

This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

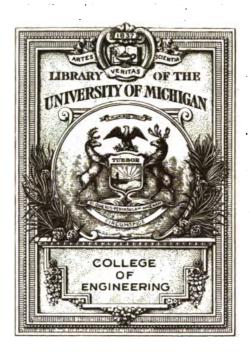
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + Keep it legal Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at http://books.google.com/

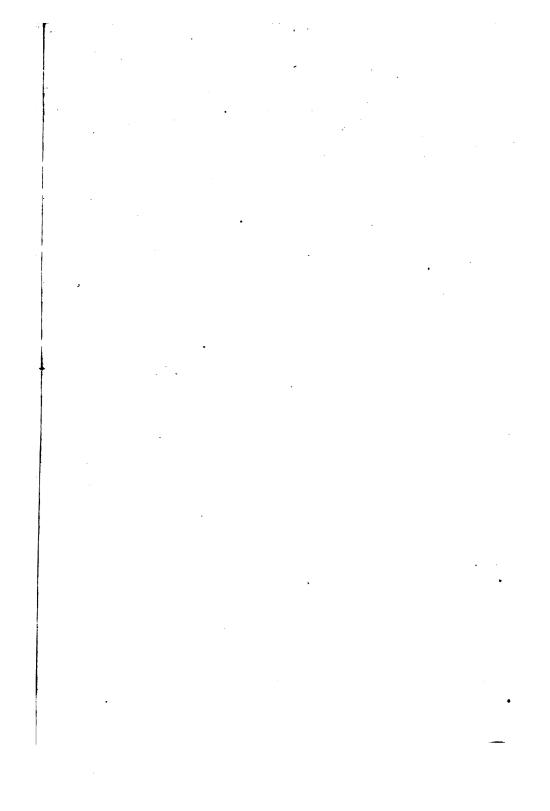


• TA 492 • A6 W32 Cop.2 . • . · · · .





. • .



WORKS BY L. A. WATERBURY PUBLISHED BY JOHN WILEY & SONS, Inc.

 Stresses in Structural Steel

 Angles with Special Tables

 v + 77 pages. 5½ x 8. Illustrated. \$1.25 net.

Laboratory Manual For the Use of Students in Testing Materials of Construction. 12mo, ix + 270 pages. 68 figures. Cloth, \$1.50 net.

Cement Laboratory Manual A Manual of Instructions for the Use of Students in Cement Laboratory Practice. 12mo, vii + 122 pages, 28 figures. Cloth, \$1.00.

A Vest-pocket Handbook of Mathematics for Engineers with Tables

Second Edition, Revised and Enlarged. xii + 213 pages, 80 figures. Morocco, \$1.50 net.

STRESSES

IN

STRUCTURAL STEEL ANGLES

WITH SPECIAL TABLES

BY ERBURY, C.E. Soc. C.E.

PROFESSOR OF CIVIL AND ARCHITECTURAL ENGINEERING, UNIVERSITY OF ARIZONA

FIRST. EDITION.

NEW YORK

JOHN WILEY & SONS, Inc. London : CHAPMAN & HALL, LIMITED

۱

Copyright, 1917 BY L. A. WATERBURY 2

1

PRESS OF BRAUNWORTH & CO. BOOK MANUFACTURERS BROOKLYT N. Y.

PREFACE

ALTHOUGH steel angles are extensively used in structural framing, there are important factors affecting the stresses in such members that are not commonly considered in analyses which are made for purposes of design. This volume has been prepared in the hope that it may serve to indicate the nature of some of these factors, and that it may furnish the means for their consideration in practical problems.

On account of lack of symmetry of the section, the product of inertia is involved in the computation of bending stresses, but the ordinary structural handbooks do not include values of this element. The author has computed the values of the products of inertia for commercial angles 2 by 2 inches and larger, which values are included in Table I and Table II at the back of the book.

The section modulus polygon, which is a very useful device for studying and for determining the flexural stresses in unsymmetrical sections, is explained, and for commercial angles 2 by 2 inches and larger coordinates for the vertices of the polygons are given in Table III.

The subject of end connections and their efficiency is considered, and in Table IV and Table V are given a considerable number of values of efficiency, of equivalent effective area, and of total tension allowable for a maximum unit stress of 16,000 pounds per square inch, computed in accordance with the method which is outlined in the text.

