA FOR TYPE I SLABS

4.1 General

Type I slabs (Fig. 2, p. 40) are not affected either by the type of superstructure or by the climate at the construction site. The superstructure is supported directly on footings, and the soils on which Type I slabs are founded are practically unaffected by climate and water content changes.

This type of slab, by its very nature, possesses only limited capabilities; specifically, it has only compressive strength and cannot tolerate appreciable amounts of tension or warping. It may crack during drying, but, when used under controlled conditions, such cracks as do occur should not become excessively wide nor prove a detriment to the serviceability of the slab.

The controlling factors in the successful performance of these slabs are the quality of materials and construction, size, and certain other basic details. Aspects of quality control are described fully in Part B, pp. 126-136, and the other factors are discussed below.

4.2 Site

Any site upon which this slab is to be placed should be well drained and properly graded.[1] The soil should be one of those appropriate for supporting a slab of this type, and should be uniformly and

[1] This report, Part B, pp. 126-136.

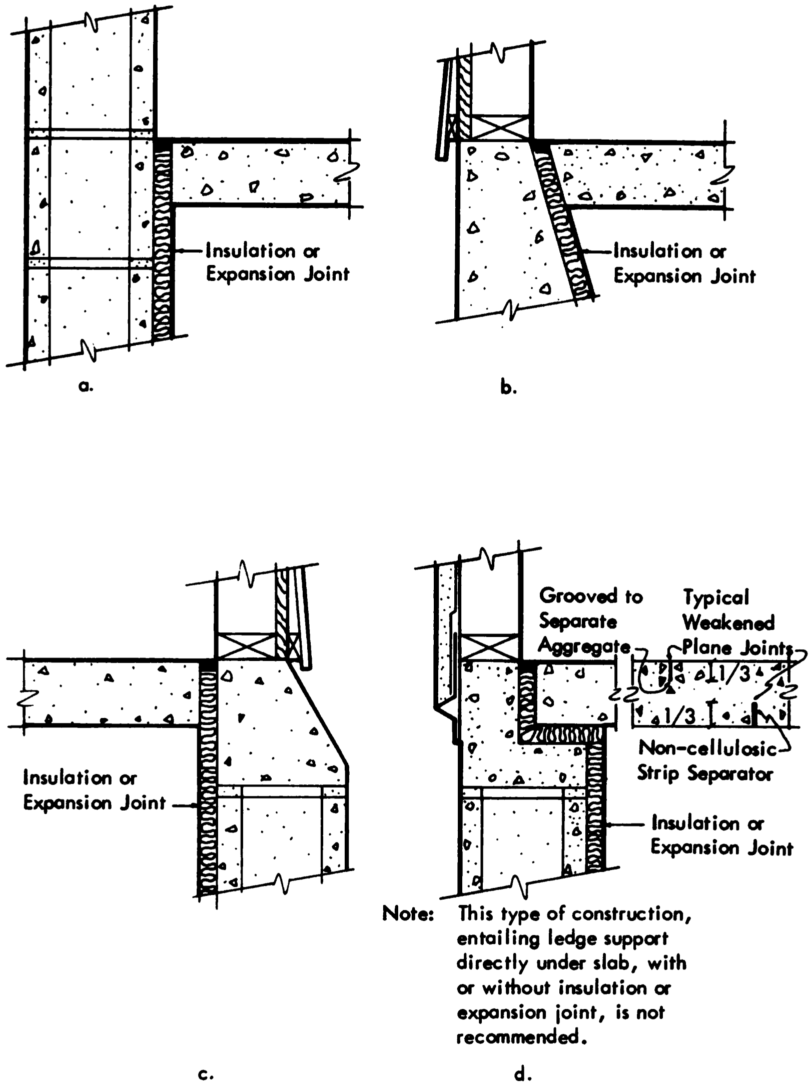


FIG. 2 Typical Type I Slabs

adequately compacted[1] to provide the support necessary to ensure that warping and tensile stresses which contribute to cracking are not induced in the slab.

[1]This report, Part B, Fig. 22, p. 128.

4.3 Dimensions

This slab is one of uniform 4-inch thickness, rectangular or square in outline. The maximum dimension is 32 feet, in order to minimize shrinkage during drying and subsequent thermal volume change.

4.4 Irregular Shapes

The slab cross section should not contain irregularities in its horizontal plane, lest the stresses incident to drying shrinkage or thermal change induce cracking at such irregularities. Whenever the top surface of the slab must be interrupted (e.g., lowered to permit proper installation of ceramic tile), the uniform 4-inch thickness should be maintained by lowering the slab underside, beginning at least 24 inches away. In addition, when the vertical displacement is greater than 1-1/2 inches, 6x6 - 6/6 WWF should be placed midway in the slab and for 25 inches on either side of the point of displacement. When the slab has an irregular outline, such as a T- or L-shape, weakened planes (see Fig. 2d, p. 40) should be provided in a manner which will divide the slab into squares or rectangles; otherwise, objectionable diagonal cracks are likely to occur at the junction.

4.5 Weakened-Plane Joints

A useful method of predetermining the location of shrinkage cracks due to drying and temperature change in such unreinforced slabs is to create weakened-plane joints (Fig. 2d). Since this slab type is expected to receive uniform nonyielding support, the only consideration is judicious placement of joints to induce cracks at the least objectionable location—e.g., under partitions. To provide controlled cracks, it is necessary to reduce the effective cross section of the slab, e.g., by

Sawing a grove in the slab after initial set
Grooving the moist concrete with a T-bar or jointing tool
Placing continuous strips of a noncellulosic material on the slab site, prior to placing the slab.

Whichever method is used, the effective thickness of the slab at the weakened plane should be reduced by a quarter to a third of the normal slab thickness. In this manner, the tensile stresses generated will find relief at the weakened plane, reducing the likelihood of cracks occurring where they might be objectionable. Control joints should be placed no more than 32 feet apart and preferably closer, in order to minimize width (4.3 above). In this connection, however, consideration should be given to the possibility of other deleterious effects, such as creating a pathway for termites or moisture.

4.6 Embedment in Slab

Heating coils, pipes, or conduits, such as are shown in Fig. 4b, p. 44), should not be embedded in an unreinforced slab, since these will induce tangential stresses. Heating ducts may be embedded, provided they are completely encased in not less than 2 inches of concrete, and the slab over the duct is reinforced with 6x6 - 6/6 WWF (similar to Fig. 4c). This reinforcement should extend for 19 inches on either side of the centerline of the duct or to the slab edge, whichever is closer.

4.7 Loads

The slab should not be subjected to partition loads greater than 500 plf, nor to equivalent concentrated loads such as chimneys. The slab cannot tolerate loadings of this magnitude without undue deflection. A method of supporting partition or concentrated loads in excess of 500 plf is shown in Fig. 3. When this method is used, care should be

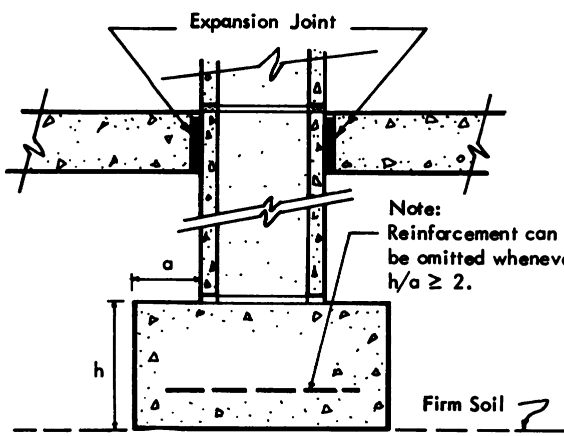


FIG. 3 Method of Supporting Partition Loads in Excess of 500 PLF

exercised to ensure that the footing rests on undisturbed soil, that the slab does not lose support near the partition, and that the load-bearing element is isolated from the slab.

4.8 Openings

Openings in the slab should be kept to a minimum, since they introduce nonuniform stresses. Wherever a 12-inch or wider opening must be included, the slab should be reinforced with 25-inch-width 6x6 - 10/10 WWF all around the opening.

5.0 CRITERIA FOR TYPE II SLABS

5.1 General

Type II slabs (Fig. 4, p. 44) need not be adjusted for various types of superstructure, because the latter will be directly supported on spread footings; nor will such slabs be influenced by climate, since soils on which they are founded are not significantly affected by climate changes.

Reinforcement of Type II slabs provides for control of crack size only. Although cracking is almost certain to occur, cracks will, with reinforcement, be held tightly closed and will not be objectionable. However, this slab cannot be expected to bridge a void, since the amount of reinforcement provided is based on the premise that the entire slab will remain uniformly supported by underlying soil. The conditions of loading, site drainage, and grading are identical with those of Type I, except that less desirable soils are acceptable as support.

The controlling factors for success are quality of materials and construction, reinforcement, size, and other basic details. Aspects of quality control are described fully in Part B, pp. 126-136, and other criteria follow.

5.2 Dimensions

This slab is basically one of uniform 4-inch thickness and may be of dimensions up to 75 feet. These slabs are expected to deflect with slight movements of the soil, and should be free of foundation

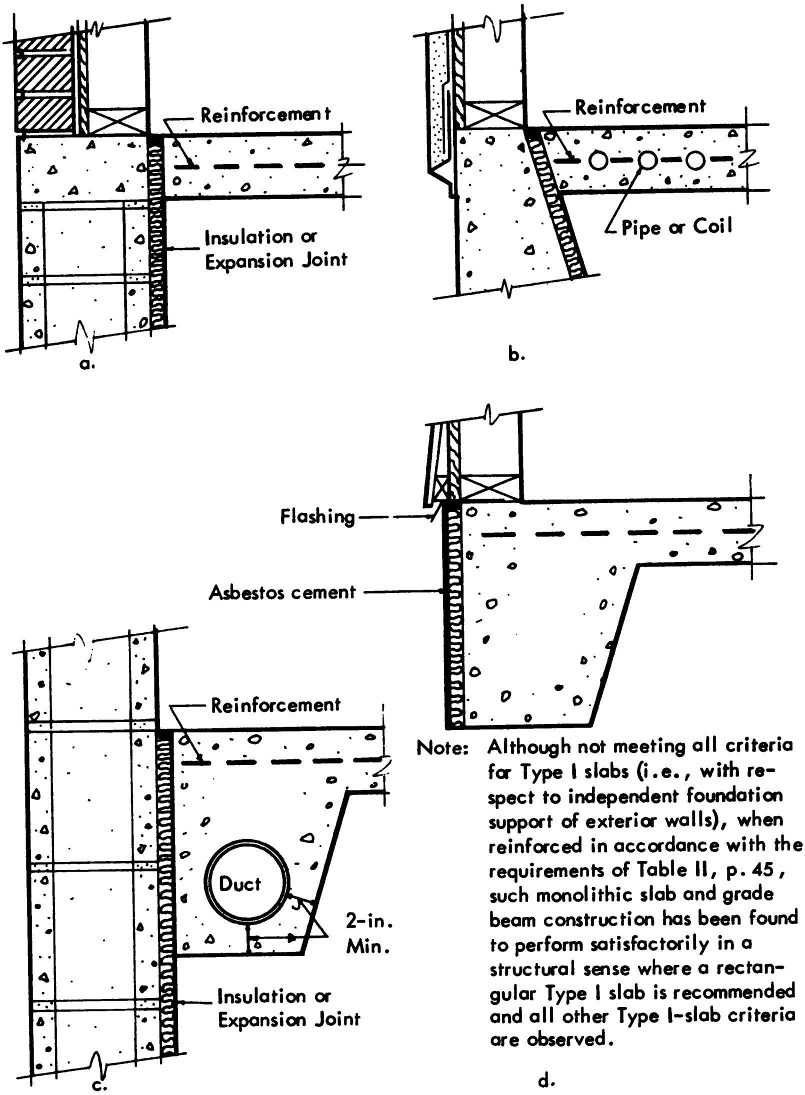


FIG. 4 Typical Type II Slabs

walls, piers, or footings; otherwise, the slab is likely to experience flexural stresses which it is not capable of resisting without cracking.

5.3 Reinforcement

In order to control the size of cracks, the slab should have a specified minimum WWF reinforcement over its entire area, located midway between top and bottom of the slab and supported on chairs. Placement of the fabric in the center of the slab is to ensure that cracks will be kept tightly closed. The sizes recommended are based on the "drag" theory as follows:

$$A_s = FLw_d/2fs$$

where A_s = area of steel required per foot of width (in.^{2})
F = coefficient of friction = 1.25
L = longest dimension of slab (ft)
w_d = weight of slab = 12.5 pounds per inch of thickness (psf)
f_s = allowable steel design stress (45,000 psi for Type II slabs).

Typical reinforcement needs are shown in Table II.

TABLE II Minimum WWF Reinforcement between Design Joints for Type II Slabs

Maximum Dimension (ft)	Wire Spacing (in.)	Wire Gauge (no.)
Up to 45	6 x 6	10/10
45 to 60	6 x 6	8/8
60 to 75	6 x 6	6/6

5.4 Embedment in Slab

Heating coil may be embedded, since a slab of this type is reinforced over its entire area. The reinforcement provided can also accommodate the thermal stresses induced due to heating, but only if coils or ducts are completely encased in at least 2 inches of concrete (Fig. 4b and c).

5.5 Irregular Shapes

The same restriction as for slabs of Type I apply to planes or cross sections of irregular shape, with the added requirement that reinforcement be continuous across the weakened plane to eliminate the possibility of vertical displacement between adjacent sections.

5.6 Loads

Since it is reinforced, this slab can accommodate partition loads of up to 500 plf; however, when this loading is exceeded, an additional layer of reinforcement should be provided to extend at least 25 inches on either side, in order to distribute the added stresses. Further, concentrated loads in excess of this amount (500 plf), should be supported on independent footings.

5.7 Openings

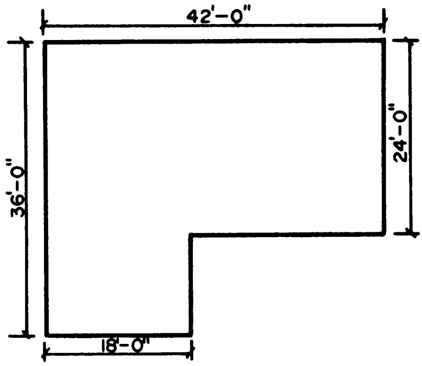
Openings in the slab should be kept to a minimum and should be less than 12 inches in width. Openings greater than 12 inches in width should be provided with an additional layer of 6x6 - 6/6 WWF reinforcement all around to prevent the concentration of stresses which could crack the slab at these points.

6.0 EXAMPLE OF PROCEDURE FOR DETERMINING WHETHER A TYPE I OR II SLAB IS APPROPRIATE, AND APPLICATION OF CRITERIA

6.1 General

The procedures which follow demonstrate the application on more stable soil types of the criteria recommended in para. 1.0, 10-20.

Location: McAlester, Oklahoma
Floor plan and outside dimensions:



Type of construction: Solid masonry with plaster-on-lath interior and ceramic tile bathroom floor

Total weight of superstructure: 143 kips

Method of heating: Warm air, with ducts in attic, i.e., none in slab

Partitions: Non-loadbearing, weight 100 plf

Openings through slab: None greater than 8 inches

Concentrated loads: None.

6.2 Determination of Slab Type[1]

Step 1 — Soil investigation results show
Type of soil: SM with a PI = 2
Thickness: 15 ft
Relative density: 0-4 ft = 25%, and 4-15 ft = 50%.

Step 2 — Determine appropriate slab type
From Table I, it is noted that for a loose SM soil the recommended slab is Type II (or Type I if the soil is compacted to a dense state).

[1]See para. 1.1, pp. 10-12.

6.3 Procedure[1]

Since the slab is not to be heated, the decision is to densify the soil and use a Type I slab as follows:

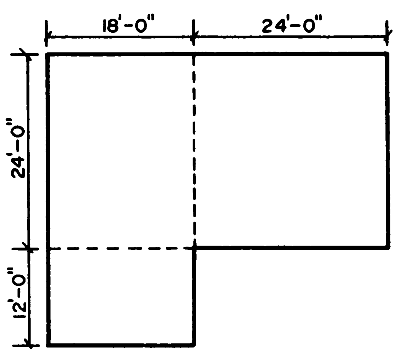
Step 1 — Check method of heating.
No coils or ducts are to be embedded; therefore, special reinforcement is not required.

Step 2 — Check maximum slab dimensions.
The slab is L-shaped, and two dimensions exceed 32 feet; therefore, two weakened planes will be needed.

Step 3 — Check partition loads.
All partitions are non-loadbearing, and none exceeds the 500 plf maximum allowable; therefore, partitions may rest on the slab.

Step 4 — Check openings through slab.
All openings in the slab are less than 12 inches wide; therefore, no special reinforcing is required.

Step 5 — Check slab shape.
The slab is irregular in shape; however, the two weakened planes (Step 2) can be conveniently located under the edge of partitions, dividing the plan into three segments (12 x 18 feet, 18 x 24 feet, and 24 x 24 feet) as follows:



[1]See para. 1.2, pp. 12-13.

Step 6 — Check irregularities in horizontal plane of slab.
Ceramic tile is to be used for the bathroom floor; therefore, the slab surface under the tile will be 1 inch lower than the remaining slab, and the underside of the slab must be sloped in order to maintain the 4-inch slab thickness.

Step 7 — Check for concentrated loads.
There are no concentrated loads involved, and the roof load is supported on the exterior walls; therefore, there is no need for independent footings through the slab.

Step 8 — Locate necessary weakened planes.
The two weakened plane joints, located in Step 5, satisfy all requirements.

Step 9 — Provide for soil densification.
The slab site will be compacted to 95% of that obtainable by the standard Proctor density test.

7.0 DESIGN OF TYPE III SLABS

Unlike Types I and II, these slabs are affected in their design (dimensions and reinforcement) both by the type of superstructure and by soil properties as affected by climate. The superstructure, depending on its rigidity, imposes limits on the maximum slab deflection that can be tolerated. The climate, on the other hand, affects the pattern of distribution of the soil bearing stresses; hence, the distribution and intensity of stresses, and resultant deformation of the slab (as explained in some detail below).

7.1 Effect of Superstructure

Since, with this slab type, the superstructure is supported on the slab itself, the walls and other load-carrying elements of the superstructure will tend to follow any slab deformations. The deformations that can be tolerated, before undesirable effects develop, such as cracking, or window- and door-opening distortions, depend upon the materials and nature of superstructure construction used. It is estimated that wood-frame construction can sustain deformations about twice as great as concrete block construction before the effects of warping and cracking create mechanical and aesthetic problems. This tolerance is due to the fibrous nature of wood and the plastic nature of member connections, as against the comparative brittleness of cementitious materials—concrete, stucco, plaster, mortar—which can tolerate only small deformations before actual cracking develops.

Thus, for various types of superstructure, particularly for the wall and wall-finishing materials, a limit must be imposed on the maximum differential vertical displacement of any two points on the slab, in order to protect against objectionable distortions and/or cracks. Table III presents, for certain commonly used superstructure types, recommended limits in terms of Δ/L, to be measured between any two points on the slab along one or another of its principal rectangular axes.

7.2 Effect of Soil Behavior

Some fundamental assumptions relating to the mode of slab support must be made for analysis of Type III slabs. The assumptions adopted for purposes of this report are described in the following paragraphs and lead to the definition of the Support Index (C) used in the analysis.

TABLE III Permissible Differential Settlements for Stiffened Slabs to Minimize Utility Damage to Superstructure

Typical Types of Superstructure[1]	Maximum Permissible Deflection Ratio[2] (Δ/L)
Wood	1 in 200 = 1/200
Unplastered masonry or gypsum wallboard	1 in 300 = 1/300
Stucco or plaster	1 in 360 = 1/360

[1] The deflection ratios are determined by the weakest exposed finish material in the superstructure; therefore, if the superstructure contains one or more of the listed materials as an exposed finish, the most severe corresponding Δ/L will apply.

[2] The listed values are based in part on information contained in U.S. Department of Commerce, National Bureau of Standards, BMS 109, Strength of Houses (Washington: 1948), Table 19, p. 84, and Fig. 42, p. 71.

As pointed out previously, soil properties and climate determine the magnitude of potential soil shrinkage or swelling, which, in turn, directly affects the pressure distribution beneath the slab. Thus, if either a very flexible or a very rigid slab rests on level ground, and the soil beneath the slab shrinks or swells unevenly because of change in soil moisture brought about by climate variation, one of two extreme situations results. The very flexible slab will deform to follow the changing ground contour, resulting in differential settlements in the slab but no stress. On the other hand, the infinitely rigid slab, retaining its plane, will be supported on the high points of the soil surface without differential settlements but with stress induced in the slab.

The Type III slab under consideration is both stiffened (through deep beams) and strengthened (through reinforcement); as such, its behavior falls between that of a very flexible and that of an infinitely rigid slab. Although differential settlements will occur, they will be substantially smaller than those of the supporting ground, and stresses will develop because of the accompanying uneven ground reactions. The degree of stiffening should be sufficient to reduce the differential settlements to a level which can be accommodated by the superstructure, and the reinforcing should be sufficient to impart to the slab the strength necessary to withstand the resulting stresses from the uneven reactions.

Actually, there will generally be continuous contact between the soil and slab along the entire surface of the slab; but, because of slab stiffness, the soil does not develop the differential settlement that would occur if the slab were flexible and capable of following soil movements point by point. Instead, it develops a variable bearing intensity, leading to the consolidation of soils in the higher-pressure areas. This maintains the continuity of soil-to-slab contact under most conditions.

Obviously, slight tilting of the structure as a rigid body and the phenomena related to such tilting do not influence the safety of slabs-on-ground or the structures supported thereon; consequently, tilting has been ignored in the above discussion. For this reason, "differential settlement of the slab" as used here must be recognized as referring to the deflection of the slab rather than to all differential settlements, which would also include those due to tilting.

7.3 Support Index

Since the exact shape of the pressure distributions is not known, the assumptions that follow have been introduced to permit development of a rational procedure for analysis and design of a Type III slab.

A study of the various patterns of uneven bearing-stress distribution has shown that the most severe deflections will result from one or the other of two principal forms of bearing support (Fig. 5): a. When the maximum bearing stresses develop under the center of a rectangular slab of dimensions L by L′ (center support); and b. when the maximum bearing stresses develop on two diagonally opposite corners of the rectangular slab (diagonal support).

It is assumed that, whenever either of these two critical bearing conditions develops, bearing stresses of uniform intensity will occur only under the cross-hatched areas of the slab. This is, of course, not a statement of fact, but a supposition which corresponds to some true conditions giving the same deflection or the same maximum stresses in the slab. As such, therefore, it can be treated as an equivalent mode of support.

Since climate and sensitivity of soil affect the extent and intensity of stresses under the slab, the coefficient C (Fig. 6, p. 53), which defines the boundaries of the supported fraction of slab, is defined as the support index of the slab; this varies with the climatic rating of the site and the plasticity index of the soil upon which the slab rests. For the most favorable combination of climate and soil, the value of C is taken equal to unity (i.e., it is assumed that the slab is uniformly supported over its entire area). For the combination of most severe climate and soil conditions, C obtains the value of 0.6 (i.e., the slab is supposedly supported over 36% of its total area, at the center or at diagonally opposite corners).

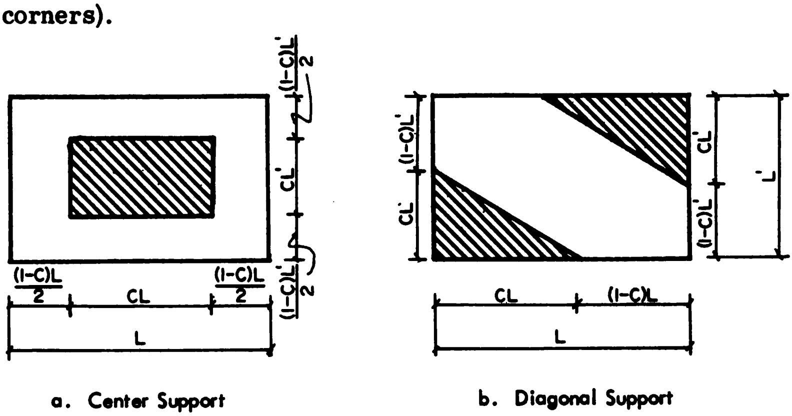


FIG. 5 Support Assumptions

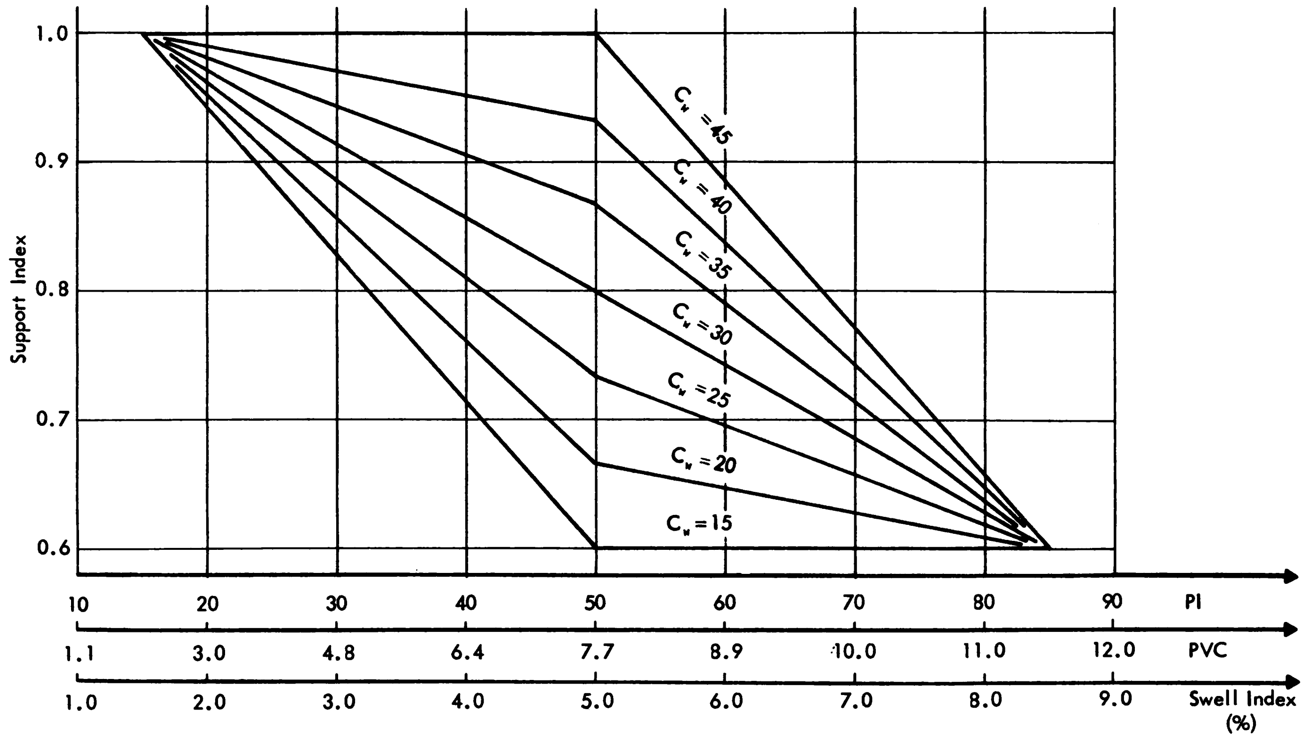


FIG. 6 Support Index (C) Based on Criterion for Soil Sensitivity and Climatic Rating (C_W)

Figure 6 defines the support index (C) in terms of the climatic rating for the slab site and the criterion used to evaluate sensitivity of foundation soil to moisture change. This criterion may be the PI of the soil, PVC-meter reading for the soil, or percentage swell of the soil. The potential volume change of a particular soil is best determined by a swell test on an undisturbed sample of the soil subjected to probable loading and moisture changes which will likely be experienced beneath the structure. However, in the absence of such a test or tests, PI and PVC-meter readings may be used as an indication of potential volume change in determining the support index (C) from Fig. 6. The effective value of PI, PVC-meter reading or percentage swell to be used in connection with Fig. 6, is obtained as specified under para. 7.8.1, pp. 65-68 (see also, Fig. 7, p. 55).

In the ensuing text, all references to PI should be construed to refer generally to the soil sensitivity criterion—whether PI, PVC-meter reading, or percentage swell—which is used by the designer in each case of slab design.

7.4 Increase of Support Index (C)

It is evident, from the way the support index (C) is defined, that it serves as a parameter which permits the setting up of an idealized model (defined by the support assumptions of Fig. 5) for analysis. It is recognized that, under actual conditions, the loads and the reaction pressures on the slab vary greatly from those stipulated by the support index (C) and the support assumptions of Fig. 5. However, the diminishing values of C along with the climatic rating (C_W), and increasing PI values (Fig. 6, p. 53), indicate that, if slab dimensioning and reinforcement are based on analysis of the model resulting from the support assumption of Fig. 5, the slab will become progressively stronger and stiffer as C becomes smaller—i.e., as PI increases or C_W is lowered, a stiffer and stronger slab (smaller C) is needed for the satisfaction of similar criteria of strength and deflection. Therefore, adoption of this model as representative of the actual slab satisfies the qualitative requirements of the actual slab, i.e., that it be stronger and stiffer as the climate becomes more adverse and as the plasticity index of the supporting soil increases.

As discussed in para. 3.3, the climate rating (C_W) is indicative of the intensity of dry-moisture cycles in the supporting soil. The upper limit (C_W = 45) indicates more stable conditions in the soil-moisture balance. As the C_W-value becomes smaller, it represents

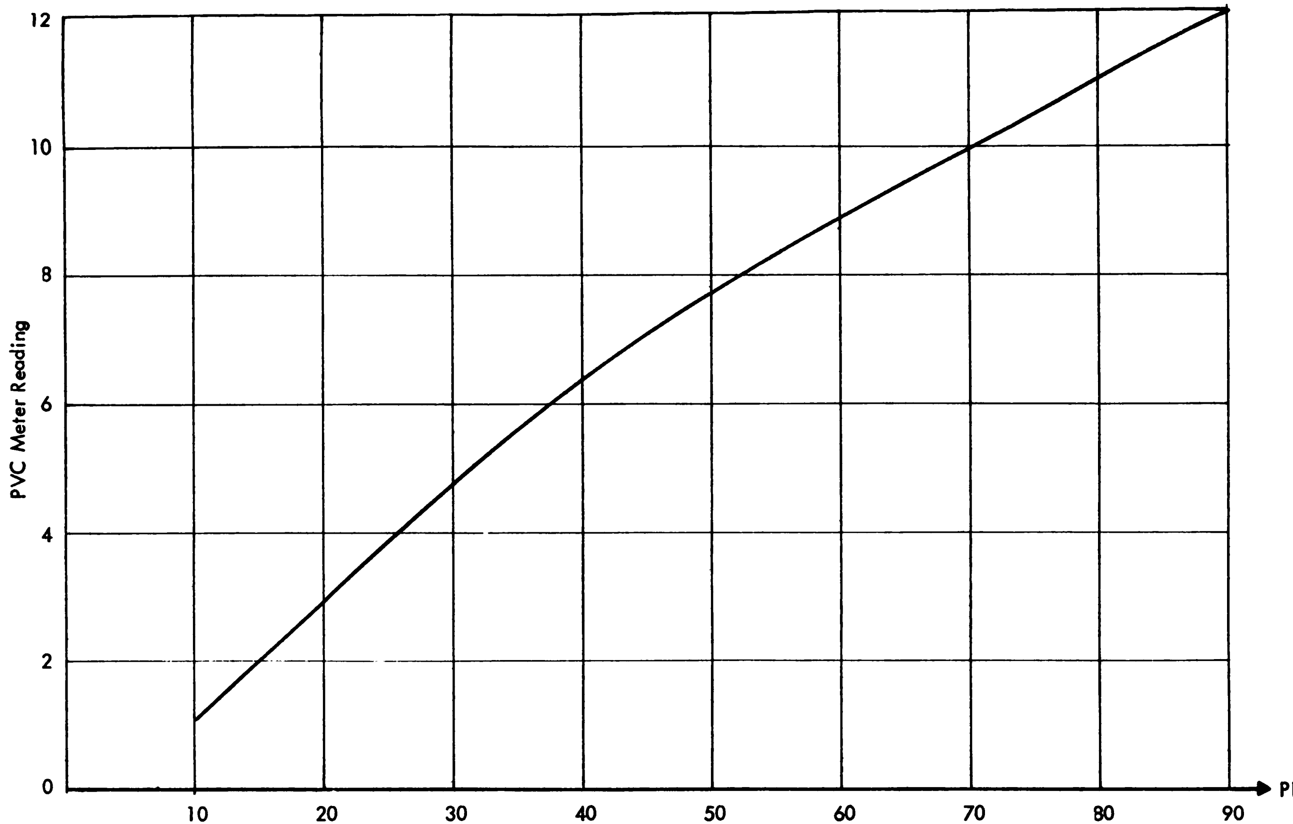


FIG. 7 Curve Relating PI to FHA - PVC Reading

more severe climatic conditions which tend to upset the soil-moisture balance. It is conceivable, however, that in an area with a low C_w (i.e., with a climate tending to upset the soil-moisture balance), stable soil-moisture conditions may exist or be achieved by artificial means[1]—in which case, soils with high PI will be subject to less swelling and shrinkage than in the absence of such artificial means. To compensate for the favorable effects of soil-moisture balancing, the support index (C) can be taken as larger than the value specified in Fig. 6; however, this increase in the absence of justifying quantitative data should not exceed that provided by the empirical expression

$$C_m = 0.5\ (1 + C)$$

where C_m is the modified value of the index C.

7.5 Determination of Support Index (C) for Compressible Soils ($2.5 < q_u/w < 7.5$)

When the ratio of unconfined compressive strength (q_u) of the soil to average total load (w) on the slab is in the range $2.5 < q_u/w < 7.5$, the soil is herein characterized as compressible. For such soils, a reduced support index (C_r) is substituted for the support index (C). The value of C_r is defined as follows:

For $C > 0.65 - w_c/w$

$$C_r = (2.5 - q_u/w)[0.13 - 0.2\ (w_c/w + C)] + (0.65 - w_c/w) \qquad (7.5a)$$

and for $C \leq 0.65 - w_c/w$

$$C_r = C \qquad (7.5b)$$

where $w = W/LL'$ = total slab dead and alive load (W)—including its own weight—averaged over the area LL' of the slab; and $w_c = W_c/LL'$ = total concentrated dead and live loads (W_c), applied

[1] Such a case would exist if the water table is, or is maintained, at a sufficiently high level to produce a relatively constant soil moisture condition, e.g., as is accomplished by a system of drainage and controlled pumping in the New Orleans (Louisiana) area.

within the central 50% in any direction (L or L′) of the slab and averaged over the entire area of the slab (LL′).

With this definition, it is possible that the support index (C) will assume one value for design of the slab in the long direction and another in the short direction. For example, for the slab of Fig. 8, the reduced support indices do differ and are arrived at as follows:

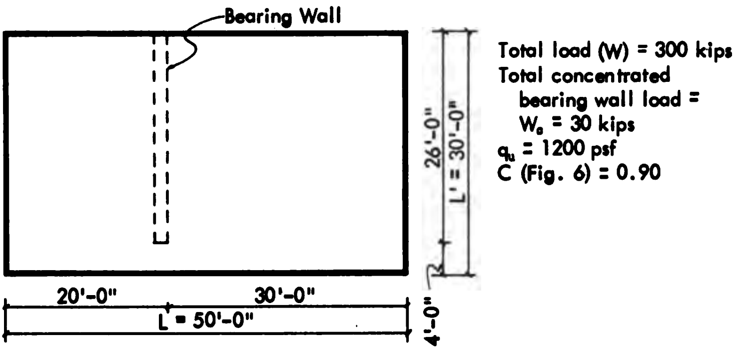


FIG. 8 Determining C_r for Slab on Compressible Soil

a. In the long direction

$$w = W/LL' = 300{,}000/50(30) = 200 \text{ psf}$$

$q_u/w = 1200/200 = 6$, which is within the range $2.5 < q_u/w < 7.5$.

Since W_c acts as a concentrated load with respect to the long (L) dimension of the slab and is located within the central 50% of the L-dimension

$$w_c = 30{,}000/50(30) = 20 \text{ psf}$$

and, using equation 7.5a, p. 56,

$$C_r = (2.5 - 1200/200)\,[0.13 - 0.2(20/200 + 0.9)] + (0.65 - 20/200)$$

$$= (-3.5)(-0.07) + 0.65 - 0.1$$

$$= 0.795.$$

b. In the short direction

$W_c = 0$ (due to the fact that in the short direction, the load W_c is not acting as a concentrated load)

and

$$C_r = (2.5 - 6)\,[0.13 - 0.2\,(0.9)] + 0.65$$

$$= (-3.5)(-0.05) + 0.65$$

$$= 0.825.$$

Equation 7.5a is a linear expression of the ratio q_u/w. Consequently, C_r changes linearly with q_u/w between a low limit of $0.65 - w_c/w$ and a high limit of C for a corresponding variation of q_u/w between 2.5 and 7.5. This is shown graphically in Fig. 9.

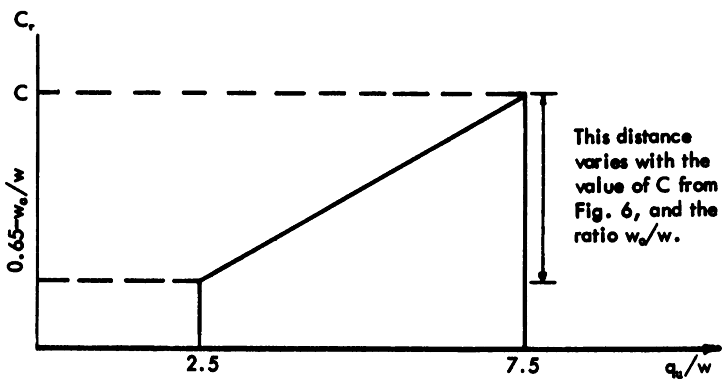


FIG. 9 Variation of C_r with Ratio q_u/w

7.6 Typical Stiffened-Slab Cross Section

There are several cross sections which might be used in designing a stiffened slab; however, the procedures which follow apply only to the waffle or ribbed slab (Fig. 10, p. 59), and to flat slabs.

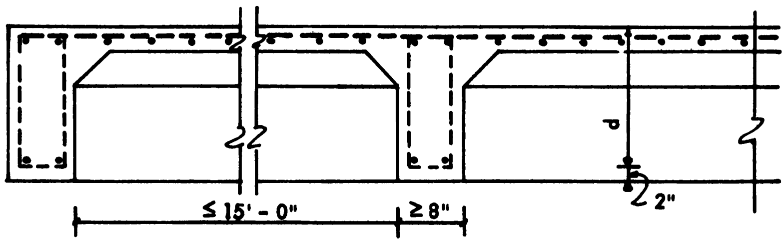


FIG. 10 Typical Type III Slab Section

A special concern in connection with the waffle slab is uniformity of distribution of the rib-stiffening effect along the length of the stiffening beams. In this connection, the following conditions should be met:

a. All interior stiffening beams should be made continuous and "dead-ended" at the perimeter beams.

b. Beams should be equally spaced along each side, unless special analysis clearly demonstrates that another spacing will provide a slab of uniform stiffness along its width.

7.7 Analysis of Type III Slabs

As a basis for analysis, slabs are taken to be rectangular in shape with sides L and L′. Whenever a given slab is not rectangular, it is assumed to be composed of an aggregation of rectangular component slabs, each of which is independently analyzed in a manner which will be explained in the design examples which follow.

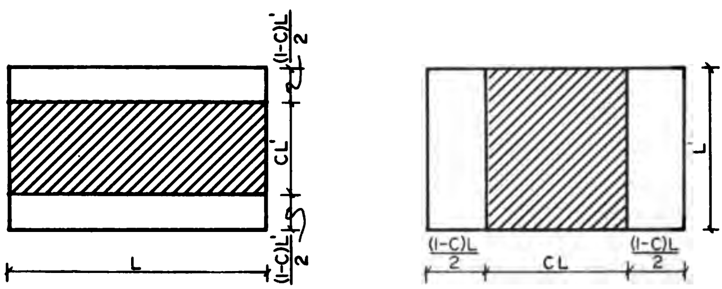
For purposes of analysis, the basic support condition assumed (7.3 above) is retained. Further, rather than make a two-dimensional analysis, each slab is analyzed for deflection and stress distribution as two one-dimensional cases, one each for the directions L and L′. Comparison of results obtained by the two one-dimensional analyses with those from a rigorous two-dimensional analysis by electronic computation indicates that:

a. Smaller limiting moments are derived from the one-dimensional than from the two-dimensional analysis.

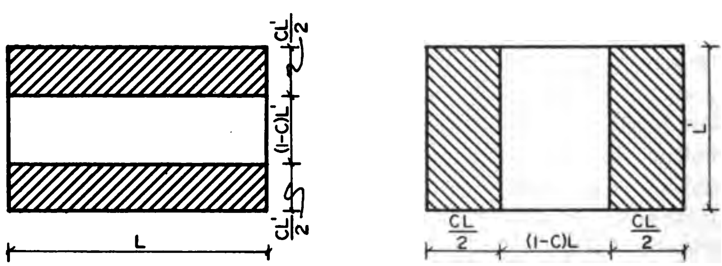
b. Larger deflections are derived from the one-dimensional than from the two-dimensional analysis.

For each one-dimensional analysis, it is assumed that the slab is deformed to a cylindrical surface. The two-dimensional effect is obtained by combining the two cylindrical deformations, one in each direction. This necessitates examining two limiting cases (Fig. 11a and b) of support corresponding to the support assumptions defined in Fig. 5, p. 52. For each of these limiting cases, two one-dimensional analyses are required for support conditions specified in Fig. 11, below.

Such assumptions, while erroneous, simplify analysis and design, and are fully justified in view of the fact that the error involved in one-dimensional analysis is smaller than the inherent error in the various assumptions made in establishing the problem parameters. In addition, whereas the ultimate capacity of concrete provides ample margin of safety against failure due to bending moment, there is little ability to accommodate deflections greater



a. Cantilever



b. Simple Beam

FIG. 11 Assumed Ground Reaction Conditions to Permit One-Dimensional Slab Analysis than those allowed. Therefore, analysis in one dimension provides a compensation in that it automatically increases safety against excess deflection, while reducing the existing margins of safety against bending moment failure.

Loading on Type III slabs is assumed to be uniformly distributed over the entire slab area.

With these basic assumptions made, the analysis of Type III slabs reduces to the analysis of two basic cases, center support (Fig. 12a—cantilever) and end support (Fig. 12b—simple beam).

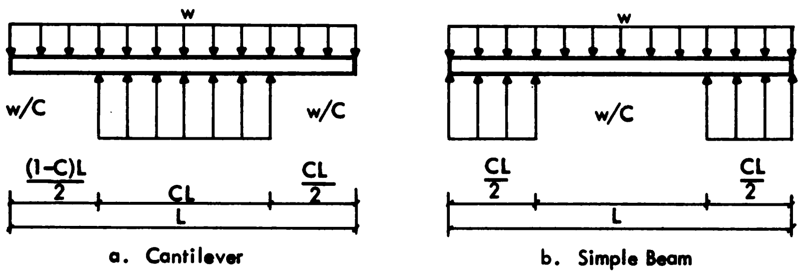


FIG. 12 Limiting Cases of Support for Type III Slab Analysis

Analyzing slabs having the above two limiting cases of support for stress and deflection

	Cantilever	Simple Span
Maximum moment (M_{max}) =	$wL^2L'(1-C)/8$	$wL^2L'(1-C)/8$
Maximum shear (V_{max}) =	$wLL'(1-C)/2$	$wLL'(1-C)/2$
Maximum deflection (Δ_{max}) =	$wL^4L'(3-4C^2+C^3)/384E'I$	$wL^4L'(5-6C+C^3)/384E'I$

where w is the per-square-foot average total load on the slab; L and L′ are the slab length and width, respectively; I is the moment of inertia of the slab cross section; and E′ is the effective modulus of elasticity, i.e., 1.5 $(10)^6$ psi for concrete under sustained loading.

Since slabs-on-ground are likely to remain in maximum deflected condition for long periods, the creep modulus of elasticity of concrete under sustained loading is considered to be the "effective modulus." The creep modulus of elasticity (E) for concrete is of the order of one half the modulus of elasticity, i.e., $3(10)^6$ psi, for concrete with $f'_c = 3000$ psi.

Introducting the conventional concrete design modulus of elasticity (E) into the above formula

Cantilever	Simple Beam
$\Delta_{max} = wL^4L'(3-4C^2+C^3)/192\,EI$	$wL^4L'(5-6C+C^3)/192\,EI$

For values of $0.6 \le C \le 1.0$, the linear function $4(1-C)$ provides a suitable approximation for both functions $3-4C^2+C^3$ and $5-6C+C^3$.

Therefore, with this approximation introduced,

$$M_{max} = wL^2L'(1-C)/8 \qquad (7.7a)$$

and

$$V_{max} = wLL'(1-C)/2. \qquad (7.7b)$$

In the range $0.6 \le C \le 1.0$

$$\Delta_{max} = wL^4L'(1-C)/48\ EI$$

and, by solving for the deflection ratio (Δ/L), this equation becomes

$$\Delta/L_{max} = wL^3L'(1-C)/48\ EI. \qquad (7.7c)$$

For a reinforced rectangular concrete beam of width b and depth d, the moment of inertia (I) after cracking of the section, is considered to be

$$1/3\ k^3bd^3 + np\ (1-k)^2bd^3$$

where k is the ratio of the depth of compression zone to the effective depth of the slab, n is the ratio of the moduli of elasticity for steel and concrete, and p is the steel ratio, i.e., ratio of steel cross-sectional area (A_s) to concrete cross-sectional area (bd).

Introducing the moment of inertia factor $Z = 1/3\ k^3 + np\ (1-k)^2$

$$I = bd^3Z$$

and, by substituting in equation 7.7c,

$$\Delta/L_{max} = wL^3L'(1 - C)/48\ Ebd^3Z. \qquad (7.7d)$$

In the elastic range, the maximum bending moment resisted by the internal stresses of the beam section (bd) based on the steel reinforcement is

$$A_s f_s jd$$

where

f_s = allowable unit tensile stress of steel (20,000 psi)[1]

j = ratio of internal moment arm to depth (an average 0.865)

A_s = cross-sectional area of tensile reinforcement (pbd).

Therefore, the maximum allowable bending moment (M), should be

$$f_s jdA_s = f_s jpb^2 \qquad (7.7e)$$

Similarly, if v_c is the maximum allowable shear stress for concrete, then the maximum shear capacity (V) of the slab will be

$$v_c bd. \qquad (7.7f)$$

Considering the pairs of equations 7.7b and f, and 7.7a and e, plus equation 7.7d, and designating the maximum permissible differential deflection ratio to be Δ/L, the following condition equations provide the design criteria for Type III slabs:

$V_{max} \le V_{max_{allow}}$ or $w(1-C)LL'/2 \le v_c Bd$

$M_{max} \le (\Delta/L)_{max_{allow}}$ or $w(1-C)L^2L'/8 \le f_s jpBd^2$

$(\Delta/L)_{max} \le (\Delta/L)_{max_{allow}}$ or $w(1-C)L^3L'/48\ EBd^3Z \le \Delta/L$

[1]Values of f_s for A-432 and higher strength steels, as recommended in the 1963 American Institute of Steel Construction (AISC) Specification, can also be used. The value used here (20,000 psi) is for A-15 steel.

where B = sum of the web widths of beams running parallel to the L-dimension of the slab.

These condition equations can be rewritten in more convenient form as follows:

$$w(1-C)(L'/B)(L/d) \le k_1, \text{ where } k_1 = 2v_c = 150 \text{ psi} = 21{,}600 \text{ psf} \quad (7.7g)$$

$$w(1-C)(L'/B)(L/d)^2 \le pk_2, \text{ where } k_2 = 8jf_s = 2(10)^7 \text{ psf} \quad (7.7h)$$

$$w(1-C)(L'/B)(L/d)^3 \le Zk_3, \text{ where } k_3 = 48E(\Delta/L) = 207(10)^8(\Delta/L) \text{ psf.} \quad (7.7i)$$

Obviously, if the analysis is conducted along the width (L′) of the slab, the above relationships (7.7g, h, and i) will have to be modified by interchanging L with L′ and substituting B′ for B; i.e., B′ = sum of web widths of beams running parallel to dimension L′.

Defining

ℓ as the slab dimension (L or L′) along which the slab analysis is conducted

ℓ' as the slab dimension (L′ or L) normal to the direction along which the analysis is conducted

b as the aggregate width of stiffening beams along the dimension ℓ for which the design is conducted

conditions 7.7g, h, and i obtain the following general form, which is adaptable to the analysis or design of the slab along either of its principal dimensions (L or L′):

$$w(1-C)(\ell'/b)(\ell/d) \le k_1 = 2v_c = 150 \text{ psi} = 21{,}600 \text{ psf} \quad (7.7g')$$

$$w(1-C)(\ell'/b)(\ell/d)^2 \le pk_2, \text{ where } k_2 = 8jf_s = 2(10)^7 \text{ psf} \quad (7.7h')$$

$$w(1-C)(\ell'/b)(\ell/d)^3 \le Zk_3, \text{ where } k_3 = 48E(\Delta/L) = 207(10)^8(\Delta/L) \text{ psf.} \quad (7.7i')$$

Conditions 7.7g′, h′, and i′ are necessary and sufficient to safeguard the slab against excessive shear failure, bending moment, and differential settlement, respectively.

In expression 7.7f, the maximum shear force (V_{max}) is taken equal to $v_c bd$ in accordance with the 1963 ACI Code. In 7.7g, v_c was assumed equal to 75 psi. The 1963 ACI Code allows, as a measure of diagonal tension, a maximum shear stress (v_c) equal to 60 psi at a distance d from the face of the support, i.e.,

$$60/v_c = 0.5\ wL'(1-C)L - wL'd/0.5\ wL'(1-C)L = 1 - 2d/(1-C)L$$

or

$$2d/(1-C)L = 1 - 60/v_c.$$

However,

$$1/1-C \geq 1/0.4 \text{ or } 1/1-C \geq 2.5$$

and

$$d/L > 1/24 \text{ or } 2d/L > 1/12.$$

Therefore,

$$2d/(1-C)L \geq 2.5/12 \text{ or } 2d/(1-C)L \geq 5/24$$

and

$$1 - 60/v_c \geq 5/24 \text{ or } 60/v_c \leq 1 - 5/24 \text{ or } 60/v_c \leq 19/24$$

and

$$v_c \geq 24(60)/19 \text{ or } v_c \geq 75 \text{ psi}.$$

7.8 Design of Type III Slabs

7.8.1 Determination of Effective PI, PVC-Meter Reading, or Percentage Swell of Soil

An essential design parameter, in addition to the average dead and live load on the slab, is the support index (C). As observed in para. 7.3, this index depends on the climatic rating and the PI of the soil.

a. When the soil has a uniform PI for a depth of at least 15 feet,[1] this PI is considered to be the effective PI for design purposes. However, when different soil strata possess different PI's, the determination of a PI value to be used for design purposes is made as follows:

If the PI at the layer immediately below the lowest elevation of the slab is the maximum PI of all soil layers within a depth of 15 feet below the lowest elevation of the slab, then the PI of the top layer is considered applicable to the entire foundation soil.

In all other cases, the PI to be used for design purposes is taken as the weighted average of PI's within the top 15 feet of the soil immediately below the slab stiffening beams. Weight factors (3, 2, and 1, respectively) are used for soil strata within the top, middle, and bottom 5 feet of soil below the stiffening beams.

For example, for the hypothetical soil profile of Fig. 13, below,

$$PI = 1/30 \text{ ft } (\Sigma)$$

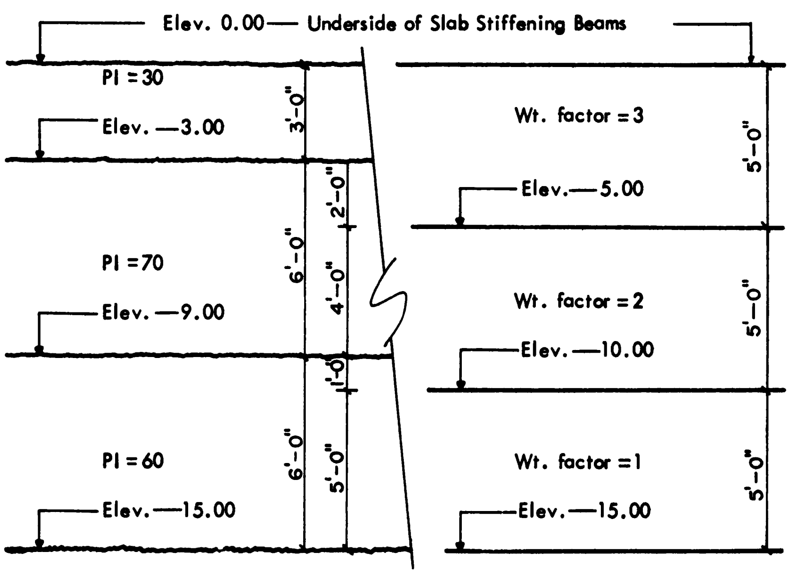


FIG. 13 Hypothetical Soil Profile with Variable PI

[1]All soil measurement depths are taken from below the bottom of the slab stiffening beams.

where Σ = sum of [(weight factor)(thickness of stratum)(PI of stratum)], and 30 ft = 5 ft times the sum of weight factors = 5(3+2+1).

Referring to Fig. 13, p. 66

$$\Sigma = 3(3\text{ ft})30+3(2\text{ ft})70+2(4\text{ ft})70+2(1\text{ ft})60+1(5\text{ ft})60 = 1670\text{ ft}$$

then

$$PI = 1670/30 = 55.7 \text{ or } 56.$$

b. When the determination of support index (C) is based on values of C_W and a PVC-meter reading, the effective value to be used for the PVC-meter reading should be derived in a manner similar to that given above, i.e., if the PVC-meter reading for the soil stratum immediately below the bottom of the slab[1] is higher than the reading obtained in underlying strata within a depth of 15 feet below the slab,[1] then this reading should be considered applicable to the entire foundation soil. Otherwise, a weighted average value of PVC-meter readings should be computed for the soil within 15 feet from the bottom of the slab,[1] i.e., weight factors of 3, 2, and 1, respectively, should be used for the soil strata within the top, middle, and bottom 5 feet of soil below the stiffening beams. (See also Fig. 7, p. 55.)

c. When the determination of support index (C) is made in terms of C_W and percentage swell of the foundation soil, the percentage swell value also should be derived in a manner similar to that given above; i.e., the percentage swell of the top layer should be considered applicable to the entire foundation soil if it is the highest within a depth of 15 feet below the bottom of the slab.[1] Otherwise, the effective percentage swell should be obtained from the percentage swell of the soil strata within 15 feet below the bottom of the slab[1] as a weighted average using weight factors 3, 2, and 1, respectively, for the top, middle, and bottom 5 feet of soil below the bottom of the slab.[1]

The percentage swell for a specific soil stratum should be obtained through swell tests using conventional consolidometer test equipment on undisturbed soil samples under pressure corresponding to the in situ overburden pressure plus the average total dead and live load $(\overline{w})$ on the slab (see also, para. 7.3, p. 51). The

[1]See footnote, p. 66.

undisturbed samples should be obtained under soil moisture conditions representative of conditions prevailing at the time of construction.

7.8.2 Effective Load ($\bar{\bar{w}}$) on Slab

It has been assumed that the slab is uniformly supported on the ground over at least 60% ($C \geq 0.6$) of its area in each of its principal directions. It has also been assumed that the maximum unsupported length in each direction is proportional to the length (L) or width (L′) of the slab. While both these assumptions are reasonable when $L = L'$, they become progressively less so as the ratio L/L' becomes greater than unity. As the ratio L/L' increases above unity, the design becomes more conservative for the long dimension (L) of the slab as compared to the design for the short dimension (L′). For this reason, the load acting along the long dimension is reduced by a coefficient φ which is equal to unity when $L = L'$, and which obtains a minimum value of 0.5 when $L \geq 2.25\,L'$, varying linearly between these limits; thus

$$\varphi = 1.4 - 0.4\,(L/L') \geq 0.5.$$

With this adjustment, and in consideration of expressions 7.7g′, h′, and i′, the effective load ($\bar{\bar{w}}$) acting on the slab can be obtained from the equation

$$\bar{\bar{w}} = w(1 - C)\varphi$$

where

$$\varphi \begin{cases} = 1.4 - 0.4\,(L/L'), \text{ but not less than 0.5, for the analysis in the long direction (L), i.e., when } \ell = L' \\ = 1 \text{ for the analysis in the short direction (L'), i.e., when } \ell = L. \end{cases}$$

When the symbol for the effective load ($\bar{\bar{w}}$) is introduced in expressions 7.7g′, h′, and i′, they become

$$\bar{\bar{w}}(\ell'/b)(\ell/d) \leq k_1, \text{ where } k_1 = 21{,}600 \text{ psf} \qquad (7.8a)$$

$$\bar{\bar{w}}(\ell'/b)(\ell/d)^2 \leq pk_2, \text{ where } k_2 = 2(10)^7 \text{ psf} \qquad (7.8b)$$

$$\bar{\bar{w}}(\ell'/b)(\ell/d)^3 \leq Zk_3, \text{ where } k_3 = 207(10)^8\,(\Delta/L) \text{ psf.} \qquad (7.8c)$$

7.8.3 Determination of Effective Load ($\bar{w}$)

Once the effective PI of the soil is determined and the climatic rating of the site is known, the value of the support index (C) can be obtained from the curves of Fig. 6, p. 53. The average load (w) on the slab consists of two parts

w_d = dead load of the slab itself

w_s = dead and live load of the superstructure.

Of these, w_d is estimated by the empirical formula

$$w_d = (2L + 30) \text{ psf}$$

where L = the long dimension of the slab in feet.

The slab dead load (w_d) empirically obtained as above, must obviously be checked for accuracy after the actual dimensions of the slab, and therefore loads, become known. The value of w_s is derived from the total of actual superstructure dead load plus live load calculated on the basis of 30 psf on each floor and 10 psf on the roof, with no reduction for total area.

With w_d and w_s computed, the effective load ($\bar{w}$) is finally estimated as follows:

$$w = w_d + w_s$$

$$\bar{w} = w(1\text{-}C)\varphi = w\,(1\text{-}C)(1.4\text{-}0.4\ L/L') \geq 0.5\ w(1\text{-}C), \text{ for } \ell = L$$

$$\bar{w} = w(1\text{-}C), \text{ for } \ell = L'.$$

7.8.4 Limiting Values of Variables

The allowable range of the steel ratio (p) is $0.003 \leq p \leq 0.020$. For this range of p, the function $Z = 1/3\ k^3 + np\,(1 - k)^2$ varies in the range of $0.0224 \leq Z \leq 0.0908$.

For extreme cases (the heaviest possible two-story residence built on the worst type of soil, in the most sensitive climatic region), the quantity $\bar{w}$ becomes of the order of 150 psf.

Under usual design conditions, the ratio L/L' varies between 1 and 2, i.e., $1 \leq L/L' \leq 2$, except for overlapping slab portions which belong to a slab of irregular shape.

The width of waffle slab stiffening beam webs usually varies between 8 and 12 inches and rarely reaches 14 inches. The spacing varies at most between 8 and 15 feet.

An economical depth of the stiffening beam is usually between 1/14 and 1/24 of the long dimension of the slab, i.e., $14 \leq L/d \leq 24$. For average effective loads, i.e., $\bar{w} = w(1-C)\varphi = 25$ to 50 psf, a good design depth (d) is 1/20 of the long dimension (L).

From condition equation 7.8a, i.e., $\bar{w}(\ell'/b)(\ell/d) \leq k_1$, it becomes evident that the maximum allowable value for $\bar{w}(\ell'/b)$ will be obtained for the minimum ℓ/d ratio, i.e., for $\ell/d = 7$. For this value of ℓ/d

$$\bar{w}(\ell'/b) \leq 21{,}600/7 = 3086 \text{ or } 3100 \text{ psf.}$$

For the maximum condition ($\ell/d = 24$), 7.8a is reduced to

$$\bar{w}(\ell'/b) \leq 21{,}600/24 = 900 \text{ psf.}$$

Therefore, if $\bar{w}(\ell'/b)$ is less than 900, the shear condition (7.8a) is invariably satisfied.

By dividing respective sides of equation 7.8b by equation 7.8a, and equation 7.8c by equation 7.8b, two expressions are obtained for the ratio ℓ/d

$$\ell/d = k_2/k_1\,(p) = 925\,p \qquad (7.8d)$$

and

$$\ell/d = k_3/k_2\,(Z/p) = 1035\,(\Delta/L)\,Z/p. \qquad (7.8e)$$

By equating the right sides of these two equations

$$Z/p = 0.894\,(L/\Delta)p. \qquad (7.8f)$$

With Z a function of p, it is obvious that for each of the discrete values of L/Δ, i.e., 200, 300, or 360, there is a unique value of p which satisfies equation 7.8f. At this steel-ratio value, all three conditions, i.e., shear (7.8a), moment (7.8b), and deflection (7.8c), are simultaneously satisfied. Therefore, this value of p is required for balanced design of the slab. Corresponding values of p and ℓ/d for the various deflection ratios are

$L/\Delta = 200$; $p_{balanced} = 0.002$ (less than the minimum required)

$L/\Delta = 300$; $p_{balanced} = 0.0177$ (corresponding to $\ell/d = 16.4$)

$L/\Delta = 360$; $p_{balanced} = 0.0154$ (corresponding to $\ell/d = 14.25$)

However, the steel ratio for balanced design is not associated with the most economical design. Inasmuch as the shear condition (7.8a) is more easily satisfied than the conditions for bending moment and deflection, it is not necessary to design for a state of stress for which all three conditions become concurrently critical.

In order to define the boundaries for which the dominating conditions of bending moment and deflection become simultaneously critical, equation 7.8c is divided by equation 7.8b, or

$$\ell/d = 1035\ (\Delta/L)\ Z/p. \qquad (7.8g)$$

For a given fixed value of Δ/L, and for each value of ℓ/d, there is one specific value of the Z/p ratio for which both conditions 7.8b and c are simultaneously satisfied. Values of the steel ratio (p) above the value corresponding to the Z/p ratio for which equation 7.8g is satisfied, tend to become uneconomic because steel, rather than concrete, is used to impart stiffness to the slab in order to prevent excessive deflection. If the steel ratio for the long dimension of a rectangular slab is selected so that critical conditions for bending moment and deflection develop simultaneously, this slab will be stiffer than necessary in the short direction. Thus, in actual design practice, economic design of rectangular slabs often requires that some steel be used to impart stiffness in the long dimension. The significance of this practice will become more evident in the examples of design, and the pertinent graphs to aid the design process, which follow.

7.8.5 Use of Charts for Design

To facilitate design, Figs. 14, 15, and 16, have been prepared for the discrete values L/200, L/300, and L/360 (pp. 72-74).

The charts enable one to select the steel ratio (p) in terms of the load index, i.e., the amount $\bar{w}\ (\ell'/b)$ for specific values of the depth ratio (ℓ/d) at increments of one.

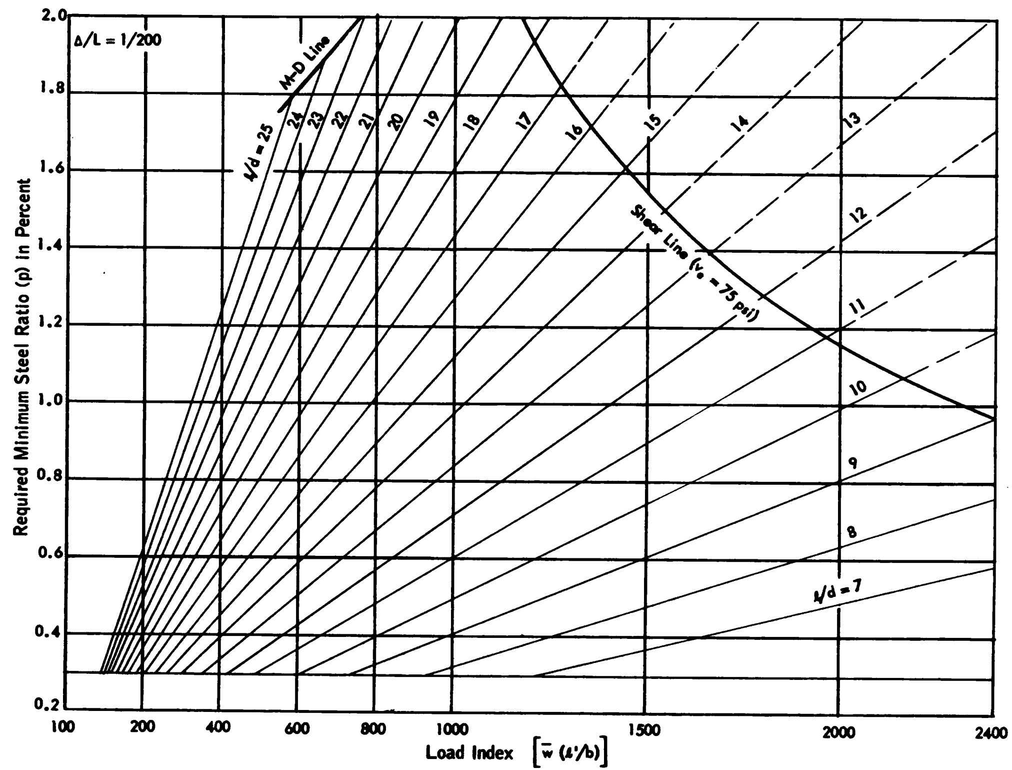


FIG. 14 Steel Ratio (p) in Terms of Load Index [$\bar{w}(\ell'/b)$] and Depth Ratio (ℓ/d) for $\Delta/L = 1/200$

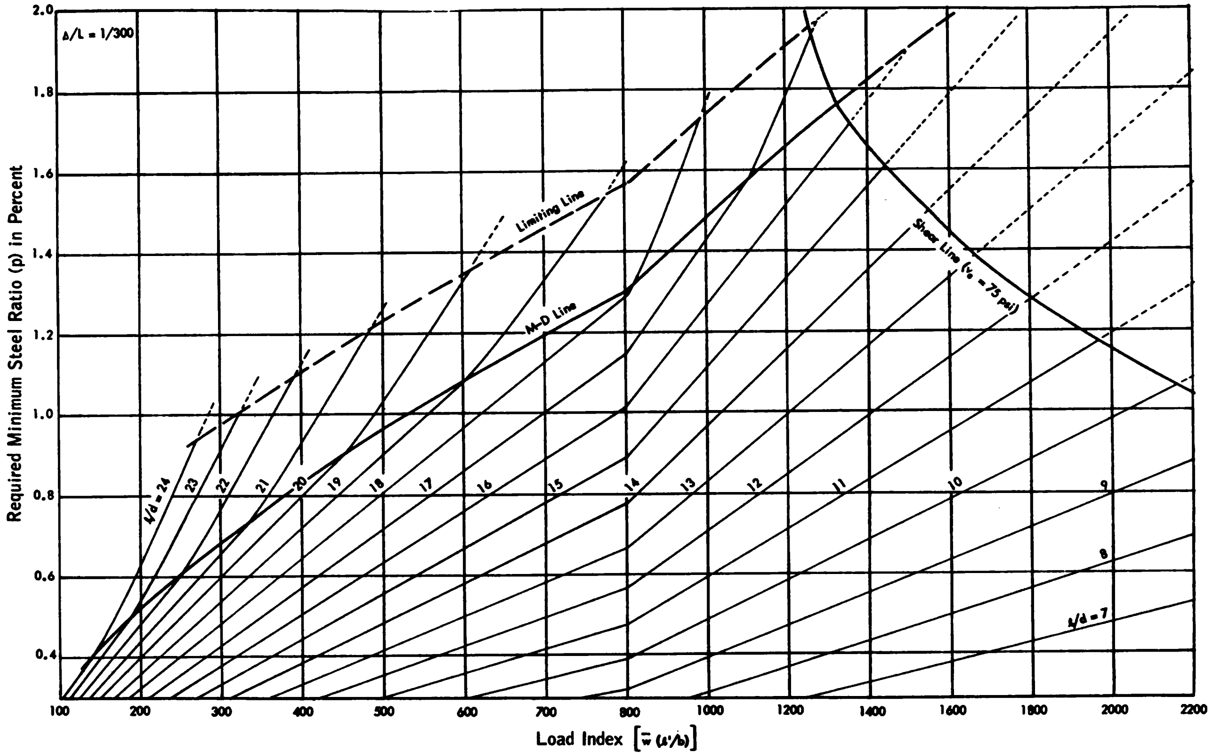


FIG. 15 Steel Ratio (p) in Terms of Load Index [$\bar{w}(\ell'/b)$] and Depth Ratio (ℓ/d) for $\Delta/L = 1/300$

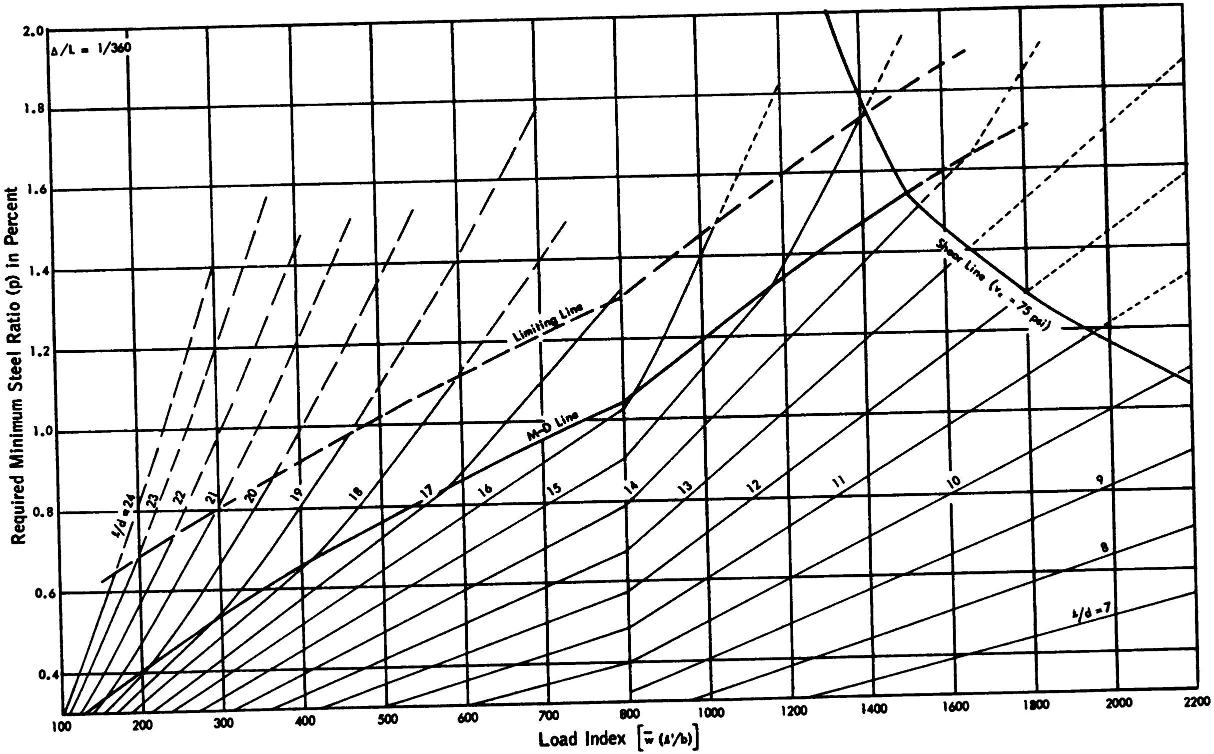


FIG. 16 Steel Ratio (p) in Terms of Load Index [$\bar{w}$ (ℓ'/b)] and Depth Ratio (ℓ/d) for $\Delta/L = 1/360$

For a given ℓ/d, the minimum required steel ratio (p) increases linearly with $\bar{w}(\ell'/b)$, in accordance with the bending moment condition (7.8b). This linear dependence is graphically expressed in the curves of Figs. 14, 15, and 16. However, in accordance with shear condition 7.8a, the product ℓ/d times $\bar{w}(\ell'/b)$ cannot exceed k_1 = 21,600 psf unless the stiffening beams are reinforced with stirrups for shear. The limits, therefore, up to which the linear function 7.8b is valid for use of stiffening beams without stirrups, are defined in the charts by the curve marked v_c = 75 psi.

This means that if, for a selected combination of ℓ/d and $\bar{w}(\ell'/b)$, the corresponding value of minimum steel ratio (p) is above the shear line v_c = 75 psi, the stiffening beam then designed should be reinforced with stirrups to accommodate shear stresses in excess of 75 psi. This practice is not recommended.

Instead, if this happens, changes should be made in b or d, to effect a reduction below the shear line of the minimum required steel ratio (p). If, however, for any reason this is not done, the designer should compute the necessary steel for stirrups on the basis of a maximum shear given by equation 7.7b, and modified by the load coefficient, i.e.,

$$V_{max} = 0.5\,\bar{w}(LL') = 0.5\,\bar{w}(1 - C)\,LL.$$

The deflection condition 7.8c requires that, for a given deflection ratio (Δ/L), the minimum required Z be

$$1/k_3\ (\bar{w})\ell'/b(\ell/d)^3$$

Table IV provides values of Z for discrete values of p, at increments of 0.1% in the range $0.003 \leq p \leq 0.02$. Fig. 17, p. 77, charts the function Z versus p. A four-degree polynomial curve, fitted by the method of least squares, provides p as a function of Z in accordance with

$$p = -0.088092446 + 0.17827805(Z) - 0.5542073(10)^{-2}(Z)^2$$

$$+ 0.17393919(10)^{-2}(Z)^3 - 0.55434473(10)^{-4}(Z)^4.$$

This shows that p increases with Z, and that the minimum required p increases nonlinearly with the load index $[\bar{w}(\ell'/b]$ in accordance with 7.7i.

The curve designated as M-D (for moment-deflection) in Figs. 14, 15, and 16, represents the values of p for which the deflection and bending moment conditions are simultaneously satisfied. Above

TABLE IV Values of the Steel Ratio Function (Z)

p	Z[1]	k[2]
0.003	0.0224	0.216
0.004	0.0277	0.246
0.005	0.0332	0.270
0.006	0.0384	0.291
0.007	0.0433	0.309
0.008	0.0479	0.327
0.009	0.0523	0.344
0.010	0.0565	0.359
0.011	0.0605	0.373
0.012	0.0644	0.386
0.013	0.0681	0.398
0.014	0.0717	0.410
0.015	0.0752	0.421
0.016	0.0785	0.432
0.017	0.0817	0.442
0.018	0.0848	0.452
0.019	0.0879	0.460
0.020	0.0908	0.464

[1] $Z = 1/3k^3 + np(1-k)^3$

[2] $k = \sqrt{2np + n^2p^2} - np$

$n = 10$

this curve, the required steel to satisfy the deflection condition 7.8c is greater than the steel ratio required to satisfy the bending moment condition 7.8b—this derivation is as described above.

If the value of the minimum required steel ratio (p) is, for a given set of $\bar{w}(\ell'/b)$ and ℓ/d values, above the M-D curve, the deflection condition 7.7i controls, and the value of p is obtained by nonlinear extension of the curves as shown in Figs. 14, 15, and 16.

For reasons explained above, the broken-line curve marked in the chart as "limiting steel" should be regarded as the curve defining the maximum allowable steel ratio (p) for any combination of $\bar{w}(\ell'/b)$ and ℓ/d. If, for a given combination of $\bar{w}(\ell'/b)$ and ℓ/d, the minimum required p is above this boundary line, a change should be made in the values of d, b, or both, to effect a reduction of the minimum required steel ratio (p) below this line.

7.8.6 Design Sequence

The designer usually bases design on the following given conditions:

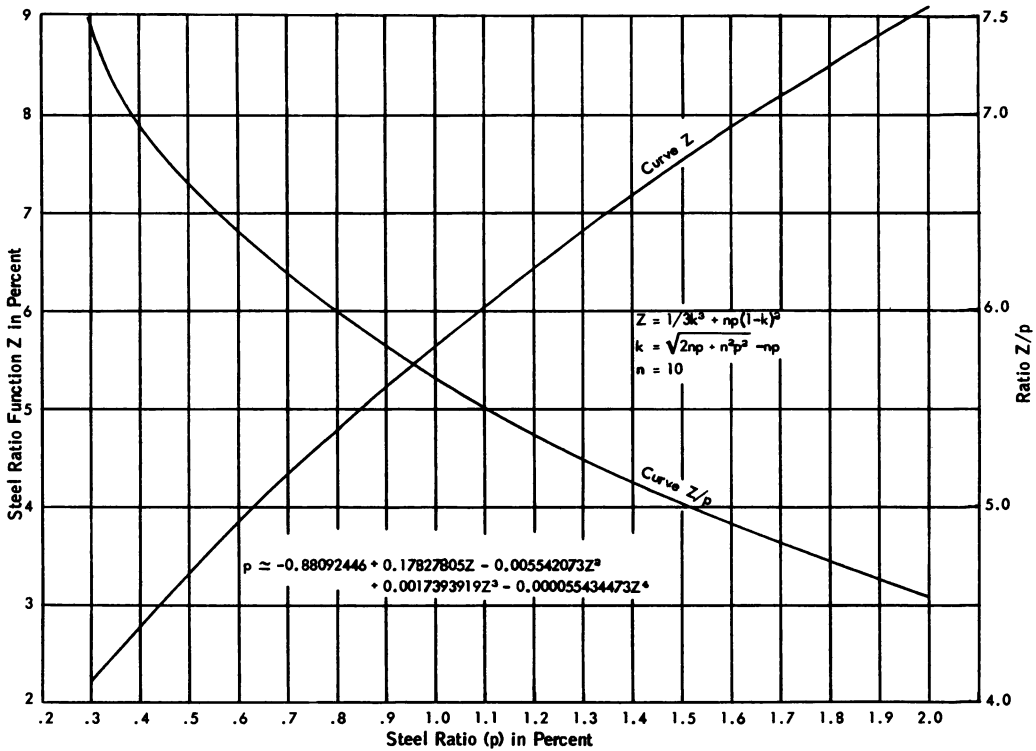


FIG. 17 Z vs. p Curve and Z/p vs. p Curve

a. Slab dimension L and L′

b. Support coefficient (C), which depends on slab site, and PI and q_u of the soil

c. Effective load coefficient (φ), which depends on the ratio L/L′

d. Dead and live load (w) acting on the slab.

From these quantities, the designer must determine values for the bottom and top steel ratios (along the two dimensions of the slab), in terms of widths b and b′ and depth d of the stiffening beams. These variables must be so defined as to ensure economy of materials and construction, and to satisfy the shear, bending moment, and deflection criteria given by expressions 7.8a, b, and c, respectively.

To achieve these goals, the following guidelines and procedure are recommended:

Step 1 — Estimate the total average dead and live load on the slab, i.e.,

a. First compute the total superstructure load (w_s), allowing for a live load of 30 psf of floor area and 10 psf of roof area, and introducing all superstructure dead loads at true value

b. Next, estimate the per-square-foot dead load (w_d) of the slab itself from the empirical formula

$$w_d = (2L + 30) \text{ psf}$$

where L is the long side of the rectangular slab in feet

c. Finally, set the average total load, i.e., $w = w_d + w_s$.

Step 2 — On the slab site, determine

a. The lowest unconfined compressive strength (q_u) from undisturbed samples within the top 15 feet of soil immediately below the lowest point of the slab (if q_u obviously exceeds 7.5w, i.e., 7.5 times the average slab dead and live load, its determination is not necessary); verify that $q_u/w \geq 2.5$—if not, a Type IV slab will be necessary (Table I, p. 11).

b. The plasticity index (PI), as specified in para. 7.8.1, pp. 65-68.

Step 3 — Determine (Fig. 6, p. 53) the support index (C) in terms of the climate rating (C_w) as obtained from Fig. 1, p. 38 and the PI as determined in Step 2 above. Equate C to the value of the modified support index (C_m) as given by the empirical equation of para. 7.4, pp. 54 and 56, whenever—because of special circumstances—conditions are such that variations in soil moisture are not reasonably expected to the extent stipulated by the climatic rating (C_w), para. 7.4.

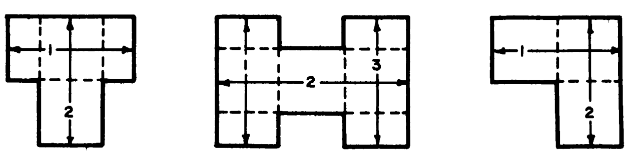
Wherever $7.5 < q_u/w \leq 2.5$, equate C to the value of the reduced support index (C_r) as given in para. 7.5, pp. 56-58. In computing the ratio q_u/w, use a tentative empirical value for w_d obtained from the relationship

$$w_d = 2L + 30 \text{ psf}$$

where L is the long dimension of the slab in feet.

Step 4 — From Table III, p. 50, determine the maximum allowable deflection ratio (Δ/L) for the contemplated type of superstructure.

Step 5 — Determine outside dimensions of slabs to be designed.[1] Divide slabs of irregular shape into overlapping rectangles in such fashion that the resulting exterior boundary provides complete congruence with the slab perimeter—e.g.,



Design each of the composing rectangles thus derived as in Step 6 below.

Step 6 — In terms of the ratio L/L', average load (w), and support index (C), compute the effective average load (w) on the

[1]See also 5.0, pp. 21-22.

slab for design in the long and short dimensions from the following equations:

$$\bar{w} = w(1\text{-}C)\,\varphi \text{ for the long direction}$$

$$\bar{w} = w(1\text{-}C) \text{ for the short direction}$$

where $\varphi = 1.4 - 0.4\,(L/L') \geq 0.5$.

Step 7 — Divide both sides of the slab with stiffening beams spaced at equal distances. Select a beam spacing not greater than 15 feet, nor smaller than 8 feet—preferably 9 to 12 feet. Select a beam width between 8 and 14 inches, preferably 8 to 10 inches.

In practice it is often difficult to open an 8-inch-wide trench in the ground, especially a deep one, i.e., 20 inches or more. However, it must be recognized that selection of wider beams does not lead to savings in beam depth or in the amount of reinforcement unless

a. Shear stresses are high and an increase of B or B′ may reduce the load factor $[\bar{w}\,(L'/b)]$

b. The steel required for deflection control is substantially more than the steel required for bending moment—a condition which is more likely to occur in the long direction.

Consequently, it is recommended that design be based on narrow beams which can be widened if it becomes evident that such widening will reduce the steel or ease shear stresses. Once designed, the beams can of course be built wider in the field if doing so appears to offer advantages in construction.

Within the range of values set here, a closer spacing of beams and a greater width are recommended for comparatively greater values of the effective load. (Usually beams 8 inches wide at about 12-foot spacing will be adequate for effective loads not exceeding 30 to 35 psf.)

If L and L′ are, respectively, the long and short dimensions of the slab, compute the load factors

in the long direction,

$$\bar{w}(\ell'/b) = w(1 - C)\,\varphi\,(L/B)$$

and, in the short direction,

$$\bar{w}(\ell'/b) = w(1\text{-}C)(L/B).$$

In both cases, the load index must be smaller than 3100. It is recommended that the load index in the long direction be kept below 1200, and, in the short direction, below 2000, by adjusting the spacing and/or width of the stiffening beams.

Step 8 — Select a beam depth (d). This depth is determined indirectly from the depth ratio (L/d), i.e., long dimension (L) over beam depth (d). The L/d ratio is selected in terms of the effective load ($\bar{w}$) in the long direction and the deflection ratio (Δ/L). The following rule of thumb can be used for selecting a trial value for the depth ratio (L/d):

For $0 \le \bar{w} \le 25$ psf, $L/d \ge 20$

For $25 < \bar{w} \le 50$ psf, try $20 \ge L/d \ge 17$

For $50 < \bar{w} \le 150$ psf, try $18 \ge L/d \ge 14$.

Usually a comparatively lower range of L/d values is recommended, i.e., greater depth (d) for $L/\Delta = 360$. The higher range of values is more appropriate for $L/\Delta\,200$. Square slabs require comparatively lower values of L/d.

Step 9 — For the given value of Δ/L (depending on type of superstructure, Table III, p. 50), enter the appropriate chart, i.e., Fig. 13, 14, or 15. Then proceed as follows:

a. When designing for the long (L) direction, find the value of load index $\bar{w}(\ell'/b) = w(1\text{-}C)\,\varphi\,(L'/B)$ and determine p for the value corresponding to the ratio L/d. If p is too far below the M-D curve, it means that beams selected were too deep, i.e., d is too large. If p is above the "limiting steel" curve, it means that beams selected were too shallow and probably too narrow. In both cases, an adjustment should be effected in the value of either B or d, or both, and the design repeated from Step 7.

If the minimum required steel ratio (p) lies above the 75-psi curve, it means that the selected width (B) is too small. An increase should be made and the slab redesigned from Step 7.

If, in an exceptional case, it is desired to restrict beam dimensions, the beams should be provided with stirrups to accommodate the excessive shear stresses. In this case, the ACI Code should be used, and the maximum effective shear force should be estimated from

$$V_{max} = 0.5\ (1\text{-}C)\ LL'.$$

This shear force will be assumed to be distributed among all the beams in the direction for which the design is executed.

A good selection of values for B and d will usually (with some exception for very lightly or very heavily loaded slabs) result in values of p in the neighborhood of the M-D curve

b. When designing for the short (L′) direction, find the value of load index $\bar{w}(\ell'/b) = w(1 - C)(L/B')$, and determine p for the value corresponding to the depth ratio $\ell/d = L'/d$. If the p-value is less than 0.003, ascertain whether B′ can be reduced (but not below a value corresponding to a beam width of less than 8 inches).

If B′ cannot be reduced, check the previously determined steel ratio (p) for the long direction. If p for the long direction is below the M-D curve, reduce the depth (d) of the beams and redesign from Step 7. If p in the long direction is above the M-D curve, the width of beams running along the short direction is 8 inches, and p in the short direction is less than 0.003, then use 0.003 for p in the short direction (the minimum required steel ratio).

c. For reinforcement, if b_s and b'_s are, respectively, the width of each stiffening beam along the long and short dimensions of the slab, the bottom steel (A_s) in each beam is determined by $A_s = pb_s$ for the beams in the long direction, and by $A_s = pb'_sd$ for the beams in the short direction, where p is the steel ratio for the long and short dimensions, respectively.