L. A. W.

TUCSON, ARIZONA, January 1, 1917.

1. 141 21

3-13-41 MIGD

Leela ...



TABLE OF CONTENTS

THEORY AND DISCUSSION

IKL	ICLS PA	GE
1.	Relation between Bending Moment and Flexural Stress	I
2.	Expressions for the Section Modulus	2
3.	Product of Inertia	5
4.	Section Modulus Polygons	6
5.	Neutral Axis	9
6.	Plane of Loading	12
7.	Combined Stresses	13
8.	Flexure for Angles in Pairs	15
9.	Transfer of Stress by Shear to an Outstanding Leg	17
ιο.	Efficiency of End Connections	19

TABLES

TABL	E	
I.	Elements of Angles with Equal Legs	31
п.	Elements of Angles with Unequal Legs	34
ш.	Coordinates of Section Modulus Polygons for Angles	44
IV.	Efficiency and Allowable Tension for Angles Riveted through	
	One Leg to a Rigid Connection Plate with Two Lines of	
	Rivets	50
V.	Efficiency and Allowable Tension for Angles Riveted through	
	One Leg to a Rigid Connection Plate with One Line of	
•	Rivets	60

• · · ·

STRESSES IN STRUCTURAL STEEL ANGLES

THEORY AND DISCUSSION

Art. 1. Relation between Bending Moment and Flexural Stress *

FOR a symmetrical section, with the plane of loading coincident with one of the principal axes of the section, the relation between the bending moment and the bending stress at an extreme fiber is

$$f = \frac{My}{I}, \qquad \dots \qquad \dots \qquad (\mathbf{I})$$

in which f = unit stress at the extreme fiber, due to bending; M = bending moment at the section under consideration;

- I =moment of inertia of the section;
- y=distance from extreme fiber to a line through the center of gravity of the section, the line being taken coincident with or parallel to the neutral axis of the section.

The value of $\frac{l}{y}$ is a constant for any given section and is ordinarily called the section modulus or section factor. If

* For an excellent treatment of this subject, see "An Analysis of General Flexure in a Straight Bar of Uniform Cross Section," by Professor L. J. Johnson, Trans. Am. Soc. C. E., Vol. LVI, p. 169, 1906.

STRESSES IN STRUCTURAL STEEL ANGLES

the letter s is used to designate the section modulus, Eq. (1) becomes

$$f = \frac{M}{s}.$$
 (2)

If $\frac{I}{v}$ is retained as the value of the section modulus, Eq.

(2) will be applicable only for those conditions which obtained for Eq. (1), viz., for symmetrical sections, with the planes of loading coincident with principal axes of the sections considered. However, a more general value of the section modulus can be derived, which, if used in Eq. (2), as the value of s, will make this equation applicable to any section, whether symmetrical or unsymmetrical, and for a plane of loading extending in any direction from the center of gravity of the section. The term section modulus, unless otherwise specifically stated, will be used to designate the general value, and for any case of pure flexure the extreme fiber stress will then be equal to the bending moment at the section divided by the section modulus.

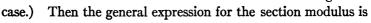
Art. 2. Expressions for the Section Modulus

đA

Fig. 1.

For any given section subject to bending stresses, let the

rectangular axes of reference, X-X and Y-Y, be taken with their origin at O, the center of gravity of the section, as indicated in Fig. 1. Let OP be the plane of loading and nn the neutral axis. (It is frequently assumed that the neutral axis is perpendicular to the plane of loading, but this is not true for the general



$$s = \frac{I_x I_y - J^2}{(I_y \sin \theta - J \cos \theta) y + (I_x \cos \theta - J \sin \theta) x}, \quad (3)$$

in which s = section modulus of the section for the particular plane of loading;

 I_x = moment of inertia of the section about X-X;

- I_y = moment of inertia of the section about Y-Y;
- J = product of inertia of the section for axes X-X, Y-Y;
- x, y =coordinates of the extreme fiber;

 θ = angle from OX to OP (see Fig. 1).