The top steel (A'_s) in each beam is given by

$$A'_s = A_s - 0.65 \text{ in.}^2$$

This top steel is to be placed one inch clear of the slab top, and the bottom steel is to be placed two inches clear of the beam bottoms.

d. Adjustments for unequal spacing should be made if, as often happens in slabs of irregular shape, the beams in one direction of a particular rectangular portion of the slab are not all equally spaced. Since the above design assumes equal spacing of all beams in any one direction of the slab, an adjustment is needed for the steel. Whether this adjustment will influence only the steel, or both the steel and beam width, depends on how critical the shear criterion is for the beams concerned. If, in determining the steel ratio (p) for average spacing, the point in the appropriate chart (Fig. 14, 15, or 16) corresponding to this ratio is found to be very close (within 0.15%) to the v_c = 75-psi curve, then the shear criterion must be considered close to critical. In such case, both the width (b_s) and the steel (A_s) are increased in all beams at more than average spacing by a factor equal to the ratio of the actual over the average spacing of the beams. True spacing of an intermediate beam at unequal distances from adjacent beams to either side is considered equal to the average value of these two unequal distances; spacing of an end beam is considered equal to its distance from the first interior beam.

If the shear criterion is not close to critical (ratio p not within 0.15% of the v_c = 75-psi curve), the only adjustment required is for steel. In this case (which is the most commonly encountered), only the steel in beams spaced at more than the average spacing is increased, i.e., by the ratio of the actual to the average beam spacing.

7.8.7 Top Slab

The stiffening beams of a waffle slab divide the slab into rectangular or square bays. If the beam spacing is 12 feet, then a top slab 4 inches thick is adequate, provided no unusual concentrated loads (such as chimneys or heavy equipment) are acting on the slab. This 4-inch slab is to be reinforced with No. 3 bars, 12 inches o.c. each way, placed at one third the thickness of the slab from the top.

If the maximum clear dimension of some rectangular or square bays exceeds 12 feet, the designer then has the choice of using either a slab with No. 3 bars at 10 inches o.c. each way, or a 5-inch slab with No. 3 bars at 12 inches o.c. each way.

In either case, the steel is placed at one third the thickness of the slab from the top. These provisions for the top slab are valid with the limitation that no unusual concentrated loads are acting on the slab.

7.8.8 Excluded Parameters

Obviously, in the analytical procedure thus far presented, there are numerous parameters which have not been entered in the mathematical expressions or reflected in the conclusions of this report. Among these parameters are the actual moment of inertia of the concrete T-beam which deflects because of both negative and positive moment, and the contribution of the stiffness of superstructure to the stiffness of the slab.

The problem is sufficiently complex when analyzed on the basis of the parameters which have been given consideration. While a rigorous mathematical procedure has been provided here, this analysis is based in several critical instances upon assumptions which of necessity limit the precision of the solution that can be obtained in each instance. Since the additional parameters would influence design results to a degree less than the measure of accuracy provided by the considered basic assumptions, their inclusion would complicate the problem of analysis without making a meaningful contribution. Thus, besides adding to the difficulties of analysis, it would mislead by implying an accuracy beyond that inherent in the assumptions which have been made.

It is felt that, in its present form, the analytical method provided herein gives due and adequate consideration to the principal parameters involved. These parameters, as well as the pertinent assumptions, are clearly identified; thus experience plus future case histories of designs based on this analysis can be expected ultimately to provide data needed for reevaluation of the basic assumptions and for any necessary corrections. As the degree of approximation in present assumptions can be more accurately gauged, other parameters can be worked into the design procedures. This should happen as soon as the order of accuracy associated with the omitted parameters is comparable with the overall accuracy of the developed analysis.

Only the properties of the soil itself and its tendency to heave under varying climatic conditions of moisture have been considered. Excluded is any design reference to frost action. Where frost is a problem, local codes usually require that the perimeter wall, even with a slab-on-ground, be carried below the frost line. Where such is the case and the slab is to be stiffened as well, interior cross beams need be made only as deep as needed to conform to the requirements established in this report, not to the greater depth which may be required for exterior beams to reach below the frost line.

7.8.9 Use of 24,000-psi Steel (ASTM A-432) or WWF

Whenever 24,000-psi reinforcing bars are used, the cross-sectional area of required steel, as determined from the formulas in this report, can be modified as follows:

a. Bottom reinforcement of beams can be reduced by one sixth, provided it is not less than 3% of the effective beam concrete area (bd).

b. Slab reinforcement cannot be reduced unless use is made of WWF. In this case, 6x6 - 3/3 WWF may be substituted for No. 3 bars at 12 inches o.c. and 6x6 - 2/2 WWF may be substituted for No. 3 bars at 10 inches o.c.

c. Top reinforcement of beams will not be reduced unless reinforcing bars used in the top slab comply with ASTM A-432 or consist of WWF. In this event, top reinforcement will be equal to bottom reinforcement (reduced as specified in a above), less 0.55 in.^{2}.

7.9 Design of Type III Slabs on Compressible Soils ($7.5 > q_u/w \geq 2.5$)

Compressible soils usually have an unconfined compressive strength (q_u) of less than 2000 psf. The average dead and live load on slabs-on-ground supporting residential construction of no more than two stories varies in the range of 200 psf $\leq w \leq$ 400 psf. Therefore, by defining compressible soils as those for which the ratio $q_u/w < 7.5$, it is assumed that a hazard resulting from settlement due to soil compressibility becomes likely when the unconfined strength of the soil (q_u) is less than a limit which varies between 200 (7.5) = 1500 psf and 400 (7.5) = 3000 psf. Since it is the ultimate settlement, rather than the slope of the stress-settlement curve, which defines the damage potential of compressible soil, a given soil can be considered "acceptable" with respect to compressibility when subjected to relatively small loads (w), and unacceptable when subjected to larger loads (w). This explains why a lower limit (q_u = 1500 psf) defines compressible soils when subjected to light slab loads of approximately 200 psf, while the higher limit (q_u = 3000 psf) is used to define compressibility for soils subjected to higher loads, i.e., approximately 400 psf.

7.9.1 Behavior of Compressible Soils under Uniform Load (w)

In describing the behavior of compressible clay soils under the application of uniformly distributed loads (w), it is useful to review two theoretically extreme cases. The first (Fig. 18a), graphically represents an absolutely flexible slab. With such a slab, loads (w) are balanced by equal soil reactions (w) from below, since the slab cannot develop or transmit shear forces or bending moments (a bedsheet provides a simple analogy). If a slab of this kind receives a uniform load (w), it will have to develop support stresses exactly equal to w, in lieu of shear or bending moment. The result will be uniform loading (w) of the soil over its entire surface. When the soil is loaded uniformly at its surface, it will develop nonuniform stresses at a depth below the surface in accordance with the

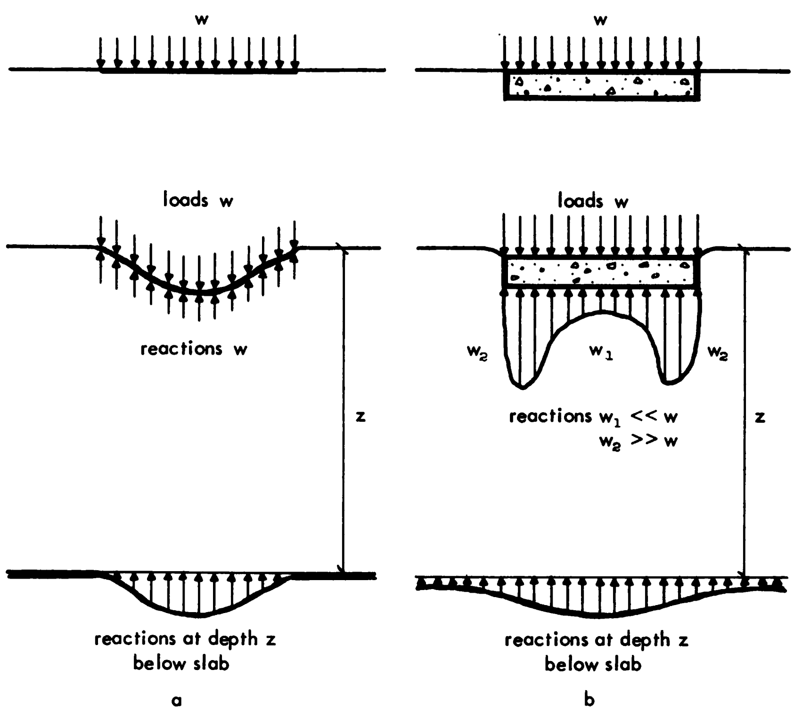


FIG. 18 Stress Pattern in Clay Compressible Soils under Absolutely Flexible and Absolutely Rigid Slabs

elasticity analysis of Boussinesque, or the Westergaard theory, for imperfectly elastic soils. According to these theories, higher stresses will develop under the center of the slab than under the perimeter as the depth below the slab increases. Thus, the soil will undergo a greater total settlement under the center than under the edges, and the perfectly flexible slab will settle unevenly, "dishing" as shown in Fig. 18a.

The second extreme case, shown graphically in Fig. 18b, is an absolutely rigid slab, i.e., one having an infinite modulus of elasticity or rigidity and hence one which will not deform under any combination of loads. If such a slab is placed over a compressible clay soil and loaded uniformly with load w, it will have to settle uniformly because of its rigidity. Therefore, it will force a distribution of stresses on the soil, such that the soil surface will settle uniformly. By applying either the Boussinesque or the Westergaard theory for analysis of soil settlement, substantially higher stresses (w_2) must be applied on the soil surface below the perimeter of the slab than the stresses (w_1) under the center of the slab, in order to bring about uniform settlement of the soil surface under the entire area of the slab. Under such an unequal distribution of stresses at the slab undersurface, the stresses which will develop at some depth below the slab will tend to be equal over the full extent of the slab; eventually, at a sufficient depth below the slab, stresses will tend to be higher below the center than below the perimeter of the slab.

Since settlement will be equal at all points on the slab, it follows that the integrals of all settlement increments over all increments of depth are identical at all points, even though the contact pressure immediately beneath the slab is higher at the perimeter than over the interior area under the slab.

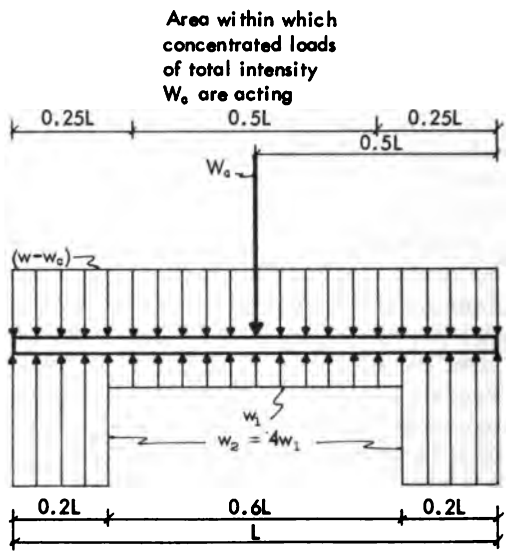
From study of these two extreme cases (Fig. 18), it becomes evident that in a regular, beam-stiffened slab-on-ground, the soil reactions must be uneven and substantially higher under the perimeter of the slab if excessive differential settlements of the slab are to be prevented. Therefore, to have a slab-on-ground which will not settle unacceptably, sufficient strength and stiffness must be imparted to the slab to resist the bending moments resulting from uneven support pressures within the limits of the allowable Δ/L ratio.

7.9.2 Assumed Reactions and Corresponding Support Index (C) for Slabs on Compressible Soils

The assumed soil reactions on a slab supported on compressible soils are in accordance with the discussion in the preceding paragraph, and provide for a pressure intensity along the perimeter of the slab four times as high as the pressures under the center.

To determine qualitatively the support index (C) corresponding to a slab on compressible soil, consider the idealized general case illustrated in Fig. 19. This slab is loaded with a total weight, which includes (W) dead and live loads, the weight of the slab itself and all concentrated loads, and is analyzed along its long dimension (L). Any substantial concentrated load (W_c), such as bearing walls, acting normal to the L-direction of the slab, within the central 50% of its length (L), are assumed concentrated at the center of the slab and uniformly distributed along its least dimension (width L′).

The part of the total load ($W - W_c$) which is not assumed concentrated at the centerline of the slab, is assumed uniformly



$w = \frac{W}{LL'}$ = Total average load on slab

$w_c = \frac{W_c}{LL'}$ = Total concentrated load acting within critical area of slab along L direction, and averaged over total slab area

FIG. 19 Loading and Reaction Assumptions for Slab Supported on Compressible Soils distributed over the entire slab. Both these assumed loads and reactions are shown. Summarizing,

w_1 = reaction intensity under the slab center

$w_2 = 4w_1$ = reaction intensity along end strips of width 0.2L

$w = W/LL'$ = average total load intensity over the entire slab, including concentrated loads

$w_c = W_c/LL'$ = total concentrated load (W_c) averaged over the entire slab area.

The conditions and equations for these forces are derived from statics, i.e.,

$w - w_c$ = intensity of uniform load acting on the slab

$$W = (w - w_c)\,LL' + W_c = \text{downward forces} \qquad (7.9a)$$

$$W = 0.4\,LL'\,w_2 + 0.6\,LL'\,w_1 = 1.6\,LL'\,w_1 + 0.6\,LL'\,w_1 = 2.2\,LL'w_1.$$

Then,

$$w_1 = W/2.2LL' = w/2.2 = \text{upward forces.} \qquad (7.9b)$$

The maximum bending moment occurs at the slab center. Therefore,

$$M_{max} = 0.2LL'\,(4w_1)\,0.4L + 0.3LL'\,w_1\,(0.15L) - 0.5LL'(w - w_c)\,0.25L$$

$$= 0.32w_1\,L^2L' + 0.045w_1\,L^2L' - 0.125(w - w_c)\,L^2L'$$

$$= 0.365w_1\,L^2L' - 0.125(w - w_c)\,L^2L'.$$

Incorporating equation 7.9b,

$$M_{max} = (0.365/2.2)(wL^2L') - 0.125wL^2L' + 0.125\,w_cL^2L'$$

$$= 0.041wL^2L' + 0.125w_cL^2L'$$

$$= (L^2L'/8)(0.33\,w + w_c). \qquad (7.9c)$$

The maximum bending moment (based on the criteria developed for expansive soils) for a slab supported by a soil for which $q_u/w \geq 7.5$ is given by equation 7.7a, p. 62, and is

$$1/8(L^2L')(1-C)\,w.$$

Equating this maximum bending moment to the righthand side of equation 7.9c permits an evaluation of the support index (C_r) corresponding to compressible soils, i.e.,

$$(L^2L'/8)(0.33w + w_c) = (L^2L'/8)(1-C_r)w \qquad (7.9d)$$

where C_r = reduced support index for compressible soils ($2.5 \leq q_u/w < 7.5$).

Solving equation 7.9d for C_r,

$$C_r = 1-0.33 - w_c/w = 0.67 - w_c/w \simeq 0.65 - w_c/w.$$

Since compressibility is a relative rather than an absolute soil property, it is assumed that the support index (C) for soils with $q_u/w \leq 7.5$ is reduced linearly to the value $0.65 - w_c/w$, as the ratio q_u/w moves from 7.5 to the limiting value of 2.5. With this assumption, the reduced support index (C_r) becomes a linear function of the ratio q_u/w, and is expressed mathematically by the relationship (equation 7.5a, p. 56)

$$C_r = (2.5 - q_u/w)[0.13 - 0.2\,(w_c/w) - 0.2C]$$
$$+ 0.65 - (w_c/w) \qquad (7.9e)$$

for $C \geq 0.65 - (w_c/w)$.

Obviously, for the case $C < 0.65 - (w_c/w)$ (i.e., when the value of C for noncompressible soils is already smaller than the limiting value $0.65 - (w_c/w)$ of the reduced support index), the value of C_r is equated to that of C, so that

$$C_r = C \qquad (7.9f)$$

for $C < 0.65 - (w_c/w)$.

It is easy to see that for slabs with no concentrated loads (W_c), equations 7.9e may be simplified, i.e.,

$$C_r = [2.5 - (q_u/w)](0.13 - 0.2C) + 0.65 \qquad (7.9g)$$

for $C \geq 0.65$.

7.9.3 Design Sequence

The design sequence for Type III slabs on compressible soils is identical with that for Type III slabs on soils for which $q_u/w \geq 7.5$, with the following modifications:

a. The design is carried out both for the initial value of the support index (C), and for the reduced value of the support index (C_r) as obtained from equations 7.9e and f.

b. If the soil is not compressible (i.e., if $q_u/w \geq 7.5$), the applicable support index would be C and the amount of steel (A_s) resulting from Step 9c, p. 82, would be placed at the bottom of each beam. A corresponding amount of steel ($A_s' = A_s - 0.65$ in.^{2}) would be necessary at the top of each beam. On the contrary, if the slab is to be placed on compressible soil (i.e., $2.5 \leq q_u/w < 7.5$), the applicable support index has the value C_r, and the reinforcement per beam (A_s) computed on this basis is necessary only at the bottom of each beam; i.e., slabs on compressible soils deform with the tensile side on the bottom (para. 7.9.1, pp. 86-87).

c. Since the transition from soils which are not classified compressible ($q_u/w \geq 7.5$) to those which are compressible is gradual rather than sudden, it is not reasonable to shift at the boundary of $q_u/w = 7.5$ from a slab with beams reinforced at top and bottom to beams reinforced only at the bottom. For this reason, if the bottom steel (A_s) computed on the basis C_r is greater than or equal to $A_s + A_s'$ (sum of bottom and top steel computed on the basis of C for a slab with identical dimensions), then no top reinforcement is placed, and the bottom reinforcement is equal to the reinforcement (A_s) computed on the basis of C_r.

If, on the other hand, bottom steel (A_s) computed on the basis C_r is less than $A_s + A_s'$ (sum of bottom and top steel computed on the basis of C), then the slab is designed with bottom steel equal to A_s as computed on the basis of C_r, and with top steel equal to the difference of this steel (A_s) and the sum of $A_s + A_s'$ as computed on the basis of C.

This design procedure will be illustrated in para. 7.13, pp. 115-122.

7.10 Related Design Considerations

7.10.1 Concentrated Loads on the Slab

Every effort should be made to ensure that concentrated loads such as chimneys are so located that these loads are transferred to the stiffening beams. It is particularly important that concentrated loads in excess of 100 psf per bay area (including slab load) be so located as to rest on at least two stiffening beams.

In the case of smaller concentrated loads, a structural analysis of the supporting slab is necessary to assure its ability to transfer such loads to adjacent stiffening beams. Such analysis should be conducted on the assumption that the particular portion of the slab involved will be called on to act as a framed slab supported directly on the stiffening beams, and hence that ACI provisions apply.

7.10.2 Limiting Reinforcement

It is expected that a Type III slab will be subjected to a variety of support conditions; consequently, deflections will occur in the slab. To ensure that the slab will be able to accommodate these deflections and accompanying stresses, it is essential that a steel ratio no less than 0.003 nor greater than 0.02 be provided.

In addition, the need for shear reinforcement will usually be dictated by whether the slab itself possesses sufficient inherent shear strength. Every effort should be made to eliminate the need for special shear reinforcement. Nonetheless, in all cases, No. 2 stirrups at 5 feet o.c. should be provided as a minimum, properly to position and maintain the spacing of longitudinal reinforcement.

The distribution and location of reinforcement is also important, i.e.,

a. bottom reinforcement should be positioned 2 inches clear of the bottom of the beam

b. top reinforcement should be positioned at least 1 inch clear of the top of the slab

c. slab reinforcement for a 4-inch slab should be positioned one third the slab thickness clear of the top of the slab and should be uniformly distributed; for slabs of greater thickness, clearance should be increased so that the bottom of the lower crossbars is at the slab center line

d. reinforcing bars for the top slab should be spaced not closer than 4 inches o.c., nor farther than 12 inches o.c.

If the selected beam dimensions are larger than those required by structural considerations incorporated in the design procedure of this report, the limiting reinforcement ratio should be considered applicable to the dimensions used for the structural design, instead of the dimensions specified for construction. However, in this case, the contribution to strength and/or stiffness of dimensions specified for construction will be ignored throughout the design.

7.10.3 Embedment of Conduits in the Slab

Since movements in Type III slabs are to be expected, embedment in the slab of utility lines, heating pipes, ducts, and the like is highly inadvisable. Special care must be taken to prevent breaking of such pipes by isolation from the slab whenever passage through the slab is necessary. Pipes should pass through the slab vertically and be provided with expansion joints; service lines entering the house should pass beneath the stiffening beams.

7.10.4 Other Stiffened-Slab Designs

The design procedures in previous paragraphs are not to be construed as precluding use of other stiffened-slab designs, nor of precast and prestressed slab designs. Such designs should be considered acceptable for Type III slabs, provided that the design concepts incorporated in this report are also incorporated in the alternate design.

In the case of prestressed concrete, the design should be based on the provisions of the ACI Code. The moment of inertia of the slab should be based on the complete uncracked section rather than the cracked section as recommended earlier, and the computation of deflection on an effective modulus of elasticity (E') of creeping concrete which is equal to one third the value of the modulus of elasticity (E) for concrete provided in the ACI Code for the type of concrete to be used.

7.11 Example 1—Design of Type III Slabs Supported on Expansive Soils

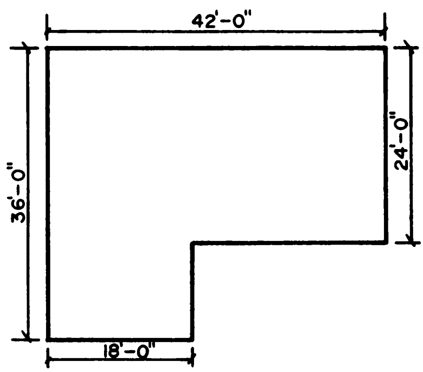
The procedures which follow demonstrate the application on expansive soils of the criteria recommended in 1.4, pp. 14-20.

7.11.1 Determination of Slab Type[1]

Slab type determinations are made in three steps corresponding to the criteria in para. 1.1, pp. 10-12. Once it has been determined on the basis of this investigation that a Type III slab is required, the design proceeds as is illustrated in the ten steps which follow (para. 7.11.2).

Location: San Antonio, Texas.

Floor plan and outside dimensions:



Type of construction: solid masonry with plaster-on-lath interior

Total weight of superstructure = all dead and live loads = 185 kips

Method of heating: warm-air with ducts in attic

Partitions: non-load bearing, weighing 100 plf

Openings through slab: none greater than 8 inches; all having expansion joints

Concentrated loads: none

Concrete: 2500 psi; v_c = 75 psi.

[1] See para. 1.1, pp. 10-12.

Step 1 — Summarize soil investigation results.

a. Soil type: CH with PI = 41 to a depth of 10 ft, and
GW with PI = 0 from 10-20 ft in depth

b. Consistency of CH soil: Stiff, q_u = 2800 psf

c. Relative density of GW = 65%.

Step 2 — Determine climatic rating. Referring to Fig. 1, p. 38, C_w = 17 for San Antonio (by interpolation).

Step 3 — Determine appropriate slab type. Since the soil to a depth of 10 feet is CH with PI > 15, and q_u/w is obviously > 7.5, it is determined from Table I that a Type III slab is required.

7.11.2 Application of Type III Procedure[1]

Step 1 — Determine total average load.

a. Compute superstructure load per square foot of slab area [total slab area = 42(24) + 12(18) = 1224 ft^2]

$$w_s = 185{,}000/1224 = 151 \text{ psf.}$$

b. Compute estimated dead weight of slab

$$w_d = 2L + 30 = 2(42) + 30 = 114 \text{ psf (est.)}$$

c. Compute total superstructure and slab dead load

$$w = w_d + w_s = 114 + 151 = 265 \text{ psf.}$$

Step 2 — Establish controlling soil properties.

a. $q_u/w = 2800/265 > 7.5$

b. In accordance with the provisions of para. 7.8.1, p. 65, PI is equal to the PI of the top 5 feet of that soil within the top 15 feet of the soil; in this case, PI = 41.

[1] See para. 7.8.6, pp. 76-83.

Step 3 — Determine support index.
Referring to Fig. 6, p. 53, for $C_W = 17$ and $PI = 41$, the support index (C) is found to be 0.72. Since no special circumstances prevent or diminish the expected variations in soil moisture, the support index (C) should not be increased to the value of C_m. Since $q_u/w > 7.5$, the support index (C) should not be reduced to the value of C_r. Therefore, $C = 0.72$.

Step 4 — Ascertain the deflection ratio. From Table III, p. 50, the permissible $\Delta/L = 1/360$.

Step 5 — Determine outside slab dimensions. It is necessary to plan for two slabs, i.e.,

slab one (L_1 L'_1) = 42 by 24 ft

slab two (L_2 L'_2) = 36 by 18 ft.

Step 6 — Determine effective loads for slabs one and two.

a. Coefficient φ for the long direction of slab one, is

$$1.4\text{-}0.4(L_1/L'_1) = 1.4\text{-}0.4(42/24) = 0.7.$$

b. Effective loads for slab one are

$$\bar{w} = (1-0.72)\ 265 = 74.2 \text{ psf}$$

in the short direction, and

$$\bar{w} = 0.7\ (74.2) = 51.9 \text{ psf}$$

in the long direction.

c. Coefficient φ for the long direction of slab two is

$$1.4\text{-}0.4(36/18) = 0.6.$$

d. Effective loads for slab two are

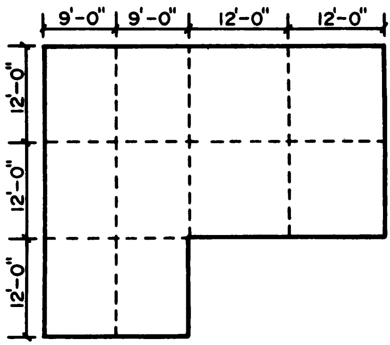
$$\bar{w} = (1-0.72)\ 265 = 74.2 \text{ psf}$$

in the short direction, and

$$\bar{\bar{w}} = 0.6(74.2) = 44.5 \text{ psf}$$

in the long direction.

Step 7 — Develop layout of stiffening beams.
The long beams of slab two must coincide with the short beams of slab one. The arrangement of beams which follows is selected to satisfy this condition.



7.11.3 Design of Slab One—Analytical and Chart Procedures

This design will be carried out using two different procedures for purposes of illustration, i.e., through an analytical procedure, and through use of charts.
The analytical procedure will be used first.

Step 8 — Select tentative design values for d, B, and B′. Since $\bar{w}$ is approximately equal to 50 psf, an L/d ratio of 18 is selected (Step 8, p. 17 and p. 81.
On this basis,

$$d = 42(12)/18 = 28 \text{ in.}$$

A good initial value for the width of each beam is 8 inches (see discussion, Step 7, pp. 16-17 and pp. 80-81).
On this basis,

$$B = 3(8) = 24 \text{ in.}$$

$$B' = 5(8) = 40 \text{ in.}$$

Step 9 — Execute recommended design computations.

a. Depth ratios are

$$L/d = 18$$

$$L'/d = 24(12)/28 = 10.3.$$

b. Load indices are

$$\bar{w}(L'/B) = 51.9\ [24(12)/24] = 623 \text{ psf}$$

in the long direction, and

$$\bar{w}(L/B') = 74.2\ [42(12)/40] = 935 \text{ psf}$$

in the short direction.

c. Shear criteria are

$$\bar{w}(L'/B)\ L/d = 623(18) = 11{,}200 < 21{,}600 \text{ psf}$$

in the long direction, and

$$\bar{w}(L/B')\ L'/d = 935(10.3) = 9{,}630 < 21{,}600 \text{ psf}$$

in the short direction.

d. Moment criteria are

$$p = \bar{w}(L'/B)(L/d)^2/2\,(10)^7 = 623(18)^2/2\,(10)^7 = 0.0101$$

in the long direction, and

$$p = \bar{w}(L/B')(L'/d)^2/2\,(10)^7 = 935(10.3)^2/2\,(10)^7 = 0.00496$$

in the short direction.

e. Deflection criterion is

$$Z = \frac{w(L'/B)(L/d)^3}{207(10)^8(\Delta/L)} = \frac{623(18)^3(360)}{207(10)^8} = 0.0632$$

in the long direction.

Note: From Fig. 17, p. 77, for $Z = 0.0632$, $p_1 = 0.01175$.

This value is compared with the value of p obtained for the moment criterion. If $p_1 > p$, and p_1 does not exceed p by more than 0.0015, p_1 is the controlling steel ratio.

If $p_1 > p$ and $p_1 - p > 0.0015$, a considerable percentage of steel is needed to impart stiffness rather than strength to the beam. This means that the dimensions of the beam must be increased in order to reduce p_1-p. Returning to this example,

$$p_1 - p = 0.01175 - 0.0101 = 0.00165 > 0.0015.$$

Therefore, a wider beam is needed in the long direction. Each beam will be made 10 inches wide in the long direction, and the design procedure repeated from Step 8 onward.

Revised
Step 8 — Select basic dimensions.

$$d = 28 \text{ in.}$$

$$B = 3(10) = 30 \text{ in.}$$

$$B' = 5(8) = 40 \text{ in.}$$

Revised
Step 9 — Design computations.

a. Depth ratios are

$$L/d = 18$$

$$L'/d = 10.3$$

b. Load indices are

$$\bar{w}(L'/B) = 51.9\ [24(12)/30] = 498 \text{ psf}$$

in the long direction, and

$$\bar{w}(L/B') = 74.2\ [42(12)/40] = 935 \text{ psf}$$

in the short direction.

c. Shear criteria

These need not be revised; in fact, the new dimensions have helped.

d. Moment of criteria

Since the beam depth was not increased, the total steel required to resist maximum moment is unchanged. Consequently, the steel ratio has changed in inverse proportion to the cross-sectional area of the beam. Thus, in the long direction

$$p = 0.0101\ (24/30) = 0.0081,$$

and in the short direction,

$$p = 0.00496 \text{ (same as before)}.$$

e. Deflection criteria

The value of Z will be different for the new load index ($\bar{w}$). Thus, in the long direction,

$$Z = (498/623)\ 0.0632 = 0.051.$$

The corresponding steel ratio (p_1) from Fig. 17, p. 77, is

$$p_1 = 0.0087$$

and

$$p_1 - p = 0.0087 - 0.0081 = 0.0006 < 0.0015.$$

Therefore, the steel ratio in the long direction is

$$p = p_1 = 0.0087.$$

In the short direction,

$$Z = \frac{\bar{w}(L/B')(L'/d)^3}{207\ (10)^8\ \Delta/L} = \frac{935\ (10.3)\ 360}{207\ (10)^8} = 0.0178.$$

The corresponding steel ratio (p_1), from Fig. 17, is less than 0.003. Therefore, $p > p_1$, and the bending moment controls in the short direction, for which the required steel ratio (p) is 0.00492.

f. Reinforcing required per beam in the long direction is as follows:

Bottom steel

$$A_s = 0.0087\ (10)\ 28 = 2.44\ \text{in.}^2$$

Use four No. 7 bars per beam (area = 2.4 in.^{2}).

Top steel

$$A'_s = 2.44 - 0.65 = 1.79\ \text{in.}^2$$

Use three No. 7 bars per beam (area = 1.8 in.^{2}).

Reinforcing per beam required in the short direction is as follows:

Bottom steel

$$A_s = 0.00492\ (8)\ 28 = 1.1\ \text{in.}^2$$

Use two No. 7 bars per beam (area = 1.2 in.^{2}).

Top steel

$$A'_s = 1.1 - 0.65 = 0.45\ \text{in.}^2$$

Use four extra No. 3 bars per beam (area = 0.44 in.^{2}), placed as top reinforcement in excess of the No. 3 bars at 12 inches o.c. placed as reinforcement in the slab.

Charts will now be used for the design.

Step 8 — This step remains the same as that for the analytical procedure above, i.e.,

$$d = 28\ \text{in.},\ B = 30\ \text{in.},\ B' = 40\ \text{in.}$$

Step 9 — Select basic parameters (from revised Step 9, pp. 99-101).

a. Depth ratios are

$$\ell/d = 18$$

in the long direction, and

$$\ell/d = 10.3$$

in the short direction.

b. Load indices are

$$\bar{w}(\ell'/b) = 498 \text{ psf}$$

in the long direction, and

$$w(\ell'/b) = 935 \text{ psf}$$

in the short direction.

c. Steel ratios (p), using Fig. 16, p. 74, are determined as follows:

For $\Delta/L = 1/360$, ordinate $\bar{w}(\ell'/b) = 498$ psf.

For this value and for the curve $\ell/d = 18$, the required steel ratio (p) is 0.00875.

This steel ratio is above the M-D curve but is not above the broken-line curve nor the $v_c = 75$-psi curve. Therefore, deflection controls the steel ratio and the shear condition is satisfied.

Note that if the initial width selected for the long beams had been 8 inches, the load index $[\bar{w}(\ell'/b)]$ would be 623 psf (as computed previously). For this value and for $\ell/d = 18$, the required steel ratio obtained from the chart would be 1.18%, and would be located above the limiting-line curve. Therefore, this value of p would be unacceptable and an increase in the dimensions of the beam would be necessary, exactly as in the analytical determination.

From b above, the ordinate for the design along the short direction is 935 psf. For this value and for the corresponding curve $\ell/d = 10.3$, the steel ratio (p) in the short direction (by interpolation between curves $\ell/d = 10$ and $\ell/d = 11$) is 0.006.

The steel ratio in the short direction is obviously controlled by bending moment, as the corresponding point in the chart is below the M-D curve. For obvious reasons, the shear criterion is satisfied.

A comparison of values thus obtained with those obtained analytically indicates a high degree of accuracy for the chart method.

d. Reinforcing steel computations are identical with those resulting from the purely analytical procedure.

7.11.4 Design of Slab Two—Chart Procedure Only

Step 8 — Select basic dimensions.

Beam depths equal to the depth of those for slab one will be selected, because the long beams of slab two coincide with some of the short beams of slab one. In this case, the length does not vary substantially between slab one and slab two (42 vs. 36 feet). If the difference in length were substantial (e.g., 60 vs. 30 feet), the alternative of designing slab two beams shallower than those of slab one could be considered.

In this case, the basic dimensions are chosen as follows:

$d = 28$ in.

$B = 3\ (8) = 24$ in.

$B' = 4\ (10) = 40$ in. (Three of the four beams require a 10-inch width because they belong to slab one also. The fourth beam is made 10 inches wide for uniformity.)

Step 9 — Execute design computations.

a. Depth ratios are

$$L/d = 12(36)/28 = 15.5$$

$$L'/d = 12(18)/28 = 7.7.$$

b. Load indices are

$$\bar{w}(L'/B) = 44.4\ [12(18)/24] = 400 \text{ psf}$$

in the long direction (note that the effective load in the long direction of slab two is only 44.4 psf), and

$$\bar{w}(L/B') = 74\ [12(36)/40] = 800 \text{ psf}$$

in the short direction.

c. Determine steel ratios (p).

From Fig. 16, p. 74, for a 400-psf load index and a depth ratio $\ell/d = 15.5$, by interpolation, the ratio is

$$p = 0.48\% = 0.0048$$

in the long direction.

Since the corresponding point is below the M-D line, the normal criterion controls, obviously, the shear condition is easily satisfied.

In the same chart (Fig. 16) for an 800-psf load index and a depth ratio $\ell/d = 7.7$, the required steel is less than 0.3%. Therefore, in the short direction, the minimum value of p is used, i.e.,

$$p = 0.3\% = 0.003.$$

d. Required reinforcing per beam in the long direction is as follows:

Bottom steel

$$A_s = 0.0048\ (8)\ 28 = 1.08\ \text{in.}^2$$

This area of steel is greater than that required for the short beams of slab one but less than the steel specified (i.e., two No. 7 bars); therefore, all of those beams of slab one in the short direction which coincide with those of slab two will have 1.20 in.^{2} of steel—use two No. 7 bars per beam.

Top steel

$$A'_s = 1.08 - 0.65 = 0.43\ \text{in.}^2$$

Use four extra No. 3 bars per beam (area = 0.44 in.^{2}).

Required reinforcing per beam in the short direction is as follows:

Bottom steel

$$A_s = 0.003\ (10)\ 28 = 0.84\ \text{in.}^2$$

This area of steel is less than that required in the long beams of slab one. Therefore, the only short beam to be reinforced with this amount of steel is the one end beam which does not participate in the long direction of slab one. Use two No. 7 bars in this beam (area - 1.2 in.^{2}).

Top steel

$$A'_s - 0.84 - 0.65 = 0.19 \text{ in.}^2$$

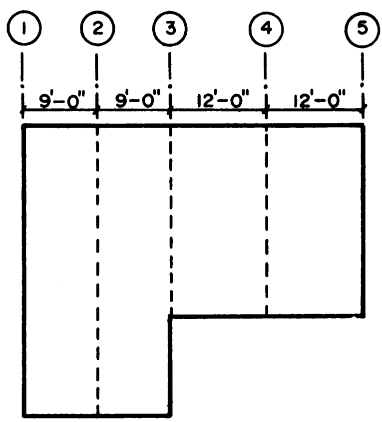
Use two extra No. 3 bars in this beam, i.e., in addition to the No. 3 bars at 12 inches o.c. used in the slab.

e. Adjust for unequal beam spacing.

The beams along the short direction of slab two are equally spaced at 12 feet o.c. This, however, is not the case with the five beams along the short direction of slab one.

The average spacing for these beams is

$$42/4 = 10.5 \text{ ft.}$$



Beams ① and ② are spaced at 9 feet o.c., i.e., at less than the average, and thus need no adjustment.

Beam ③ is spaced at an average (9 + 12)/2 = 10.5 feet. This beam needs no adjustment because its spacing is equal to the average spacing of all beams.

Beams ④ and ⑤ are spaced at 12 feet o.c. (which is greater than the 10.5-foot average); therefore, these require adjustment. However, no adjustment is needed for beam width because the shear criterion is satisfied by a wide margin.

The bottom steel of these beams was found to be

$$A_s = 1.10 \text{ in.}^2$$

The adjusted steel will have to be

$$A_s = 1.10\ (12/10.5) = 1.26 \text{ in.}^2$$

Note that beams ①, ②, and ③ were reinforced with two No. 7 bars (area = 1.2 in.^{2}) because of the controlling requirement of the long beams of slab two. The same reinforcement is used for beams ④ and ⑤ to satisfy the value of the adjusted steel. The small inadequcy in steel area is not considered significant.

Top steel for this beam, however, will be

$$1.26 - 0.65 = 0.61 \text{ in.}^2$$

Therefore, one extra No. 7 bar will be used.

f. Select top slab reinforcement.

Since all squares of the top slab have clear spans smaller than 12 feet, the top slab is designed 4 inches thick, with No. 3 bars at 12 inches o.c. each way placed at one third the slab thickness clear from the top.

Figure 20, pp. 107-108, shows a schematic layout of slab and reinforcement as designed above.

Step 10 — Check slab dead load.

Lineal feet of 10-inch beam

$$3(42) + 18 = 144 \text{ ft}$$

Lineal feet of 8-inch beam

$$2(24) + 3(36) - [(5/6)(18)] = 141 \text{ ft}$$

Adjusted beam depth is

$$28 + 3 - 4 = 27 \text{ in.}$$

(28-inch depth plus 3-inch steel coverage minus 4-inch slab thickness).

Volume of concrete in the beams is

$$144\ (5/6)\ 2.25 + 141\ (2/3)\ 2.25 = 481.5\ \text{ft.}^3$$

Slab area is

$$42(24) + 18(12) = 1224\ \text{ft.}^2$$

Slab thickness equivalent to beam volume is

$$481.5(12)/1224 = 4.72\ \text{in.}$$

Equivalent uniform slab thickness is

$$4 + 4.72 = 8.72\ \text{in.}$$

Average slab load is

$$\bar{w} = 8.72(150)/12 = 109\ \text{psf.}$$

This load is less than the 114 psf estimated in Step 3.

Estimated total average load is

$$\bar{w} = 265\ \text{psf.}$$

Actual total average load is

$$w = 265 - 114 + 109 = 260\ \text{psf.}$$

Ratio of estimated load to actual load is

$$260/265 = 0.98 > 0.95.$$

Therefore, no adjustment of the design is required.

7.11.5 Discussion of Design

For a load ($\bar{w}$) equal to 74 psf, it is recommended in this report that the depth ratio (ℓ/d) be selected between the values of 14 and 18. If this recommendation had been adopted for the design example, then the beam depth would have been greater than the 28 inches chosen. If, for example, a depth of 30 inches were chosen, it would not be necessary to widen the long beams of slab one to 10 inches;

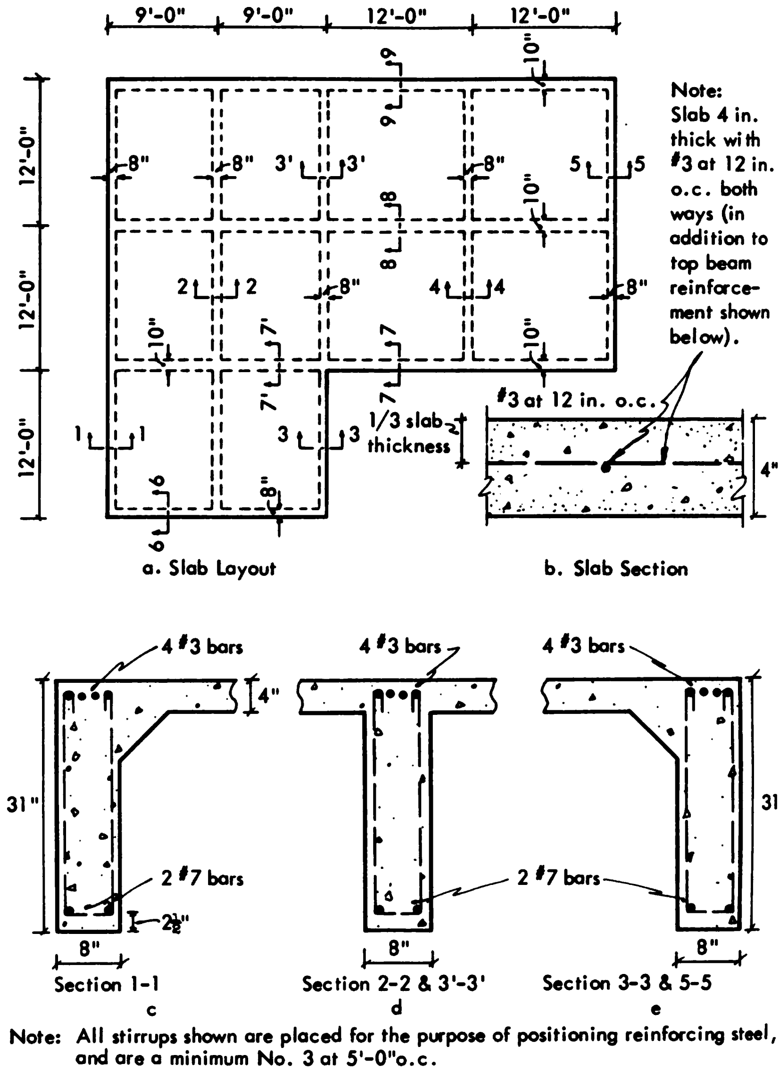
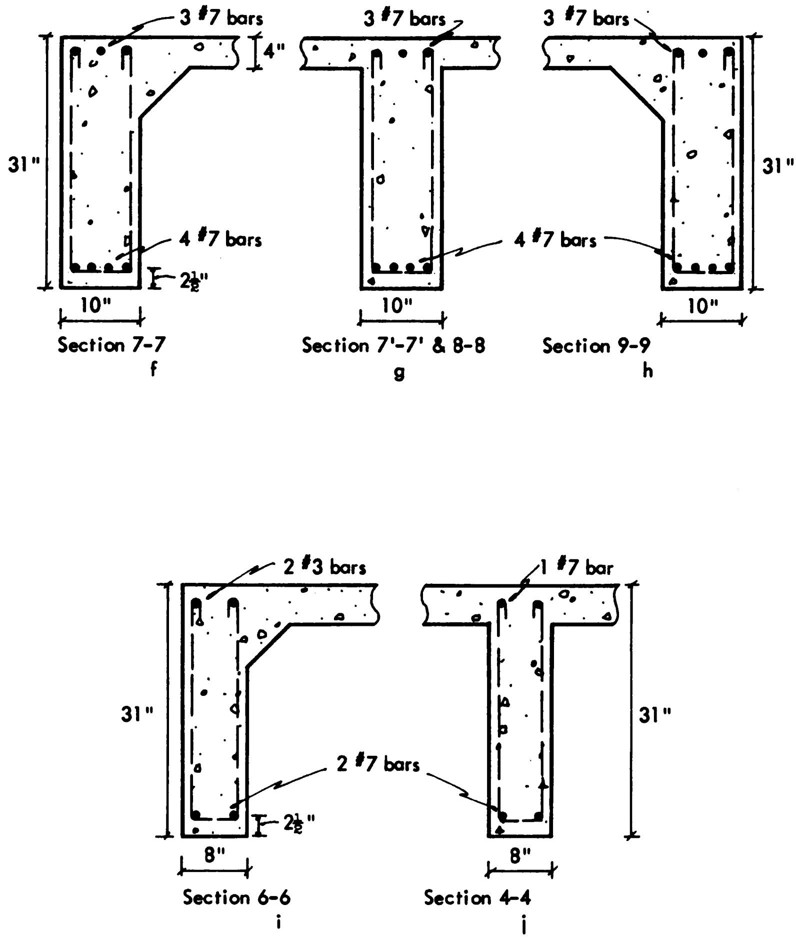


FIG. 20 Slab Layout and Reinforcement—Para. 7.11 Design Example



Note: All stirrups shown are placed for the purpose of positioning reinforcing steel, and are a minimum No. 3 at 5'-0"o.c.

FIG. 20 (Cont.) Slab Layout and Reinforcement—Para. 7.11 Design Example also, the steel would be less. On the other hand, a depth of 30 inches would cause very low depth ratios for slab two, which is smaller in dimension. Thus, the design for slab one would be more economical; however, more concrete than necessary would be used in slab two. In any event, the overall difference in materials and cost between the two designs would not be large. It is up to the designer, therefore, to exercise judgment on the basis of the prevailing special conditions associated with each slab under design, when deciding on the choice of basic parameters. In a report such as this, only guidelines can be provided for achievement of efficiency in design; it is both impossible and undesirable to set forth rigid and absolute rules which will be valid under all possible conditions.

7.12 Example 2—Design of Type III Slabs Supported on Expansive Soils: Shallow Beams

7.12.1 Determination of Slab Type

For purposes of this example, it will be assumed that the slab is the same as that designed in para. 7.11, subjected to the same loads, and founded on similar soil, but in a different geographic location, i.e., one having a climatic rating (C_w) = 39.

7.12.2 Application of Type III Procedure

The design through Step 2 of the Type III Procedure of the preceding example remains the same and provides the following values.

$$w = 265 \text{ psf}$$

$$PI = 41.$$

<u>Step 3</u> — Determine support index.

Referring to Fig. 6, p. 35, for $C_w = 39$ and $PI = 41$, the support index (C) = 0.94 > 0.90.

<u>Step 4</u> — Ascertain the deflection ratio.

From Table III, p. 50, the permissible $\Delta/L = 1/360$.

Step 5 — Determine outside slab dimensions

$$\text{Slab one} = (L_1\ L'_1) = 42 \text{ by } 24 \text{ ft}$$

$$\text{Slab two} = (L_2\ L'_2) = 36 \text{ by } 18 \text{ ft.}$$

Step 6 — Determine effective loads for slabs one and two.

a. Coefficient φ for the long direction of slab one is

$$1.4 - 0.4\ (42/24) = 0.7.$$

b. Effective loads for slab one are

$$\bar{w} = 0.1\,w = 0.1\,(265) = 26.5 \text{ psf}$$

in the short direction, and

$$\bar{w} = 0.1\,w\varphi = 26.5\ (0.7) = 18.6 \text{ psf}$$

in the long direction.

c. Coefficient φ for the long direction of slab two is

$$1.4 - 0.4\ (36/18) = 0.6.$$

d. Effective loads for slab two are

$$\bar{w} = 0.1\,w = 0.1\ (265) = 26.5 \text{ psf}$$

in the short direction, and

$$\bar{w} = 0.1\,w\varphi = 26.5\ (0.6) = 15.9 \text{ psf}$$

in the long direction.

Step 7a — Design for d, b_s, and A_s for both slabs using Steps 6-10, pp. 16-19.

Step 7 — Develop layout of stiffening beams.

Use same layout as shown for the example of para. 7.11.

7.12.3 Design of Slab One

Step 8 — Select tentative design values for d, B, and B′.

$$\text{Try}\quad d = 23.5 \text{ in.}$$

$$B = 3(8) = 24 \text{ in.}$$

$$B' = 5(8) = 40 \text{ in.}$$

Step 9 — Execute recommended design computations.

a. Depth ratios are

$$L/d = 42(12)/23.5 = 21.4$$

$$L'/d = 24(12)/23.5 = 12.2.$$

b. Load indices are

$$\bar{w}\ (L'/B) = 18.6\ [24(12)/24] = 223 \text{ psf}$$

in the long direction, and

$$\bar{w}\ (L/B') = 26.5\ [42(12)/40] = 334 \text{ psf}$$

in the short direction.

c. Steel ratios (p) for $\Delta/L = 1/360$, using Fig. 16, p. 74, are

$$0.006$$

in the long direction, and

$$0.003 \text{ (min.)}$$

in the short direction.

d. Reinforcing required per beam is as follows:

Bottom steel in the long direction

$$A_s = 0.006\ (23.5)\ 8 = 1.13 \text{ in.}^2$$

Bottom steel in the short direction

$$A_s = 0.003\ (23.5)\ 8 = 0.56\ \text{in.}^2$$

Step 8a — Determine d, b_s, A_s, and A'_s per beam.

b_s = 8 in. for all beams

d = 2 + 10 (1-0.94)(d-2) = 2 + 10 (0.06) 21.5 = 15 in.

A_s (long dimension) = 10(1-C) A_s = 10(1-0.94) 1.13 = 0.68 in.^{2}

A'_s (long dimension) = 10(1-C) A_s - 0.65 = 0.68-0.65 = 0.03 in.^{2},

or effectively zero.

A_s (short dimension) = 10(1-C) A_s = 10(1-0.94) 0.56

= 0.34 in.^{2} < 0.65 in.^{2}

Step 9a — Reinforcement used in the long direction is as follows:

Bottom steel, 2 No. 6 bars per beam (area = 0.88 in.^{2})

Top steel, No. 3 bars in the slab at 12 in. o.c.

Reinforcement used in the short direction is as follows:

Bottom steel, 1 No. 6 bar per beam (area = 0.44 in.^{2})

Top steel, No. 2 bars in the slab at 9 in. o.c. (area = 0.067 in.^{2}/ft) for a requirement of 0.18 (0.34) = 0.061 in.^{2}/ft.

7.12.4 Design of Slab Two

Step 8 — Select tentative design values for d, B, and B′.

Try d = 23.5 in.

B = 3(8) = 24 in.

B′ = 4(8) = 32 in.

Step 9 — Execute recommended design computations.

a. Depth ratios are

$$L/d = 36(12)/23.5 = 18.4$$

$$L'/d = 18(12)/23.5 = 9.2$$

b. Load indices are

$$\bar{w}(L'/B) = 15.9\ [18(12)/24] = 143 \text{ psf}$$

in the long direction, and

$$\bar{w}(L/B) = 26.5\ [36(12)/32] = 358 \text{ psf}$$

in the short direction.

c. Steel ratios (p) for $\Delta/L = 1/360$, using Fig. 16, are

0.003 (min)

in the long direction, and

0.003 (min)

in the short direction.

d. Reinforcing required per beam is as follows:

Bottom steel in both the long and short directions

$A_s = 0.003\ (23.5)\ 8 = 0.56 \text{ in.}^2$

Step 8a — Determine d, b_s, A_s, and A_s' per beam.

$b_s = 8$ in. for all beams

$d = 2 + 10(1-0.94)(d-2) = 2 + 10\ (0.06)\ 21.5 = 15$ in.

Bottom steel is the same in both directions; therefore

$$A_s = 10\ (1-0.94)\ 0.56 = 0.34 \text{ in.}^2 < 0.65 \text{ in.}^2$$

Since $A_s < 0.65 \text{ in.}^2$, $A_s' = 0$.

Step 9a — Reinforcement used in both directions is as follows:

Bottom steel, 1 No. 6 bar per beam (area = 0.44 in.^{2})

Top steel, No. 2 bars in the slab at 9 in. o.c. (area = 0.067 in.^{2}/ft) for a requirement of 0.18 (0.34) = 0.061 in.^{2}/ft.

Note: Slab reinforcement (No. 2 bars at 9 in. o.c.) exceeds the WWF reinforcement specified for the corresponding Type II slab.

Steps 10a and 11a — Not applicable.

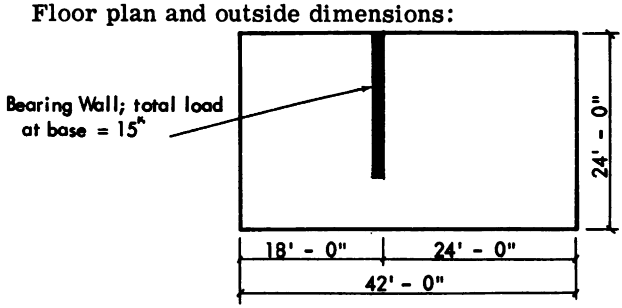
The full slab layout is shown in Fig. 21, p. 116. No steel adjustment is made for unequal beam spacing, because the steel provided in excess of the minimal steel required is ample compensation. Since beams are shallow, the use of stirrups (No. 3 at 5 ft-0 in.) is optional—bottom steel can be easily placed and secured by other means. However, if stirrups are not used, chairs or other means should be provided to assure that bottom steel will be held clear a minimum of 2 inches from the soil as recommended herein. It should be noted too, that for smaller slabs or for slabs on less active soils or in less unfavorable climates, the depth of beams would be even less, approaching a flat slab or Type II slab.

7.13 Example 1—Design of Type III Slabs Supported on Compressible Soils

The procedures which follow demonstrate the application on compressible soil of the criteria recommended in para. 1.4, Step 9c, 1.14, and amplified in para. 7.9-7.9.3, pp. 85-91.

7.13.1 Given Conditions

Location: Alexandria, Louisiana
Floor plan and outside dimensions:



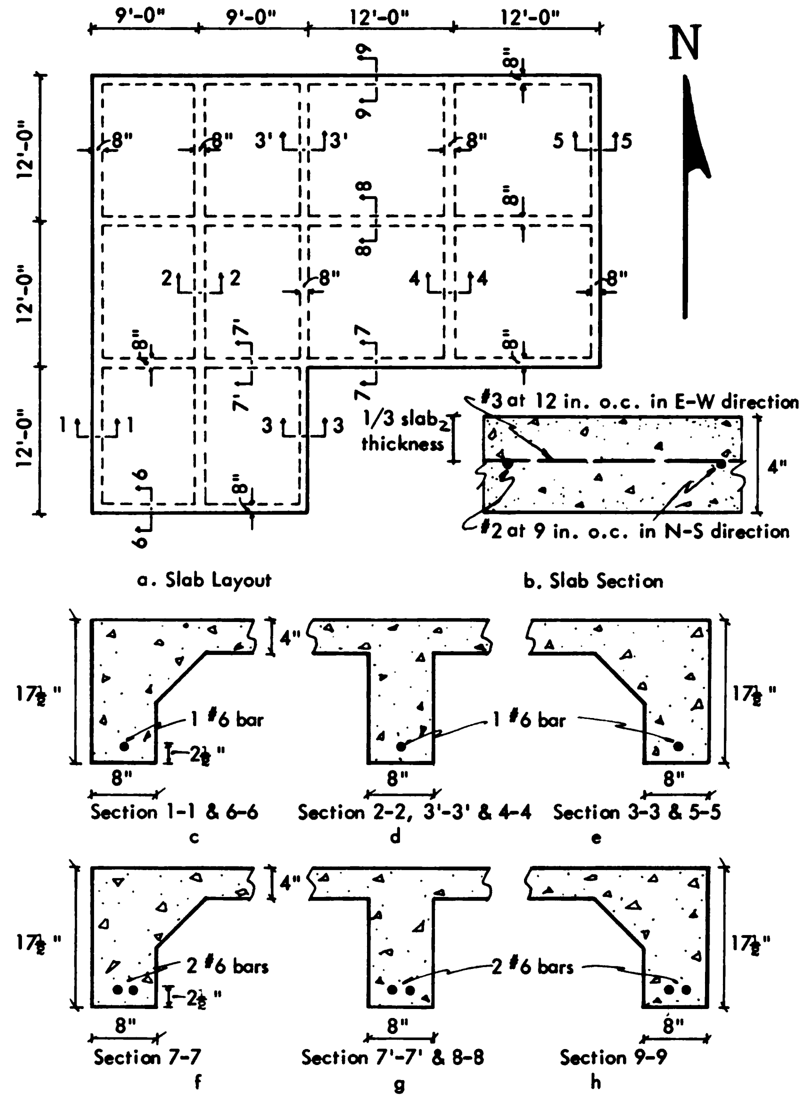


FIG. 21 Slab Layout and Reinforcement—Para. 7.12 Design Example

Type of construction: wood frame; masonry veneer and plaster-board interior

Total weight of superstructure = all dead and live loads, including concentrated loads = 140 kips

Openings through slab: none greater than 8 inches; all having expansion joints

Concentrated loads: one bearing wall, with a total dead and live load of 15 kips, located as shown above.

Step 1 — Summarize soil investigation results.

a. Soil type: CH with PI = 35 to a depth of 8 ft and
OH with PI = 44 from 8-20 ft in depth

b. Consistency of CH soil: $q_u = 1200$ psf.

Step 2 — Determine climatic rating.

Referring to Fig. 1, p. 38, $C_w = 35$ for Alexandria, Louisiana.

Step 3 — Determine appropriate slab type.

Since the soil is CH and OH, PI > 15, and $C_w = 45$, a Type III slab is required unless $q_u/w < 2.5$, in which case a Type IV slab would be needed (Table I, p. 11).

7.13.2 Application of Type III Procedure[1]

Step 1 — Determine total average load.

a. Compute psf-superstructure load.

$$w_s = 140{,}000/24(42) = 139 \text{ psf}$$

b. Compute estimated dead weight of slab.

$$w_d = 2L + 30 = 2(42) + 30 = 114 \text{ psf}$$

c. Compute total superstructure and slab dead load.

$$w = w_d + w_s = 114 + 139 = 253 \text{ psf}$$

[1] See para. 7.9.3, p. 91.

Step 2 — Establish controlling soil properties.

a. The minimum q_u in the top 15 feet of the soil immediately below the bottom of the slab stiffening beams is the q_u for the CH soil stratum, i.e., $q_u = 1200$ psf. Therefore

$$q_u/w = 1200/253 = 4.75$$

and

$$2.5 \le q_u/w \le 7.5.$$

b. In accordance with the provisions of 7.8.1a, p. 66, PI of the soil is determined as follows:

The top 3 ft are devoted to the depth of stiffening beams
From 3 to 8 ft, PI = 35 (total depth = 5 ft and weight factor = 3)
From 8 to 13 ft, PI = 44 (total depth = 5 ft and weight factor = 2)
From 13 to 18 ft, PI = 44 (total depth = 5 ft and weight factor = 1)
From which

$$PI = 1/30\ [3(5)\ 35 + 2(5)\ 44 + 1(5)\ 44]$$

$$= 5/30\ (105 + 88 + 44)$$

$$= 1/6\ (237)$$

$$= 39.5$$

Step 3 — Determine support index.

From Fig. 6, p. 53, for PI = 39.5 and $C_w = 35$, C = 0.91. No special circumstances prevent or diminish the expected variations in soil moisture; therefore

$$C_m = C = 0.9.$$

Since $2.5 \le q_u/w < 7.5$, the support index (C) must be reduced and equated to C_r, in accordance with 7.5, p. 56 and 7.9, p. 85, and, since C > 0.65, C_r is determined from the equation

$$q_u/w = 4.75.$$

Total superstructure load (W) is

$$w\,(24)\,42 = 0.253\,(24)\,42 = 255 \text{ kips}$$

$$w_c = 15 \text{ kips}$$

and

$$\frac{w_c}{w} = \frac{W_c}{W} = \frac{15}{255} = 0.059.$$

Therefore, in the long direction

$$C_r = (2.5 - 4.75)[0.13 - 0.2\,(0.059) - 0.2\,(0.91)] + (0.65 - 0.059)$$

$$= -2.25\,(-0.064) + 0.591$$

$$= 0.735.$$

Because the concentrated load is uniformly distributed along the short direction, $W_c = 0$ for the short direction, and

$$C_r = (2.5 - 4.75)[0.13 - 0.2\,(0.91)] + 0.65 = 0.767.$$

Step 4 — Establish deflection ratio.

From Table III, p. 50, allowable $\Delta/L = 1/300$.

Step 5 — Determine outside slab dimensions.

$$L = 42 \text{ ft}$$

$$L' = 24 \text{ ft}$$

Step 6 — Determine effective loads on the slab.

$$\varphi = 1.4 - 0.4\,(L/L') = 1.4 - 0.4\,(42/24) = 0.7.$$

Then

$$\bar{w} = (1-C_r)\,w = (1.0 - 0.767)(255) = 59.4 \text{ or } 59 \text{ psf}$$

in the short direction, and

$$\bar{w} = (1-C_r)w\varphi = (1.0 - 0.735)(255)\ 0.7 = 47.3 \text{ psf}$$

in the long direction.

The initial value of the support index is

$$C = 0.91,$$

and the effective load in the short direction is

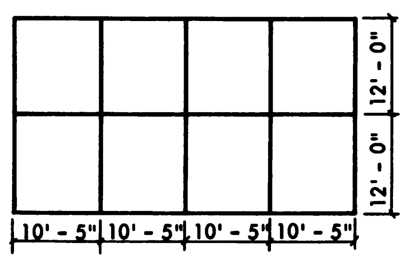
$$\bar{w} = 255\ (1.0 - 0.91) = 23 \text{ psf},$$

and the effective load in the long direction is

$$\bar{w} = 23\varphi \text{ psf} = 23\ (0.7) = 16.1 \text{ or } 16 \text{ psf}.$$

<u>Step 7</u> — Layout of the slab

Three stiffening beams will be placed along the 42-foot dimension at 12 feet o.c., and five stiffening beams along the short dimension at approximately 10 feet o.c.



<u>Step 8</u> — Select basic beam dimensions.

$$d = 28 \text{ in.}$$

$$B = 3\ (8) = 24 \text{ in.}$$

$$B' = 5\ (8) = 40 \text{ in.}$$

<u>Step 9</u> — Select basic parameters.

a. Depth ratios are

$$L/d = 42(12)/28 = 18$$

$$L'/d = 24(12)/28 = 10.3.$$

b. Load indices are

$$\bar{w}(L'/B) = 47.3\ [24(12)/24] = 568 \text{ psf}$$

in the long direction, and

$$\bar{w}(L/B') = 59\ [42(12)/40] = 743 \text{ psf}$$

in the short direction.

For the initial value of the support index (C = 0.91), the load indices are

$$\bar{w}(L'/B) = 16\ [24(12)/24] = 192 \text{ psf}$$

in the long direction, and

$$\bar{w}(L/B') = 23\ [42(12)/40] = 290 \text{ psf}$$

in the short direction.

c. Determine steel ratios (p).

Referring to Fig. 15 for $\Delta/L = 1/300$, ordinate $\bar{w}(\ell'/b)$ is

568 ($p = 0.95\%$) for $\ell/d = 18$

743 ($p = 0.39\%$) for $\ell/d = 10.3$

192 ($p = 0.31\%$) for $\ell/d = 18$

290 ($p_{min} = 0.3\%$) for $\ell/d = 10.3$.

d. Reinforcing steel required per beam in the long direction is

$$A_s = 0.009\ (28)\ 8 = 2.13 \text{ in.}^2 \text{ (bottom)}$$

and in the short direction is

$$A_s = 0.0039\ (28)\ 8 = 0.87 \text{ in.}^2 \text{ (bottom)}.$$

For the initial value of the support index (C = 0.91), the required steel in the long direction is

$$A_s = 0.0031\ (28)\ 8 = 0.69\ \text{in.}^2\ \text{(bottom)}$$

$$A_s = 0.69 - 0.65 = 0.0\ \text{in.}^2\ \text{(top)}$$

and in the short direction is

$$A_s = 0.003\ (28)\ 8 = 0.67\ \text{in.}^2\ \text{(bottom)}$$

$$A_s' = 0.67\ \text{in.}^2 - 0.65\ \text{in.}^2 = 0.02\ \text{in.}^2\ \text{(top)}.$$

Compare requirements in the long direction.

Since the 2.13 in.^{2} bottom reinforcement exceeds the sum of bottom plus additional reinforcement obtained for the initial value,

C = 0.91 (i.e., since 2.13 ≥ (0.69 + 0.04) in.^{2}, no additional top reinforcement is required).

Compare requirements in the short direction.

$$0.87 > (0.67 + 0.02)\ \text{in.}^2$$

Therefore, no additional top reinforcement is needed in the short direction either.

7.14 Example 2—Design of Type III Slabs Supported on Compressible Soils

Assuming that the slab of the preceding example (para. 7.12) was to be applied in Dallas, Texas, instead of Alexandria, Louisiana, the design would have been affected as follows:

C_w for Dallas (Fig. 1, p. 38) would have been 20

From Fig. 6, p. 53, for PI = 39.5 and C_w = 20, the value of C would have been 0.775.

Continuing with step 3 of the previous example and referring to equation 7.9e, p. 90, the value of C_r in the long direction is

$$(2.5 - q_u/w)[0.13 - 0.2\ (w_c/w) - 0.2C] + (0.65 - w_c/w)$$

$$= (2.5 - 4.75)[0.13 - 0.2(0.059) - 0.2(0.775)] + 0.65 - 0.059$$

$$= 0.674.$$

In the short direction, $w_c = 0$ (because the concentrated load W_c is uniformly distributed along the short direction), and

$$C_r = (2.5 - 4.75)[0.13 - 0.2\ (0.775)] + 0.65 = 0.706.$$

Steps 4 and 5 remain unchanged from the preceding example.

Step 6 — In determining effective loads on the slab, $\varphi = 0.7$ as before; however, the effective loads for the reduced value of C are

$$\bar{w} = (1.0 - 0.706)(253) = 74.4 \text{ psf}$$

in the short direction, and

$$\bar{w} = (1.0 - 0.674)(0.7)(253) = 57.8 \text{ psf}$$

in the long direction.

Effective loads for the initial value C = 0.775 are

$$\bar{w} = 253(1.0 - 0.775) = 57 \text{ psf}$$

in the short direction, and

$$\bar{w} = 57\varphi = 57(0.7) = 40 \text{ psf}$$

in the long direction.

Steps 7 and 8 remain unchanged from the preceding example.

Step 9 — Select basic parameters.

a. Depth ratios are

$$L/d = 18$$

$$L'/d = 10.3.$$

b. Load indices are

$$\bar{w}(L'/B) = 57.8\ [24(12)/24] = 694 \text{ psf}$$

for the reduced value of C in the long direction, and

$$\bar{w}(L/B') = 74.4\ [42(12)/40] = 937 \text{ psf}$$

in the short direction.

For the initial value C = 0.775, load indices are

$$\bar{w}(L'/B) = 40\ [24(12)/24] = 480 \text{ psf}$$

in the long direction, and

$$\bar{w}(L/B') = 57\ [42(12)/40] = 718 \text{ psf}$$

in the short direction.

c. Steel ratios (p), Fig. 15, p. 73, are for the reduced value C_r; therefore

$$\bar{w}(\ell'/b) = 694\ (p = 1.12\%) \text{ for } \ell/d = 18$$

$$= 937\ (p = 0.49\%) \text{ for } \ell/d = 10.3.$$

For the initial value C = 0.755

$$\bar{w}(L'/b) = 480\ (p = 0.78\%) \text{ for } L/d = 18$$

$$= 71\ (p = 0.39\%) \text{ for } L/d = 10.3.$$

d. Reinforcing steel required per beam for the reduced value of C_r is

$$A_s = 0.011\ (28)\ 8 = 2.47 \text{ in.}^2 \text{ (bottom)}$$

in the long direction, and

$$A_s = 0.0049\ (28)\ 8 = 1.10 \text{ in.}^2 \text{ (bottom)}$$

in the short direction.

Reinforcing steel required per beam for the initial value C = 0.775 is

$$A_s = 0.0078\ (28)\ 8 = 1.75\ \text{in.}^2\ \text{(bottom)}$$

$$A'_s = 1.75 - 0.65 = 1.0\ \text{in.}^2\ \text{(top)}$$

in the long direction, and

$$A_s = 0.0039\ (28)\ 9 = 0.985\ \text{in.}^2\ \text{(bottom)}$$

$$A'_s = 0.985 - 0.65 = 0.335\ \text{in.}^2\ \text{(top)}$$

in the short direction.

Compare requirements in the long direction.

$$2.47 < (1.75 + 1.0)\ \text{in.}^2$$

Therefore, additional top reinforcement is needed, i.e.,

$$A'_s = (1.75 + 1.0) - 2.47 = 0.28\ \text{in.}^2\ \text{(top).}$$

Compare requirements in the short direction.

$$1.10 < (0.985 + 0.335)\ \text{in.}^2$$

Therefore, additional top reinforcement is needed, i.e.,

$$A'_s = (0.985 + 0.335) - 1.10 = 0.22\ \text{in.}^2\ \text{(top).}$$

Summarizing,

$$A_s = 2.47\ \text{in.}^2\ \text{(bottom)}$$

$$A'_s = 0.28\ \text{in.}^2\ \text{(top)}$$

in the long direction, and

$$A_s = 1.10\ \text{in.}^2\ \text{(bottom)}$$

$$A'_s = 0.22\ \text{in.}^2\ \text{(top)}$$

in the short direction.

8.0 DESIGN OF TYPE IV SLABS

Design procedures for this type of slab need little elaboration, since it is a framed slab in the engineering sense—supported without contacting the soil on the site. However, some points of caution bear repeating.

This slab is appropriate for use with any soil, since it does not rest on soil anywhere over its entire area. It is designed in accordance with conventional engineering practices, i.e., supported on piles, piers, or footings which rest on unyielding stable soil or rock. In areas of highly expansive soils, contact should not be permitted with slab or grade beams; otherwise pressure sufficient to damage the slab may result. In addition, it is advisable to provide protection—by the use of belled reinforced caissons, greased tubes, or other means—to reduce the effect of friction on piers or piles passing through expansive soils.

PART B: Quality Control

1.0 GENERAL

Satisfactory performance of slabs-on-ground cannot be assured by design alone. Appropriate control of site preparation, and of quality of materials and workmanship at each step in the construction process, is of no less importance. While the loads normally encountered with a residential slab-on-ground will be relatively light as compared with those in larger multi-storied buildings, it is nevertheless true that carefully designed house slabs can be and are damaged through lack or inadequacy of quality control. Thus, the quality and soundness of the finished slab are dependent to a large extent on procedures often ignored or compromised.

Practices contained herein are offered as guides; experience indicates that adherence will result in a finished slab which performs as intended by the designer.

2.0 SITE PREPARATION

It is vital that the soil upon which the slab is to be placed be of uniform density over and through the entire slab site. The method used is secondary to the uniformity and degree of compaction achieved. Failure to obtain uniform compaction will lead to soil settlements and induced stresses in the slab which cannot be structurally accommodated. The degree of compaction needed varies with the plasticity index of the soil (PI), and the anticipated climatic variation, since, as has been adequately demonstrated, different soil types react differently to changes in moisture. If proper advantage is to be taken of this characteristic in assuring uniform soil support for the slab, careful attention should be given to preparing the soil to receive the slab.

The distortions of a soil mass because of heaving become increasingly pronounced with increases in density. On the other hand, distortions due to settlement as a result of loading are likely to occur in a loose soil mass. Of these two effects, heaving can potentially induce effects more destructive to the superstructure. Further, the potential for heaving increases with the PI of clays. In these circumstances, the required degree of density, on a site expected to receive construction loads, should be as high as possible—in order to limit settlement—for soils not susceptible to heaving. On the contrary, for a soil mass in relatively looser condition that can better accommodate the potential heaving action within its volume of voids, the degree of compaction of soils subject to heaving (because of soil consistency or weather or both) should be lower than for time-stable soils.

In order to provide guidance in this respect, an empirical chart has been developed, which, on the basis of engineering judgment and experience, provides for the needed degree of compaction in terms of the climatic rating (C_W) and PI of the soil. Figure 22, p. 128, graphically portrays this empirical relationship. A variation of 2% from the optimum density should be considered the maximum acceptable. However, since soils compacted to 80% of ASTM D698-63T or 75% of D1557-64T (or latest editions thereof) will have a relatively low q_u, such materials, when used in a fill, should be subjected to analysis by a qualified soils engineer for both compressibility and potential heaving effects. The amount of compaction required can best be determined by proper analysis and laboratory tests conducted by a qualified soils engineer.

A simple test that has proven helpful in determining the proper moisture content for compacting clay soils is to squeeze a sample

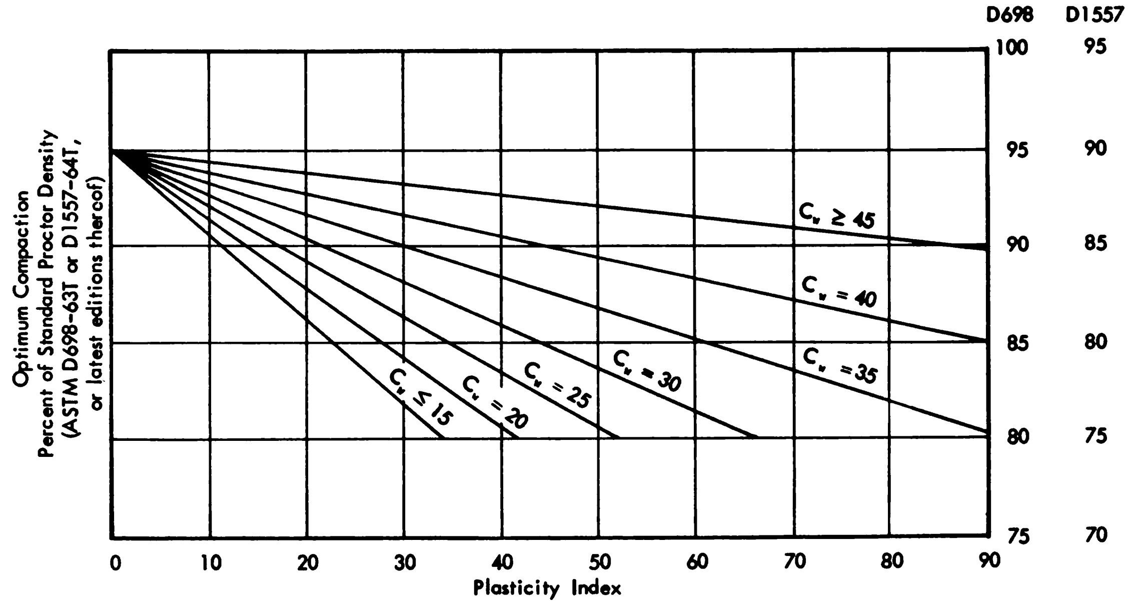


FIG. 22 Optimum Compaction Requirements for Slab Site Based on Plasticity Index and Climatic Rating (Percent of Standard or Modified Proctor Density)

of the material. The sample should be wet enough to hold together when squeezed, but not wet enough to squeeze through the fingers. This is a rough guide and merely an aid in determining satisfactory moisture content for the compacted soil.

Highly organic soils should never be used as foundation soils for slabs and must be removed from the slab site, since they cannot be satisfactorily compacted and are extremely compressible because of the decay of organic matter.

2.1 Fills[1]

Clear distinction should be drawn between an uncontrolled fill as a slab site, a controlled fill, and a cut-and-fill. Each has its own peculiarities and needs to be treated accordingly.

2.1.1 Controlled Fills

Controlled fills are those placed under specified conditions and under qualified supervision and testing. The qualities of such fills are therefore known, and their properties are generally more uniform.

2.1.2 Uncontrolled Fills

Uncontrolled fills are those which do not meet the control requirement. They are subject to nonuniformity, and their qualities as foundation support cannot be accurately predicted unless verified beforehand by appropriate soil investigation methods. The controlling type of soil to be used for slab selection and/or design purposes should be determined in such fills by the necessary field and laboratory tests.

2.1.3 Cut-and-Fill

A cut-and-fill is one in which the soil is excavated from one area of the slab site and redistributed to another area on the site in order to provide a level surface. When this type of fill is employed, it is necessary that the fill and natural soil provide the same degree of support over the slab site The fill material should be placed as a controlled fill.

Where cuts and fills involving plastic soil (PI > 15) are proposed

[1] Appendix C, Reference 6, Publications No. 1076 and 1281.

as support for structures, the services of a qualified soils engineer should be required for analysis, testing, and placement supervision.

2.1.4 Construction of Fills[1]

To ensure uniformity, fills should be constructed in shallow increments which are tested adequately in order to eliminate the possibility of loose layers.

2.1.5 Fill Materials

Where site conditions require fill materials, such fill should conform to one of the following conditions:

a. Clean granular type such as gravel, crushed stone, or sand, uniformly graded with 2-inch maximum size.

b. Any clean fill material (soil free of organic material and rubbish) installed under competent supervision with mechanical equipment.

2.2 Natural Moisture Control

Variation in moisture content is an important contributor to soil behavior; therefore, every effort should be made to eliminate situations which contribute to variation. With expansive soils, the water content required during placement needs to be maintained until foundations (slabs) are placed. Whereas nothing can be done to control the occurrence of the natural elements, much can be done to limit their effect on soil behavior.

2.3 Site Drainage

Unless proper drainage is provided for the slab site, free surface water will accumulate around and under the slab. This water will tend to consolidate silts and coarse-grained soils and cause expansive soils to increase in volume. Precautions are necessary to provide positive drainage away from the slab perimeter, in order to maintain the best possible state of moisture equilibrium. The bottom of the surface slab should be a minimum of 6 inches above the surrounding outside finished grade. The ground should be sloped

[1]See footnote 2, p. 129.

down and away from the edge of the slab for 25 feet at a 2% slope, or a minimum drop of at least 6 inches.

3.0 SLAB MATERIALS

The quality of materials to be used in slab construction is of key importance. While the quality of materials used in concrete is generally taken for granted, attention should be directed to the minimum specifications for materials upon which these recommendations are based.

The latest revisions of the following American Society for Testing and Materials Standards should be used for slab materials:

ASTM C-33 - Specifications for Concrete Aggregates
ASTM C-330 - Specifications for Lightweight Aggregates for Structural Concrete
ASTM C-150 - Specifications for Portland Cement
ASTM C-175 - Specifications for Air-Entraining Portland Cement
ASTM C-94 - Specifications for Ready-Mixed Concrete
ASTM C-205 - Specifications for Portland Blast-Furnace Cement
ASTM C-260 - Specifications for Air-Entraining Admixtures for Concrete
ASTM A-15 - Specifications for Billet-Steel Bars for Concrete Reinforcement
ASTM A-16 - Specifications for Rail-Steel Bars for Concrete Reinforcement
ASTM A-160 - Specifications for Axle-Steel Bars for Concrete Reinforcement
ASTM A-185 - Specifications for Welded Steel Wire Fabric for Concrete Reinforcement.

3.1 Concrete Quality

Mix proportions used should produce a concrete which is workable and readily finished. Concrete should have low permeability, good wear and abrasion resistance, and sufficient durability to withstand local atmospheric and exposure conditions during construction. It is generally possible to obtain these characteristics in a concrete having a compressive strength of 2500 psi when tested in accordance with ASTM Designation C-39.[1]

For Type II and IV slabs, the compressive strength, when tested in accordance with ASTM C-39, should be in accordance with the ultimate strength used in the structural design.

3.2 Test for Concrete Consistency

The consistency of concrete should be measured in accordance with ASTM Designation C-143.[2]

3.3 Admixtures

Admixtures should be permitted when they contribute materially to one or more of the following in fresh or hardened concrete (and provided the benefits derived do not entail adverse effect on other concrete properties recommended in this report): workability, placeability, ease of finishing, strength, durability, lowered absorption or permeability, increased abrasion resistance.

4.0 CONCRETE PRACTICES

Placement practices control to a very great extent the serviceability of any slab. To this end, such practices have been related to levels of technical competence in proportioning and mixing which may be provided on the job.

4.1 Engineer or Architect Supervision

Where proportioning, mixing, and placing of concrete are performed under control of a competent representative of the architect or

[1]ASTM Designation C-39, Method for Test for Compressive Strength of Molded Concrete Cylinders. Philadelphia: American Society for Testing and Materials.

[2]ASTM Designation C-143, Method of Test for Slump of Portland-Cement Concrete. Philadelphia: American Society for Testing and Materials.

engineer, the following ACI Standards should be considered to apply:[1]

1. Recommended Practice for Selecting Proportions for Concrete (ACI 613)

2. Recommended Practice for Selecting Proportions for Structural Lightweight Concrete (ACI 613A)

3. Recommended Practice for Measuring, Mixing, and Placing Concrete (ACI 614)

4. ACI Manual of Concrete Inspection (1957).

4.2 Ready-Mix Concrete without Engineer or Architect Supervision

Where proportioning, mixing, and placing of ready-mix concrete are not under the control of an architect or engineer, the following criteria should be considered to apply:

a. Concrete, with or without admixtures, should equal or surpass—in strength, durability, impermeability, and ease of finishing—plain concrete having a ratio of not more than 6 gallons of water per sack of cement.

b. The slump of the concrete as designed and as placed on the job should be not less than 3 nor more than 6 inches; for lightweight concrete, the slump should be 1 to 3 inches when tested in accordance with ASTM Designation C-143.

c. The contractor should submit to FHA signed delivery tickets for ready-mix concrete, attesting to compliance with the specifications.

d. Under some conditions, such as hot, dry weather with long waiting periods between mixing and placing of concrete, it may be necessary to add water to the mix at the job site to regain recommended slump after water has evaporated from the mix. In such instance (in order not to affect the quality of concrete), only suffi-

[1]Separate publications of the American Concrete Institute, Detroit, Michigan.

cient water should be added to regain the specified consistency, provided the water-to-cement ratio is not exceeded.

4.3 On-Site Mixing

Where concrete is to be mixed on a volumetric basis, and not under the control of a competent representative of the architect or engineer, the proportions in Table V, p. 135, should be used as a guide. The contractor should submit signed statements to FHA, attesting to compliance with Table V. The statement should show total gallons of water and cubic feet of coarse and fine aggregate used for each sack of cement.

4.4 Concrete Placing and Finishing

The concrete should be distributed and placed in such a manner that it will work readily into corners and angles of forms, and around reinforcement, without permitting materials to segregate or allowing excess free water to collect on the surface. After placing, concrete should be thoroughly consolidated by spading or vibration, after which it should be screeded to proper grade. Excessive spading or vibration should be avoided, to eliminate risk of separation of materials. The concrete should be worked with a float to remove high spots and to fill depressions. After floating, various finishes can be applied according to standard practices. Where a smooth, troweled finish is required, the surface should be sufficiently hard not to be marred by the weight of the machine.

4.5 Curing Practices

Curing should commence as soon as concrete has set sufficiently to prevent damage to the surface. To prevent too rapid drying, the concrete slab should be covered as soon after placement as is possible without marring the surface.

Materials such as moist burlap, canvas, cotton matting, liquid membranes, foaming compounds, polyethylene sheeting, or waterproof curing paper with edges sealed, may be used to cover the concrete during curing. If burlap, canvas, or cotton material is used, cover material should be kept moist. At no time during the curing period should concrete be exposed directly to the drying actions of sun or wind.

TABLE V Concrete Mixes - Volumetric Basis[1]

Coarse Aggregate Used (Size)	Approximate Proportions[2] (cu ft)			Water per Sack of Cement (gal)			Approximate Cement Content of Mix (Sacks per cu yd)
	Cement	Sand Agg.	Coarse Agg.	Damp[3] Sand	Wet[4] Sand	Very Wet[5] Sand	
3/4 in. to No. 4	1	2-3/4	2-3/4	5-1/2	5	4-1/4	5.8
1 in. to No. 4	1	2-3/4	3	5-1/2	5	4-1/4	5.6
1-1/2 in. to No. 4	1	2-3/4	3-1/2	5-1/2	5	4-1/4	5.2

[1] Batch should be mixed 3 to 5 minutes after addition of all materials.

[2] If the recommended proportions do not make a smooth workable mix, slight variations in the quantities of fine and coarse aggregate may be made. The amount of mixing water, however, should not be varied. When early strength in concrete is desired, as during winter construction, high early-strength cement may be used. Where exposure in service to freezing and thawing is expected, air-entrained concrete should be used, but the slab should not be hard-troweled.

[3] "Damp" describes sand which will fall apart after being squeezed in the palm of the hand.

[4] "Wet" describes average sand which will ball in the hand when squeezed but will leave no moisture on the palm.

[5] "Very Wet" describes sand that has been subjected to recent rain or which has been recently pumped. Balling a sample in the hand will leave moisture on the palm, and the sand will glisten in the light.

Concrete that is to serve as a wearing surface should be cured for at least 7 days. When a wearing surface is not required, at least 3 days' curing should be provided. For temperatures below 40° F, 2 additional days of curing should be provided in either case.

PART C: Soils

1.0 GENERAL

While there is general appreciation of the importance of soil performance in the design and construction of large and/or heavy buildings, relatively little importance has been attached to it in light construction. Some justification for this attitude is that many soils can, in fact, be used as a base for slab construction with little or no modification; others, however, must be handled with extreme caution, and many will require competent engineering analysis.

The importance attached to soil in the design of residential slabs needs to be understood. Since it is assumed that the soil will remain in contact with the slab and thus provide support, it is important that the designer recognize the possibility of soil activity. Many factors influence the behavior of soils beneath structures, and key factors among these must be taken into consideration in the design of slabs for residential construction. These include the type of soil; its composition with respect to grain size, moisture content, density, drainage characteristics, stratification, and consistency; and climatic variations.