For certain special cases Eq. (3) can be simplified. Thus, for any section which is symmetrical about either axis, J becomes zero, and the expression for the section modulus becomes

$$s = \frac{I_x I_y}{I_y \sin \theta \cdot y + I_x \cos \theta \cdot x} \quad . \quad . \quad . \quad (4)$$

For a symmetrical section for which the plane of loading coincides with Y-Y, θ becomes 90 degrees and the expression for the section modulus becomes

$$s = \frac{I_x}{y}.$$
 (5)

For a symmetrical section for which the plane of loading coincides with X-X, θ becomes zero and the expression for the section modulus becomes

$$s = \frac{I_{\nu}}{x}.$$
 (6)

In order to derive the expression for the section modulus which is given in Eq. (3), let the section be indicated by Fig. r, x', y' being the coordinates of any infinitesimal area (dA), and α being the angle which the neutral axis (nn) makes with X-X. M is the bending moment for which the plane of action is OP, and the other quantities are as defined under Eq. (3).

For a combination of bending and direct stress the neutral

axis will not pass through the center of gravity of the section, but since the resultant stress can in this case be obtained by combining the stresses obtained for pure flexure and for axial loading, the derivation of the section modulus will be made for the case of pure flexure, for which the neutral axis will pass through the center of gravity.

For any point for which the coordinates are x', y', the distance of the point from the neutral axis is $(y' \cos \alpha - x' \sin \alpha)$. Therefore, if the stress is proportional to the distance from the neutral axis,

$$\frac{f'}{f} = \frac{y'\cos\alpha - x'\sin\alpha}{y\cos\alpha - x\sin\alpha}, \quad \dots \quad (7)$$

in which f' = unit stress at the point for which the coordinates are x', y';

f= unit stress at a point for which the coordinates \cdot are x, y, or since x, y, are the coordinates the extreme fiber, f is the extreme fiber stress.

The bending moment may be resolved into two components, one of which acts in the plane of OY and the other in the plane of OX. Also, for equilibrium, the component of the moment which acts in the plane of OY must be equal to the sum of the moments of the stresses about the axis X-X, and the component of the moment in the plane of OX must be equal to the sum of the moments of the stresses about the axis Y-Y, or using for any stress the value of f' obtained from Eq. (7),

$$M \sin \theta = \int f' y' dA$$

= $\frac{f}{y \cos \alpha - x \sin \alpha} \int y' (y' \cos \alpha - x' \sin \alpha) dA$, (8)

and

$$M \cos \theta = \int f' x' dA$$

= $\frac{f}{y \cos \alpha - x \sin \alpha} \int x' (y' \cos \alpha - x' \sin \alpha) dA$. (9)

Eqs. (8) and (9) may be simplified by substituting for $\int (y')^2 dA$ its equivalent I_x , for $\int (x')^2 dA$, its equivalent I_y , and for $\int x'y' dA$ its equivalent J. Then, by equating the value of f obtained from Eq. (8) to the value obtained from Eq. (9),

$$\frac{\sin \theta}{I_x \cos \alpha - J \sin \alpha} = \frac{\cos \theta}{J \cos \alpha - I_y \sin \alpha}, \quad . \quad (10)$$

from which

$$\tan \alpha = \frac{I_x - J \tan \theta}{J - I_y \tan \theta}.$$
 (11)

By substituting the value of tan α in Eq. (9), solving for $\frac{M}{f}$ and by substituting for $\frac{M}{f}$ its equivalent *s*, the value obtained for the section modulus is that which is given in Eq. (3).

Art. 3. Product of Inertia

The product of inertia (J), which is involved in the general equation for the section modulus, may be defined by the mathematical expression,

$$J = \int x' y' dA, \quad . \quad . \quad . \quad . \quad (12)$$

in which x', y', are the coordinates of any infinitesimal area (dA).

Also

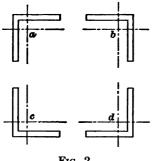
$$J = J_{cg} + Akh, \quad \dots \quad \dots \quad \dots \quad (13)$$

- in which J = product of inertia for any given rectangular axes;
 - J_{cg} = product of inertia for parallel axes through the center of gravity;

A =area of the section;

k, h =coordinates of the center of gravity with reference to the given axes for which J is desired.

For any symmetrical section J_{cq} is zero, or for such a section J becomes Akh.





The product of inertia may be either a positive or a negative quantity. For an angle the value of J will be positive for axes taken as shown at a and d of Fig. 2, and the value will be negative for axes, as shown at b and c of the same figure.

The numerical values of J for structural steel angles are given

in the tables at the back of the book, to which the proper sign must be applied for each particular case.

Art. 4. Section Modulus Polygons

If, for any given section, the values of the section modulus are computed for values of θ from 0 to 360 degrees, and if

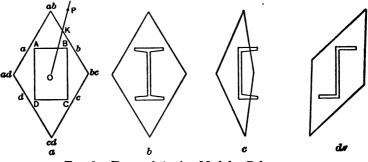


FIG. 3.-Types of Section Modulus Polygons.

these values are plotted as radii vectors, the outline of the resulting figure will be a polygon, having a side for each salient angle of the polygon which bounds the section. For some common sections the general forms of the corresponding section modulus polygons are indicated in Fig. 3.

Having the section modulus polygon for a given section, the value of the section modulus may be obtained by scaling the radius vector corresponding to the plane of loading. For example, for the rectangular section indicated at a of Fig. 3, the vector OK is the graphical representation of the section modulus for the plane of loading OP, and the bending stress at the vertex B is obtained by dividing the bending moment by this value of the section modulus. It will be observed that by using the section modulus polygon, not only is the required section modulus readily obtained, but also, the lines of the polygon which are intersected by the line of direction of OP indicate the points of the section at which the critical bending stresses will occur.

In order to plot the section modulus polygon for a particular section, the coordinates of each vertex of the polygon may be determined, and the polygon can then be drawn by connecting each two successive vertices with a straight line. If x_a , y_a are the coordinates of a and x_b , y_b , the coordinates of b, two successive vertices of the polygon which bounds the section, the coordinates x_{ab} , y_{ab} of the vertex of the section modulus polygon corresponding to the side ab of the section will be,

$$x_{ab} = \frac{(x_a - x_b)J - (y_a - y_b)I_y}{x_a y_b - x_b y_a}, \quad . \quad . \quad (14)$$

$$y_{ab} = \frac{(x_a - x_b)I_x - (y_a - y_b)J}{x_a y_b - x_b y_a}, \ldots$$
 (15)

If *ab* is parallel to X-X,

STRESSES IN STRUCTURAL STEEL ANGLES

If *ab* is parallel to Y-Y.

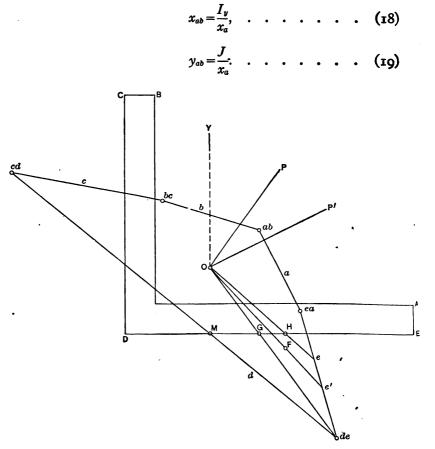


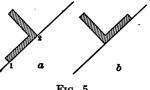
FIG. 4.

An inspection of Eqs. (14) to (19) will show that for many cases the vertices of the section modulus polygon can be easily located, since the values of $\frac{I}{y}$ and $\frac{I}{x}$ can be obtained from handbooks, for structural sections, and since J is zero for symmetrical sections, which includes I-beams, channels, and tees. For angles, Eqs. (14) and (15) may be used, but in order that the users of this book may avoid this labor, the coordinates have been computed and are tabulated at the back of the book for the commercial sizes of steel angles, and for variations in thickness of $\frac{1}{8}$ inch. For thicknesses in odd numbers of sixteenths of an inch, the values of the coordinates may be obtained by interpolation.

A typical section modulus polygon for an angle is shown in Fig. 4. If OP represents the direction of the plane of loading, the two points at which critical stresses will occur are b and d of the angle, but if the plane of loading is shifted to OP' the points of critical stresses will be a and d.

The most advantageous plane of loading is that for which there is the greatest section modulus. For an angle used as a purlin, for a vertical load,

a study of Fig. 4 will show that the purlin should be set as indicated at a of Fig. 5, not as shown at b.





It will be observed that for an angle in tension or compression, the application of the load at the gauge line is not far from the most advantageous point of loading.