The discussion which follows will cover the most important factors involved in evaluating soils for use with residential slabs-on-ground. Using the Unified Soils Classification System[1] as a basis, soils identification and classification are considered. A method for rating the effect on soils of climatic variations is provided. For discussion purposes, distinction is drawn between soils

[1]Appendix C, Reference 4; this publication discusses soils in detail. See also Appendix D.

which present problems and those which do not. Heated-slab effects on soils, natural moisture conditions, site investigations, and the various types of fill are treated. Site preparation is discussed, and a scale of suggested compaction densities based on climatic rating and soil plasticity index is provided.

2.0 UNIFIED SOIL CLASSIFICATION SYSTEM

The Unified Soil Classification System is based on the system developed during World War II for the Corps of Engineers by Dr. Arthur Cassagrande of Harvard University. It identifies soils according to textural qualities and plasticity, and sets up groupings with respect to performance as engineering construction materials. The following properties form the basis of this system:

a. Percentages of gravel, sand, and fine-textured materials

b. Shape of the grain-size distribution curve

c. Plasticity and compressibility characteristics.

Each soil is given a descriptive name and a letter symbol indicating its principal characteristics, as shown in Appendix D, p. 289.

It is felt that this system more adequately meets the needs of the designer of residential slabs than any other currently in use, since it provides a means of identifying a soil accurately and placing it in a class with well-established engineering properties. This classification, together with density, consistency, and moisture content, provides adequate means of describing and/or distinguishing among foundation soils for slab-on-ground construction.

2.1 Identification and Classification

The designer must know the engineering characteristics of soil, including grain size, gradation, and plasticity. As these characteristics vary widely and descriptions of essentially similar soils often differ substantially from one locality to another, adequate evaluation is not always easy.

An important factor in soil classification is that rarely will only a single soil type be found on a residential building site. In fact, soils generally vary in composition and characteristics, vertically and horizontally, sometimes within inches. Thus it is important to know what types of soil are present, and the amount and distribution of each.

2.2 Aids to Soil Identification

Before any conclusions can be reached concerning the suitability of a particular site for a particular slab design, the basic characteristics of the soil must be determined.

Agricultural soil surveys, geological maps, and similar items[1] are among the many aids to the identification of soils. These generally can be helpful if properly interpreted, but caution must be exercised in their use.

The procedures outlined in the Unified Soil Classification System are sufficient for the field identification of most soils; for complete classification, there must be information regarding natural moisture content, density, and consistency. If there is still any question as to soil type, more extensive and exacting tests should be conducted by a soils laboratory.

2.3 Major Soil Classes

Broadly speaking, soils are either granular or cohesive; in many areas, the soil consists of a combination of these broad classes, in varying proportions. Granular soils generally have a grain size too large for a No. 22 sieve, though so-called "rock flour" soils are considered granular in spite of being finer than No. 200.[2] Co-

[1]In this connection, the Federal Housing Administration has been responsible for the development of two special aids which are described in the following:

Federal Housing Administration, Engineering Soil Classification for Residential Developments, FHA No. 373. From data prepared principally by the Virginia Polytechnic Institute and the United States Bureau of Public Roads. Washington: U.S. Government Printing Office, revised November 1961.

Federal Housing Administration, Soil PVC Meter, FHA 701, December 1960.

[2]ASTM Designation E-11, Sieves for Testing Purposes (Philadelphia: American Society for Testing and Materials), contains detailed specifications for sieves.

hesive soils are fine-textured soils that have plasticity. Such soils, when mixed with water, can be molded without rupture. When dried, they become hard and brittle. Organic soils include peat, topsoil, and organic silt containing decayed vegetable and animal matter in various percentages.

A natural soil consisting primarily of granular particles greater than No. 200 sieve, but containing perhaps 20% of clay particles, would probably behave as a cohesive soil even though the dominant material is not clay. Thus, for purposes of this report, a soil cannot be considered granular unless it is nonplastic (as determined by Atterberg Limit Test). Lack of strength when the soil is dry is indicative of granular soils.

There is a wide variation in the physical properties of soils even for almost identical grain-size curves, and neither grain size nor plasticity index alone can be fully relied upon to define expansive or compressible soils. Yet, the potential for volume change in a soil due to fluctuations in the moisture content is usually associated with the clay fraction and is indicated by PI. Volume changes, however, can be better predicted from the results of consolidation tests on undisturbed samples.

3.0 PROBLEM SOILS

A number of soils may be considered problem soils—if only because of climatic or moisture conditions—and will, therefore, require special consideration.

3.1 Loess

Loess soils will fall in the ML or MH groups of the Unified Soil Classification System and should usually be treated in the same manner as other soils in this group. It is important, however, to recognize that heavily loaded slabs may settle unduly when loess becomes saturated. Proper drainage is extremely important where these soils are encountered. In residential construction the loads are generally not sufficient to cause trouble with loess-type soils except where slabs support chimneys or other heavy, concentrated loads.

3.2 Highly Compressible Clays

Highly compressible clays are those with sufficient moisture content to have a soft or very soft consistency. Every effort must be made to avoid overloading these clays, as they may settle unduly even under residential loads.

3.3 Expansive Clays

Expansive clays are problem soils because of the extent to which their activity is affected by climatic conditions. Any clay with PI greater than 10 may cause trouble by expansion under exposure to severe climatic conditions; yet this same material, under favorable or intermediate conditions, may be considered satisfactory for foundation purposes. Under severe climatic conditions, clays will generate very high swelling pressures which may reach many tons per square foot. It is, therefore, impossible to control the swelling by loading with a residential slab. Where a framed slab (Type IV) is used, care is necessary to ensure that the slab and beams cannot possibly be reached by the swelling clay and that the supporting portions are anchored below the line of seasonal moisture change. In the absence of such precautions, damage can be expected whenever the soil moisture content varies appreciably.

3.4 Highly Plastic Soils

It is with highly plastic soils that the designer is most likely to experience difficulty.

The potential pressures generated from expansion caused by an increase in moisture are difficult to estimate. The fact remains, however, that they may reach the magnitude of many tons per square foot. This is indicated by separation from bell-bottomed piles because of soil expansion. Since the loads associated with residential construction are not sufficient to control expansion by loading, extreme care must be exercised in placing slabs on highly plastic soils. (Although there is not yet full substantiation for this view, it is believed that removal of the highly plastic soils and replacement with a coarse granular mat may equalize settlement; it is further believed that this practice would result in maintenance of more stable moisture content in the soil beneath, reducing the possibility of expansion and the consequent generation of excessive pressures.)

3.5 Sands and Silts

A very loose sand or silt may cause serious trouble beneath a foundation or slab. Fine sands and silts can be especially troublesome when loose. A damp sand may be "bulked" to such an extent that drying out or flooding can produce a decrease in volume that will cause excessive and unequal settlements. Vibration of loose sands and silts is sure to cause a decrease in volume, with resultant rapid settlement. Gravels usually occur in a dense state and are unlikely to cause problems.

If a sand or silt is encountered in the site investigation, an attempt should be made to determine whether it is dense or loose. If loose, either the sand or silt should be compacted to a dense state before building on the site, or the building should be supported on soil beneath the loose material in such a manner that volume change of the sand or silt will produce no effect on the building.

4.0 UNDISTURBED CONDITION OF SOILS

4.1 Natural Density of Sands and Silts

The natural density of sands and silts is of importance. A reasonably accurate method of determining the relative density of a cohesionless soil at the bottom of a bore hole has been adopted by ASTM.[1] This test requires power-driven equipment. Its use could not normally be justified for investigation of a site for a one- or two-family residence, where the test holes usually need to be only 15 feet deep, but for larger residential developments it would be justified. The resistance to penetration varies somewhat with the grain size of the cohesionless material and depends upon whether the soil lies above or below the water table. Table VI, p. 142, shows relative densities of sands.

[1]ASTM Designation D1586-64T (or most recent edition), Penetration Test and Split-Barrel Sampling of Soils. Philadelphia: American Society for Testing and Materials.

TABLE VI Relative Density of Sands[1]

ASTM Method (No. of Blows)	Relative Density (%)	Classification
0 - 4	0 - 20	Very Loose
4 - 10	20 - 40	Loose
10 - 30	40 - 60	Medium
30 - 50	60 - 80	Dense
Over 50	80 - 100	Very Dense

[1]Penetration resistance values of sands determined in accordance with ASTM Designation D1586-64T. The number of blows causing the split-barrel sampler to penetrate to a depth of one foot is recorded; the sampler and driving apparatus must be in accordance with specifications.

TABLE VII Consistency of Undisturbed Clay Soils

Undisturbed Consistency	q_u (tsf)[1]	Rule-of-thumb Test
Very soft	0.25	Core (height = twice diameter) sags under own weight
Soft	0.25 - 0.50	Can be pinched in two between thumb and forefinger
Medium	0.50 - 1.00	Can be imprinted easily with fingers
Stiff	1.00 - 2.00	Can be imprinted with considerable pressure from fingers
Very stiff	2.00 - 4.00	Can barely be imprinted by pressure from fingers
Hard	4.00+	Cannot be imprinted by fingers

[1]q_u = unconfined compressive strength in tons per sq ft (not the bearing capacity).

4.2 Consistency of Cohesive Soils

It is also important to determine the consistency of the soil in its undisturbed stage; otherwise, the assumed behavior characteristics may not be valid. Table VII, p. 142, can be used as a guide to the consistency of clay-type soils.

5.0 NONPROBLEM SOILS

Dense, coarse-grained soils which are properly drained offer few problems with respect to slabs-on-ground. By their very nature, these soils possess excellent bearing capacity, since they are not subject to volume change. The only consideration required is that of ensuring that the natural confinement of the soil is not disturbed by trenching or grading operations.

APPENDIX A

DESIGN TABLES

In this Appendix a set of tables is provided for the design of rectangular slabs of given dimensions for different load intensities [w(1-C)] in the range 4 to 150 psf.

For this purpose, designs for a total of five slabs are given as follows:

1. A small rectangular slab 24 by 40 ft.
2. A medium-size rectangular slab 30 by 50 ft.
3. A large-size rectangular slab 36 by 72 ft.
4. A large square slab 35 by 35 ft.
5. A medium-size square slab 30 by 30 ft.

Each slab has been designed for three separate deflection conditions, i.e., for allowable $\Delta/L = 1/200, 1/300, 1/360$.

For each given load coefficient [w(1 - C)] and allowable ratio (Δ/L), a number of slab designs are provided; they differ in number and/or width of stiffening beams and/or in depth of stiffening beams.

In most cases of beams 8 inches wide, further increasing the width does not lead to a reduction in the reinforcement or the required depth. In those cases for which an increase in beam width may permit use of shallower beams or less reinforcement, the tables so indicate by an alternative combination of dimensions with wider beams. In all cases, the designer is free to increase the beam requirements. In so doing it is not necessary to supply extra reinforcement, and it should not be concluded that compensation can be made by reduction in beam depth.

It is acknowledged that a designer will seldom be called on to design a slab with the exact dimensions and loads of those included in the tables of this Appendix, regardless of the large number of examples provided.

The purpose of these tables is to permit a quick check of the design of a given slab by comparing its design characteristics with the slab in the tables which is closest in dimension and loading These tables will also prove useful in guiding the designer in the selection of trial beam layout and dimensions (b and d) of a slab to be designed, by reference to the closest slab for which a design is readily available in the tables.

Finally, the tables in this Appendix could be used for an actual approximate design of a slab by interpolation, whenever the slab to be designed has the approximate configuration and dimensions of a slab for which a design is available in the tables.

In preparing and organizing these tables, it was recognized that small effective slab loads [w(1-C)] will result either from small distributed loads (w) or because the coefficient 1 - C is very small. However, if the latter is in the range $0.9 \leq 1 - C < 1.0$, the sequence of slab design is different from that required for the same w(1 - C) effective load for which $1 - C \geq 0.9$. Therefore, for values of w(1 - C) in the range 4 to 36 psf, the tables provide slab designs for the different values of the support coefficient (1 - C). Whenever the value of 1 - C is not explicitly given in the tables, it is assumed that $1 - C \geq 0.9$ and the slab design is thus independent of the exact value of 1 - C depending only on the value of the effective load [w(1 - C)] given in the first column of the ensuing tables.

Example of Use of Tables

Suppose it is desired to design a slab 30 by 50 feet in size, with a total average dead and live load of 340 psf, in a locality for which the support index (C) is equal to 0.75 and for a structure for which the allowable deflection ratio (Δ/L) is 1/300.

Compute the load coefficient.

$$w(1 - C) = 340(1.0 - 0.75) = 85 \text{ psf}$$

Enter the appropriate table (p. 184) and in the first column with the value w(1 - C) = 85 psf (the value of w(1 - C) is designated in the tables as W).

There are a number of slabs available in the tables for different combinations of beam depth, width, and number. In the long direction, the slab can be provided with 3 or 4 beams ranging in depth from 32 to 37 inches and in width from 8 to 12 inches (columns D, X and BX). All slabs have five beams, 8 inches wide along the short dimension (columns Y and BY).

Assume that it has been decided to select the slab with 33-inch effective depth stiffening beams. Then, the D column of the table is entered at 33 inches, and the corresponding line of the table provides all the design characteristics of the slab. Summarizing:

1. For a load coefficient w(1 - C) = 85 psf (column W), the depth of stiffening beams (d) is 33 inches (column D).

2. Use four (column X) stiffening beams 8 inches wide (column BX) in the long dimension of the slab at 30/(4 - 1) = 10-foot spacing.

3. Use five (column Y) stiffening beams 8 inches wide (column BY) in the short dimension of the slab at 50/(5 - 1) = 12.5-foot spacing.

4. The depth ratio (L/d) for this slab is 18.18 (column L/D).

5. The bottom steel ratio in the longitudinal beams is 1.15% (column PX). The bottom steel required per longitudinal beam is 3.05 in.^{2} (column AX). Four No. 8 bars with a cross-sectional area = 3.16 in.^{2} can be used per beam.

6. The additional top steel per longitudinal beam is also obtained from column AX by subtracting 0.65 in.^{2} from the botton steel, i.e., 3.05 - 0.65 = 2.40 in.^{2} per beam. Three No. 9 bars with a total cross-sectional area = 3.00 in.^{2} can be used as top reinforcement per longitudinal beam, or one could accept 3 No. 8 bars = 2.37 in.^{2}

7. The bottom steel ratio per short beam is equal to 0.75% (column PY). The bottom steel per short beam corresponding to this steel ratio is 2.00 in.^{2} per beam (column AY). Two No. 9 bars will provide exactly 2.00 in.^{2}, or if uniformity of bar diameter is desired, 3 No. 8 bars = 2.37 in.^{2}.

8. The top steel per short beam is obtained from column AY by subtracting 0.65 in.^{2} from the bottom steel, i.e., 200 - 0.65 = 1.35 in.^{2}. Two No. 8 bars will provide 1.58 in.^{2}.

9. Since the squares of the surface slab have clear dimensions of less than 12 feet, i.e., 11 feet 8 inches by 9 feet 4 inches, a surface slab 4 inches thick, reinforced with No. 3 bars at 12 inches o.c. each way, will suffice.

10. Since the value of K is equal to 1 (column K), the steel design of this slab is controlled by bending moment. Had the value of K been equal to 2 (as is the case with some 32-inch-deep slab beams), design requirements would be controlled by the deflection criterion.

11. The last column (column N) provides the value of N. This is an index indicating whether or not reinforcement in the short direction of the beam is the minimum required or is determined on the basis of moment or deflection requirements. When N = 1, the steel in the short direction is required for bending moment. On the other hand, when N = 2, the short-direction reinforcement is equal to the minimum required, i.e., 0.3% of the effective concrete section of the beams.

Note: These design tables were developed for A-15 reinforcing steel. If a higher strength steel (such as A-432) is to be used for reinforcing bars, the steel requirements provided by these tables can be modified in accordance with provisions in the text of this report.

Key to Table Symbols

Because the computer printout of these tables required the use of capital letters, symbols used do not always agree with those used in the body of the report. Where this is the case, a parenthetical note has been added.

C = Support index which is dependent on soil characteristics and geographic area in which slab is located.

W = $w(1 - C)\varphi$ = effective average dead and live load on slab in psf (in the text, the symbol $\bar{\bar{w}}$ is used for this quantity).

D = Structural depth of slab beams, i.e., distance from centerline of bottom beam steel to top of slab (in the text, the symbol d is used).

X = Number of beams parallel to long direction of slab for rectangular slabs or number of beams in each direction for square slabs.

BX = Width of each beam parallel to long direction of rectangular slabs (in the text, the symbol b_s is used).

Y = Number of beams parallel to short direction of rectangular slabs.

BY = Width of beams parallel to short direction of rectangular slabs (in the text, the symbol b_s is used).

L/D = Ratio of maximum side length of slab to structural depth of slab (in the text, the symbol L/d is used).

PX = Steel ratio of beams parallel to long direction of rectangular slabs (in the text, the symbol p is used).

AX = Cross sectional area of bottom reinforcing steel in each beam parallel to long direction of rectangular slab in square inches (in the text, the symbol A_s is used).

PY = Steel ratio of beams parallel to short direction of rectangular slabs (in the text, the symbol p is used).

AY = Cross-sectional area of bottom reinforcing steel in each beam parallel to short direction of rectangular slab in square inches (in the text, the symbol A_s is used for this quantity).

K = 1, when reinforcement of slab is governed by bending moment;
= 2, when reinforcement of slab is governed by deflection.

N = 1, when reinforcement in short direction of rectangular slab is governed by minimum reinforcement requirements.
= 2, when reinforcement of all beams exceeds minimum reinforcement requirements.

B = Width of each beam in square slab (in the text, the symbol b_s is used for this quantity).

P = Steel ratio of beams in square slabs (in the text, the symbol p is used).

A = Cross-sectional area of bottom reinforcement in each beam of square slabs (in the text, the symbol A_s is used).

TABLE VIII-A Slab 24 x 40 " L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	4	3	8	4	8		.65	.20	.36	.11		
4	.02	5	3	8	4	8		.58	.23	.33	.13		
4	.03	6	3	8	4	8		.52	.25	.29	.14		
8	.02	5	3	8	4	8		1.04	.41	.58	.23		
8	.03	7	3	8	4	8		.76	.42	.44	.24		
8	.04	8	3	8	4	8		.73	.47	.41	.26		
8	.05	8	3	8	4	8		.83	.53	.44	.28		
8	.06	10	3	8	4	8		.63	.50	.35	.28		
12	.03	7	3	8	4	8		1.12	.62	.62	.35		
12	.04	8	3	8	4	8		1.05	.67	.58	.37		
12	.05	9	3	8	4	8		.85	.61	.51	.37		
12	.06	10	3	8	4	8		.88	.70	.49	.39		
12	.07	12	3	8	4	8		.69	.66	.41	.39		
12	.08	12	3	8	4	8		.82	.78	.44	.42		
12	.09	13	3	8	4	8		.72	.75	.41	.42		
12		14	3	8	4	8	34.28	.65	.73	.38	.42	2	2
12		14	3	10	4	8	34.28	.49	.69	.38	.42	1	2
12		15	3	8	4	8	32.00	.54	.64	.33	.39	1	2
12		16	3	8	4	8	30.00	.47	.60	.30	.38	1	1
12		17	3	8	4	8	28.23	.42	.57	.30	.40	1	1
16	.04	8	3	8	4	8		1.30	.83	.73	.46		
16	.05	10	3	8	4	8		.95	.76	.58	.46		
16	.06	11	3	8	4	8		.97	.85	.56	.49		
16	.07	12	3	8	4	8		.84	.81	.51	.49		
16	.08	13	3	8	4	8		.90	.94	.51	.53		
16	.09	14	3	8	4	8		.80	.90	.47	.53		
16		14	3	8	4	8	34.28	.95	1.07	.50	.56	2	2
16		14	3	10	4	8	34.28	.71	.99	.50	.56	2	2
16		15	3	8	4	8	32.00	.72	.87	.44	.53	2	2
16		15	3	10	4	8	32.00	.57	.86	.44	.53	1	2
16		16	3	8	4	8	30.00	.63	.81	.38	.49	1	2
16		17	3	8	4	8	28.23	.56	.76	.34	.46	1	2
16		18	3	8	4	8	26.66	.50	.72	.30	.44	1	2
16		19	3	8	4	8	25.26	.44	.68	.30	.45	1	1
20	.05	10	3	8	4	8		1.30	1.04	.73	.58		
20	.06	11	3	8	4	8		1.09	.96	.66	.58		
20	.07	12	3	8	4	8		1.14	1.10	.64	.62		
20	.08	14	3	8	4	8		.93	1.04	.55	.62		
20	.09	14	3	8	4	8		1.09	1.22	.59	.66		
20		15	3	8	4	8	32.00	.98	1.17	.55	.66	2	2
20		15	3	10	4	8	32.00	.72	1.09	.55	.66	2	2
20		16	3	8	4	8	30.00	.79	1.01	.48	.62	1	2
20		17	3	8	4	8	28.23	.70	.95	.43	.58	1	2
20		18	3	8	4	8	26.66	.62	.90	.38	.55	1	2
20		19	3	8	4	8	25.26	.56	.85	.34	.52	1	2
20		20	3	8	4	8	24.00	.50	.81	.31	.49	1	2
20		21	3	8	4	8	22.85	.45	.77	.30	.50	1	1
24	.06	11	3	8	4	8		1.42	1.25	.79	.70		
24	.07	13	3	8	4	8		1.12	1.17	.67	.70		
24	.08	14	3	8	4	8		1.20	1.35	.66	.74		
24	.09	15	3	8	4	8		1.07	1.28	.62	.74		
24		16	3	8	4	8	30.00	.96	1.23	.58	.74	2	2
24		16	3	10	4	8	30.00	.75	1.21	.58	.74	1	2
24		17	3	8	4	8	28.23	.84	1.14	.51	.70	1	2
24		18	3	8	4	8	26.66	.75	1.08	.46	.66	1	2

TABLE VIII-A (Cont'd) Slab 24 x 40 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		19	3	8	4	8	25.26	.67	1.02	.41	.62	1	2
24		20	3	8	4	8	24.00	.60	.97	.37	.59	1	2
24		21	3	8	4	8	22.85	.55	.92	.33	.56	1	2
24		22	3	8	4	8	21.81	.50	.88	.30	.54	1	2
28	.07	13	3	8	4	8		1.41	1.46	.78	.81		
28	.08	14	3	8	4	8		1.23	1.37	.73	.81		
28	.09	16	3	8	4	8		1.04	1.33	.64	.81		
28		16	3	8	4	8	30.00	1.19	1.53	.68	.87	2	2
28		16	3	10	4	8	30.00	.88	1.41	.68	.87	1	2
28		17	3	8	4	8	28.23	.98	1.33	.60	.81	1	2
28		18	3	8	4	8	26.66	.87	1.26	.53	.77	1	2
28		19	3	8	4	8	25.26	.78	1.19	.48	.73	1	2
28		20	3	8	4	8	24.00	.70	1.13	.43	.69	1	2
28		21	3	8	4	8	22.85	.64	1.08	.39	.66	1	2
28		22	3	8	4	8	21.81	.58	1.03	.35	.63	1	2
32	.08	14	3	8	4	8		1.49	1.67	.83	.93		
32	.09	16	3	8	4	8		1.24	1.58	.73	.93		
32		17	3	8	4	8	28.23	1.12	1.52	.68	.93	1	2
32		18	3	8	4	8	26.66	1.00	1.44	.61	.88	1	2
32		19	3	8	4	8	25.26	.89	1.36	.55	.83	1	2
32		20	3	8	4	8	24.00	.81	1.29	.49	.79	1	2
32		21	3	8	4	8	22.85	.73	1.23	.45	.75	1	2
32		22	3	8	4	8	21.81	.66	1.17	.41	.72	1	2
32		23	3	8	4	8	20.86	.61	1.12	.37	.69	1	2
36	.09	16	3	8	4	8		1.47	1.88	.82	1.05		
36		17	3	8	4	8	28.23	1.32	1.79	.77	1.05	2	2
36		17	3	10	4	8	28.23	1.00	1.71	.77	1.05	1	2
36		18	3	8	4	8	26.66	1.12	1.62	.69	.99	1	2
36		19	3	8	4	8	25.26	1.01	1.53	.62	.94	1	2
36		20	3	8	4	8	24.00	.91	1.45	.55	.89	1	2
36		21	3	8	4	8	22.85	.82	1.38	.50	.85	1	2
36		22	3	8	4	8	21.81	.75	1.32	.46	.81	1	2
36		23	3	8	4	8	20.86	.68	1.26	.42	.77	1	2
40		17	3	8	4	8	28.23	1.54	2.09	.86	1.17	2	2
40		17	3	10	4	8	28.23	1.12	1.90	.86	1.17	1	2
40		18	3	8	4	8	26.66	1.25	1.80	.76	1.10	1	2
40		19	3	8	4	8	25.26	1.12	1.70	.68	1.04	1	2
40		20	3	8	4	8	24.00	1.01	1.62	.62	.99	1	2
40		21	3	8	4	8	22.85	.91	1.54	.56	.94	1	2
40		22	3	8	4	8	21.81	.83	1.47	.51	.90	1	2
40		23	3	8	4	8	20.86	.76	1.40	.47	.86	1	2
45		18	3	8	4	8	26.66	1.42	2.04	.86	1.24	2	2
45		18	3	10	4	8	26.66	1.12	2.02	.86	1.24	1	2
45		19	3	8	4	8	25.26	1.26	1.91	.77	1.17	1	2
45		20	3	8	4	8	24.00	1.13	1.82	.69	1.11	1	2
45		21	3	8	4	8	22.85	1.03	1.73	.63	1.06	1	2
45		22	3	8	4	8	21.81	.94	1.65	.57	1.01	1	2
45		23	3	8	4	8	20.86	.86	1.58	.52	.97	1	2
45		24	3	8	4	8	20.00	.79	1.51	.48	.93	1	2
50		18	3	8	4	8	26.66	1.66	2.39	.96	1.38	2	2
50		18	3	10	4	8	26.66	1.25	2.25	.96	1.38	1	2
50		19	3	8	4	8	25.26	1.40	2.13	.86	1.30	1	2
50		20	3	8	4	8	24.00	1.26	2.02	.77	1.24	1	2
50		21	3	8	4	8	22.85	1.14	1.93	.70	1.18	1	2
50		22	3	8	4	8	21.81	1.04	1.84	.64	1.13	1	2
50		23	3	8	4	8	20.86	.95	1.76	.58	1.08	1	2
50		24	3	8	4	8	20.00	.87	1.68	.54	1.03	1	2

TABLE VIII-A (Cont'd) Slab 24 x 40 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
55		19	3	8	4	8	25.26	1.54	2.34	.94	1.44	1	2
55		20	3	8	4	8	24.00	1.39	2.22	.85	1.36	1	2
55		21	3	8	4	8	22.85	1.26	2.12	.77	1.30	1	2
55		22	3	8	4	8	21.81	1.15	2.02	.70	1.24	1	2
55		23	3	8	4	8	20.86	1.05	1.93	.64	1.19	1	2
55		24	3	8	4	8	20.00	.96	1.85	.59	1.14	1	2
55		25	3	8	4	8	19.20	.89	1.78	.54	1.09	1	2
60		19	3	8	4	8	25.26	1.71	2.60	1.03	1.57	2	2
60		19	3	10	4	8	25.26	1.34	2.55	1.03	1.57	1	2
60		20	3	8	4	8	24.00	1.51	2.43	.93	1.49	1	2
60		21	3	8	4	8	22.85	1.37	2.31	.84	1.42	1	2
60		22	3	8	4	8	21.81	1.25	2.21	.77	1.35	1	2
60		23	3	8	4	8	20.86	1.14	2.11	.70	1.29	1	2
60		24	3	8	4	8	20.00	1.05	2.02	.64	1.24	1	2
60		25	3	8	4	8	19.20	.97	1.94	.59	1.19	1	2
65		20	3	8	4	8	24.00	1.64	2.63	1.01	1.61	1	2
65		21	3	8	4	8	22.85	1.49	2.50	.91	1.54	1	2
65		22	3	8	4	8	21.81	1.36	2.39	.83	1.47	1	2
65		23	3	8	4	8	20.86	1.24	2.29	.76	1.40	1	2
65		24	3	8	4	8	20.00	1.14	2.19	.70	1.34	1	2
65		25	3	8	4	8	19.20	1.05	2.10	.64	1.29	1	2
65		26	3	8	4	8	18.46	.97	2.02	.59	1.24	1	2
70		21	3	8	4	8	22.85	1.60	2.70	.98	1.65	1	2
70		22	3	8	4	8	21.81	1.46	2.57	.89	1.58	1	2
70		23	3	8	4	8	20.86	1.34	2.46	.82	1.51	1	2
70		24	3	8	4	8	20.00	1.23	2.36	.75	1.45	1	2
70		25	3	8	4	8	19.20	1.13	2.26	.69	1.39	1	2
70		26	3	8	4	8	18.46	1.04	2.18	.64	1.33	1	2
70		27	3	8	4	8	17.77	.97	2.10	.59	1.29	1	2
75		22	3	8	4	8	21.81	1.57	2.76	.96	1.69	1	2
75		23	3	8	4	8	20.86	1.43	2.64	.88	1.62	1	2
75		24	3	8	4	8	20.00	1.31	2.53	.81	1.55	1	2
75		25	3	8	4	8	19.20	1.21	2.43	.74	1.49	1	2
75		26	3	8	4	8	18.46	1.12	2.33	.69	1.43	1	2
75		27	3	8	4	8	17.77	1.04	2.25	.63	1.38	1	2
75		28	3	8	4	8	17.14	.96	2.17	.59	1.33	1	2
80		22	3	8	4	8	21.81	1.67	2.94	1.02	1.80	1	2
80		23	3	8	4	8	20.86	1.53	2.81	.94	1.73	1	2
80		24	3	8	4	8	20.00	1.40	2.70	.86	1.65	1	2
80		25	3	8	4	8	19.20	1.29	2.59	.79	1.59	1	2
80		26	3	8	4	8	18.46	1.19	2.49	.73	1.53	1	2
80		27	3	8	4	8	17.77	1.11	2.40	.68	1.47	1	2
80		28	3	8	4	8	17.14	1.03	2.31	.63	1.42	1	2
85		23	3	8	4	10	20.86	1.62	2.99	.79	1.83	1	2
85		24	3	8	4	8	20.00	1.49	2.87	.91	1.76	1	2
85		25	3	8	4	8	19.20	1.37	2.75	.84	1.69	1	2
85		26	3	8	4	8	18.46	1.27	2.65	.78	1.62	1	2
85		27	3	8	4	8	17.77	1.18	2.55	.72	1.56	1	2
85		28	3	8	4	8	17.14	1.09	2.46	.67	1.51	1	2
85		29	3	8	4	8	16.55	1.02	2.37	.62	1.45	1	2
90		24	3	8	4	10	20.00	1.58	3.03	.77	1.86	1	2
90		25	3	8	4	8	19.20	1.45	2.91	.89	1.79	1	2
90		26	3	8	4	8	18.46	1.34	2.80	.82	1.72	1	2
90		27	3	8	4	8	17.77	1.25	2.70	.76	1.65	1	2
90		28	3	8	4	8	17.14	1.16	2.60	.71	1.59	1	2
90		29	3	8	4	8	16.55	1.08	2.51	.66	1.54	1	2

TABLE VIII-A (Cont'd) Slab 24 x 40 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
90		30	3	8	4	8	16.00	1.01	2.43	.62	1.49	1	2
95		22	3	10	4	10	21.81	1.59	3.50	.97	2.14	1	2
95		24	3	8	4	8	20.00	1.67	3.20	1.02	1.96	1	2
95		25	3	8	4	8	19.20	1.54	3.08	.94	1.89	1	2
95		26	3	8	4	8	18.46	1.42	2.96	.87	1.81	1	2
95		27	3	8	4	8	17.77	1.32	2.85	.81	1.75	1	2
95		28	3	8	4	8	17.14	1.22	2.75	.75	1.68	1	2
95		29	3	8	4	8	16.55	1.14	2.65	.70	1.63	1	2
100		22	3	10	4	10	21.81	1.67	3.68	1.02	2.26	1	2
100		25	3	8	4	8	19.20	1.62	3.24	.99	1.99	1	2
100		26	3	8	4	8	18.46	1.49	3.11	.92	1.91	1	2
100		27	3	8	4	8	17.77	1.38	3.00	.85	1.84	1	2
100		28	3	8	4	8	17.14	1.29	2.89	.79	1.77	1	2
100		29	3	8	4	8	16.55	1.20	2.79	.73	1.71	1	2
100		30	3	8	4	8	16.00	1.12	2.70	.69	1.65	1	2
105		23	3	10	4	12	20.86	1.60	3.70	.82	2.27	1	2
105		26	3	8	4	8	18.46	1.57	3.27	.96	2.00	1	2
105		27	3	8	4	8	17.77	1.45	3.15	.89	1.93	1	2
105		28	3	8	4	8	17.14	1.35	3.03	.83	1.86	1	2
105		29	3	8	4	8	16.55	1.26	2.93	.77	1.80	1	2
105		30	3	8	4	8	16.00	1.18	2.83	.72	1.74	1	2
105		31	3	8	4	8	15.48	1.10	2.74	.67	1.68	1	2
110		23	3	10	4	12	20.86	1.68	3.87	.86	2.38	1	2
110		26	3	8	4	8	18.46	1.64	3.42	1.01	2.10	1	2
110		27	3	8	4	8	17.77	1.52	3.30	.93	2.02	1	2
110		28	3	8	4	8	17.14	1.42	3.18	.87	1.95	1	2
110		29	3	8	4	8	16.55	1.32	3.07	.81	1.88	1	2
110		30	3	8	4	8	16.00	1.23	2.97	.76	1.82	1	2
110		31	3	8	4	8	15.48	1.15	2.87	.71	1.76	1	2
115		22	3	12	4	12	21.81	1.60	4.23	.98	2.60	1	2
115		24	3	10	4	10	20.00	1.61	3.88	.99	2.38	1	2
115		27	3	8	4	8	17.77	1.59	3.45	.98	2.11	1	2
115		28	3	8	4	8	17.14	1.48	3.32	.91	2.04	1	2
115		29	3	8	4	8	16.55	1.38	3.21	.85	1.97	1	2
115		30	3	8	4	8	16.00	1.29	3.10	.79	1.90	1	2
115		31	3	8	4	8	15.48	1.21	3.00	.74	1.84	1	2
120		22	3	12	4	12	21.81	1.67	4.42	1.02	2.71	1	2
120		24	3	10	4	10	20.00	1.68	4.05	1.03	2.48	1	2
120		25	3	10	4	10	19.20	1.55	3.89	.95	2.38	1	2
120		27	3	8	4	8	17.77	1.66	3.60	1.02	2.21	1	2
120		28	3	8	4	8	17.14	1.55	3.47	.95	2.13	1	2
120		29	3	8	4	8	16.55	1.44	3.35	.88	2.05	1	2
120		30	3	8	4	8	16.00	1.35	3.24	.82	1.99	1	2
125		23	3	12	4	12	20.86	1.59	4.40	.97	2.70	1	2
125		25	3	10	4	10	19.20	1.62	4.05	.99	2.48	1	2
125		26	3	10	4	10	18.46	1.49	3.89	.92	2.39	1	2
125		28	3	8	4	8	17.14	1.61	3.61	.99	2.22	1	2
125		29	3	8	4	8	16.55	1.50	3.49	.92	2.14	1	2
125		30	3	8	4	8	16.00	1.40	3.37	.86	2.07	1	2
125		31	3	8	4	8	15.48	1.31	3.26	.80	2.00	1	2
130		23	3	12	4	12	20.86	1.66	4.58	1.01	2.81	1	2
130		25	3	10	4	10	19.20	1.68	4.21	1.03	2.58	1	2
130		26	3	10	4	10	18.46	1.55	4.05	.95	2.48	1	2
130		27	3	10	4	10	17.77	1.44	3.90	.88	2.39	1	2
130		28	3	8	4	10	17.14	1.68	3.76	.82	2.31	1	2
130		29	3	8	4	8	16.55	1.56	3.63	.96	2.23	1	2

TABLE VIII-A (Cont'd) Slab 24 x 40 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
130		30	3	8	4	8	16.00	1.46	3.51	.89	2.15	1	2
135		24	3	12	4	14	20.00	1.58	4.55	.83	2.79	1	2
135		26	3	10	4	10	18.46	1.61	4.20	.99	2.58	1	2
135		27	3	10	4	10	17.77	1.50	4.05	.92	2.48	1	2
135		28	3	10	4	10	17.14	1.39	3.90	.85	2.39	1	2
135		29	3	8	4	10	16.55	1.62	3.77	.79	2.31	1	2
135		30	3	8	4	8	16.00	1.51	3.64	.93	2.23	1	2
135		31	3	8	4	8	15.48	1.42	3.53	.87	2.16	1	2
140		24	3	12	4	14	20.00	1.64	4.72	.86	2.90	1	2
140		26	3	10	4	10	18.46	1.67	4.36	1.03	2.67	1	2
140		27	3	10	4	10	17.77	1.55	4.20	.95	2.58	1	2
140		28	3	10	4	10	17.14	1.44	4.05	.88	2.48	1	2
140		29	3	10	4	10	16.55	1.34	3.91	.82	2.40	1	2
140		30	3	8	4	10	16.00	1.57	3.78	.77	2.32	1	2
140		31	3	8	4	8	15.48	1.47	3.66	.90	2.24	1	2
145		23	3	14	4	14	20.86	1.58	5.11	.97	3.13	1	2
145		25	3	12	4	12	19.20	1.56	4.70	.96	2.88	1	2
145		27	3	10	4	10	17.77	1.61	4.35	.98	2.67	1	2
145		28	3	10	4	10	17.14	1.49	4.19	.92	2.57	1	2
145		29	3	10	4	10	16.55	1.39	4.05	.85	2.48	1	2
145		30	3	10	4	10	16.00	1.30	3.91	.80	2.40	1	2
145		31	3	8	4	10	15.48	1.52	3.79	.75	2.32	1	2
150		23	3	14	4	14	20.86	1.64	5.28	1.00	3.24	1	2
150		25	3	12	4	12	19.20	1.62	4.86	.99	2.98	1	2
150		27	3	10	4	10	17.77	1.66	4.50	1.02	2.76	1	2
150		28	3	10	4	10	17.14	1.55	4.34	.95	2.66	1	2
150		29	3	10	4	10	16.55	1.44	4.19	.88	2.57	1	2
150		30	3	10	4	10	16.00	1.35	4.05	.82	2.48	1	2
150		31	3	10	4	10	15.48	1.26	3.92	.77	2.40	1	2

TABLE VIII-B Slab 24 x 40 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	4	3	8	4	8		.50	.16	.28	.09		
4	.02	6	3	8	4	8		.41	.19	.21	.10		
4	.03	7	3	8	4	8		.43	.24	.21	.12		
8	.02	6	3	8	4	8		.67	.32	.37	.18		
8	.03	8	3	8	4	8		.58	.37	.31	.19		
8	.04	9	3	8	4	8		.55	.39	.29	.20		
8	.05	10	3	8	4	8		.54	.43	.27	.22		
8	.06	11	3	8	4	8		.55	.48	.27	.24		
12	.03	8	3	8	4	8		.75	.48	.42	.27		
12	.04	10	3	8	4	8		.63	.50	.35	.28		
12	.05	11	3	8	4	8		.61	.54	.33	.29		
12	.06	13	3	8	4	8		.57	.59	.30	.31		
12	.07	14	3	8	4	8		.59	.66	.29	.33		
12	.08	15	3	8	4	8		.53	.64	.28	.34		
12	.09	16	3	8	4	8		.57	.73	.28	.36		
12		17	3	8	4	8	28.23	.52	.71	.30	.40	2	1
12		17	3	10	4	8	28.23	.39	.67	.30	.40	2	1
12		18	3	8	4	8	26.66	.42	.60	.30	.43	2	1
12		18	3	10	4	8	26.66	.31	.56	.30	.43	2	1
12		19	3	8	4	8	25.26	.34	.51	.30	.45	2	1
12		19	3	10	4	8	25.26	.26	.51	.30	.45	1	1
12		20	3	8	4	8	24.00	.30	.48	.30	.48	1	1
16	.04	10	3	8	4	8		.80	.64	.45	.36		
16	.05	12	3	8	4	8		.71	.68	.39	.37		
16	.06	13	3	8	4	8		.72	.74	.38	.39		
16	.07	14	3	8	4	8		.74	.83	.37	.41		
16	.08	16	3	8	4	8		.62	.79	.32	.41		
16	.09	17	3	8	4	8		.66	.90	.32	.44		
16		18	3	8	4	8	26.66	.60	.87	.30	.44	2	2
16		18	3	10	4	8	26.66	.45	.82	.30	.44	2	2
16		19	3	8	4	8	25.26	.49	.75	.30	.45	2	1
16		19	3	10	4	8	25.26	.37	.70	.30	.45	2	1
16		20	3	8	4	8	24.00	.40	.64	.30	.48	2	1
16		20	3	10	4	8	24.00	.32	.64	.30	.48	1	1
16		21	3	8	4	8	22.85	.36	.61	.30	.50	1	1
20	.05	12	3	8	4	8		.83	.80	.47	.45		
20	.06	14	3	8	4	8		.77	.87	.42	.47		
20	.07	15	3	8	4	8		.79	.95	.41	.49		
20	.08	17	3	8	4	8		.67	.91	.36	.49		
20	.09	18	3	8	4	8		.71	1.02	.36	.52		
20		19	3	8	4	8	25.26	.65	.99	.34	.52	2	2
20		19	3	10	4	8	25.26	.49	.93	.34	.52	2	2
20		20	3	8	4	8	24.00	.53	.86	.31	.49	2	2
20		20	3	10	4	8	24.00	.40	.81	.31	.49	2	2
20		21	3	8	4	8	22.85	.45	.77	.30	.50	1	1
20		22	3	8	4	8	21.81	.41	.73	.30	.52	1	1
24	.06	14	3	8	4	8		.86	.96	.48	.54		
24	.07	16	3	8	4	8		.82	1.05	.44	.56		
24	.08	18	3	8	4	8		.70	1.01	.39	.56		
24	.09	19	3	8	4	8		.73	1.12	.39	.59		
24		20	3	8	4	8	24.00	.68	1.08	.37	.59	2	2
24		20	3	10	4	8	24.00	.51	1.02	.37	.59	2	2
24		21	3	8	4	8	22.85	.56	.94	.33	.56	2	2
24		21	3	10	4	8	22.85	.44	.92	.33	.56	1	2
24		22	3	8	4	8	21.81	.50	.88	.30	.54	1	2

TABLE VIII-B (Cont'd) Slab 24 x 40 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		23	3	8	4	8	20.86	.45	.84	.30	.55	1	1
28	.07	16	3	8	4	8		.88	1.12	.49	.63		
28	.08	18	3	8	4	8		.86	1.24	.46	.66		
28	.09	20	3	8	4	8		.74	1.19	.41	.66		
28		20	3	8	4	8	24.00	.83	1.33	.43	.69	2	2
28		20	3	10	4	8	24.00	.62	1.24	.43	.69	2	2
28		21	3	8	4	8	22.85	.68	1.15	.39	.66	2	2
28		21	3	10	4	8	22.85	.51	1.08	.39	.66	2	2
28		22	3	8	4	8	21.81	.58	1.03	.35	.63	1	2
28		23	3	8	4	8	20.86	.53	.98	.32	.60	1	2
28		24	3	8	4	8	20.00	.49	.94	.30	.58	1	2
28		25	3	8	4	8	19.20	.45	.90	.30	.60	1	1
32	.08	18	3	8	4	8		.89	1.28	.50	.72		
32	.09	20	3	8	4	8		.89	1.42	.47	.75		
32		21	3	8	4	8	22.85	.81	1.37	.45	.75	2	2
32		21	3	10	4	8	22.85	.61	1.28	.45	.75	2	2
32		22	3	8	4	8	21.81	.68	1.20	.41	.72	2	2
32		22	3	10	4	8	21.81	.53	1.17	.41	.72	1	2
32		23	3	8	4	8	20.86	.61	1.12	.37	.69	1	2
32		24	3	8	4	8	20.00	.56	1.08	.34	.66	1	2
32		25	3	8	4	8	19.20	.51	1.03	.31	.63	1	2
32		26	3	8	4	8	18.46	.47	.99	.30	.62	1	1
36	.09	20	3	8	4	8		.90	1.44	.50	.81		
36		21	3	8	4	8	22.85	.95	1.61	.50	.85	2	2
36		21	3	10	4	8	22.85	.71	1.49	.50	.85	2	2
36		22	3	8	4	8	21.81	.79	1.40	.46	.81	2	2
36		22	3	10	4	8	21.81	.60	1.32	.46	.81	1	2
36		23	3	8	4	8	20.86	.68	1.26	.42	.77	1	2
36		24	3	8	4	8	20.00	.63	1.21	.38	.74	1	2
36		25	3	8	4	8	19.20	.58	1.16	.35	.71	1	2
36		26	3	8	4	8	18.46	.53	1.12	.33	.68	1	2
36		27	3	8	4	8	17.77	.50	1.08	.30	.66	1	2
40		21	3	10	4	8	22.85	.81	1.71	.56	.94	2	2
40		21	3	12	4	8	22.85	.64	1.62	.56	.94	2	2
40		22	3	8	4	8	21.81	.91	1.61	.51	.90	2	2
40		22	3	10	4	8	21.81	.68	1.50	.51	.90	2	2
40		23	3	8	4	8	20.86	.76	1.41	.47	.86	2	2
40		23	3	10	4	8	20.86	.61	1.40	.47	.86	1	2
40		24	3	8	4	8	20.00	.70	1.35	.43	.82	1	2
40		25	3	8	4	8	19.20	.64	1.29	.39	.79	1	2
40		26	3	8	4	8	18.46	.59	1.24	.36	.76	1	2
40		27	3	8	4	8	17.77	.55	1.20	.34	.73	1	2
45		22	3	8	4	8	21.81	1.07	1.89	.57	1.01	2	2
45		22	3	10	4	8	21.81	.79	1.75	.57	1.01	2	2
45		23	3	8	4	8	20.86	.89	1.64	.52	.97	2	2
45		23	3	10	4	8	20.86	.68	1.58	.52	.97	1	2
45		24	3	8	4	8	20.00	.79	1.51	.48	.93	1	2
45		25	3	8	4	8	19.20	.72	1.45	.44	.89	1	2
45		26	3	8	4	8	18.46	.67	1.40	.41	.86	1	2
45		27	3	8	4	8	17.77	.62	1.35	.38	.82	1	2
45		28	3	8	4	8	17.14	.58	1.30	.35	.79	1	2
50		23	3	8	4	8	20.86	1.03	1.90	.58	1.08	2	2
50		23	3	10	4	8	20.86	.76	1.76	.58	1.08	2	2
50		24	3	8	4	8	20.00	.87	1.68	.54	1.03	1	2
50		25	3	8	4	8	19.20	.81	1.62	.49	.99	1	2
50		26	3	8	4	8	18.46	.74	1.55	.46	.95	1	2

TABLE VIII-B (Cont'd) Slab 24 x 40 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
50		27	3	8	4	8	17.77	.69	1.50	.42	.92	1	2
50		28	3	8	4	8	17.14	.64	1.44	.39	.88	1	2
50		29	3	8	4	8	16.55	.60	1.39	.36	.85	1	2
55		23	3	8	4	8	20.86	1.18	2.17	.64	1.19	2	2
55		23	3	10	4	8	20.86	.86	2.00	.64	1.19	2	2
55		24	3	8	4	8	20.00	.98	1.90	.59	1.14	2	2
55		24	3	10	4	8	20.00	.77	1.85	.59	1.14	1	2
55		25	3	8	4	8	19.20	.89	1.78	.54	1.09	1	2
55		26	3	8	4	8	18.46	.82	1.71	.50	1.05	1	2
55		27	3	8	4	8	17.77	.76	1.65	.46	1.01	1	2
55		28	3	8	4	8	17.14	.71	1.59	.43	.97	1	2
55		29	3	8	4	8	16.55	.66	1.53	.40	.94	1	2
60		24	3	8	4	8	20.00	1.11	2.14	.64	1.24	2	2
60		24	3	10	4	8	20.00	.84	2.02	.64	1.24	1	2
60		25	3	8	4	8	19.20	.97	1.94	.59	1.19	1	2
60		26	3	8	4	8	18.46	.89	1.87	.55	1.14	1	2
60		27	3	8	4	8	17.77	.83	1.80	.51	1.10	1	2
60		28	3	8	4	8	17.14	.77	1.73	.47	1.06	1	2
60		29	3	8	4	8	16.55	.72	1.67	.44	1.02	1	2
60		30	3	8	4	8	16.00	.67	1.62	.41	.99	1	2
65		24	3	8	4	8	20.00	1.24	2.39	.70	1.34	2	2
65		24	3	10	4	8	20.00	.91	2.20	.70	1.34	2	2
65		25	3	8	4	8	19.20	1.05	2.10	.64	1.29	1	2
65		26	3	8	4	8	18.46	.97	2.02	.59	1.24	1	2
65		27	3	8	4	8	17.77	.90	1.95	.55	1.19	1	2
65		28	3	8	4	8	17.14	.84	1.88	.51	1.15	1	2
65		29	3	8	4	8	16.55	.78	1.81	.48	1.11	1	2
65		30	3	8	4	8	16.00	.73	1.75	.44	1.07	1	2
70		25	3	8	4	8	19.20	1.16	2.33	.69	1.39	2	2
70		25	3	10	4	8	19.20	.90	2.26	.69	1.39	1	2
70		26	3	8	4	8	18.46	1.04	2.18	.64	1.33	1	2
70		27	3	8	4	8	17.77	.97	2.10	.59	1.29	1	2
70		28	3	8	4	8	17.14	.90	2.02	.55	1.24	1	2
70		29	3	8	4	8	16.55	.84	1.95	.51	1.20	1	2
70		30	3	8	4	8	16.00	.78	1.89	.48	1.16	1	2
70		31	3	8	4	8	15.48	.73	1.83	.45	1.12	1	2
75		25	3	8	4	8	19.20	1.28	2.57	.74	1.49	2	2
75		25	3	10	4	8	19.20	.97	2.43	.74	1.49	1	2
75		26	3	8	4	8	18.46	1.12	2.33	.69	1.43	1	2
75		27	3	8	4	8	17.77	1.04	2.25	.63	1.38	1	2
75		28	3	8	4	8	17.14	.96	2.17	.59	1.33	1	2
75		29	3	8	4	8	16.55	.90	2.09	.55	1.28	1	2
75		30	3	8	4	8	16.00	.84	2.02	.51	1.24	1	2
75		31	3	8	4	8	15.48	.79	1.96	.48	1.20	1	2
80		25	3	8	4	8	19.20	1.41	2.82	.79	1.59	2	2
80		25	3	10	4	8	19.20	1.03	2.59	.79	1.59	1	2
80		26	3	8	4	8	18.46	1.19	2.49	.73	1.53	1	2
80		27	3	8	4	8	17.77	1.11	2.40	.68	1.47	1	2
80		28	3	8	4	8	17.14	1.03	2.31	.63	1.42	1	2
80		29	3	8	4	8	16.55	.96	2.23	.59	1.37	1	2
80		30	3	8	4	8	16.00	.90	2.16	.55	1.32	1	2
80		31	3	8	4	8	15.48	.84	2.09	.51	1.28	1	2
85		26	3	8	4	8	18.46	1.30	2.70	.78	1.62	2	2
85		26	3	10	4	8	18.46	1.01	2.65	.78	1.62	1	2
85		27	3	8	4	8	17.77	1.18	2.55	.72	1.56	1	2
85		28	3	8	4	8	17.14	1.09	2.46	.67	1.51	1	2

TABLE VIII-B (Cont'd) Slab 24 x 40 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
85		29	3	8	4	8	16.55	1.02	2.37	.62	1.45	1	2
85		30	3	8	4	8	16.00	.95	2.29	.58	1.41	1	2
85		31	3	8	4	8	15.48	.89	2.22	.55	1.36	1	2
85		32	3	8	4	8	15.00	.84	2.15	.51	1.32	1	2
90		26	3	8	4	8	18.46	1.41	2.94	.82	1.72	2	2
90		26	3	10	4	8	18.46	1.07	2.80	.82	1.72	1	2
90		27	3	8	4	8	17.77	1.25	2.70	.76	1.65	1	2
90		28	3	8	4	8	17.14	1.16	2.60	.71	1.59	1	2
90		29	3	8	4	8	16.55	1.08	2.51	.66	1.54	1	2
90		30	3	8	4	8	16.00	1.01	2.43	.62	1.49	1	2
90		31	3	8	4	8	15.48	.94	2.35	.58	1.44	1	2
90		32	3	8	4	8	15.00	.89	2.27	.54	1.39	1	2
95		26	3	8	4	8	18.46	1.53	3.18	.87	1.81	2	2
95		26	3	10	4	8	18.46	1.13	2.96	.87	1.81	1	2
95		27	3	8	4	8	17.77	1.32	2.85	.81	1.75	1	2
95		28	3	8	4	8	17.14	1.22	2.75	.75	1.68	1	2
95		29	3	8	4	8	16.55	1.14	2.65	.70	1.63	1	2
95		30	3	8	4	8	16.00	1.06	2.56	.65	1.57	1	2
95		31	3	8	4	8	15.48	1.00	2.48	.61	1.52	1	2
95		32	3	8	4	8	15.00	.94	2.40	.57	1.47	1	2
100		27	3	8	4	8	17.77	1.39	3.01	.85	1.84	2	2
100		27	3	10	4	8	17.77	1.11	3.00	.85	1.84	1	2
100		28	3	8	4	8	17.14	1.29	2.89	.79	1.77	1	2
100		29	3	8	4	8	16.55	1.20	2.79	.73	1.71	1	2
100		30	3	8	4	8	16.00	1.12	2.70	.69	1.65	1	2
100		31	3	8	4	8	15.48	1.05	2.61	.64	1.60	1	2
100		32	3	8	4	8	15.00	.98	2.53	.60	1.55	1	2
100		33	3	8	4	8	14.54	.93	2.45	.57	1.50	1	2
105		27	3	8	4	8	17.77	1.50	3.24	.89	1.93	2	2
105		27	3	10	4	8	17.77	1.16	3.15	.89	1.93	1	2
105		28	3	8	4	8	17.14	1.35	3.03	.83	1.86	1	2
105		29	3	8	4	8	16.55	1.26	2.93	.77	1.80	1	2
105		30	3	8	4	8	16.00	1.18	2.83	.72	1.74	1	2
105		31	3	8	4	8	15.48	1.10	2.74	.67	1.68	1	2
105		32	3	8	4	8	15.00	1.03	2.65	.63	1.63	1	2
105		33	3	8	4	8	14.54	.97	2.57	.59	1.58	1	2
110		26	3	10	4	10	18.46	1.36	3.55	.80	2.10	2	2
110		26	3	12	4	10	18.46	1.09	3.42	.80	2.10	1	2
110		27	3	8	4	8	17.77	1.60	3.47	.93	2.02	2	2
110		27	3	10	4	8	17.77	1.22	3.30	.93	2.02	1	2
110		28	3	8	4	8	17.14	1.42	3.18	.87	1.95	1	2
110		29	3	8	4	8	16.55	1.32	3.07	.81	1.88	1	2
110		30	3	8	4	8	16.00	1.23	2.97	.76	1.82	1	2
110		31	3	8	4	8	15.48	1.15	2.87	.71	1.76	1	2
110		32	3	8	4	8	15.00	1.08	2.78	.66	1.71	1	2
115		26	3	10	4	10	18.46	1.46	3.79	.84	2.20	2	2
115		26	3	12	4	10	18.46	1.14	3.58	.84	2.20	1	2
115		27	3	8	4	8	17.77	1.72	3.71	.98	2.11	2	2
115		27	3	10	4	8	17.77	1.27	3.45	.98	2.11	1	2
115		28	3	8	4	8	17.14	1.48	3.32	.91	2.04	1	2
115		29	3	8	4	8	16.55	1.38	3.21	.85	1.97	1	2
115		30	3	8	4	8	16.00	1.29	3.10	.79	1.90	1	2
115		31	3	8	4	8	15.48	1.21	3.00	.74	1.84	1	2
115		32	3	8	4	8	15.00	1.13	2.91	.69	1.78	1	2
120		26	3	10	4	10	18.46	1.55	4.04	.88	2.29	2	2
120		26	3	12	4	10	18.46	1.19	3.74	.88	2.29	1	2

TABLE VIII-B (Cont'd) Slab 24 x 40 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
120		28	3	8	4	8	17.14	1.55	3.48	.95	2.13	2	2
120		28	3	10	4	8	17.14	1.24	3.47	.95	2.13	1	2
120		29	3	8	4	8	16.55	1.44	3.35	.88	2.05	1	2
120		30	3	8	4	8	16.00	1.35	3.24	.82	1.99	1	2
120		31	3	8	4	8	15.48	1.26	3.13	.77	1.92	1	2
120		32	3	8	4	8	15.00	1.18	3.03	.72	1.86	1	2
120		33	3	8	4	8	14.54	1.11	2.94	.68	1.80	1	2
125		27	3	10	4	10	17.77	1.39	3.77	.85	2.30	2	2
125		27	3	12	4	10	17.77	1.15	3.75	.85	2.30	1	2
125		28	3	8	4	8	17.14	1.65	3.70	.99	2.22	2	2
125		28	3	10	4	8	17.14	1.29	3.61	.99	2.22	1	2
125		29	3	8	4	8	16.55	1.50	3.49	.92	2.14	1	2
125		30	3	8	4	8	16.00	1.40	3.37	.86	2.07	1	2
125		31	3	8	4	8	15.48	1.31	3.26	.80	2.00	1	2
125		32	3	8	4	8	15.00	1.23	3.16	.75	1.94	1	2
125		33	3	8	4	8	14.54	1.16	3.07	.71	1.88	1	2
130		27	3	10	4	10	17.77	1.48	3.99	.88	2.39	2	2
130		27	3	12	4	10	17.77	1.20	3.90	.88	2.39	1	2
130		28	3	8	4	10	17.14	1.75	3.93	.82	2.31	2	2
130		28	3	10	4	10	17.14	1.34	3.76	.82	2.31	1	2
130		29	3	8	4	8	16.55	1.56	3.63	.96	2.23	1	2
130		30	3	8	4	8	16.00	1.46	3.51	.89	2.15	1	2
130		31	3	8	4	8	15.48	1.37	3.39	.84	2.08	1	2
130		32	3	8	4	8	15.00	1.28	3.29	.78	2.02	1	2
130		33	3	8	4	8	14.54	1.20	3.19	.74	1.96	1	2
135		27	3	10	4	12	17.77	1.56	4.22	.76	2.48	2	2
135		27	3	12	4	12	17.77	1.25	4.05	.76	2.48	1	2
135		28	3	10	4	10	17.14	1.39	3.90	.85	2.39	1	2
135		29	3	8	4	10	16.55	1.62	3.77	.79	2.31	1	2
135		30	3	8	4	8	16.00	1.51	3.64	.93	2.23	1	2
135		31	3	8	4	8	15.48	1.42	3.53	.87	2.16	1	2
135		32	3	8	4	8	15.00	1.33	3.41	.82	2.09	1	2
135		33	3	8	4	8	14.54	1.25	3.31	.77	2.03	1	2
140		26	3	12	4	12	18.46	1.49	4.65	.85	2.67	2	2
140		26	3	14	4	12	18.46	1.19	4.36	.85	2.67	1	2
140		27	3	10	4	10	17.77	1.65	4.46	.95	2.58	2	2
140		27	3	12	4	10	17.77	1.29	4.20	.95	2.58	1	2
140		28	3	10	4	10	17.14	1.44	4.05	.88	2.48	1	2
140		29	3	10	4	10	16.55	1.34	3.91	.82	2.40	1	2
140		30	3	8	4	10	16.00	1.57	3.78	.77	2.32	1	2
140		31	3	8	4	8	15.48	1.47	3.66	.90	2.24	1	2
140		32	3	8	4	8	15.00	1.38	3.54	.85	2.17	1	2
145		26	3	12	4	12	18.46	1.57	4.90	.88	2.77	2	2
145		26	3	14	4	12	18.46	1.25	4.56	.88	2.77	2	2
145		27	3	10	4	10	17.77	1.74	4.70	.98	2.67	2	2
145		27	3	12	4	10	17.77	1.34	4.35	.98	2.67	1	2
145		28	3	10	4	10	17.14	1.49	4.19	.92	2.57	1	2
145		29	3	10	4	10	16.55	1.39	4.05	.85	2.48	1	2
145		30	3	10	4	10	16.00	1.30	3.91	.80	2.40	1	2
145		31	3	8	4	10	15.48	1.52	3.79	.75	2.32	1	2
145		32	3	8	4	8	15.00	1.43	3.67	.88	2.25	1	2
150		27	3	12	4	12	17.77	1.39	4.52	.85	2.76	2	2
150		27	3	14	4	12	17.77	1.19	4.50	.85	2.76	1	2
150		28	3	10	4	10	17.14	1.55	4.36	.95	2.66	2	2
150		28	3	12	4	10	17.14	1.29	4.34	.95	2.66	1	2
150		29	3	10	4	10	16.55	1.44	4.19	.88	2.57	1	2

TABLE VIII-B (Cont'd) Slab 24 x 40 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
150		30	3	10	4	10	16.00	1.35	4.05	.82	2.48	1	2
150		31	3	10	4	10	15.48	1.26	3.92	.77	2.40	1	2
150		32	3	8	4	10	15.00	1.48	3.79	.72	2.33	1	2
150		33	3	8	4	8	14.54	1.39	3.68	.85	2.26	1	2

TABLE VIII-C Slab 24 x 40 ft $L/\Delta = 360$

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	5	3	8	4	8		.39	.15	.20	.08		
4	.02	6	3	8	4	8		.39	.18	.21	.10		
4	.03	8	3	8	4	8		.35	.22	.21	.13		
8	.02	7	3	8	4	8		.56	.31	.29	.16		
8	.03	8	3	8	4	8		.56	.36	.28	.18		
8	.04	10	3	8	4	8		.47	.37	.25	.20		
8	.05	11	3	8	4	8		.46	.40	.27	.24		
8	.06	13	3	8	4	8		.43	.45	.26	.27		
12	.03	9	3	8	4	8		.65	.47	.34	.24		
12	.04	11	3	8	4	8		.55	.49	.29	.25		
12	.05	12	3	8	4	8		.54	.52	.28	.27		
12	.06	14	3	8	4	8		.50	.56	.27	.30		
12	.07	15	3	8	4	8		.52	.62	.28	.33		
12	.08	17	3	8	4	8		.44	.60	.28	.38		
12	.09	18	3	8	4	8		.46	.67	.28	.41		
12		19	3	8	4	8	25.26	.43	.65	.30	.45	2	1
12		19	3	10	4	8	25.26	.32	.61	.30	.45	2	1
12		20	3	8	4	8	24.00	.35	.56	.30	.48	2	1
12		20	3	10	4	8	24.00	.26	.52	.30	.48	2	1
12		21	3	8	4	8	22.85	.29	.49	.30	.50	2	1
12		21	3	10	4	8	22.85	.22	.46	.30	.50	1	1
12		22	3	8	4	8	21.81	.25	.44	.30	.52	1	1
16	.04	11	3	8	4	8		.71	.63	.37	.33		
16	.05	13	3	8	4	8		.64	.66	.33	.34		
16	.06	14	3	8	4	8		.64	.72	.32	.36		
16	.07	16	3	8	4	8		.53	.68	.28	.36		
16	.08	18	3	8	4	8		.52	.75	.28	.40		
16	.09	19	3	8	4	8		.55	.84	.28	.43		
16		20	3	8	4	8	24.00	.51	.81	.30	.48	2	1
16		20	3	10	4	8	24.00	.38	.77	.30	.48	2	1
16		21	3	8	4	8	22.85	.42	.71	.30	.50	2	1
16		21	3	10	4	8	22.85	.31	.66	.30	.50	2	1
16		22	3	8	4	8	21.81	.35	.62	.30	.52	2	1
16		22	3	10	4	8	21.81	.26	.58	.30	.52	1	1
16		23	3	8	4	8	20.86	.30	.56	.30	.55	1	1
20	.05	13	3	8	4	8		.76	.79	.39	.41		
20	.06	15	3	8	4	8		.70	.84	.36	.43		
20	.07	17	3	8	4	8		.59	.80	.31	.43		
20	.08	18	3	8	4	8		.61	.88	.31	.45		
20	.09	20	3	8	4	8		.61	.97	.29	.47		
20		21	3	8	4	8	22.85	.56	.94	.30	.50	2	1
20		21	3	10	4	8	22.85	.42	.89	.30	.50	2	1
20		22	3	8	4	8	21.81	.47	.83	.30	.52	2	1
20		22	3	10	4	8	21.81	.35	.78	.30	.52	2	1
20		23	3	8	4	8	20.86	.39	.73	.30	.55	2	1
20		23	3	10	4	8	20.86	.30	.70	.30	.55	1	1
20		24	3	8	4	8	20.00	.35	.67	.30	.57	1	1
24	.06	16	3	8	4	8		.74	.94	.38	.49		
24	.07	17	3	8	4	8		.75	1.02	.38	.51		
24	.08	19	3	8	4	8		.64	.98	.34	.51		
24	.09	20	3	8	4	8		.67	1.08	.33	.54		
24		22	3	8	4	8	21.81	.59	1.04	.30	.54	2	2
24		22	3	10	4	8	21.81	.44	.98	.30	.54	2	2
24		23	3	8	4	8	20.86	.50	.92	.30	.55	2	1
24		23	3	10	4	8	20.86	.37	.87	.30	.55	2	1

TABLE VIII-C (Cont'd) Slab 24 x 40 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		24	3	8	4	8	20.00	.42	.82	.30	.57	2	1
24		24	3	10	4	8	20.00	.33	.81	.30	.57	1	1
24		25	3	8	4	8	19.20	.38	.77	.30	.60	1	1
28	.07	18	3	8	4	8		.76	1.10	.40	.58		
28	.08	20	3	8	4	8		.66	1.06	.36	.58		
28	.09	21	3	8	4	8		.69	1.16	.36	.60		
28		23	3	8	4	8	20.86	.61	1.12	.32	.60	2	2
28		23	3	10	4	8	20.86	.46	1.05	.32	.60	2	2
28		24	3	8	4	8	20.00	.52	.99	.30	.58	2	2
28		24	3	10	4	8	20.00	.39	.94	.30	.58	1	2
28		25	3	8	4	8	19.20	.45	.90	.30	.60	1	1
28		26	3	8	4	8	18.46	.41	.87	.30	.62	1	1
32	.08	20	3	8	4	8		.79	1.26	.41	.66		
32	.09	22	3	8	4	8		.69	1.22	.37	.66		
32		23	3	8	4	8	20.86	.72	1.33	.37	.69	2	2
32		23	3	10	4	8	20.86	.54	1.25	.37	.69	2	2
32		24	3	8	4	8	20.00	.61	1.18	.34	.66	2	2
32		24	3	10	4	8	20.00	.46	1.11	.34	.66	2	2
32		25	3	8	4	8	19.20	.52	1.05	.31	.63	2	2
32		25	3	10	4	8	19.20	.41	1.03	.31	.63	1	2
32		26	3	8	4	8	18.46	.47	.99	.30	.62	1	1
36	.09	22	3	8	4	8		.80	1.42	.42	.74		
36		24	3	8	4	8	20.00	.71	1.37	.38	.74	2	2
36		24	3	10	4	8	20.00	.53	1.29	.38	.74	2	2
36		25	3	8	4	8	19.20	.61	1.22	.35	.71	2	2
36		25	3	10	4	8	19.20	.46	1.16	.35	.71	1	2
36		26	3	8	4	8	18.46	.53	1.12	.33	.68	1	2
36		27	3	8	4	8	17.77	.50	1.08	.30	.66	1	2
36		28	3	8	4	8	17.14	.46	1.04	.30	.67	1	1
40		22	3	14	4	8	21.81	.55	1.72	.51	.90	2	2
40		22	3	16	4	8	21.81	.47	1.66	.51	.90	2	2
40		23	3	10	4	8	20.86	.72	1.67	.47	.86	2	2
40		23	3	12	4	8	20.86	.57	1.58	.47	.86	2	2
40		24	3	8	4	8	20.00	.82	1.58	.43	.82	2	2
40		24	3	10	4	8	20.00	.61	1.47	.43	.82	2	2
40		25	3	8	4	8	19.20	.70	1.40	.39	.79	2	2
40		25	3	10	4	8	19.20	.52	1.31	.39	.79	2	2
40		26	3	8	4	8	18.46	.60	1.25	.36	.76	2	2
40		26	3	10	4	8	18.46	.47	1.24	.36	.76	1	2
40		27	3	8	4	8	17.77	.55	1.20	.34	.73	1	2
40		28	3	8	4	8	17.14	.51	1.15	.31	.71	1	2
45		22	3	14	4	8	21.81	.65	2.00	.57	1.01	2	2
45		22	3	16	4	8	21.81	.54	1.93	.57	1.01	2	2
45		23	3	12	4	8	20.86	.66	1.84	.52	.97	2	2
45		23	3	14	4	8	20.86	.54	1.76	.52	.97	2	2
45		24	3	10	4	8	20.00	.71	1.72	.48	.93	2	2
45		24	3	12	4	8	20.00	.56	1.63	.48	.93	2	2
45		25	3	8	4	8	19.20	.81	1.63	.44	.89	2	2
45		25	3	10	4	8	19.20	.61	1.53	.44	.89	2	2
45		26	3	8	4	8	18.46	.70	1.46	.41	.86	2	2
45		26	3	10	4	8	18.46	.53	1.40	.41	.86	1	2
45		27	3	8	4	8	17.77	.62	1.35	.38	.82	1	2
45		28	3	8	4	8	17.14	.58	1.30	.35	.79	1	2
50		23	3	12	4	8	20.86	.76	2.11	.58	1.08	2	2
50		23	3	14	4	8	20.86	.62	2.02	.58	1.08	2	2
50		24	3	10	4	8	20.00	.82	1.97	.54	1.03	2	2

TABLE VIII-C (Cont'd) Slab 24 x 40 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
50		24	3	12	4	8	20.00	.64	1.87	.54	1.03	2	2
50		25	3	8	4	8	19.20	.94	1.88	.49	.99	2	2
50		25	3	10	4	8	19.20	.70	1.75	.49	.99	2	2
50		26	3	8	4	8	18.46	.80	1.67	.46	.95	2	2
50		26	3	10	4	8	18.46	.60	1.56	.46	.95	2	2
50		27	3	8	4	8	17.77	.69	1.50	.42	.92	1	2
50		28	3	8	4	8	17.14	.64	1.44	.39	.88	1	2
50		29	3	8	4	8	16.55	.60	1.39	.36	.85	1	2
55		24	3	12	4	8	20.00	.73	2.11	.59	1.14	2	2
55		24	3	14	4	8	20.00	.60	2.02	.59	1.14	2	2
55		25	3	10	4	8	19.20	.79	1.98	.54	1.09	2	2
55		25	3	12	4	8	19.20	.62	1.88	.54	1.09	2	2
55		26	3	8	4	8	18.46	.91	1.90	.50	1.05	2	2
55		26	3	10	4	8	18.46	.68	1.77	.50	1.05	2	2
55		27	3	8	4	8	17.77	.78	1.69	.46	1.01	2	2
55		27	3	10	4	8	17.77	.61	1.65	.46	1.01	1	2
55		28	3	8	4	8	17.14	.71	1.59	.43	.97	1	2
55		29	3	8	4	8	16.55	.66	1.53	.40	.94	1	2
55		30	3	8	4	8	16.00	.61	1.48	.38	.91	1	2
60		25	3	10	4	8	19.20	.89	2.23	.59	1.19	2	2
60		25	3	12	4	8	19.20	.70	2.10	.59	1.19	2	2
60		26	3	8	4	8	18.46	1.03	2.14	.55	1.14	2	2
60		26	3	10	4	8	18.46	.76	1.98	.55	1.14	2	2
60		27	3	8	4	8	17.77	.88	1.90	.51	1.10	2	2
60		27	3	10	4	8	17.77	.66	1.80	.51	1.10	1	2
60		28	3	8	4	8	17.14	.77	1.73	.47	1.06	1	2
60		29	3	8	4	8	16.55	.72	1.67	.44	1.02	1	2
60		30	3	8	4	8	16.00	.67	1.62	.41	.99	1	2
60		31	3	8	4	8	15.48	.63	1.56	.38	.96	1	2
65		26	3	10	4	8	18.46	.84	2.20	.59	1.24	2	2
65		26	3	12	4	8	18.46	.66	2.08	.59	1.24	2	2
65		27	3	8	4	8	17.77	.98	2.12	.55	1.19	2	2
65		27	3	10	4	8	17.77	.73	1.97	.55	1.19	2	2
65		28	3	8	4	8	17.14	.84	1.90	.51	1.15	2	2
65		28	3	10	4	8	17.14	.67	1.88	.51	1.15	1	2
65		29	3	8	4	8	16.55	.78	1.81	.48	1.11	1	2
65		30	3	8	4	8	16.00	.73	1.75	.44	1.07	1	2
65		31	3	8	4	8	15.48	.68	1.69	.42	1.04	1	2
65		32	3	8	4	8	15.00	.64	1.64	.39	1.01	1	2
70		27	3	8	4	8	17.77	1.09	2.35	.59	1.29	2	2
70		27	3	10	4	8	17.77	.80	2.17	.59	1.29	2	2
70		28	3	8	4	8	17.14	.93	2.10	.55	1.24	2	2
70		28	3	10	4	8	17.14	.72	2.02	.55	1.24	1	2
70		29	3	8	4	8	16.55	.84	1.95	.51	1.20	1	2
70		30	3	8	4	8	16.00	.78	1.89	.48	1.16	1	2
70		31	3	8	4	8	15.48	.73	1.83	.45	1.12	1	2
70		32	3	8	4	8	15.00	.69	1.77	.42	1.08	1	2
70		33	3	8	4	8	14.54	.65	1.71	.39	1.05	1	2
75		28	3	8	4	8	17.14	1.03	2.30	.59	1.33	2	2
75		28	3	10	4	8	17.14	.77	2.17	.59	1.33	1	2
75		29	3	8	4	8	16.55	.90	2.09	.55	1.28	1	2
75		30	3	8	4	8	16.00	.84	2.02	.51	1.24	1	2
75		31	3	8	4	8	15.48	.79	1.96	.48	1.20	1	2
75		32	3	8	4	8	15.00	.74	1.89	.45	1.16	1	2
75		33	3	8	4	8	14.54	.69	1.84	.42	1.13	1	2
75		34	3	8	4	8	14.11	.65	1.78	.40	1.09	1	2

TABLE VIII-C (Cont'd) Slab 24 x 40 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
80		28	3	8	4	8	17.14	1.12	2.52	.63	1.42	2	2
80		28	3	10	4	8	17.14	.83	2.33	.63	1.42	2	2
80		29	3	8	4	8	16.55	.97	2.26	.59	1.37	2	2
80		29	3	10	4	8	16.55	.77	2.23	.59	1.37	1	2
80		30	3	8	4	8	16.00	.90	2.16	.55	1.32	1	2
80		31	3	8	4	8	15.48	.84	2.09	.51	1.28	1	2
80		32	3	8	4	8	15.00	.79	2.02	.48	1.24	1	2
80		33	3	8	4	8	14.54	.74	1.96	.45	1.20	1	2
80		34	3	8	4	8	14.11	.70	1.90	.43	1.17	1	2
85		28	3	8	4	8	17.14	1.22	2.75	.67	1.51	2	2
85		28	3	10	4	8	17.14	.90	2.52	.67	1.51	2	2
85		29	3	8	4	8	16.55	1.05	2.45	.62	1.45	2	2
85		29	3	10	4	8	16.55	.81	2.37	.62	1.45	1	2
85		30	3	8	4	8	16.00	.95	2.29	.58	1.41	1	2
85		31	3	8	4	8	15.48	.89	2.22	.55	1.36	1	2
85		32	3	8	4	8	15.00	.84	2.15	.51	1.32	1	2
85		33	3	8	4	8	14.54	.79	2.08	.48	1.28	1	2
85		34	3	8	4	8	14.11	.74	2.02	.45	1.24	1	2
90		29	3	8	4	8	16.55	1.14	2.66	.66	1.54	2	2
90		29	3	10	4	8	16.55	.86	2.51	.66	1.54	1	2
90		30	3	8	4	8	16.00	1.01	2.43	.62	1.49	1	2
90		31	3	8	4	8	15.48	.94	2.35	.58	1.44	1	2
90		32	3	8	4	8	15.00	.89	2.27	.54	1.39	1	2
90		33	3	8	4	8	14.54	.83	2.21	.51	1.35	1	2
90		34	3	8	4	8	14.11	.78	2.14	.48	1.31	1	2
90		35	3	8	4	8	13.71	.74	2.08	.45	1.27	1	2
95		29	3	8	4	8	16.55	1.23	2.87	.70	1.63	2	2
95		29	3	10	4	8	16.55	.91	2.65	.70	1.63	1	2
95		30	3	8	4	8	16.00	1.07	2.57	.65	1.57	2	2
95		30	3	10	4	8	16.00	.85	2.56	.65	1.57	1	2
95		31	3	8	4	8	15.48	1.00	2.48	.61	1.52	1	2
95		32	3	8	4	8	15.00	.94	2.40	.57	1.47	1	2
95		33	3	8	4	8	14.54	.88	2.33	.54	1.43	1	2
95		34	3	8	4	8	14.11	.83	2.26	.51	1.39	1	2
95		35	3	8	4	8	13.71	.78	2.20	.48	1.35	1	2
100		29	3	8	4	8	16.55	1.33	3.09	.73	1.71	2	2
100		29	3	10	4	8	16.55	.97	2.82	.73	1.71	2	2
100		30	3	8	4	8	16.00	1.15	2.76	.69	1.65	2	2
100		30	3	10	4	8	16.00	.90	2.70	.69	1.65	1	2
100		31	3	8	4	8	15.48	1.05	2.61	.64	1.60	1	2
100		32	3	8	4	8	15.00	.98	2.53	.60	1.55	1	2
100		33	3	8	4	8	14.54	.93	2.45	.57	1.50	1	2
100		34	3	8	4	8	14.11	.87	2.38	.53	1.46	1	2
100		35	3	8	4	8	13.71	.82	2.31	.50	1.42	1	2
105		30	3	8	4	8	16.00	1.23	2.96	.72	1.74	2	2
105		30	3	10	4	8	16.00	.94	2.83	.72	1.74	1	2
105		31	3	8	4	8	15.48	1.10	2.74	.67	1.68	1	2
105		32	3	8	4	8	15.00	1.03	2.65	.63	1.63	1	2
105		33	3	8	4	8	14.54	.97	2.57	.59	1.58	1	2
105		34	3	8	4	8	14.11	.92	2.50	.56	1.53	1	2
105		35	3	8	4	8	13.71	.86	2.43	.53	1.49	1	2
105		36	3	8	4	8	13.33	.82	2.36	.50	1.45	1	2
110		30	3	8	4	8	16.00	1.32	3.17	.76	1.82	2	2
110		30	3	10	4	8	16.00	.99	2.97	.76	1.82	1	2
110		31	3	8	4	8	15.48	1.15	2.87	.71	1.76	1	2
110		32	3	8	4	8	15.00	1.08	2.78	.66	1.71	1	2

TABLE VIII-C (Cont'd) Slab 24 x 40 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
110		33	3	8	4	8	14.54	1.02	2.70	.62	1.65	1	2
110		34	3	8	4	8	14.11	.96	2.62	.59	1.61	1	2
110		35	3	8	4	8	13.71	.90	2.54	.55	1.56	1	2
110		36	3	8	4	8	13.33	.86	2.47	.52	1.52	1	2
115		30	3	8	4	8	16.00	1.41	3.38	.79	1.90	2	2
115		30	3	10	4	8	16.00	1.03	3.10	.79	1.90	1	2
115		31	3	8	4	8	15.48	1.22	3.03	.74	1.84	2	2
115		31	3	10	4	8	15.48	.97	3.00	.74	1.84	1	2
115		32	3	8	4	8	15.00	1.13	2.91	.69	1.78	1	2
115		33	3	8	4	8	14.54	1.07	2.82	.65	1.73	1	2
115		34	3	8	4	8	14.11	1.00	2.74	.61	1.68	1	2
115		35	3	8	4	8	13.71	.95	2.66	.58	1.63	1	2
115		36	3	8	4	8	13.33	.89	2.58	.55	1.58	1	2
120		31	3	8	4	8	15.48	1.30	3.22	.77	1.92	2	2
120		31	3	10	4	8	15.48	1.01	3.13	.77	1.92	1	2
120		32	3	8	4	8	15.00	1.18	3.03	.72	1.86	1	2
120		33	3	8	4	8	14.54	1.11	2.94	.68	1.80	1	2
120		34	3	8	4	8	14.11	1.05	2.86	.64	1.75	1	2
120		35	3	8	4	8	13.71	.99	2.77	.60	1.70	1	2
120		36	3	8	4	8	13.33	.93	2.70	.57	1.65	1	2
120		37	3	8	4	8	12.97	.88	2.62	.54	1.61	1	2
125		31	3	8	4	8	15.48	1.37	3.42	.80	2.00	2	2
125		31	3	10	4	8	15.48	1.05	3.26	.80	2.00	1	2
125		32	3	8	4	8	15.00	1.23	3.16	.75	1.94	1	2
125		33	3	8	4	8	14.54	1.16	3.07	.71	1.88	1	2
125		34	3	8	4	8	14.11	1.09	2.98	.67	1.82	1	2
125		35	3	8	4	8	13.71	1.03	2.89	.63	1.77	1	2
125		36	3	8	4	8	13.33	.97	2.81	.60	1.72	1	2
125		37	3	8	4	8	12.97	.92	2.73	.56	1.68	1	2
130		30	3	10	4	10	16.00	1.21	3.65	.71	2.15	2	2
130		30	3	12	4	10	16.00	.97	3.51	.71	2.15	1	2
130		31	3	8	4	8	15.48	1.46	3.62	.84	2.08	2	2
130		31	3	10	4	8	15.48	1.09	3.39	.84	2.08	1	2
130		32	3	8	4	8	15.00	1.28	3.29	.78	2.02	1	2
130		33	3	8	4	8	14.54	1.20	3.19	.74	1.96	1	2
130		34	3	8	4	8	14.11	1.13	3.09	.69	1.90	1	2
130		35	3	8	4	8	13.71	1.07	3.01	.66	1.84	1	2
130		36	3	8	4	8	13.33	1.01	2.92	.62	1.79	1	2
135		30	3	10	4	10	16.00	1.28	3.86	.74	2.23	2	2
135		30	3	12	4	10	16.00	1.01	3.64	.74	2.23	1	2
135		31	3	8	4	8	15.48	1.54	3.83	.87	2.16	2	2
135		31	3	10	4	8	15.48	1.13	3.53	.87	2.16	1	2
135		32	3	8	4	8	15.00	1.34	3.43	.82	2.09	2	2
135		32	3	10	4	8	15.00	1.06	3.41	.82	2.09	1	2
135		33	3	8	4	8	14.54	1.25	3.31	.77	2.03	1	2
135		34	3	8	4	8	14.11	1.18	3.21	.72	1.97	1	2
135		35	3	8	4	8	13.71	1.11	3.12	.68	1.91	1	2
135		36	3	8	4	8	13.33	1.05	3.03	.64	1.86	1	2
140		30	3	10	4	10	16.00	1.35	4.07	.77	2.32	2	2
140		30	3	12	4	10	16.00	1.05	3.78	.77	2.32	1	2
140		32	3	8	4	8	15.00	1.41	3.62	.85	2.17	2	2
140		32	3	10	4	8	15.00	1.10	3.54	.85	2.17	1	2
140		33	3	8	4	8	14.54	1.30	3.43	.79	2.11	1	2
140		34	3	8	4	8	14.11	1.22	3.33	.75	2.04	1	2
140		35	3	8	4	8	13.71	1.15	3.24	.71	1.99	1	2
140		36	3	8	4	8	13.33	1.09	3.15	.67	1.93	1	2

TABLE VIII-C (Cont'd) Slab 24 x 40 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
140		37	3	8	4	8	12.97	1.03	3.06	.63	1.88	1	2
145		30	3	10	4	10	16.00	1.42	4.28	.80	2.40	2	2
145		30	3	12	4	10	16.00	1.10	3.96	.80	2.40	2	2
145		32	3	8	4	10	15.00	1.49	3.81	.70	2.25	2	2
145		32	3	10	4	10	15.00	1.14	3.67	.70	2.25	1	2
145		33	3	8	4	8	14.54	1.34	3.56	.82	2.18	1	2
145		34	3	8	4	8	14.11	1.27	3.45	.78	2.12	1	2
145		35	3	8	4	8	13.71	1.19	3.35	.73	2.06	1	2
145		36	3	8	4	8	13.33	1.13	3.26	.69	2.00	1	2
145		37	3	8	4	8	12.97	1.07	3.17	.65	1.95	1	2
150		31	3	10	4	10	15.48	1.30	4.03	.77	2.40	2	2
150		31	3	12	4	10	15.48	1.05	3.92	.77	2.40	1	2
150		32	3	8	4	10	15.00	1.56	4.01	.72	2.33	2	2
150		32	3	10	4	10	15.00	1.18	3.79	.72	2.33	1	2
150		33	3	8	4	8	14.54	1.39	3.68	.85	2.26	1	2
150		34	3	8	4	8	14.11	1.31	3.57	.80	2.19	1	2
150		35	3	8	4	8	13.71	1.24	3.47	.76	2.13	1	2
150		36	3	8	4	8	13.33	1.17	3.37	.72	2.07	1	2
150		37	3	8	4	8	12.97	1.11	3.28	.68	2.01	1	2