Art. 5. Neutral Axis

For pure flexure the neutral axis will pass through the center of gravity of the section, assuming some direction, as for example nn (Fig. 1), which direction will depend upon the plane of loading and upon the section, but the neutral axis will not necessarily be perpendicular to the plane of loading.

In Art. 2, the relation of α to θ (see Eq. 11), was obtained in the derivation of the expression for the section modulus.

STRESSES IN STRUCTURAL STEEL ANGLES

This equation and two of its equivalent forms are:

$$\tan \alpha = \frac{I_x - J}{J - I_y} \frac{\tan \theta}{\tan \theta}, \quad \dots \quad (20)$$

$$\tan \alpha = \frac{I_x \cot \theta - J}{J \cot \theta - I_y}, \quad \dots \quad (21)$$

$$\tan \alpha = \frac{I_x \cos \theta - J \sin \theta}{J \cos \theta - I_y \sin \theta}.$$
 (22)

For a combination of flexure and direct loading the neutral axis will not pass through the center of gravity of the section, but it will be parallel to the position which it would have for pure flexure, and the distance between the two parallel lines will be,

$$v = \frac{F}{A} \frac{(y \cos \alpha - x \sin \alpha)}{f}, \quad . \quad . \quad (23)$$

in which v = distance from the neutral axis to the centerof gravity;

F =total stress acting normal to the section;

A =area of the section;

f = unit stress at the extreme fiber due to flexure;

x, y =coordinates of the extreme fiber;

 α = angle which the neutral axis makes with X-X.

By the use of Eqs. (20) to (23) the position and the direction of the neutral axis can be determined, but by the use of the section modulus polygon these computations can usually be avoided for practical problems. For example, consider an I-beam, as indicated in Fig. 6. For a loading in the plane OP, the section modulus is represented by the line from O to the vertex *ab*. Had the plane of loading intersected the sides *a* and *c* of the polygon, the critical stresses would have been at *A* and *C* of the beam, and had the plane of loading inter-

sected the sides b and d of the polygon, the points of critical stress would have been B and D, but since the plane of loading passes through the vertex ab the bending stresses at A and B are equal, or the neutral axis must be parallel to the line

joining A and B. Also, if the plane of loading, for pure flexure, is parallel to a side of the section modulus polygon, the neutral axis will intersect the corresponding vertex of the section.

As another example, let the plane of loading be taken as OP' (Fig. 6). The line Ob' now represents the section modulus for the point B, and by prolonging the side c to c', Oc' is obtained which is the section modulus for the point C of the beam. The bending stress at B is to the bending stress at C as Oc' is to Ob'. Since the

 $da \qquad e \\ da \qquad b \\ b' \\ c'' \\$

stress is proportional to the distance from the neutral axis, the distance from C along the prolongation of the line joining B and C to the point N at which the neutral axis for pure flexure is intersected, will be,

$$CN = \frac{BC}{\frac{Oc'}{Ob'} - 1} \dots \dots \dots \dots \dots (24)$$

To observe the conditions which obtain for the angle, consider the section and polygon shown in Fig. 4. It will be seen that when the plane of loading coincides with OG the section modulus for the side DE of the angle is represented by the line from O to the vertex de of the polygon. Since the

12 STRESSES IN STRUCTURAL STEEL ANGLES

plane of loading (OG) intersects the vertex de, the neutral axis must be parallel to DE of the section, as has been explained for the case of the I-beam. However, while for the I-beam the neutral axis happened to be perpendicular to the plane of loading, in the case of the angle such an assumption is not even approximately correct. A study of the angle and its polygon will show that if the plane of loading coincides with OY, the stresses at D and at E, for pure flexure, will be of opposite sign, since the lines d and e of the polygon cut the plane of loading on opposite sides of O; or, for pure flexure with OY as the plane of loading the neutral axis will intersect the side DE of the angle within the limits of the section. As the plane of loading shifts from OG to OY the change of sign for the stress at E will occur when the neutral axis passes through E, and the neutral axis will intersect E when the plane of loading is parallel to the side e of the polygon.