TABLE IX-A Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	5	3	8	5	8		.69	.27	.33	.13		
4	.01	5	4	8	5	8		.51	.20	.33	.13		
4	.02	6	3	8	5	8		.68	.32	.32	.15		
4	.02	6	4	8	5	8		.49	.23	.32	.15		
4	.03	7	3	8	5	8		.69	.39	.30	.17		
4	.03	7	4	8	5	8		.47	.26	.30	.17		
8	.02	7	3	8	5	8		.99	.55	.48	.27		
8	.02	7	4	8	5	8		.73	.41	.48	.27		
8	.03	8	3	8	5	8		.97	.62	.46	.29		
8	.03	8	4	8	5	8		.70	.45	.46	.29		
8	.04	10	3	8	5	8		.81	.65	.38	.31		
8	.04	10	4	8	5	8		.59	.47	.38	.31		
8	.05	11	3	8	5	8		.80	.70	.37	.32		
8	.05	11	4	8	5	8		.56	.49	.37	.32		
8	.06	12	3	8	5	8		.81	.78	.35	.34		
8	.06	12	4	8	5	8		.55	.53	.35	.34		
12	.03	9	3	8	5	8		1.15	.83	.56	.40		
12	.03	9	4	8	5	8		.86	.61	.56	.40		
12	.04	10	3	8	5	8		1.23	.99	.55	.44		
12	.04	10	4	8	5	8		.84	.67	.55	.44		
12	.05	11	3	8	5	8		1.19	1.05	.53	.46		
12	.05	11	4	8	5	8		.80	.71	.53	.46		
12	.06	13	3	8	5	8		.94	.97	.44	.46		
12	.06	13	4	8	5	8		.68	.71	.44	.46		
12	.07	14	3	8	5	8		.96	1.08	.43	.49		
12	.07	14	4	8	5	8		.66	.74	.43	.49		
12	.08	16	3	8	5	8		.80	1.03	.38	.49		
12	.08	16	4	8	5	8		.58	.74	.38	.49		
12	.09	17	3	8	5	8		.86	1.17	.38	.51		
12	.09	17	4	8	5	8		.59	.80	.38	.51		
12		18	3	8	5	8	33.33	.78	1.13	.36	.51	2	2
12		18	3	10	5	8	33.33	.58	1.05	.36	.51	2	2
12		19	3	8	5	8	31.57	.65	.99	.32	.49	1	2
12		20	3	8	5	8	30.00	.59	.94	.30	.48	1	1
12		21	3	8	5	8	28.57	.53	.90	.30	.50	1	1
12		17	4	8	5	8	35.29	.67	.91	.40	.54	2	2
12		17	4	10	5	8	35.29	.50	.86	.40	.54	2	2
12		18	4	8	5	8	33.33	.54	.79	.36	.51	1	2
12		19	4	8	5	8	31.57	.49	.74	.32	.49	1	2
12		20	4	8	5	8	30.00	.44	.71	.30	.48	1	1
16	.04	11	3	8	5	8		1.26	1.11	.61	.54		
16	.04	11	4	8	5	8		.93	.82	.61	.54		
16	.05	12	3	8	5	8		1.21	1.16	.58	.56		
16	.05	12	4	8	5	8		.89	.86	.58	.56		
16	.06	14	3	8	5	8		1.11	1.25	.52	.59		
16	.06	14	4	8	5	8		.80	.90	.52	.59		
16	.07	15	3	8	5	8		1.14	1.37	.51	.62		
16	.07	15	4	8	5	8		.79	.94	.51	.62		
16	.08	17	3	8	5	8		.96	1.30	.45	.62		
16	.08	17	4	8	5	8		.69	.94	.45	.62		
16	.09	18	3	8	5	8		1.01	1.46	.45	.65		
16	.09	18	4	8	5	8		.69	.99	.45	.65		
16		19	3	8	5	8	31.57	.92	1.41	.43	.65	2	2
16		19	3	10	5	8	31.57	.70	1.33	.43	.65	1	2
16		20	3	8	5	8	30.00	.79	1.26	.38	.62	1	2

TABLE IX-A (Cont'd) Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
16		21	3	8	5	8	28.57	.71	1.20	.35	.59	1	2
16		22	3	8	5	8	27.27	.65	1.15	.32	.56	1	2
16		23	3	8	5	8	26.08	.59	1.10	.30	.55	1	1
16		18	4	8	5	8	33.33	.78	1.13	.48	.69	2	2
16		18	4	10	5	8	33.33	.58	1.05	.48	.69	2	2
16		19	4	8	5	8	31.57	.65	.99	.43	.65	1	2
16		20	4	8	5	8	30.00	.59	.94	.38	.62	1	2
16		21	4	8	5	8	28.57	.53	.90	.35	.59	1	2
16		22	4	8	5	8	27.27	.49	.86	.32	.56	1	2
16		23	4	8	5	8	26.08	.44	.82	.30	.55	1	1
20	.05	13	3	8	5	8		1.33	1.38	.65	.67		
20	.05	13	4	8	5	8		.99	1.03	.65	.67		
20	.06	14	3	8	5	8		1.32	1.48	.63	.70		
20	.06	14	4	8	5	8		.96	1.07	.63	.70		
20	.07	16	3	8	5	8		1.26	1.61	.57	.74		
20	.07	16	4	8	5	8		.88	1.13	.57	.74		
20	.08	18	3	8	5	8		1.05	1.52	.51	.74		
20	.08	18	4	8	5	8		.78	1.13	.51	.74		
20	.09	19	3	8	5	8		1.11	1.70	.51	.77		
20	.09	19	4	8	5	8		.78	1.18	.51	.77		
20		20	3	8	5	8	30.00	1.02	1.63	.48	.77	2	2
20		20	3	10	5	8	30.00	.79	1.58	.48	.77	1	2
20		21	3	8	5	8	28.57	.89	1.50	.44	.74	1	2
20		22	3	8	5	8	27.27	.81	1.43	.40	.70	1	2
20		23	3	8	5	8	26.08	.74	1.37	.36	.67	1	2
20		24	3	8	5	8	25.00	.68	1.31	.33	.64	1	2
20		25	3	8	5	8	24.00	.63	1.26	.31	.62	1	2
20		26	3	8	5	8	23.07	.58	1.21	.30	.62	1	1
20		19	4	8	5	8	31.57	.85	1.29	.53	.81	2	2
20		19	4	10	5	8	31.57	.65	1.24	.53	.81	1	2
20		20	4	8	5	8	30.00	.74	1.18	.48	.77	1	2
20		21	4	8	5	8	28.57	.67	1.13	.44	.74	1	2
20		22	4	8	5	8	27.27	.61	1.07	.40	.70	1	2
20		23	4	8	5	8	26.08	.56	1.03	.36	.67	1	2
20		24	4	8	5	8	25.00	.51	.98	.33	.64	1	2
20		25	4	8	5	8	24.00	.47	.94	.31	.62	1	2
24	.06	15	3	8	5	8		1.38	1.66	.67	.81		
24	.06	15	4	8	5	8		1.03	1.23	.67	.81		
24	.07	16	3	8	5	8		1.40	1.80	.66	.84		
24	.07	16	4	8	5	8		1.01	1.29	.66	.84		
24	.08	18	3	8	5	8		1.37	1.98	.61	.88		
24	.08	18	4	8	5	8		.94	1.35	.61	.88		
24	.09	20	3	8	5	8		1.17	1.88	.55	.88		
24	.09	20	4	8	5	8		.84	1.35	.55	.88		
24		20	3	8	5	8	30.00	1.31	2.11	.58	.93	2	2
24		20	3	10	5	8	30.00	.96	1.93	.58	.93	2	2
24		21	3	8	5	8	28.57	1.07	1.80	.52	.88	1	2
24		22	3	8	5	8	27.27	.98	1.72	.48	.84	1	2
24		23	3	8	5	8	26.08	.89	1.65	.44	.81	1	2
24		24	3	8	5	8	25.00	.82	1.58	.40	.77	1	2
24		25	3	8	5	8	24.00	.75	1.51	.37	.74	1	2
24		26	3	8	5	8	23.07	.70	1.46	.34	.71	1	2
24		19	4	8	5	8	31.57	1.09	1.65	.64	.98	2	2
24		19	4	10	5	8	31.57	.80	1.53	.64	.98	2	2
24		20	4	8	5	8	30.00	.89	1.42	.58	.93	1	2
24		21	4	8	5	8	28.57	.80	1.35	.52	.88	1	2

TABLE IX-A (Cont'd) **Slab 30 x 50 ft** **L /Δ = 200**

W	%1-C□	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		22	4	8	5	8	27.27	.73	1.29	.48	.84	1	2
24		23	4	8	5	8	26.08	.67	1.23	.44	.81	1	2
24		24	4	8	5	8	25.00	.61	1.18	.40	.77	1	2
24		25	4	8	5	8	24.00	.56	1.13	.37	.74	1	2
28	.07	17	3	8	5	8		1.42	1.94	.69	.94		
28	.07	17	4	8	5	8		1.06	1.44	.69	.94		
28	.08	18	3	8	5	8		1.47	2.12	.68	.98		
28	.08	18	4	8	5	8		1.04	1.51	.68	.98		
28	.09	20	3	8	5	8		1.25	2.01	.61	.98		
28	.09	20	4	8	5	8		.94	1.51	.61	.98		
28		21	3	8	5	8	28.57	1.33	2.24	.61	1.03	2	2
28		21	3	10	5	8	28.57	1.00	2.11	.61	1.03	1	2
28		22	3	8	5	8	27.27	1.14	2.01	.56	.98	1	2
28		23	3	8	5	8	26.08	1.04	1.92	.51	.94	1	2
28		24	3	8	5	8	25.00	.96	1.84	.47	.90	1	2
28		25	3	8	5	8	24.00	.88	1.77	.43	.87	1	2
28		26	3	8	5	8	23.07	.81	1.70	.40	.83	1	2
28		27	3	8	5	8	22.22	.76	1.64	.37	.80	1	2
28		20	4	8	5	8	30.00	1.09	1.74	.68	1.08	2	2
28		20	4	10	5	8	30.00	.83	1.66	.68	1.08	1	2
28		21	4	8	5	8	28.57	.94	1.58	.61	1.03	1	2
28		22	4	8	5	8	27.27	.85	1.51	.56	.98	1	2
28		23	4	8	5	8	26.08	.78	1.44	.51	.94	1	2
28		24	4	8	5	8	25.00	.72	1.38	.47	.90	1	2
28		25	4	8	5	8	24.00	.66	1.32	.43	.87	1	2
28		26	4	8	5	8	23.07	.61	1.27	.40	.83	1	2
32	.08	19	3	8	5	8		1.46	2.22	.71	1.08		
32	.08	19	4	8	5	8		1.08	1.65	.71	1.08		
32	.09	20	3	8	5	8		1.52	2.44	.70	1.13		
32	.09	20	4	8	5	8		1.07	1.72	.70	1.13		
32		22	3	8	5	8	27.27	1.32	2.32	.64	1.13	2	2
32		22	3	10	5	8	27.27	1.04	2.30	.64	1.13	1	2
32		23	3	8	5	8	26.08	1.19	2.20	.58	1.08	1	2
32		24	3	8	5	8	25.00	1.09	2.11	.54	1.03	1	2
32		25	3	8	5	8	24.00	1.01	2.02	.49	.99	1	2
32		26	3	8	5	8	23.07	.93	1.94	.46	.95	1	2
32		27	3	8	5	8	22.22	.86	1.87	.42	.92	1	2
32		28	3	8	5	8	21.42	.80	1.80	.39	.88	1	2
32		20	4	8	5	8	30.00	1.31	2.11	.77	1.24	2	2
32		20	4	10	5	8	30.00	.96	1.93	.77	1.24	2	2
32		21	4	8	5	8	28.57	1.07	1.80	.70	1.18	1	2
32		22	4	8	5	8	27.27	.98	1.72	.64	1.13	1	2
32		23	4	8	5	8	26.08	.89	1.65	.58	1.08	1	2
32		24	4	8	5	8	25.00	.82	1.58	.54	1.03	1	2
32		25	4	8	5	8	24.00	.75	1.51	.49	.99	1	2
32		26	4	8	5	8	23.07	.70	1.46	.46	.95	1	2
36	.09	21	3	8	5	8		1.48	2.49	.72	1.21		
36	.09	21	4	8	5	8		1.10	1.85	.72	1.21		
36		22	3	8	5	8	27.27	1.57	2.76	.72	1.27	2	2
36		22	3	10	5	8	27.27	1.17	2.59	.72	1.27	1	2
36		23	3	8	5	8	26.08	1.34	2.47	.66	1.21	1	2
36		24	3	8	5	8	25.00	1.23	2.37	.60	1.16	1	2
36		25	3	8	5	8	24.00	1.13	2.27	.55	1.11	1	2
36		26	3	8	5	8	23.07	1.05	2.19	.51	1.07	1	2
36		27	3	8	5	8	22.22	.97	2.11	.47	1.03	1	2
36		28	3	8	5	8	21.42	.90	2.03	.44	.99	1	2

TABLE IX-A (Cont'd) Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
36		21	4	8	5	8	28.57	1.26	2.12	.79	1.33	2	2
36		21	4	10	5	8	28.57	.96	2.03	.79	1.33	1	2
36		22	4	8	5	8	27.27	1.10	1.94	.72	1.27	1	2
36		23	4	8	5	8	26.08	1.01	1.85	.66	1.21	1	2
36		24	4	8	5	8	25.00	.92	1.78	.60	1.16	1	2
36		25	4	8	5	8	24.00	.85	1.70	.55	1.11	1	2
36		26	4	8	5	8	23.07	.79	1.64	.51	1.07	1	2
36		27	4	8	5	8	22.22	.73	1.58	.47	1.03	1	2
40		22	3	10	5	8	27.27	1.32	2.91	.80	1.41	2	2
40		22	3	12	5	8	27.27	1.09	2.87	.80	1.41	1	2
40		23	3	8	5	8	26.08	1.50	2.77	.73	1.35	2	2
40		23	3	10	5	8	26.08	1.19	2.75	.73	1.35	1	2
40		24	3	8	5	8	25.00	1.37	2.63	.67	1.29	1	2
40		25	3	8	5	8	24.00	1.26	2.53	.62	1.24	1	2
40		26	3	8	5	8	23.07	1.17	2.43	.57	1.19	1	2
40		27	3	8	5	8	22.22	1.08	2.34	.53	1.15	1	2
40		28	3	8	5	8	21.42	1.00	2.26	.49	1.11	1	2
40		21	4	8	5	8	28.57	1.47	2.47	.88	1.48	2	2
40		21	4	10	5	8	28.57	1.07	2.26	.88	1.48	1	2
40		22	4	8	5	8	27.27	1.22	2.15	.80	1.41	1	2
40		23	4	8	5	8	26.08	1.12	2.06	.73	1.35	1	2
40		24	4	8	5	8	25.00	1.03	1.97	.67	1.29	1	2
40		25	4	8	5	8	24.00	.94	1.89	.62	1.24	1	2
40		26	4	8	5	8	23.07	.87	1.82	.57	1.19	1	2
40		27	4	8	5	8	22.22	.81	1.75	.53	1.15	1	2
45		23	3	8	5	8	26.08	1.80	3.31	.82	1.52	2	2
45		23	3	10	5	8	26.08	1.34	3.09	.82	1.52	1	2
45		24	3	8	5	8	25.00	1.54	2.96	.75	1.45	1	2
45		25	3	8	5	8	24.00	1.42	2.84	.69	1.39	1	2
45		26	3	8	5	8	23.07	1.31	2.74	.64	1.34	1	2
45		27	3	8	5	8	22.22	1.22	2.63	.59	1.29	1	2
45		28	3	8	5	8	21.42	1.13	2.54	.55	1.24	1	2
45		29	3	8	5	8	20.68	1.05	2.45	.52	1.20	1	2
45		22	4	8	5	8	27.27	1.42	2.51	.90	1.59	2	2
45		22	4	10	5	8	27.27	1.10	2.42	.90	1.59	1	2
45		23	4	8	5	8	26.08	1.26	2.32	.82	1.52	1	2
45		24	4	8	5	8	25.00	1.15	2.22	.75	1.45	1	2
45		25	4	8	5	8	24.00	1.06	2.13	.69	1.39	1	2
45		26	4	8	5	8	23.07	.98	2.05	.64	1.34	1	2
45		27	4	8	5	8	22.22	.91	1.97	.59	1.29	1	2
45		28	4	8	5	8	21.42	.85	1.90	.55	1.24	1	2
50		25	3	8	5	8	24.00	1.58	3.16	.77	1.55	1	2
50		26	3	8	5	8	23.07	1.46	3.04	.71	1.49	1	2
50		27	3	8	5	8	22.22	1.35	2.93	.66	1.43	1	2
50		28	3	8	5	8	21.42	1.26	2.82	.61	1.38	1	2
50		29	3	8	5	8	20.68	1.17	2.72	.57	1.34	1	2
50		30	3	8	5	8	20.00	1.09	2.63	.54	1.29	1	2
50		31	3	8	5	8	19.35	1.02	2.55	.50	1.25	1	2
50		22	4	8	5	8	27.27	1.67	2.94	1.00	1.76	2	2
50		22	4	10	5	8	27.27	1.22	2.69	1.00	1.76	1	2
50		23	4	8	5	8	26.08	1.40	2.58	.91	1.69	1	2
50		24	4	8	5	8	25.00	1.28	2.47	.84	1.62	1	2
50		25	4	8	5	8	24.00	1.18	2.37	.77	1.55	1	2
50		26	4	8	5	8	23.07	1.09	2.28	.71	1.49	1	2
50		27	4	8	5	8	22.22	1.01	2.19	.66	1.43	1	2
50		28	4	8	5	8	21.42	.94	2.12	.61	1.38	1	2

TABLE IX-A (Cont'd) Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
55		23	3	10	5	8	26.08	1.74	4.00	1.01	1.85	2	2
55		23	3	12	5	8	26.08	1.37	3.78	1.01	1.85	1	2
55		26	3	8	5	8	23.07	1.61	3.34	.79	1.64	1	2
55		27	3	8	5	8	22.22	1.49	3.22	.73	1.58	1	2
55		28	3	8	5	8	21.42	1.38	3.11	.68	1.52	1	2
55		29	3	8	5	8	20.68	1.29	3.00	.63	1.47	1	2
55		30	3	8	5	8	20.00	1.20	2.90	.59	1.42	1	2
55		31	3	8	5	8	19.35	1.13	2.80	.55	1.37	1	2
55		23	4	8	5	8	26.08	1.57	2.90	1.01	1.85	2	2
55		23	4	10	5	8	26.08	1.23	2.83	1.01	1.85	1	2
55		24	4	8	5	8	25.00	1.41	2.72	.92	1.78	1	2
55		25	4	8	5	8	24.00	1.30	2.61	.85	1.71	1	2
55		26	4	8	5	8	23.07	1.20	2.51	.79	1.64	1	2
55		27	4	8	5	8	22.22	1.11	2.41	.73	1.58	1	2
55		28	4	8	5	8	21.42	1.04	2.33	.68	1.52	1	2
55		29	4	8	5	8	20.68	.97	2.25	.63	1.47	1	2
60		24	3	10	5	8	25.00	1.64	3.95	1.01	1.94	1	2
60		27	3	8	5	8	22.22	1.62	3.51	.79	1.72	1	2
60		28	3	8	5	8	21.42	1.51	3.39	.74	1.66	1	2
60		29	3	8	5	8	20.68	1.41	3.27	.69	1.60	1	2
60		30	3	8	5	8	20.00	1.31	3.16	.64	1.55	1	2
60		31	3	8	5	8	19.35	1.23	3.06	.60	1.50	1	2
60		32	3	8	5	8	18.75	1.15	2.96	.56	1.45	1	2
60		23	4	8	5	8	26.08	1.80	3.31	1.10	2.02	2	2
60		23	4	10	5	8	26.08	1.34	3.09	1.10	2.02	1	2
60		24	4	8	5	8	25.00	1.54	2.96	1.01	1.94	1	2
60		25	4	8	5	8	24.00	1.42	2.84	.93	1.86	1	2
60		26	4	8	5	8	23.07	1.31	2.74	.86	1.79	1	2
60		27	4	8	5	8	22.22	1.22	2.63	.79	1.72	1	2
60		28	4	8	5	8	21.42	1.13	2.54	.74	1.66	1	2
60		29	4	8	5	8	20.68	1.05	2.45	.69	1.60	1	2
65		25	3	10	5	8	24.00	1.64	4.11	1.01	2.02	1	2
65		28	3	8	5	8	21.42	1.64	3.67	.80	1.80	1	2
65		29	3	8	5	8	20.68	1.52	3.54	.75	1.74	1	2
65		30	3	8	5	8	20.00	1.42	3.43	.70	1.68	1	2
65		31	3	8	5	8	19.35	1.33	3.31	.65	1.63	1	2
65		32	3	8	5	8	18.75	1.25	3.21	.61	1.57	1	2
65		33	3	8	5	8	18.18	1.18	3.11	.58	1.53	1	2
65		24	4	8	5	8	25.00	1.67	3.21	1.09	2.10	2	2
65		24	4	10	5	8	25.00	1.34	3.21	1.09	2.10	1	2
65		25	4	8	5	8	24.00	1.54	3.08	1.01	2.02	1	2
65		26	4	8	5	8	23.07	1.42	2.96	.93	1.94	1	2
65		27	4	8	5	8	22.22	1.32	2.85	.86	1.87	1	2
65		28	4	8	5	8	21.42	1.23	2.75	.80	1.80	1	2
65		29	4	8	5	8	20.68	1.14	2.66	.75	1.74	1	2
65		30	4	8	5	8	20.00	1.07	2.57	.70	1.68	1	2
70		26	3	10	5	8	23.07	1.63	4.26	1.00	2.09	1	2
70		29	3	8	5	8	20.68	1.64	3.82	.80	1.87	1	2
70		30	3	8	5	8	20.00	1.53	3.69	.75	1.81	1	2
70		31	3	8	5	8	19.35	1.44	3.57	.70	1.75	1	2
70		32	3	8	5	8	18.75	1.35	3.46	.66	1.70	1	2
70		33	3	8	5	8	18.18	1.27	3.35	.62	1.64	1	2
70		34	3	8	5	8	17.64	1.19	3.25	.58	1.60	1	2
70		25	4	8	5	8	24.00	1.66	3.32	1.08	2.17	1	2
70		26	4	8	5	8	23.07	1.53	3.19	1.00	2.09	1	2
70		27	4	8	5	8	22.22	1.42	3.07	.93	2.01	1	2

TABLE IX-A (Cont'd) **Slab 30 x 50 ft** **L /Δ = 200**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
70		28	4	8	5	8	21.42	1.32	2.96	.86	1.94	1	2
70		29	4	8	5	8	20.68	1.23	2.86	.80	1.87	1	2
70		30	4	8	5	8	20.00	1.15	2.77	.75	1.81	1	2
70		31	4	8	5	8	19.35	1.08	2.68	.70	1.75	1	2
75		27	3	10	5	8	22.22	1.62	4.39	.99	2.15	1	2
75		30	3	8	5	8	20.00	1.64	3.95	.81	1.94	1	2
75		31	3	8	5	8	19.35	1.54	3.83	.75	1.88	1	2
75		32	3	8	5	8	18.75	1.44	3.71	.71	1.82	1	2
75		33	3	8	5	8	18.18	1.36	3.59	.66	1.76	1	2
75		34	3	8	5	8	17.64	1.28	3.49	.63	1.71	1	2
75		35	3	8	5	8	17.14	1.21	3.39	.59	1.66	1	2
75		26	4	8	5	8	23.07	1.64	3.42	1.07	2.24	1	2
75		27	4	8	5	8	22.22	1.52	3.29	.99	2.15	1	2
75		28	4	8	5	8	21.42	1.41	3.18	.92	2.08	1	2
75		29	4	8	5	8	20.68	1.32	3.07	.86	2.01	1	2
75		30	4	8	5	8	20.00	1.23	2.96	.81	1.94	1	2
75		31	4	8	5	8	19.35	1.15	2.87	.75	1.88	1	2
75		32	4	8	5	8	18.75	1.08	2.78	.71	1.82	1	2
80		28	3	10	5	8	21.42	1.61	4.52	.99	2.22	1	2
80		31	3	8	5	8	19.35	1.64	4.08	.80	2.00	1	2
80		32	3	8	5	8	18.75	1.54	3.95	.75	1.94	1	2
80		33	3	8	5	8	18.18	1.45	3.83	.71	1.88	1	2
80		34	3	8	5	8	17.64	1.36	3.72	.67	1.82	1	2
80		35	3	8	5	8	17.14	1.29	3.61	.63	1.77	1	2
80		36	3	8	5	8	16.66	1.22	3.51	.60	1.72	1	2
80		27	4	8	5	8	22.22	1.62	3.51	1.06	2.30	1	2
80		28	4	8	5	8	21.42	1.51	3.39	.99	2.22	1	2
80		29	4	8	5	8	20.68	1.41	3.27	.92	2.14	1	2
80		30	4	8	5	8	20.00	1.31	3.16	.86	2.07	1	2
80		31	4	8	5	8	19.35	1.23	3.06	.80	2.00	1	2
80		32	4	8	5	8	18.75	1.15	2.96	.75	1.94	1	2
80		33	4	8	5	8	18.18	1.09	2.87	.71	1.88	1	2
85		29	3	10	5	8	20.68	1.60	4.64	.98	2.27	1	2
85		32	3	8	5	8	18.75	1.64	4.20	.80	2.06	1	2
85		33	3	8	5	8	18.18	1.54	4.07	.75	2.00	1	2
85		34	3	8	5	8	17.64	1.45	3.95	.71	1.94	1	2
85		35	3	8	5	8	17.14	1.37	3.84	.67	1.88	1	2
85		36	3	8	5	8	16.66	1.29	3.73	.63	1.83	1	2
85		37	3	8	5	8	16.21	1.22	3.63	.60	1.78	1	2
85		28	4	8	5	8	21.42	1.60	3.60	1.05	2.36	1	2
85		29	4	8	5	8	20.68	1.50	3.48	.98	2.27	1	2
85		30	4	8	5	8	20.00	1.40	3.36	.91	2.20	1	2
85		31	4	8	5	8	19.35	1.31	3.25	.85	2.13	1	2
85		32	4	8	5	8	18.75	1.23	3.15	.80	2.06	1	2
85		33	4	8	5	8	18.18	1.15	3.05	.75	2.00	1	2
85		34	4	8	5	8	17.64	1.09	2.96	.71	1.94	1	2
90		29	3	10	5	10	20.68	1.69	4.91	.83	2.41	1	2
90		33	3	8	5	8	18.18	1.63	4.31	.80	2.12	1	2
90		34	3	8	5	8	17.64	1.54	4.19	.75	2.05	1	2
90		35	3	8	5	8	17.14	1.45	4.07	.71	1.99	1	2
90		36	3	8	5	8	16.66	1.37	3.95	.67	1.94	1	2
90		37	3	8	5	8	16.21	1.30	3.85	.63	1.89	1	2
90		38	3	8	5	8	15.78	1.23	3.74	.60	1.84	1	2
90		29	4	8	5	10	20.68	1.58	3.68	.83	2.41	1	2
90		30	4	8	5	8	20.00	1.48	3.56	.97	2.33	1	2

TABLE IX-A (Cont'd) Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
90		31	4	8	5	8	19.35	1.39	3.44	.91	2.25	1	2
90		32	4	8	5	8	18.75	1.30	3.33	.85	2.18	1	2
90		33	4	8	5	8	18.18	1.22	3.23	.80	2.12	1	2
90		34	4	8	5	8	17.64	1.15	3.14	.75	2.05	1	2
90		35	4	8	5	8	17.14	1.09	3.05	.71	1.99	1	2
95		28	3	12	5	10	21.42	1.59	5.37	.94	2.63	1	2
95		30	3	10	5	8	20.00	1.67	5.01	1.02	2.46	1	2
95		31	3	10	5	8	19.35	1.56	4.85	.96	2.38	1	2
95		34	3	8	5	8	17.64	1.62	4.42	.79	2.17	1	2
95		35	3	8	5	8	17.14	1.53	4.29	.75	2.11	1	2
95		36	3	8	5	8	16.66	1.45	4.17	.71	2.05	1	2
95		37	3	8	5	8	16.21	1.37	4.06	.67	1.99	1	2
95		29	4	8	5	10	20.68	1.67	3.88	.87	2.54	1	2
95		30	4	8	5	8	20.00	1.56	3.76	1.02	2.46	1	2
95		31	4	8	5	8	19.35	1.46	3.63	.96	2.38	1	2
95		32	4	8	5	8	18.75	1.37	3.52	.90	2.30	1	2
95		33	4	8	5	8	18.18	1.29	3.41	.84	2.23	1	2
95		34	4	8	5	8	17.64	1.21	3.31	.79	2.17	1	2
95		35	4	8	5	8	17.14	1.15	3.22	.75	2.11	1	2
100		28	3	12	5	10	21.42	1.68	5.65	.99	2.77	1	2
100		31	3	10	5	8	19.35	1.64	5.10	1.01	2.50	1	2
100		32	3	10	5	8	18.75	1.54	4.94	.94	2.43	1	2
100		35	3	8	5	8	17.14	1.61	4.52	.79	2.22	1	2
100		36	3	8	5	8	16.66	1.52	4.39	.75	2.16	1	2
100		37	3	8	5	8	16.21	1.44	4.27	.71	2.10	1	2
100		38	3	8	5	8	15.78	1.37	4.16	.67	2.04	1	2
100		30	4	8	5	10	20.00	1.64	3.95	.86	2.59	1	2
100		31	4	8	5	8	19.35	1.54	3.83	1.01	2.50	1	2
100		32	4	8	5	8	18.75	1.44	3.71	.94	2.43	1	2
100		33	4	8	5	8	18.18	1.36	3.59	.89	2.35	1	2
100		34	4	8	5	8	17.64	1.28	3.49	.84	2.28	1	2
100		35	4	8	5	8	17.14	1.21	3.39	.79	2.22	1	2
100		36	4	8	5	8	16.66	1.14	3.29	.75	2.16	1	2
105		29	3	12	5	10	20.68	1.64	5.73	.97	2.81	1	2
105		32	3	10	5	8	18.75	1.62	5.19	.99	2.55	1	2
105		33	3	10	5	8	18.18	1.52	5.03	.93	2.47	1	2
105		34	3	10	5	8	17.64	1.43	4.88	.88	2.40	1	2
105		35	3	8	5	8	17.14	1.69	4.74	.83	2.33	1	2
105		36	3	8	5	8	16.66	1.60	4.61	.78	2.26	1	2
105		37	3	8	5	8	16.21	1.51	4.49	.74	2.20	1	2
105		31	4	8	5	10	19.35	1.62	4.02	.84	2.63	1	2
105		32	4	8	5	8	18.75	1.52	3.89	.99	2.55	1	2
105		33	4	8	5	8	18.18	1.43	3.77	.93	2.47	1	2
105		34	4	8	5	8	17.64	1.34	3.66	.88	2.40	1	2
105		35	4	8	5	8	17.14	1.27	3.56	.83	2.33	1	2
105		36	4	8	5	8	16.66	1.20	3.46	.78	2.26	1	2
105		37	4	8	5	8	16.21	1.13	3.36	.74	2.20	1	2
110		30	3	12	5	10	20.00	1.61	5.80	.95	2.85	1	2
110		33	3	10	5	8	18.18	1.59	5.27	.98	2.59	1	2
110		34	3	10	5	8	17.64	1.50	5.12	.92	2.51	1	2
110		35	3	10	5	8	17.14	1.42	4.97	.87	2.44	1	2
110		36	3	10	5	8	16.66	1.34	4.83	.82	2.37	1	2
110		37	3	8	5	8	16.21	1.59	4.70	.78	2.31	1	2
110		38	3	8	5	8	15.78	1.50	4.58	.74	2.25	1	2
110		28	4	10	5	10	21.42	1.66	4.66	1.09	3.05	1	2
110		31	4	8	5	10	19.35	1.69	4.21	.89	2.75	1	2

TABLE IX-A (Cont'd) Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
110		32	4	8	5	8	18.75	1.59	4.08	1.04	2.67	1	2
110		33	4	8	5	8	18.18	1.49	3.95	.98	2.59	1	2
110		34	4	8	5	8	17.64	1.41	3.84	.92	2.51	1	2
110		35	4	8	5	8	17.14	1.33	3.73	.87	2.44	1	2
110		36	4	8	5	8	16.66	1.25	3.62	.82	2.37	1	2
115		28	3	14	5	12	21.42	1.65	6.50	.95	3.19	1	2
115		30	3	12	5	10	20.00	1.68	6.06	.99	2.98	1	2
115		33	3	10	5	10	18.18	1.67	5.51	.82	2.70	1	2
115		34	3	10	5	8	17.64	1.57	5.35	.96	2.63	1	2
115		35	3	10	5	8	17.14	1.48	5.20	.91	2.55	1	2
115		36	3	10	5	8	16.66	1.40	5.05	.86	2.48	1	2
115		37	3	10	5	8	16.21	1.33	4.92	.81	2.41	1	2
115		29	4	10	5	12	20.68	1.62	4.70	.88	3.08	1	2
115		32	4	8	5	10	18.75	1.66	4.26	.87	2.79	1	2
115		33	4	8	5	8	18.18	1.56	4.13	1.02	2.70	1	2
115		34	4	8	5	8	17.64	1.47	4.01	.96	2.63	1	2
115		35	4	8	5	8	17.14	1.39	3.90	.91	2.55	1	2
115		36	4	8	5	8	16.66	1.31	3.79	.86	2.48	1	2
115		37	4	8	5	8	16.21	1.24	3.69	.81	2.41	1	2
120		29	3	14	5	12	20.68	1.61	6.55	.92	3.21	1	2
120		31	3	12	5	10	19.35	1.64	6.12	.97	3.01	1	2
120		34	3	10	5	10	17.64	1.64	5.58	.80	2.74	1	2
120		35	3	10	5	8	17.14	1.55	5.42	.95	2.66	1	2
120		36	3	10	5	8	16.66	1.46	5.27	.90	2.59	1	2
120		37	3	10	5	8	16.21	1.38	5.13	.85	2.52	1	2
120		38	3	10	5	8	15.78	1.31	4.99	.80	2.45	1	2
120		29	4	10	5	12	20.68	1.69	4.91	.92	3.21	1	2
120		33	4	8	5	10	18.18	1.63	4.31	.85	2.82	1	2
120		34	4	8	5	8	17.64	1.54	4.19	1.00	2.74	1	2
120		35	4	8	5	8	17.14	1.45	4.07	.95	2.66	1	2
120		36	4	8	5	8	16.66	1.37	3.95	.90	2.59	1	2
120		37	4	8	5	8	16.21	1.30	3.85	.85	2.52	1	2
120		38	4	8	5	8	15.78	1.23	3.74	.80	2.45	1	2
125		29	3	14	5	12	20.68	1.68	6.82	.96	3.35	1	2
125		32	3	12	5	10	18.75	1.61	6.18	.94	3.03	1	2
125		35	3	10	5	10	17.14	1.61	5.65	.79	2.77	1	2
125		36	3	10	5	8	16.66	1.52	5.49	.93	2.70	1	2
125		37	3	10	5	8	16.21	1.44	5.34	.88	2.62	1	2
125		38	3	10	5	8	15.78	1.37	5.20	.84	2.55	1	2
125		39	3	10	5	8	15.38	1.30	5.07	.79	2.49	1	2
125		30	4	10	5	12	20.00	1.64	4.94	.90	3.24	1	2
125		34	4	8	5	10	17.64	1.60	4.36	.84	2.85	1	2
125		35	4	8	5	8	17.14	1.51	4.24	.99	2.77	1	2
125		36	4	8	5	8	16.66	1.43	4.12	.93	2.70	1	2
125		37	4	8	5	8	16.21	1.35	4.01	.88	2.62	1	2
125		38	4	8	5	8	15.78	1.28	3.90	.84	2.55	1	2
125		39	4	8	5	8	15.38	1.21	3.80	.79	2.49	1	2
130		30	3	14	5	12	20.00	1.63	6.86	.93	3.36	1	2
130		32	3	12	5	10	18.75	1.67	6.43	.98	3.15	1	2
130		33	3	12	5	10	18.18	1.57	6.23	.92	3.06	1	2
130		34	3	12	5	10	17.64	1.48	6.05	.87	2.97	1	2
130		35	3	10	5	10	17.14	1.68	5.88	.82	2.88	1	2
130		36	3	10	5	8	16.66	1.58	5.71	.97	2.80	1	2
130		37	3	10	5	8	16.21	1.50	5.56	.92	2.73	1	2
130		31	4	10	5	12	19.35	1.60	4.97	.87	3.26	1	2
130		32	4	10	5	10	18.75	1.50	4.82	.98	3.15	1	2

TABLE IX-A (Cont'd) **Slab 30 x 50 ft** **L /Δ = 200**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
130		34	4	8	5	10	17.64	1.66	4.54	.87	2.97	1	2
130		35	4	8	5	10	17.14	1.57	4.41	.82	2.88	1	2
130		36	4	8	5	8	16.66	1.48	4.28	.97	2.80	1	2
130		37	4	8	5	8	16.21	1.40	4.17	.92	2.73	1	2
130		38	4	8	5	8	15.78	1.33	4.06	.87	2.66	1	2
135		30	3	14	5	12	20.00	1.69	7.12	.97	3.49	1	2
135		33	3	12	5	10	18.18	1.63	6.47	.96	3.18	1	2
135		34	3	12	5	10	17.64	1.54	6.28	.90	3.08	1	2
135		35	3	12	5	10	17.14	1.45	6.10	.85	2.99	1	2
135		36	3	10	5	10	16.66	1.64	5.93	.81	2.91	1	2
135		37	3	10	5	8	16.21	1.56	5.77	.95	2.83	1	2
135		38	3	10	5	8	15.78	1.48	5.62	.90	2.76	1	2
135		31	4	10	5	12	19.35	1.66	5.17	.91	3.38	1	2
135		32	4	10	5	10	18.75	1.56	5.00	1.02	3.28	1	2
135		33	4	10	5	10	18.18	1.47	4.85	.96	3.18	1	2
135		35	4	8	5	10	17.14	1.63	4.58	.85	2.99	1	2
135		36	4	8	5	10	16.66	1.54	4.45	.81	2.91	1	2
135		37	4	8	5	8	16.21	1.46	4.33	.95	2.83	1	2
135		38	4	8	5	8	15.78	1.38	4.21	.90	2.76	1	2
140		31	3	14	5	12	19.35	1.64	7.15	.94	3.51	1	2
140		33	3	12	5	10	18.18	1.69	6.71	.99	3.29	1	2
140		34	3	12	5	10	17.64	1.59	6.51	.94	3.20	1	2
140		35	3	12	5	10	17.14	1.50	6.33	.88	3.11	1	2
140		36	3	12	5	10	16.66	1.42	6.15	.84	3.02	1	2
140		37	3	10	5	10	16.21	1.61	5.99	.79	2.94	1	2
140		38	3	10	5	8	15.78	1.53	5.83	.94	2.86	1	2
140		29	4	12	5	12	20.68	1.64	5.73	1.07	3.75	1	2
140		32	4	10	5	12	18.75	1.62	5.19	.88	3.40	1	2
140		33	4	10	5	10	18.18	1.52	5.03	.99	3.29	1	2
140		34	4	10	5	10	17.64	1.43	4.88	.94	3.20	1	2
140		35	4	8	5	10	17.14	1.69	4.74	.88	3.11	1	2
140		36	4	8	5	10	16.66	1.60	4.61	.84	3.02	1	2
140		37	4	8	5	10	16.21	1.51	4.49	.79	2.94	1	2
145		32	3	14	5	12	18.75	1.60	7.17	.91	3.52	1	2
145		34	3	12	5	10	17.64	1.65	6.75	.97	3.31	1	2
145		35	3	12	5	10	17.14	1.56	6.55	.92	3.22	1	2
145		36	3	12	5	10	16.66	1.47	6.37	.87	3.13	1	2
145		37	3	12	5	10	16.21	1.39	6.20	.82	3.04	1	2
145		38	3	12	5	10	15.78	1.32	6.04	.78	2.96	1	2
145		39	3	10	5	10	15.38	1.50	5.88	.74	2.89	1	2
145		30	4	12	5	14	20.00	1.59	5.73	.89	3.75	1	2
145		32	4	10	5	12	18.75	1.68	5.38	.91	3.52	1	2
145		33	4	10	5	10	18.18	1.58	5.21	1.03	3.41	1	2
145		34	4	10	5	10	17.64	1.48	5.06	.97	3.31	1	2
145		35	4	10	5	10	17.14	1.40	4.91	.92	3.22	1	2
145		36	4	8	5	10	16.66	1.66	4.78	.87	3.13	1	2
145		37	4	8	5	10	16.21	1.57	4.65	.82	3.04	1	2
150		32	3	14	5	12	18.75	1.65	7.42	.94	3.64	1	2
150		35	3	12	5	10	17.14	1.61	6.78	.95	3.33	1	2
150		36	3	12	5	10	16.66	1.52	6.59	.90	3.24	1	2
150		37	3	12	5	10	16.21	1.44	6.41	.85	3.15	1	2
150		38	3	12	5	10	15.78	1.37	6.24	.80	3.06	1	2
150		39	3	12	5	10	15.38	1.30	6.08	.76	2.99	1	2
150		40	3	10	5	10	15.00	1.48	5.93	.72	2.91	1	2
150		30	4	12	5	14	20.00	1.64	5.93	.92	3.88	1	2
150		33	4	10	5	12	18.18	1.63	5.39	.89	3.53	1	2

TABLE IX-A (Cont'd) Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
150		34	4	10	5	10	17.64	1.54	5.23	1.00	3.43	1	2
150		35	4	10	5	10	17.14	1.45	5.08	.95	3.33	1	2
150		36	4	10	5	10	16.66	1.37	4.94	.90	3.24	1	2
150		37	4	10	5	10	16.21	1.30	4.81	.85	3.15	1	2
150		38	4	8	5	10	15.78	1.54	4.68	.80	3.06	1	2

TABLE IX-B Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	5	3	8	5	8		.57	.23	.26	.10		
4	.01	5	4	8	5	8		.40	.16	.26	.10		
4	.02	7	3	8	5	8		.51	.28	.22	.12		
4	.02	7	4	8	5	8		.35	.19	.22	.12		
4	.03	9	3	8	5	8		.45	.32	.23	.16		
4	.03	9	4	8	5	8		.31	.22	.23	.16		
8	.02	8	3	8	5	8		.72	.46	.33	.21		
8	.02	8	4	8	5	8		.51	.32	.33	.21		
8	.03	10	3	8	5	8		.70	.56	.29	.23		
8	.03	10	4	8	5	8		.48	.38	.29	.23		
8	.04	12	3	8	5	8		.59	.57	.25	.24		
8	.04	12	4	8	5	8		.41	.39	.25	.24		
8	.05	13	3	8	5	8		.58	.60	.27	.28		
8	.05	13	4	8	5	8		.40	.41	.27	.28		
8	.06	15	3	8	5	8		.54	.64	.27	.33		
8	.06	15	4	8	5	8		.37	.45	.27	.33		
12	.03	11	3	8	5	8		.78	.69	.36	.32		
12	.03	11	4	8	5	8		.55	.49	.36	.32		
12	.04	12	3	8	5	8		.81	.78	.35	.34		
12	.04	12	4	8	5	8		.55	.53	.35	.34		
12	.05	14	3	8	5	8		.72	.81	.32	.35		
12	.05	14	4	8	5	8		.50	.56	.32	.35		
12	.06	16	3	8	5	8		.67	.86	.29	.37		
12	.06	16	4	8	5	8		.46	.59	.29	.37		
12	.07	18	3	8	5	8		.64	.92	.28	.40		
12	.07	18	4	8	5	8		.44	.64	.28	.40		
12	.08	19	3	8	5	8		.66	1.00	.29	.44		
12	.08	19	4	8	5	8		.45	.69	.29	.44		
12	.09	21	3	8	5	8		.57	.97	.29	.49		
12	.09	21	4	8	5	8		.40	.67	.29	.49		
12		22	3	8	5	8	27.27	.60	1.07	.30	.52	2	1
12		22	3	10	5	8	27.27	.45	1.00	.30	.52	2	1
12		23	3	8	5	8	26.08	.51	.94	.30	.55	2	1
12		23	3	10	5	8	26.08	.38	.89	.30	.55	2	1
12		24	3	8	5	8	25.00	.43	.83	.30	.57	2	1
12		24	3	10	5	8	25.00	.32	.79	.30	.57	1	1
12		25	3	8	5	8	24.00	.37	.75	.30	.60	1	1
12		21	4	8	5	8	28.57	.50	.84	.30	.50	2	1
12		21	4	10	5	8	28.57	.37	.79	.30	.50	2	1
12		22	4	8	5	8	27.27	.42	.74	.30	.52	2	1
12		22	4	10	5	8	27.27	.31	.69	.30	.52	2	1
12		23	4	8	5	8	26.08	.35	.65	.30	.55	2	1
12		23	4	10	5	8	26.08	.26	.61	.30	.55	1	1
12		24	4	8	5	8	25.00	.30	.59	.30	.57	1	1
16	.04	13	3	8	5	8		.89	.92	.41	.42		
16	.04	13	4	8	5	8		.62	.65	.41	.42		
16	.05	15	3	8	5	8		.88	1.06	.38	.46		
16	.05	15	4	8	5	8		.60	.72	.38	.46		
16	.06	17	3	8	5	8		.82	1.12	.35	.47		
16	.06	17	4	8	5	8		.56	.76	.35	.47		
16	.07	19	3	8	5	8		.78	1.19	.32	.49		
16	.07	19	4	8	5	8		.54	.82	.32	.49		
16	.08	21	3	8	5	8		.68	1.14	.29	.49		
16	.08	21	4	8	5	8		.47	.79	.29	.49		
16	.09	22	3	8	5	8		.70	1.24	.29	.51		

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
16	.09	22	4	8	5	8		.49	.86	.29	.51		
16		24	3	8	5	8	25.00	.63	1.20	.30	.57	2	1
16		24	3	10	5	8	25.00	.47	1.13	.30	.57	2	1
16		25	3	8	5	8	24.00	.53	1.07	.30	.60	2	1
16		25	3	10	5	8	24.00	.40	1.01	.30	.60	2	1
16		26	3	8	5	8	23.07	.46	.97	.30	.62	1	1
16		27	3	8	5	8	22.22	.43	.93	.30	.64	1	1
16		22	4	8	5	8	27.27	.60	1.07	.32	.56	2	2
16		22	4	10	5	8	27.27	.45	1.00	.32	.56	2	2
16		23	4	8	5	8	26.08	.51	.94	.30	.55	2	1
16		23	4	10	5	8	26.08	.38	.89	.30	.55	2	1
16		24	4	8	5	8	25.00	.43	.83	.30	.57	2	1
16		24	4	10	5	8	25.00	.32	.79	.30	.57	1	1
16		25	4	8	5	8	24.00	.37	.75	.30	.60	1	1
20	.05	16	3	8	5	8		.90	1.15	.41	.53		
20	.05	16	4	8	5	8		.63	.81	.41	.53		
20	.06	17	3	8	5	8		.99	1.35	.42	.57		
20	.06	17	4	8	5	8		.67	.92	.42	.57		
20	.07	20	3	8	5	8		.80	1.28	.35	.57		
20	.07	20	4	8	5	8		.55	.88	.35	.57		
20	.08	22	3	8	5	8		.77	1.37	.33	.59		
20	.08	22	4	8	5	8		.53	.94	.33	.59		
20	.09	23	3	8	5	8		.80	1.48	.33	.62		
20	.09	23	4	8	5	8		.55	1.02	.33	.62		
20		25	3	8	5	8	24.00	.71	1.43	.31	.62	2	2
20		25	3	10	5	8	24.00	.53	1.34	.31	.62	2	2
20		26	3	8	5	8	23.07	.61	1.28	.30	.62	2	1
20		26	3	10	5	8	23.07	.46	1.21	.30	.62	1	1
20		27	3	8	5	8	22.22	.54	1.17	.30	.64	1	1
20		28	3	8	5	8	21.42	.50	1.13	.30	.67	1	1
20		23	4	8	5	8	26.08	.68	1.25	.36	.67	2	2
20		23	4	10	5	8	26.08	.51	1.18	.36	.67	2	2
20		24	4	8	5	8	25.00	.58	1.11	.33	.64	2	2
20		24	4	10	5	8	25.00	.43	1.04	.33	.64	2	2
20		25	4	8	5	8	24.00	.49	.99	.31	.62	2	2
20		25	4	10	5	8	24.00	.37	.94	.31	.62	1	2
20		26	4	8	5	8	23.07	.43	.91	.30	.62	1	1
24	.06	19	3	8	5	8		.91	1.38	.42	.64		
24	.06	19	4	8	5	8		.64	.98	.42	.64		
24	.07	21	3	8	5	8		.87	1.46	.39	.66		
24	.07	21	4	8	5	8		.60	1.01	.39	.66		
24	.08	22	3	8	5	8		.88	1.56	.39	.69		
24	.08	22	4	8	5	8		.60	1.07	.39	.69		
24	.09	24	3	8	5	8		.87	1.68	.37	.71		
24	.09	24	4	8	5	8		.60	1.15	.37	.71		
24		26	3	8	5	8	23.07	.78	1.62	.34	.71	2	2
24		26	3	10	5	8	23.07	.58	1.52	.34	.71	2	2
24		27	3	8	5	8	22.22	.67	1.45	.31	.69	2	2
24		27	3	10	5	8	22.22	.52	1.40	.31	.69	1	2
24		28	3	8	5	8	21.42	.60	1.35	.30	.67	1	1
24		29	3	8	5	8	20.68	.56	1.31	.30	.69	1	1
24		24	4	8	5	8	25.00	.73	1.40	.40	.77	2	2
24		24	4	10	5	8	25.00	.55	1.32	.40	.77	2	2
24		25	4	8	5	8	24.00	.62	1.25	.37	.74	2	2
24		25	4	10	5	8	24.00	.47	1.17	.37	.74	2	2
24		26	4	8	5	8	23.07	.53	1.12	.34	.71	2	2

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		26	4	10	5	8	23.07	.42	1.09	.34	.71	1	2
24		27	4	8	5	8	22.22	.48	1.05	.31	.69	1	2
24		28	4	8	5	8	21.42	.45	1.01	.30	.67	1	1
28	.07	21	3	8	5	8		.96	1.62	.44	.75		
28	.07	21	4	8	5	8		.68	1.14	.44	.75		
28	.08	23	3	8	5	8		.93	1.72	.42	.77		
28	.08	23	4	8	5	8		.64	1.18	.42	.77		
28	.09	25	3	8	5	8		.92	1.84	.40	.80		
28	.09	25	4	8	5	8		.63	1.26	.40	.80		
28		26	3	8	5	8	23.07	.95	1.99	.40	.83	2	2
28		26	3	10	5	8	23.07	.71	1.85	.40	.83	2	2
28		27	3	8	5	8	22.22	.82	1.78	.37	.80	2	2
28		27	3	10	5	8	22.22	.61	1.66	.37	.80	2	2
28		28	3	8	5	8	21.42	.71	1.60	.34	.77	2	2
28		28	3	10	5	8	21.42	.56	1.58	.34	.77	1	2
28		29	3	8	5	8	20.68	.65	1.52	.32	.75	1	2
28		30	3	8	5	8	20.00	.61	1.47	.30	.72	1	2
28		31	3	8	5	8	19.35	.57	1.43	.30	.74	1	1
28		25	4	8	5	8	24.00	.76	1.52	.43	.87	2	2
28		25	4	10	5	8	24.00	.57	1.43	.43	.87	2	2
28		26	4	8	5	8	23.07	.65	1.36	.40	.83	2	2
28		26	4	10	5	8	23.07	.49	1.28	.40	.83	2	2
28		27	4	8	5	8	22.22	.57	1.23	.37	.80	1	2
28		28	4	8	5	8	21.42	.53	1.18	.34	.77	1	2
28		29	4	8	5	8	20.68	.49	1.14	.32	.75	1	2
28		30	4	8	5	8	20.00	.46	1.10	.30	.72	1	2
28		31	4	8	5	8	19.35	.43	1.07	.30	.74	1	1
32	.08	24	3	8	5	8		.96	1.85	.44	.85		
32	.08	24	4	8	5	8		.68	1.31	.44	.85		
32	.09	26	3	8	5	8		.95	1.97	.42	.88		
32	.09	26	4	8	5	8		.65	1.35	.42	.88		
32		27	3	8	5	8	22.22	.98	2.13	.42	.92	2	2
32		27	3	10	5	8	22.22	.73	1.97	.42	.92	2	2
32		28	3	8	5	8	21.42	.85	1.90	.39	.88	2	2
32		28	3	10	5	8	21.42	.64	1.80	.39	.88	1	2
32		29	3	8	5	8	20.68	.75	1.74	.36	.85	1	2
32		30	3	8	5	8	20.00	.70	1.68	.34	.82	1	2
32		31	3	8	5	8	19.35	.65	1.63	.32	.80	1	2
32		32	3	8	5	8	18.75	.61	1.58	.30	.77	1	2
32		33	3	8	5	8	18.18	.58	1.53	.30	.79	1	1
32		26	4	8	5	8	23.07	.78	1.62	.46	.95	2	2
32		26	4	10	5	8	23.07	.58	1.52	.46	.95	2	2
32		27	4	8	5	8	22.22	.67	1.45	.42	.92	2	2
32		27	4	10	5	8	22.22	.52	1.40	.42	.92	1	2
32		28	4	8	5	8	21.42	.60	1.35	.39	.88	1	2
32		29	4	8	5	8	20.68	.56	1.31	.36	.85	1	2
32		30	4	8	5	8	20.00	.52	1.26	.34	.82	1	2
32		31	4	8	5	8	19.35	.49	1.22	.32	.80	1	2
32		32	4	8	5	8	18.75	.46	1.18	.30	.77	1	2
36	.09	27	3	8	5	8		.96	2.08	.44	.96		
36	.09	27	4	8	5	8		.68	1.47	.44	.96		
36		28	3	8	5	8	21.42	.99	2.23	.44	.99	2	2
36		28	3	10	5	8	21.42	.74	2.07	.44	.99	2	2
36		29	3	8	5	8	20.68	.86	2.00	.41	.96	2	2
36		29	3	10	5	8	20.68	.67	1.96	.41	.96	1	2
36		30	3	8	5	8	20.00	.79	1.89	.38	.93	1	2

TABLE IX-B (Cont'd) **Slab 30 x 50 ft** **L /Δ = 300**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
36		31	3	8	5	8	19.35	.74	1.83	.36	.90	1	2
36		32	3	8	5	8	18.75	.69	1.78	.34	.87	1	2
36		33	3	8	5	8	18.18	.65	1.72	.32	.84	1	2
36		34	3	8	5	8	17.64	.61	1.67	.30	.82	1	2
36		26	4	8	5	8	23.07	.91	1.89	.51	1.07	2	2
36		26	4	10	5	8	23.07	.68	1.76	.51	1.07	2	2
36		27	4	8	5	8	22.22	.78	1.69	.47	1.03	2	2
36		27	4	10	5	8	22.22	.58	1.58	.47	1.03	2	2
36		28	4	8	5	8	21.42	.68	1.52	.44	.99	1	2
36		29	4	8	5	8	20.68	.63	1.47	.41	.96	1	2
36		30	4	8	5	8	20.00	.59	1.42	.38	.93	1	2
36		31	4	8	5	8	19.35	.55	1.37	.36	.90	1	2
36		32	4	8	5	8	18.75	.52	1.33	.34	.87	1	2
40		26	3	12	5	8	23.07	.89	2.80	.57	1.19	2	2
40		26	3	14	5	8	23.07	.73	2.66	.57	1.19	2	2
40		27	3	10	5	8	22.22	.98	2.66	.53	1.15	2	2
40		27	3	12	5	8	22.22	.77	2.50	.53	1.15	2	2
40		28	3	10	5	8	21.42	.85	2.38	.49	1.11	2	2
40		28	3	12	5	8	21.42	.67	2.26	.49	1.11	1	2
40		29	3	8	5	8	20.68	.99	2.31	.46	1.07	2	2
40		29	3	10	5	8	20.68	.75	2.18	.46	1.07	1	2
40		30	3	8	5	8	20.00	.87	2.11	.43	1.03	1	2
40		31	3	8	5	8	19.35	.82	2.04	.40	1.00	1	2
40		32	3	8	5	8	18.75	.77	1.97	.37	.97	1	2
40		26	4	10	5	8	23.07	.78	2.03	.57	1.19	2	2
40		26	4	12	5	8	23.07	.61	1.92	.57	1.19	2	2
40		27	4	8	5	8	22.22	.90	1.95	.53	1.15	2	2
40		27	4	10	5	8	22.22	.67	1.81	.53	1.15	2	2
40		28	4	8	5	8	21.42	.78	1.75	.49	1.11	2	2
40		28	4	10	5	8	21.42	.60	1.69	.49	1.11	1	2
40		29	4	8	5	8	20.68	.70	1.63	.46	1.07	1	2
40		30	4	8	5	8	20.00	.65	1.58	.43	1.03	1	2
40		31	4	8	5	8	19.35	.61	1.53	.40	1.00	1	2
40		32	4	8	5	8	18.75	.57	1.48	.37	.97	1	2
45		27	3	12	5	8	22.22	.90	2.92	.59	1.29	2	2
45		27	3	14	5	8	22.22	.73	2.78	.59	1.29	2	2
45		28	3	10	5	8	21.42	.99	2.79	.55	1.24	2	2
45		28	3	12	5	8	21.42	.78	2.62	.55	1.24	2	2
45		29	3	8	5	8	20.68	1.17	2.72	.52	1.20	2	2
45		29	3	10	5	8	20.68	.86	2.51	.52	1.20	2	2
45		30	3	8	5	8	20.00	1.02	2.44	.48	1.16	2	2
45		30	3	10	5	8	20.00	.79	2.37	.48	1.16	1	2
45		31	3	8	5	8	19.35	.92	2.29	.45	1.12	1	2
45		32	3	8	5	8	18.75	.86	2.22	.42	1.09	1	2
45		33	3	8	5	8	18.18	.81	2.15	.40	1.06	1	2
45		27	4	10	5	8	22.22	.78	2.12	.59	1.29	2	2
45		27	4	12	5	8	22.22	.62	2.00	.59	1.29	2	2
45		28	4	8	5	8	21.42	.91	2.04	.55	1.24	2	2
45		28	4	10	5	8	21.42	.68	1.90	.55	1.24	1	2
45		29	4	8	5	8	20.68	.79	1.84	.52	1.20	2	2
45		29	4	10	5	8	20.68	.63	1.84	.52	1.20	1	2
45		30	4	8	5	8	20.00	.74	1.78	.48	1.16	1	2
45		31	4	8	5	8	19.35	.69	1.72	.45	1.12	1	2
45		32	4	8	5	8	18.75	.65	1.66	.42	1.09	1	2
45		33	4	8	5	8	18.18	.61	1.61	.40	1.06	1	2
50		29	3	10	5	8	20.68	.99	2.89	.57	1.34	2	2

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
50		29	3	12	5	8	20.68	.78	2.72	.57	1.34	1	2
50		30	3	8	5	8	20.00	1.18	2.83	.54	1.29	2	2
50		30	3	10	5	8	20.00	.87	2.63	.54	1.29	1	2
50		31	3	8	5	8	19.35	1.03	2.55	.50	1.25	2	2
50		31	3	10	5	8	19.35	.82	2.55	.50	1.25	1	2
50		32	3	8	5	8	18.75	.96	2.47	.47	1.21	1	2
50		33	3	8	5	8	18.18	.90	2.39	.44	1.17	1	2
50		34	3	8	5	8	17.64	.85	2.32	.42	1.14	1	2
50		35	3	8	5	8	17.14	.80	2.26	.39	1.11	1	2
50		28	4	8	5	8	21.42	1.05	2.36	.61	1.38	2	2
50		28	4	10	5	8	21.42	.78	2.18	.61	1.38	2	2
50		29	4	8	5	8	20.68	.91	2.12	.57	1.34	2	2
50		29	4	10	5	8	20.68	.70	2.04	.57	1.34	1	2
50		30	4	8	5	8	20.00	.82	1.97	.54	1.29	1	2
50		31	4	8	5	8	19.35	.77	1.91	.50	1.25	1	2
50		32	4	8	5	8	18.75	.72	1.85	.47	1.21	1	2
50		33	4	8	5	8	18.18	.68	1.79	.44	1.17	1	2
50		34	4	8	5	8	17.64	.64	1.74	.42	1.14	1	2
55		30	3	10	5	8	20.00	.98	2.96	.59	1.42	2	2
55		30	3	12	5	8	20.00	.80	2.90	.59	1.42	1	2
55		31	3	8	5	8	19.35	1.17	2.91	.55	1.37	2	2
55		31	3	10	5	8	19.35	.90	2.80	.55	1.37	1	2
55		32	3	8	5	8	18.75	1.06	2.72	.52	1.33	1	2
55		33	3	8	5	8	18.18	.99	2.63	.49	1.29	1	2
55		34	3	8	5	8	17.64	.94	2.56	.46	1.25	1	2
55		35	3	8	5	8	17.14	.88	2.48	.43	1.22	1	2
55		36	3	8	5	8	16.66	.83	2.41	.41	1.18	1	2
55		29	4	8	5	8	20.68	1.04	2.41	.63	1.47	2	2
55		29	4	10	5	8	20.68	.77	2.25	.63	1.47	1	2
55		30	4	8	5	8	20.00	.90	2.17	.59	1.42	1	2
55		31	4	8	5	8	19.35	.84	2.10	.55	1.37	1	2
55		32	4	8	5	8	18.75	.79	2.04	.52	1.33	1	2
55		33	4	8	5	8	18.18	.74	1.97	.49	1.29	1	2
55		34	4	8	5	8	17.64	.70	1.92	.46	1.25	1	2
55		35	4	8	5	8	17.14	.66	1.86	.43	1.22	1	2
60		31	3	8	5	8	19.35	1.33	3.30	.60	1.50	2	2
60		31	3	10	5	8	19.35	.98	3.06	.60	1.50	1	2
60		32	3	8	5	8	18.75	1.16	2.97	.56	1.45	2	2
60		32	3	10	5	8	18.75	.92	2.96	.56	1.45	1	2
60		33	3	8	5	8	18.18	1.09	2.87	.53	1.41	1	2
60		34	3	8	5	8	17.64	1.02	2.79	.50	1.37	1	2
60		35	3	8	5	8	17.14	.96	2.71	.47	1.33	1	2
60		36	3	8	5	8	16.66	.91	2.63	.45	1.29	1	2
60		37	3	8	5	8	16.21	.86	2.56	.42	1.26	1	2
60		29	4	8	5	8	20.68	1.17	2.72	.69	1.60	2	2
60		29	4	10	5	8	20.68	.86	2.51	.69	1.60	2	2
60		30	4	8	5	8	20.00	1.02	2.44	.64	1.55	2	2
60		30	4	10	5	8	20.00	.79	2.37	.64	1.55	1	2
60		31	4	8	5	8	19.35	.92	2.29	.60	1.50	1	2
60		32	4	8	5	8	18.75	.86	2.22	.56	1.45	1	2
60		33	4	8	5	8	18.18	.81	2.15	.53	1.41	1	2
60		34	4	8	5	8	17.64	.77	2.09	.50	1.37	1	2
60		35	4	8	5	8	17.14	.72	2.03	.47	1.33	1	2
65		32	3	8	5	8	18.75	1.30	3.33	.61	1.57	2	2
65		32	3	10	5	8	18.75	1.00	3.21	.61	1.57	1	2
65		33	3	8	5	8	18.18	1.18	3.11	.58	1.53	1	2

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
65		34	3	8	5	8	17.64	1.11	3.02	.54	1.48	1	2
65		35	3	8	5	8	17.14	1.05	2.94	.51	1.44	1	2
65		36	3	8	5	8	16.66	.99	2.85	.48	1.40	1	2
65		37	3	8	5	8	16.21	.93	2.78	.46	1.36	1	2
65		38	3	8	5	8	15.78	.89	2.70	.43	1.33	1	2
65		30	4	8	5	8	20.00	1.14	2.73	.70	1.68	2	2
65		30	4	10	5	8	20.00	.85	2.57	.70	1.68	1	2
65		31	4	8	5	8	19.35	1.00	2.48	.65	1.63	1	2
65		32	4	8	5	8	18.75	.94	2.41	.61	1.57	1	2
65		33	4	8	5	8	18.18	.88	2.33	.58	1.53	1	2
65		34	4	8	5	8	17.64	.83	2.27	.54	1.48	1	2
65		35	4	8	5	8	17.14	.78	2.20	.51	1.44	1	2
65		36	4	8	5	8	16.66	.74	2.14	.48	1.40	1	2
70		32	3	8	5	8	18.75	1.45	3.71	.66	1.70	2	2
70		32	3	10	5	8	18.75	1.08	3.46	.66	1.70	1	2
70		33	3	8	5	8	18.18	1.27	3.35	.62	1.64	1	2
70		34	3	8	5	8	17.64	1.19	3.25	.58	1.60	1	2
70		35	3	8	5	8	17.14	1.13	3.16	.55	1.55	1	2
70		36	3	8	5	8	16.66	1.06	3.07	.52	1.51	1	2
70		37	3	8	5	8	16.21	1.01	2.99	.49	1.47	1	2
70		38	3	8	5	8	15.78	.95	2.91	.47	1.43	1	2
70		30	4	8	5	8	20.00	1.26	3.04	.75	1.81	2	2
70		30	4	10	5	8	20.00	.92	2.78	.75	1.81	2	2
70		31	4	8	5	8	19.35	1.10	2.73	.70	1.75	2	2
70		31	4	10	5	8	19.35	.86	2.68	.70	1.75	1	2
70		32	4	8	5	8	18.75	1.01	2.59	.66	1.70	1	2
70		33	4	8	5	8	18.18	.95	2.51	.62	1.64	1	2
70		34	4	8	5	8	17.64	.89	2.44	.58	1.60	1	2
70		35	4	8	5	8	17.14	.84	2.37	.55	1.55	1	2
70		36	4	8	5	8	16.66	.80	2.30	.52	1.51	1	2
75		33	3	8	5	8	18.18	1.40	3.70	.66	1.76	2	2
75		33	3	10	5	8	18.18	1.09	3.59	.66	1.76	1	2
75		34	3	8	5	8	17.64	1.28	3.49	.63	1.71	1	2
75		35	3	8	5	8	17.14	1.21	3.39	.59	1.66	1	2
75		36	3	8	5	8	16.66	1.14	3.29	.56	1.62	1	2
75		37	3	8	5	8	16.21	1.08	3.20	.53	1.57	1	2
75		38	3	8	5	8	15.78	1.02	3.12	.50	1.53	1	2
75		39	3	8	5	8	15.38	.97	3.04	.47	1.49	1	2
75		31	4	8	5	8	19.35	1.21	3.01	.75	1.88	2	2
75		31	4	10	5	8	19.35	.92	2.87	.75	1.88	1	2
75		32	4	8	5	8	18.75	1.08	2.78	.71	1.82	1	2
75		33	4	8	5	8	18.18	1.02	2.69	.66	1.76	1	2
75		34	4	8	5	8	17.64	.96	2.61	.63	1.71	1	2
75		35	4	8	5	8	17.14	.90	2.54	.59	1.66	1	2
75		36	4	8	5	8	16.66	.85	2.47	.56	1.62	1	2
75		37	4	8	5	8	16.21	.81	2.40	.53	1.57	1	2
80		33	3	8	5	8	18.18	1.54	4.07	.71	1.88	2	2
80		33	3	10	5	8	18.18	1.16	3.83	.71	1.88	1	2
80		34	3	8	5	8	17.64	1.36	3.72	.67	1.82	1	2
80		35	3	8	5	8	17.14	1.29	3.61	.63	1.77	1	2
80		36	3	8	5	8	16.66	1.22	3.51	.60	1.72	1	2
80		37	3	8	5	8	16.21	1.15	3.42	.56	1.68	1	2
80		38	3	8	5	8	15.78	1.09	3.33	.53	1.63	1	2
80		39	3	8	5	8	15.38	1.04	3.24	.51	1.59	1	2
80		31	4	8	5	8	19.35	1.33	3.30	.80	2.00	2	2

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
80		31	4	10	5	8	19.35	.98	3.06	.80	2.00	1	2
80		32	4	8	5	8	18.75	1.16	2.97	.75	1.94	2	2
80		32	4	10	5	8	18.75	.92	2.96	.75	1.94	1	2
80		33	4	8	5	8	18.18	1.09	2.87	.71	1.88	1	2
80		34	4	8	5	8	17.64	1.02	2.79	.67	1.82	1	2
80		35	4	8	5	8	17.14	.96	2.71	.63	1.77	1	2
80		36	4	8	5	8	16.66	.91	2.63	.60	1.72	1	2
80		37	4	8	5	8	16.21	.86	2.56	.56	1.68	1	2
85		32	3	10	5	8	18.75	1.39	4.45	.80	2.06	2	2
85		32	3	12	5	8	18.75	1.09	4.20	.80	2.06	1	2
85		34	3	8	5	8	17.64	1.47	4.02	.71	1.94	2	2
85		34	3	10	5	8	17.64	1.16	3.95	.71	1.94	1	2
85		35	3	8	5	8	17.14	1.37	3.84	.67	1.88	1	2
85		36	3	8	5	8	16.66	1.29	3.73	.63	1.83	1	2
85		37	3	8	5	8	16.21	1.22	3.63	.60	1.78	1	2
85		38	3	8	5	8	15.78	1.16	3.54	.57	1.73	1	2
85		39	3	8	5	8	15.38	1.10	3.45	.54	1.69	1	2
85		32	4	8	5	8	18.75	1.26	3.24	.80	2.06	2	2
85		32	4	10	5	8	18.75	.98	3.15	.80	2.06	1	2
85		33	4	8	5	8	18.18	1.15	3.05	.75	2.00	1	2
85		34	4	8	5	8	17.64	1.09	2.96	.71	1.94	1	2
85		35	4	8	5	8	17.14	1.02	2.88	.67	1.88	1	2
85		36	4	8	5	8	16.66	.97	2.80	.63	1.83	1	2
85		37	4	8	5	8	16.21	.92	2.72	.60	1.78	1	2
85		38	4	8	5	8	15.78	.87	2.65	.57	1.73	1	2
90		32	3	10	5	8	18.75	1.51	4.84	.85	2.18	2	2
90		32	3	12	5	8	18.75	1.16	4.46	.85	2.18	2	2
90		34	3	8	5	8	17.64	1.61	4.38	.75	2.05	2	2
90		34	3	10	5	8	17.64	1.23	4.19	.75	2.05	1	2
90		35	3	8	5	8	17.14	1.45	4.07	.71	1.99	1	2
90		36	3	8	5	8	16.66	1.37	3.95	.67	1.94	1	2
90		37	3	8	5	8	16.21	1.30	3.85	.63	1.89	1	2
90		38	3	8	5	8	15.78	1.23	3.74	.60	1.84	1	2
90		39	3	8	5	8	15.38	1.17	3.65	.57	1.79	1	2
90		32	4	8	5	8	18.75	1.37	3.52	.85	2.18	2	2
90		32	4	10	5	8	18.75	1.04	3.33	.85	2.18	1	2
90		33	4	8	5	8	18.18	1.22	3.23	.80	2.12	1	2
90		34	4	8	5	8	17.64	1.15	3.14	.75	2.05	1	2
90		35	4	8	5	8	17.14	1.09	3.05	.71	1.99	1	2
90		36	4	8	5	8	16.66	1.03	2.96	.67	1.94	1	2
90		37	4	8	5	8	16.21	.97	2.88	.63	1.89	1	2
90		38	4	8	5	8	15.78	.92	2.81	.60	1.84	1	2
95		33	3	10	5	8	18.18	1.43	4.72	.84	2.23	2	2
95		33	3	12	5	8	18.18	1.15	4.55	.84	2.23	1	2
95		34	3	8	5	8	17.64	1.74	4.75	.79	2.17	2	2
95		34	3	10	5	8	17.64	1.30	4.42	.79	2.17	1	2
95		35	3	8	5	8	17.14	1.53	4.29	.75	2.11	1	2
95		36	3	8	5	8	16.66	1.45	4.17	.71	2.05	1	2
95		37	3	8	5	8	16.21	1.37	4.06	.67	1.99	1	2
95		38	3	8	5	8	15.78	1.30	3.95	.63	1.94	1	2
95		39	3	8	5	8	15.38	1.23	3.85	.60	1.89	1	2
95		32	4	8	5	8	18.75	1.49	3.81	.90	2.30	2	2
95		32	4	10	5	8	18.75	1.10	3.52	.90	2.30	1	2
95		33	4	8	5	8	18.18	1.30	3.43	.84	2.23	2	2
95		33	4	10	5	8	18.18	1.03	3.41	.84	2.23	1	2
95		34	4	8	5	8	17.64	1.21	3.31	.79	2.17	1	2

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
95		35	4	8	5	8	17.14	1.15	3.22	.75	2.11	1	2
95		36	4	8	5	8	16.66	1.08	3.13	.71	2.05	1	2
95		37	4	8	5	8	16.21	1.03	3.04	.67	1.99	1	2
95		38	4	8	5	8	15.78	.97	2.96	.63	1.94	1	2
100		33	3	10	5	8	18.18	1.54	5.09	.89	2.35	2	2
100		33	3	12	5	8	18.18	1.21	4.79	.89	2.35	1	2
100		35	3	8	5	8	17.14	1.65	4.63	.79	2.22	2	2
100		35	3	10	5	8	17.14	1.29	4.52	.79	2.22	1	2
100		36	3	8	5	8	16.66	1.52	4.39	.75	2.16	1	2
100		37	3	8	5	8	16.21	1.44	4.27	.71	2.10	1	2
100		38	3	8	5	8	15.78	1.37	4.16	.67	2.04	1	2
100		39	3	8	5	8	15.38	1.30	4.05	.63	1.99	1	2
100		40	3	8	5	8	15.00	1.23	3.95	.60	1.94	1	2
100		33	4	8	5	8	18.18	1.40	3.70	.89	2.35	2	2
100		33	4	10	5	8	18.18	1.09	3.59	.89	2.35	1	2
100		34	4	8	5	8	17.64	1.28	3.49	.84	2.28	1	2
100		35	4	8	5	8	17.14	1.21	3.39	.79	2.22	1	2
100		36	4	8	5	8	16.66	1.14	3.29	.75	2.16	1	2
100		37	4	8	5	8	16.21	1.08	3.20	.71	2.10	1	2
100		38	4	8	5	8	15.78	1.02	3.12	.67	2.04	1	2
100		39	4	8	5	8	15.38	.97	3.04	.63	1.99	1	2
105		33	3	10	5	8	18.18	1.66	5.48	.93	2.47	2	2
105		33	3	12	5	8	18.18	1.27	5.03	.93	2.47	1	2
105		34	3	10	5	8	17.64	1.45	4.94	.88	2.40	2	2
105		34	3	12	5	8	17.64	1.19	4.88	.88	2.40	1	2
105		35	3	8	5	8	17.14	1.78	4.99	.83	2.33	2	2
105		35	3	10	5	8	17.14	1.35	4.74	.83	2.33	1	2
105		36	3	8	5	8	16.66	1.60	4.61	.78	2.26	1	2
105		37	3	8	5	8	16.21	1.51	4.49	.74	2.20	1	2
105		38	3	8	5	8	15.78	1.43	4.37	.70	2.14	1	2
105		39	3	8	5	8	15.38	1.36	4.26	.67	2.09	1	2
105		33	4	8	5	8	18.18	1.50	3.98	.93	2.47	2	2
105		33	4	10	5	8	18.18	1.14	3.77	.93	2.47	1	2
105		34	4	8	5	8	17.64	1.34	3.66	.88	2.40	1	2
105		35	4	8	5	8	17.14	1.27	3.56	.83	2.33	1	2
105		36	4	8	5	8	16.66	1.20	3.46	.78	2.26	1	2
105		37	4	8	5	8	16.21	1.13	3.36	.74	2.20	1	2
105		38	4	8	5	8	15.78	1.07	3.28	.70	2.14	1	2
105		39	4	8	5	8	15.38	1.02	3.19	.67	2.09	1	2
110		32	3	12	5	10	18.75	1.55	5.97	.83	2.67	2	2
110		32	3	14	5	10	18.75	1.24	5.56	.83	2.67	2	2
110		34	3	10	5	8	17.64	1.55	5.29	.92	2.51	2	2
110		34	3	12	5	8	17.64	1.25	5.12	.92	2.51	1	2
110		35	3	10	5	8	17.14	1.42	4.97	.87	2.44	1	2
110		36	3	10	5	8	16.66	1.34	4.83	.82	2.37	1	2
110		37	3	8	5	8	16.21	1.59	4.70	.78	2.31	1	2
110		38	3	8	5	8	15.78	1.50	4.58	.74	2.25	1	2
110		39	3	8	5	8	15.38	1.43	4.46	.70	2.19	1	2
110		33	4	8	5	10	18.18	1.61	4.26	.78	2.59	2	2
110		33	4	10	5	10	18.18	1.19	3.95	.78	2.59	1	2
110		34	4	8	5	8	17.64	1.41	3.85	.92	2.51	2	2
110		34	4	10	5	8	17.64	1.12	3.84	.92	2.51	1	2
110		35	4	8	5	8	17.14	1.33	3.73	.87	2.44	1	2
110		36	4	8	5	8	16.66	1.25	3.62	.82	2.37	1	2
110		37	4	8	5	8	16.21	1.19	3.53	.78	2.31	1	2
110		38	4	8	5	8	15.78	1.13	3.43	.74	2.25	1	2

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
110		39	4	8	5	8	15.38	1.07	3.34	.70	2.19	1	2
115		33	3	12	5	10	18.18	1.44	5.74	.82	2.70	2	2
115		33	3	14	5	10	18.18	1.19	5.51	.82	2.70	1	2
115		34	3	10	5	8	17.64	1.66	5.65	.96	2.63	2	2
115		34	3	12	5	8	17.64	1.31	5.35	.96	2.63	1	2
115		35	3	10	5	8	17.14	1.48	5.20	.91	2.55	1	2
115		36	3	10	5	8	16.66	1.40	5.05	.86	2.48	1	2
115		37	3	10	5	8	16.21	1.33	4.92	.81	2.41	1	2
115		38	3	8	5	8	15.78	1.57	4.79	.77	2.35	1	2
115		39	3	8	5	8	15.38	1.49	4.66	.73	2.29	1	2
115		34	4	8	5	10	17.64	1.51	4.11	.77	2.63	2	2
115		34	4	10	5	10	17.64	1.18	4.01	.77	2.63	1	2
115		35	4	8	5	8	17.14	1.39	3.90	.91	2.55	1	2
115		36	4	8	5	8	16.66	1.31	3.79	.86	2.48	1	2
115		37	4	8	5	8	16.21	1.24	3.69	.81	2.41	1	2
115		38	4	8	5	8	15.78	1.18	3.59	.77	2.35	1	2
115		39	4	8	5	8	15.38	1.12	3.50	.73	2.29	1	2
115		40	4	8	5	8	15.00	1.06	3.41	.69	2.23	1	2
120		33	3	12	5	10	18.18	1.54	6.11	.85	2.82	2	2
120		33	3	14	5	10	18.18	1.24	5.75	.85	2.82	1	2
120		34	3	10	5	8	17.64	1.77	6.03	1.00	2.74	2	2
120		34	3	12	5	8	17.64	1.36	5.58	1.00	2.74	1	2
120		35	3	10	5	8	17.14	1.55	5.45	.95	2.66	2	2
120		35	3	12	5	8	17.14	1.29	5.42	.95	2.66	1	2
120		36	3	10	5	8	16.66	1.46	5.27	.90	2.59	1	2
120		37	3	10	5	8	16.21	1.38	5.13	.85	2.52	1	2
120		38	3	10	5	8	15.78	1.31	4.99	.80	2.45	1	2
120		39	3	10	5	8	15.38	1.24	4.87	.76	2.39	1	2
120		34	4	8	5	10	17.64	1.61	4.38	.80	2.74	2	2
120		34	4	10	5	10	17.64	1.23	4.19	.80	2.74	1	2
120		35	4	8	5	8	17.14	1.45	4.07	.95	2.66	1	2
120		36	4	8	5	8	16.66	1.37	3.95	.90	2.59	1	2
120		37	4	8	5	8	16.21	1.30	3.85	.85	2.52	1	2
120		38	4	8	5	8	15.78	1.23	3.74	.80	2.45	1	2
120		39	4	8	5	8	15.38	1.17	3.65	.76	2.39	1	2
120		40	4	8	5	8	15.00	1.11	3.56	.72	2.33	1	2
125		33	3	12	5	10	18.18	1.64	6.49	.89	2.94	2	2
125		33	3	14	5	10	18.18	1.30	6.04	.89	2.94	2	2
125		35	3	10	5	8	17.14	1.65	5.79	.99	2.77	2	2
125		35	3	12	5	8	17.14	1.34	5.65	.99	2.77	1	2
125		36	3	10	5	8	16.66	1.52	5.49	.93	2.70	1	2
125		37	3	10	5	8	16.21	1.44	5.34	.88	2.62	1	2
125		38	3	10	5	8	15.78	1.37	5.20	.84	2.55	1	2
125		39	3	10	5	8	15.38	1.30	5.07	.79	2.49	1	2
125		40	3	10	5	8	15.00	1.23	4.94	.75	2.43	1	2
125		33	4	10	5	10	18.18	1.40	4.63	.89	2.94	2	2
125		33	4	12	5	10	18.18	1.13	4.49	.89	2.94	1	2
125		34	4	8	5	8	17.64	1.71	4.65	1.05	2.85	2	2
125		34	4	10	5	8	17.64	1.28	4.36	1.05	2.85	1	2
125		35	4	8	5	8	17.14	1.51	4.24	.99	2.77	1	2
125		36	4	8	5	8	16.66	1.43	4.12	.93	2.70	1	2
125		37	4	8	5	8	16.21	1.35	4.01	.88	2.62	1	2
125		38	4	8	5	8	15.78	1.28	3.90	.84	2.55	1	2
125		39	4	8	5	8	15.38	1.21	3.80	.79	2.49	1	2
130		34	3	12	5	10	17.64	1.52	6.21	.87	2.97	2	2
130		34	3	14	5	10	17.64	1.27	6.05	.87	2.97	1	2

TABLE IX-B (Cont'd) Slab 30 x 50 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
130		35	3	10	5	10	17.14	1.75	6.14	.82	2.88	2	2
130		35	3	12	5	10	17.14	1.40	5.88	.82	2.88	1	2
130		36	3	10	5	8	16.66	1.58	5.71	.97	2.80	1	2
130		37	3	10	5	8	16.21	1.50	5.56	.92	2.73	1	2
130		38	3	10	5	8	15.78	1.42	5.41	.87	2.66	1	2
130		39	3	10	5	8	15.38	1.35	5.27	.83	2.59	1	2
130		40	3	10	5	8	15.00	1.28	5.14	.78	2.52	1	2
130		33	4	10	5	10	18.18	1.48	4.90	.92	3.06	2	2
130		33	4	12	5	10	18.18	1.18	4.67	.92	3.06	1	2
130		35	4	8	5	10	17.14	1.59	4.46	.82	2.88	2	2
130		35	4	10	5	10	17.14	1.26	4.41	.82	2.88	1	2
130		36	4	8	5	8	16.66	1.48	4.28	.97	2.80	1	2
130		37	4	8	5	8	16.21	1.40	4.17	.92	2.73	1	2
130		38	4	8	5	8	15.78	1.33	4.06	.87	2.66	1	2
130		39	4	8	5	8	15.38	1.26	3.95	.83	2.59	1	2
130		40	4	8	5	8	15.00	1.20	3.85	.78	2.52	1	2
135		33	3	14	5	12	18.18	1.46	6.75	.80	3.18	2	2
135		33	3	16	5	12	18.18	1.22	6.47	.80	3.18	1	2
135		34	3	12	5	10	17.64	1.61	6.57	.90	3.08	2	2
135		34	3	14	5	10	17.64	1.32	6.28	.90	3.08	1	2
135		35	3	12	5	10	17.14	1.45	6.10	.85	2.99	1	2
135		36	3	10	5	10	16.66	1.64	5.93	.81	2.91	1	2
135		37	3	10	5	8	16.21	1.56	5.77	.95	2.83	1	2
135		38	3	10	5	8	15.78	1.48	5.62	.90	2.76	1	2
135		39	3	10	5	8	15.38	1.40	5.48	.86	2.69	1	2
135		33	4	10	5	12	18.18	1.57	5.19	.80	3.18	2	2
135		33	4	12	5	12	18.18	1.22	4.85	.80	3.18	1	2
135		35	4	8	5	10	17.14	1.68	4.72	.85	2.99	2	2
135		35	4	10	5	10	17.14	1.30	4.58	.85	2.99	1	2
135		36	4	8	5	10	16.66	1.54	4.45	.81	2.91	1	2
135		37	4	8	5	8	16.21	1.46	4.33	.95	2.83	1	2
135		38	4	8	5	8	15.78	1.38	4.21	.90	2.76	1	2
135		39	4	8	5	8	15.38	1.31	4.11	.86	2.69	1	2
135		40	4	8	5	8	15.00	1.25	4.00	.82	2.62	1	2
140		33	3	14	5	12	18.18	1.54	7.13	.83	3.29	2	2
140		33	3	16	5	12	18.18	1.27	6.71	.83	3.29	1	2
140		34	3	12	5	10	17.64	1.70	6.94	.94	3.20	2	2
140		34	3	14	5	10	17.64	1.36	6.51	.94	3.20	1	2
140		35	3	12	5	10	17.14	1.50	6.33	.88	3.11	1	2
140		36	3	12	5	10	16.66	1.42	6.15	.84	3.02	1	2
140		37	3	10	5	10	16.21	1.61	5.99	.79	2.94	1	2
140		38	3	10	5	8	15.78	1.53	5.83	.94	2.86	1	2
140		39	3	10	5	8	15.38	1.45	5.68	.89	2.79	1	2
140		33	4	10	5	12	18.18	1.66	5.48	.83	3.29	2	2
140		33	4	12	5	12	18.18	1.27	5.03	.83	3.29	1	2
140		34	4	10	5	10	17.64	1.45	4.94	.94	3.20	2	2
140		34	4	12	5	10	17.64	1.19	4.88	.94	3.20	1	2
140		35	4	8	5	10	17.14	1.78	4.99	.88	3.11	2	2
140		35	4	10	5	10	17.14	1.35	4.74	.88	3.11	1	2
140		36	4	8	5	10	16.66	1.60	4.61	.84	3.02	1	2
140		37	4	8	5	10	16.21	1.51	4.49	.79	2.94	1	2
140		38	4	8	5	8	15.78	1.43	4.37	.94	2.86	1	2
140		39	4	8	5	8	15.38	1.36	4.26	.89	2.79	1	2
145		33	3	14	5	12	18.18	1.62	7.51	.86	3.41	2	2
145		33	3	16	5	12	18.18	1.33	7.05	.86	3.41	2	2
145		34	3	12	5	10	17.64	1.79	7.32	.97	3.31	2	2

TABLE IX-B (Cont'd) **Slab 30 x 50 ft** **L /Δ = 300**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
145		34	3	14	5	10	17.64	1.42	6.78	.97	3.31	2	2
145		35	3	12	5	10	17.14	1.57	6.60	.92	3.22	2	2
145		35	3	14	5	10	17.14	1.33	6.55	.92	3.22	1	2
145		36	3	12	5	10	16.66	1.47	6.37	.87	3.13	1	2
145		37	3	12	5	10	16.21	1.39	6.20	.82	3.04	1	2
145		38	3	12	5	10	15.78	1.32	6.04	.78	2.96	1	2
145		39	3	10	5	10	15.38	1.50	5.88	.74	2.89	1	2
145		34	4	10	5	12	17.64	1.53	5.20	.81	3.31	2	2
145		34	4	12	5	12	17.64	1.24	5.06	.81	3.31	1	2
145		35	4	10	5	10	17.14	1.40	4.91	.92	3.22	1	2
145		36	4	8	5	10	16.66	1.66	4.78	.87	3.13	1	2
145		37	4	8	5	10	16.21	1.57	4.65	.82	3.04	1	2
145		38	4	8	5	10	15.78	1.49	4.53	.78	2.96	1	2
145		39	4	8	5	10	15.38	1.41	4.41	.74	2.89	1	2
145		40	4	8	5	8	15.00	1.34	4.30	.88	2.81	1	2
150		34	3	14	5	12	17.64	1.49	7.12	.84	3.43	2	2
150		34	3	16	5	12	17.64	1.28	6.98	.84	3.43	1	2
150		35	3	12	5	10	17.14	1.65	6.95	.95	3.33	2	2
150		35	3	14	5	10	17.14	1.38	6.78	.95	3.33	1	2
150		36	3	12	5	10	16.66	1.52	6.59	.90	3.24	1	2
150		37	3	12	5	10	16.21	1.44	6.41	.85	3.15	1	2
150		38	3	12	5	10	15.78	1.37	6.24	.80	3.06	1	2
150		39	3	12	5	10	15.38	1.30	6.08	.76	2.99	1	2
150		40	3	10	5	10	15.00	1.48	5.93	.72	2.91	1	2
150		34	4	10	5	12	17.64	1.61	5.47	.84	3.43	2	2
150		34	4	12	5	12	17.64	1.28	5.23	.84	3.43	1	2
150		35	4	10	5	10	17.14	1.45	5.08	.95	3.33	1	2
150		36	4	10	5	10	16.66	1.37	4.94	.90	3.24	1	2
150		37	4	10	5	10	16.21	1.30	4.81	.85	3.15	1	2
150		38	4	8	5	10	15.78	1.54	4.68	.80	3.06	1	2
150		39	4	8	5	10	15.38	1.46	4.56	.76	2.99	1	2
150		40	4	8	5	10	15.00	1.39	4.45	.72	2.91	1	2

TABLE IX-C Slab 30 x 50 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	5	3	8	5	8		.54	.21	.24	.09		
4	.01	5	4	8	5	8		.37	.15	.24	.09		
4	.02	7	3	8	5	8		.51	.29	.23	.12		
4	.02	7	4	8	5	8		.36	.20	.23	.12		
4	.03	9	3	8	5	8		.44	.32	.25	.18		
4	.03	9	4	8	5	8		.31	.22	.25	.18		
8	.02	8	3	8	5	8		.68	.43	.30	.19		
8	.02	8	4	8	5	8		.47	.30	.30	.19		
8	.03	11	3	8	5	8		.58	.51	.24	.21		
8	.03	11	4	8	5	8		.40	.35	.24	.21		
8	.04	12	3	8	5	8		.60	.58	.27	.25		
8	.04	12	4	8	5	8		.42	.40	.27	.25		
8	.05	14	3	8	5	8		.54	.60	.27	.31		
8	.05	14	4	8	5	8		.37	.42	.27	.31		
8	.06	16	3	8	5	8		.50	.64	.28	.36		
8	.06	16	4	8	5	8		.35	.44	.28	.36		
12	.03	11	3	8	5	8		.74	.65	.33	.29		
12	.03	11	4	8	5	8		.51	.45	.33	.29		
12	.04	14	3	8	5	8		.64	.72	.27	.31		
12	.04	14	4	8	5	8		.44	.50	.27	.31		
12	.05	15	3	8	5	8		.69	.82	.28	.33		
12	.05	15	4	8	5	8		.47	.57	.28	.33		
12	.06	17	3	8	5	8		.64	.87	.28	.38		
12	.06	17	4	8	5	8		.44	.60	.28	.38		
12	.07	19	3	8	5	8		.61	.93	.28	.43		
12	.07	19	4	8	5	8		.42	.64	.28	.43		
12	.08	22	3	8	5	8		.50	.89	.28	.49		
12	.08	22	4	8	5	8		.35	.62	.28	.49		
12	.09	23	3	8	5	8		.52	.97	.29	.54		
12	.09	23	4	8	5	8		.36	.67	.29	.54		
12		24	3	8	5	8	25.00	.55	1.05	.30	.57	2	1
12		24	3	10	5	8	25.00	.41	.99	.30	.57	2	1
12		25	3	8	5	8	24.00	.47	.94	.30	.60	2	1
12		25	3	10	5	8	24.00	.35	.88	.30	.60	2	1
12		26	3	8	5	8	23.07	.40	.84	.30	.62	2	1
12		26	3	10	5	8	23.07	.30	.79	.30	.62	2	1
12		27	3	8	5	8	22.22	.35	.75	.30	.64	2	1
12		27	3	10	5	8	22.22	.26	.70	.30	.64	2	1
12		23	4	8	5	8	26.08	.44	.82	.30	.55	2	1
12		23	4	10	5	8	26.08	.33	.77	.30	.55	2	1
12		24	4	8	5	8	25.00	.38	.73	.30	.57	2	1
12		24	4	10	5	8	25.00	.28	.68	.30	.57	2	1
12		25	4	8	5	8	24.00	.32	.65	.30	.60	2	1
12		25	4	10	5	8	24.00	.24	.60	.30	.60	2	1
12		26	4	8	5	8	23.07	.27	.58	.30	.62	2	1
12		26	4	10	5	8	23.07	.21	.54	.30	.62	1	1
16	.04	14	3	8	5	8		.78	.87	.34	.38		
16	.04	14	4	8	5	8		.53	.60	.34	.38		
16	.05	16	3	8	5	8		.77	.98	.32	.41		
16	.05	16	4	8	5	8		.53	.68	.32	.41		
16	.06	19	3	8	5	8		.67	1.03	.28	.42		
16	.06	19	4	8	5	8		.46	.71	.28	.42		
16	.07	21	3	8	5	8		.64	1.09	.28	.47		
16	.07	21	4	8	5	8		.44	.75	.28	.47		
16	.08	22	3	8	5	8		.66	1.16	.29	.51		

TABLE IX-C (Cont'd) Slab 30 x 50 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
16	.08	22	4	8	5	8		.45	.80	.29	.51		
16	.09	25	3	8	5	8		.56	1.12	.29	.58		
16	.09	25	4	8	5	8		.39	.78	.29	.58		
16		26	3	8	5	8	23.07	.58	1.21	.30	.62	2	1
16		26	3	10	5	8	23.07	.44	1.14	.30	.62	2	1
16		27	3	8	5	8	22.22	.50	1.09	.30	.64	2	1
16		27	3	10	5	8	22.22	.38	1.03	.30	.64	2	1
16		28	3	8	5	8	21.42	.44	.98	.30	.67	2	1
16		28	3	10	5	8	21.42	.33	.92	.30	.67	2	1
16		29	3	8	5	8	20.68	.38	.89	.30	.69	2	1
16		29	3	10	5	8	20.68	.30	.87	.30	.69	1	1
16		24	4	8	5	8	25.00	.55	1.05	.30	.57	2	1
16		24	4	10	5	8	25.00	.41	.99	.30	.57	2	1
16		25	4	8	5	8	24.00	.47	.94	.30	.60	2	1
16		25	4	10	5	8	24.00	.35	.88	.30	.60	2	1
16		26	4	8	5	8	23.07	.40	.84	.30	.62	2	1
16		26	4	10	5	8	23.07	.30	.79	.30	.62	2	1
16		27	4	8	5	8	22.22	.35	.75	.30	.64	2	1
16		27	4	10	5	8	22.22	.26	.70	.30	.64	2	1
20	.05	17	3	8	5	8		.80	1.09	.35	.48		
20	.05	17	4	8	5	8		.55	.75	.35	.48		
20	.06	19	3	8	5	8		.82	1.25	.34	.51		
20	.06	19	4	8	5	8		.56	.86	.34	.51		
20	.07	21	3	8	5	8		.78	1.31	.31	.53		
20	.07	21	4	8	5	8		.54	.90	.31	.53		
20	.08	24	3	8	5	8		.65	1.26	.29	.55		
20	.08	24	4	8	5	8		.45	.87	.29	.55		
20	.09	26	3	8	5	8		.64	1.35	.29	.60		
20	.09	26	4	8	5	8		.45	.93	.29	.60		
20		27	3	8	5	8	22.22	.67	1.45	.30	.64	2	1
20		27	3	10	5	8	22.22	.50	1.36	.30	.64	2	1
20		28	3	8	5	8	21.42	.58	1.31	.30	.67	2	1
20		28	3	10	5	8	21.42	.44	1.23	.30	.67	2	1
20		29	3	8	5	8	20.68	.51	1.18	.30	.69	2	1
20		29	3	10	5	8	20.68	.38	1.11	.30	.69	2	1
20		30	3	8	5	8	20.00	.45	1.08	.30	.72	2	1
20		30	3	10	5	8	20.00	.35	1.05	.30	.72	1	1
20		26	4	8	5	8	23.07	.53	1.12	.30	.62	2	1
20		26	4	10	5	8	23.07	.40	1.05	.30	.62	2	1
20		27	4	8	5	8	22.22	.46	1.00	.30	.64	2	1
20		27	4	10	5	8	22.22	.35	.94	.30	.64	2	1
20		28	4	8	5	8	21.42	.40	.91	.30	.67	2	1
20		28	4	10	5	8	21.42	.30	.85	.30	.67	2	1
20		29	4	8	5	8	20.68	.35	.82	.30	.69	2	1
20		29	4	10	5	8	20.68	.28	.81	.30	.69	1	1
24	.06	20	3	8	5	8		.82	1.31	.36	.58		
24	.06	20	4	8	5	8		.56	.90	.36	.58		
24	.07	23	3	8	5	8		.74	1.37	.32	.60		
24	.07	23	4	8	5	8		.51	.94	.32	.60		
24	.08	25	3	8	5	8		.72	1.45	.31	.62		
24	.08	25	4	8	5	8		.50	1.00	.31	.62		
24	.09	27	3	8	5	8		.71	1.54	.29	.64		
24	.09	27	4	8	5	8		.49	1.06	.29	.64		
24		28	3	8	5	8	21.42	.74	1.65	.30	.67	2	1
24		28	3	10	5	8	21.42	.55	1.55	.30	.67	2	1
24		29	3	8	5	8	20.68	.64	1.50	.30	.69	2	1

TABLE IX-C (Cont'd) Slab 30 x 50 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		29	3	10	5	8	20.68	.48	1.41	.30	.69	2	1
24		30	3	8	5	8	20.00	.56	1.36	.30	.72	2	1
24		30	3	10	5	8	20.00	.42	1.28	.30	.72	2	1
24		31	3	8	5	8	19.35	.50	1.24	.30	.74	2	1
24		31	3	10	5	8	19.35	.39	1.22	.30	.74	1	1
24		27	4	8	5	8	22.22	.58	1.27	.31	.69	2	2
24		27	4	10	5	8	22.22	.44	1.19	.31	.69	2	2
24		28	4	8	5	8	21.42	.51	1.14	.30	.67	2	1
24		28	4	10	5	8	21.42	.38	1.08	.30	.67	2	1
24		29	4	8	5	8	20.68	.44	1.04	.30	.69	2	1
24		29	4	10	5	8	20.68	.33	.98	.30	.69	1	1
24		30	4	8	5	8	20.00	.39	.94	.30	.72	1	1
28	.07	23	3	8	5	8		.83	1.53	.36	.68		
28	.07	23	4	8	5	8		.57	1.05	.36	.68		
28	.08	26	3	8	5	8		.77	1.61	.33	.70		
28	.08	26	4	8	5	8		.53	1.11	.33	.70		
28	.09	28	3	8	5	8		.76	1.71	.32	.72		
28	.09	28	4	8	5	8		.52	1.18	.32	.72		
28		29	3	8	5	8	20.68	.79	1.83	.32	.75	2	2
28		29	3	10	5	8	20.68	.59	1.71	.32	.75	2	2
28		30	3	8	5	8	20.00	.69	1.66	.30	.72	2	2
28		30	3	10	5	8	20.00	.52	1.56	.30	.72	2	2
28		31	3	8	5	8	19.35	.60	1.51	.30	.74	2	1
28		31	3	10	5	8	19.35	.46	1.43	.30	.74	1	1
28		32	3	8	5	8	18.75	.54	1.38	.30	.76	1	1
28		28	4	8	5	8	21.42	.62	1.39	.34	.77	2	2
28		28	4	10	5	8	21.42	.46	1.31	.34	.77	2	2
28		29	4	8	5	8	20.68	.54	1.26	.32	.75	2	2
28		29	4	10	5	8	20.68	.41	1.19	.32	.75	2	2
28		30	4	8	5	8	20.00	.47	1.15	.30	.72	2	2
28		30	4	10	5	8	20.00	.36	1.10	.30	.72	1	2
28		31	4	8	5	8	19.35	.43	1.07	.30	.74	1	1
32	.08	26	3	8	5	8		.84	1.75	.37	.77		
32	.08	26	4	8	5	8		.58	1.20	.37	.77		
32	.09	29	3	8	5	8		.80	1.85	.34	.80		
32	.09	29	4	8	5	8		.55	1.27	.34	.80		
32		30	3	8	5	8	20.00	.82	1.97	.34	.82	2	2
32		30	3	10	5	8	20.00	.61	1.84	.34	.82	2	2
32		31	3	8	5	8	19.35	.72	1.79	.32	.80	2	2
32		31	3	10	5	8	19.35	.54	1.68	.32	.80	2	2
32		32	3	8	5	8	18.75	.64	1.63	.30	.77	2	2
32		32	3	10	5	8	18.75	.49	1.58	.30	.77	1	2
32		33	3	8	5	8	18.18	.58	1.53	.30	.79	1	1
32		28	4	8	5	8	21.42	.74	1.65	.39	.88	2	2
32		28	4	10	5	8	21.42	.55	1.55	.39	.88	2	2
32		29	4	8	5	8	20.68	.64	1.50	.36	.85	2	2
32		29	4	10	5	8	20.68	.48	1.41	.36	.85	2	2
32		30	4	8	5	8	20.00	.56	1.36	.34	.82	2	2
32		30	4	10	5	8	20.00	.42	1.28	.34	.82	2	2
32		31	4	8	5	8	19.35	.50	1.24	.32	.80	2	2
32		31	4	10	5	8	19.35	.39	1.22	.32	.80	1	2
32		32	4	8	5	8	18.75	.46	1.18	.30	.77	1	2
32		33	4	8	5	8	18.18	.43	1.15	.30	.79	1	1
36	.09	29	3	8	5	8		.85	1.97	.37	.87		
36	.09	29	4	8	5	8		.58	1.35	.37	.87		
36		31	3	8	5	8	19.35	.84	2.09	.36	.90	2	2

TABLE IX-C (Cont'd) **Slab 30 x 50 ft** **L /Δ = 360**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
36		31	3	10	5	8	19.35	.63	1.95	.36	.90	2	2
36		32	3	8	5	8	18.75	.74	1.90	.34	.87	2	2
36		32	3	10	5	8	18.75	.55	1.79	.34	.87	2	2
36		33	3	8	5	8	18.18	.66	1.74	.32	.84	2	2
36		33	3	10	5	8	18.18	.52	1.72	.32	.84	1	2
36		34	3	8	5	8	17.64	.61	1.67	.30	.82	1	2
36		35	3	8	5	8	17.14	.58	1.62	.30	.84	1	1
36		29	4	8	5	8	20.68	.75	1.74	.41	.96	2	2
36		29	4	10	5	8	20.68	.56	1.63	.41	.96	2	2
36		30	4	8	5	8	20.00	.66	1.58	.38	.93	2	2
36		30	4	10	5	8	20.00	.49	1.48	.38	.93	2	2
36		31	4	8	5	8	19.35	.58	1.44	.36	.90	2	2
36		31	4	10	5	8	19.35	.44	1.37	.36	.90	1	2
36		32	4	8	5	8	18.75	.52	1.33	.34	.87	1	2
36		33	4	8	5	8	18.18	.49	1.29	.32	.84	1	2
36		34	4	8	5	8	17.64	.46	1.25	.30	.82	1	2
36		35	4	8	5	8	17.14	.43	1.22	.30	.84	1	1
40		28	3	14	5	8	21.42	.69	2.72	.49	1.11	2	2
40		28	3	16	5	8	21.42	.58	2.62	.49	1.11	2	2
40		29	3	12	5	8	20.68	.74	2.57	.46	1.07	2	2
40		29	3	14	5	8	20.68	.60	2.46	.46	1.07	2	2
40		30	3	10	5	8	20.00	.82	2.47	.43	1.03	2	2
40		30	3	12	5	8	20.00	.64	2.33	.43	1.03	2	2
40		31	3	10	5	8	19.35	.72	2.24	.40	1.00	2	2
40		31	3	12	5	8	19.35	.57	2.13	.40	1.00	2	2
40		32	3	8	5	8	18.75	.85	2.19	.37	.97	2	2
40		32	3	10	5	8	18.75	.64	2.04	.37	.97	2	2
40		33	3	8	5	8	18.18	.75	2.00	.35	.94	2	2
40		33	3	10	5	8	18.18	.58	1.91	.35	.94	1	2
40		34	3	8	5	8	17.64	.68	1.86	.33	.91	1	2
40		26	4	14	5	8	23.07	.63	2.32	.57	1.19	2	2
40		26	4	16	5	8	23.07	.53	2.24	.57	1.19	2	2
40		27	4	12	5	8	22.22	.67	2.18	.53	1.15	2	2
40		27	4	14	5	8	22.22	.55	2.09	.53	1.15	2	2
40		28	4	10	5	8	21.42	.74	2.07	.49	1.11	2	2
40		28	4	12	5	8	21.42	.58	1.96	.49	1.11	2	2
40		29	4	10	5	8	20.68	.64	1.87	.46	1.07	2	2
40		29	4	12	5	8	20.68	.51	1.78	.46	1.07	2	2
40		30	4	8	5	8	20.00	.75	1.81	.43	1.03	2	2
40		30	4	10	5	8	20.00	.56	1.70	.43	1.03	2	2
40		31	4	8	5	8	19.35	.66	1.65	.40	1.00	2	2
40		31	4	10	5	8	19.35	.50	1.55	.40	1.00	2	2
40		32	4	8	5	8	18.75	.58	1.50	.37	.97	2	2
40		32	4	10	5	8	18.75	.46	1.48	.37	.97	1	2
45		29	3	14	5	8	20.68	.70	2.86	.52	1.20	2	2
45		29	3	16	5	8	20.68	.59	2.76	.52	1.20	2	2
45		30	3	12	5	8	20.00	.75	2.72	.48	1.16	2	2
45		30	3	14	5	8	20.00	.62	2.60	.48	1.16	2	2
45		31	3	10	5	8	19.35	.84	2.62	.45	1.12	2	2
45		31	3	12	5	8	19.35	.66	2.47	.45	1.12	2	2
45		32	3	8	5	8	18.75	1.00	2.57	.42	1.09	2	2
45		32	3	10	5	8	18.75	.74	2.38	.42	1.09	2	2
45		33	3	8	5	8	18.18	.88	2.34	.40	1.06	2	2
45		33	3	10	5	8	18.18	.66	2.18	.40	1.06	2	2
45		34	3	8	5	8	17.64	.78	2.14	.37	1.02	2	2
45		34	3	10	5	8	17.64	.61	2.09	.37	1.02	1	2

TABLE IX-C (Cont'd) Slab 30 x 50 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
45		35	3	8	5	8	17.14	.72	2.03	.35	.99	1	2
45		27	4	14	5	8	22.22	.64	2.43	.59	1.29	2	2
45		27	4	16	5	8	22.22	.54	2.34	.59	1.29	2	2
45		28	4	12	5	8	21.42	.68	2.28	.55	1.24	2	2
45		28	4	14	5	8	21.42	.55	2.19	.55	1.24	2	2
45		29	4	10	5	8	20.68	.75	2.18	.52	1.20	2	2
45		29	4	12	5	8	20.68	.59	2.07	.52	1.20	2	2
45		30	4	10	5	8	20.00	.66	1.98	.48	1.16	2	2
45		30	4	12	5	8	20.00	.52	1.88	.48	1.16	2	2
45		31	4	8	5	8	19.35	.77	1.92	.45	1.12	2	2
45		31	4	10	5	8	19.35	.58	1.80	.45	1.12	2	2
45		32	4	8	5	8	18.75	.68	1.75	.42	1.09	2	2
45		32	4	10	5	8	18.75	.52	1.66	.42	1.09	1	2
45		33	4	8	5	8	18.18	.61	1.61	.40	1.06	1	2
50		29	3	14	5	8	20.68	.81	3.29	.57	1.34	2	2
50		29	3	16	5	8	20.68	.68	3.16	.57	1.34	2	2
50		30	3	12	5	8	20.00	.87	3.13	.54	1.29	2	2
50		30	3	14	5	8	20.00	.71	2.98	.54	1.29	2	2
50		31	3	12	5	8	19.35	.76	2.84	.50	1.25	2	2
50		31	3	14	5	8	19.35	.62	2.71	.50	1.25	2	2
50		32	3	10	5	8	18.75	.85	2.74	.47	1.21	2	2
50		32	3	12	5	8	18.75	.67	2.59	.47	1.21	2	2
50		33	3	8	5	8	18.18	1.02	2.70	.44	1.17	2	2
50		33	3	10	5	8	18.18	.75	2.50	.44	1.17	2	2
50		34	3	8	5	8	17.64	.90	2.46	.42	1.14	2	2
50		34	3	10	5	8	17.64	.68	2.32	.42	1.14	1	2
50		35	3	8	5	8	17.14	.80	2.26	.39	1.11	1	2
50		29	4	12	5	8	20.68	.68	2.37	.57	1.34	2	2
50		29	4	14	5	8	20.68	.55	2.27	.57	1.34	2	2
50		30	4	10	5	8	20.00	.75	2.27	.54	1.29	2	2
50		30	4	12	5	8	20.00	.59	2.15	.54	1.29	2	2
50		31	4	8	5	8	19.35	.89	2.21	.50	1.25	2	2
50		31	4	10	5	8	19.35	.66	2.06	.50	1.25	2	2
50		32	4	8	5	8	18.75	.78	2.01	.47	1.21	2	2
50		32	4	10	5	8	18.75	.58	1.88	.47	1.21	2	2
50		33	4	8	5	8	18.18	.69	1.84	.44	1.17	2	2
50		33	4	10	5	8	18.18	.54	1.79	.44	1.17	1	2
50		34	4	8	5	8	17.64	.64	1.74	.42	1.14	1	2
50		35	4	8	5	8	17.14	.60	1.69	.39	1.11	1	2
55		30	3	14	5	8	20.00	.80	3.37	.59	1.42	2	2
55		30	3	16	5	8	20.00	.67	3.24	.59	1.42	2	2
55		31	3	12	5	8	19.35	.86	3.22	.55	1.37	2	2
55		31	3	14	5	8	19.35	.70	3.07	.55	1.37	2	2
55		32	3	10	5	8	18.75	.97	3.11	.52	1.33	2	2
55		32	3	12	5	8	18.75	.76	2.93	.52	1.33	2	2
55		33	3	10	5	8	18.18	.86	2.83	.49	1.29	2	2
55		33	3	12	5	8	18.18	.67	2.68	.49	1.29	2	2
55		34	3	8	5	8	17.64	1.03	2.80	.46	1.25	2	2
55		34	3	10	5	8	17.64	.76	2.59	.46	1.25	2	2
55		35	3	8	5	8	17.14	.91	2.56	.43	1.22	2	2
55		35	3	10	5	8	17.14	.71	2.48	.43	1.22	1	2
55		36	3	8	5	8	16.66	.83	2.41	.41	1.18	1	2
55		30	4	10	5	8	20.00	.85	2.57	.59	1.42	2	2
55		30	4	12	5	8	20.00	.67	2.43	.59	1.42	2	2
55		31	4	10	5	8	19.35	.75	2.33	.55	1.37	2	2
55		31	4	12	5	8	19.35	.59	2.21	.55	1.37	2	2

TABLE IX-C (Cont'd)   Slab 30 x 50 ft   L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
55		32	4	8	5	8	18.75	.89	2.28	.52	1.33	2	2
55		32	4	10	5	8	18.75	.66	2.13	.52	1.33	2	2
55		33	4	8	5	8	18.18	.78	2.08	.49	1.29	2	2
55		33	4	10	5	8	18.18	.59	1.97	.49	1.29	1	2
55		34	4	8	5	8	17.64	.70	1.92	.46	1.25	1	2
55		35	4	8	5	8	17.14	.66	1.86	.43	1.22	1	2
55		36	4	8	5	8	16.66	.62	1.81	.41	1.18	1	2
60		32	3	12	5	8	18.75	.85	3.29	.56	1.45	2	2
60		32	3	14	5	8	18.75	.69	3.13	.56	1.45	2	2
60		33	3	10	5	8	18.18	.96	3.19	.53	1.41	2	2
60		33	3	12	5	8	18.18	.75	3.00	.53	1.41	2	2
60		34	3	8	5	8	17.64	1.16	3.16	.50	1.37	2	2
60		34	3	10	5	8	17.64	.85	2.91	.50	1.37	2	2
60		35	3	8	5	8	17.14	1.03	2.88	.47	1.33	2	2
60		35	3	10	5	8	17.14	.77	2.71	.47	1.33	1	2
60		36	3	8	5	8	16.66	.91	2.64	.45	1.29	2	2
60		36	3	10	5	8	16.66	.73	2.63	.45	1.29	1	2
60		37	3	8	5	8	16.21	.86	2.56	.42	1.26	1	2
60		38	3	8	5	8	15.78	.82	2.49	.40	1.22	1	2
60		32	4	8	5	8	18.75	1.00	2.57	.56	1.45	2	2
60		32	4	10	5	8	18.75	.74	2.38	.56	1.45	2	2
60		33	4	8	5	8	18.18	.88	2.34	.53	1.41	2	2
60		33	4	10	5	8	18.18	.66	2.18	.53	1.41	2	2
60		34	4	8	5	8	17.64	.78	2.14	.50	1.37	2	2
60		34	4	10	5	8	17.64	.61	2.09	.50	1.37	1	2
60		35	4	8	5	8	17.14	.72	2.03	.47	1.33	1	2
60		36	4	8	5	8	16.66	.68	1.97	.45	1.29	1	2
60		37	4	8	5	8	16.21	.65	1.92	.42	1.26	1	2
60		38	4	8	5	8	15.78	.61	1.87	.40	1.22	1	2
65		33	3	10	5	8	18.18	1.08	3.56	.58	1.53	2	2
65		33	3	12	5	8	18.18	.84	3.33	.58	1.53	2	2
65		34	3	10	5	8	17.64	.95	3.24	.54	1.48	2	2
65		34	3	12	5	8	17.64	.74	3.05	.54	1.48	2	2
65		35	3	8	5	8	17.14	1.15	3.22	.51	1.44	2	2
65		35	3	10	5	8	17.14	.84	2.97	.51	1.44	2	2
65		36	3	8	5	8	16.66	1.02	2.95	.48	1.40	2	2
65		36	3	10	5	8	16.66	.79	2.85	.48	1.40	1	2
65		37	3	8	5	8	16.21	.93	2.78	.46	1.36	1	2
65		38	3	8	5	8	15.78	.89	2.70	.43	1.33	1	2
65		39	3	8	5	8	15.38	.84	2.63	.41	1.29	1	2
65		33	4	8	5	8	18.18	.98	2.60	.58	1.53	2	2
65		33	4	10	5	8	18.18	.73	2.42	.58	1.53	2	2
65		34	4	8	5	8	17.64	.87	2.38	.54	1.48	2	2
65		34	4	10	5	8	17.64	.66	2.27	.54	1.48	1	2
65		35	4	8	5	8	17.14	.78	2.20	.51	1.44	1	2
65		36	4	8	5	8	16.66	.74	2.14	.48	1.40	1	2
65		37	4	8	5	8	16.21	.70	2.08	.46	1.36	1	2
65		38	4	8	5	8	15.78	.66	2.03	.43	1.33	1	2
65		39	4	8	5	8	15.38	.63	1.97	.41	1.29	1	2
70		34	3	10	5	8	17.64	1.05	3.59	.58	1.60	2	2
70		34	3	12	5	8	17.64	.82	3.36	.58	1.60	2	2
70		35	3	10	5	8	17.14	.93	3.28	.55	1.55	2	2
70		35	3	12	5	8	17.14	.75	3.16	.55	1.55	1	2
70		36	3	8	5	8	16.66	1.13	3.27	.52	1.51	2	2
70		36	3	10	5	8	16.66	.85	3.07	.52	1.51	1	2

TABLE IX-C (Cont'd)   Slab 30 x 50 ft   L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
70		37	3	8	5	8	16.21	1.01	3.00	.49	1.47	2	2
70		37	3	10	5	8	16.21	.80	2.99	.49	1.47	1	2
70		38	3	8	5	8	15.78	.95	2.91	.47	1.43	1	2
70		39	3	8	5	8	15.38	.91	2.84	.44	1.39	1	2
70		40	3	8	5	8	15.00	.86	2.77	.42	1.36	1	2
70		34	4	8	5	8	17.64	.96	2.63	.58	1.60	2	2
70		34	4	10	5	8	17.64	.71	2.44	.58	1.60	2	2
70		35	4	8	5	8	17.14	.86	2.40	.55	1.55	2	2
70		35	4	10	5	8	17.14	.67	2.37	.55	1.55	1	2
70		36	4	8	5	8	16.66	.80	2.30	.52	1.51	1	2
70		37	4	8	5	8	16.21	.75	2.24	.49	1.47	1	2
70		38	4	8	5	8	15.78	.71	2.18	.47	1.43	1	2
70		39	4	8	5	8	15.38	.68	2.13	.44	1.39	1	2
70		40	4	8	5	8	15.00	.64	2.07	.42	1.36	1	2
75		35	3	10	5	8	17.14	1.03	3.60	.59	1.66	2	2
75		35	3	12	5	8	17.14	.80	3.39	.59	1.66	1	2
75		36	3	8	5	8	16.66	1.25	3.60	.56	1.62	2	2
75		36	3	10	5	8	16.66	.91	3.30	.56	1.62	2	2
75		37	3	8	5	8	16.21	1.11	3.30	.53	1.57	2	2
75		37	3	10	5	8	16.21	.86	3.20	.53	1.57	1	2
75		38	3	8	5	8	15.78	1.02	3.12	.50	1.53	1	2
75		39	3	8	5	8	15.38	.97	3.04	.47	1.49	1	2
75		40	3	8	5	8	15.00	.92	2.96	.45	1.45	1	2
75		41	3	8	5	8	14.63	.88	2.89	.43	1.42	1	2
75		34	4	8	5	8	17.64	1.06	2.89	.63	1.71	2	2
75		34	4	10	5	8	17.64	.78	2.67	.63	1.71	2	2
75		35	4	8	5	8	17.14	.94	2.64	.59	1.66	2	2
75		35	4	10	5	8	17.14	.72	2.54	.59	1.66	1	2
75		36	4	8	5	8	16.66	.85	2.47	.56	1.62	1	2
75		37	4	8	5	8	16.21	.81	2.40	.53	1.57	1	2
75		38	4	8	5	8	15.78	.77	2.34	.50	1.53	1	2
75		39	4	8	5	8	15.38	.73	2.28	.47	1.49	1	2
75		40	4	8	5	8	15.00	.69	2.22	.45	1.45	1	2
80		36	3	10	5	8	16.66	1.00	3.61	.60	1.72	2	2
80		36	3	12	5	8	16.66	.81	3.51	.60	1.72	1	2
80		37	3	8	5	8	16.21	1.22	3.61	.56	1.68	2	2
80		37	3	10	5	8	16.21	.92	3.42	.56	1.68	1	2
80		38	3	8	5	8	15.78	1.09	3.33	.53	1.63	1	2
80		39	3	8	5	8	15.38	1.04	3.24	.51	1.59	1	2
80		40	3	8	5	8	15.00	.98	3.16	.48	1.55	1	2
80		41	3	8	5	8	14.63	.94	3.08	.46	1.51	1	2
80		42	3	8	5	8	14.28	.89	3.01	.44	1.48	1	2
80		34	4	8	5	8	17.64	1.16	3.16	.67	1.82	2	2
80		34	4	10	5	8	17.64	.85	2.91	.67	1.82	2	2
80		35	4	8	5	8	17.14	1.03	2.88	.63	1.77	2	2
80		35	4	10	5	8	17.14	.77	2.71	.63	1.77	1	2
80		36	4	8	5	8	16.66	.91	2.64	.60	1.72	2	2
80		36	4	10	5	8	16.66	.73	2.63	.60	1.72	1	2
80		37	4	8	5	8	16.21	.86	2.56	.56	1.68	1	2
80		38	4	8	5	8	15.78	.82	2.49	.53	1.63	1	2
80		39	4	8	5	8	15.38	.78	2.43	.51	1.59	1	2
80		40	4	8	5	8	15.00	.74	2.37	.48	1.55	1	2
85		37	3	8	5	8	16.21	1.33	3.94	.60	1.78	2	2
85		37	3	10	5	8	16.21	.98	3.63	.60	1.78	1	2
85		38	3	8	5	8	15.78	1.18	3.61	.57	1.73	2	2
85		38	3	10	5	8	15.78	.93	3.54	.57	1.73	1	2

TABLE IX-C (Cont'd) Slab 30 x 50 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
85		39	3	8	5	8	15.38	1.10	3.45	.54	1.69	1	2
85		40	3	8	5	8	15.00	1.05	3.36	.51	1.65	1	2
85		41	3	8	5	8	14.63	1.00	3.28	.49	1.61	1	2
85		42	3	8	5	8	14.28	.95	3.20	.46	1.57	1	2
85		43	3	8	5	8	13.95	.90	3.12	.44	1.53	1	2
85		35	4	8	5	8	17.14	1.12	3.14	.67	1.88	2	2
85		35	4	10	5	8	17.14	.82	2.89	.67	1.88	2	2
85		36	4	8	5	8	16.66	.99	2.87	.63	1.83	2	2
85		36	4	10	5	8	16.66	.77	2.80	.63	1.83	1	2
85		37	4	8	5	8	16.21	.92	2.72	.60	1.78	1	2
85		38	4	8	5	8	15.78	.87	2.65	.57	1.73	1	2
85		39	4	8	5	8	15.38	.82	2.58	.54	1.69	1	2
85		40	4	8	5	8	15.00	.78	2.52	.51	1.65	1	2
85		41	4	8	5	8	14.63	.75	2.46	.49	1.61	1	2
90		38	3	8	5	8	15.78	1.28	3.91	.60	1.84	2	2
90		38	3	10	5	8	15.78	.98	3.74	.60	1.84	1	2
90		39	3	8	5	8	15.38	1.17	3.65	.57	1.79	1	2
90		40	3	8	5	8	15.00	1.11	3.56	.54	1.74	1	2
90		41	3	8	5	8	14.63	1.05	3.47	.52	1.70	1	2
90		42	3	8	5	8	14.28	1.00	3.39	.49	1.66	1	2
90		43	3	8	5	8	13.95	.96	3.31	.47	1.62	1	2
90		44	3	8	5	8	13.63	.92	3.23	.45	1.59	1	2
90		35	4	8	5	8	17.14	1.21	3.40	.71	1.99	2	2
90		35	4	10	5	8	17.14	.89	3.12	.71	1.99	2	2
90		36	4	8	5	8	16.66	1.07	3.10	.67	1.94	2	2
90		36	4	10	5	8	16.66	.82	2.96	.67	1.94	1	2
90		37	4	8	5	8	16.21	.97	2.88	.63	1.89	1	2
90		38	4	8	5	8	15.78	.92	2.81	.60	1.84	1	2
90		39	4	8	5	8	15.38	.87	2.74	.57	1.79	1	2
90		40	4	8	5	8	15.00	.83	2.67	.54	1.74	1	2
90		41	4	8	5	8	14.63	.79	2.60	.52	1.70	1	2
95		36	3	10	5	8	16.66	1.27	4.59	.71	2.05	2	2
95		36	3	12	5	8	16.66	.98	4.27	.71	2.05	2	2
95		38	3	8	5	8	15.78	1.39	4.23	.63	1.94	2	2
95		38	3	10	5	8	15.78	1.04	3.95	.63	1.94	1	2
95		39	3	8	5	8	15.38	1.24	3.88	.60	1.89	2	2
95		39	3	10	5	8	15.38	.98	3.85	.60	1.89	1	2
95		40	3	8	5	8	15.00	1.17	3.76	.57	1.84	1	2
95		41	3	8	5	8	14.63	1.11	3.66	.54	1.80	1	2
95		42	3	8	5	8	14.28	1.06	3.58	.52	1.75	1	2
95		43	3	8	5	8	13.95	1.01	3.49	.49	1.71	1	2
95		36	4	8	5	8	16.66	1.16	3.35	.71	2.05	2	2
95		36	4	10	5	8	16.66	.87	3.13	.71	2.05	1	2
95		37	4	8	5	8	16.21	1.03	3.07	.67	1.99	2	2
95		37	4	10	5	8	16.21	.82	3.04	.67	1.99	1	2
95		38	4	8	5	8	15.78	.97	2.96	.63	1.94	1	2
95		39	4	8	5	8	15.38	.92	2.89	.60	1.89	1	2
95		40	4	8	5	8	15.00	.88	2.82	.57	1.84	1	2
95		41	4	8	5	8	14.63	.83	2.75	.54	1.80	1	2
95		42	4	8	5	8	14.28	.79	2.68	.52	1.75	1	2
100		37	3	10	5	8	16.21	1.22	4.51	.71	2.10	2	2
100		37	3	12	5	8	16.21	.96	4.27	.71	2.10	1	2
100		38	3	8	5	8	15.78	1.50	4.57	.67	2.04	2	2
100		38	3	10	5	8	15.78	1.09	4.16	.67	2.04	1	2
100		39	3	8	5	8	15.38	1.34	4.18	.63	1.99	2	2
100		39	3	10	5	8	15.38	1.04	4.05	.63	1.99	1	2

TABLE IX-C (Cont'd) Slab 30 x 50 ft L'/Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
100		40	3	8	5	8	15.00	1.23	3.95	.60	1.94	1	2
100		41	3	8	5	8	14.63	1.17	3.86	.57	1.89	1	2
100		42	3	8	5	8	14.28	1.12	3.76	.55	1.85	1	2
100		43	3	8	5	8	13.95	1.07	3.68	.52	1.80	1	2
100		36	4	8	5	8	16.66	1.25	3.60	.75	2.16	2	2
100		36	4	10	5	8	16.66	.91	3.30	.75	2.16	2	2
100		37	4	8	5	8	16.21	1.11	3.30	.71	2.10	2	2
100		37	4	10	5	8	16.21	.86	3.20	.71	2.10	1	2
100		38	4	8	5	8	15.78	1.02	3.12	.67	2.04	1	2
100		39	4	8	5	8	15.38	.97	3.04	.63	1.99	1	2
100		40	4	8	5	8	15.00	.92	2.96	.60	1.94	1	2
100		41	4	8	5	8	14.63	.88	2.89	.57	1.89	1	2
100		42	4	8	5	8	14.28	.84	2.82	.55	1.85	1	2
105		37	3	10	5	8	16.21	1.30	4.84	.74	2.20	2	2
105		37	3	12	5	8	16.21	1.01	4.50	.74	2.20	2	2
105		39	3	8	5	8	15.38	1.44	4.49	.67	2.09	2	2
105		39	3	10	5	8	15.38	1.09	4.26	.67	2.09	1	2
105		40	3	8	5	8	15.00	1.29	4.15	.63	2.04	1	2
105		41	3	8	5	8	14.63	1.23	4.05	.60	1.99	1	2
105		42	3	8	5	8	14.28	1.17	3.95	.57	1.94	1	2
105		43	3	8	5	8	13.95	1.12	3.86	.55	1.89	1	2
105		44	3	8	5	8	13.63	1.07	3.77	.52	1.85	1	2
105		37	4	8	5	8	16.21	1.19	3.53	.74	2.20	2	2
105		37	4	10	5	8	16.21	.91	3.36	.74	2.20	1	2
105		38	4	8	5	8	15.78	1.07	3.28	.70	2.14	1	2
105		39	4	8	5	8	15.38	1.02	3.19	.67	2.09	1	2
105		40	4	8	5	8	15.00	.97	3.11	.63	2.04	1	2
105		41	4	8	5	8	14.63	.92	3.04	.60	1.99	1	2
105		42	4	8	5	8	14.28	.88	2.96	.57	1.94	1	2
105		43	4	8	5	8	13.95	.84	2.89	.55	1.89	1	2
110		37	3	10	5	8	16.21	1.40	5.18	.78	2.31	2	2
110		37	3	12	5	8	16.21	1.08	4.79	.78	2.31	2	2
110		39	3	8	5	8	15.38	1.54	4.81	.70	2.19	2	2
110		39	3	10	5	8	15.38	1.14	4.46	.70	2.19	1	2
110		40	3	8	5	8	15.00	1.37	4.41	.66	2.13	2	2
110		40	3	10	5	8	15.00	1.08	4.35	.66	2.13	1	2
110		41	3	8	5	8	14.63	1.29	4.24	.63	2.08	1	2
110		42	3	8	5	8	14.28	1.23	4.14	.60	2.03	1	2
110		43	3	8	5	8	13.95	1.17	4.05	.57	1.98	1	2
110		44	3	8	5	8	13.63	1.12	3.95	.55	1.94	1	2
110		37	4	8	5	8	16.21	1.27	3.77	.78	2.31	2	2
110		37	4	10	5	8	16.21	.95	3.53	.78	2.31	1	2
110		38	4	8	5	8	15.78	1.13	3.46	.74	2.25	2	2
110		38	4	10	5	8	15.78	.90	3.43	.74	2.25	1	2
110		39	4	8	5	8	15.38	1.07	3.34	.70	2.19	1	2
110		40	4	8	5	8	15.00	1.02	3.26	.66	2.13	1	2
110		41	4	8	5	8	14.63	.97	3.18	.63	2.08	1	2
110		42	4	8	5	8	14.28	.92	3.11	.60	2.03	1	2
110		43	4	8	5	8	13.95	.88	3.03	.57	1.98	1	2
115		38	3	10	5	8	15.78	1.33	5.05	.77	2.35	2	2
115		38	3	12	5	8	15.78	1.05	4.79	.77	2.35	1	2
115		40	3	8	5	8	15.00	1.47	4.71	.69	2.23	2	2
115		40	3	10	5	8	15.00	1.13	4.55	.69	2.23	1	2
115		41	3	8	5	8	14.63	1.35	4.44	.66	2.18	1	2
115		42	3	8	5	8	14.28	1.29	4.33	.63	2.12	1	2
115		43	3	8	5	8	13.95	1.23	4.23	.60	2.07	1	2

TABLE IX-C (Cont'd) **Slab 30 x 50 ft** **L /Δ = 360**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
115		44	3	8	5	8	13.63	1.17	4.13	.57	2.03	1	2
115		45	3	8	5	8	13.33	1.12	4.04	.55	1.98	1	2
115		37	4	8	5	8	16.21	1.36	4.02	.81	2.41	2	2
115		37	4	10	5	8	16.21	.99	3.69	.81	2.41	1	2
115		38	4	8	5	8	15.78	1.21	3.68	.77	2.35	2	2
115		38	4	10	5	8	15.78	.94	3.59	.77	2.35	1	2
115		39	4	8	5	8	15.38	1.12	3.50	.73	2.29	1	2
115		40	4	8	5	8	15.00	1.06	3.41	.69	2.23	1	2
115		41	4	8	5	8	14.63	1.01	3.33	.66	2.18	1	2
115		42	4	8	5	8	14.28	.96	3.25	.63	2.12	1	2
115		43	4	8	5	8	13.95	.92	3.17	.60	2.07	1	2
120		38	3	10	5	8	15.78	1.41	5.38	.80	2.45	2	2
120		38	3	12	5	8	15.78	1.09	4.99	.80	2.45	1	2
120		39	3	10	5	8	15.38	1.26	4.93	.76	2.39	2	2
120		39	3	12	5	8	15.38	1.04	4.87	.76	2.39	1	2
120		40	3	8	5	8	15.00	1.56	5.01	.72	2.33	2	2
120		40	3	10	5	8	15.00	1.18	4.74	.72	2.33	1	2
120		41	3	8	5	8	14.63	1.41	4.63	.69	2.27	1	2
120		42	3	8	5	8	14.28	1.34	4.52	.66	2.22	1	2
120		43	3	8	5	8	13.95	1.28	4.41	.63	2.17	1	2
120		44	3	8	5	8	13.63	1.22	4.31	.60	2.12	1	2
120		38	4	8	5	8	15.78	1.28	3.91	.80	2.45	2	2
120		38	4	10	5	8	15.78	.98	3.74	.80	2.45	1	2
120		39	4	8	5	8	15.38	1.17	3.65	.76	2.39	1	2
120		40	4	8	5	8	15.00	1.11	3.56	.72	2.33	1	2
120		41	4	8	5	8	14.63	1.05	3.47	.69	2.27	1	2
120		42	4	8	5	8	14.28	1.00	3.39	.66	2.22	1	2
120		43	4	8	5	8	13.95	.96	3.31	.63	2.17	1	2
120		44	4	8	5	8	13.63	.92	3.23	.60	2.12	1	2
125		38	3	10	5	8	15.78	1.50	5.71	.84	2.55	2	2
125		38	3	12	5	8	15.78	1.15	5.26	.84	2.55	2	2
125		39	3	10	5	8	15.38	1.34	5.23	.79	2.49	2	2
125		39	3	12	5	8	15.38	1.08	5.07	.79	2.49	1	2
125		40	3	10	5	8	15.00	1.23	4.94	.75	2.43	1	2
125		41	3	10	5	8	14.63	1.17	4.82	.72	2.37	1	2
125		42	3	8	5	8	14.28	1.40	4.71	.68	2.31	1	2
125		43	3	8	5	8	13.95	1.33	4.60	.65	2.26	1	2
125		44	3	8	5	8	13.63	1.27	4.49	.62	2.20	1	2
125		38	4	8	5	8	15.78	1.36	4.15	.84	2.55	2	2
125		38	4	10	5	8	15.78	1.02	3.90	.84	2.55	1	2
125		39	4	8	5	8	15.38	1.22	3.81	.79	2.49	2	2
125		39	4	10	5	8	15.38	.97	3.80	.79	2.49	1	2
125		40	4	8	5	8	15.00	1.15	3.71	.75	2.43	1	2
125		41	4	8	5	8	14.63	1.10	3.62	.72	2.37	1	2
125		42	4	8	5	8	14.28	1.05	3.53	.68	2.31	1	2
125		43	4	8	5	8	13.95	1.00	3.45	.65	2.26	1	2
125		44	4	8	5	8	13.63	.95	3.37	.62	2.20	1	2
130		37	3	12	5	10	16.21	1.37	6.08	.73	2.73	2	2
130		37	3	14	5	10	16.21	1.10	5.70	.73	2.73	2	2
130		39	3	10	5	8	15.38	1.42	5.53	.83	2.59	2	2
130		39	3	12	5	8	15.38	1.12	5.27	.83	2.59	1	2
130		40	3	10	5	8	15.00	1.28	5.14	.78	2.52	1	2
130		41	3	10	5	8	14.63	1.22	5.02	.75	2.46	1	2
130		42	3	10	5	8	14.28	1.16	4.90	.71	2.40	1	2
130		43	3	8	5	8	13.95	1.39	4.78	.68	2.35	1	2
130		44	3	8	5	8	13.63	1.32	4.67	.65	2.29	1	2

TABLE XI-C Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
130		38	4	8	5	10	15.78	1.44	4.40	.70	2.66	2	2
130		38	4	10	5	10	15.78	1.06	4.06	.70	2.66	1	2
130		39	4	8	5	8	15.38	1.29	4.03	.83	2.59	2	2
130		39	4	10	5	8	15.38	1.01	3.95	.83	2.59	1	2
130		40	4	8	5	8	15.00	1.20	3.85	.78	2.52	1	2
130		41	4	8	5	8	14.63	1.14	3.76	.75	2.46	1	2
130		42	4	8	5	8	14.28	1.09	3.67	.71	2.40	1	2
130		43	4	8	5	8	13.95	1.04	3.58	.68	2.35	1	2
130		44	4	8	5	8	13.63	.99	3.50	.65	2.29	1	2
135		38	3	12	5	10	15.78	1.28	5.87	.72	2.76	2	2
135		38	3	14	5	10	15.78	1.05	5.62	.72	2.76	1	2
135		39	3	10	5	8	15.38	1.50	5.85	.86	2.69	2	2
135		39	3	12	5	8	15.38	1.17	5.48	.86	2.69	1	2
135		40	3	10	5	8	15.00	1.34	5.37	.82	2.62	2	2
135		40	3	12	5	8	15.00	1.11	5.34	.82	2.62	1	2
135		41	3	10	5	8	14.63	1.27	5.21	.78	2.56	1	2
135		42	3	10	5	8	14.28	1.21	5.08	.74	2.49	1	2
135		43	3	10	5	8	13.95	1.15	4.97	.70	2.44	1	2
135		44	3	10	5	8	13.63	1.10	4.85	.67	2.38	1	2
135		39	4	8	5	10	15.38	1.36	4.26	.69	2.69	2	2
135		39	4	10	5	10	15.38	1.05	4.11	.69	2.69	1	2
135		40	4	8	5	8	15.00	1.25	4.00	.82	2.62	1	2
135		41	4	8	5	8	14.63	1.19	3.90	.78	2.56	1	2
135		42	4	8	5	8	14.28	1.13	3.81	.74	2.49	1	2
135		43	4	8	5	8	13.95	1.08	3.72	.70	2.44	1	2
135		44	4	8	5	8	13.63	1.03	3.64	.67	2.38	1	2
135		45	4	8	5	8	13.33	.98	3.56	.64	2.33	1	2
140		38	3	12	5	10	15.78	1.35	6.19	.75	2.86	2	2
140		38	3	14	5	10	15.78	1.09	5.83	.75	2.86	1	2
140		39	3	10	5	8	15.38	1.58	6.18	.89	2.79	2	2
140		39	3	12	5	8	15.38	1.21	5.68	.89	2.79	2	2
140		40	3	10	5	8	15.00	1.41	5.66	.85	2.72	2	2
140		40	3	12	5	8	15.00	1.15	5.54	.85	2.72	1	2
140		41	3	10	5	8	14.63	1.31	5.40	.80	2.65	1	2
140		42	3	10	5	8	14.28	1.25	5.27	.77	2.59	1	2
140		43	3	10	5	8	13.95	1.19	5.15	.73	2.53	1	2
140		44	3	10	5	8	13.63	1.14	5.03	.70	2.47	1	2
140		39	4	8	5	10	15.38	1.44	4.49	.71	2.79	2	2
140		39	4	10	5	10	15.38	1.09	4.26	.71	2.79	1	2
140		40	4	8	5	8	15.00	1.29	4.15	.85	2.72	1	2
140		41	4	8	5	8	14.63	1.23	4.05	.80	2.65	1	2
140		42	4	8	5	8	14.28	1.17	3.95	.77	2.59	1	2
140		43	4	8	5	8	13.95	1.12	3.86	.73	2.53	1	2
140		44	4	8	5	8	13.63	1.07	3.77	.70	2.47	1	2
140		45	4	8	5	8	13.33	1.02	3.69	.67	2.41	1	2
145		38	3	12	5	10	15.78	1.43	6.52	.78	2.96	2	2
145		38	3	14	5	10	15.78	1.14	6.09	.78	2.96	2	2
145		40	3	10	5	10	15.00	1.49	5.96	.70	2.81	2	2
145		40	3	12	5	10	15.00	1.19	5.73	.70	2.81	1	2
145		41	3	10	5	8	14.63	1.36	5.59	.83	2.75	1	2
145		42	3	10	5	8	14.28	1.30	5.46	.79	2.68	1	2
145		43	3	10	5	8	13.95	1.24	5.33	.76	2.62	1	2
145		44	3	10	5	8	13.63	1.18	5.21	.72	2.56	1	2
145		45	3	10	5	8	13.33	1.13	5.10	.69	2.50	1	2
145		37	4	10	5	10	16.21	1.37	5.09	.82	3.04	2	2

TABLE XI-C (Cont'd) Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
145		37	4	12	5	10	16.21	1.06	4.72	.82	3.04	2	2
145		39	4	8	5	10	15.38	1.51	4.73	.74	2.89	2	2
145		39	4	10	5	10	15.38	1.13	4.41	.74	2.89	1	2
145		40	4	8	5	8	15.00	1.35	4.34	.88	2.81	2	2
145		40	4	10	5	8	15.00	1.07	4.30	.88	2.81	1	2
145		41	4	8	5	8	14.63	1.28	4.19	.83	2.75	1	2
145		42	4	8	5	8	14.28	1.22	4.09	.79	2.68	1	2
145		43	4	8	5	8	13.95	1.16	4.00	.76	2.62	1	2
145		44	4	8	5	8	13.63	1.11	3.91	.72	2.56	1	2
150		38	3	12	5	10	15.78	1.50	6.85	.80	3.06	2	2
150		38	3	14	5	10	15.78	1.20	6.39	.80	3.06	2	2
150		39	3	12	5	10	15.38	1.34	6.27	.76	2.99	2	2
150		39	3	14	5	10	15.38	1.11	6.08	.76	2.99	1	2
150		40	3	10	5	10	15.00	1.56	6.27	.72	2.91	2	2
150		40	3	12	5	10	15.00	1.23	5.93	.72	2.91	1	2
150		41	3	10	5	8	14.63	1.41	5.79	.86	2.84	1	2
150		42	3	10	5	8	14.28	1.34	5.65	.82	2.77	1	2
150		43	3	10	5	8	13.95	1.28	5.52	.78	2.71	1	2
150		44	3	10	5	8	13.63	1.22	5.39	.75	2.65	1	2
150		38	4	10	5	10	15.78	1.28	4.89	.80	3.06	2	2
150		38	4	12	5	10	15.78	1.02	4.68	.80	3.06	1	2
150		39	4	8	5	10	15.38	1.59	4.97	.76	2.99	2	2
150		39	4	10	5	10	15.38	1.17	4.56	.76	2.99	1	2
150		40	4	8	5	10	15.00	1.42	4.56	.72	2.91	2	2
150		40	4	10	5	10	15.00	1.11	4.45	.72	2.91	1	2
150		41	4	8	5	8	14.63	1.32	4.34	.86	2.84	1	2
150		42	4	8	5	8	14.28	1.26	4.24	.82	2.77	1	2
150		43	4	8	5	8	13.95	1.20	4.14	.78	2.71	1	2
150		44	4	8	5	8	13.63	1.15	4.04	.75	2.65	1	2

TABLE X-A Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	5	4	8	6	10		.79	.31	.34	.17		
4	.01	5	4	8	7	8		.79	.31	.37	.14		
4	.02	7	4	8	6	8		.75	.42	.36	.20		
4	.02	7	4	8	7	8		.75	.42	.31	.17		
4	.03	9	4	8	6	8		.65	.47	.31	.22		
4	.03	9	4	8	7	8		.65	.47	.26	.19		
8	.02	8	4	8	6	10		.99	.63	.43	.34		
8	.02	8	4	8	7	8		.99	.63	.46	.29		
8	.03	10	4	8	6	8		.94	.75	.47	.38		
8	.03	10	4	8	7	8		.94	.75	.41	.32		
8	.04	12	4	8	6	8		.88	.85	.43	.41		
8	.04	12	4	8	7	8		.88	.85	.36	.35		
8	.05	14	4	8	6	8		.79	.88	.38	.42		
8	.05	14	4	8	7	8		.79	.88	.32	.36		
8	.06	16	4	8	6	8		.73	.94	.34	.44		
8	.06	16	4	8	7	8		.73	.94	.29	.38		
12	.03	11	4	8	6	10		1.09	.95	.47	.52		
12	.03	11	4	8	7	8		1.09	.95	.50	.44		
12	.04	13	4	8	6	8		1.01	1.05	.53	.55		
12	.04	13	4	8	7	8		1.01	1.05	.45	.47		
12	.05	15	4	8	6	8		1.01	1.21	.49	.59		
12	.05	15	4	8	7	8		1.01	1.21	.42	.51		
12	.06	17	4	8	6	8		.93	1.27	.45	.62		
12	.06	17	4	8	7	8		.93	1.27	.39	.53		
12	.07	19	4	8	6	8		.79	1.20	.40	.62		
12	.07	19	4	8	7	8		.79	1.20	.34	.53		
12	.08	21	4	8	6	8		.77	1.30	.38	.64		
12	.08	21	4	8	7	8		.77	1.30	.32	.55		
12	.09	22	4	8	6	8		.80	1.41	.38	.67		
12	.09	22	4	8	7	8		.80	1.41	.32	.57		
12		24	4	8	6	8	36.00	.71	1.36	.34	.67	2	2
12		24	4	10	6	8	36.00	.53	1.28	.34	.67	2	2
12		25	4	8	6	8	34.56	.60	1.21	.32	.64	2	2
12		25	4	10	6	8	34.56	.46	1.16	.32	.64	1	2
12		26	4	8	6	8	33.23	.53	1.11	.30	.62	1	1
12		27	4	8	6	8	32.00	.49	1.07	.30	.64	1	1
12		24	4	8	7	8	36.00	.71	1.36	.30	.57	2	1
12		24	4	10	7	8	36.00	.53	1.28	.30	.57	2	1
12		25	4	8	7	8	34.56	.60	1.21	.30	.60	2	1
12		25	4	10	7	8	34.56	.46	1.16	.30	.60	1	1
12		26	4	8	7	8	33.23	.53	1.11	.30	.62	1	1
12		27	4	8	7	8	32.00	.49	1.07	.30	.64	1	1
16	.04	14	4	8	6	8		1.14	1.27	.61	.69		
16	.04	14	4	8	7	8		1.14	1.27	.53	.59		
16	.05	16	4	8	6	8		1.13	1.44	.57	.74		
16	.05	16	4	8	7	8		1.13	1.44	.49	.63		
16	.06	18	4	8	6	8		1.04	1.50	.53	.76		
16	.06	18	4	8	7	8		1.04	1.50	.45	.65		
16	.07	20	4	8	6	8		.99	1.58	.49	.79		
16	.07	20	4	8	7	8		.99	1.58	.42	.68		
16	.08	22	4	8	6	8		.96	1.70	.46	.82		
16	.08	22	4	8	7	8		.96	1.70	.40	.70		
16	.09	24	4	8	6	8		.84	1.63	.43	.82		
16	.09	24	4	8	7	8		.84	1.63	.36	.70		
16		25	4	8	6	8	34.56	.88	1.77	.42	.85	2	2

TABLE X-A (Cont'd) Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
16		25	4	10	6	8	34.56	.66	1.65	.42	.85	2	2
16		26	4	8	6	8	33.23	.75	1.57	.39	.82	2	2
16		26	4	10	6	8	33.23	.57	1.48	.39	.82	1	2
16		27	4	8	6	8	32.00	.66	1.43	.36	.79	1	2
16		28	4	8	6	8	30.85	.61	1.38	.34	.76	1	2
16		29	4	8	6	8	29.79	.57	1.33	.31	.74	1	2
16		30	4	8	6	8	28.80	.53	1.28	.30	.72	1	1
16		25	4	8	7	8	34.56	.88	1.77	.36	.73	2	2
16		25	4	10	7	8	34.56	.66	1.65	.36	.73	2	2
16		26	4	8	7	8	33.23	.75	1.57	.34	.70	2	2
16		26	4	10	7	8	33.23	.57	1.48	.34	.70	1	2
16		27	4	8	7	8	32.00	.66	1.43	.31	.68	1	2
16		28	4	8	7	8	30.85	.61	1.38	.30	.67	1	1
20	.05	17	4	8	6	8		1.17	1.59	.63	.86		
20	.05	17	4	8	7	8		1.17	1.59	.54	.74		
20	.06	19	4	8	6	8		1.21	1.84	.60	.92		
20	.06	19	4	8	7	8		1.21	1.84	.52	.79		
20	.07	21	4	8	6	8		1.15	1.93	.57	.95		
20	.07	21	4	8	7	8		1.15	1.93	.48	.82		
20	.08	23	4	8	6	8		.99	1.83	.52	.95		
20	.08	23	4	8	7	8		.99	1.83	.44	.82		
20	.09	25	4	8	6	8		.98	1.96	.49	.99		
20	.09	25	4	8	7	8		.98	1.96	.42	.85		
20		26	4	8	6	8	33.23	1.02	2.12	.49	1.03	2	2
20		26	4	10	6	8	33.23	.75	1.97	.49	1.03	2	2
20		27	4	8	6	8	32.00	.87	1.89	.46	.99	2	2
20		27	4	10	6	8	32.00	.66	1.79	.46	.99	1	2
20		28	4	8	6	8	30.85	.77	1.72	.42	.95	1	2
20		29	4	8	6	8	29.79	.71	1.66	.39	.92	1	2
20		30	4	8	6	8	28.80	.67	1.61	.37	.89	1	2
20		31	4	8	6	8	27.87	.62	1.56	.34	.86	1	2
20		32	4	8	6	8	27.00	.59	1.51	.32	.83	1	2
20		26	4	8	7	8	33.23	1.02	2.12	.42	.88	2	2
20		26	4	10	7	8	33.23	.75	1.97	.42	.88	2	2
20		27	4	8	7	8	32.00	.87	1.89	.39	.85	2	2
20		27	4	10	7	8	32.00	.66	1.79	.39	.85	1	2
20		28	4	8	7	8	30.85	.77	1.72	.36	.82	1	2
20		29	4	8	7	8	29.79	.71	1.66	.34	.79	1	2
20		30	4	8	7	8	28.80	.67	1.61	.31	.76	1	2
20		31	4	8	7	8	27.87	.62	1.56	.30	.74	1	1
24	.06	20	4	8	6	8		1.19	1.91	.65	1.04		
24	.06	20	4	8	7	8		1.19	1.91	.55	.89		
24	.07	22	4	8	6	8		1.13	2.00	.61	1.07		
24	.07	22	4	8	7	8		1.13	2.00	.52	.92		
24	.08	24	4	8	6	8		1.10	2.11	.57	1.11		
24	.08	24	4	8	7	8		1.10	2.11	.49	.95		
24	.09	26	4	8	6	8		1.08	2.25	.55	1.15		
24	.09	26	4	8	7	8		1.08	2.25	.47	.98		
24		27	4	8	6	8	32.00	1.12	2.43	.55	1.19	2	2
24		27	4	10	6	8	32.00	.83	2.24	.55	1.19	2	2
24		28	4	8	6	8	30.85	.96	2.16	.51	1.15	2	2
24		28	4	10	6	8	30.85	.74	2.07	.51	1.15	1	2
24		29	4	8	6	8	29.79	.86	2.00	.47	1.11	1	2
24		30	4	8	6	8	28.80	.80	1.93	.44	1.07	1	2
24		31	4	8	6	8	27.87	.75	1.87	.41	1.04	1	2
24		32	4	8	6	8	27.00	.70	1.81	.39	1.00	1	2

TABLE X-A (Cont'd) Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		33	4	8	6	8	26.18	.66	1.75	.37	.97	1	2
24		27	4	8	7	8	32.00	1.12	2.43	.47	1.02	2	2
24		27	4	10	7	8	32.00	.83	2.24	.47	1.02	2	2
24		28	4	8	7	8	30.85	.96	2.16	.44	.98	2	2
24		28	4	10	7	8	30.85	.74	2.07	.44	.98	1	2
24		29	4	8	7	8	29.79	.86	2.00	.41	.95	1	2
24		30	4	8	7	8	28.80	.80	1.93	.38	.92	1	2
24		31	4	8	7	8	27.87	.75	1.87	.35	.89	1	2
24		32	4	8	7	8	27.00	.70	1.81	.33	.86	1	2
24		33	4	8	7	8	26.18	.66	1.75	.31	.83	1	2
28	.07	23	4	8	6	8		1.21	2.23	.65	1.21		
28	.07	23	4	8	7	8		1.21	2.23	.56	1.04		
28	.08	25	4	8	6	8		1.17	2.35	.62	1.25		
28	.08	25	4	8	7	8		1.17	2.35	.53	1.07		
28	.09	27	4	8	6	8		1.15	2.50	.60	1.29		
28	.09	27	4	8	7	8		1.15	2.50	.51	1.11		
28		28	4	8	6	8	30.85	1.19	2.68	.59	1.34	2	2
28		28	4	10	6	8	30.85	.88	2.46	.59	1.34	2	2
28		29	4	8	6	8	29.79	1.03	2.40	.55	1.29	2	2
28		29	4	10	6	8	29.79	.80	2.33	.55	1.29	1	2
28		30	4	8	6	8	28.80	.94	2.25	.52	1.25	1	2
28		31	4	8	6	8	27.87	.88	2.18	.48	1.21	1	2
28		32	4	8	6	8	27.00	.82	2.11	.45	1.17	1	2
28		33	4	8	6	8	26.18	.77	2.05	.43	1.14	1	2
28		34	4	8	6	8	25.41	.73	1.99	.40	1.10	1	2
28		28	4	8	7	8	30.85	1.19	2.68	.51	1.15	2	2
28		28	4	10	7	8	30.85	.88	2.46	.51	1.15	2	2
28		29	4	8	7	8	29.79	1.03	2.40	.47	1.11	2	2
28		29	4	10	7	8	29.79	.80	2.33	.47	1.11	1	2
28		30	4	8	7	8	28.80	.94	2.25	.44	1.07	1	2
28		31	4	8	7	8	27.87	.88	2.18	.41	1.04	1	2
28		32	4	8	7	8	27.00	.82	2.11	.39	1.00	1	2
28		33	4	8	7	8	26.18	.77	2.05	.37	.97	1	2
28		34	4	8	7	8	25.41	.73	1.99	.34	.94	1	2
32	.08	26	4	8	6	8		1.23	2.55	.66	1.38		
32	.08	26	4	8	7	8		1.23	2.55	.57	1.18		
32	.09	28	4	8	6	8		1.20	2.71	.63	1.43		
32	.09	28	4	8	7	8		1.20	2.71	.54	1.22		
32		29	4	8	6	8	29.79	1.24	2.89	.63	1.48	2	2
32		29	4	10	6	8	29.79	.92	2.66	.63	1.48	1	2
32		30	4	8	6	8	28.80	1.08	2.59	.59	1.43	2	2
32		30	4	10	6	8	28.80	.85	2.57	.59	1.43	1	2
32		31	4	8	6	8	27.87	1.00	2.49	.55	1.38	1	2
32		32	4	8	6	8	27.00	.94	2.41	.52	1.34	1	2
32		33	4	8	6	8	26.18	.88	2.34	.49	1.30	1	2
32		34	4	8	6	8	25.41	.83	2.27	.46	1.26	1	2
32		35	4	8	6	8	24.68	.78	2.21	.43	1.22	1	2
32		29	4	8	7	8	29.79	1.24	2.89	.54	1.27	2	2
32		29	4	10	7	8	29.79	.92	2.66	.54	1.27	1	2
32		30	4	8	7	8	28.80	1.08	2.59	.51	1.22	2	2
32		30	4	10	7	8	28.80	.85	2.57	.51	1.22	1	2
32		31	4	8	7	8	27.87	1.00	2.49	.47	1.18	1	2
32		32	4	8	7	8	27.00	.94	2.41	.44	1.15	1	2
32		33	4	8	7	8	26.18	.88	2.34	.42	1.11	1	2
32		34	4	8	7	8	25.41	.83	2.27	.39	1.08	1	2
32		35	4	8	7	8	24.68	.78	2.21	.37	1.05	1	2

TABLE X-A (Cont'd) Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
36	.09	29	4	8	6	8		1.24	2.87	.67	1.56		
36	.09	29	4	8	7	8		1.24	2.87	.57	1.33		
36		30	4	8	6	8	28.80	1.27	3.06	.67	1.61	2	2
36		30	4	10	6	8	28.80	.96	2.90	.67	1.61	1	2
36		31	4	8	6	8	27.87	1.13	2.80	.62	1.56	1	2
36		32	4	8	6	8	27.00	1.06	2.72	.59	1.51	1	2
36		33	4	8	6	8	26.18	.99	2.63	.55	1.46	1	2
36		34	4	8	6	8	25.41	.94	2.56	.52	1.42	1	2
36		35	4	8	6	8	24.68	.88	2.48	.49	1.38	1	2
36		36	4	8	6	8	24.00	.83	2.41	.46	1.34	1	2
36		30	4	8	7	8	28.80	1.27	3.06	.57	1.38	2	2
36		30	4	10	7	8	28.80	.96	2.90	.57	1.38	1	2
36		31	4	8	7	8	27.87	1.13	2.80	.53	1.33	1	2
36		32	4	8	7	8	27.00	1.06	2.72	.50	1.29	1	2
36		33	4	8	7	8	26.18	.99	2.63	.47	1.25	1	2
36		34	4	8	7	8	25.41	.94	2.56	.44	1.21	1	2
36		35	4	8	7	8	24.68	.88	2.48	.42	1.18	1	2
36		36	4	8	7	8	24.00	.83	2.41	.39	1.15	1	2
40		28	4	12	6	12	30.85	1.11	3.76	.57	1.91	2	2
40		31	4	8	6	8	27.87	1.29	3.19	.69	1.73	2	2
40		31	4	10	6	8	27.87	1.00	3.12	.69	1.73	1	2
40		32	4	8	6	8	27.00	1.18	3.02	.65	1.67	1	2
40		33	4	8	6	8	26.18	1.11	2.93	.61	1.62	1	2
40		34	4	8	6	8	25.41	1.04	2.84	.58	1.58	1	2
40		35	4	8	6	8	24.68	.98	2.76	.54	1.53	1	2
40		36	4	8	6	8	24.00	.93	2.68	.51	1.49	1	2
40		28	4	12	7	10	30.85	1.11	3.76	.58	1.64	2	2
40		28	4	14	7	10	30.85	.90	3.55	.58	1.64	2	2
40		31	4	8	7	8	27.87	1.29	3.19	.59	1.48	2	2
40		31	4	10	7	8	27.87	1.00	3.12	.59	1.48	1	2
40		32	4	8	7	8	27.00	1.18	3.02	.56	1.43	1	2
40		33	4	8	7	8	26.18	1.11	2.93	.52	1.39	1	2
40		34	4	8	7	8	25.41	1.04	2.84	.49	1.35	1	2
40		35	4	8	7	8	24.68	.98	2.76	.47	1.31	1	2
40		36	4	8	7	8	24.00	.93	2.68	.44	1.27	1	2
45		31	4	8	6	8	27.87	1.53	3.80	.78	1.95	2	2
45		31	4	10	6	8	27.87	1.13	3.51	.78	1.95	1	2
45		32	4	8	6	8	27.00	1.33	3.41	.73	1.88	2	2
45		32	4	10	6	8	27.00	1.06	3.40	.73	1.88	1	2
45		33	4	8	6	8	26.18	1.24	3.29	.69	1.83	1	2
45		34	4	8	6	8	25.41	1.17	3.20	.65	1.77	1	2
45		35	4	8	6	8	24.68	1.11	3.10	.61	1.72	1	2
45		36	4	8	6	8	24.00	1.04	3.02	.58	1.67	1	2
45		37	4	8	6	8	23.35	.99	2.94	.55	1.63	1	2
45		31	4	8	7	8	27.87	1.53	3.80	.67	1.67	2	2
45		31	4	10	7	8	27.87	1.13	3.51	.67	1.67	1	2
45		32	4	8	7	8	27.00	1.33	3.41	.63	1.61	2	2
45		32	4	10	7	8	27.00	1.06	3.40	.63	1.61	1	2
45		33	4	8	7	8	26.18	1.24	3.29	.59	1.57	1	2
45		34	4	8	7	8	25.41	1.17	3.20	.56	1.52	1	2
45		35	4	8	7	8	24.68	1.11	3.10	.52	1.48	1	2
45		36	4	8	7	8	24.00	1.04	3.02	.49	1.43	1	2
45		37	4	8	7	8	23.35	.99	2.94	.47	1.40	1	2
50		32	4	8	6	8	27.00	1.55	3.98	.82	2.09	2	2
50		32	4	10	6	8	27.00	1.18	3.77	.82	2.09	1	2
50		33	4	8	6	8	26.18	1.38	3.66	.77	2.03	1	2

TABLE X-A (Cont'd) **Slab 36 x 72 ft** **L /Δ = 200**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
50		34	4	8	6	8	25.41	1.30	3.55	.72	1.97	1	2
50		35	4	8	6	8	24.68	1.23	3.45	.68	1.91	1	2
50		36	4	8	6	8	24.00	1.16	3.35	.64	1.86	1	2
50		37	4	8	6	8	23.35	1.10	3.26	.61	1.81	1	2
50		38	4	8	6	8	22.73	1.04	3.18	.58	1.76	1	2
50		32	4	8	7	8	27.00	1.55	3.98	.70	1.79	2	2
50		32	4	10	7	8	27.00	1.18	3.77	.70	1.79	1	2
50		33	4	8	7	8	26.18	1.38	3.66	.66	1.74	1	2
50		34	4	8	7	8	25.41	1.30	3.55	.62	1.69	1	2
50		35	4	8	7	8	24.68	1.23	3.45	.58	1.64	1	2
50		36	4	8	7	8	24.00	1.16	3.35	.55	1.59	1	2
50		37	4	8	7	8	23.35	1.10	3.26	.52	1.55	1	2
60		33	4	10	6	8	26.18	1.33	4.39	.92	2.44	1	2
60		34	4	8	6	8	25.41	1.56	4.26	.87	2.37	1	2
60		35	4	8	6	8	24.68	1.48	4.14	.82	2.30	1	2
60		36	4	8	6	8	24.00	1.39	4.03	.77	2.23	1	2
60		37	4	8	6	8	23.35	1.32	3.92	.73	2.17	1	2
60		38	4	8	6	8	22.73	1.25	3.81	.69	2.12	1	2
60		39	4	8	6	8	22.15	1.19	3.72	.66	2.06	1	2
60		33	4	8	7	8	26.18	1.78	4.70	.79	2.09	2	2
60		33	4	10	7	8	26.18	1.33	4.39	.79	2.09	1	2
60		34	4	8	7	8	25.41	1.56	4.26	.74	2.03	1	2
60		35	4	8	7	8	24.68	1.48	4.14	.70	1.97	1	2
60		36	4	8	7	8	24.00	1.39	4.03	.66	1.91	1	2
60		37	4	8	7	8	23.35	1.32	3.92	.63	1.86	1	2
60		38	4	8	7	8	22.73	1.25	3.81	.59	1.81	1	2
60		39	4	8	7	8	22.15	1.19	3.72	.56	1.77	1	2
65		34	4	8	6	8	25.41	1.75	4.77	.94	2.56	2	2
65		34	4	10	6	8	25.41	1.35	4.62	.94	2.56	1	2
65		35	4	8	6	8	24.68	1.60	4.49	.89	2.49	1	2
65		36	4	8	6	8	24.00	1.51	4.36	.84	2.42	1	2
65		37	4	8	6	8	23.35	1.43	4.24	.79	2.36	1	2
65		38	4	8	6	8	22.73	1.36	4.13	.75	2.29	1	2
65		39	4	8	6	8	22.15	1.29	4.03	.71	2.23	1	2
65		40	4	8	6	8	21.60	1.22	3.93	.68	2.18	1	2
65		34	4	8	7	8	25.41	1.75	4.77	.80	2.20	2	2
65		34	4	10	7	8	25.41	1.35	4.62	.80	2.20	1	2
65		35	4	8	7	8	24.68	1.60	4.49	.76	2.13	1	2
65		36	4	8	7	8	24.00	1.51	4.36	.72	2.07	1	2
65		37	4	8	7	8	23.35	1.43	4.24	.68	2.02	1	2
65		38	4	8	7	8	22.73	1.36	4.13	.64	1.97	1	2
50		38	4	8	7	8	22.73	1.04	3.18	.49	1.51	1	2
55		33	4	8	6	8	26.18	1.56	4.12	.84	2.23	2	2
55		33	4	10	6	8	26.18	1.22	4.03	.84	2.23	1	2
55		34	4	8	6	8	25.41	1.43	3.91	.79	2.17	1	2
55		35	4	8	6	8	24.68	1.35	3.80	.75	2.11	1	2
55		36	4	8	6	8	24.00	1.28	3.69	.71	2.05	1	2
55		37	4	8	6	8	23.35	1.21	3.59	.67	1.99	1	2
55		38	4	8	6	8	22.73	1.15	3.50	.63	1.94	1	2
55		39	4	8	6	8	22.15	1.09	3.41	.60	1.89	1	2
55		33	4	8	7	8	26.18	1.56	4.12	.72	1.91	2	2
55		33	4	10	7	8	26.18	1.22	4.03	.72	1.91	1	2
55		34	4	8	7	8	25.41	1.43	3.91	.68	1.86	1	2
55		35	4	8	7	8	24.68	1.35	3.80	.64	1.80	1	2
55		36	4	8	7	8	24.00	1.28	3.69	.61	1.75	1	2
55		37	4	8	7	8	23.35	1.21	3.59	.57	1.71	1	2

TABLE X-A (Cont'd) Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
55		38	4	8	7	8	22.73	1.15	3.50	.54	1.66	1	2
55		39	4	8	7	8	22.15	1.09	3.41	.52	1.62	1	2
60		33	4	8	6	8	26.18	1.78	4.70	.92	2.44	2	2
65		39	4	8	7	8	22.15	1.29	4.03	.61	1.91	1	2
65		40	4	8	7	8	21.60	1.22	3.93	.58	1.87	1	2
70		36	4	8	6	8	24.00	1.63	4.70	.90	2.61	1	2
70		37	4	8	6	8	23.35	1.54	4.57	.85	2.54	1	2
70		38	4	8	6	8	22.73	1.46	4.45	.81	2.47	1	2
70		39	4	8	6	8	22.15	1.39	4.34	.77	2.41	1	2
70		40	4	8	6	8	21.60	1.32	4.23	.73	2.35	1	2
70		41	4	8	6	8	21.07	1.25	4.12	.69	2.29	1	2
70		42	4	8	6	8	20.57	1.19	4.03	.66	2.23	1	2
70		36	4	8	7	8	24.00	1.63	4.70	.77	2.23	1	2
70		37	4	8	7	8	23.35	1.54	4.57	.73	2.17	1	2
70		38	4	8	7	8	22.73	1.46	4.45	.69	2.12	1	2
70		39	4	8	7	8	22.15	1.39	4.34	.66	2.06	1	2
70		40	4	8	7	8	21.60	1.32	4.23	.62	2.01	1	2
70		41	4	8	7	8	21.07	1.25	4.12	.59	1.96	1	2
70		42	4	8	7	8	20.57	1.19	4.03	.57	1.91	1	2
75		37	4	8	6	8	23.35	1.65	4.90	.92	2.72	1	2
75		38	4	8	6	8	22.73	1.57	4.77	.87	2.65	1	2
75		39	4	8	6	8	22.15	1.49	4.65	.82	2.58	1	2
75		40	4	8	6	8	21.60	1.41	4.53	.78	2.51	1	2
75		41	4	8	6	8	21.07	1.34	4.42	.74	2.45	1	2
75		42	4	8	6	8	20.57	1.28	4.31	.71	2.39	1	2
75		43	4	8	6	8	20.09	1.22	4.21	.68	2.34	1	2
75		37	4	8	7	8	23.35	1.65	4.90	.78	2.33	1	2
75		38	4	8	7	8	22.73	1.57	4.77	.74	2.27	1	2
75		39	4	8	7	8	22.15	1.49	4.65	.70	2.21	1	2
75		40	4	8	7	8	21.60	1.41	4.53	.67	2.15	1	2
75		41	4	8	7	8	21.07	1.34	4.42	.64	2.10	1	2
75		42	4	8	7	8	20.57	1.28	4.31	.61	2.05	1	2
75		43	4	8	7	8	20.09	1.22	4.21	.58	2.00	1	2
80		38	4	8	6	8	22.73	1.67	5.09	.93	2.82	1	2
80		39	4	8	6	8	22.15	1.59	4.96	.88	2.75	1	2
80		40	4	8	6	8	21.60	1.51	4.83	.83	2.68	1	2
80		41	4	8	6	8	21.07	1.43	4.71	.79	2.62	1	2
80		42	4	8	6	8	20.57	1.37	4.60	.76	2.55	1	2
80		43	4	8	6	8	20.09	1.30	4.49	.72	2.49	1	2
80		44	4	8	6	8	19.63	1.24	4.39	.69	2.44	1	2
80		38	4	8	7	8	22.73	1.67	5.09	.79	2.42	1	2
80		39	4	8	7	8	22.15	1.59	4.96	.75	2.36	1	2
80		40	4	8	7	8	21.60	1.51	4.83	.71	2.30	1	2
80		41	4	8	7	8	21.07	1.43	4.71	.68	2.24	1	2
80		42	4	8	7	8	20.57	1.37	4.60	.65	2.19	1	2
80		43	4	8	7	8	20.09	1.30	4.49	.62	2.14	1	2
80		44	4	8	7	8	19.63	1.24	4.39	.59	2.09	1	2
85		39	4	8	6	8	22.15	1.68	5.27	.93	2.92	1	2
85		40	4	8	6	8	21.60	1.60	5.13	.89	2.85	1	2
85		41	4	8	6	8	21.07	1.52	5.01	.84	2.78	1	2
85		42	4	8	6	8	20.57	1.45	4.89	.80	2.71	1	2
85		43	4	8	6	8	20.09	1.38	4.78	.77	2.65	1	2
85		44	4	8	6	8	19.63	1.32	4.67	.73	2.59	1	2
85		45	4	8	6	8	19.20	1.26	4.56	.70	2.53	1	2
85		39	4	8	7	8	22.15	1.68	5.27	.80	2.51	1	2

TABLE X-A (Cont'd) Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
85		40	4	8	7	8	21.60	1.60	5.13	.76	2.44	1	2
85		41	4	8	7	8	21.07	1.52	5.01	.72	2.38	1	2
85		42	4	8	7	8	20.57	1.45	4.89	.69	2.33	1	2
85		43	4	8	7	8	20.09	1.38	4.78	.66	2.27	1	2
85		44	4	8	7	8	19.63	1.32	4.67	.63	2.22	1	2
85		45	4	8	7	8	19.20	1.26	4.56	.60	2.17	1	2
90		41	4	8	6	8	21.07	1.61	5.30	.89	2.94	1	2
90		42	4	8	6	8	20.57	1.54	5.18	.85	2.87	1	2
90		43	4	8	6	8	20.09	1.47	5.06	.81	2.81	1	2
90		44	4	8	6	8	19.63	1.40	4.94	.78	2.74	1	2
90		45	4	8	6	8	19.20	1.34	4.83	.74	2.68	1	2
90		46	4	8	6	8	18.78	1.28	4.73	.71	2.62	1	2
90		47	4	8	6	8	18.38	1.23	4.63	.68	2.57	1	2
90		41	4	8	7	8	21.07	1.61	5.30	.77	2.52	1	2
90		42	4	8	7	8	20.57	1.54	5.18	.73	2.46	1	2
90		43	4	8	7	8	20.09	1.47	5.06	.70	2.41	1	2
90		44	4	8	7	8	19.63	1.40	4.94	.66	2.35	1	2
90		45	4	8	7	8	19.20	1.34	4.83	.63	2.30	1	2
90		46	4	8	7	8	18.78	1.28	4.73	.61	2.25	1	2
90		47	4	8	7	8	18.38	1.23	4.63	.58	2.20	1	2
95		42	4	8	6	8	20.57	1.62	5.47	.90	3.03	1	2
95		43	4	8	6	8	20.09	1.55	5.34	.86	2.96	1	2
95		44	4	8	6	8	19.63	1.48	5.22	.82	2.90	1	2
95		45	4	8	6	8	19.20	1.41	5.10	.78	2.83	1	2
95		46	4	8	6	8	18.78	1.35	4.99	.75	2.77	1	2
95		47	4	8	6	8	18.38	1.30	4.88	.72	2.71	1	2
95		48	4	8	6	8	18.00	1.24	4.78	.69	2.65	1	2
95		42	4	8	7	8	20.57	1.62	5.47	.77	2.60	1	2
95		43	4	8	7	8	20.09	1.55	5.34	.73	2.54	1	2
95		44	4	8	7	8	19.63	1.48	5.22	.70	2.48	1	2
95		45	4	8	7	8	19.20	1.41	5.10	.67	2.43	1	2
95		46	4	8	7	8	18.78	1.35	4.99	.64	2.37	1	2
95		47	4	8	7	8	18.38	1.30	4.88	.61	2.32	1	2
95		48	4	8	7	8	18.00	1.24	4.78	.59	2.27	1	2
100		43	4	8	6	10	20.09	1.63	5.62	.72	3.12	1	2
100		44	4	8	6	8	19.63	1.56	5.49	.86	3.05	1	2
100		45	4	8	6	8	19.20	1.49	5.37	.82	2.98	1	2
100		46	4	8	6	8	18.78	1.42	5.25	.79	2.92	1	2
100		47	4	8	6	8	18.38	1.36	5.14	.76	2.85	1	2
100		48	4	8	6	8	18.00	1.31	5.03	.72	2.79	1	2
100		49	4	8	6	8	17.63	1.25	4.93	.69	2.74	1	2
100		43	4	8	7	8	20.09	1.63	5.62	.77	2.67	1	2
100		44	4	8	7	8	19.63	1.56	5.49	.74	2.61	1	2
110		45	4	8	7	8	19.20	1.64	5.91	.78	2.81	1	2
100		45	4	8	7	8	19.20	1.49	5.37	.71	2.55	1	2
100		49	4	8	7	8	17.63	1.25	4.93	.59	2.35	1	2
100		48	4	8	7	8	18.00	1.31	5.03	.62	2.39	1	2
100		46	4	8	7	8	18.78	1.42	5.25	.68	2.50	1	2
100		47	4	8	7	8	18.38	1.36	5.14	.65	2.45	1	2
105		44	4	8	6	10	19.63	1.63	5.77	.72	3.20	1	2
105		45	4	8	6	8	19.20	1.56	5.64	.87	3.13	1	2
105		46	4	8	6	8	18.78	1.50	5.52	.83	3.06	1	2
105		47	4	8	6	8	18.38	1.43	5.40	.79	3.00	1	2
105		48	4	8	6	8	18.00	1.37	5.29	.76	2.93	1	2
105		49	4	8	6	8	17.63	1.32	5.18	.73	2.87	1	2
105		50	4	8	6	8	17.28	1.26	5.07	.70	2.82	1	2

TABLE X-A (Cont'd) Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
105		44	4	8	7	8	19.63	1.63	5.77	.78	2.74	1	2
105		45	4	8	7	8	19.20	1.56	5.64	.74	2.68	1	2
105		46	4	8	7	8	18.78	1.50	5.52	.71	2.62	1	2
105		47	4	8	7	8	18.38	1.43	5.40	.68	2.57	1	2
105		48	4	8	7	8	18.00	1.37	5.29	.65	2.51	1	2
105		49	4	8	7	8	17.63	1.32	5.18	.62	2.46	1	2
105		50	4	8	7	8	17.28	1.26	5.07	.60	2.41	1	2
110		45	4	8	6	10	19.20	1.64	5.91	.72	3.28	1	2
110		46	4	8	6	8	18.78	1.57	5.78	.87	3.21	1	2
110		47	4	8	6	8	18.38	1.50	5.66	.83	3.14	1	2
110		48	4	8	6	8	18.00	1.44	5.54	.80	3.07	1	2
110		49	4	8	6	8	17.63	1.38	5.42	.76	3.01	1	2
110		50	4	8	6	8	17.28	1.33	5.32	.73	2.95	1	2
110		51	4	8	6	8	16.94	1.27	5.21	.71	2.89	1	2
110		46	4	8	7	8	18.78	1.57	5.78	.74	2.75	1	2
110		47	4	8	7	8	18.38	1.50	5.66	.71	2.69	1	2
110		48	4	8	7	8	18.00	1.44	5.54	.68	2.63	1	2
110		49	4	8	7	8	17.63	1.38	5.42	.65	2.58	1	2
110		50	4	8	7	8	17.28	1.33	5.32	.63	2.53	1	2
110		51	4	8	7	8	16.94	1.27	5.21	.60	2.48	1	2
115		46	4	8	6	10	18.78	1.64	6.04	.73	3.35	1	2
115		47	4	8	6	8	18.38	1.57	5.91	.87	3.28	1	2
115		48	4	8	6	8	18.00	1.50	5.79	.83	3.21	1	2
115		49	4	8	6	8	17.63	1.44	5.67	.80	3.15	1	2
115		50	4	8	6	8	17.28	1.39	5.56	.77	3.09	1	2
115		51	4	8	6	8	16.94	1.33	5.45	.74	3.02	1	2
115		52	4	8	6	8	16.61	1.28	5.34	.71	2.97	1	2
115		46	4	8	7	8	18.78	1.64	6.04	.78	2.87	1	2
115		47	4	8	7	8	18.38	1.57	5.91	.74	2.81	1	2
115		48	4	8	7	8	18.00	1.50	5.79	.71	2.75	1	2
115		49	4	8	7	8	17.63	1.44	5.67	.68	2.70	1	2
115		50	4	8	7	8	17.28	1.39	5.56	.66	2.64	1	2
115		51	4	8	7	8	16.94	1.33	5.45	.63	2.59	1	2
115		52	4	8	7	8	16.61	1.28	5.34	.61	2.54	1	2
120		47	4	8	6	10	18.38	1.64	6.17	.72	3.43	1	2
120		48	4	8	6	8	18.00	1.57	6.04	.87	3.35	1	2
120		49	4	8	6	8	17.63	1.51	5.92	.83	3.29	1	2
120		50	4	8	6	8	17.28	1.45	5.80	.80	3.22	1	2
120		51	4	8	6	8	16.94	1.39	5.69	.77	3.16	1	2
120		52	4	8	6	8	16.61	1.34	5.58	.74	3.10	1	2
120		53	4	8	6	8	16.30	1.29	5.47	.71	3.04	1	2
120		47	4	8	7	8	18.38	1.64	6.17	.78	2.94	1	2
120		48	4	8	7	8	18.00	1.57	6.04	.74	2.87	1	2
120		49	4	8	7	8	17.63	1.51	5.92	.71	2.82	1	2
120		50	4	8	7	8	17.28	1.45	5.80	.69	2.76	1	2
120		51	4	8	7	8	16.94	1.39	5.69	.66	2.70	1	2
120		52	4	8	7	8	16.61	1.34	5.58	.63	2.65	1	2
120		53	4	8	7	8	16.30	1.29	5.47	.61	2.60	1	2
125		43	4	10	6	10	20.09	1.63	7.03	.90	3.90	1	2
125		48	4	8	6	10	18.00	1.64	6.29	.72	3.49	1	2
125		49	4	8	6	8	17.63	1.57	6.17	.87	3.42	1	2
125		50	4	8	6	8	17.28	1.51	6.04	.83	3.35	1	2
125		51	4	8	6	8	16.94	1.45	5.92	.80	3.29	1	2
125		52	4	8	6	8	16.61	1.39	5.81	.77	3.23	1	2
125		53	4	8	6	8	16.30	1.34	5.70	.74	3.16	1	2
125		43	4	10	7	8	20.09	1.63	7.03	.97	3.34	1	2

TABLE X-A (Cont'd) **Slab 36 x 72 ft** **L /Δ = 200**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
125		48	4	8	7	8	18.00	1.64	6.29	.78	2.99	1	2
125		49	4	8	7	8	17.63	1.57	6.17	.74	2.93	1	2
125		50	4	8	7	8	17.28	1.51	6.04	.71	2.87	1	2
125		51	4	8	7	8	16.94	1.45	5.92	.69	2.82	1	2
125		52	4	8	7	8	16.61	1.39	5.81	.66	2.76	1	2
125		53	4	8	7	8	16.30	1.34	5.70	.64	2.71	1	2
130		44	4	10	6	12	19.63	1.62	7.14	.75	3.97	1	2
130		45	4	10	6	10	19.20	1.55	6.98	.86	3.88	1	2
130		49	4	8	6	10	17.63	1.63	6.41	.72	3.56	1	2
130		50	4	8	6	10	17.28	1.57	6.28	.69	3.49	1	2
130		51	4	8	6	8	16.94	1.51	6.16	.83	3.42	1	2
130		52	4	8	6	8	16.61	1.45	6.04	.80	3.35	1	2
130		53	4	8	6	8	16.30	1.39	5.93	.77	3.29	1	2
130		44	4	10	7	10	19.63	1.62	7.14	.77	3.40	1	2
130		45	4	10	7	8	19.20	1.55	6.98	.92	3.32	1	2
130		49	4	8	7	8	17.63	1.63	6.41	.77	3.05	1	2
130		50	4	8	7	8	17.28	1.57	6.28	.74	2.99	1	2
130		51	4	8	7	8	16.94	1.51	6.16	.71	2.93	1	2
130		52	4	8	7	8	16.61	1.45	6.04	.69	2.87	1	2
130		53	4	8	7	8	16.30	1.39	5.93	.66	2.82	1	2
135		44	4	10	6	12	19.63	1.68	7.42	.78	4.12	1	2
135		45	4	10	6	10	19.20	1.61	7.25	.89	4.03	1	2
135		46	4	10	6	10	18.78	1.54	7.09	.85	3.94	1	2
135		47	4	10	6	10	18.38	1.47	6.94	.82	3.85	1	2
135		44	4	10	7	10	19.63	1.68	7.42	.80	3.53	1	2
135		45	4	10	7	8	19.20	1.61	7.25	.95	3.45	1	2
135		46	4	10	7	8	18.78	1.54	7.09	.91	3.38	1	2
135		47	4	10	7	8	18.38	1.47	6.94	.87	3.30	1	2
135		49	4	8	7	8	17.63	1.69	6.66	.80	3.17	1	2
135		50	4	8	7	8	17.28	1.63	6.53	.77	3.10	1	2
135		51	4	8	7	8	16.94	1.56	6.40	.74	3.04	1	2
135		49	4	8	6	10	17.63	1.69	6.66	.75	3.70	1	2
135		50	4	8	6	10	17.28	1.63	6.53	.72	3.62	1	2
135		51	4	8	6	10	16.94	1.56	6.40	.69	3.55	1	2
140		45	4	10	6	12	19.20	1.67	7.52	.77	4.18	1	2
140		46	4	10	6	10	18.78	1.60	7.36	.88	4.08	1	2
140		47	4	10	6	10	18.38	1.53	7.20	.85	4.00	1	2
140		48	4	10	6	10	18.00	1.46	7.05	.81	3.91	1	2
140		50	4	8	6	10	17.28	1.69	6.77	.75	3.76	1	2
140		51	4	8	6	10	16.94	1.62	6.63	.72	3.68	1	2
140		52	4	8	6	10	16.61	1.56	6.51	.69	3.61	1	2
140		45	4	10	7	10	19.20	1.67	7.52	.79	3.58	1	2
140		46	4	10	7	10	18.78	1.60	7.36	.76	3.50	1	2
140		47	4	10	7	8	18.38	1.53	7.20	.91	3.43	1	2
140		48	4	10	7	8	18.00	1.46	7.05	.87	3.35	1	2
140		50	4	8	7	8	17.28	1.69	6.77	.80	3.22	1	2
140		51	4	8	7	8	16.94	1.62	6.63	.77	3.16	1	2
140		52	4	8	7	8	16.61	1.56	6.51	.74	3.10	1	2
145		39	4	14	6	14	22.15	1.64	8.99	.91	4.99	1	2
145		42	4	12	6	12	20.57	1.65	8.35	.92	4.63	1	2
145		46	4	10	6	12	18.78	1.65	7.62	.76	4.23	1	2
145		47	4	10	6	10	18.38	1.58	7.46	.88	4.14	1	2
145		48	4	10	6	10	18.00	1.52	7.30	.84	4.05	1	2
145		49	4	10	6	10	17.63	1.46	7.15	.81	3.97	1	2
145		50	4	10	6	10	17.28	1.40	7.01	.77	3.89	1	2
145		39	4	14	7	14	22.15	1.64	8.99	.78	4.28	1	2

TABLE X-A (Cont'd) Slab 36 x 72 ft L /Δ = 200

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
145		42	4	12	7	10	20.57	1.65	8.35	.94	3.97	1	2
145		46	4	10	7	10	18.78	1.65	7.62	.78	3.63	1	2
145		47	4	10	7	10	18.38	1.58	7.46	.75	3.55	1	2
145		48	4	10	7	10	18.00	1.52	7.30	.72	3.47	1	2
145		49	4	10	7	8	17.63	1.46	7.15	.86	3.40	1	2
145		50	4	10	7	8	17.28	1.40	7.01	.83	3.34	1	2
150		43	4	12	6	14	20.09	1.63	8.43	.77	4.68	1	2
150		47	4	10	6	12	18.38	1.64	7.71	.76	4.28	1	2
150		48	4	10	6	10	18.00	1.57	7.55	.87	4.19	1	2
150		49	4	10	6	10	17.63	1.51	7.40	.83	4.11	1	2
150		50	4	10	6	10	17.28	1.45	7.25	.80	4.03	1	2
150		51	4	10	6	10	16.94	1.39	7.11	.77	3.95	1	2
150		52	4	10	6	10	16.61	1.34	6.97	.74	3.87	1	2
150		43	4	12	7	12	20.09	1.63	8.43	.77	4.01	1	2
150		47	4	10	7	10	18.38	1.64	7.71	.78	3.67	1	2
150		48	4	10	7	10	18.00	1.57	7.55	.74	3.59	1	2
150		49	4	10	7	10	17.63	1.51	7.40	.71	3.52	1	2
150		50	4	10	7	8	17.28	1.45	7.25	.86	3.45	1	2
150		51	4	10	7	8	16.94	1.39	7.11	.83	3.38	1	2
150		52	4	10	7	8	16.61	1.34	6.97	.79	3.32	1	2
150		53	4	8	7	8	16.30	1.61	6.84	.76	3.25	1	2

TABLE X-B Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	6	4	8	6	10		.61	.29	.23	.14		
4	.01	6	4	8	7	8		.61	.29	.25	.12		
4	.02	9	4	8	6	8		.49	.35	.22	.16		
4	.02	9	4	8	7	8		.49	.35	.22	.15		
4	.03	11	4	8	6	8		.47	.41	.24	.21		
4	.03	11	4	8	7	8		.47	.41	.24	.21		
8	.02	10	4	8	6	10		.73	.58	.28	.28		
8	.02	10	4	8	7	8		.73	.58	.30	.24		
8	.03	12	4	8	6	8		.68	.65	.31	.30		
8	.03	12	4	8	7	8		.68	.65	.27	.26		
8	.04	15	4	8	6	8		.59	.71	.27	.32		
8	.04	15	4	8	7	8		.59	.71	.26	.31		
8	.05	17	4	8	6	8		.53	.73	.28	.38		
8	.05	17	4	8	7	8		.53	.73	.28	.38		
8	.06	19	4	8	6	8		.55	.83	.28	.43		
8	.06	19	4	8	7	8		.55	.83	.28	.43		
12	.03	13	4	8	6	10		.84	.88	.32	.42		
12	.03	13	4	8	7	8		.84	.88	.34	.36		
12	.04	16	4	8	6	8		.73	.94	.34	.44		
12	.04	16	4	8	7	8		.73	.94	.29	.38		
12	.05	18	4	8	6	8		.72	1.03	.32	.47		
12	.05	18	4	8	7	8		.72	1.03	.28	.40		
12	.06	21	4	8	6	8		.63	1.07	.29	.48		
12	.06	21	4	8	7	8		.63	1.07	.28	.47		
12	.07	23	4	8	6	8		.60	1.12	.29	.53		
12	.07	23	4	8	7	8		.60	1.12	.29	.53		
12	.08	26	4	8	6	8		.56	1.18	.28	.59		
12	.08	26	4	8	7	8		.56	1.18	.28	.59		
12	.09	28	4	8	6	8		.56	1.25	.28	.64		
12	.09	28	4	8	7	8		.56	1.25	.28	.64		
12		30	4	8	6	8	28.80	.50	1.21	.30	.72	2	1
12		30	4	10	6	8	28.80	.38	1.14	.30	.72	2	1
12		31	4	8	6	8	27.87	.44	1.11	.30	.74	2	1
12		31	4	10	6	8	27.87	.33	1.04	.30	.74	2	1
12		32	4	8	6	8	27.00	.39	1.01	.30	.76	2	1
12		32	4	10	6	8	27.00	.29	.95	.30	.76	2	1
12		33	4	8	6	8	26.18	.35	.93	.30	.79	2	1
12		33	4	10	6	8	26.18	.26	.87	.30	.79	1	1
12		30	4	8	7	8	28.80	.50	1.21	.30	.72	2	1
12		30	4	10	7	8	28.80	.38	1.14	.30	.72	2	1
12		31	4	8	7	8	27.87	.44	1.11	.30	.74	2	1
12		31	4	10	7	8	27.87	.33	1.04	.30	.74	2	1
12		32	4	8	7	8	27.00	.39	1.01	.30	.76	2	1
12		32	4	10	7	8	27.00	.29	.95	.30	.76	2	1
12		33	4	8	7	8	26.18	.35	.93	.30	.79	2	1
12		33	4	10	7	8	26.18	.26	.87	.30	.79	1	1
16	.04	17	4	8	6	8		.86	1.17	.41	.56		
16	.04	17	4	8	7	8		.86	1.17	.35	.48		
16	.05	20	4	8	6	8		.73	1.18	.36	.58		
16	.05	20	4	8	7	8		.73	1.18	.31	.49		
16	.06	22	4	8	6	8		.74	1.31	.34	.61		
16	.06	22	4	8	7	8		.74	1.31	.29	.52		
16	.07	25	4	8	6	8		.68	1.36	.31	.63		
16	.07	25	4	8	7	8		.68	1.36	.28	.57		
16	.08	27	4	8	6	8		.66	1.43	.30	.65		

TABLE X-B (Cont'd) Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
16	.08	27	4	8	7	8		.66	1.43	.29	.63		
16	.09	29	4	8	6	8		.65	1.51	.29	.69		
16	.09	29	4	8	7	8		.65	1.51	.29	.69		
16		32	4	8	6	8	27.00	.57	1.46	.30	.76	2	1
16		32	4	10	6	8	27.00	.43	1.38	.30	.76	2	1
16		33	4	8	6	8	26.18	.50	1.34	.30	.79	2	1
16		33	4	10	6	8	26.18	.38	1.26	.30	.79	2	1
16		34	4	8	6	8	25.41	.45	1.23	.30	.81	2	1
16		34	4	10	6	8	25.41	.34	1.16	.30	.81	2	1
16		35	4	8	6	8	24.68	.40	1.13	.30	.84	2	1
16		35	4	10	6	8	24.68	.31	1.10	.30	.84	1	1
16		32	4	8	7	8	27.00	.57	1.46	.30	.76	2	1
16		32	4	10	7	8	27.00	.43	1.38	.30	.76	2	1
16		33	4	8	7	8	26.18	.50	1.34	.30	.79	2	1
16		33	4	10	7	8	26.18	.38	1.26	.30	.79	2	1
16		34	4	8	7	8	25.41	.45	1.23	.30	.81	2	1
16		34	4	10	7	8	25.41	.34	1.16	.30	.81	2	1
16		35	4	8	7	8	24.68	.40	1.13	.30	.84	2	1
16		35	4	10	7	8	24.68	.31	1.10	.30	.84	1	1
20	.05	20	4	8	6	8		.91	1.47	.44	.70		
20	.05	20	4	8	7	8		.91	1.47	.37	.60		
20	.06	23	4	8	6	8		.81	1.49	.39	.72		
20	.06	23	4	8	7	8		.81	1.49	.33	.62		
20	.07	26	4	8	6	8		.74	1.54	.35	.74		
20	.07	26	4	8	7	8		.74	1.54	.30	.63		
20	.08	29	4	8	6	8		.69	1.61	.33	.76		
20	.08	29	4	8	7	8		.69	1.61	.28	.67		
20	.09	31	4	8	6	8		.68	1.69	.31	.79		
20	.09	31	4	8	7	8		.68	1.69	.29	.73		
20		33	4	8	6	8	26.18	.67	1.78	.30	.81	2	2
20		33	4	10	6	8	26.18	.50	1.68	.30	.81	2	2
20		34	4	8	6	8	25.41	.60	1.64	.30	.81	2	1
20		34	4	10	6	8	25.41	.45	1.54	.30	.81	2	1
20		35	4	8	6	8	24.68	.54	1.51	.30	.84	2	1
20		35	4	10	6	8	24.68	.40	1.42	.30	.84	2	1
20		36	4	8	6	8	24.00	.48	1.39	.30	.86	2	1
20		36	4	10	6	8	24.00	.37	1.34	.30	.86	1	1
20		33	4	8	7	8	26.18	.67	1.78	.30	.79	2	1
20		33	4	10	7	8	26.18	.50	1.68	.30	.79	2	1
20		34	4	8	7	8	25.41	.60	1.64	.30	.81	2	1
20		34	4	10	7	8	25.41	.45	1.54	.30	.81	2	1
20		35	4	8	7	8	24.68	.54	1.51	.30	.84	2	1
20		35	4	10	7	8	24.68	.40	1.42	.30	.84	2	1
20		36	4	8	7	8	24.00	.48	1.39	.30	.86	2	1
20		36	4	10	7	8	24.00	.37	1.34	.30	.86	1	1
24	.06	24	4	8	6	8		.91	1.76	.44	.84		
24	.06	24	4	8	7	8		.91	1.76	.37	.72		
24	.07	27	4	8	6	8		.84	1.81	.40	.87		
24	.07	27	4	8	7	8		.84	1.81	.34	.74		
24	.08	30	4	8	6	8		.78	1.88	.37	.89		
24	.08	30	4	8	7	8		.78	1.88	.31	.76		
24	.09	32	4	8	6	8		.77	1.97	.35	.92		
24	.09	32	4	8	7	8		.77	1.97	.30	.78		
24		34	4	8	6	8	25.41	.76	2.07	.34	.94	2	2
24		34	4	10	6	8	25.41	.57	1.94	.34	.94	2	2
24		35	4	8	6	8	24.68	.68	1.91	.32	.92	2	2
24		35	4	10	6	8	24.68	.51	1.79	.32	.92	2	2

TABLE X-B (Cont'd) Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		36	4	8	6	8	24.00	.61	1.76	.31	.89	2	2
24		36	4	10	6	8	24.00	.46	1.65	.31	.89	2	2
24		37	4	8	6	8	23.35	.55	1.63	.30	.88	2	1
24		37	4	10	6	8	23.35	.42	1.56	.30	.88	1	1
24		34	4	8	7	8	25.41	.76	2.07	.30	.81	2	1
24		34	4	10	7	8	25.41	.57	1.94	.30	.81	2	1
24		35	4	8	7	8	24.68	.68	1.91	.30	.84	2	1
24		35	4	10	7	8	24.68	.51	1.79	.30	.84	2	1
24		36	4	8	7	8	24.00	.61	1.76	.30	.86	2	1
24		36	4	10	7	8	24.00	.46	1.65	.30	.86	2	1
24		37	4	8	7	8	23.35	.55	1.63	.30	.88	2	1
24		37	4	10	7	8	23.35	.42	1.56	.30	.88	1	1
28	.07	28	4	8	6	8		.91	2.06	.44	.99		
28	.07	28	4	8	7	8		.91	2.06	.37	.84		
28	.08	30	4	8	6	8		.88	2.13	.42	1.01		
28	.08	30	4	8	7	8		.88	2.13	.36	.87		
28	.09	33	4	8	6	8		.84	2.22	.39	1.04		
28	.09	33	4	8	7	8		.84	2.22	.33	.89		
28		36	4	8	6	8	24.00	.74	2.15	.36	1.04	2	2
28		36	4	10	6	8	24.00	.56	2.01	.36	1.04	2	2
28		37	4	8	6	8	23.35	.67	1.98	.34	1.01	2	2
28		37	4	10	6	8	23.35	.50	1.86	.34	1.01	2	2
28		38	4	8	6	8	22.73	.60	1.84	.32	.99	2	2
28		38	4	10	6	8	22.73	.46	1.78	.32	.99	1	2
28		39	4	8	6	8	22.15	.55	1.73	.30	.96	1	2
28		40	4	8	6	8	21.60	.52	1.69	.30	.96	1	1
28		36	4	8	7	8	24.00	.74	2.15	.31	.89	2	2
28		36	4	10	7	8	24.00	.56	2.01	.31	.89	2	2
28		37	4	8	7	8	23.35	.67	1.98	.30	.88	2	1
28		37	4	10	7	8	23.35	.50	1.86	.30	.88	2	1
28		38	4	8	7	8	22.73	.60	1.84	.30	.91	2	1
28		38	4	10	7	8	22.73	.46	1.78	.30	.91	1	1
28		39	4	8	7	8	22.15	.55	1.73	.30	.93	1	1
32	.08	31	4	8	6	8		.94	2.35	.45	1.13		
32	.08	31	4	8	7	8		.94	2.35	.39	.96		
32	.09	34	4	8	6	8		.90	2.45	.42	1.16		
32	.09	34	4	8	7	8		.90	2.45	.36	.99		
32		37	4	8	6	8	23.35	.79	2.36	.39	1.16	2	2
32		37	4	10	6	8	23.35	.59	2.21	.39	1.16	2	2
32		38	4	8	6	8	22.73	.71	2.18	.37	1.13	2	2
32		38	4	10	6	8	22.73	.54	2.05	.37	1.13	2	2
32		39	4	8	6	8	22.15	.65	2.03	.35	1.10	2	2
32		39	4	10	6	8	22.15	.50	1.98	.35	1.10	1	2
32		40	4	8	6	8	21.60	.60	1.93	.33	1.07	1	2
32		41	4	8	6	8	21.07	.57	1.88	.31	1.04	1	2
32		42	4	8	6	8	20.57	.54	1.84	.30	1.02	1	2
32		43	4	8	6	8	20.09	.52	1.79	.30	1.03	1	1
32		37	4	8	7	8	23.35	.79	2.36	.33	.99	2	2
32		37	4	10	7	8	23.35	.59	2.21	.33	.99	2	2
32		38	4	8	7	8	22.73	.71	2.18	.31	.96	2	2
32		38	4	10	7	8	22.73	.54	2.05	.31	.96	2	2
32		39	4	8	7	8	22.15	.65	2.03	.30	.94	2	2
32		39	4	10	7	8	22.15	.50	1.98	.30	.94	1	2
32		40	4	8	7	8	21.60	.60	1.93	.30	.96	1	1
36	.09	35	4	8	6	8		.94	2.64	.45	1.27		

TABLE X-B (Cont'd) **Slab 36 x 72 ft** **L /Δ = 300**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
36	.09	35	4	8	7	8		.94	2.64	.38	1.09		
36		38	4	8	6	8	22.73	.84	2.55	.41	1.27	2	2
36		38	4	10	6	8	22.73	.62	2.38	.41	1.27	2	2
36		39	4	8	6	8	22.15	.75	2.36	.39	1.24	2	2
36		39	4	10	6	8	22.15	.57	2.23	.39	1.24	1	2
36		40	4	8	6	8	21.60	.68	2.19	.37	1.20	2	2
36		40	4	10	6	8	21.60	.54	2.17	.37	1.20	1	2
36		41	4	8	6	8	21.07	.64	2.12	.35	1.17	1	2
36		42	4	8	6	8	20.57	.61	2.07	.34	1.15	1	2
36		43	4	8	6	8	20.09	.58	2.02	.32	1.12	1	2
36		44	4	8	6	8	19.63	.56	1.97	.31	1.09	1	2
36		38	4	8	7	8	22.73	.84	2.55	.35	1.09	2	2
36		38	4	10	7	8	22.73	.62	2.38	.35	1.09	2	2
36		39	4	8	7	8	22.15	.75	2.36	.34	1.06	2	2
36		39	4	10	7	8	22.15	.57	2.23	.34	1.06	1	2
36		40	4	8	7	8	21.60	.68	2.19	.32	1.03	2	2
36		40	4	10	7	8	21.60	.54	2.17	.32	1.03	1	2
36		41	4	8	7	8	21.07	.64	2.12	.30	1.01	1	2
36		42	4	8	7	8	20.57	.61	2.07	.30	1.00	1	1
40		34	4	14	6	8	25.41	.71	3.41	.58	1.58	2	2
40		34	4	16	6	8	25.41	.60	3.28	.58	1.58	2	2
40		35	4	12	6	8	24.68	.78	3.28	.54	1.53	2	2
40		35	4	14	6	8	24.68	.64	3.14	.54	1.53	2	2
40		36	4	12	6	8	24.00	.70	3.02	.51	1.49	2	2
40		36	4	14	6	8	24.00	.57	2.89	.51	1.49	2	2
40		37	4	10	6	8	23.35	.79	2.95	.49	1.45	2	2
40		37	4	12	6	8	23.35	.63	2.80	.49	1.45	2	2
40		38	4	8	6	8	22.73	.96	2.94	.46	1.41	2	2
40		38	4	10	6	8	22.73	.71	2.73	.46	1.41	2	2
40		39	4	8	6	8	22.15	.87	2.71	.44	1.37	2	2
40		39	4	10	6	8	22.15	.65	2.53	.44	1.37	2	2
40		40	4	8	6	8	21.60	.78	2.52	.41	1.34	2	2
40		40	4	10	6	8	21.60	.60	2.41	.41	1.34	1	2
40		34	4	14	7	8	25.41	.71	3.41	.49	1.35	2	2
40		34	4	16	7	8	25.41	.60	3.28	.49	1.35	2	2
40		35	4	12	7	8	24.68	.78	3.28	.47	1.31	2	2
40		35	4	14	7	8	24.68	.64	3.14	.47	1.31	2	2
40		36	4	12	7	8	24.00	.70	3.02	.44	1.27	2	2
40		36	4	14	7	8	24.00	.57	2.89	.44	1.27	2	2
40		37	4	10	7	8	23.35	.79	2.95	.42	1.24	2	2
40		37	4	12	7	8	23.35	.63	2.80	.42	1.24	2	2
40		38	4	8	7	8	22.73	.96	2.94	.39	1.21	2	2
40		38	4	10	7	8	22.73	.71	2.73	.39	1.21	2	2
40		39	4	8	7	8	22.15	.87	2.71	.37	1.18	2	2
40		39	4	10	7	8	22.15	.65	2.53	.37	1.18	2	2
40		40	4	8	7	8	21.60	.78	2.52	.35	1.15	2	2
40		40	4	10	7	8	21.60	.60	2.41	.35	1.15	1	2
45		36	4	12	6	8	24.00	.81	3.53	.58	1.67	2	2
45		36	4	14	6	8	24.00	.66	3.37	.58	1.67	2	2
45		37	4	12	6	8	23.35	.73	3.26	.55	1.63	2	2
45		37	4	14	6	8	23.35	.60	3.11	.55	1.63	2	2
45		38	4	10	6	8	22.73	.84	3.19	.52	1.59	2	2
45		38	4	12	6	8	22.73	.66	3.01	.52	1.59	2	2
45		39	4	8	6	8	22.15	1.02	3.18	.49	1.55	2	2
45		39	4	10	6	8	22.15	.75	2.95	.49	1.55	2	2
45		40	4	8	6	8	21.60	.92	2.94	.47	1.51	2	2

TABLE X-B (Cont'd) Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
45		40	4	10	6	8	21.60	.68	2.74	.47	1.51	2	2
45		41	4	8	6	8	21.07	.83	2.73	.44	1.47	2	2
45		41	4	10	6	8	21.07	.64	2.65	.44	1.47	1	2
45		42	4	8	6	8	20.57	.77	2.59	.42	1.43	1	2
45		35	4	14	7	8	24.68	.74	3.65	.52	1.48	2	2
45		35	4	16	7	8	24.68	.62	3.51	.52	1.48	2	2
45		36	4	12	7	8	24.00	.81	3.53	.49	1.43	2	2
45		36	4	14	7	8	24.00	.66	3.37	.49	1.43	2	2
45		37	4	12	7	8	23.35	.73	3.26	.47	1.40	2	2
45		37	4	14	7	8	23.35	.60	3.11	.47	1.40	2	2
45		38	4	10	7	8	22.73	.84	3.19	.44	1.36	2	2
45		38	4	12	7	8	22.73	.66	3.01	.44	1.36	2	2
45		39	4	8	7	8	22.15	1.02	3.18	.42	1.32	2	2
45		39	4	10	7	8	22.15	.75	2.95	.42	1.32	2	2
45		40	4	8	7	8	21.60	.92	2.94	.40	1.29	2	2
45		40	4	10	7	8	21.60	.68	2.74	.40	1.29	2	2
45		41	4	8	7	8	21.07	.83	2.73	.38	1.26	2	2
45		41	4	10	7	8	21.07	.64	2.65	.38	1.26	1	2
50		38	4	10	6	8	22.73	.96	3.67	.58	1.76	2	2
50		38	4	12	6	8	22.73	.75	3.46	.58	1.76	2	2
50		39	4	10	6	8	22.15	.87	3.39	.55	1.72	2	2
50		39	4	12	6	8	22.15	.68	3.20	.55	1.72	2	2
50		40	4	8	6	8	21.60	1.06	3.40	.52	1.67	2	2
50		40	4	10	6	8	21.60	.78	3.15	.52	1.67	2	2
50		41	4	8	6	8	21.07	.96	3.15	.49	1.63	2	2
50		41	4	10	6	8	21.07	.71	2.94	.49	1.63	1	2
50		42	4	8	6	8	20.57	.87	2.93	.47	1.59	2	2
50		42	4	10	6	8	20.57	.68	2.87	.47	1.59	1	2
50		43	4	8	6	8	20.09	.81	2.81	.45	1.56	1	2
50		44	4	8	6	8	19.63	.78	2.74	.43	1.52	1	2
50		36	4	14	7	8	24.00	.76	3.86	.55	1.59	2	2
50		36	4	16	7	8	24.00	.64	3.71	.55	1.59	2	2
50		37	4	12	7	8	23.35	.84	3.74	.52	1.55	2	2
50		37	4	14	7	8	23.35	.68	3.57	.52	1.55	2	2
50		38	4	10	7	8	22.73	.96	3.67	.49	1.51	2	2
50		38	4	12	7	8	22.73	.75	3.46	.49	1.51	2	2
50		39	4	10	7	8	22.15	.87	3.39	.47	1.47	2	2
50		39	4	12	7	8	22.15	.68	3.20	.47	1.47	2	2
50		40	4	8	7	8	21.60	1.06	3.40	.44	1.43	2	2
50		40	4	10	7	8	21.60	.78	3.15	.44	1.43	2	2
50		41	4	8	7	8	21.07	.96	3.15	.42	1.40	2	2
50		41	4	10	7	8	21.07	.71	2.94	.42	1.40	1	2
50		42	4	8	7	8	20.57	.87	2.93	.40	1.37	2	2
50		42	4	10	7	8	20.57	.68	2.87	.40	1.37	1	2
55		40	4	10	6	8	21.60	.89	3.57	.57	1.84	2	2
55		40	4	12	6	8	21.60	.70	3.37	.57	1.84	2	2
55		41	4	8	6	8	21.07	1.09	3.59	.54	1.80	2	2
55		41	4	10	6	8	21.07	.81	3.32	.54	1.80	2	2
55		42	4	8	6	8	20.57	.99	3.33	.52	1.75	2	2
55		42	4	10	6	8	20.57	.75	3.16	.52	1.75	1	2
55		43	4	8	6	8	20.09	.90	3.10	.49	1.71	2	2
55		43	4	10	6	8	20.09	.71	3.09	.49	1.71	1	2
55		44	4	8	6	8	19.63	.85	3.02	.47	1.67	1	2
55		45	4	8	6	8	19.20	.82	2.95	.45	1.64	1	2
55		46	4	8	6	8	18.78	.78	2.89	.43	1.60	1	2
55		37	4	14	7	8	23.35	.78	4.04	.57	1.71	2	2

TABLE X-B (Cont'd) Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
55		37	4	16	7	8	23.35	.65	3.88	.57	1.71	2	2
55		38	4	12	7	8	22.73	.86	3.92	.54	1.66	2	2
55		38	4	14	7	8	22.73	.70	3.74	.54	1.66	2	2
55		39	4	10	7	8	22.15	.99	3.86	.52	1.62	2	2
55		39	4	12	7	8	22.15	.77	3.63	.52	1.62	2	2
55		40	4	10	7	8	21.60	.89	3.57	.49	1.58	2	2
55		40	4	12	7	8	21.60	.70	3.37	.49	1.58	2	2
55		41	4	8	7	8	21.07	1.09	3.59	.47	1.54	2	2
55		41	4	10	7	8	21.07	.81	3.32	.47	1.54	2	2
55		42	4	8	7	8	20.57	.99	3.33	.44	1.50	2	2
55		42	4	10	7	8	20.57	.75	3.16	.44	1.50	1	2
55		43	4	8	7	8	20.09	.90	3.10	.42	1.47	2	2
55		43	4	10	7	8	20.09	.71	3.09	.42	1.47	1	2
60		41	4	10	6	8	21.07	.91	3.73	.59	1.96	2	2
60		41	4	12	6	8	21.07	.71	3.53	.59	1.96	1	2
60		42	4	8	6	8	20.57	1.11	3.76	.57	1.91	2	2
60		42	4	10	6	8	20.57	.82	3.47	.57	1.91	2	2
60		43	4	8	6	8	20.09	1.01	3.49	.54	1.87	2	2
60		43	4	10	6	8	20.09	.78	3.37	.54	1.87	1	2
60		44	4	8	6	8	19.63	.93	3.29	.52	1.83	1	2
60		45	4	8	6	8	19.20	.89	3.22	.49	1.79	1	2
60		46	4	8	6	8	18.78	.85	3.15	.47	1.75	1	2
60		47	4	8	6	8	18.38	.82	3.08	.45	1.71	1	2
60		38	4	12	7	8	22.73	.96	4.41	.59	1.81	2	2
60		38	4	14	7	8	22.73	.78	4.19	.59	1.81	2	2
60		39	4	12	7	8	22.15	.87	4.07	.56	1.77	2	2
60		39	4	14	7	8	22.15	.71	3.88	.56	1.77	2	2
60		40	4	10	7	8	21.60	1.00	4.02	.53	1.72	2	2
60		40	4	12	7	8	21.60	.78	3.78	.53	1.72	2	2
60		41	4	10	7	8	21.07	.91	3.73	.51	1.68	2	2
60		41	4	12	7	8	21.07	.71	3.53	.51	1.68	1	2
60		42	4	8	7	8	20.57	1.11	3.76	.48	1.64	2	2
60		42	4	10	7	8	20.57	.82	3.47	.48	1.64	2	2
60		43	4	8	7	8	20.09	1.01	3.49	.46	1.60	2	2
60		43	4	10	7	8	20.09	.78	3.37	.46	1.60	1	2
60		44	4	8	7	8	19.63	.93	3.29	.44	1.57	1	2
65		42	4	8	6	8	20.57	1.25	4.21	.61	2.07	2	2
65		42	4	10	6	8	20.57	.91	3.86	.61	2.07	2	2
65		43	4	8	6	8	20.09	1.13	3.90	.59	2.03	2	2
65		43	4	10	6	8	20.09	.85	3.65	.59	2.03	1	2
65		44	4	8	6	8	19.63	1.03	3.62	.56	1.98	2	2
65		44	4	10	6	8	19.63	.81	3.57	.56	1.98	1	2
65		45	4	8	6	8	19.20	.97	3.49	.53	1.94	1	2
65		46	4	8	6	8	18.78	.92	3.41	.51	1.89	1	2
65		47	4	8	6	8	18.38	.88	3.34	.49	1.85	1	2
65		48	4	8	6	8	18.00	.85	3.27	.47	1.81	1	2
65		40	4	12	7	8	21.60	.87	4.20	.58	1.87	2	2
65		40	4	14	7	8	21.60	.71	4.00	.58	1.87	2	2
65		41	4	10	7	8	21.07	1.01	4.16	.55	1.82	2	2
65		41	4	12	7	8	21.07	.79	3.90	.55	1.82	2	2
65		42	4	8	7	8	20.57	1.25	4.21	.53	1.78	2	2
65		42	4	10	7	8	20.57	.91	3.86	.53	1.78	2	2
65		43	4	8	7	8	20.09	1.13	3.90	.50	1.74	2	2
65		43	4	10	7	8	20.09	.85	3.65	.50	1.74	1	2
65		44	4	8	7	8	19.63	1.03	3.62	.48	1.70	2	2

TABLE X-B (Cont'd) Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
65		44	4	10	7	8	19.63	.81	3.57	.48	1.70	1	2
65		45	4	8	7	8	19.20	.97	3.49	.46	1.66	1	2
65		46	4	8	7	8	18.78	.92	3.41	.44	1.62	1	2
70		43	4	8	6	8	20.09	1.25	4.33	.63	2.18	2	2
70		43	4	10	6	8	20.09	.92	3.97	.63	2.18	2	2
70		44	4	8	6	8	19.63	1.14	4.02	.60	2.13	2	2
70		44	4	10	6	8	19.63	.87	3.84	.60	2.13	1	2
70		45	4	8	6	8	19.20	1.04	3.76	.58	2.09	1	2
70		46	4	8	6	8	18.78	1.00	3.68	.55	2.04	1	2
70		47	4	8	6	8	18.38	.95	3.60	.53	2.00	1	2
70		48	4	8	6	8	18.00	.91	3.52	.51	1.95	1	2
70		49	4	8	6	8	17.63	.88	3.45	.48	1.91	1	2
70		41	4	10	7	8	21.07	1.12	4.61	.59	1.96	2	2
70		41	4	12	7	8	21.07	.87	4.31	.59	1.96	2	2
70		42	4	10	7	8	20.57	1.01	4.27	.57	1.91	2	2
70		42	4	12	7	8	20.57	.79	4.03	.57	1.91	1	2
70		43	4	8	7	8	20.09	1.25	4.33	.54	1.87	2	2
70		43	4	10	7	8	20.09	.92	3.97	.54	1.87	2	2
70		44	4	8	7	8	19.63	1.14	4.02	.52	1.83	2	2
70		44	4	10	7	8	19.63	.87	3.84	.52	1.83	1	2
70		45	4	8	7	8	19.20	1.04	3.76	.49	1.79	1	2
70		46	4	8	7	8	18.78	1.00	3.68	.47	1.75	1	2
70		47	4	8	7	8	18.38	.95	3.60	.45	1.71	1	2
75		44	4	8	6	8	19.63	1.25	4.43	.65	2.29	2	2
75		44	4	10	6	8	19.63	.93	4.12	.65	2.29	1	2
75		45	4	8	6	8	19.20	1.14	4.12	.62	2.23	2	2
75		45	4	10	6	8	19.20	.89	4.03	.62	2.23	1	2
75		46	4	8	6	8	18.78	1.07	3.94	.59	2.19	1	2
75		47	4	8	6	8	18.38	1.02	3.85	.57	2.14	1	2
75		48	4	8	6	8	18.00	.98	3.77	.54	2.09	1	2
75		49	4	8	6	8	17.63	.94	3.70	.52	2.05	1	2
75		50	4	8	6	8	17.28	.90	3.62	.50	2.01	1	2
75		43	4	10	7	8	20.09	1.01	4.36	.58	2.00	2	2
75		43	4	12	7	8	20.09	.81	4.21	.58	2.00	1	2
75		44	4	8	7	8	19.63	1.25	4.43	.55	1.96	2	2
75		44	4	10	7	8	19.63	.93	4.12	.55	1.96	1	2
75		45	4	8	7	8	19.20	1.14	4.12	.53	1.91	2	2
75		45	4	10	7	8	19.20	.89	4.03	.53	1.91	1	2
75		46	4	8	7	8	18.78	1.07	3.94	.51	1.87	1	2
75		47	4	8	7	8	18.38	1.02	3.85	.48	1.83	1	2
75		48	4	8	7	8	18.00	.98	3.77	.46	1.79	1	2
75		49	4	8	7	8	17.63	.94	3.70	.44	1.76	1	2
80		44	4	8	6	8	19.63	1.38	4.86	.69	2.44	2	2
80		44	4	10	6	8	19.63	1.00	4.43	.69	2.44	2	2
80		45	4	8	6	8	19.20	1.25	4.51	.66	2.38	2	2
80		45	4	10	6	8	19.20	.95	4.29	.66	2.38	1	2
80		46	4	8	6	8	18.78	1.14	4.20	.63	2.33	1	2
80		47	4	8	6	8	18.38	1.09	4.11	.60	2.28	1	2
80		48	4	8	6	8	18.00	1.04	4.03	.58	2.23	1	2
80		49	4	8	6	8	17.63	1.00	3.94	.55	2.19	1	2
80		50	4	8	6	8	17.28	.96	3.86	.53	2.14	1	2
80		44	4	8	7	8	19.63	1.38	4.86	.59	2.09	2	2
80		44	4	10	7	8	19.63	1.00	4.43	.59	2.09	2	2
80		45	4	8	7	8	19.20	1.25	4.51	.56	2.04	2	2
80		45	4	10	7	8	19.20	.95	4.29	.56	2.04	1	2
80		46	4	8	7	8	18.78	1.14	4.20	.54	2.00	1	2

TABLE X-B (Cont'd) Slab 36 x 72 ft L/Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
80		47	4	8	7	8	18.38	1.09	4.11	.52	1.96	1	2
80		48	4	8	7	8	18.00	1.04	4.03	.49	1.91	1	2
80		49	4	8	7	8	17.63	1.00	3.94	.47	1.88	1	2
80		50	4	8	7	8	17.28	.96	3.86	.46	1.84	1	2
85		45	4	8	6	8	19.20	1.36	4.92	.70	2.53	2	2
85		45	4	10	6	8	19.20	1.01	4.56	.70	2.53	1	2
85		46	4	8	6	8	18.78	1.24	4.58	.67	2.48	2	2
85		46	4	10	6	8	18.78	.97	4.46	.67	2.48	1	2
85		47	4	8	6	8	18.38	1.16	4.37	.64	2.43	1	2
85		48	4	8	6	8	18.00	1.11	4.28	.61	2.37	1	2
85		49	4	8	6	8	17.63	1.07	4.19	.59	2.33	1	2
85		50	4	8	6	8	17.28	1.02	4.11	.57	2.28	1	2
85		51	4	8	6	8	16.94	.98	4.03	.54	2.23	1	2
85		45	4	8	7	8	19.20	1.36	4.92	.60	2.17	2	2
85		45	4	10	7	8	19.20	1.01	4.56	.60	2.17	1	2
85		46	4	8	7	8	18.78	1.24	4.58	.57	2.12	2	2
85		46	4	10	7	8	18.78	.97	4.46	.57	2.12	1	2
85		47	4	8	7	8	18.38	1.16	4.37	.55	2.08	1	2
85		48	4	8	7	8	18.00	1.11	4.28	.53	2.03	1	2
85		49	4	8	7	8	17.63	1.07	4.19	.50	1.99	1	2
85		50	4	8	7	8	17.28	1.02	4.11	.48	1.95	1	2
85		51	4	8	7	8	16.94	.98	4.03	.47	1.91	1	2
90		46	4	8	6	8	18.78	1.35	4.97	.71	2.62	2	2
90		46	4	10	6	8	18.78	1.02	4.73	.71	2.62	1	2
90		47	4	8	6	8	18.38	1.23	4.63	.68	2.57	2	2
90		47	4	10	6	8	18.38	.98	4.63	.68	2.57	1	2
90		48	4	8	6	8	18.00	1.18	4.53	.65	2.51	1	2
90		49	4	8	6	8	17.63	1.13	4.44	.62	2.46	1	2
90		50	4	8	6	8	17.28	1.08	4.35	.60	2.41	1	2
90		51	4	8	6	8	16.94	1.04	4.26	.58	2.37	1	2
90		52	4	8	6	8	16.61	1.00	4.18	.55	2.32	1	2
90		46	4	8	7	8	18.78	1.35	4.97	.61	2.25	2	2
90		46	4	10	7	8	18.78	1.02	4.73	.61	2.25	1	2
90		47	4	8	7	8	18.38	1.23	4.63	.58	2.20	2	2
90		47	4	10	7	8	18.38	.98	4.63	.58	2.20	1	2
90		48	4	8	7	8	18.00	1.18	4.53	.56	2.15	1	2
90		49	4	8	7	8	17.63	1.13	4.44	.53	2.11	1	2
90		50	4	8	7	8	17.28	1.08	4.35	.51	2.07	1	2
90		51	4	8	7	8	16.94	1.04	4.26	.49	2.03	1	2
90		52	4	8	7	8	16.61	1.00	4.18	.47	1.99	1	2
95		46	4	8	6	8	18.78	1.46	5.38	.75	2.77	2	2
95		46	4	10	6	8	18.78	1.08	4.99	.75	2.77	1	2
95		47	4	8	6	8	18.38	1.33	5.00	.72	2.71	2	2
95		47	4	10	6	8	18.38	1.04	4.88	.72	2.71	1	2
95		48	4	8	6	8	18.00	1.24	4.78	.69	2.65	1	2
95		49	4	8	6	8	17.63	1.19	4.68	.66	2.60	1	2
95		50	4	8	6	8	17.28	1.14	4.59	.63	2.55	1	2
95		51	4	8	6	8	16.94	1.10	4.50	.61	2.50	1	2
95		52	4	8	6	8	16.61	1.06	4.41	.59	2.45	1	2
95		46	4	8	7	8	18.78	1.46	5.38	.64	2.37	2	2
95		46	4	10	7	8	18.78	1.08	4.99	.64	2.37	1	2
95		47	4	8	7	8	18.38	1.33	5.00	.61	2.32	2	2
95		47	4	10	7	8	18.38	1.04	4.88	.61	2.32	1	2
95		48	4	8	7	8	18.00	1.24	4.78	.59	2.27	1	2
95		49	4	8	7	8	17.63	1.19	4.68	.56	2.23	1	2
95		50	4	8	7	8	17.28	1.14	4.59	.54	2.18	1	2

TABLE X-B (Cont'd) Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
95		51	4	8	7	8	16.94	1.10	4.50	.52	2.14	1	2
95		52	4	8	7	8	16.61	1.06	4.41	.50	2.10	1	2
100		47	4	8	6	8	18.38	1.43	5.39	.76	2.85	2	2
100		47	4	10	6	8	18.38	1.09	5.14	.76	2.85	1	2
100		48	4	8	6	8	18.00	1.31	5.03	.72	2.79	1	2
100		49	4	8	6	8	17.63	1.25	4.93	.69	2.74	1	2
100		50	4	8	6	8	17.28	1.20	4.83	.67	2.68	1	2
100		51	4	8	6	8	16.94	1.16	4.74	.64	2.63	1	2
100		52	4	8	6	8	16.61	1.11	4.65	.62	2.58	1	2
100		53	4	8	6	8	16.30	1.07	4.56	.59	2.53	1	2
100		47	4	8	7	8	18.38	1.43	5.39	.65	2.45	2	2
100		47	4	10	7	8	18.38	1.09	5.14	.65	2.45	1	2
100		48	4	8	7	8	18.00	1.31	5.03	.62	2.39	1	2
100		49	4	8	7	8	17.63	1.25	4.93	.59	2.35	1	2
100		50	4	8	7	8	17.28	1.20	4.83	.57	2.30	1	2
100		51	4	8	7	8	16.94	1.16	4.74	.55	2.25	1	2
100		52	4	8	7	8	16.61	1.11	4.65	.53	2.21	1	2
100		53	4	8	7	8	16.30	1.07	4.56	.51	2.17	1	2
105		47	4	8	6	8	18.38	1.54	5.79	.79	3.00	2	2
105		47	4	10	6	8	18.38	1.14	5.40	.79	3.00	1	2
105		48	4	8	6	8	18.00	1.40	5.39	.76	2.93	2	2
105		48	4	10	6	8	18.00	1.10	5.29	.76	2.93	1	2
105		49	4	8	6	8	17.63	1.32	5.18	.73	2.87	1	2
105		50	4	8	6	8	17.28	1.26	5.07	.70	2.82	1	2
105		51	4	8	6	8	16.94	1.22	4.97	.67	2.76	1	2
105		52	4	8	6	8	16.61	1.17	4.88	.65	2.71	1	2
105		53	4	8	6	8	16.30	1.13	4.79	.62	2.66	1	2
105		47	4	8	7	8	18.38	1.54	5.79	.68	2.57	2	2
105		47	4	10	7	8	18.38	1.14	5.40	.68	2.57	1	2
105		48	4	8	7	8	18.00	1.40	5.39	.65	2.51	2	2
105		48	4	10	7	8	18.00	1.10	5.29	.65	2.51	1	2
105		49	4	8	7	8	17.63	1.32	5.18	.62	2.46	1	2
105		50	4	8	7	8	17.28	1.26	5.07	.60	2.41	1	2
105		51	4	8	7	8	16.94	1.22	4.97	.58	2.37	1	2
105		52	4	8	7	8	16.61	1.17	4.88	.55	2.32	1	2
105		53	4	8	7	8	16.30	1.13	4.79	.53	2.28	1	2
110		48	4	8	6	8	18.00	1.50	5.77	.80	3.07	2	2
110		48	4	10	6	8	18.00	1.15	5.54	.80	3.07	1	2
110		49	4	8	6	8	17.63	1.38	5.42	.76	3.01	1	2
110		50	4	8	6	8	17.28	1.33	5.32	.73	2.95	1	2
110		51	4	8	6	8	16.94	1.27	5.21	.71	2.89	1	2
110		52	4	8	6	8	16.61	1.22	5.11	.68	2.84	1	2
110		53	4	8	6	8	16.30	1.18	5.01	.65	2.78	1	2
110		54	4	8	6	8	16.00	1.14	4.92	.63	2.73	1	2
110		48	4	8	7	8	18.00	1.50	5.77	.68	2.63	2	2
110		48	4	10	7	8	18.00	1.15	5.54	.68	2.63	1	2
110		49	4	8	7	8	17.63	1.38	5.42	.65	2.58	1	2
110		50	4	8	7	8	17.28	1.33	5.32	.63	2.53	1	2
110		51	4	8	7	8	16.94	1.27	5.21	.60	2.48	1	2
110		52	4	8	7	8	16.61	1.22	5.11	.58	2.43	1	2
110		53	4	8	7	8	16.30	1.18	5.01	.56	2.39	1	2
110		54	4	8	7	8	16.00	1.14	4.92	.54	2.34	1	2
115		48	4	8	6	10	18.00	1.60	6.17	.67	3.21	2	2
115		48	4	10	6	10	18.00	1.20	5.79	.67	3.21	1	2
115		49	4	8	6	8	17.63	1.46	5.74	.80	3.15	2	2
115		49	4	10	6	8	17.63	1.15	5.67	.80	3.15	1	2

TABLE X-B (Cont'd) **Slab 36 x 72 ft** **L /Δ = 300**

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
115		50	4	8	6	8	17.28	1.39	5.56	.77	3.09	1	2
115		51	4	8	6	8	16.94	1.33	5.45	.74	3.02	1	2
115		52	4	8	6	8	16.61	1.28	5.34	.71	2.97	1	2
115		53	4	8	6	8	16.30	1.23	5.24	.68	2.91	1	2
115		54	4	8	6	8	16.00	1.19	5.15	.66	2.86	1	2
115		48	4	8	7	8	18.00	1.60	6.17	.71	2.75	2	2
115		48	4	10	7	8	18.00	1.20	5.79	.71	2.75	1	2
115		49	4	8	7	8	17.63	1.46	5.74	.68	2.70	2	2
115		49	4	10	7	8	17.63	1.15	5.67	.68	2.70	1	2
115		50	4	8	7	8	17.28	1.39	5.56	.66	2.64	1	2
115		51	4	8	7	8	16.94	1.33	5.45	.63	2.59	1	2
115		52	4	8	7	8	16.61	1.28	5.34	.61	2.54	1	2
115		53	4	8	7	8	16.30	1.23	5.24	.58	2.49	1	2
115		54	4	8	7	8	16.00	1.19	5.15	.56	2.45	1	2
120		48	4	8	6	10	18.00	1.71	6.58	.69	3.35	2	2
120		48	4	10	6	10	18.00	1.25	6.04	.69	3.35	1	2
120		49	4	8	6	8	17.63	1.56	6.12	.83	3.29	2	2
120		49	4	10	6	8	17.63	1.20	5.92	.83	3.29	1	2
120		50	4	8	6	8	17.28	1.45	5.80	.80	3.22	1	2
120		51	4	8	6	8	16.94	1.39	5.69	.77	3.16	1	2
120		52	4	8	6	8	16.61	1.34	5.58	.74	3.10	1	2
120		53	4	8	6	8	16.30	1.29	5.47	.71	3.04	1	2
120		54	4	8	6	8	16.00	1.24	5.37	.69	2.98	1	2
120		48	4	8	7	8	18.00	1.71	6.58	.74	2.87	2	2
120		48	4	10	7	8	18.00	1.25	6.04	.74	2.87	1	2
120		49	4	8	7	8	17.63	1.56	6.12	.71	2.82	2	2
120		49	4	10	7	8	17.63	1.20	5.92	.71	2.82	1	2
120		50	4	8	7	8	17.28	1.45	5.80	.69	2.76	1	2
120		51	4	8	7	8	16.94	1.39	5.69	.66	2.70	1	2
120		52	4	8	7	8	16.61	1.34	5.58	.63	2.65	1	2
120		53	4	8	7	8	16.30	1.29	5.47	.61	2.60	1	2
120		54	4	8	7	8	16.00	1.24	5.37	.59	2.55	1	2
125		49	4	8	6	10	17.63	1.66	6.51	.69	3.42	2	2
125		49	4	10	6	10	17.63	1.25	6.17	.69	3.42	1	2
125		50	4	8	6	8	17.28	1.51	6.06	.83	3.35	2	2
125		50	4	10	6	8	17.28	1.20	6.04	.83	3.35	1	2
125		51	4	8	6	8	16.94	1.45	5.92	.80	3.29	1	2
125		52	4	8	6	8	16.61	1.39	5.81	.77	3.23	1	2
125		53	4	8	6	8	16.30	1.34	5.70	.74	3.16	1	2
125		54	4	8	6	8	16.00	1.29	5.59	.72	3.11	1	2
125		55	4	8	6	8	15.70	1.24	5.49	.69	3.05	1	2
125		49	4	8	7	8	17.63	1.66	6.51	.74	2.93	2	2
125		49	4	10	7	8	17.63	1.25	6.17	.74	2.93	1	2
125		50	4	8	7	8	17.28	1.51	6.06	.71	2.87	2	2
125		50	4	10	7	8	17.28	1.20	6.04	.71	2.87	1	2
125		51	4	8	7	8	16.94	1.45	5.92	.69	2.82	1	2
125		52	4	8	7	8	16.61	1.39	5.81	.66	2.76	1	2
125		53	4	8	7	8	16.30	1.34	5.70	.64	2.71	1	2
125		54	4	8	7	8	16.00	1.29	5.59	.61	2.66	1	2
125		55	4	8	7	8	15.70	1.24	5.49	.59	2.61	1	2
130		47	4	10	6	10	18.38	1.52	7.14	.79	3.71	2	2
130		47	4	12	6	10	18.38	1.18	6.68	.79	3.71	1	2
130		49	4	8	6	10	17.63	1.76	6.90	.72	3.56	2	2
130		49	4	10	6	10	17.63	1.30	6.41	.72	3.56	1	2
130		50	4	8	6	10	17.28	1.60	6.43	.69	3.49	2	2
130		50	4	10	6	10	17.28	1.25	6.28	.69	3.49	1	2

TABLE X-B (Cont'd) Slab 36 x 72 ft $L/\Delta = 300$

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
130		51	4	8	6	8	16.94	1.51	6.16	.83	3.42	1	2
130		52	4	8	6	8	16.61	1.45	6.04	.80	3.35	1	2
130		53	4	8	6	8	16.30	1.39	5.93	.77	3.29	1	2
130		54	4	8	6	8	16.00	1.34	5.82	.74	3.23	1	2
130		47	4	10	7	8	18.38	1.52	7.14	.84	3.18	2	2
130		47	4	12	7	8	18.38	1.18	6.68	.84	3.18	1	2
130		49	4	8	7	8	17.63	1.76	6.90	.77	3.05	2	2
130		49	4	10	7	8	17.63	1.30	6.41	.77	3.05	1	2
130		50	4	8	7	8	17.28	1.60	6.43	.74	2.99	2	2
130		50	4	10	7	8	17.28	1.25	6.28	.74	2.99	1	2
130		51	4	8	7	8	16.94	1.51	6.16	.71	2.93	1	2
130		52	4	8	7	8	16.61	1.45	6.04	.69	2.87	1	2
130		53	4	8	7	8	16.30	1.39	5.93	.66	2.82	1	2
130		54	4	8	7	8	16.00	1.34	5.82	.64	2.77	1	2
135		47	4	10	6	10	18.38	1.60	7.56	.82	3.85	2	2
135		47	4	12	6	10	18.38	1.23	6.94	.82	3.85	2	2
135		50	4	8	6	10	17.28	1.70	6.80	.72	3.62	2	2
135		50	4	10	6	10	17.28	1.30	6.53	.72	3.62	1	2
135		51	4	8	6	10	16.94	1.56	6.40	.69	3.55	1	2
135		52	4	8	6	10	16.61	1.50	6.27	.67	3.48	1	2
135		53	4	8	6	8	16.30	1.45	6.16	.80	3.42	1	2
135		54	4	8	6	8	16.00	1.39	6.04	.77	3.35	1	2
135		55	4	8	6	8	15.70	1.34	5.93	.74	3.29	1	2
135		47	4	10	7	10	18.38	1.60	7.56	.70	3.30	2	2
135		47	4	12	7	10	18.38	1.23	6.94	.70	3.30	2	2
135		50	4	8	7	8	17.28	1.70	6.80	.77	3.10	2	2
135		50	4	10	7	8	17.28	1.30	6.53	.77	3.10	1	2
135		51	4	8	7	8	16.94	1.56	6.40	.74	3.04	1	2
135		52	4	8	7	8	16.61	1.50	6.27	.71	2.99	1	2
135		53	4	8	7	8	16.30	1.45	6.16	.69	2.93	1	2
135		54	4	8	7	8	16.00	1.39	6.04	.66	2.87	1	2
135		55	4	8	7	8	15.70	1.34	5.93	.64	2.82	1	2
140		48	4	10	6	12	18.00	1.54	7.41	.68	3.91	2	2
140		48	4	12	6	12	18.00	1.22	7.05	.68	3.91	1	2
140		50	4	8	6	10	17.28	1.79	7.19	.75	3.76	2	2
140		50	4	10	6	10	17.28	1.35	6.77	.75	3.76	1	2
140		51	4	8	6	10	16.94	1.64	6.70	.72	3.68	2	2
140		51	4	10	6	10	16.94	1.30	6.63	.72	3.68	1	2
140		52	4	8	6	10	16.61	1.56	6.51	.69	3.61	1	2
140		53	4	8	6	10	16.30	1.50	6.38	.66	3.54	1	2
140		54	4	8	6	10	16.00	1.45	6.27	.64	3.48	1	2
140		55	4	8	6	8	15.70	1.39	6.15	.77	3.42	1	2
140		48	4	10	7	10	18.00	1.54	7.41	.69	3.35	2	2
140		48	4	12	7	10	18.00	1.22	7.05	.69	3.35	1	2
140		50	4	8	7	8	17.28	1.79	7.19	.80	3.22	2	2
140		50	4	10	7	8	17.28	1.35	6.77	.80	3.22	1	2
140		51	4	8	7	8	16.94	1.64	6.70	.77	3.16	2	2
140		51	4	10	7	8	16.94	1.30	6.63	.77	3.16	1	2
140		52	4	8	7	8	16.61	1.56	6.51	.74	3.10	1	2
140		53	4	8	7	8	16.30	1.50	6.38	.71	3.04	1	2
140		54	4	8	7	8	16.00	1.45	6.27	.69	2.98	1	2
140		55	4	8	7	8	15.70	1.39	6.15	.66	2.93	1	2
145		48	4	10	6	12	18.00	1.62	7.81	.70	4.05	2	2
145		48	4	12	6	12	18.00	1.26	7.30	.70	4.05	1	2
145		49	4	10	6	10	17.63	1.48	7.27	.81	3.97	2	2

TABLE X-B (Cont'd) Slab 36 x 72 ft L /Δ = 300

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
145		49	4	12	6	10	17.63	1.21	7.15	.81	3.97	1	2
145		50	4	10	6	10	17.28	1.40	7.01	.77	3.89	1	2
145		51	4	8	6	10	16.94	1.73	7.07	.74	3.82	2	2
145		51	4	10	6	10	16.94	1.34	6.87	.74	3.82	1	2
145		52	4	8	6	10	16.61	1.62	6.74	.72	3.74	1	2
145		53	4	8	6	10	16.30	1.56	6.61	.69	3.67	1	2
145		54	4	8	6	10	16.00	1.50	6.49	.66	3.60	1	2
145		48	4	10	7	10	18.00	1.62	7.81	.72	3.47	2	2
145		48	4	12	7	10	18.00	1.26	7.30	.72	3.47	1	2
145		49	4	10	7	8	17.63	1.48	7.27	.86	3.40	2	2
145		49	4	12	7	8	17.63	1.21	7.15	.86	3.40	1	2
145		50	4	10	7	8	17.28	1.40	7.01	.83	3.34	1	2
145		51	4	8	7	8	16.94	1.73	7.07	.80	3.27	2	2
145		51	4	10	7	8	16.94	1.34	6.87	.80	3.27	1	2
145		52	4	8	7	8	16.61	1.62	6.74	.77	3.21	1	2
145		53	4	8	7	8	16.30	1.56	6.61	.74	3.15	1	2
145		54	4	8	7	8	16.00	1.50	6.49	.71	3.09	1	2
150		48	4	10	6	12	18.00	1.71	8.22	.72	4.19	2	2
150		48	4	12	6	12	18.00	1.31	7.55	.72	4.19	1	2
150		49	4	10	6	10	17.63	1.56	7.65	.83	4.11	2	2
150		49	4	12	6	10	17.63	1.25	7.40	.83	4.11	1	2
150		50	4	10	6	10	17.28	1.45	7.25	.80	4.03	1	2
150		51	4	10	6	10	16.94	1.39	7.11	.77	3.95	1	2
150		52	4	10	6	10	16.61	1.34	6.97	.74	3.87	1	2
150		53	4	8	6	10	16.30	1.61	6.84	.71	3.80	1	2
150		48	4	10	7	10	18.00	1.71	8.22	.74	3.59	2	2
150		48	4	12	7	10	18.00	1.31	7.55	.74	3.59	1	2
150		49	4	10	7	10	17.63	1.56	7.65	.71	3.52	2	2
150		49	4	12	7	10	17.63	1.25	7.40	.71	3.52	1	2
150		50	4	10	7	8	17.28	1.45	7.25	.86	3.45	1	2
150		51	4	10	7	8	16.94	1.39	7.11	.83	3.38	1	2
150		52	4	10	7	8	16.61	1.34	6.97	.79	3.32	1	2
150		53	4	8	7	8	16.30	1.61	6.84	.76	3.25	1	2
150		54	4	8	7	8	16.00	1.55	6.71	.74	3.19	1	2
150		54	4	8	6	10	16.00	1.55	6.71	.69	3.73	1	2

TABLE X-C Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
4	.01	7	4	8	6	10		.46	.25	.18	.12		
4	.01	7	4	8	7	8		.46	.25	.19	.10		
4	.02	9	4	8	6	8		.45	.32	.24	.17		
4	.02	9	4	8	7	8		.45	.32	.24	.17		
4	.03	12	4	8	6	8		.42	.40	.24	.23		
4	.03	12	4	8	7	8		.42	.40	.24	.23		
8	.02	11	4	8	6	10		.58	.51	.23	.25		
8	.02	11	4	8	7	8		.58	.51	.24	.21		
8	.03	14	4	8	6	8		.54	.60	.25	.28		
8	.03	14	4	8	7	8		.54	.60	.25	.28		
8	.04	16	4	8	6	8		.50	.65	.27	.35		
8	.04	16	4	8	7	8		.50	.65	.27	.35		
8	.05	19	4	8	6	8		.47	.71	.27	.42		
8	.05	19	4	8	7	8		.47	.71	.27	.42		
8	.06	21	4	8	6	8		.48	.80	.28	.47		
8	.06	21	4	8	7	8		.48	.80	.28	.47		
12	.03	15	4	8	6	10		.64	.77	.25	.38		
12	.03	15	4	8	7	8		.64	.77	.26	.32		
12	.04	18	4	8	6	8		.61	.87	.27	.40		
12	.04	18	4	8	7	8		.61	.87	.26	.38		
12	.05	20	4	8	6	8		.59	.95	.28	.45		
12	.05	20	4	8	7	8		.59	.95	.28	.45		
12	.06	23	4	8	6	8		.53	.97	.28	.53		
12	.06	23	4	8	7	8		.53	.97	.28	.53		
12	.07	26	4	8	6	8		.52	1.09	.28	.58		
12	.07	26	4	8	7	8		.52	1.09	.28	.58		
12	.08	28	4	8	6	8		.51	1.14	.29	.65		
12	.08	28	4	8	7	8		.51	1.14	.29	.65		
12	.09	30	4	8	6	8		.50	1.21	.29	.71		
12	.09	30	4	8	7	8		.50	1.21	.29	.71		
12		33	4	8	6	8	26.18	.44	1.17	.30	.79	2	1
12		33	4	10	6	8	26.18	.33	1.10	.30	.79	2	1
12		34	4	8	6	8	25.41	.39	1.08	.30	.81	2	1
12		34	4	10	6	8	25.41	.29	1.01	.30	.81	2	1
12		35	4	8	6	8	24.68	.35	.99	.30	.84	2	1
12		35	4	10	6	8	24.68	.26	.92	.30	.84	2	1
12		30	4	8	7	8	28.80	.50	1.21	.30	.72	2	1
12		30	4	10	7	8	28.80	.38	1.14	.30	.72	2	1
12		31	4	8	7	8	27.87	.44	1.11	.30	.74	2	1
12		31	4	10	7	8	27.87	.33	1.04	.30	.74	2	1
12		32	4	8	7	8	27.00	.39	1.01	.30	.76	2	1
12		32	4	10	7	8	27.00	.29	.95	.30	.76	2	1
12		33	4	8	7	8	26.18	.44	1.17	.30	.79	2	1
12		33	4	10	7	8	26.18	.33	1.10	.30	.79	2	1
12		34	4	8	7	8	25.41	.39	1.08	.30	.81	2	1
12		34	4	10	7	8	25.41	.29	1.01	.30	.81	2	1
12		35	4	8	7	8	24.68	.35	.99	.30	.84	2	1
12		35	4	10	7	8	24.68	.26	.92	.30	.84	2	1
16	.04	19	4	8	6	10		.68	1.03	.27	.51		
16	.04	19	4	8	7	8		.68	1.03	.28	.42		
16	.05	22	4	8	6	10		.63	1.11	.27	.61		
16	.05	22	4	8	7	8		.63	1.11	.27	.49		
16	.06	25	4	8	6	8		.60	1.21	.28	.56		
16	.06	25	4	8	7	8		.60	1.21	.28	.56		
16	.07	28	4	8	6	8		.56	1.25	.28	.63		

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
16	.07	28	4	8	7	8		.56	1.25	.28	.63		
16	.08	30	4	8	6	8		.54	1.30	.29	.71		
16	.08	30	4	8	7	8		.54	1.30	.29	.71		
16	.09	33	4	8	6	8		.51	1.36	.29	.77		
16	.09	33	4	8	7	8		.51	1.36	.29	.77		
16		35	4	8	6	8	24.68	.51	1.43	.30	.84	2	1
16		35	4	10	6	8	24.68	.38	1.35	.30	.84	2	1
16		36	4	8	6	8	24.00	.46	1.32	.30	.86	2	1
16		36	4	10	6	8	24.00	.34	1.24	.30	.86	2	1
16		37	4	8	6	8	23.35	.41	1.22	.30	.88	2	1
16		37	4	10	6	8	23.35	.31	1.15	.30	.88	2	1
16		38	4	8	6	8	22.73	.37	1.13	.30	.91	2	1
16		38	4	10	6	8	22.73	.28	1.06	.30	.91	2	1
16		35	4	8	7	8	24.68	.51	1.43	.30	.84	2	1
16		35	4	10	7	8	24.68	.38	1.35	.30	.84	2	1
16		36	4	8	7	8	24.00	.46	1.32	.30	.86	2	1
16		36	4	10	7	8	24.00	.34	1.24	.30	.86	2	1
16		37	4	8	7	8	23.35	.41	1.22	.30	.88	2	1
16		37	4	10	7	8	23.35	.31	1.15	.30	.88	2	1
16		38	4	8	7	8	22.73	.37	1.13	.30	.91	2	1
16		38	4	10	7	8	22.73	.28	1.06	.30	.91	2	1
20	.05	23	4	8	6	8		.70	1.29	.33	.62		
20	.05	23	4	8	7	8		.70	1.29	.29	.53		
20	.06	26	4	8	6	8		.67	1.40	.31	.65		
20	.06	26	4	8	7	8		.67	1.40	.28	.59		
20	.07	29	4	8	6	8		.62	1.44	.28	.67		
20	.07	29	4	8	7	8		.62	1.44	.28	.67		
20	.08	31	4	8	6	8		.64	1.61	.29	.72		
20	.08	31	4	8	7	8		.64	1.61	.29	.72		
20	.09	34	4	8	6	8		.61	1.68	.29	.79		
20	.09	34	4	8	7	8		.61	1.68	.29	.79		
20		37	4	8	6	8	23.35	.55	1.63	.30	.88	2	1
20		37	4	10	6	8	23.35	.41	1.53	.30	.88	2	1
20		38	4	8	6	8	22.73	.49	1.51	.30	.91	2	1
20		38	4	10	6	8	22.73	.37	1.42	.30	.91	2	1
20		39	4	8	6	8	22.15	.45	1.40	.30	.93	2	1
20		39	4	10	6	8	22.15	.33	1.32	.30	.93	2	1
20		40	4	8	6	8	21.60	.40	1.31	.30	.96	2	1
20		40	4	10	6	8	21.60	.30	1.22	.30	.96	2	1
20		37	4	8	7	8	23.35	.55	1.63	.30	.88	2	1
20		37	4	10	7	8	23.35	.41	1.53	.30	.88	2	1
20		38	4	8	7	8	22.73	.49	1.51	.30	.91	2	1
20		38	4	10	7	8	22.73	.37	1.42	.30	.91	2	1
20		39	4	8	7	8	22.15	.45	1.40	.30	.93	2	1
20		39	4	10	7	8	22.15	.33	1.32	.30	.93	2	1
20		40	4	8	7	8	21.60	.40	1.31	.30	.96	2	1
20		40	4	10	7	8	21.60	.30	1.22	.30	.96	2	1
24	.06	27	4	8	6	8		.71	1.55	.34	.74		
24	.06	27	4	8	7	8		.71	1.55	.29	.64		
24	.07	30	4	8	6	8		.70	1.70	.32	.78		
24	.07	30	4	8	7	8		.70	1.70	.28	.68		
24	.08	33	4	8	6	8		.66	1.75	.30	.80		
24	.08	33	4	8	7	8		.66	1.75	.29	.76		
24	.09	36	4	8	6	8		.63	1.82	.29	.84		
24	.09	36	4	8	7	8		.63	1.82	.29	.84		
24		38	4	8	6	8	22.73	.62	1.90	.30	.91	2	1

TABLE X-C (Cont'd) Slab 36 x 72 ft $L/\Delta = 360$

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
24		38	4	10	6	8	22.73	.47	1.79	.30	.91	2	1
24		39	4	8	6	8	22.15	.56	1.77	.30	.93	2	1
24		39	4	10	6	8	22.15	.42	1.67	.30	.93	2	1
24		40	4	8	6	8	21.60	.51	1.65	.30	.96	2	1
24		40	4	10	6	8	21.60	.38	1.55	.30	.96	2	1
24		41	4	8	6	8	21.07	.47	1.54	.30	.98	2	1
24		41	4	10	6	8	21.07	.35	1.44	.30	.98	2	1
24		38	4	8	7	8	22.73	.62	1.90	.30	.91	2	1
24		38	4	10	7	8	22.73	.47	1.79	.30	.91	2	1
24		39	4	8	7	8	22.15	.56	1.77	.30	.93	2	1
24		39	4	10	7	8	22.15	.42	1.67	.30	.93	2	1
24		40	4	8	7	8	21.60	.51	1.65	.30	.96	2	1
24		40	4	10	7	8	21.60	.38	1.55	.30	.96	2	1
24		41	4	8	7	8	21.07	.47	1.54	.30	.98	2	1
24		41	4	10	7	8	21.07	.35	1.44	.30	.98	2	1
28	.07	31	4	8	6	8		.73	1.81	.35	.87		
28	.07	31	4	8	7	8		.73	1.81	.30	.74		
28	.08	34	4	8	6	8		.73	2.00	.33	.91		
28	.08	34	4	8	7	8		.73	2.00	.28	.78		
28	.09	37	4	8	6	8		.70	2.07	.31	.94		
28	.09	37	4	8	7	8		.70	2.07	.29	.86		
28		39	4	8	6	8	22.15	.69	2.16	.30	.96	2	2
28		39	4	10	6	8	22.15	.52	2.03	.30	.96	2	2
28		40	4	8	6	8	21.60	.62	2.01	.30	.96	2	1
28		40	4	10	6	8	21.60	.47	1.89	.30	.96	2	1
28		41	4	8	6	8	21.07	.57	1.87	.30	.98	2	1
28		41	4	10	6	8	21.07	.43	1.76	.30	.98	2	1
28		42	4	8	6	8	20.57	.52	1.75	.30	1.00	2	1
28		42	4	10	6	8	20.57	.39	1.64	.30	1.00	2	1
28		39	4	8	7	8	22.15	.69	2.16	.30	.93	2	1
28		39	4	10	7	8	22.15	.52	2.03	.30	.93	2	1
28		40	4	8	7	8	21.60	.62	2.01	.30	.96	2	1
28		40	4	10	7	8	21.60	.47	1.89	.30	.96	2	1
28		41	4	8	7	8	21.07	.57	1.87	.30	.98	2	1
28		41	4	10	7	8	21.07	.43	1.76	.30	.98	2	1
28		42	4	8	7	8	20.57	.52	1.75	.30	1.00	2	1
28		42	4	10	7	8	20.57	.39	1.64	.30	1.00	2	1
32	.08	35	4	8	6	8		.74	2.07	.35	.99		
32	.08	35	4	8	7	8		.74	2.07	.30	.85		
32	.09	38	4	8	6	8		.75	2.29	.34	1.04		
32	.09	38	4	8	7	8		.75	2.29	.29	.89		
32		41	4	8	6	8	21.07	.67	2.22	.31	1.04	2	2
32		41	4	10	6	8	21.07	.51	2.09	.31	1.04	2	2
32		42	4	8	6	8	20.57	.61	2.07	.30	1.02	2	2
32		42	4	10	6	8	20.57	.46	1.95	.30	1.02	2	2
32		43	4	8	6	8	20.09	.56	1.94	.30	1.03	2	1
32		43	4	10	6	8	20.09	.42	1.82	.30	1.03	2	1
32		44	4	8	6	8	19.63	.51	1.82	.30	1.05	2	1
32		44	4	10	6	8	19.63	.39	1.75	.30	1.05	1	1
32		41	4	8	7	8	21.07	.67	2.22	.30	.98	2	1
32		41	4	10	7	8	21.07	.51	2.09	.30	.98	2	1
32		42	4	8	7	8	20.57	.61	2.07	.30	1.00	2	1
32		42	4	10	7	8	20.57	.46	1.95	.30	1.00	2	1
32		43	4	8	7	8	20.09	.56	1.94	.30	1.03	2	1
32		43	4	10	7	8	20.09	.42	1.82	.30	1.03	2	1
32		44	4	8	7	8	19.63	.51	1.82	.30	1.05	2	1

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
32		44	4	10	7	8	19.63	.39	1.75	.30	1.05	1	1
36	.09	39	4	8	6	8		.74	2.33	.36	1.12		
36	.09	39	4	8	7	8		.74	2.33	.30	.96		
36		42	4	8	6	8	20.57	.71	2.41	.34	1.15	2	2
36		42	4	10	6	8	20.57	.54	2.26	.34	1.15	2	2
36		43	4	8	6	8	20.09	.65	2.25	.32	1.12	2	2
36		43	4	10	6	8	20.09	.49	2.12	.32	1.12	2	2
36		44	4	8	6	8	19.63	.60	2.11	.31	1.09	2	2
36		44	4	10	6	8	19.63	.45	1.99	.31	1.09	2	2
36		45	4	8	6	8	19.20	.55	1.98	.30	1.08	2	1
36		45	4	10	6	8	19.20	.42	1.93	.30	1.08	1	1
36		42	4	8	7	8	20.57	.71	2.41	.30	1.00	2	1
36		42	4	10	7	8	20.57	.54	2.26	.30	1.00	2	1
36		43	4	8	7	8	20.09	.65	2.25	.30	1.03	2	1
36		43	4	10	7	8	20.09	.49	2.12	.30	1.03	2	1
36		44	4	8	7	8	19.63	.60	2.11	.30	1.05	2	1
36		44	4	10	7	8	19.63	.45	1.99	.30	1.05	2	1
36		45	4	8	7	8	19.20	.55	1.98	.30	1.08	2	1
36		45	4	10	7	8	19.20	.42	1.93	.30	1.08	1	1
40		38	4	14	6	8	22.73	.59	3.13	.46	1.41	2	2
40		38	4	16	6	8	22.73	.49	3.02	.46	1.41	2	2
40		39	4	12	6	8	22.15	.65	3.04	.44	1.37	2	2
40		39	4	14	6	8	22.15	.53	2.91	.44	1.37	2	2
40		40	4	12	6	8	21.60	.59	2.83	.41	1.34	2	2
40		40	4	14	6	8	21.60	.48	2.71	.41	1.34	2	2
40		41	4	10	6	8	21.07	.67	2.78	.39	1.31	2	2
40		41	4	12	6	8	21.07	.53	2.64	.39	1.31	2	2
40		42	4	10	6	8	20.57	.61	2.59	.38	1.27	2	2
40		42	4	12	6	8	20.57	.49	2.47	.38	1.27	2	2
40		43	4	8	6	8	20.09	.75	2.59	.36	1.24	2	2
40		43	4	10	6	8	20.09	.56	2.42	.36	1.24	2	2
40		44	4	8	6	8	19.63	.68	2.42	.34	1.22	2	2
40		44	4	10	6	8	19.63	.51	2.27	.34	1.22	2	2
40		38	4	14	7	8	22.73	.59	3.13	.39	1.21	2	2
40		38	4	16	7	8	22.73	.49	3.02	.39	1.21	2	2
40		39	4	12	7	8	22.15	.65	3.04	.37	1.18	2	2
40		39	4	14	7	8	22.15	.53	2.91	.37	1.18	2	2
40		40	4	12	7	8	21.60	.59	2.83	.35	1.15	2	2
40		40	4	14	7	8	21.60	.48	2.71	.35	1.15	2	2
40		41	4	10	7	8	21.07	.67	2.78	.34	1.12	2	2
40		41	4	12	7	8	21.07	.53	2.64	.34	1.12	2	2
40		42	4	10	7	8	20.57	.61	2.59	.32	1.09	2	2
40		42	4	12	7	8	20.57	.49	2.47	.32	1.09	2	2
40		43	4	8	7	8	20.09	.75	2.59	.31	1.07	2	2
40		43	4	10	7	8	20.09	.56	2.42	.31	1.07	2	2
40		44	4	8	7	8	19.63	.68	2.42	.30	1.05	2	1
40		44	4	10	7	8	19.63	.51	2.27	.30	1.05	2	1
45		39	4	14	6	8	22.15	.62	3.39	.49	1.55	2	2
45		39	4	16	6	8	22.15	.52	3.26	.49	1.55	2	2
45		40	4	12	6	8	21.60	.68	3.29	.47	1.51	2	2
45		40	4	14	6	8	21.60	.56	3.15	.47	1.51	2	2
45		41	4	12	6	8	21.07	.62	3.07	.44	1.47	2	2
45		41	4	14	6	8	21.07	.51	2.94	.44	1.47	2	2
45		42	4	10	6	8	20.57	.71	3.02	.42	1.43	2	2
45		42	4	12	6	8	20.57	.56	2.86	.42	1.43	2	2
45		43	4	10	6	8	20.09	.65	2.82	.40	1.40	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
45		43	4	12	6	8	20.09	.52	2.68	.40	1.40	2	2
45		44	4	8	6	8	19.63	.80	2.82	.39	1.37	2	2
45		44	4	10	6	8	19.63	.60	2.64	.39	1.37	2	2
45		45	4	8	6	8	19.20	.73	2.64	.37	1.34	2	2
45		45	4	10	6	8	19.20	.55	2.48	.37	1.34	2	2
45		39	4	14	7	8	22.15	.62	3.39	.42	1.32	2	2
45		39	4	16	7	8	22.15	.52	3.26	.42	1.32	2	2
45		40	4	12	7	8	21.60	.68	3.29	.40	1.29	2	2
45		40	4	14	7	8	21.60	.56	3.15	.40	1.29	2	2
45		41	4	12	7	8	21.07	.62	3.07	.38	1.26	2	2
45		41	4	14	7	8	21.07	.51	2.94	.38	1.26	2	2
45		42	4	10	7	8	20.57	.71	3.02	.36	1.23	2	2
45		42	4	12	7	8	20.57	.56	2.86	.36	1.23	2	2
45		43	4	10	7	8	20.09	.65	2.82	.35	1.20	2	2
45		43	4	12	7	8	20.09	.52	2.68	.35	1.20	2	2
45		44	4	8	7	8	19.63	.80	2.82	.33	1.17	2	2
45		44	4	10	7	8	19.63	.60	2.64	.33	1.17	2	2
45		45	4	8	7	8	19.20	.73	2.64	.31	1.15	2	2
45		45	4	10	7	8	19.20	.55	2.48	.31	1.15	2	2
50		40	4	14	6	8	21.60	.64	3.61	.52	1.67	2	2
50		40	4	16	6	8	21.60	.54	3.48	.52	1.67	2	2
50		41	4	12	6	8	21.07	.71	3.51	.49	1.63	2	2
50		41	4	14	6	8	21.07	.58	3.36	.49	1.63	2	2
50		42	4	12	6	8	20.57	.65	3.28	.47	1.59	2	2
50		42	4	14	6	8	20.57	.53	3.14	.47	1.59	2	2
50		43	4	10	6	8	20.09	.75	3.23	.45	1.56	2	2
50		43	4	12	6	8	20.09	.59	3.07	.45	1.56	2	2
50		44	4	10	6	8	19.63	.68	3.02	.43	1.52	2	2
50		44	4	12	6	8	19.63	.54	2.87	.43	1.52	2	2
50		45	4	8	6	8	19.20	.84	3.03	.41	1.49	2	2
50		45	4	10	6	8	19.20	.63	2.83	.41	1.49	2	2
50		46	4	8	6	8	18.78	.77	2.84	.39	1.46	2	2
50		46	4	10	6	8	18.78	.58	2.66	.39	1.46	2	2
50		40	4	14	7	8	21.60	.64	3.61	.44	1.43	2	2
50		40	4	16	7	8	21.60	.54	3.48	.44	1.43	2	2
50		41	4	12	7	8	21.07	.71	3.51	.42	1.40	2	2
50		41	4	14	7	8	21.07	.58	3.36	.42	1.40	2	2
50		42	4	12	7	8	20.57	.65	3.28	.40	1.37	2	2
50		42	4	14	7	8	20.57	.53	3.14	.40	1.37	2	2
50		43	4	10	7	8	20.09	.75	3.23	.38	1.33	2	2
50		43	4	12	7	8	20.09	.59	3.07	.38	1.33	2	2
50		44	4	10	7	8	19.63	.68	3.02	.37	1.30	2	2
50		44	4	12	7	8	19.63	.54	2.87	.37	1.30	2	2
50		45	4	8	7	8	19.20	.84	3.03	.35	1.27	2	2
50		45	4	10	7	8	19.20	.63	2.83	.35	1.27	2	2
50		46	4	8	7	8	18.78	.77	2.84	.34	1.25	2	2
50		46	4	10	7	8	18.78	.58	2.66	.34	1.25	2	2
55		40	4	14	6	8	21.60	.72	4.08	.57	1.84	2	2
55		40	4	16	6	8	21.60	.61	3.92	.57	1.84	2	2
55		41	4	14	6	8	21.07	.66	3.80	.54	1.80	2	2
55		41	4	16	6	8	21.07	.55	3.66	.54	1.80	2	2
55		42	4	12	6	8	20.57	.73	3.71	.52	1.75	2	2
55		42	4	14	6	8	20.57	.60	3.55	.52	1.75	2	2
55		43	4	10	6	8	20.09	.85	3.67	.49	1.71	2	2
55		43	4	12	6	8	20.09	.67	3.46	.49	1.71	2	2
55		44	4	10	6	8	19.63	.77	3.42	.47	1.67	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
55		44	4	12	6	8	19.63	.61	3.24	.47	1.67	2	2
55		45	4	8	6	8	19.20	.95	3.45	.45	1.64	2	2
55		45	4	10	6	8	19.20	.71	3.21	.45	1.64	2	2
55		46	4	8	6	8	18.78	.87	3.23	.43	1.60	2	2
55		46	4	10	6	8	18.78	.65	3.01	.43	1.60	2	2
55		40	4	14	7	8	21.60	.72	4.08	.49	1.58	2	2
55		40	4	16	7	8	21.60	.61	3.92	.49	1.58	2	2
55		41	4	14	7	8	21.07	.66	3.80	.47	1.54	2	2
55		41	4	16	7	8	21.07	.55	3.66	.47	1.54	2	2
55		42	4	12	7	8	20.57	.73	3.71	.44	1.50	2	2
55		42	4	14	7	8	20.57	.60	3.55	.44	1.50	2	2
55		43	4	10	7	8	20.09	.85	3.67	.42	1.47	2	2
55		43	4	12	7	8	20.09	.67	3.46	.42	1.47	2	2
55		44	4	10	7	8	19.63	.77	3.42	.40	1.43	2	2
55		44	4	12	7	8	19.63	.61	3.24	.40	1.43	2	2
55		45	4	8	7	8	19.20	.95	3.45	.39	1.40	2	2
55		45	4	10	7	8	19.20	.71	3.21	.39	1.40	2	2
55		46	4	8	7	8	18.78	.87	3.23	.37	1.37	2	2
55		46	4	10	7	8	18.78	.65	3.01	.37	1.37	2	2
60		41	4	14	6	8	21.07	.74	4.25	.59	1.96	2	2
60		41	4	16	6	8	21.07	.62	4.09	.59	1.96	2	2
60		42	4	14	6	8	20.57	.67	3.97	.57	1.91	2	2
60		42	4	16	6	8	20.57	.56	3.82	.57	1.91	2	2
60		43	4	12	6	8	20.09	.75	3.88	.54	1.87	2	2
60		43	4	14	6	8	20.09	.61	3.71	.54	1.87	2	2
60		44	4	10	6	8	19.63	.87	3.84	.52	1.83	2	2
60		44	4	12	6	8	19.63	.68	3.63	.52	1.83	2	2
60		45	4	10	6	8	19.20	.79	3.59	.49	1.79	2	2
60		45	4	12	6	8	19.20	.63	3.40	.49	1.79	2	2
60		46	4	8	6	8	18.78	.98	3.63	.47	1.75	2	2
60		46	4	10	6	8	18.78	.73	3.37	.47	1.75	2	2
60		47	4	8	6	8	18.38	.90	3.40	.45	1.71	2	2
60		47	4	10	6	8	18.38	.67	3.17	.45	1.71	2	2
60		41	4	14	7	8	21.07	.74	4.25	.51	1.68	2	2
60		41	4	16	7	8	21.07	.62	4.09	.51	1.68	2	2
60		42	4	14	7	8	20.57	.67	3.97	.48	1.64	2	2
60		42	4	16	7	8	20.57	.56	3.82	.48	1.64	2	2
60		43	4	12	7	8	20.09	.75	3.88	.46	1.60	2	2
60		43	4	14	7	8	20.09	.61	3.71	.46	1.60	2	2
60		44	4	10	7	8	19.63	.87	3.84	.44	1.57	2	2
60		44	4	12	7	8	19.63	.68	3.63	.44	1.57	2	2
60		45	4	10	7	8	19.20	.79	3.59	.42	1.53	2	2
60		45	4	12	7	8	19.20	.63	3.40	.42	1.53	2	2
60		46	4	8	7	8	18.78	.98	3.63	.40	1.50	2	2
60		46	4	10	7	8	18.78	.73	3.37	.40	1.50	2	2
60		47	4	8	7	8	18.38	.90	3.40	.39	1.47	2	2
60		47	4	10	7	8	18.38	.67	3.17	.39	1.47	2	2
65		43	4	12	6	8	20.09	.83	4.31	.59	2.03	2	2
65		43	4	14	6	8	20.09	.68	4.11	.59	2.03	2	2
65		44	4	12	6	8	19.63	.76	4.03	.56	1.98	2	2
65		44	4	14	6	8	19.63	.62	3.85	.56	1.98	2	2
65		45	4	10	6	8	19.20	.88	4.00	.53	1.94	2	2
65		45	4	12	6	8	19.20	.69	3.77	.53	1.94	2	2
65		46	4	10	6	8	18.78	.81	3.74	.51	1.89	2	2
65		46	4	12	6	8	18.78	.64	3.54	.51	1.89	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
65		47	4	8	6	8	18.38	1.00	3.79	.49	1.85	2	2
65		47	4	10	6	8	18.38	.74	3.51	.49	1.85	2	2
65		48	4	8	6	8	18.00	.92	3.55	.47	1.81	2	2
65		48	4	10	6	8	18.00	.68	3.30	.47	1.81	2	2
65		49	4	8	6	8	17.63	.85	3.33	.45	1.78	2	2
65		49	4	10	6	8	17.63	.65	3.20	.45	1.78	1	2
65		42	4	14	7	8	20.57	.74	4.40	.53	1.78	2	2
65		42	4	16	7	8	20.57	.63	4.23	.53	1.78	2	2
65		43	4	12	7	8	20.09	.83	4.31	.50	1.74	2	2
65		43	4	14	7	8	20.09	.68	4.11	.50	1.74	2	2
65		44	4	12	7	8	19.63	.76	4.03	.48	1.70	2	2
65		44	4	14	7	8	19.63	.62	3.85	.48	1.70	2	2
65		45	4	10	7	8	19.20	.88	4.00	.46	1.66	2	2
65		45	4	12	7	8	19.20	.69	3.77	.46	1.66	2	2
65		46	4	10	7	8	18.78	.81	3.74	.44	1.62	2	2
65		46	4	12	7	8	18.78	.64	3.54	.44	1.62	2	2
65		47	4	8	7	8	18.38	1.00	3.79	.42	1.59	2	2
65		47	4	10	7	8	18.38	.74	3.51	.42	1.59	2	2
65		48	4	8	7	8	18.00	.92	3.55	.40	1.55	2	2
65		48	4	10	7	8	18.00	.68	3.30	.40	1.55	2	2
70		45	4	12	6	8	19.20	.77	4.16	.58	2.09	2	2
70		45	4	14	6	8	19.20	.63	3.97	.58	2.09	2	2
70		46	4	10	6	8	18.78	.89	4.13	.55	2.04	2	2
70		46	4	12	6	8	18.78	.70	3.90	.55	2.04	2	2
70		47	4	10	6	8	18.38	.82	3.87	.53	2.00	2	2
70		47	4	12	6	8	18.38	.65	3.66	.53	2.00	2	2
70		48	4	8	6	8	18.00	1.02	3.93	.51	1.95	2	2
70		48	4	10	6	8	18.00	.75	3.64	.51	1.95	2	2
70		49	4	8	6	8	17.63	.94	3.68	.48	1.91	2	2
70		49	4	10	6	8	17.63	.70	3.45	.48	1.91	1	2
70		50	4	8	6	8	17.28	.86	3.46	.47	1.88	2	2
70		50	4	10	6	8	17.28	.67	3.38	.47	1.88	1	2
70		51	4	8	6	8	16.94	.81	3.31	.45	1.84	1	2
70		43	4	14	7	8	20.09	.75	4.53	.54	1.87	2	2
70		43	4	16	7	8	20.09	.63	4.35	.54	1.87	2	2
70		44	4	12	7	8	19.63	.84	4.44	.52	1.83	2	2
70		44	4	14	7	8	19.63	.68	4.24	.52	1.83	2	2
70		45	4	12	7	8	19.20	.77	4.16	.49	1.79	2	2
70		45	4	14	7	8	19.20	.63	3.97	.49	1.79	2	2
70		46	4	10	7	8	18.78	.89	4.13	.47	1.75	2	2
70		46	4	12	7	8	18.78	.70	3.90	.47	1.75	2	2
70		47	4	10	7	8	18.38	.82	3.87	.45	1.71	2	2
70		47	4	12	7	8	18.38	.65	3.66	.45	1.71	2	2
70		48	4	8	7	8	18.00	1.02	3.93	.43	1.67	2	2
70		48	4	10	7	8	18.00	.75	3.64	.43	1.67	2	2
70		49	4	8	7	8	17.63	.94	3.68	.41	1.64	2	2
70		49	4	10	7	8	17.63	.70	3.45	.41	1.64	1	2
75		46	4	10	6	8	18.78	.98	4.54	.59	2.19	2	2
75		46	4	12	6	8	18.78	.77	4.27	.59	2.19	2	2
75		47	4	10	6	8	18.38	.90	4.25	.57	2.14	2	2
75		47	4	12	6	8	18.38	.71	4.01	.57	2.14	2	2
75		48	4	10	6	8	18.00	.83	3.99	.54	2.09	2	2
75		48	4	12	6	8	18.00	.65	3.77	.54	2.09	1	2
75		49	4	8	6	8	17.63	1.03	4.05	.52	2.05	2	2
75		49	4	10	6	8	17.63	.76	3.75	.52	2.05	2	2
75		50	4	8	6	8	17.28	.95	3.80	.50	2.01	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
75		50	4	10	6	8	17.28	.72	3.62	.50	2.01	1	2
75		51	4	8	6	8	16.94	.87	3.58	.48	1.97	2	2
75		51	4	10	6	8	16.94	.69	3.55	.48	1.97	1	2
75		52	4	8	6	8	16.61	.83	3.48	.46	1.93	1	2
75		43	4	14	7	8	20.09	.82	4.96	.58	2.00	2	2
75		43	4	16	7	8	20.09	.69	4.76	.58	2.00	2	2
75		44	4	14	7	8	19.63	.75	4.63	.55	1.96	2	2
75		44	4	16	7	8	19.63	.63	4.45	.55	1.96	2	2
75		45	4	12	7	8	19.20	.84	4.55	.53	1.91	2	2
75		45	4	14	7	8	19.20	.68	4.34	.53	1.91	2	2
75		46	4	10	7	8	18.78	.98	4.54	.51	1.87	2	2
75		46	4	12	7	8	18.78	.77	4.27	.51	1.87	2	2
75		47	4	10	7	8	18.38	.90	4.25	.48	1.83	2	2
75		47	4	12	7	8	18.38	.71	4.01	.48	1.83	2	2
75		48	4	10	7	8	18.00	.83	3.99	.46	1.79	2	2
75		48	4	12	7	8	18.00	.65	3.77	.46	1.79	1	2
75		49	4	8	7	8	17.63	1.03	4.05	.44	1.76	2	2
75		49	4	10	7	8	17.63	.76	3.75	.44	1.76	2	2
80		48	4	10	6	8	18.00	.90	4.35	.58	2.23	2	2
80		48	4	12	6	8	18.00	.71	4.10	.58	2.23	2	2
80		49	4	8	6	8	17.63	1.13	4.43	.55	2.19	2	2
80		49	4	10	6	8	17.63	.83	4.08	.55	2.19	2	2
80		50	4	8	6	8	17.28	1.03	4.15	.53	2.14	2	2
80		50	4	10	6	8	17.28	.77	3.86	.53	2.14	1	2
80		51	4	8	6	8	16.94	.95	3.91	.51	2.10	2	2
80		51	4	10	6	8	16.94	.74	3.79	.51	2.10	1	2
80		52	4	8	6	8	16.61	.89	3.72	.49	2.06	1	2
80		53	4	8	6	8	16.30	.86	3.65	.47	2.02	1	2
80		54	4	8	6	8	16.00	.82	3.58	.46	1.99	1	2
80		44	4	14	7	8	19.63	.81	5.04	.59	2.09	2	2
80		44	4	16	7	8	19.63	.68	4.84	.59	2.09	2	2
80		45	4	12	7	8	19.20	.92	4.97	.56	2.04	2	2
80		45	4	14	7	8	19.20	.75	4.72	.56	2.04	2	2
80		46	4	12	7	8	18.78	.84	4.65	.54	2.00	2	2
80		46	4	14	7	8	18.78	.68	4.43	.54	2.00	2	2
80		47	4	10	7	8	18.38	.98	4.64	.52	1.96	2	2
80		47	4	12	7	8	18.38	.77	4.36	.52	1.96	2	2
80		48	4	10	7	8	18.00	.90	4.35	.49	1.91	2	2
80		48	4	12	7	8	18.00	.71	4.10	.49	1.91	2	2
80		49	4	8	7	8	17.63	1.13	4.43	.47	1.88	2	2
80		49	4	10	7	8	17.63	.83	4.08	.47	1.88	2	2
80		50	4	8	7	8	17.28	1.03	4.15	.46	1.84	2	2
80		50	4	10	7	8	17.28	.77	3.86	.46	1.84	1	2
85		49	4	10	6	8	17.63	.90	4.43	.59	2.33	2	2
85		49	4	12	6	8	17.63	.71	4.19	.59	2.33	1	2
85		50	4	8	6	8	17.28	1.13	4.52	.57	2.28	2	2
85		50	4	10	6	8	17.28	.83	4.17	.57	2.28	2	2
85		51	4	8	6	8	16.94	1.04	4.24	.54	2.23	2	2
85		51	4	10	6	8	16.94	.79	4.03	.54	2.23	1	2
85		52	4	8	6	8	16.61	.96	4.00	.52	2.19	2	2
85		52	4	10	6	8	16.61	.76	3.95	.52	2.19	1	2
85		53	4	8	6	8	16.30	.91	3.87	.50	2.15	1	2
85		54	4	8	6	8	16.00	.88	3.80	.48	2.11	1	2
85		55	4	8	6	8	15.70	.84	3.73	.47	2.07	1	2
85		46	4	12	7	8	18.78	.91	5.04	.57	2.12	2	2
85		46	4	14	7	8	18.78	.74	4.79	.57	2.12	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
85		47	4	12	7	8	18.38	.83	4.72	.55	2.08	2	2
85		47	4	14	7	8	18.38	.68	4.50	.55	2.08	2	2
85		48	4	10	7	8	18.00	.98	4.72	.53	2.03	2	2
85		48	4	12	7	8	18.00	.77	4.44	.53	2.03	2	2
85		49	4	10	7	8	17.63	.90	4.43	.50	1.99	2	2
85		49	4	12	7	8	17.63	.71	4.19	.50	1.99	1	2
85		50	4	8	7	8	17.28	1.13	4.52	.48	1.95	2	2
85		50	4	10	7	8	17.28	.83	4.17	.48	1.95	2	2
85		51	4	8	7	8	16.94	1.04	4.24	.47	1.91	2	2
85		51	4	10	7	8	16.94	.79	4.03	.47	1.91	1	2
85		52	4	8	7	8	16.61	.96	4.00	.45	1.88	2	2
85		52	4	10	7	8	16.61	.76	3.95	.45	1.88	1	2
90		50	4	8	6	8	17.28	1.22	4.90	.60	2.41	2	2
90		50	4	10	6	8	17.28	.90	4.50	.60	2.41	2	2
90		51	4	8	6	8	16.94	1.12	4.60	.58	2.37	2	2
90		51	4	10	6	8	16.94	.83	4.26	.58	2.37	1	2
90		52	4	8	6	8	16.61	1.03	4.32	.55	2.32	2	2
90		52	4	10	6	8	16.61	.80	4.18	.55	2.32	1	2
90		53	4	8	6	8	16.30	.96	4.10	.53	2.28	1	2
90		54	4	8	6	8	16.00	.93	4.03	.51	2.23	1	2
90		55	4	8	6	8	15.70	.89	3.95	.49	2.19	1	2
90		56	4	8	6	8	15.42	.86	3.88	.48	2.15	1	2
90		47	4	12	7	8	18.38	.90	5.10	.58	2.20	2	2
90		47	4	14	7	8	18.38	.73	4.85	.58	2.20	2	2
90		48	4	10	7	8	18.00	1.06	5.11	.56	2.15	2	2
90		48	4	12	7	8	18.00	.83	4.79	.56	2.15	2	2
90		49	4	10	7	8	17.63	.97	4.79	.53	2.11	2	2
90		49	4	12	7	8	17.63	.76	4.50	.53	2.11	2	2
90		50	4	8	7	8	17.28	1.22	4.90	.51	2.07	2	2
90		50	4	10	7	8	17.28	.90	4.50	.51	2.07	2	2
90		51	4	8	7	8	16.94	1.12	4.60	.49	2.03	2	2
90		51	4	10	7	8	16.94	.83	4.26	.49	2.03	1	2
90		52	4	8	7	8	16.61	1.03	4.32	.47	1.99	2	2
90		52	4	10	7	8	16.61	.80	4.18	.47	1.99	1	2
90		53	4	8	7	8	16.30	.96	4.10	.46	1.95	1	2
95		51	4	8	6	8	16.94	1.21	4.96	.61	2.50	2	2
95		51	4	10	6	8	16.94	.89	4.56	.61	2.50	2	2
95		52	4	[illegible]	6	8	16.61	1.12	4.66	.59	2.45	2	2
95		52	4	10	6	8	16.61	.84	4.41	.59	2.45	1	2
95		53	4	8	6	8	16.30	1.03	4.39	.56	2.40	2	2
95		53	4	10	6	8	16.30	.81	4.33	.56	2.40	1	2
95		54	4	8	6	8	16.00	.98	4.25	.54	2.36	1	2
95		55	4	8	6	8	15.70	.94	4.17	.52	2.32	1	2
95		56	4	8	6	8	15.42	.91	4.10	.50	2.27	1	2
95		57	4	8	6	8	15.15	.88	4.03	.49	2.23	1	2
95		48	4	12	7	8	18.00	.89	5.14	.59	2.27	2	2
95		48	4	14	7	8	18.00	.72	4.89	.59	2.27	2	2
95		49	4	10	7	8	17.63	1.05	5.16	.56	2.23	2	2
95		49	4	12	7	8	17.63	.82	4.83	.56	2.23	2	2
95		50	4	10	7	8	17.28	.96	4.84	.54	2.18	2	2
95		50	4	12	7	8	17.28	.76	4.59	.54	2.18	1	2
95		51	4	8	7	8	16.94	1.21	4.96	.52	2.14	2	2
95		51	4	10	7	8	16.94	.89	4.56	.52	2.14	2	2
95		52	4	8	7	8	16.61	1.12	4.66	.50	2.10	2	2
95		52	4	10	7	8	16.61	.84	4.41	.50	2.10	1	2
95		53	4	8	7	8	16.30	1.03	4.39	.48	2.06	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft $L/\Delta = 360$

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
95		53	4	10	7	8	16.30	.81	4.33	.48	2.06	1	2
95		54	4	8	7	8	16.00	.98	4.25	.46	2.02	1	2
100		52	4	8	6	8	16.61	1.20	5.01	.62	2.58	2	2
100		52	4	10	6	8	16.61	.89	4.65	.62	2.58	1	2
100		53	4	8	6	8	16.30	1.11	4.71	.59	2.53	2	2
100		53	4	10	6	8	16.30	.86	4.56	.59	2.53	1	2
100		54	4	8	6	8	16.00	1.03	4.47	.57	2.48	1	2
100		55	4	8	6	8	15.70	.99	4.39	.55	2.44	1	2
100		56	4	8	6	8	15.42	.96	4.31	.53	2.39	1	2
100		57	4	8	6	8	15.15	.93	4.24	.51	2.35	1	2
100		58	4	8	6	8	14.89	.89	4.17	.49	2.31	1	2
100		49	4	10	7	8	17.63	1.13	5.54	.59	2.35	2	2
100		49	4	12	7	8	17.63	.88	5.18	.59	2.35	2	2
100		50	4	10	7	8	17.28	1.03	5.19	.57	2.30	2	2
100		50	4	12	7	8	17.28	.81	4.87	.57	2.30	2	2
100		51	4	10	7	8	16.94	.95	4.88	.55	2.25	2	2
100		51	4	12	7	8	16.94	.77	4.74	.55	2.25	1	2
100		52	4	8	7	8	16.61	1.20	5.01	.53	2.21	2	2
100		52	4	10	7	8	16.61	.89	4.65	.53	2.21	1	2
100		53	4	8	7	8	16.30	1.11	4.71	.51	2.17	2	2
100		53	4	10	7	8	16.30	.86	4.56	.51	2.17	1	2
100		54	4	8	7	8	16.00	1.03	4.47	.49	2.13	1	2
100		55	4	8	7	8	15.70	.99	4.39	.47	2.09	1	2
105		52	4	8	6	8	16.61	1.29	5.37	.65	2.71	2	2
105		52	4	10	6	8	16.61	.94	4.92	.65	2.71	2	2
105		53	4	8	6	8	16.30	1.19	5.04	.62	2.66	2	2
105		53	4	10	6	8	16.30	.90	4.79	.62	2.66	1	2
105		54	4	8	6	8	16.00	1.10	4.75	.60	2.61	2	2
105		54	4	10	6	8	16.00	.87	4.70	.60	2.61	1	2
105		55	4	8	6	8	15.70	1.04	4.61	.58	2.56	1	2
105		56	4	8	6	8	15.42	1.01	4.53	.56	2.51	1	2
105		57	4	8	6	8	15.15	.97	4.45	.54	2.47	1	2
105		58	4	8	6	8	14.89	.94	4.37	.52	2.43	1	2
105		51	4	10	7	8	16.94	1.02	5.22	.58	2.37	2	2
105		51	4	12	7	8	16.94	.81	4.97	.58	2.37	1	2
105		52	4	8	7	8	16.61	1.29	5.37	.55	2.32	2	2
105		52	4	10	7	8	16.61	.94	4.92	.55	2.32	2	2
105		53	4	8	7	8	16.30	1.19	5.04	.53	2.28	2	2
105		53	4	10	7	8	16.30	.90	4.79	.53	2.28	1	2
105		54	4	8	7	8	16.00	1.10	4.75	.51	2.23	2	2
105		54	4	10	7	8	16.00	.87	4.70	.51	2.23	1	2
105		55	4	8	7	8	15.70	1.04	4.61	.49	2.19	1	2
105		56	4	8	7	8	15.42	1.01	4.53	.48	2.15	1	2
105		57	4	8	7	8	15.15	.97	4.45	.46	2.12	1	2
110		53	4	8	6	8	16.30	1.27	5.39	.65	2.78	2	2
110		53	4	10	6	8	16.30	.94	5.01	.65	2.78	1	2
110		54	4	8	6	8	16.00	1.17	5.07	.63	2.73	2	2
110		54	4	10	6	8	16.00	.91	4.92	.63	2.73	1	2
110		55	4	8	6	8	15.70	1.09	4.83	.61	2.68	1	2
110		56	4	8	6	8	15.42	1.06	4.75	.58	2.63	1	2
110		57	4	8	6	8	15.15	1.02	4.66	.56	2.59	1	2
110		58	4	8	6	8	14.89	.98	4.58	.54	2.54	1	2
110		59	4	8	6	8	14.64	.95	4.50	.53	2.50	1	2
110		52	4	10	7	8	16.61	1.00	5.24	.58	2.43	2	2
110		52	4	12	7	8	16.61	.81	5.11	.58	2.43	1	2
110		53	4	8	7	8	16.30	1.27	5.39	.56	2.39	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
110		53	4	10	7	8	16.30	.94	5.01	.56	2.39	1	2
110		54	4	8	7	8	16.00	1.17	5.07	.54	2.34	2	2
110		54	4	10	7	8	16.00	.91	4.92	.54	2.34	1	2
110		55	4	8	7	8	15.70	1.09	4.83	.52	2.30	1	2
110		56	4	8	7	8	15.42	1.06	4.75	.50	2.26	1	2
110		57	4	8	7	8	15.15	1.02	4.66	.48	2.22	1	2
110		58	4	8	7	8	14.89	.98	4.58	.47	2.18	1	2
115		53	4	8	6	8	16.30	1.35	5.75	.68	2.91	2	2
115		53	4	10	6	8	16.30	.99	5.25	.68	2.91	2	2
115		54	4	8	6	8	16.00	1.25	5.40	.66	2.86	2	2
115		54	4	10	6	8	16.00	.95	5.15	.66	2.86	1	2
115		55	4	8	6	8	15.70	1.15	5.09	.63	2.80	2	2
115		55	4	10	6	8	15.70	.91	5.05	.63	2.80	1	2
115		56	4	8	6	8	15.42	1.10	4.96	.61	2.75	1	2
115		57	4	8	6	8	15.15	1.07	4.87	.59	2.71	1	2
115		58	4	8	6	8	14.89	1.03	4.79	.57	2.66	1	2
115		59	4	8	6	8	14.64	.99	4.71	.55	2.61	1	2
115		53	4	8	7	8	16.30	1.35	5.75	.58	2.49	2	2
115		53	4	10	7	8	16.30	.99	5.25	.58	2.49	2	2
115		54	4	8	7	8	16.00	1.25	5.40	.56	2.45	2	2
115		54	4	10	7	8	16.00	.95	5.15	.56	2.45	1	2
115		55	4	8	7	8	15.70	1.15	5.09	.54	2.40	2	2
115		55	4	10	7	8	15.70	.91	5.05	.54	2.40	1	2
115		56	4	8	7	8	15.42	1.10	4.96	.52	2.36	1	2
115		57	4	8	7	8	15.15	1.07	4.87	.50	2.32	1	2
115		58	4	8	7	8	14.89	1.03	4.79	.49	2.28	1	2
115		59	4	8	7	8	14.64	.99	4.71	.47	2.24	1	2
120		54	4	8	6	8	16.00	1.33	5.74	.69	2.98	2	2
120		54	4	10	6	8	16.00	.99	5.37	.69	2.98	1	2
120		55	4	8	6	8	15.70	1.22	5.40	.66	2.93	2	2
120		55	4	10	6	8	15.70	.95	5.27	.66	2.93	1	2
120		56	4	8	6	8	15.42	1.15	5.18	.64	2.87	1	2
120		57	4	8	6	8	15.15	1.11	5.09	.62	2.82	1	2
120		58	4	8	6	8	14.89	1.07	5.00	.59	2.78	1	2
120		59	4	8	6	8	14.64	1.04	4.91	.57	2.73	1	2
120		60	4	8	6	8	14.40	1.00	4.83	.55	2.68	1	2
120		54	4	8	7	8	16.00	1.33	5.74	.59	2.55	2	2
120		54	4	10	7	8	16.00	.99	5.37	.59	2.55	1	2
120		55	4	8	7	8	15.70	1.22	5.40	.57	2.51	2	2
120		55	4	10	7	8	15.70	.95	5.27	.57	2.51	1	2
120		56	4	8	7	8	15.42	1.15	5.18	.55	2.46	1	2
120		57	4	8	7	8	15.15	1.11	5.09	.53	2.42	1	2
120		58	4	8	7	8	14.89	1.07	5.00	.51	2.38	1	2
120		59	4	8	7	8	14.64	1.04	4.91	.49	2.34	1	2
120		60	4	8	7	8	14.40	1.00	4.83	.47	2.30	1	2
125		54	4	8	6	8	16.00	1.41	6.10	.72	3.11	2	2
125		54	4	10	6	8	16.00	1.03	5.59	.72	3.11	1	2
125		55	4	8	6	8	15.70	1.30	5.73	.69	3.05	2	2
125		55	4	10	6	8	15.70	.99	5.49	.69	3.05	1	2
125		56	4	8	6	8	15.42	1.20	5.40	.66	2.99	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
125		56	4	10	6	8	15.42	.96	5.39	.66	2.99	1	2
125		57	4	8	6	8	15.15	1.16	5.30	.64	2.94	1	2
125		58	4	8	6	8	14.89	1.12	5.21	.62	2.89	1	2
125		59	4	8	6	8	14.64	1.08	5.12	.60	2.84	1	2
125		60	4	8	6	8	14.40	1.04	5.03	.58	2.79	1	2
125		54	4	8	7	8	16.00	1.41	6.10	.61	2.66	2	2
125		54	4	10	7	8	16.00	1.03	5.59	.61	2.66	1	2
125		55	4	8	7	8	15.70	1.30	5.73	.59	2.61	2	2
125		55	4	10	7	8	15.70	.99	5.49	.59	2.61	1	2
125		56	4	8	7	8	15.42	1.20	5.40	.57	2.57	2	2
125		56	4	10	7	8	15.42	.96	5.39	.57	2.57	1	2
125		57	4	8	7	8	15.15	1.16	5.30	.55	2.52	1	2
125		58	4	8	7	8	14.89	1.12	5.21	.53	2.48	1	2
125		59	4	8	7	8	14.64	1.08	5.12	.51	2.44	1	2
125		60	4	8	7	8	14.40	1.04	5.03	.49	2.39	1	2
130		54	4	10	6	10	16.00	1.08	5.86	.59	3.23	2	2
130		54	4	12	6	10	16.00	.89	5.82	.59	3.23	1	2
130		55	4	8	6	8	15.70	1.37	6.07	.72	3.17	2	2
130		55	4	10	6	8	15.70	1.03	5.71	.72	3.17	1	2
130		56	4	8	6	8	15.42	1.27	5.71	.69	3.11	2	2
130		56	4	10	6	8	15.42	1.00	5.61	.69	3.11	1	2
130		57	4	8	6	8	15.15	1.20	5.51	.67	3.06	1	2
130		58	4	8	6	8	14.89	1.16	5.42	.64	3.01	1	2
130		59	4	8	6	8	14.64	1.12	5.32	.62	2.96	1	2
130		60	4	8	6	8	14.40	1.09	5.24	.60	2.91	1	2
130		55	4	8	7	8	15.70	1.37	6.07	.61	2.72	2	2
130		55	4	10	7	8	15.70	1.03	5.71	.61	2.72	1	2
130		56	4	8	7	8	15.42	1.27	5.71	.59	2.67	2	2
130		56	4	10	7	8	15.42	1.00	5.61	.59	2.67	1	2
130		57	4	8	7	8	15.15	1.20	5.51	.57	2.62	1	2
130		58	4	8	7	8	14.89	1.16	5.42	.55	2.58	1	2
130		59	4	8	7	8	14.64	1.12	5.32	.53	2.53	1	2
130		60	4	8	7	8	14.40	1.09	5.24	.51	2.49	1	2
130		61	4	8	7	8	14.16	1.05	5.15	.50	2.45	1	2
135		55	4	8	6	10	15.70	1.45	6.41	.59	3.29	2	2
135		55	4	10	6	10	15.70	1.07	5.93	.59	3.29	1	2
135		56	4	8	6	8	15.42	1.34	6.03	.72	3.23	2	2
135		56	4	10	6	8	15.42	1.04	5.83	.72	3.23	1	2
135		57	4	8	6	8	15.15	1.25	5.72	.69	3.18	1	2
135		58	4	8	6	8	14.89	1.21	5.62	.67	3.12	1	2
135		59	4	8	6	8	14.64	1.17	5.53	.65	3.07	1	2
135		60	4	8	6	8	14.40	1.13	5.44	.62	3.02	1	2
135		61	4	8	6	8	14.16	1.09	5.35	.60	2.97	1	2
135		55	4	8	7	8	15.70	1.45	6.41	.64	2.82	2	2
135		55	4	10	7	8	15.70	1.07	5.93	.64	2.82	1	2
135		56	4	8	7	8	15.42	1.34	6.03	.61	2.77	2	2
135		56	4	10	7	8	15.42	1.04	5.83	.61	2.77	1	2
135		57	4	8	7	8	15.15	1.25	5.72	.59	2.72	1	2
135		58	4	8	7	8	14.89	1.21	5.62	.57	2.68	1	2
135		59	4	8	7	8	14.64	1.17	5.53	.55	2.63	1	2
135		60	4	8	7	8	14.40	1.13	5.44	.53	2.59	1	2
135		61	4	8	7	8	14.16	1.09	5.35	.52	2.54	1	2
140		55	4	8	6	10	15.70	1.53	6.77	.62	3.42	2	2
140		55	4	10	6	10	15.70	1.11	6.15	.62	3.42	1	2
140		56	4	8	6	8	15.42	1.42	6.36	.74	3.35	2	2

TABLE X-C (Cont'd) Slab 36 x 72 ft L /Δ = 360

W	1-C	D	X	BX	Y	BY	L/D	PX	AX	PY	AY	K	N
140		56	4	10	6	8	15.42	1.07	6.04	.74	3.35	1	2
140		57	4	8	6	8	15.15	1.31	5.99	.72	3.30	2	2
140		57	4	10	6	8	15.15	1.04	5.94	.72	3.30	1	2
140		58	4	8	6	8	14.89	1.25	5.83	.69	3.24	1	2
140		59	4	8	6	8	14.64	1.21	5.73	.67	3.18	1	2
140		60	4	8	6	8	14.40	1.17	5.64	.65	3.13	1	2
140		61	4	8	6	8	14.16	1.13	5.55	.63	3.08	1	2
140		55	4	8	7	8	15.70	1.53	6.77	.66	2.93	2	2
140		55	4	10	7	8	15.70	1.11	6.15	.66	2.93	1	2
140		56	4	8	7	8	15.42	1.42	6.36	.64	2.87	2	2
140		56	4	10	7	8	15.42	1.07	6.04	.64	2.87	1	2
140		57	4	8	7	8	15.15	1.31	5.99	.62	2.82	2	2
140		57	4	10	7	8	15.15	1.04	5.94	.62	2.82	1	2
140		58	4	8	7	8	14.89	1.25	5.83	.59	2.78	1	2
140		59	4	8	7	8	14.64	1.21	5.73	.57	2.73	1	2
140		60	4	8	7	8	14.40	1.17	5.64	.55	2.68	1	2
140		61	4	8	7	8	14.16	1.13	5.55	.54	2.64	1	2
145		56	4	8	6	10	15.42	1.49	6.70	.62	3.47	2	2
145		56	4	10	6	10	15.42	1.11	6.26	.62	3.47	1	2
145		57	4	8	6	8	15.15	1.38	6.31	.74	3.41	2	2
145		57	4	10	6	8	15.15	1.07	6.15	.74	3.41	1	2
145		58	4	8	6	8	14.89	1.30	6.04	.72	3.35	1	2
145		59	4	8	6	8	14.64	1.25	5.94	.69	3.30	1	2
145		60	4	8	6	8	14.40	1.21	5.84	.67	3.24	1	2
145		61	4	8	6	8	14.16	1.17	5.74	.65	3.19	1	2
145		62	4	8	6	8	13.93	1.14	5.65	.63	3.14	1	2
145		56	4	8	7	8	15.42	1.49	6.70	.66	2.98	2	2
145		56	4	10	7	8	15.42	1.11	6.26	.66	2.98	1	2
145		57	4	8	7	8	15.15	1.38	6.31	.64	2.92	2	2
145		57	4	10	7	8	15.15	1.07	6.15	.64	2.92	1	2
145		58	4	8	7	8	14.89	1.30	6.04	.62	2.87	1	2
145		59	4	8	7	8	14.64	1.25	5.94	.59	2.83	1	2
145		60	4	8	7	8	14.40	1.21	5.84	.57	2.78	1	2
145		61	4	8	7	8	14.16	1.17	5.74	.56	2.73	1	2
145		62	4	8	7	8	13.93	1.14	5.65	.54	2.69	1	2
150		54	4	10	6	10	16.00	1.33	7.18	.69	3.73	2	2
150		54	4	12	6	10	16.00	1.03	6.71	.69	3.73	1	2
150		56	4	8	6	10	15.42	1.57	7.04	.64	3.59	2	2
150		56	4	10	6	10	15.42	1.15	6.47	.64	3.59	1	2
150		57	4	8	6	10	15.15	1.45	6.63	.62	3.53	2	2
150		57	4	10	6	10	15.15	1.11	6.36	.62	3.53	1	2
150		58	4	8	6	10	14.89	1.34	6.25	.59	3.47	1	2
150		59	4	8	6	8	14.64	1.30	6.14	.72	3.41	1	2
150		60	4	8	6	8	14.40	1.25	6.04	.69	3.35	1	2
150		61	4	8	6	8	14.16	1.21	5.94	.67	3.30	1	2
150		54	4	10	7	8	16.00	1.33	7.18	.74	3.19	2	2
150		54	4	12	7	8	16.00	1.03	6.71	.74	3.19	1	2
150		56	4	8	7	8	15.42	1.57	7.04	.68	3.08	2	2
150		56	4	10	7	8	15.42	1.15	6.47	.68	3.08	1	2
150		57	4	8	7	8	15.15	1.45	6.63	.66	3.03	2	2
150		57	4	10	7	8	15.15	1.11	6.36	.66	3.03	1	2
150		58	4	8	7	8	14.89	1.34	6.25	.64	2.97	1	2
150		59	4	8	7	8	14.64	1.30	6.14	.62	2.92	1	2
150		60	4	8	7	8	14.40	1.25	6.04	.59	2.87	1	2
150		61	4	8	7	8	14.16	1.21	5.94	.58	2.83	1	2

TABLE XI-A Slab 30 x 30 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
4	.01	4	3	8		.60	.19	
4	.02	5	3	8		.59	.23	
4	.03	5	3	8		.64	.25	
4	.01	4	4	8		.52	.16	
4	.02	4	4	8		.63	.20	
4	.03	5	4	8		.48	.19	
8	.02	5	3	8		.97	.38	
8	.03	6	3	8		.92	.44	
8	.04	7	3	8		.85	.47	
8	.05	7	3	8		.98	.55	
8	.06	8	3	8		.80	.51	
8	.02	5	4	8		.83	.33	
8	.03	6	4	8		.74	.35	
8	.04	6	4	8		.84	.40	
8	.05	7	4	8		.69	.38	
8	.06	8	4	8		.60	.38	
12	.03	7	3	8		1.04	.58	
12	.04	7	3	8		1.19	.66	
12	.05	8	3	8		1.18	.76	
12	.06	9	3	8		.99	.71	
12	.07	9	3	8		1.18	.85	
12	.08	10	3	8		1.01	.80	
12	.09	11	3	8		.88	.77	
12		12	3	8	30.00	.81	.77	1
12		13	3	8	27.69	.69	.71	1
12		14	3	8	25.71	.59	.66	1
12		15	3	8	24.00	.51	.62	1
12	.03	6	4	8		1.04	.49	
12	.04	7	4	8		.98	.55	
12	.05	8	4	8		.84	.53	
12	.06	8	4	8		.94	.60	
12	.07	9	4	8		.80	.58	
12	.08	10	4	8		.89	.71	
12	.09	11	4	8		.77	.68	
12		11	4	8	32.72	.75	.66	2
12		11	4	10	32.72	.57	.63	1
12		12	4	8	30.00	.60	.58	1
12		13	4	8	27.69	.51	.53	1
12		14	4	8	25.71	.44	.49	1
16	.04	8	3	8		1.21	.77	
16	.05	8	3	8		1.41	.90	
16	.06	10	3	8		1.11	.88	
16	.07	10	3	8		1.23	.99	
16	.08	11	3	8		1.08	.95	
16	.09	11	3	8		1.31	1.15	
16		12	3	8	30.00	1.15	1.10	2
16		12	3	10	30.00	.86	1.03	1
16		13	3	8	27.69	.92	.95	1
16		14	3	8	25.71	.79	.88	1
16		15	3	8	24.00	.69	.82	1
16	.04	7	4	8		1.19	.66	
16	.05	8	4	8		1.18	.76	
16	.06	9	4	8		.99	.71	
16	.07	9	4	8		1.18	.85	
16	.08	10	4	8		1.01	.80	

TABLE XI-A (Cont'd) Slab 30 x 30 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
16	.09	11	4	8		.88	.77	
16		12	4	8	30.00	.81	.77	1
16		13	4	8	27.69	.69	.71	1
16		14	4	8	25.71	.59	.66	1
16		15	4	8	24.00	.51	.62	1
20	.05	9	3	8		1.35	.97	
20	.06	10	3	8		1.43	1.15	
20	.07	11	3	8		1.26	1.11	
20	.08	11	3	8		1.46	1.29	
20	.09	12	3	8		1.27	1.22	
20		13	3	8	27.69	1.15	1.19	1
20		14	3	8	25.71	.99	1.11	1
20		15	3	8	24.00	.86	1.03	1
20		16	3	8	22.50	.75	.97	1
20		17	3	8	21.17	.67	.91	1
20	.05	8	4	8		1.30	.83	
20	.06	9	4	8		1.34	.96	
20	.07	10	4	8		1.12	.90	
20	.08	11	4	8		1.01	.89	
20	.09	11	4	8		1.19	1.05	
20		12	4	8	30.00	1.05	1.01	2
20		12	4	10	30.00	.81	.97	1
20		13	4	8	27.69	.86	.89	1
20		14	4	8	25.71	.74	.83	1
20		15	4	8	24.00	.64	.77	1
24	.06	11	3	8		1.32	1.16	
24	.07	12	3	8		1.29	1.24	
24	.08	12	3	8		1.38	1.33	
24	.09	13	3	8		1.28	1.33	
24		13	3	8	27.69	1.46	1.52	2
24		13	3	10	27.69	1.10	1.43	1
24		14	3	8	25.71	1.19	1.33	1
24		15	3	8	24.00	1.03	1.24	1
24		16	3	8	22.50	.91	1.16	1
24		17	3	8	21.17	.80	1.09	1
24		18	3	8	20.00	.72	1.03	1
24	.06	10	4	8		1.24	.99	
24	.07	11	4	8		1.13	.99	
24	.08	11	4	8		1.25	1.10	
24	.09	12	4	8		1.12	1.07	
24		13	4	8	27.69	1.03	1.07	1
24		14	4	8	25.71	.89	.99	1
24		15	4	8	24.00	.77	.93	1
24		16	4	8	22.50	.68	.87	1
28	.07	12	3	8		1.41	1.36	
28	.08	13	3	8		1.39	1.45	
28	.09	13	3	8		1.49	1.55	
28		14	3	8	25.71	1.38	1.55	1
28		15	3	8	24.00	1.20	1.45	1
28		16	3	8	22.50	1.06	1.36	1
28		17	3	8	21.17	.94	1.28	1
28		18	3	8	20.00	.84	1.20	1
28		19	3	8	18.94	.75	1.14	1
28		20	3	8	18.00	.68	1.08	1
28	.07	11	4	8		1.32	1.16	
28	.08	12	4	8		1.21	1.16	

TABLE XI-A (Cont'd) Slab 30 x 30 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
28	.09	12	4	8		1.36	1.31	
28		13	4	8	27.69	1.20	1.25	1
28		14	4	8	25.71	1.04	1.16	1
28		15	4	8	24.00	.90	1.08	1
28		16	4	8	22.50	.79	1.02	1
28		17	4	8	21.17	.70	.96	1
32	.08	14	3	8		1.38	1.55	
32	.09	14	3	8		1.48	1.65	
32		14	3	8	25.71	1.61	1.80	2
32		14	3	10	25.71	1.26	1.77	1
32		15	3	8	24.00	1.38	1.65	1
32		16	3	8	22.50	1.21	1.55	1
32		17	3	8	21.17	1.07	1.46	1
32		18	3	8	20.00	.96	1.38	1
32		19	3	8	18.94	.86	1.30	1
32		20	3	8	18.00	.77	1.24	1
32	.08	12	4	8		1.38	1.33	
32	.09	13	4	8		1.28	1.33	
32		13	4	8	27.69	1.46	1.52	2
32		13	4	10	27.69	1.10	1.43	1
32		14	4	8	25.71	1.19	1.33	1
32		15	4	8	24.00	1.03	1.24	1
32		16	4	8	22.50	.91	1.16	1
32		17	4	8	21.17	.80	1.09	1
32		18	4	8	20.00	.72	1.03	1
36	.09	15	3	8		1.45	1.74	
36		15	3	8	24.00	1.55	1.86	1
36		16	3	8	22.50	1.36	1.74	1
36		17	3	8	21.17	1.21	1.64	1
36		18	3	8	20.00	1.08	1.55	1
36		19	3	8	18.94	.96	1.47	1
36		20	3	8	18.00	.87	1.39	1
36		21	3	8	17.14	.79	1.33	1
36	.09	13	4	8		1.44	1.49	
36		14	4	8	25.71	1.33	1.49	1
36		15	4	8	24.00	1.16	1.39	1
36		16	4	8	22.50	1.02	1.31	1
36		17	4	8	21.17	.90	1.23	1
36		18	4	8	20.00	.81	1.16	1
36		19	4	8	18.94	.72	1.10	1
40		16	3	8	22.50	1.51	1.94	1
40		17	3	8	21.17	1.34	1.82	1
40		18	3	8	20.00	1.20	1.72	1
40		19	3	8	18.94	1.07	1.63	1
40		20	3	8	18.00	.97	1.55	1
40		21	3	8	17.14	.88	1.48	1
40		22	3	8	16.36	.80	1.41	1
40		14	4	8	25.71	1.48	1.66	1
40		15	4	8	24.00	1.29	1.55	1
40		16	4	8	22.50	1.13	1.45	1
40		17	4	8	21.17	1.00	1.37	1
40		18	4	8	20.00	.90	1.29	1
40		19	4	8	18.94	.80	1.22	1
40		20	4	8	18.00	.72	1.16	1
45		15	3	10	24.00	1.55	2.33	1
45		17	3	8	21.17	1.51	2.05	1

TABLE XI-A (Cont'd) Slab 30 x 30 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
45		18	3	8	20.00	1.35	1.94	1
45		19	3	8	18.94	1.21	1.84	1
45		20	3	8	18.00	1.09	1.74	1
45		21	3	8	17.14	.99	1.66	1
45		22	3	8	16.36	.90	1.59	1
45		14	4	8	25.71	1.74	1.95	2
45		14	4	10	25.71	1.33	1.87	1
45		15	4	8	24.00	1.45	1.74	1
45		16	4	8	22.50	1.28	1.64	1
45		17	4	8	21.17	1.13	1.54	1
45		18	4	8	20.00	1.01	1.45	1
45		19	4	8	18.94	.90	1.38	1
45		20	4	8	18.00	.82	1.31	1
50		16	3	10	22.50	1.51	2.43	1
50		17	3	8	21.17	1.68	2.28	1
50		18	3	8	20.00	1.50	2.16	1
50		19	3	8	18.94	1.34	2.04	1
50		20	3	8	18.00	1.21	1.94	1
50		21	3	8	17.14	1.10	1.85	1
50		22	3	8	16.36	1.00	1.76	1
50		14	4	10	25.71	1.48	2.08	1
50		15	4	8	24.00	1.62	1.94	1
50		16	4	8	22.50	1.42	1.82	1
50		17	4	8	21.17	1.26	1.71	1
50		18	4	8	20.00	1.12	1.62	1
50		19	4	8	18.94	1.00	1.53	1
50		20	4	8	18.00	.91	1.45	1
55		16	3	10	22.50	1.67	2.67	1
55		18	3	8	20.00	1.65	2.37	1
55		19	3	8	18.94	1.48	2.25	1
55		20	3	8	18.00	1.33	2.13	1
55		21	3	8	17.14	1.21	2.03	1
55		22	3	8	16.36	1.10	1.94	1
55		23	3	8	15.65	1.01	1.85	1
55		14	4	10	25.71	1.68	2.36	2
55		14	4	12	25.71	1.36	2.29	1
55		16	4	8	22.50	1.56	2.00	1
55		17	4	8	21.17	1.38	1.88	1
55		18	4	8	20.00	1.23	1.78	1
55		19	4	8	18.94	1.11	1.68	1
55		20	4	8	18.00	1.00	1.60	1
55		21	4	8	17.14	.90	1.52	1
60		16	3	12	22.50	1.51	2.91	1
60		19	3	8	18.94	1.61	2.45	1
60		20	3	8	18.00	1.45	2.33	1
60		21	3	8	17.14	1.32	2.22	1
60		22	3	8	16.36	1.20	2.12	1
60		23	3	8	15.65	1.10	2.02	1
60		24	3	8	15.00	1.01	1.94	1
60		15	4	10	24.00	1.55	2.33	1
60		17	4	8	21.17	1.51	2.05	1
60		18	4	8	20.00	1.35	1.94	1
60		19	4	8	18.94	1.21	1.84	1
60		20	4	8	18.00	1.09	1.74	1
60		21	4	8	17.14	.99	1.66	1
60		22	4	8	16.36	.90	1.59	1

TABLE XI-A (Cont'd) Slab 30 x 30 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
65		16	3	12	22.50	1.64	3.15	1
65		18	3	10	20.00	1.56	2.80	1
65		20	3	8	18.00	1.57	2.52	1
65		21	3	8	17.14	1.43	2.40	1
65		22	3	8	16.36	1.30	2.29	1
65		23	3	8	15.65	1.19	2.19	1
65		24	3	8	15.00	1.09	2.10	1
65		15	4	10	24.00	1.68	2.52	1
65		17	4	8	21.17	1.63	2.22	1
65		18	4	8	20.00	1.46	2.10	1
65		19	4	8	18.94	1.31	1.99	1
65		20	4	8	18.00	1.18	1.89	1
65		21	4	8	17.14	1.07	1.80	1
65		22	4	8	16.36	.97	1.72	1
70		16	3	14	22.50	1.51	3.40	1
70		18	3	10	20.00	1.68	3.02	1
70		21	3	8	17.14	1.54	2.59	1
70		22	3	8	16.36	1.40	2.47	1
70		23	3	8	15.65	1.28	2.36	1
70		24	3	8	15.00	1.18	2.26	1
70		25	3	8	14.40	1.08	2.17	1
70		15	4	12	24.00	1.51	2.72	1
70		18	4	8	20.00	1.57	2.26	1
70		19	4	8	18.94	1.41	2.14	1
70		20	4	8	18.00	1.27	2.04	1
70		21	4	8	17.14	1.15	1.94	1
70		22	4	8	16.36	1.05	1.85	1
70		23	4	8	15.65	.96	1.77	1
75		16	3	14	22.50	1.62	3.64	1
75		19	3	10	18.94	1.61	3.06	1
75		20	3	10	18.00	1.45	2.91	1
75		21	3	8	17.14	1.65	2.77	1
75		22	3	8	16.36	1.50	2.65	1
75		23	3	8	15.65	1.37	2.53	1
75		24	3	8	15.00	1.26	2.43	1
75		15	4	12	24.00	1.62	2.91	1
75		18	4	8	20.00	1.68	2.43	1
75		19	4	8	18.94	1.51	2.30	1
75		20	4	8	18.00	1.36	2.18	1
75		21	4	8	17.14	1.23	2.08	1
75		22	4	8	16.36	1.12	1.98	1
75		23	4	8	15.65	1.03	1.90	1
80		17	3	14	21.17	1.53	3.65	1
80		20	3	10	18.00	1.55	3.11	1
80		21	3	10	17.14	1.41	2.96	1
80		22	3	8	16.36	1.60	2.82	1
80		23	3	8	15.65	1.46	2.70	1
80		24	3	8	15.00	1.35	2.59	1
80		25	3	8	14.40	1.24	2.48	1
80		16	4	12	22.50	1.51	2.91	1
80		19	4	8	18.94	1.61	2.45	1
80		20	4	8	18.00	1.45	2.33	1
80		21	4	8	17.14	1.32	2.22	1
80		22	4	8	16.36	1.20	2.12	1
80		23	4	8	15.65	1.10	2.02	1
80		24	4	8	15.00	1.01	1.94	1

TABLE XI-A (Cont'd) Slab 30 x 30 ft **L /Δ = 200**

W	1-C	D	X	B	L/D	P	A	K
85		17	3	14	21.17	1.63	3.88	1
85		18	3	12	20.00	1.70	3.67	1
85		20	3	10	18.00	1.65	3.30	1
85		21	3	10	17.14	1.49	3.14	1
85		22	3	10	16.36	1.36	3.00	1
85		23	3	8	15.65	1.56	2.87	1
85		24	3	8	15.00	1.43	2.75	1
85		16	4	12	22.50	1.61	3.09	1
85		18	4	10	20.00	1.53	2.75	1
85		20	4	8	18.00	1.54	2.47	1
85		21	4	8	17.14	1.40	2.36	1
85		22	4	8	16.36	1.28	2.25	1
85		23	4	8	15.65	1.17	2.15	1
85		24	4	8	15.00	1.07	2.06	1
90		18	3	14	20.00	1.54	3.88	1
90		19	3	12	18.94	1.61	3.68	1
90		21	3	10	17.14	1.58	3.33	1
90		22	3	10	16.36	1.44	3.18	1
90		23	3	10	15.65	1.32	3.04	1
90		24	3	10	15.00	1.21	2.91	1
90		25	3	8	14.40	1.39	2.79	1
90		15	4	14	24.00	1.66	3.49	1
90		18	4	10	20.00	1.62	2.91	1
90		20	4	8	18.00	1.64	2.62	1
90		21	4	8	17.14	1.48	2.49	1
90		22	4	8	16.36	1.35	2.38	1
90		23	4	8	15.65	1.24	2.28	1
90		24	4	8	15.00	1.13	2.18	1
95		18	3	14	20.00	1.62	4.10	1
95		20	3	12	18.00	1.53	3.69	1
95		21	3	10	17.14	1.67	3.51	1
95		22	3	10	16.36	1.52	3.35	1
95		23	3	10	15.65	1.39	3.21	1
95		24	3	10	15.00	1.28	3.07	1
95		25	3	10	14.40	1.18	2.95	1
95		16	4	14	22.50	1.54	3.46	1
95		19	4	10	18.94	1.53	2.91	1
95		21	4	8	17.14	1.57	2.63	1
95		22	4	8	16.36	1.43	2.51	1
95		23	4	8	15.65	1.30	2.40	1
95		24	4	8	15.00	1.20	2.30	1
95		25	4	8	14.40	1.10	2.21	1
100		19	3	14	18.94	1.53	4.09	1
100		20	3	12	18.00	1.62	3.88	1
100		21	3	12	17.14	1.46	3.70	1
100		22	3	10	16.36	1.60	3.53	1
100		23	3	10	15.65	1.46	3.38	1
100		24	3	10	15.00	1.35	3.24	1
100		25	3	10	14.40	1.24	3.11	1
100		16	4	14	22.50	1.62	3.64	1
100		19	4	10	18.94	1.61	3.06	1
100		20	4	10	18.00	1.45	2.91	1
100		21	4	8	17.14	1.65	2.77	1
100		22	4	8	16.36	1.50	2.65	1
100		23	4	8	15.65	1.37	2.53	1

TABLE XI-A (Cont'd) Slab 30 x 30 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
100		24	4	8	15.00	1.26	2.43	1
105		19	3	14	18.94	1.61	4.29	1
105		21	3	12	17.14	1.54	3.88	1
105		22	3	12	16.36	1.40	3.71	1
105		23	3	10	15.65	1.54	3.54	1
105		24	3	10	15.00	1.41	3.40	1
105		25	3	10	14.40	1.30	3.26	1
105		26	3	10	13.84	1.20	3.14	1
105		17	4	14	21.17	1.51	3.60	1
105		19	4	10	18.94	1.69	3.22	1
105		20	4	10	18.00	1.53	3.06	1
105		21	4	10	17.14	1.38	2.91	1
105		22	4	8	16.36	1.58	2.78	1
105		23	4	8	15.65	1.44	2.66	1
105		24	4	8	15.00	1.32	2.55	1
110		19	3	14	18.94	1.69	4.50	1
110		21	3	12	17.14	1.61	4.07	1
110		22	3	12	16.36	1.47	3.88	1
110		23	3	12	15.65	1.34	3.71	1
110		24	3	10	15.00	1.48	3.56	1
110		25	3	10	14.40	1.36	3.42	1
110		26	3	10	13.84	1.26	3.28	1
110		17	4	14	21.17	1.58	3.77	1
110		20	4	10	18.00	1.60	3.20	1
110		21	4	10	17.14	1.45	3.05	1
110		22	4	10	16.36	1.32	2.91	1
110		23	4	8	15.65	1.51	2.78	1
110		24	4	8	15.00	1.39	2.67	1
110		25	4	8	14.40	1.28	2.56	1
115		20	3	14	18.00	1.59	4.47	1
115		21	3	12	17.14	1.68	4.25	1
115		22	3	12	16.36	1.53	4.06	1
115		23	3	12	15.65	1.40	3.88	1
115		24	3	12	15.00	1.29	3.72	1
115		25	3	10	14.40	1.43	3.57	1
115		26	3	10	13.84	1.32	3.43	1
115		17	4	14	21.17	1.65	3.94	1
115		19	4	12	18.94	1.54	3.52	1
115		20	4	10	18.00	1.67	3.35	1
115		21	4	10	17.14	1.52	3.19	1
115		22	4	10	16.36	1.38	3.04	1
115		23	4	10	15.65	1.26	2.91	1
115		24	4	8	15.00	1.45	2.79	1
120		20	3	14	18.00	1.66	4.66	1
120		21	3	14	17.14	1.51	4.44	1
120		22	3	12	16.36	1.60	4.24	1
120		23	3	12	15.65	1.46	4.05	1
120		24	3	12	15.00	1.35	3.88	1
120		25	3	12	14.40	1.24	3.73	1
120		26	3	10	13.84	1.38	3.58	1
120		18	4	14	20.00	1.54	3.88	1
120		19	4	12	18.94	1.61	3.68	1
120		21	4	10	17.14	1.58	3.33	1
120		22	4	10	16.36	1.44	3.18	1
120		23	4	10	15.65	1.32	3.04	1
120		24	4	10	15.00	1.21	2.91	1

TABLE IX-A (Cont'd) Slab 30 x 50 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
120		25	4	8	14.40	1.39	2.79	1
125		21	3	14	17.14	1.57	4.62	1
125		22	3	14	16.36	1.43	4.41	1
125		23	3	12	15.65	1.53	4.22	1
125		24	3	12	15.00	1.40	4.05	1
125		25	3	12	14.40	1.29	3.88	1
125		26	3	12	13.84	1.19	3.73	1
125		27	3	10	13.33	1.33	3.59	1
125		18	4	14	20.00	1.60	4.04	1
125		19	4	12	18.94	1.68	3.83	1
125		20	4	12	18.00	1.51	3.64	1
125		21	4	10	17.14	1.65	3.47	1
125		22	4	10	16.36	1.50	3.31	1
125		23	4	10	15.65	1.37	3.16	1
125		24	4	10	15.00	1.26	3.03	1
130		21	3	14	17.14	1.63	4.81	1
130		22	3	14	16.36	1.49	4.59	1
130		23	3	14	15.65	1.36	4.39	1
130		24	3	12	15.00	1.46	4.21	1
130		25	3	12	14.40	1.34	4.04	1
130		26	3	12	13.84	1.24	3.88	1
130		27	3	12	13.33	1.15	3.74	1
130		18	4	14	20.00	1.67	4.21	1
130		20	4	12	18.00	1.57	3.79	1
130		21	4	12	17.14	1.43	3.61	1
130		22	4	10	16.36	1.56	3.44	1
130		23	4	10	15.65	1.43	3.29	1
130		24	4	10	15.00	1.31	3.15	1
130		25	4	10	14.40	1.21	3.03	1
135		22	3	14	16.36	1.54	4.77	1
135		23	3	14	15.65	1.41	4.56	1
135		24	3	14	15.00	1.30	4.37	1
135		25	3	12	14.40	1.39	4.19	1
135		26	3	12	13.84	1.29	4.03	1
135		27	3	12	13.33	1.19	3.88	1
135		28	3	12	12.85	1.11	3.74	1
135		19	4	14	18.94	1.55	4.14	1
135		20	4	12	18.00	1.64	3.93	1
135		21	4	12	17.14	1.48	3.74	1
135		22	4	10	16.36	1.62	3.57	1
135		23	4	10	15.65	1.48	3.42	1
135		24	4	10	15.00	1.36	3.28	1
135		25	4	10	14.40	1.25	3.14	1
140		22	3	14	16.36	1.60	4.94	1
140		23	3	14	15.65	1.46	4.73	1
140		24	3	14	15.00	1.34	4.53	1
140		25	3	14	14.40	1.24	4.35	1
140		26	3	12	13.84	1.34	4.18	1
140		27	3	12	13.33	1.24	4.03	1
140		28	3	12	12.85	1.15	3.88	1
140		19	4	14	18.94	1.61	4.29	1
140		21	4	12	17.14	1.54	3.88	1
140		22	4	12	16.36	1.40	3.71	1
140		23	4	10	15.65	1.54	3.54	1
140		24	4	10	15.00	1.41	3.40	1
140		25	4	10	14.40	1.30	3.26	1

TABLE XI-A (Cont'd) Slab 30 x 30 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
140		26	4	10	13.84	1.20	3.14	1
145		23	3	14	15.65	1.52	4.90	1
145		24	3	14	15.00	1.39	4.69	1
145		25	3	14	14.40	1.28	4.51	1
145		26	3	14	13.84	1.19	4.33	1
145		27	3	12	13.33	1.28	4.17	1
145		28	3	12	12.85	1.19	4.02	1
145		29	3	12	12.41	1.11	3.88	1
145		19	4	14	18.94	1.67	4.45	1
145		21	4	12	17.14	1.59	4.02	1
145		22	4	12	16.36	1.45	3.84	1
145		23	4	12	15.65	1.33	3.67	1
145		24	4	10	15.00	1.46	3.52	1
145		25	4	10	14.40	1.35	3.38	1
145		26	4	10	13.84	1.25	3.25	1
150		24	3	14	15.00	1.44	4.85	1
150		25	3	14	14.40	1.33	4.66	1
150		26	3	14	13.84	1.23	4.48	1
150		27	3	12	13.33	1.33	4.31	1
150		28	3	12	12.85	1.23	4.16	1
150		29	3	12	12.41	1.15	4.02	1
150		30	3	12	12.00	1.08	3.88	1
150		20	4	14	18.00	1.56	4.37	1
150		21	4	12	17.14	1.65	4.16	1
150		22	4	12	16.36	1.50	3.97	1
150		23	4	12	15.65	1.37	3.80	1
150		24	4	12	15.00	1.26	3.64	1
150		25	4	10	14.40	1.39	3.49	1
150		26	4	10	13.84	1.29	3.36	1

TABLE XI-B Slab 30 x 30 ft **L /Δ = 300**

W	1-C	D	X	B	L/D	P	A	K
4	.01	4	3	8		.60	.19	
4	.02	5	3	8		.53	.21	
4	.03	6	3	8		.47	.22	
4	.01	4	4	8		.48	.15	
4	.02	5	4	8		.44	.17	
4	.03	6	4	8		.40	.19	
8	.02	6	3	8		.80	.38	
8	.03	7	3	8		.70	.39	
8	.04	8	3	8		.66	.42	
8	.05	9	3	8		.67	.48	
8	.06	10	3	8		.57	.45	
8	.02	5	4	8		.77	.30	
8	.03	7	4	8		.57	.32	
8	.04	8	4	8		.55	.35	
8	.05	8	4	8		.63	.40	
8	.06	10	4	8		.48	.38	
12	.03	7	3	8		1.03	.57	
12	.04	8	3	8		.96	.61	
12	.05	10	3	8		.71	.56	
12	.06	11	3	8		.73	.64	
12	.07	12	3	8		.63	.61	
12	.08	13	3	8		.68	.70	
12	.09	14	3	8		.61	.68	
12		14	3	8	25.71	.72	.81	2
12		14	3	10	25.71	.54	.76	2
12		15	3	8	24.00	.55	.66	2
12		15	3	10	24.00	.41	.62	2
12		16	3	8	22.50	.45	.58	1
12		17	3	8	21.17	.40	.54	1
12	.03	7	4	8		.82	.46	
12	.04	8	4	8		.78	.50	
12	.05	9	4	8		.64	.46	
12	.06	10	4	8		.66	.53	
12	.07	12	4	8		.53	.50	
12	.08	12	4	8		.62	.59	
12	.09	13	4	8		.55	.57	
12		14	4	8	25.71	.50	.56	2
12		14	4	10	25.71	.37	.52	2
12		15	4	8	24.00	.38	.46	1
12		16	4	8	22.50	.34	.43	1
12		17	4	8	21.17	.30	.41	1
16	.04	9	3	8		1.07	.77	
16	.05	10	3	8		.88	.70	
16	.06	11	3	8		.89	.78	
16	.07	12	3	8		.93	.89	
16	.08	14	3	8		.76	.85	
16	.09	15	3	8		.68	.82	
16		15	3	8	24.00	.80	.96	2
16		15	3	10	24.00	.60	.90	2
16		16	3	8	22.50	.62	.80	2
16		16	3	10	22.50	.48	.77	1
16		17	3	8	21.17	.53	.73	1
16		18	3	8	20.00	.48	.69	1
16	.04	8	4	8		.96	.61	
16	.05	10	4	8		.71	.56	

TABLE XI-B (Cont'd) Slab 30 x 30 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
16	.06	11	4	8		.73	.64	
16	.07	12	4	8		.63	.61	
16	.08	13	4	8		.68	.70	
16	.09	14	4	8		.61	.68	
16		14	4	8	25.71	.72	.81	2
16		14	4	10	25.71	.54	.76	2
16		15	4	8	24.00	.55	.66	2
16		15	4	10	24.00	.41	.62	2
16		16	4	8	22.50	.45	.58	1
16		17	4	8	21.17	.40	.54	1
20	.05	10	3	8		1.20	.96	
20	.06	12	3	8		.93	.89	
20	.07	13	3	8		.97	1.00	
20	.08	14	3	8		.85	.96	
20	.09	15	3	8		.92	1.11	
20		16	3	8	22.50	.83	1.07	2
20		16	3	10	22.50	.62	1.00	2
20		17	3	8	21.17	.67	.91	1
20		18	3	8	20.00	.60	.86	1
20		19	3	8	18.94	.53	.81	1
20	.05	10	4	8		.96	.77	
20	.06	11	4	8		.81	.72	
20	.07	12	4	8		.85	.82	
20	.08	14	4	8		.70	.78	
20	.09	14	4	8		.81	.91	
20		15	4	8	24.00	.73	.88	2
20		15	4	10	24.00	.55	.83	2
20		16	4	8	22.50	.57	.73	2
20		16	4	10	22.50	.45	.72	1
20		17	4	8	21.17	.50	.68	1
20		18	4	8	20.00	.45	.64	1
24	.06	12	3	8		1.20	1.15	
24	.07	14	3	8		.96	1.08	
24	.08	14	3	8		1.10	1.23	
24	.09	16	3	8		.92	1.18	
24		17	3	8	21.17	.83	1.13	2
24		17	3	10	21.17	.64	1.09	1
24		18	3	8	20.00	.72	1.03	1
24		19	3	8	18.94	.64	.98	1
24		20	3	8	18.00	.58	.93	1
24	.06	11	4	8		1.05	.92	
24	.07	13	4	8		.84	.87	
24	.08	14	4	8		.89	1.00	
24	.09	15	4	8		.80	.96	
24		16	4	8	22.50	.72	.93	2
24		16	4	10	22.50	.54	.87	2
24		17	4	8	21.17	.60	.82	1
24		18	4	8	20.00	.54	.77	1
24		19	4	8	18.94	.48	.73	1
28	.07	14	3	8		1.20	1.35	
28	.08	15	3	8		1.06	1.27	
28	.09	17	3	8		.89	1.22	
28		17	3	8	21.17	1.03	1.40	2
28		17	3	10	21.17	.76	1.29	2
28		18	3	8	20.00	.84	1.20	1
28		19	3	8	18.94	.75	1.14	1

TABLE XI-B (Cont'd) Slab 30 x 30 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
28		20	3	8	18.00	.68	1.08	1
28	.07	13	4	8		1.03	1.08	
28	.08	14	4	8		.91	1.02	
28	.09	16	4	8		.77	.98	
28		16	4	8	22.50	.89	1.14	2
28		16	4	10	22.50	.66	1.06	2
28		17	4	8	21.17	.70	.96	1
28		18	4	8	20.00	.63	.90	1
28		19	4	8	18.94	.56	.85	1
32	.08	15	3	8		1.28	1.54	
32	.09	17	3	8		1.07	1.46	
32		18	3	8	20.00	.97	1.40	2
32		18	3	10	20.00	.76	1.38	1
32		19	3	8	18.94	.86	1.30	1
32		20	3	8	18.00	.77	1.24	1
32		21	3	8	17.14	.70	1.18	1
32	.08	14	4	8		1.10	1.23	
32	.09	16	4	8		.92	1.18	
32		17	4	8	21.17	.83	1.13	2
32		17	4	10	21.17	.64	1.09	1
32		18	4	8	20.00	.72	1.03	1
32		19	4	8	18.94	.64	.98	1
32		20	4	8	18.00	.58	.93	1
36	.09	17	3	8		1.27	1.73	
36		18	3	8	20.00	1.15	1.65	2
36		18	3	10	20.00	.86	1.55	1
36		19	3	8	18.94	.96	1.47	1
36		20	3	8	18.00	.87	1.39	1
36		21	3	8	17.14	.79	1.33	1
36		22	3	8	16.36	.72	1.27	1
36	.09	16	4	8		1.08	1.38	
36		17	4	8	21.17	.98	1.33	2
36		17	4	10	21.17	.72	1.23	2
36		18	4	8	20.00	.81	1.16	1
36		19	4	8	18.94	.72	1.10	1
36		20	4	8	18.00	.65	1.04	1
40		16	3	14	22.50	1.00	2.24	2
40		16	3	16	22.50	.83	2.14	2
40		17	3	12	21.17	.96	1.96	2
40		17	3	14	21.17	.78	1.86	2
40		18	3	8	20.00	1.33	1.92	2
40		18	3	10	20.00	.97	1.76	2
40		19	3	8	18.94	1.07	1.63	1
40		20	3	8	18.00	.97	1.55	1
40		21	3	8	17.14	.88	1.48	1
40		22	3	8	16.36	.80	1.41	1
40		16	4	14	22.50	.68	1.53	2
40		16	4	16	22.50	.57	1.47	2
40		17	4	8	21.17	1.13	1.54	2
40		17	4	10	21.17	.83	1.42	2
40		18	4	8	20.00	.90	1.29	1
40		19	4	8	18.94	.80	1.22	1
40		20	4	8	18.00	.72	1.16	1
45		17	3	14	21.17	.91	2.18	2
45		17	3	16	21.17	.76	2.09	2
45		18	3	10	20.00	1.15	2.07	2

TABLE XI-B (Cont'd) Slab 30 x 30 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
45		18	3	12	20.00	.90	1.94	1
45		19	3	8	18.94	1.25	1.91	2
45		19	3	10	18.94	.96	1.84	1
45		20	3	8	18.00	1.09	1.74	1
45		21	3	8	17.14	.99	1.66	1
45		22	3	8	16.36	.90	1.59	1
45		23	3	8	15.65	.82	1.52	1
45		16	4	14	22.50	.79	1.78	2
45		16	4	16	22.50	.67	1.71	2
45		17	4	10	21.17	.98	1.66	2
45		17	4	12	21.17	.76	1.56	2
45		18	4	8	20.00	1.05	1.51	2
45		18	4	10	20.00	.81	1.45	1
45		19	4	8	18.94	.90	1.38	1
45		20	4	8	18.00	.82	1.31	1
45		21	4	8	17.14	.74	1.24	1
50		17	3	14	21.17	1.06	2.52	2
50		17	3	16	21.17	.88	2.40	2
50		18	3	10	20.00	1.33	2.41	2
50		18	3	12	20.00	1.03	2.23	2
50		19	3	8	18.94	1.46	2.22	2
50		19	3	10	18.94	1.07	2.04	1
50		20	3	8	18.00	1.21	1.94	1
50		21	3	8	17.14	1.10	1.85	1
50		22	3	8	16.36	1.00	1.76	1
50		23	3	8	15.65	.91	1.69	1
50		16	4	14	22.50	.91	2.05	2
50		16	4	16	22.50	.76	1.96	2
50		17	4	10	21.17	1.13	1.92	2
50		17	4	12	21.17	.88	1.80	2
50		18	4	8	20.00	1.22	1.75	2
50		18	4	10	20.00	.90	1.62	1
50		19	4	8	18.94	1.00	1.53	1
50		20	4	8	18.00	.91	1.45	1
50		21	4	8	17.14	.82	1.38	1
50		22	4	8	16.36	.75	1.32	1
55		18	3	14	20.00	.95	2.40	2
55		18	3	16	20.00	.82	2.37	1
55		19	3	10	18.94	1.21	2.31	2
55		19	3	12	18.94	.98	2.25	1
55		20	3	8	18.00	1.34	2.15	2
55		20	3	10	18.00	1.06	2.13	1
55		21	3	8	17.14	1.21	2.03	1
55		22	3	8	16.36	1.10	1.94	1
55		23	3	8	15.65	1.01	1.85	1
55		24	3	8	15.00	.92	1.78	1
55		17	4	14	21.17	.81	1.94	2
55		17	4	16	21.17	.69	1.88	1
55		18	4	10	20.00	1.02	1.83	2
55		18	4	12	20.00	.82	1.78	1
55		19	4	8	18.94	1.11	1.68	2
55		19	4	10	18.94	.88	1.68	1
55		20	4	8	18.00	1.00	1.60	1
55		21	4	8	17.14	.90	1.52	1
55		22	4	8	16.36	.82	1.45	1
55		23	4	8	15.65	.75	1.39	1

TABLE XI-B Slab 30 x 30 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
60		18	3	14	20.00	1.07	2.71	2
60		18	3	16	20.00	.90	2.59	1
60		19	3	10	18.94	1.37	2.62	2
60		19	3	12	18.94	1.07	2.45	1
60		20	3	8	18.00	1.52	2.44	2
60		20	3	10	18.00	1.16	2.33	1
60		21	3	8	17.14	1.32	2.22	1
60		22	3	8	16.36	1.20	2.12	1
60		23	3	8	15.65	1.10	2.02	1
60		24	3	8	15.00	1.01	1.94	1
60		17	4	12	21.17	1.13	2.31	2
60		17	4	14	21.17	.91	2.18	2
60		18	4	10	20.00	1.15	2.07	2
60		18	4	12	20.00	.90	1.94	1
60		19	4	8	18.94	1.25	1.91	2
60		19	4	10	18.94	.96	1.84	1
60		20	4	8	18.00	1.09	1.74	1
60		21	4	8	17.14	.99	1.66	1
60		22	4	8	16.36	.90	1.59	1
60		23	4	8	15.65	.82	1.52	1
65		18	3	14	20.00	1.20	3.03	2
65		18	3	16	20.00	1.00	2.88	2
65		20	3	10	18.00	1.26	2.52	1
65		21	3	8	17.14	1.43	2.40	1
65		22	3	8	16.36	1.30	2.29	1
65		23	3	8	15.65	1.19	2.19	1
65		24	3	8	15.00	1.09	2.10	1
65		25	3	8	14.40	1.01	2.02	1
65		17	4	14	21.17	1.02	2.43	2
65		17	4	16	21.17	.85	2.32	2
65		18	4	10	20.00	1.29	2.32	2
65		18	4	12	20.00	1.00	2.16	2
65		19	4	8	18.94	1.41	2.14	2
65		19	4	10	18.94	1.05	1.99	1
65		20	4	8	18.00	1.18	1.89	1
65		21	4	8	17.14	1.07	1.80	1
65		22	4	8	16.36	.97	1.72	1
65		23	4	8	15.65	.89	1.64	1
70		18	3	14	20.00	1.33	3.37	2
70		18	3	16	20.00	1.10	3.19	2
70		21	3	8	17.14	1.54	2.59	2
70		21	3	10	17.14	1.23	2.59	1
70		22	3	8	16.36	1.40	2.47	1
70		23	3	8	15.65	1.28	2.36	1
70		24	3	8	15.00	1.18	2.26	1
70		25	3	8	14.40	1.08	2.17	1
70		26	3	8	13.84	1.00	2.09	1
70		17	4	14	21.17	1.13	2.70	2
70		17	4	16	21.17	.94	2.56	2
70		18	4	12	20.00	1.10	2.39	2
70		18	4	14	20.00	.89	2.26	1
70		19	4	10	18.94	1.13	2.16	2
70		19	4	12	18.94	.94	2.14	1
70		20	4	8	18.00	1.27	2.04	1
70		21	4	8	17.14	1.15	1.94	1
70		22	4	8	16.36	1.05	1.85	1

TABLE XI-B (Cont'd) Slab 30 x 30 ft **L /Δ = 300**

W	1-C	D	X	B	L/D	P	A	K
70		23	4	8	15.65	.96	1.77	1
75		19	3	14	18.94	1.17	3.11	2
75		19	3	16	18.94	1.00	3.06	1
75		20	3	10	18.00	1.52	3.05	2
75		20	3	12	18.00	1.21	2.91	1
75		21	3	8	17.14	1.71	2.87	2
75		21	3	10	17.14	1.32	2.77	1
75		22	3	8	16.36	1.50	2.65	1
75		23	3	8	15.65	1.37	2.53	1
75		24	3	8	15.00	1.26	2.43	1
75		25	3	8	14.40	1.16	2.33	1
75		18	4	14	20.00	.98	2.48	2
75		18	4	16	20.00	.84	2.43	1
75		19	4	10	18.94	1.25	2.38	2
75		19	4	12	18.94	1.00	2.30	1
75		20	4	8	18.00	1.38	2.22	2
75		20	4	10	18.00	1.09	2.18	1
75		21	4	8	17.14	1.23	2.08	1
75		22	4	8	16.36	1.12	1.98	1
75		23	4	8	15.65	1.03	1.90	1
75		24	4	8	15.00	.94	1.82	1
80		19	3	14	18.94	1.28	3.41	2
80		19	3	16	18.94	1.07	3.27	1
80		20	3	10	18.00	1.68	3.36	2
80		20	3	12	18.00	1.29	3.11	1
80		21	3	10	17.14	1.41	2.96	1
80		22	3	8	16.36	1.60	2.82	1
80		23	3	8	15.65	1.46	2.70	1
80		24	3	8	15.00	1.35	2.59	1
80		25	3	8	14.40	1.24	2.48	1
80		18	4	14	20.00	1.07	2.71	2
80		18	4	16	20.00	.90	2.59	1
80		19	4	10	18.94	1.37	2.62	2
80		19	4	12	18.94	1.07	2.45	1
80		20	4	8	18.00	1.52	2.44	2
80		20	4	10	18.00	1.16	2.33	1
80		21	4	8	17.14	1.32	2.22	1
80		22	4	8	16.36	1.20	2.12	1
80		23	4	8	15.65	1.10	2.02	1
80		24	4	8	15.00	1.01	1.94	1
85		19	3	14	18.94	1.40	3.73	2
85		19	3	16	18.94	1.15	3.52	2
85		20	3	12	18.00	1.40	3.36	2
85		20	3	14	18.00	1.18	3.30	1
85		21	3	10	17.14	1.49	3.14	1
85		22	3	10	16.36	1.36	3.00	1
85		23	3	8	15.65	1.56	2.87	1
85		24	3	8	15.00	1.43	2.75	1
85		25	3	8	14.40	1.32	2.64	1
85		18	4	14	20.00	1.17	2.95	2
85		18	4	16	20.00	.97	2.80	2
85		20	4	8	18.00	1.67	2.67	2
85		20	4	10	18.00	1.23	2.47	1
85		21	4	8	17.14	1.40	2.36	1
85		22	4	8	16.36	1.28	2.25	1

TABLE XI-B (Cont'd) Slab 30 x 30 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
85		23	4	8	15.65	1.17	2.15	1
85		24	4	8	15.00	1.07	2.06	1
85		25	4	8	14.40	.99	1.98	1
90		20	3	14	18.00	1.24	3.49	1
90		21	3	10	17.14	1.61	3.38	2
90		21	3	12	17.14	1.32	3.33	1
90		22	3	10	16.36	1.44	3.18	1
90		23	3	10	15.65	1.32	3.04	1
90		24	3	10	15.00	1.21	2.91	1
90		25	3	8	14.40	1.39	2.79	1
90		26	3	8	13.84	1.29	2.69	1
90		18	4	14	20.00	1.27	3.20	2
90		18	4	16	20.00	1.05	3.03	2
90		20	4	10	18.00	1.31	2.62	1
90		21	4	8	17.14	1.48	2.49	1
90		22	4	8	16.36	1.35	2.38	1
90		23	4	8	15.65	1.24	2.28	1
90		24	4	8	15.00	1.13	2.18	1
90		25	4	8	14.40	1.04	2.09	1
95		20	3	14	18.00	1.31	3.69	1
95		21	3	10	17.14	1.74	3.67	2
95		21	3	12	17.14	1.39	3.51	1
95		22	3	10	16.36	1.52	3.35	1
95		23	3	10	15.65	1.39	3.21	1
95		24	3	10	15.00	1.28	3.07	1
95		25	3	10	14.40	1.18	2.95	1
95		26	3	8	13.84	1.36	2.84	1
95		19	4	14	18.94	1.09	2.91	1
95		21	4	8	17.14	1.58	2.66	2
95		21	4	10	17.14	1.25	2.63	1
95		22	4	8	16.36	1.43	2.51	1
95		23	4	8	15.65	1.30	2.40	1
95		24	4	8	15.00	1.20	2.30	1
95		25	4	8	14.40	1.10	2.21	1
95		26	4	8	13.84	1.02	2.13	1
100		20	3	14	18.00	1.42	3.97	2
100		20	3	16	18.00	1.21	3.88	1
100		21	3	12	17.14	1.46	3.70	1
100		22	3	10	16.36	1.60	3.53	1
100		23	3	10	15.65	1.46	3.38	1
100		24	3	10	15.00	1.35	3.24	1
100		25	3	10	14.40	1.24	3.11	1
100		26	3	10	13.84	1.15	2.99	1
100		19	4	14	18.94	1.17	3.11	2
100		19	4	16	18.94	1.00	3.06	1
100		20	4	10	18.00	1.52	3.05	2
100		20	4	12	18.00	1.21	2.91	1
100		21	4	8	17.14	1.71	2.87	2
100		21	4	10	17.14	1.32	2.77	1
100		22	4	8	16.36	1.50	2.65	1
100		23	4	8	15.65	1.37	2.53	1
100		24	4	8	15.00	1.26	2.43	1
100		25	4	8	14.40	1.16	2.33	1
105		20	3	14	18.00	1.52	4.27	2
105		20	3	16	18.00	1.27	4.08	1
105		21	3	12	17.14	1.54	3.89	2

TABLE XI-B (Cont'd) Slab 30 x 30 ft $L'/\Delta = 300$

W	1-C	D	X	B	L/D	P	A	K
105		21	3	14	17.14	1.32	3.88	1
105		22	3	12	16.36	1.40	3.71	1
105		23	3	10	15.65	1.54	3.54	1
105		24	3	10	15.00	1.41	3.40	1
105		25	3	10	14.40	1.30	3.26	1
105		26	3	10	13.84	1.20	3.14	1
105		19	4	14	18.94	1.25	3.34	2
105		19	4	16	18.94	1.06	3.22	1
105		20	4	10	18.00	1.64	3.28	2
105		20	4	12	18.00	1.27	3.06	1
105		21	4	10	17.14	1.38	2.91	1
105		22	4	8	16.36	1.58	2.78	1
105		23	4	8	15.65	1.44	2.66	1
105		24	4	8	15.00	1.32	2.55	1
105		25	4	8	14.40	1.22	2.44	1
110		20	3	14	18.00	1.63	4.58	2
110		20	3	16	18.00	1.34	4.30	2
110		21	3	12	17.14	1.65	4.17	2
110		21	3	14	17.14	1.38	4.07	1
110		22	3	12	16.36	1.47	3.88	1
110		23	3	12	15.65	1.34	3.71	1
110		24	3	10	15.00	1.48	3.56	1
110		25	3	10	14.40	1.36	3.42	1
110		26	3	10	13.84	1.26	3.28	1
110		19	4	14	18.94	1.34	3.57	2
110		19	4	16	18.94	1.11	3.37	2
110		20	4	12	18.00	1.34	3.22	2
110		20	4	14	18.00	1.14	3.20	1
110		21	4	10	17.14	1.45	3.05	1
110		22	4	10	16.36	1.32	2.91	1
110		23	4	8	15.65	1.51	2.78	1
110		24	4	8	15.00	1.39	2.67	1
110		25	4	8	14.40	1.28	2.56	1
115		21	3	14	17.14	1.44	4.25	1
115		22	3	12	16.36	1.53	4.06	1
115		23	3	12	15.65	1.40	3.88	1
115		24	3	12	15.00	1.29	3.72	1
115		25	3	10	14.40	1.43	3.57	1
115		26	3	10	13.84	1.32	3.43	1
115		27	3	10	13.33	1.22	3.31	1
115		19	4	14	18.94	1.43	3.81	2
115		19	4	16	18.94	1.18	3.59	2
115		20	4	12	18.00	1.43	3.44	2
115		20	4	14	18.00	1.19	3.35	1
115		21	4	10	17.14	1.52	3.19	1
115		22	4	10	16.36	1.38	3.04	1
115		23	4	10	15.65	1.26	2.91	1
115		24	4	8	15.00	1.45	2.79	1
115		25	4	8	14.40	1.34	2.68	1
120		21	3	14	17.14	1.51	4.44	1
120		22	3	12	16.36	1.60	4.24	1
120		23	3	12	15.65	1.46	4.05	1
120		24	3	12	15.00	1.35	3.88	1
120		25	3	12	14.40	1.24	3.73	1
120		26	3	10	13.84	1.38	3.58	1
120		27	3	10	13.33	1.27	3.45	1

TABLE XI-B (Cont'd) Slab 30 x 30 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
120		20	4	14	18.00	1.24	3.49	1
120		21	4	10	17.14	1.61	3.38	2
120		21	4	12	17.14	1.32	3.33	1
120		22	4	10	16.36	1.44	3.18	1
120		23	4	10	15.65	1.32	3.04	1
120		24	4	10	15.00	1.21	2.91	1
120		25	4	8	14.40	1.39	2.79	1
120		26	4	8	13.84	1.29	2.69	1
125		21	3	14	17.14	1.59	4.68	2
125		21	3	16	17.14	1.37	4.62	1
125		22	3	14	16.36	1.43	4.41	1
125		23	3	12	15.65	1.53	4.22	1
125		24	3	12	15.00	1.40	4.05	1
125		25	3	12	14.40	1.29	3.88	1
125		26	3	12	13.84	1.19	3.73	1
125		27	3	10	13.33	1.33	3.59	1
125		20	4	14	18.00	1.30	3.64	1
125		21	4	10	17.14	1.71	3.59	2
125		21	4	12	17.14	1.37	3.47	1
125		22	4	10	16.36	1.50	3.31	1
125		23	4	10	15.65	1.37	3.16	1
125		24	4	10	15.00	1.26	3.03	1
125		25	4	10	14.40	1.16	2.91	1
125		26	4	8	13.84	1.34	2.80	1
130		21	3	14	17.14	1.68	4.96	2
130		21	3	16	17.14	1.43	4.81	1
130		22	3	14	16.36	1.49	4.59	1
130		23	3	14	15.65	1.36	4.39	1
130		24	3	12	15.00	1.46	4.21	1
130		25	3	12	14.40	1.34	4.04	1
130		26	3	12	13.84	1.24	3.88	1
130		27	3	12	13.33	1.15	3.74	1
130		20	4	14	18.00	1.36	3.83	2
130		20	4	16	18.00	1.18	3.79	1
130		21	4	12	17.14	1.43	3.61	1
130		22	4	10	16.36	1.56	3.44	1
130		23	4	10	15.65	1.43	3.29	1
130		24	4	10	15.00	1.31	3.15	1
130		25	4	10	14.40	1.21	3.03	1
130		26	4	10	13.84	1.12	2.91	1
135		22	3	14	16.36	1.54	4.77	1
135		23	3	14	15.65	1.41	4.56	1
135		24	3	14	15.00	1.30	4.37	1
135		25	3	12	14.40	1.39	4.19	1
135		26	3	12	13.84	1.29	4.03	1
135		27	3	12	13.33	1.19	3.88	1
135		28	3	12	12.85	1.11	3.74	1
135		20	4	14	18.00	1.44	4.05	2
135		20	4	16	18.00	1.23	3.93	1
135		21	4	12	17.14	1.48	3.74	1
135		22	4	10	16.36	1.62	3.57	1
135		23	4	10	15.65	1.48	3.42	1
135		24	4	10	15.00	1.36	3.28	1
135		25	4	10	14.40	1.25	3.14	1
135		26	4	10	13.84	1.16	3.02	1
140		22	3	14	16.36	1.60	4.94	1

TABLE XI-B (Cont'd) Slab 30 x 30 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
140		23	3	14	15.65	1.46	4.73	1
140		24	3	14	15.00	1.34	4.53	1
140		25	3	14	14.40	1.24	4.35	1
140		26	3	12	13.84	1.34	4.18	1
140		27	3	12	13.33	1.24	4.03	1
140		28	3	12	12.85	1.15	3.88	1
140		20	4	14	18.00	1.52	4.27	2
140		20	4	16	18.00	1.27	4.08	1
140		21	4	12	17.14	1.54	3.89	2
140		21	4	14	17.14	1.32	3.88	1
140		22	4	12	16.36	1.40	3.71	1
140		23	4	10	15.65	1.54	3.54	1
140		24	4	10	15.00	1.41	3.40	1
140		25	4	10	14.40	1.30	3.26	1
140		26	4	10	13.84	1.20	3.14	1
145		23	3	14	15.65	1.52	4.90	1
145		24	3	14	15.00	1.39	4.69	1
145		25	3	14	14.40	1.28	4.51	1
145		26	3	14	13.84	1.19	4.33	1
145		27	3	12	13.33	1.28	4.17	1
145		28	3	12	12.85	1.19	4.02	1
145		29	3	12	12.41	1.11	3.88	1
145		20	4	14	18.00	1.60	4.50	2
145		20	4	16	18.00	1.32	4.23	2
145		21	4	12	17.14	1.62	4.10	2
145		21	4	14	17.14	1.36	4.02	1
145		22	4	12	16.36	1.45	3.84	1
145		23	4	12	15.65	1.33	3.67	1
145		24	4	10	15.00	1.46	3.52	1
145		25	4	10	14.40	1.35	3.38	1
145		26	4	10	13.84	1.25	3.25	1
150		24	3	14	15.00	1.44	4.85	1
150		25	3	14	14.40	1.33	4.66	1
150		26	3	14	13.84	1.23	4.48	1
150		27	3	12	13.33	1.33	4.31	1
150		28	3	12	12.85	1.23	4.16	1
150		29	3	12	12.41	1.15	4.02	1
150		30	3	12	12.00	1.08	3.88	1
150		20	4	14	18.00	1.69	4.74	2
150		20	4	16	18.00	1.38	4.44	2
150		21	4	12	17.14	1.71	4.31	2
150		21	4	14	17.14	1.41	4.16	1
150		22	4	12	16.36	1.50	3.97	1
150		23	4	12	15.65	1.37	3.80	1
150		24	4	12	15.00	1.26	3.64	1
150		25	4	10	14.40	1.39	3.49	1
150		26	4	10	13.84	1.29	3.36	1

TABLE XI-C Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
4	.01	4	3	8		.55	.17	
4	.02	6	3	8		.40	.19	
4	.03	7	3	8		.42	.24	
4	.01	4	4	8		.43	.14	
4	.02	5	4	8		.39	.15	
4	.03	6	4	8		.41	.19	
8	.02	6	3	8		.73	.35	
8	.03	8	3	8		.56	.35	
8	.04	9	3	8		.53	.38	
8	.05	10	3	8		.53	.42	
8	.06	11	3	8		.54	.48	
8	.02	6	4	8		.58	.28	
8	.03	7	4	8		.51	.28	
8	.04	8	4	8		.49	.31	
8	.05	9	4	8		.48	.35	
8	.06	10	4	8		.49	.39	
12	.03	8	3	8		.83	.53	
12	.04	9	3	8		.77	.56	
12	.05	10	3	8		.76	.61	
12	.06	12	3	8		.60	.57	
12	.07	13	3	8		.62	.65	
12	.08	14	3	8		.56	.62	
12	.09	15	3	8		.60	.72	
12		16	3	8	22.50	.54	.70	2
12		16	3	10	22.50	.41	.65	2
12		17	3	8	21.17	.43	.59	2
12		17	3	10	21.17	.32	.55	2
12		18	3	8	20.00	.36	.51	1
12		19	3	8	18.94	.32	.49	1
12	.03	8	4	8		.65	.42	
12	.04	9	4	8		.62	.44	
12	.05	10	4	8		.61	.49	
12	.06	11	4	8		.53	.47	
12	.07	12	4	8		.55	.53	
12	.08	14	4	8		.46	.51	
12	.09	14	4	8		.53	.59	
12		15	4	8	24.00	.48	.58	2
12		15	4	10	24.00	.36	.54	2
12		16	4	8	22.50	.37	.48	2
12		16	4	10	22.50	.28	.45	2
12		17	4	8	21.17	.30	.41	1
12		18	4	8	20.00	.27	.38	1
16	.04	10	3	8		.88	.70	
16	.05	11	3	8		.74	.65	
16	.06	13	3	8		.69	.71	
16	.07	14	3	8		.71	.80	
16	.08	15	3	8		.64	.77	
16	.09	16	3	8		.68	.87	
16		17	3	8	21.17	.62	.85	2
16		17	3	10	21.17	.47	.80	2
16		18	3	8	20.00	.50	.72	2
16		18	3	10	20.00	.38	.69	1
16		19	3	8	18.94	.43	.65	1
16		20	3	8	18.00	.38	.62	1
16	.04	9	4	8		.77	.56	

TABLE XI-C (Cont'd) Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
16	.05	10	4	8		.76	.61	
16	.06	12	4	8		.60	.57	
16	.07	13	4	8		.62	.65	
16	.08	14	4	8		.56	.62	
16	.09	15	4	8		.60	.72	
16		16	4	8	22.50	.54	.70	2
16		16	4	10	22.50	.41	.65	2
16		17	4	8	21.17	.43	.59	2
16		17	4	10	21.17	.32	.55	2
16		18	4	8	20.00	.36	.51	1
16		19	4	8	18.94	.32	.49	1
20	.05	11	3	8		1.00	.88	
20	.06	13	3	8		.79	.82	
20	.07	14	3	8		.82	.91	
20	.08	16	3	8		.68	.88	
20	.09	17	3	8		.73	.99	
20		18	3	8	20.00	.66	.96	2
20		18	3	10	20.00	.50	.90	2
20		19	3	8	18.94	.54	.82	2
20		19	3	10	18.94	.43	.81	1
20		20	3	8	18.00	.48	.77	1
20		21	3	8	17.14	.44	.74	1
20	.05	11	4	8		.79	.70	
20	.06	13	4	8		.63	.66	
20	.07	14	4	8		.65	.73	
20	.08	14	4	8		.74	.83	
20	.09	16	4	8		.63	.80	
20		17	4	8	21.17	.57	.78	2
20		17	4	10	21.17	.43	.73	2
20		18	4	8	20.00	.46	.66	2
20		18	4	10	20.00	.36	.64	1
20		19	4	8	18.94	.40	.61	1
20		20	4	8	18.00	.36	.58	1
24	.06	13	3	8		1.02	1.06	
24	.07	15	3	8		.83	1.00	
24	.08	16	3	8		.87	1.12	
24	.09	18	3	8		.74	1.07	
24		18	3	8	20.00	.84	1.22	2
24		18	3	10	20.00	.63	1.14	2
24		19	3	8	18.94	.68	1.04	2
24		19	3	10	18.94	.51	.98	1
24		20	3	8	18.00	.58	.93	1
24		21	3	8	17.14	.52	.88	1
24	.06	13	4	8		.80	.84	
24	.07	14	4	8		.71	.79	
24	.08	15	4	8		.74	.89	
24	.09	17	4	8		.63	.86	
24		17	4	8	21.17	.72	.99	2
24		17	4	10	21.17	.54	.93	2
24		18	4	8	20.00	.58	.84	2
24		18	4	10	20.00	.44	.79	2
24		19	4	8	18.94	.48	.73	1
24		20	4	8	18.00	.43	.69	1
28	.07	15	3	8		1.03	1.24	
28	.08	17	3	8		.86	1.18	
28	.09	18	3	8		.91	1.32	

TABLE XI-C (Cont'd) Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
28		19	3	8	18.94	.84	1.27	2
28		19	3	10	18.94	.62	1.19	2
28		20	3	8	18.00	.68	1.09	2
28		20	3	10	18.00	.54	1.08	1
28		21	3	8	17.14	.61	1.03	1
28		22	3	8	16.36	.56	.98	1
28	.07	14	4	8		.87	.98	
28	.08	16	4	8		.73	.93	
28	.09	17	4	8		.77	1.06	
28		18	4	8	20.00	.71	1.02	2
28		18	4	10	20.00	.53	.96	2
28		19	4	8	18.94	.57	.87	2
28		19	4	10	18.94	.45	.85	1
28		20	4	8	18.00	.51	.81	1
28		21	4	8	17.14	.46	.77	1
32	.08	17	3	8		1.04	1.41	
32	.09	19	3	8		.89	1.35	
32		20	3	8	18.00	.81	1.30	2
32		20	3	10	18.00	.62	1.24	1
32		21	3	8	17.14	.70	1.18	1
32		22	3	8	16.36	.64	1.13	1
32		23	3	8	15.65	.58	1.08	1
32	.08	16	4	8		.87	1.12	
32	.09	18	4	8		.74	1.07	
32		18	4	8	20.00	.84	1.22	2
32		18	4	10	20.00	.63	1.14	2
32		19	4	8	18.94	.68	1.04	2
32		19	4	10	18.94	.51	.98	1
32		20	4	8	18.00	.58	.93	1
32		21	4	8	17.14	.52	.88	1
36	.09	19	3	8		1.04	1.59	
36		20	3	8	18.00	.95	1.53	2
36		20	3	10	18.00	.71	1.42	2
36		21	3	8	17.14	.79	1.33	1
36		22	3	8	16.36	.72	1.27	1
36		23	3	8	15.65	.66	1.21	1
36	.09	18	4	8		.87	1.26	
36		19	4	8	18.94	.80	1.21	2
36		19	4	10	18.94	.59	1.13	2
36		20	4	8	18.00	.65	1.04	1
36		21	4	8	17.14	.59	.99	1
36		22	4	8	16.36	.54	.95	1
40		18	3	14	20.00	.79	2.00	2
40		18	3	16	20.00	.66	1.92	2
40		19	3	12	18.94	.78	1.79	2
40		19	3	14	18.94	.64	1.71	2
40		20	3	8	18.00	1.10	1.77	2
40		20	3	10	18.00	.81	1.63	2
40		21	3	8	17.14	.90	1.52	2
40		21	3	10	17.14	.70	1.48	1
40		17	4	14	21.17	.68	1.62	2
40		17	4	16	21.17	.57	1.56	2
40		18	4	10	20.00	.84	1.52	2
40		18	4	12	20.00	.66	1.44	2
40		19	4	8	18.94	.92	1.40	2
40		19	4	10	18.94	.68	1.30	2

TABLE XI-C (Cont'd) Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
40		20	4	8	18.00	.75	1.20	2
40		20	4	10	18.00	.58	1.16	1
45		19	3	14	18.94	.75	1.99	2
45		19	3	16	18.94	.63	1.92	2
45		20	3	10	18.00	.95	1.91	2
45		20	3	12	18.00	.75	1.80	2
45		21	3	8	17.14	1.06	1.78	2
45		21	3	10	17.14	.79	1.66	1
45		22	3	8	16.36	.90	1.59	1
45		23	3	8	15.65	.82	1.52	1
45		24	3	8	15.00	.75	1.45	1
45		25	3	8	14.40	.69	1.39	1
45		18	4	14	20.00	.63	1.60	2
45		18	4	16	20.00	.53	1.55	2
45		19	4	10	18.94	.80	1.52	2
45		19	4	12	18.94	.63	1.44	2
45		20	4	8	18.00	.87	1.40	2
45		20	4	10	18.00	.65	1.31	1
45		21	4	8	17.14	.74	1.24	1
50		19	3	14	18.94	.86	2.29	2
50		19	3	16	18.94	.72	2.20	2
50		20	3	10	18.00	1.10	2.21	2
50		20	3	12	18.00	.86	2.07	2
50		21	3	8	17.14	1.23	2.07	2
50		21	3	10	17.14	.90	1.90	2
50		22	3	8	16.36	1.01	1.78	2
50		22	3	10	16.36	.80	1.76	1
50		23	3	8	15.65	.91	1.69	1
50		24	3	8	15.00	.84	1.62	1
50		25	3	8	14.40	.77	1.55	1
50		18	4	14	20.00	.73	1.84	2
50		18	4	16	20.00	.61	1.77	2
50		19	4	10	18.94	.92	1.75	2
50		19	4	12	18.94	.72	1.65	2
50		20	4	8	18.00	1.01	1.62	2
50		20	4	10	18.00	.75	1.50	2
50		21	4	8	17.14	.83	1.39	2
50		21	4	10	17.14	.66	1.38	1
55		19	3	14	18.94	.98	2.61	2
55		19	3	16	18.94	.82	2.49	2
55		20	3	12	18.00	.98	2.35	2
55		20	3	14	18.00	.79	2.23	2
55		21	3	10	17.14	1.03	2.16	2
55		21	3	12	17.14	.80	2.03	1
55		22	3	8	16.36	1.15	2.04	2
55		22	3	10	16.36	.88	1.94	1
55		23	3	8	15.65	1.01	1.85	1
55		24	3	8	15.00	.92	1.78	1
55		25	3	8	14.40	.85	1.71	1
55		18	4	14	20.00	.82	2.09	2
55		18	4	16	20.00	.69	2.00	2
55		19	4	12	18.94	.82	1.87	2
55		19	4	14	18.94	.67	1.78	2
55		20	4	10	18.00	.85	1.70	2
55		20	4	12	18.00	.67	1.61	2
55		21	4	8	17.14	.94	1.58	2

TABLE XI-C (Cont'd) Slab 30 x 30 ft $L/\Delta = 360$

W	1-C	D	X	B	L/D	P	A	K
55		21	4	10	17.14	.72	1.52	1
60		20	3	14	18.00	.89	2.51	2
60		20	3	16	18.00	.75	2.40	2
60		21	3	10	17.14	1.16	2.44	2
60		21	3	12	17.14	.90	2.28	2
60		22	3	8	16.36	1.31	2.30	2
60		22	3	10	16.36	.96	2.12	1
60		23	3	8	15.65	1.10	2.02	1
60		24	3	8	15.00	1.01	1.94	1
60		25	3	8	14.40	.93	1.86	1
60		26	3	8	13.84	.86	1.79	1
60		19	4	14	18.94	.75	1.99	2
60		19	4	16	18.94	.63	1.92	2
60		20	4	10	18.00	.95	1.91	2
60		20	4	12	18.00	.75	1.80	2
60		21	4	8	17.14	1.06	1.78	2
60		21	4	10	17.14	.79	1.66	1
60		22	4	8	16.36	.90	1.59	1
60		23	4	8	15.65	.82	1.52	1
60		24	4	8	15.00	.75	1.45	1
60		25	4	8	14.40	.69	1.39	1
65		20	3	14	18.00	.99	2.79	2
65		20	3	16	18.00	.83	2.67	2
65		21	3	12	17.14	1.01	2.54	2
65		21	3	14	17.14	.82	2.41	2
65		22	3	10	16.36	1.07	2.35	2
65		22	3	12	16.36	.87	2.29	1
65		23	3	8	15.65	1.21	2.23	2
65		23	3	10	15.65	.95	2.19	1
65		24	3	8	15.00	1.09	2.10	1
65		25	3	8	14.40	1.01	2.02	1
65		26	3	8	13.84	.93	1.94	1
65		19	4	14	18.94	.83	2.22	2
65		19	4	16	18.94	.70	2.13	2
65		20	4	10	18.00	1.06	2.13	2
65		20	4	12	18.00	.83	2.00	2
65		21	4	8	17.14	1.19	2.00	2
65		21	4	10	17.14	.87	1.83	2
65		22	4	8	16.36	.98	1.72	2
65		22	4	10	16.36	.78	1.72	1
65		23	4	8	15.65	.89	1.64	1
65		24	4	8	15.00	.82	1.57	1
65		25	4	8	14.40	.75	1.51	1
70		20	3	14	18.00	1.10	3.10	2
70		20	3	16	18.00	.92	2.95	2
70		21	3	12	17.14	1.11	2.82	2
70		21	3	14	17.14	.90	2.66	2
70		22	3	10	16.36	1.18	2.61	2
70		22	3	12	16.36	.93	2.47	1
70		23	3	8	15.65	1.35	2.48	2
70		23	3	10	15.65	1.02	2.36	1
70		24	3	8	15.00	1.18	2.26	1
70		25	3	8	14.40	1.08	2.17	1
70		26	3	8	13.84	1.00	2.09	1
70		19	4	14	18.94	.92	2.45	2
70		19	4	16	18.94	.77	2.34	2

TABLE XI-C (Cont'd) **Slab 30 x 30 ft** **L /Δ = 360**

W	1-C	D	X	B	L/D	P	A	K
70		20	4	12	18.00	.92	2.21	2
70		20	4	14	18.00	.75	2.10	2
70		21	4	10	17.14	.96	2.03	2
70		21	4	12	17.14	.77	1.94	1
70		22	4	8	16.36	1.08	1.91	2
70		22	4	10	16.36	.84	1.85	1
70		23	4	8	15.65	.96	1.77	1
70		24	4	8	15.00	.88	1.70	1
70		25	4	8	14.40	.81	1.63	1
75		21	3	14	17.14	.99	2.92	2
75		21	3	16	17.14	.83	2.79	2
75		22	3	10	16.36	1.31	2.88	2
75		22	3	12	16.36	1.01	2.68	2
75		23	3	8	15.65	1.49	2.75	2
75		23	3	10	15.65	1.10	2.53	1
75		24	3	8	15.00	1.26	2.43	1
75		25	3	8	14.40	1.16	2.33	1
75		26	3	8	13.84	1.07	2.24	1
75		27	3	8	13.33	.99	2.15	1
75		20	4	14	18.00	.82	2.30	2
75		20	4	16	18.00	.69	2.21	2
75		21	4	10	17.14	1.06	2.23	2
75		21	4	12	17.14	.83	2.09	2
75		22	4	8	16.36	1.19	2.10	2
75		22	4	10	16.36	.90	1.98	1
75		23	4	8	15.65	1.03	1.90	1
75		24	4	8	15.00	.94	1.82	1
75		25	4	8	14.40	.87	1.74	1
75		26	4	8	13.84	.80	1.68	1
80		21	3	14	17.14	1.08	3.19	2
80		21	3	16	17.14	.90	3.04	2
80		22	3	12	16.36	1.11	2.93	2
80		22	3	14	16.36	.91	2.82	1
80		23	3	10	15.65	1.18	2.73	2
80		23	3	12	15.65	.97	2.70	1
80		24	3	8	15.00	1.36	2.61	2
80		24	3	10	15.00	1.08	2.59	1
80		25	3	8	14.40	1.24	2.48	1
80		26	3	8	13.84	1.15	2.39	1
80		27	3	8	13.33	1.06	2.30	1
80		20	4	14	18.00	.89	2.51	2
80		20	4	16	18.00	.75	2.40	2
80		21	4	10	17.14	1.16	2.44	2
80		21	4	12	17.14	.90	2.28	2
80		22	4	8	16.36	1.31	2.30	2
80		22	4	10	16.36	.96	2.12	1
80		23	4	8	15.65	1.10	2.02	1
80		24	4	8	15.00	1.01	1.94	1
80		25	4	8	14.40	.93	1.86	1
80		26	4	8	13.84	.86	1.79	1
85		21	3	14	17.14	1.18	3.48	2
85		21	3	16	17.14	.98	3.30	2
85		22	3	12	16.36	1.20	3.19	2
85		22	3	14	16.36	.97	3.00	2
85		23	3	10	15.65	1.29	2.98	2

TABLE XI-C (Cont'd) Slab 30 x 30 ft L/Δ = 360

W	1-C	D	X	B	L/D	P	A	K
85		23	3	12	15.65	1.04	2.87	1
85		24	3	8	15.00	1.49	2.86	2
85		24	3	10	15.00	1.14	2.75	1
85		25	3	8	14.40	1.32	2.64	1
85		26	3	8	13.84	1.22	2.54	1
85		27	3	8	13.33	1.13	2.44	1
85		20	4	14	18.00	.97	2.72	2
85		20	4	16	18.00	.81	2.60	2
85		21	4	12	17.14	.98	2.47	2
85		21	4	14	17.14	.80	2.36	1
85		22	4	10	16.36	1.04	2.29	2
85		22	4	12	16.36	.85	2.25	1
85		23	4	8	15.65	1.18	2.17	2
85		23	4	10	15.65	.93	2.15	1
85		24	4	8	15.00	1.07	2.06	1
85		25	4	8	14.40	.99	1.98	1
85		26	4	8	13.84	.91	1.90	1
90		22	3	14	16.36	1.05	3.25	2
90		22	3	16	16.36	.90	3.18	1
90		23	3	10	15.65	1.40	3.24	2
90		23	3	12	15.65	1.10	3.04	1
90		24	3	10	15.00	1.21	2.91	1
90		25	3	8	14.40	1.39	2.79	1
90		26	3	8	13.84	1.29	2.69	1
90		27	3	8	13.33	1.19	2.59	1
90		28	3	8	12.85	1.11	2.49	1
90		20	4	14	18.00	1.05	2.94	2
90		20	4	16	18.00	.87	2.81	2
90		21	4	12	17.14	1.06	2.68	2
90		21	4	14	17.14	.86	2.53	2
90		22	4	10	16.36	1.12	2.48	2
90		22	4	12	16.36	.90	2.38	1
90		23	4	8	15.65	1.28	2.36	2
90		23	4	10	15.65	.99	2.28	1
90		24	4	8	15.00	1.13	2.18	1
90		25	4	8	14.40	1.04	2.09	1
90		26	4	8	13.84	.97	2.01	1
95		22	3	14	16.36	1.13	3.50	2
95		22	3	16	16.36	.95	3.35	1
95		23	3	10	15.65	1.52	3.51	2
95		23	3	12	15.65	1.17	3.23	2
95		24	3	10	15.00	1.28	3.07	1
95		25	3	10	14.40	1.18	2.95	1
95		26	3	8	13.84	1.36	2.84	1
95		27	3	8	13.33	1.26	2.73	1
95		28	3	8	12.85	1.17	2.63	1
95		21	4	14	17.14	.92	2.72	2
95		21	4	16	17.14	.78	2.63	1
95		22	4	10	16.36	1.21	2.68	2
95		22	4	12	16.36	.95	2.51	1
95		23	4	8	15.65	1.38	2.55	2
95		23	4	10	15.65	1.04	2.40	1
95		24	4	8	15.00	1.20	2.30	1
95		25	4	8	14.40	1.10	2.21	1
95		26	4	8	13.84	1.02	2.13	1
95		27	4	8	13.33	.94	2.05	1

TABLE XI-C (Cont'd) Slab 30 x 30 ft **L /Δ = 360**

W	1-C	D	X	B	L/D	P	A	K
100		22	3	14	16.36	1.22	3.76	2
100		22	3	16	16.36	1.01	3.57	2
100		23	3	12	15.65	1.26	3.47	2
100		23	3	14	15.65	1.04	3.38	1
100		24	3	10	15.00	1.36	3.27	2
100		24	3	12	15.00	1.12	3.24	1
100		25	3	10	14.40	1.24	3.11	1
100		26	3	10	13.84	1.15	2.99	1
100		27	3	8	13.33	1.33	2.87	1
100		28	3	8	12.85	1.23	2.77	1
100		21	4	14	17.14	.99	2.92	2
100		21	4	16	17.14	.83	2.79	2
100		22	4	10	16.36	1.31	2.88	2
100		22	4	12	16.36	1.01	2.68	2
100		23	4	8	15.65	1.49	2.75	2
100		23	4	10	15.65	1.10	2.53	1
100		24	4	8	15.00	1.26	2.43	1
100		25	4	8	14.40	1.16	2.33	1
100		26	4	8	13.84	1.07	2.24	1
100		27	4	8	13.33	.99	2.15	1
105		22	3	14	16.36	1.31	4.04	2
105		22	3	16	16.36	1.08	3.82	2
105		23	3	12	15.65	1.35	3.73	2
105		23	3	14	15.65	1.10	3.54	1
105		24	3	10	15.00	1.46	3.51	2
105		24	3	12	15.00	1.18	3.40	1
105		25	3	10	14.40	1.30	3.26	1
105		26	3	10	13.84	1.20	3.14	1
105		27	3	10	13.33	1.11	3.02	1
105		28	3	10	12.85	1.04	2.91	1
105		21	4	14	17.14	1.06	3.12	2
105		21	4	16	17.14	.88	2.98	2
105		22	4	12	16.36	1.08	2.86	2
105		22	4	14	16.36	.90	2.78	1
105		23	4	10	15.65	1.16	2.67	2
105		23	4	12	15.65	.96	2.66	1
105		24	4	8	15.00	1.33	2.55	2
105		24	4	10	15.00	1.06	2.55	1
105		25	4	8	14.40	1.22	2.44	1
105		26	4	8	13.84	1.13	2.35	1
105		27	4	8	13.33	1.04	2.26	1
110		23	3	14	15.65	1.15	3.73	2
110		23	3	16	15.65	1.01	3.71	1
110		24	3	10	15.00	1.56	3.76	2
110		24	3	12	15.00	1.23	3.56	1
110		25	3	10	14.40	1.36	3.42	1
110		26	3	10	13.84	1.26	3.28	1
110		27	3	10	13.33	1.17	3.16	1
110		28	3	10	12.85	1.09	3.05	1
110		29	3	10	12.41	1.01	2.94	1
110		21	4	14	17.14	1.13	3.33	2
110		21	4	16	17.14	.94	3.17	2
110		22	4	12	16.36	1.15	3.06	2
110		22	4	14	16.36	.94	2.91	1
110		23	4	10	15.65	1.24	2.85	2
110		23	4	12	15.65	1.01	2.78	1

TABLE XI-C (Cont'd) **Slab 30 x 30 ft** **L /Δ = 360**

W	1-C	D	X	B	L/D	P	A	K
110		24	4	8	15.00	1.42	2.73	2
110		24	4	10	15.00	1.11	2.67	1
110		25	4	8	14.40	1.28	2.56	1
110		26	4	8	13.84	1.18	2.46	1
110		27	4	8	13.33	1.09	2.37	1
115		23	3	14	15.65	1.23	3.97	2
115		23	3	16	15.65	1.05	3.88	1
115		24	3	12	15.00	1.29	3.72	1
115		25	3	10	14.40	1.43	3.57	1
115		26	3	10	13.84	1.32	3.43	1
115		27	3	10	13.33	1.22	3.31	1
115		28	3	10	12.85	1.14	3.19	1
115		29	3	10	12.41	1.06	3.08	1
115		21	4	14	17.14	1.20	3.55	2
115		21	4	16	17.14	1.00	3.37	2
115		22	4	12	16.36	1.23	3.25	2
115		22	4	14	16.36	.99	3.06	2
115		23	4	10	15.65	1.32	3.04	2
115		23	4	12	15.65	1.05	2.91	1
115		24	4	8	15.00	1.52	2.92	2
115		24	4	10	15.00	1.16	2.79	1
115		25	4	8	14.40	1.34	2.68	1
115		26	4	8	13.84	1.24	2.57	1
115		27	4	8	13.33	1.14	2.48	1
120		23	3	14	15.65	1.31	4.22	2
120		23	3	16	15.65	1.10	4.05	1
120		24	3	12	15.00	1.36	3.92	2
120		24	3	14	15.00	1.15	3.88	1
120		25	3	12	14.40	1.24	3.73	1
120		26	3	10	13.84	1.38	3.58	1
120		27	3	10	13.33	1.27	3.45	1
120		28	3	10	12.85	1.19	3.33	1
120		29	3	10	12.41	1.10	3.21	1
120		22	4	14	16.36	1.05	3.25	2
120		22	4	16	16.36	.90	3.18	1
120		23	4	10	15.65	1.40	3.24	2
120		23	4	12	15.65	1.10	3.04	1
120		24	4	10	15.00	1.21	2.91	1
120		25	4	8	14.40	1.39	2.79	1
120		26	4	8	13.84	1.29	2.69	1
125		23	3	14	15.65	1.39	4.48	2
125		23	3	16	15.65	1.15	4.23	2
125		24	3	12	15.00	1.44	4.17	2
125		24	3	14	15.00	1.20	4.04	1
125		25	3	12	14.40	1.29	3.88	1
125		26	3	12	13.84	1.19	3.73	1
125		27	3	10	13.33	1.33	3.59	1
125		28	3	10	12.85	1.23	3.47	1
125		29	3	10	12.41	1.15	3.35	1
120		27	4	8	13.33	1.19	2.59	1
120		28	4	8	12.85	1.11	2.49	1
125		22	4	14	16.36	1.11	3.44	2
125		22	4	16	16.36	.94	3.31	1
125		23	4	10	15.65	1.49	3.44	2
125		23	4	12	15.65	1.15	3.17	2
125		24	4	10	15.00	1.26	3.03	1

TABLE XI-C (Cont'd) Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
125		25	4	10	14.40	1.16	2.91	1
125		26	4	8	13.84	1.34	2.80	1
125		27	4	8	13.33	1.24	2.69	1
125		28	4	8	12.85	1.16	2.60	1
130		23	3	14	15.65	1.47	4.75	2
130		23	3	16	15.65	1.21	4.47	2
130		24	3	12	15.00	1.53	4.41	2
130		24	3	14	15.00	1.25	4.21	1
130		25	3	12	14.40	1.34	4.04	1
130		26	3	12	13.84	1.24	3.88	1
130		27	3	12	13.33	1.15	3.74	1
130		28	3	12	12.85	1.07	3.61	1
130		29	3	10	12.41	1.20	3.48	1
130		22	4	14	16.36	1.18	3.63	2
130		22	4	16	16.36	.98	3.45	2
130		23	4	12	15.65	1.21	3.35	2
130		23	4	14	15.65	1.02	3.29	1
130		24	4	10	15.00	1.31	3.15	1
130		25	4	10	14.40	1.21	3.03	1
130		26	4	10	13.84	1.12	2.91	1
130		27	4	8	13.33	1.29	2.80	1
130		28	4	8	12.85	1.20	2.70	1
135		24	3	14	15.00	1.30	4.37	1
135		25	3	12	14.40	1.39	4.19	1
135		26	3	12	13.84	1.29	4.03	1
135		27	3	12	13.33	1.19	3.88	1
135		28	3	12	12.85	1.11	3.74	1
135		29	3	12	12.41	1.04	3.61	1
135		30	3	10	12.00	1.16	3.49	1
135		22	4	14	16.36	1.24	3.83	2
135		22	4	16	16.36	1.03	3.63	2
135		23	4	12	15.65	1.28	3.54	2
135		23	4	14	15.65	1.06	3.42	1
135		24	4	10	15.00	1.38	3.33	2
135		24	4	12	15.00	1.13	3.28	1
135		25	4	10	14.40	1.25	3.14	1
135		26	4	10	13.84	1.16	3.02	1
135		27	4	10	13.33	1.07	2.91	1
135		28	4	8	12.85	1.25	2.81	1
140		24	3	14	15.00	1.36	4.58	2
140		24	3	16	15.00	1.18	4.53	1
140		25	3	14	14.40	1.24	4.35	1
140		26	3	12	13.84	1.34	4.18	1
140		27	3	12	13.33	1.24	4.03	1
140		28	3	12	12.85	1.15	3.88	1
140		29	3	12	12.41	1.07	3.75	1
140		30	3	12	12.00	1.00	3.62	1
140		22	4	14	16.36	1.31	4.04	2
140		22	4	16	16.36	1.08	3.82	2
140		23	4	12	15.65	1.35	3.73	2
140		23	4	14	15.65	1.10	3.54	1
140		24	4	10	15.00	1.46	3.51	2
140		24	4	12	15.00	1.18	3.40	1
140		25	4	10	14.40	1.30	3.26	1
140		26	4	10	13.84	1.20	3.14	1
140		27	4	10	13.33	1.11	3.02	1

TABLE XI-C Slab 30 x 30 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
140		28	4	10	12.85	1.04	2.91	1
145		24	3	14	15.00	1.43	4.82	2
145		24	3	16	15.00	1.22	4.69	1
145		25	3	14	14.40	1.28	4.51	1
145		26	3	14	13.84	1.19	4.33	1
145		27	3	12	13.33	1.28	4.17	1
145		28	3	12	12.85	1.19	4.02	1
145		29	3	12	12.41	1.11	3.88	1
145		30	3	12	12.00	1.04	3.75	1
145		22	4	14	16.36	1.38	4.25	2
145		22	4	16	16.36	1.14	4.01	2
145		23	4	12	15.65	1.42	3.92	2
145		23	4	14	15.65	1.14	3.67	1
145		24	4	10	15.00	1.54	3.70	2
145		24	4	12	15.00	1.22	3.52	1
145		25	4	10	14.40	1.35	3.38	1
145		26	4	10	13.84	1.25	3.25	1
145		27	4	10	13.33	1.15	3.13	1
145		28	4	10	12.85	1.07	3.02	1
150		24	3	14	15.00	1.50	5.07	2
150		24	3	16	15.00	1.26	4.86	1
150		25	3	14	14.40	1.33	4.66	1
150		26	3	14	13.84	1.23	4.48	1
150		27	3	12	13.33	1.33	4.31	1
150		28	3	12	12.85	1.23	4.16	1
150		29	3	12	12.41	1.15	4.02	1
150		30	3	12	12.00	1.08	3.88	1
150		23	4	14	15.65	1.19	3.85	2
150		23	4	16	15.65	1.03	3.80	1
150		24	4	12	15.00	1.26	3.64	1
150		25	4	10	14.40	1.39	3.49	1
150		26	4	10	13.84	1.29	3.36	1
150		27	4	10	13.33	1.19	3.23	1
150		28	4	10	12.85	1.11	3.12	1
150		29	4	10	12.41	1.04	3.01	1

TABLE XII-A Slab 35 x 35 ft L/Δ = 200

W	1-C	D	X	B	L/D	P	A	K
4	.01	4	4	8		.68	.21	
4	.02	5	4	8		.73	.29	
4	.03	6	4	8		.65	.31	
8	.02	5	4	8		1.08	.43	
8	.03	6	4	8		1.10	.53	
8	.04	7	4	8		1.04	.58	
8	.05	8	4	8		.83	.53	
8	.06	9	4	8		.87	.63	
12	.03	7	4	8		1.16	.65	
12	.04	8	4	8		1.08	.69	
12	.05	9	4	8		1.05	.75	
12	.06	10	4	8		1.09	.87	
12	.07	11	4	8		.93	.82	
12	.08	12	4	8		.82	.79	
12	.09	12	4	8		.98	.94	
12		13	4	8	32.30	.87	.91	2
12		13	4	10	32.30	.65	.85	1
12		14	4	8	30.00	.70	.79	1
12		15	4	8	28.00	.61	.74	1
12		16	4	8	26.25	.54	.69	1
16	.04	8	4	8		1.36	.87	
16	.05	9	4	8		1.28	.92	
16	.06	10	4	8		1.32	1.06	
16	.07	12	4	8		1.03	.99	
16	.08	12	4	8		1.22	1.17	
16	.09	13	4	8		1.07	1.11	
16		14	4	8	30.00	.95	1.07	2
16		14	4	10	30.00	.75	1.05	1
16		15	4	8	28.00	.82	.98	1
16		16	4	8	26.25	.72	.92	1
16		17	4	8	24.70	.64	.87	1
20	.05	10	4	8		1.36	1.08	
20	.06	11	4	8		1.34	1.18	
20	.07	12	4	8		1.20	1.15	
20	.08	13	4	8		1.23	1.28	
20	.09	14	4	8		1.10	1.23	
20		14	4	8	30.00	1.30	1.46	2
20		14	4	10	30.00	.95	1.34	2
20		15	4	8	28.00	1.02	1.23	1
20		16	4	8	26.25	.90	1.15	1
20		17	4	8	24.70	.80	1.08	1
20		18	4	8	23.33	.71	1.02	1
24	.06	11	4	8		1.48	1.30	
24	.07	12	4	8		1.49	1.43	
24	.08	14	4	8		1.24	1.38	
24	.09	14	4	8		1.42	1.59	
24		15	4	8	28.00	1.26	1.51	2
24		15	4	10	28.00	.98	1.48	1
24		16	4	8	26.25	1.08	1.38	1
24		17	4	8	24.70	.96	1.30	1
24		18	4	8	23.33	.85	1.23	1
24		19	4	8	22.10	.76	1.16	1
24		20	4	8	21.00	.69	1.11	1
28	.07	13	4	8		1.46	1.52	
28	.08	14	4	8		1.51	1.69	

TABLE XII-A (Cont'd) Slab 35 x 35 ft L / Δ = 200

W	1-C	D	X	B	L/D	P	A	K
28	.09	15	4	8		1.35	1.62	
28		16	4	8	26.25	1.26	1.62	1
28		17	4	8	24.70	1.12	1.52	1
28		18	4	8	23.33	1.00	1.44	1
28		19	4	8	22.10	.89	1.36	1
28		20	4	8	21.00	.81	1.29	1
28		21	4	8	20.00	.73	1.23	1
32	.08	14	4	8		1.55	1.74	
32	.09	15	4	8		1.62	1.95	
32		16	4	8	26.25	1.44	1.85	2
32		16	4	10	26.25	1.15	1.85	1
32		17	4	8	24.70	1.28	1.74	1
32		18	4	8	23.33	1.14	1.64	1
32		19	4	8	22.10	1.02	1.55	1
32		20	4	8	21.00	.92	1.48	1
32		21	4	8	20.00	.84	1.41	1
32		22	4	8	19.09	.76	1.34	1
36	.09	16	4	8		1.53	1.96	
36		16	4	8	26.25	1.72	2.21	2
36		16	4	10	26.25	1.30	2.08	1
36		17	4	8	24.70	1.44	1.96	1
36		18	4	8	23.33	1.28	1.85	1
36		19	4	8	22.10	1.15	1.75	1
36		20	4	8	21.00	1.04	1.66	1
36		21	4	8	20.00	.94	1.58	1
36		22	4	8	19.09	.86	1.51	1
40		17	4	8	24.70	1.60	2.17	1
40		18	4	8	23.33	1.42	2.05	1
40		19	4	8	22.10	1.28	1.94	1
40		20	4	8	21.00	1.15	1.85	1
40		21	4	8	20.00	1.05	1.76	1
40		22	4	8	19.09	.95	1.68	1
40		23	4	8	18.26	.87	1.61	1
45		18	4	8	23.33	1.60	2.31	1
45		19	4	8	22.10	1.44	2.19	1
45		20	4	8	21.00	1.30	2.08	1
45		21	4	8	20.00	1.18	1.98	1
45		22	4	8	19.09	1.07	1.89	1
45		23	4	8	18.26	.98	1.81	1
45		24	4	8	17.50	.90	1.73	1
50		19	4	8	22.10	1.60	2.43	1
50		20	4	8	21.00	1.44	2.31	1
50		21	4	8	20.00	1.31	2.20	1
50		22	4	8	19.09	1.19	2.10	1
50		23	4	8	18.26	1.09	2.01	1
50		24	4	8	17.50	1.00	1.92	1
50		25	4	8	16.80	.92	1.85	1
55		18	4	10	23.33	1.57	2.82	1
55		20	4	8	21.00	1.59	2.54	1
55		21	4	8	20.00	1.44	2.42	1
55		22	4	8	19.09	1.31	2.31	1
55		23	4	8	18.26	1.20	2.21	1
55		24	4	8	17.50	1.10	2.12	1
55		25	4	8	16.80	1.01	2.03	1
60		19	4	10	22.10	1.53	2.92	1
60		21	4	8	20.00	1.57	2.64	1

TABLE XII-A (Cont'd) **Slab 35 x 35 ft** **L / Δ = 200**

W	1-C	D	X	B	L/D	P	A	K
60		22	4	8	19.09	1.43	2.52	1
60		23	4	8	18.26	1.31	2.41	1
60		24	4	8	17.50	1.20	2.31	1
60		25	4	8	16.80	1.11	2.22	1
60		26	4	8	16.15	1.02	2.13	1
65		19	4	10	22.10	1.66	3.16	1
65		22	4	8	19.09	1.55	2.73	1
65		23	4	8	18.26	1.42	2.61	1
65		24	4	8	17.50	1.30	2.50	1
65		25	4	8	16.80	1.20	2.40	1
65		26	4	8	16.15	1.11	2.31	1
65		27	4	8	15.55	1.03	2.22	1
70		18	4	12	23.33	1.66	3.60	1
70		20	4	10	21.00	1.62	3.24	1
70		22	4	8	19.09	1.67	2.94	1
70		23	4	8	18.26	1.53	2.81	1
70		24	4	8	17.50	1.40	2.70	1
70		25	4	8	16.80	1.29	2.59	1
70		26	4	8	16.15	1.19	2.49	1
75		19	4	12	22.10	1.60	3.65	1
75		21	4	10	20.00	1.57	3.30	1
75		23	4	8	18.26	1.64	3.01	1
75		24	4	8	17.50	1.50	2.89	1
75		25	4	8	16.80	1.38	2.77	1
75		26	4	8	16.15	1.28	2.67	1
75		27	4	8	15.55	1.19	2.57	1
80		20	4	12	21.00	1.54	3.70	1
80		21	4	10	20.00	1.68	3.52	1
80		22	4	10	19.09	1.53	3.36	1
80		24	4	8	17.50	1.60	3.08	1
80		25	4	8	16.80	1.48	2.96	1
80		26	4	8	16.15	1.36	2.84	1
80		27	4	8	15.55	1.27	2.74	1
85		20	4	12	21.00	1.63	3.93	1
85		22	4	10	19.09	1.62	3.57	1
85		23	4	10	18.26	1.48	3.42	1
85		25	4	8	16.80	1.57	3.14	1
85		26	4	8	16.15	1.45	3.02	1
85		27	4	8	15.55	1.34	2.91	1
85		28	4	8	15.00	1.25	2.81	1
90		19	4	14	22.10	1.64	4.38	1
90		23	4	10	18.26	1.57	3.62	1
90		24	4	10	17.50	1.44	3.47	1
90		25	4	8	16.80	1.66	3.33	1
90		26	4	8	16.15	1.54	3.20	1
90		27	4	8	15.55	1.42	3.08	1
90		28	4	8	15.00	1.32	2.97	1
95		20	4	14	21.00	1.57	4.39	1
95		23	4	10	18.26	1.66	3.82	1
95		24	4	10	17.50	1.52	3.66	1
95		25	4	10	16.80	1.40	3.51	1
95		26	4	10	16.15	1.30	3.38	1
95		27	4	8	15.55	1.50	3.25	1
95		28	4	8	15.00	1.40	3.14	1
100		20	4	14	21.00	1.65	4.63	1
100		22	4	12	19.09	1.59	4.20	1

TABLE XII-A (Cont'd) Slab 35 x 35 ft L /Δ = 200

W	1-C	D	X	B	L/D	P	A	K
100		24	4	10	17.50	1.60	3.85	1
100		25	4	10	16.80	1.48	3.70	1
100		26	4	10	16.15	1.36	3.56	1
100		27	4	10	15.55	1.27	3.42	1
100		28	4	8	15.00	1.47	3.30	1
105		21	4	14	20.00	1.57	4.63	1
105		22	4	12	19.09	1.67	4.42	1
105		23	4	12	18.26	1.53	4.22	1
105		24	4	10	17.50	1.68	4.05	1
105		25	4	10	16.80	1.55	3.88	1
105		26	4	10	16.15	1.43	3.74	1
105		27	4	10	15.55	1.33	3.60	1
110		21	4	14	20.00	1.65	4.85	1
110		23	4	12	18.26	1.60	4.42	1
110		24	4	12	17.50	1.47	4.24	1
110		25	4	10	16.80	1.62	4.07	1
110		26	4	10	16.15	1.50	3.91	1
110		27	4	10	15.55	1.39	3.77	1
110		28	4	10	15.00	1.29	3.63	1
115		22	4	14	19.09	1.57	4.84	1
115		23	4	12	18.26	1.67	4.63	1
115		24	4	12	17.50	1.54	4.43	1
115		25	4	12	16.80	1.42	4.26	1
115		26	4	10	16.15	1.57	4.09	1
115		27	4	10	15.55	1.46	3.94	1
115		28	4	10	15.00	1.35	3.80	1
120		22	4	14	19.09	1.64	5.05	1
120		24	4	12	17.50	1.60	4.63	1
120		25	4	12	16.80	1.48	4.44	1
120		26	4	12	16.15	1.36	4.27	1
120		27	4	10	15.55	1.52	4.11	1
120		28	4	10	15.00	1.41	3.96	1
120		29	4	10	14.48	1.32	3.83	1
125		23	4	14	18.26	1.56	5.03	1
125		24	4	12	17.50	1.67	4.82	1
125		25	4	12	16.80	1.54	4.63	1
125		26	4	12	16.15	1.42	4.45	1
125		27	4	12	15.55	1.32	4.28	1
125		28	4	10	15.00	1.47	4.13	1
125		29	4	10	14.48	1.37	3.99	1
130		23	4	14	18.26	1.62	5.23	1
130		25	4	12	16.80	1.60	4.81	1
130		26	4	12	16.15	1.48	4.63	1
130		27	4	12	15.55	1.37	4.45	1
130		28	4	12	15.00	1.27	4.29	1
130		29	4	10	14.48	1.43	4.15	1
130		30	4	10	14.00	1.33	4.01	1
135		23	4	14	18.26	1.68	5.43	1
135		24	4	14	17.50	1.55	5.20	1
135		25	4	12	16.80	1.66	5.00	1
135		26	4	12	16.15	1.54	4.80	1
135		27	4	12	15.55	1.42	4.63	1
135		28	4	12	15.00	1.32	4.46	1
135		29	4	12	14.48	1.23	4.31	1
140		24	4	14	17.50	1.60	5.40	1
140		25	4	14	16.80	1.48	5.18	1

TABLE XII-A (Cont'd) Slab 35 x 35 ft L / Δ = 200

W	1-C	D	X	B	L/D	P	A	K
140		26	4	12	16.15	1.59	4.98	1
140		27	4	12	15.55	1.48	4.80	1
140		28	4	12	15.00	1.37	4.63	1
140		29	4	12	14.48	1.28	4.47	1
140		30	4	12	14.00	1.20	4.32	1
145		24	4	14	17.50	1.66	5.59	1
145		25	4	14	16.80	1.53	5.37	1
145		26	4	14	16.15	1.41	5.16	1
145		27	4	12	15.55	1.53	4.97	1
145		28	4	12	15.00	1.42	4.79	1
145		29	4	12	14.48	1.33	4.63	1
145		30	4	12	14.00	1.24	4.47	1
150		25	4	14	16.80	1.58	5.55	1
150		26	4	14	16.15	1.46	5.34	1
150		27	4	14	15.55	1.36	5.14	1
150		28	4	12	15.00	1.47	4.96	1
150		29	4	12	14.48	1.37	4.79	1
150		30	4	12	14.00	1.28	4.63	1
150		31	4	12	13.54	1.20	4.48	1

TABLE XII-B Slab 35 x 35 ft $L/\Delta = 300$

W	1-C	D	X	B	L/D	P	A	K
4	.01	4	4	8		.58	.18	
4	.02	6	4	8		.48	.23	
4	.03	7	4	8		.43	.24	
8	.02	6	4	8		.77	.37	
8	.03	8	4	8		.68	.43	
8	.04	9	4	8		.64	.46	
8	.05	10	4	8		.64	.51	
8	.06	11	4	8		.55	.48	
12	.03	8	4	8		.87	.55	
12	.04	10	4	8		.73	.58	
12	.05	11	4	8		.71	.63	
12	.06	12	4	8		.72	.69	
12	.07	14	4	8		.59	.66	
12	.08	14	4	8		.67	.75	
12	.09	16	4	8		.57	.73	
12		16	4	8	26.25	.65	.84	2
12		16	4	10	26.25	.49	.79	2
12		17	4	8	24.70	.52	.71	2
12		17	4	10	24.70	.39	.66	2
12		18	4	8	23.33	.42	.61	1
12		19	4	8	22.10	.38	.58	1
16	.04	10	4	8		.93	.74	
16	.05	11	4	8		.90	.79	
16	.06	13	4	8		.84	.87	
16	.07	14	4	8		.74	.83	
16	.08	15	4	8		.77	.93	
16	.09	17	4	8		.66	.90	
16		17	4	8	24.70	.75	1.02	2
16		17	4	10	24.70	.56	.96	2
16		18	4	8	23.33	.60	.87	2
16		18	4	10	23.33	.45	.82	1
16		19	4	8	22.10	.51	.77	1
16		20	4	8	21.00	.46	.74	1
20	.05	12	4	8		.96	.93	
20	.06	13	4	8		.97	1.01	
20	.07	14	4	8		1.00	1.12	
20	.08	16	4	8		.83	1.06	
20	.09	17	4	8		.88	1.20	
20		18	4	8	23.33	.81	1.16	2
20		18	4	10	23.33	.60	1.09	2
20		19	4	8	22.10	.65	.99	2
20		19	4	10	22.10	.51	.97	1
20		20	4	8	21.00	.57	.92	1
20		21	4	8	20.00	.52	.88	1
24	.06	14	4	8		.99	1.11	
24	.07	15	4	8		1.02	1.22	
24	.08	17	4	8		.85	1.16	
24	.09	18	4	8		.91	1.31	
24		19	4	8	22.10	.83	1.26	2
24		19	4	10	22.10	.62	1.18	2
24		20	4	8	21.00	.69	1.11	1
24		21	4	8	20.00	.63	1.05	1
24		22	4	8	19.09	.57	1.01	1
28	.07	16	4	8		1.01	1.30	
28	.08	17	4	8		1.06	1.44	

TABLE XII-B (Cont'd) Slab 35 x 35 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
28	.09	19	4	8		.90	1.38	
28		19	4	8	22.10	1.02	1.55	2
28		19	4	10	22.10	.75	1.44	2
28		20	4	8	21.00	.83	1.33	2
28		20	4	10	21.00	.64	1.29	1
28		21	4	8	20.00	.73	1.23	1
28		22	4	8	19.09	.66	1.17	1
32	.08	18	4	8		1.03	1.48	
32	.09	19	4	8		1.09	1.66	
32		20	4	8	21.00	.99	1.59	2
32		20	4	10	21.00	.74	1.48	1
32		21	4	8	20.00	.84	1.41	1
32		22	4	8	19.09	.76	1.34	1
32		23	4	8	18.26	.70	1.28	1
36	.09	20	4	8		1.04	1.67	
36		20	4	8	21.00	1.17	1.87	2
36		20	4	10	21.00	.86	1.72	2
36		21	4	8	20.00	.95	1.60	2
36		21	4	10	20.00	.75	1.58	1
36		22	4	8	19.09	.86	1.51	1
36		23	4	8	18.26	.78	1.44	1
36		24	4	8	17.50	.72	1.38	1
40		19	4	14	22.10	.78	2.07	2
40		19	4	16	22.10	.65	1.99	2
40		20	4	10	21.00	.99	1.99	2
40		20	4	12	21.00	.78	1.87	2
40		21	4	8	20.00	1.10	1.86	2
40		21	4	10	20.00	.84	1.76	1
40		22	4	8	19.09	.95	1.68	1
40		23	4	8	18.26	.87	1.61	1
40		24	4	8	17.50	.80	1.54	1
40		25	4	8	16.80	.74	1.48	1
45		19	4	14	22.10	.91	2.42	2
45		19	4	16	22.10	.76	2.32	2
45		20	4	10	21.00	1.17	2.34	2
45		20	4	12	21.00	.91	2.19	2
45		21	4	8	20.00	1.30	2.19	2
45		21	4	10	20.00	.95	2.01	2
45		22	4	8	19.09	1.07	1.89	1
45		23	4	8	18.26	.98	1.81	1
45		24	4	8	17.50	.90	1.73	1
45		25	4	8	16.80	.83	1.66	1
50		19	4	14	22.10	1.05	2.80	2
50		19	4	16	22.10	.87	2.67	2
50		20	4	12	21.00	1.05	2.52	2
50		20	4	14	21.00	.85	2.39	2
50		21	4	10	20.00	1.10	2.32	2
50		21	4	12	20.00	.87	2.20	1
50		22	4	8	19.09	1.24	2.19	2
50		22	4	10	19.09	.95	2.10	1
50		23	4	8	18.26	1.09	2.01	1
50		24	4	8	17.50	1.00	1.92	1
50		25	4	8	16.80	.92	1.85	1
55		20	4	14	21.00	.97	2.72	2
55		20	4	16	21.00	.81	2.60	2
55		21	4	10	20.00	1.26	2.66	2

TABLE XII-B (Cont'd) Slab 35 x 35 ft L / Δ = 300

W	1-C	D	X	B	L/D	P	A	K
55		21	4	12	20.00	.98	2.47	2
55		22	4	8	19.09	1.43	2.51	2
55		22	4	10	19.09	1.05	2.31	1
55		23	4	8	18.26	1.20	2.21	1
55		24	4	8	17.50	1.10	2.12	1
55		25	4	8	16.80	1.01	2.03	1
55		26	4	8	16.15	.94	1.95	1
60		20	4	14	21.00	1.09	3.06	2
60		20	4	16	21.00	.91	2.92	2
60		21	4	12	20.00	1.10	2.79	2
60		21	4	14	20.00	.90	2.64	1
60		22	4	10	19.09	1.17	2.58	2
60		22	4	12	19.09	.95	2.52	1
60		23	4	8	18.26	1.33	2.46	2
60		23	4	10	18.26	1.05	2.41	1
60		24	4	8	17.50	1.20	2.31	1
60		25	4	8	16.80	1.11	2.22	1
60		26	4	8	16.15	1.02	2.13	1
65		21	4	14	20.00	1.00	2.94	2
65		21	4	16	20.00	.85	2.86	1
65		22	4	10	19.09	1.31	2.90	2
65		22	4	12	19.09	1.03	2.73	1
65		23	4	8	18.26	1.50	2.76	2
65		23	4	10	18.26	1.13	2.61	1
65		24	4	8	17.50	1.30	2.50	1
65		25	4	8	16.80	1.20	2.40	1
65		26	4	8	16.15	1.11	2.31	1
65		27	4	8	15.55	1.03	2.22	1
70		21	4	14	20.00	1.10	3.25	2
70		21	4	16	20.00	.92	3.09	2
70		22	4	10	19.09	1.46	3.23	2
70		22	4	12	19.09	1.13	2.98	2
70		23	4	10	18.26	1.22	2.81	1
70		24	4	8	17.50	1.40	2.70	1
70		25	4	8	16.80	1.29	2.59	1
70		26	4	8	16.15	1.19	2.49	1
70		27	4	8	15.55	1.11	2.40	1
75		21	4	14	20.00	1.22	3.58	2
75		21	4	16	20.00	1.01	3.40	2
75		23	4	10	18.26	1.33	3.07	2
75		23	4	12	18.26	1.09	3.01	1
75		24	4	8	17.50	1.53	2.95	2
75		24	4	10	17.50	1.20	2.89	1
75		25	4	8	16.80	1.38	2.77	1
75		26	4	8	16.15	1.28	2.67	1
75		27	4	8	15.55	1.19	2.57	1
75		28	4	8	15.00	1.10	2.48	1
80		21	4	14	20.00	1.33	3.93	2
80		21	4	16	20.00	1.10	3.72	2
80		22	4	12	19.09	1.36	3.61	2
80		22	4	14	19.09	1.09	3.38	2
80		24	4	8	17.50	1.69	3.25	2
80		24	4	10	17.50	1.28	3.08	1
80		25	4	8	16.80	1.48	2.96	1
80		26	4	8	16.15	1.36	2.84	1
80		27	4	8	15.55	1.27	2.74	1

TABLE XII-B (Cont'd) Slab 35 x 35 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
80		28	4	8	15.00	1.18	2.64	1
85		22	4	14	19.09	1.19	3.68	2
85		22	4	16	19.09	1.01	3.57	1
85		23	4	10	18.26	1.60	3.70	2
85		23	4	12	18.26	1.24	3.42	1
85		25	4	8	16.80	1.57	3.14	1
85		26	4	8	16.15	1.45	3.02	1
85		27	4	8	15.55	1.34	2.91	1
85		28	4	8	15.00	1.25	2.81	1
85		29	4	8	14.48	1.17	2.71	1
90		22	4	14	19.09	1.29	3.99	2
90		22	4	16	19.09	1.07	3.78	1
90		23	4	12	18.26	1.33	3.69	2
90		23	4	14	18.26	1.12	3.62	1
90		24	4	10	17.50	1.44	3.47	2
90		24	4	12	17.50	1.20	3.47	1
90		25	4	8	16.80	1.68	3.36	2
90		25	4	10	16.80	1.33	3.33	1
90		26	4	8	16.15	1.54	3.20	1
90		27	4	8	15.55	1.42	3.08	1
90		28	4	8	15.00	1.32	2.97	1
95		22	4	14	19.09	1.40	4.32	2
95		22	4	16	19.09	1.15	4.08	2
95		23	4	12	18.26	1.44	3.99	2
95		23	4	14	18.26	1.18	3.82	1
95		24	4	10	17.50	1.56	3.76	2
95		24	4	12	17.50	1.27	3.66	1
95		25	4	10	16.80	1.40	3.51	1
95		26	4	10	16.15	1.30	3.38	1
95		27	4	8	15.55	1.50	3.25	1
95		28	4	8	15.00	1.40	3.14	1
100		23	4	14	18.26	1.25	4.02	1
100		24	4	10	17.50	1.69	4.06	2
100		24	4	12	17.50	1.33	3.85	1
100		25	4	10	16.80	1.48	3.70	1
100		26	4	10	16.15	1.36	3.56	1
100		27	4	10	15.55	1.27	3.42	1
100		28	4	8	15.00	1.47	3.30	1
100		29	4	8	14.48	1.37	3.19	1
105		23	4	14	18.26	1.33	4.30	2
105		23	4	16	18.26	1.14	4.22	1
105		24	4	10	17.50	1.82	4.38	2
105		24	4	12	17.50	1.40	4.05	1
105		25	4	10	16.80	1.55	3.88	1
105		26	4	10	16.15	1.43	3.74	1
105		27	4	10	15.55	1.33	3.60	1
105		28	4	10	15.00	1.24	3.47	1
105		29	4	8	14.48	1.44	3.35	1
110		23	4	14	18.26	1.43	4.60	2
110		23	4	16	18.26	1.20	4.42	1
110		24	4	12	17.50	1.48	4.28	2
110		24	4	14	17.50	1.26	4.24	1
110		25	4	10	16.80	1.62	4.07	1
110		26	4	10	16.15	1.50	3.91	1
110		27	4	10	15.55	1.39	3.77	1
110		28	4	10	15.00	1.29	3.63	1

TABLE XII-B (Cont'd) Slab 35 x 35 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
110		29	4	10	14.48	1.21	3.51	1
115		23	4	14	18.26	1.52	4.92	2
115		23	4	16	18.26	1.25	4.63	1
115		24	4	12	17.50	1.59	4.58	2
115		24	4	14	17.50	1.32	4.43	1
115		25	4	12	16.80	1.42	4.26	1
115		26	4	10	16.15	1.57	4.09	1
115		27	4	10	15.55	1.46	3.94	1
115		28	4	10	15.00	1.35	3.80	1
115		29	4	10	14.48	1.26	3.67	1
120		23	4	14	18.26	1.62	5.24	2
120		23	4	16	18.26	1.33	4.92	2
120		24	4	12	17.50	1.69	4.88	2
120		24	4	14	17.50	1.37	4.63	1
120		25	4	12	16.80	1.48	4.44	1
120		26	4	12	16.15	1.36	4.27	1
120		27	4	10	15.55	1.52	4.11	1
120		28	4	10	15.00	1.41	3.96	1
120		29	4	10	14.48	1.32	3.83	1
125		24	4	14	17.50	1.43	4.82	1
125		25	4	12	16.80	1.54	4.63	1
125		26	4	12	16.15	1.42	4.45	1
125		27	4	12	15.55	1.32	4.28	1
125		28	4	10	15.00	1.47	4.13	1
125		29	4	10	14.48	1.37	3.99	1
125		30	4	10	14.00	1.28	3.85	1
130		24	4	14	17.50	1.51	5.09	2
130		24	4	16	17.50	1.30	5.01	1
130		25	4	12	16.80	1.60	4.81	1
130		26	4	12	16.15	1.48	4.63	1
130		27	4	12	15.55	1.37	4.45	1
130		28	4	12	15.00	1.27	4.29	1
130		29	4	10	14.48	1.43	4.15	1
130		30	4	10	14.00	1.33	4.01	1
135		24	4	14	17.50	1.60	5.39	2
135		24	4	16	17.50	1.35	5.20	1
135		25	4	12	16.80	1.68	5.05	2
135		25	4	14	16.80	1.42	5.00	1
135		26	4	12	16.15	1.54	4.80	1
135		27	4	12	15.55	1.42	4.63	1
135		28	4	12	15.00	1.32	4.46	1
135		29	4	12	14.48	1.23	4.31	1
135		30	4	10	14.00	1.38	4.16	1
140		24	4	14	17.50	1.69	5.69	2
140		24	4	16	17.50	1.40	5.40	1
140		25	4	14	16.80	1.48	5.18	1
140		26	4	12	16.15	1.59	4.98	1
140		27	4	12	15.55	1.48	4.80	1
140		28	4	12	15.00	1.37	4.63	1
140		29	4	12	14.48	1.28	4.47	1
140		30	4	12	14.00	1.20	4.32	1
145		24	4	14	17.50	1.78	6.00	2
145		24	4	16	17.50	1.46	5.62	2
145		25	4	14	16.80	1.53	5.37	1
145		26	4	14	16.15	1.41	5.16	1
145		27	4	12	15.55	1.53	4.97	1

TABLE XII-B (Cont'd) Slab 35 x 35 ft L /Δ = 300

W	1-C	D	X	B	L/D	P	A	K
145		28	4	12	15.00	1.42	4.79	1
145		29	4	12	14.48	1.33	4.63	1
145		30	4	12	14.00	1.24	4.47	1
150		25	4	14	16.80	1.58	5.55	1
150		26	4	14	16.15	1.46	5.34	1
150		27	4	14	15.55	1.36	5.14	1
150		28	4	12	15.00	1.47	4.96	1
150		29	4	12	14.48	1.37	4.79	1
150		30	4	12	14.00	1.28	4.63	1
150		31	4	12	13.54	1.20	4.48	1

TABLE XII-C Slab 35 x 35 ft. L/Δ = 360

W	1-C	D	X	B	L/D	P	A	K
4	.01	5	4	8		.44	.17	
4	.02	6	4	8		.45	.21	
4	.03	7	4	8		.46	.26	
8	.02	7	4	8		.64	.35	
8	.03	8	4	8		.64	.41	
8	.04	10	4	8		.54	.43	
8	.05	11	4	8		.53	.47	
8	.06	12	4	8		.54	.52	
12	.03	9	4	8		.74	.53	
12	.04	10	4	8		.69	.55	
12	.05	12	4	8		.62	.59	
12	.06	13	4	8		.62	.65	
12	.07	14	4	8		.64	.72	
12	.08	16	4	8		.54	.69	
12	.09	17	4	8		.57	.78	
12		18	4	8	23.33	.53	.76	2
12		18	4	10	23.33	.39	.71	2
12		19	4	8	22.10	.43	.65	2
12		19	4	10	22.10	.32	.61	2
12		20	4	8	21.00	.35	.56	2
12		20	4	10	21.00	.27	.55	1
12		21	4	8	20.00	.31	.52	1
16	.04	11	4	8		.81	.71	
16	.05	12	4	8		.79	.76	
16	.06	14	4	8		.73	.82	
16	.07	16	4	8		.61	.78	
16	.08	17	4	8		.64	.87	
16	.09	19	4	8		.55	.84	
16		19	4	8	22.10	.62	.94	2
16		19	4	10	22.10	.46	.89	2
16		20	4	8	21.00	.51	.81	2
16		20	4	10	21.00	.38	.77	2
16		21	4	8	20.00	.42	.71	2
16		21	4	10	20.00	.33	.70	1
16		22	4	8	19.09	.38	.67	1
20	.05	13	4	8		.86	.89	
20	.06	14	4	8		.86	.96	
20	.07	16	4	8		.71	.91	
20	.08	18	4	8		.70	1.01	
20	.09	19	4	8		.73	1.12	
20		20	4	8	21.00	.68	1.08	2
20		20	4	10	21.00	.51	1.02	2
20		21	4	8	20.00	.56	.94	2
20		21	4	10	20.00	.42	.89	2
20		22	4	8	19.09	.47	.84	1
20		23	4	8	18.26	.43	.80	1
24	.06	15	4	8		.89	1.07	
24	.07	16	4	8		.91	1.17	
24	.08	18	4	8		.77	1.11	
24	.09	20	4	8		.77	1.23	
24		21	4	8	20.00	.71	1.19	2
24		21	4	10	20.00	.53	1.12	2
24		22	4	8	19.09	.59	1.04	2
24		22	4	10	19.09	.45	1.01	1
24		23	4	8	18.26	.52	.96	1

TABLE XII-C (Cont'd) Slab 35 x 35 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
24		24	4	8	17.50	.48	.92	1
28	.07	17	4	8		.92	1.25	
28	.08	19	4	8		.79	1.20	
28	.09	20	4	8		.82	1.32	
28		21	4	8	20.00	.87	1.46	2
28		21	4	10	20.00	.65	1.36	2
28		22	4	8	19.09	.72	1.27	2
28		22	4	10	19.09	.54	1.19	2
28		23	4	8	18.26	.61	1.12	1
28		24	4	8	17.50	.56	1.08	1
32	.08	19	4	8		.94	1.43	
32	.09	21	4	8		.82	1.38	
32		22	4	8	19.09	.86	1.52	2
32		22	4	10	19.09	.64	1.42	2
32		23	4	8	18.26	.72	1.33	2
32		23	4	10	18.26	.56	1.28	1
32		24	4	8	17.50	.64	1.23	1
32		25	4	8	16.80	.59	1.18	1
36	.09	21	4	8		.96	1.61	
36		23	4	8	18.26	.84	1.56	2
36		23	4	10	18.26	.63	1.45	2
36		24	4	8	17.50	.72	1.38	1
36		25	4	8	16.80	.66	1.33	1
36		26	4	8	16.15	.61	1.28	1
40		21	4	14	20.00	.66	1.96	2
40		21	4	16	20.00	.56	1.89	2
40		22	4	10	19.09	.86	1.90	2
40		22	4	12	19.09	.68	1.80	2
40		23	4	8	18.26	.97	1.79	2
40		23	4	10	18.26	.72	1.67	2
40		24	4	8	17.50	.82	1.58	2
40		24	4	10	17.50	.64	1.54	1
45		21	4	14	20.00	.77	2.29	2
45		21	4	16	20.00	.65	2.20	2
45		22	4	12	19.09	.79	2.09	2
45		22	4	14	19.09	.65	2.00	2
45		23	4	10	18.26	.84	1.95	2
45		23	4	12	18.26	.66	1.84	2
45		24	4	8	17.50	.96	1.85	2
45		24	4	10	17.50	.72	1.73	1
50		22	4	14	19.09	.74	2.29	2
50		22	4	16	19.09	.62	2.20	2
50		23	4	10	18.26	.97	2.24	2
50		23	4	12	18.26	.76	2.11	2
50		24	4	8	17.50	1.11	2.14	2
50		24	4	10	17.50	.82	1.97	2
50		25	4	8	16.80	.94	1.88	2
50		25	4	10	16.80	.74	1.85	1
55		22	4	14	19.09	.84	2.60	2
55		22	4	16	19.09	.70	2.49	2
55		23	4	12	18.26	.86	2.39	2
55		23	4	14	18.26	.70	2.28	2
55		24	4	10	17.50	.93	2.24	2
55		24	4	12	17.50	.73	2.12	1
55		25	4	8	16.80	1.07	2.14	2
55		25	4	10	16.80	.81	2.03	1

TABLE XII-C (Cont'd) Slab 35 x 35 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
55		26	4	8	16.15	.94	1.95	1
55		27	4	8	15.55	.87	1.88	1
55		28	4	8	15.00	.81	1.81	1
60		22	4	14	19.09	.95	2.92	2
60		22	4	16	19.09	.79	2.79	2
60		23	4	12	18.26	.97	2.69	2
60		23	4	14	18.26	.79	2.56	2
60		24	4	10	17.50	1.05	2.52	2
60		24	4	12	17.50	.82	2.37	2
60		25	4	8	16.80	1.21	2.42	2
60		25	4	10	16.80	.89	2.23	2
60		26	4	8	16.15	1.02	2.14	2
60		26	4	10	16.15	.82	2.13	1
60		27	4	8	15.55	.95	2.05	1
60		28	4	8	15.00	.88	1.98	1
65		23	4	14	18.26	.88	2.84	2
65		23	4	16	18.26	.74	2.72	2
65		24	4	10	17.50	1.17	2.82	2
65		24	4	12	17.50	.91	2.63	2
65		25	4	10	16.80	.99	2.48	2
65		25	4	12	16.80	.80	2.40	1
65		26	4	8	16.15	1.15	2.39	2
65		26	4	10	16.15	.89	2.31	1
65		27	4	8	15.55	1.03	2.22	1
65		28	4	8	15.00	.95	2.14	1
65		29	4	8	14.48	.89	2.07	1
70		23	4	14	18.26	.97	3.14	2
70		23	4	16	18.26	.81	3.00	2
70		24	4	12	17.50	1.01	2.91	2
70		24	4	14	17.50	.82	2.76	2
70		25	4	10	16.80	1.10	2.75	2
70		25	4	12	16.80	.86	2.59	1
70		26	4	8	16.15	1.27	2.65	2
70		26	4	10	16.15	.95	2.49	1
70		27	4	8	15.55	1.11	2.40	1
70		28	4	8	15.00	1.03	2.31	1
70		29	4	8	14.48	.96	2.23	1
75		23	4	14	18.26	1.07	3.46	2
75		23	4	16	18.26	.89	3.29	2
75		24	4	12	17.50	1.11	3.21	2
75		24	4	14	17.50	.90	3.03	2
75		25	4	10	16.80	1.21	3.03	2
75		25	4	12	16.80	.94	2.82	2
75		26	4	8	16.15	1.41	2.93	2
75		26	4	10	16.15	1.02	2.67	2
75		27	4	8	15.55	1.20	2.59	2
75		27	4	10	15.55	.95	2.57	1
75		28	4	8	15.00	1.10	2.48	1
75		29	4	8	14.48	1.03	2.39	1
80		24	4	14	17.50	.98	3.31	2
80		24	4	16	17.50	.82	3.16	2
80		25	4	12	16.80	1.02	3.08	2
80		25	4	14	16.80	.84	2.96	1
80		26	4	10	16.15	1.12	2.92	2
80		26	4	12	16.15	.91	2.84	1
80		27	4	8	15.55	1.31	2.84	2

TABLE XII-C (Cont'd) Slab 35 x 35 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
80		27	4	10	15.55	1.01	2.74	1
80		28	4	8	15.00	1.18	2.64	1
80		29	4	8	14.48	1.10	2.55	1
80		30	4	8	14.00	1.02	2.46	1
85		24	4	14	17.50	1.07	3.59	2
85		24	4	16	17.50	.89	3.42	2
85		25	4	12	16.80	1.11	3.35	2
85		25	4	14	16.80	.90	3.17	2
85		26	4	10	16.15	1.22	3.18	2
85		26	4	12	16.15	.97	3.02	1
85		27	4	8	15.55	1.43	3.10	2
85		27	4	10	15.55	1.07	2.91	1
85		28	4	8	15.00	1.25	2.81	1
85		29	4	8	14.48	1.17	2.71	1
85		30	4	8	14.00	1.09	2.62	1
90		24	4	14	17.50	1.16	3.89	2
90		24	4	16	17.50	.96	3.70	2
90		25	4	12	16.80	1.21	3.64	2
90		25	4	14	16.80	.97	3.42	2
90		26	4	10	16.15	1.33	3.46	2
90		26	4	12	16.15	1.02	3.21	2
90		27	4	8	15.55	1.56	3.38	2
90		27	4	10	15.55	1.14	3.08	1
90		28	4	8	15.00	1.33	2.98	2
90		28	4	10	15.00	1.06	2.97	1
90		29	4	8	14.48	1.23	2.87	1
90		30	4	8	14.00	1.15	2.77	1
95		25	4	14	16.80	1.05	3.69	2
95		25	4	16	16.80	.87	3.51	1
95		26	4	10	16.15	1.44	3.74	2
95		26	4	12	16.15	1.10	3.46	2
95		27	4	10	15.55	1.22	3.30	2
95		27	4	12	15.55	1.00	3.25	1
95		28	4	8	15.00	1.44	3.23	2
95		28	4	10	15.00	1.12	3.14	1
95		29	4	8	14.48	1.30	3.03	1
95		30	4	8	14.00	1.22	2.93	1
95		31	4	8	13.54	1.14	2.83	1
100		25	4	14	16.80	1.13	3.96	2
100		25	4	16	16.80	.94	3.77	2
100		26	4	12	16.15	1.19	3.72	2
100		26	4	14	16.15	.97	3.56	1
100		27	4	10	15.55	1.31	3.55	2
100		27	4	12	15.55	1.05	3.42	1
100		28	4	8	15.00	1.55	3.48	2
100		28	4	10	15.00	1.18	3.30	1
100		29	4	8	14.48	1.37	3.19	1
100		30	4	8	14.00	1.28	3.08	1
100		31	4	8	13.54	1.20	2.98	1
105		25	4	14	16.80	1.21	4.24	2
105		25	4	16	16.80	1.00	4.02	2
105		26	4	12	16.15	1.27	3.98	2
105		26	4	14	16.15	1.02	3.74	2
105		27	4	10	15.55	1.41	3.81	2
105		27	4	12	15.55	1.11	3.60	1
105		28	4	10	15.00	1.24	3.47	1

TABLE XII-C Slab 35 x 35 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
105		29	4	8	14.48	1.44	3.35	1
105		30	4	8	14.00	1.35	3.24	1
105		31	4	8	13.54	1.26	3.13	1
110		25	4	14	16.80	1.29	4.54	2
110		25	4	16	16.80	1.07	4.29	2
110		26	4	12	16.15	1.36	4.26	2
110		26	4	14	16.15	1.09	3.99	2
110		27	4	10	15.55	1.51	4.08	2
110		27	4	12	15.55	1.16	3.77	1
110		28	4	10	15.00	1.29	3.63	1
110		29	4	10	14.48	1.21	3.51	1
110		30	4	10	14.00	1.13	3.39	1
110		31	4	8	13.54	1.32	3.28	1
115		26	4	14	16.15	1.16	4.25	2
115		26	4	16	16.15	.98	4.09	1
115		27	4	12	15.55	1.23	4.01	2
115		27	4	14	15.55	1.04	3.94	1
115		28	4	10	15.00	1.37	3.85	2
115		28	4	12	15.00	1.13	3.80	1
115		29	4	10	14.48	1.26	3.67	1
115		30	4	10	14.00	1.18	3.55	1
115		31	4	10	13.54	1.10	3.43	1
115		32	4	8	13.12	1.30	3.32	1
120		26	4	14	16.15	1.24	4.51	2
120		26	4	16	16.15	1.02	4.28	2
120		27	4	12	15.55	1.31	4.26	2
120		27	4	14	15.55	1.08	4.11	1
120		28	4	10	15.00	1.46	4.10	2
120		28	4	12	15.00	1.18	3.96	1
120		29	4	10	14.48	1.32	3.83	1
120		30	4	10	14.00	1.23	3.70	1
120		31	4	10	13.54	1.15	3.58	1
120		32	4	10	13.12	1.08	3.47	1
125		26	4	14	16.15	1.31	4.79	2
125		26	4	16	16.15	1.08	4.53	2
125		27	4	12	15.55	1.39	4.52	2
125		27	4	14	15.55	1.13	4.28	1
125		28	4	10	15.00	1.55	4.35	2
125		28	4	12	15.00	1.23	4.13	1
125		29	4	10	14.48	1.37	3.99	1
125		30	4	10	14.00	1.28	3.85	1
125		31	4	10	13.54	1.20	3.73	1
125		32	4	10	13.12	1.13	3.61	1
130		26	4	14	16.15	1.39	5.07	2
130		26	4	16	16.15	1.15	4.78	2
130		27	4	12	15.55	1.47	4.79	2
130		27	4	14	15.55	1.18	4.47	2
130		28	4	12	15.00	1.27	4.29	1
130		29	4	10	14.48	1.43	4.15	1
130		30	4	10	14.00	1.33	4.01	1
130		31	4	10	13.54	1.25	3.88	1
130		32	4	10	13.12	1.17	3.76	1
135		27	4	14	15.55	1.24	4.72	2
135		27	4	16	15.55	1.07	4.63	1
135		28	4	12	15.00	1.33	4.47	2
135		28	4	14	15.00	1.13	4.46	1

TABLE XII-C (Cont'd) Slab 35 x 35 ft L /Δ = 360

W	1-C	D	X	B	L/D	P	A	K
135		29	4	12	14.48	1.23	4.31	1
135		30	4	10	14.00	1.38	4.16	1
135		31	4	10	13.54	1.30	4.03	1
135		32	4	10	13.12	1.22	3.90	1
135		33	4	10	12.72	1.14	3.78	1
140		27	4	14	15.55	1.31	4.97	2
140		27	4	16	15.55	1.11	4.80	1
140		28	4	12	15.00	1.40	4.72	2
140		28	4	14	15.00	1.18	4.63	1
140		29	4	12	14.48	1.28	4.47	1
140		30	4	12	14.00	1.20	4.32	1
140		31	4	10	13.54	1.34	4.18	1
140		32	4	10	13.12	1.26	4.05	1
140		33	4	10	12.72	1.19	3.92	1
145		27	4	14	15.55	1.38	5.23	2
145		27	4	16	15.55	1.15	4.97	1
145		28	4	12	15.00	1.48	4.97	2
145		28	4	14	15.00	1.22	4.79	1
145		29	4	12	14.48	1.33	4.63	1
145		30	4	12	14.00	1.24	4.47	1
145		31	4	12	13.54	1.16	4.33	1
145		32	4	10	13.12	1.31	4.19	1
145		33	4	10	12.72	1.23	4.06	1
150		27	4	14	15.55	1.45	5.50	2
150		27	4	16	15.55	1.20	5.18	2
150		28	4	12	15.00	1.55	5.22	2
150		28	4	14	15.00	1.26	4.96	1
150		29	4	12	14.48	1.37	4.79	1
150		30	4	12	14.00	1.28	4.63	1
150		31	4	12	13.54	1.20	4.48	1
150		32	4	12	13.12	1.13	4.34	1

APPENDIX B

DEFINITIONS AND ABBREVIATIONS

For purposes of this report, the following definitions and abbreviations apply:

Active Soil. A soil susceptible to volume changes due to change in moisture content.

Deflection (Δ). Difference in elevation of high and low points on a slab caused by deformations in the slab, i.e., differential settlement.

Deflection Index (Δ/L). The maximum deflection differential which can be permitted to develop in a slab, divided by the slab length (L or L′).

Liquid Limit. The moisture content at which soil passes from a plastic to a liquid state.

Load-Bearing Partition. An interior partition which is expected to provide support for loads in addition to its own weight, such as ceiling joists, wall cabinets, bathroom fixtures.

Non-Load-Bearing Partition. An interior partition which will not be required to support any load other than its own weight, this not to exceed 500 plf.

Plastic Limit. The moisture content at which a soil changes from a semi-solid to a plastic state. This condition is said to prevail when the soil contains just enough moisture so that it can be rolled into threads of 1/8-inch diameter without breaking.

Plasticity Index. The numerical difference between liquid limit and plastic limit.

Soil Movement. The phenomenon of expansion or consolidation of cohesive soils due to change in moisture content.

Stiffened Slab. A slab which will not deflect excessively when subjected to the design conditions; such a slab rests on and moves with volume changes in the soil, and supports the entire structure.

Structural Slab. A slab designed to be independent of soil support by having its load supported on piers or piles.

Symbols used, in addition to those shown above, are as follows:

A_s = pb_sd = Cross-sectional area of bottom reinforcing steel in each stiffening beam of Type III slab.

A'_s = (pb_sd - 0.65 in.^{2}) = Cross-sectional area of reinforcing steel placed in addition to reinforcement of surface slab at the top of each stiffening beam of Type III slabs.

b_s = Width of web of stiffening beam in Type III slab.

b = Sum of widths b_s of all beams running parallel to the dimension ℓ of Type III slab.

B = Sum of widths b_s of all beams running parallel to the long direction (L) of Type III slab.

B′ = Sum of widths b_s of all beams running parallel to the short direction (L′) of Type III slab.

C = Support index representing quantitatively the degree to which the slab is supported in each of its principal directions. (Soils subject to lesser volume changes because of climate have a higher C factor.)

C_m = Increased value of support index C because of special soil-moisture conditions.

C_r = Reduced value of support index C because of compressible soils (for $q_u/w < 7.5$).

C_w = Climatic factor representative of the anticipated degree of volume change of soils.

d = Effective depth of stiffening beams in Type III slab (i.e., distance from center of bottom reinforcing steel to top of slab).

$(\Delta/L)_{allow}$ = Maximum allowable ratio Δ/L in a slab.

E = Modulus of elasticity of concrete, i.e., $3(10)^6$ psi.

E′ = Effective modulus of elasticity of concrete under sustained loading, i.e., $1.5(10)^6$ psi.

f'_c = Ultimate strength of concrete at 28 days (psi).

f_s = Allowable steel design stress (20,000 psi normally, and 45,000 psi for Welded Wire Fabric to be used in Type II slabs).

h = Over-all depth of a concrete stiffening beam (d + 3 inches).

I = Moment of inertia of a cross section.

j = Ratio of internal moment arm to effective depth of a stiffening beam (0.865 average value).

k = Ratio of the depth of compression zone to the effective depth of a rectangular concrete beam.

kips = 1,000 pounds.

ksf = kips per square foot.

K_1 = Constant = $2v_c$ = 150 psi.

K_2 = Constant = $8jf_s$ = $2(10)^7$ psf.

K_3 = Constant = $48E(\Delta/L)$ = $207(10)^8\ \Delta/L$ psf.

L = The longer side of a rectangular slab (ft).

L′ = The shorter side of a rectangular slab (ft).

ℓ = Slab dimension (L or L′) along which a Type III slab is analyzed or designed.

ℓ' = Slab dimension (L or L′) normal to the dimension ℓ of a Type III slab.

L_w = Liquid limit.

M = Bending moment (kips per ft or lb per ft).

M_{max} = Maximum value of bending moment (kips per ft or lbs per ft).

n = The ratio of the moduli of elasticity for steel and concrete = 10.

PI = Plasticity Index of a soil (dimensionless).

p = Steel ratio of a concrete beam (dimensionless) = $A_s/b_s d$.

p_1 = Steel ratio (p) as determined from deflection criterion (dimensionless).

plf = Pounds per lineal foot.

psf = Pounds per square foot.

psi = Pounds per square inch.

q_u = Unconfined compressive strength of an undisturbed cohesive soil as obtained by standard soil testing laboratory method (tsf).

t = Thickness of slab.

tsf = Tons per square foot.

V = Shear force (kips).

v = Shear stress.

v_c = Maximum allowable shear stress in concrete (75 psi).

V_{max} = Maximum value of shear force (kips).

w = Total dead and live load of slab reduced to uniform load per unit area (psf).

w_s = Total average dead and live superstructure load (psf).

w_d = Average dead load of slab (psf).

W = Total weight of structure, including slab dead weight and superstructure load (kips).

$\bar{w}$ = Effective slab load = $w\varphi\,(1-C)$ psf.

Z = Steel ratio function = $1/3\,(k^3) + np(1-k)^2$ (dimensionless).

φ = Reduction factor for length of slab equal to $1.4 - 0.4\,(L/L')$ (but not < 0.5) when applied to long dimension (L) and equal to unity (1.0) when applied to short dimension (L′).

APPENDIX C

TECHNICAL REFERENCES

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