Art. 6. Plane of Loading

For those cases in which the member is restrained from bending in some direction, the determination of the equivalent plane of loading may require some study. If the character of the restraint determines the direction in which bending must occur, then the position of the equivalent plane of loading can be determined by noting the direction of the neutral axis. Since the deformation is proportional to the distance from the neutral axis, the neutral axis must be parallel to the line joining any two points whose deformations are equal in amount and of the same sign. In such a case $\tan \alpha$ becomes a known quantity, and the position of the equivalent plane of loading may be computed by the use of Eqs. (20) to (22). From Eq. (20) the corresponding equation for θ becomes

$$\tan \theta = \frac{I_x - J \tan \alpha}{J - I_y \tan \alpha} \dots \dots \dots \dots \dots (25)$$

For practical purposes the section modulus polygon may be used to determine the equivalent plane of loading, avoiding the necessity for using Eq. (25). For illustration, consider again the angle and its section modulus polygon, shown in Fig. 4. When the neutral axis is parallel to DE of the angle, the section modulus is represented by the line from O to the vertex de, or if the angle is riveted to a connection plate along the face DE, the angle being restrained from rotation parallel to the plate, and if the point of application be taken at the face of the connection plate, then the equivalent point of application of the load is G. If the gauge line, and, therefore, the actual point of attachment, is at H, the restraining couple which is called into action will have a moment arm equivalent to GH. It is sometimes thought that complete restraint parallel to the connection plate implies the existence of a couple having a moment arm equivalent to MH. but this is not the case; complete restraint parallel to the connection plate will move the equivalent point of application from either M or H to G, or, rather, the equivalent plane of loading to the plane OG. When the neutral axis is parallel to DE it will also be parallel to BC, and hence, the plane of loading which includes O and the vertex de must also pass through the vertex bc.

Art. 7. Combined Stresses

In determining the critical stresses for a combination of direct tension or compression with flexure, the usual methods may be used, substituting the correct value of the section modulus for the more commonly used special value.

For a member which is short enough to be considered as a prism,

$$f = \frac{F}{A} \pm \frac{M}{s}, \quad \dots \quad \dots \quad \dots \quad \dots \quad (26)$$

in which f = unit stress due to both flexure and direct load; F = total load or force normal to the section; A = area of the section; M = bending moment at the section; s = section modulus.

If the bending moment (M) in the last equation is due to an eccentricity (e) of the force (F), then,

$$f = \frac{F}{A} \left(\mathbf{1} \pm \frac{Ae}{s} \right). \qquad (27)$$

For a slender member, subject to both direct loading and bending, the following formula is applicable, and will be found convenient on account of its wide range of application:

$$f = \frac{F}{A} \pm \frac{M}{s \mp \frac{FL^2}{KEz}}, \quad \dots \quad \dots \quad (28)$$

in which M = bending moment neglecting the increment of the moment which is due to the deflection of the member itself;

L=length of the member (in inches if A is in square inches);

E =coefficient of elasticity of the material;

- z = distance from the extreme fiber to a line through the center of gravity of the section, parallel to or coinciding with the neutral axis;
- K=a constant, the value of which is 9.6 for a simple beam uniformly loaded and 12 for a simple beam with a load at the center, and for which the value 10 is suggested for general purposes of design.

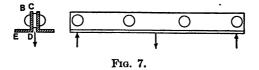
Other quantities in the last equation are as defined under Eq. (26).

In Eq. (28), the negative sign is used in the denominator for compression and the positive sign for tension.

The stress computed by Eq. (28) will be the stress at the point of maximum deflection, which for a member in compression will evidently be the critical stress, but for a member in tension the deflection reduces the eccentricity at the midlength, and for this case the critical stress will usually be at an end section. For the stress at the end section, the computation may, in general, be made by use of Eq. (26), but for angles the increase in stress on account of the outstanding legs may need special consideration.

Art. 8. Flexure for Angles in Pairs

The case of two angles of the same section, riveted together at frequent intervals, and subjected to bending in a plane



parallel to the connected legs, is indicated in Fig. 7. For such a condition the restraint which each angle exerts upon the other may be assumed to produce a deflection in the plane of bending and the neutral axis may be assumed to be perpendicular to the connected legs. The loading for each angle will then be equivalent to some loading in a plane passing through O, the center of area of the section, and through the vertices bc and de of the section modulus polygon, which is indicated for each angle in Fig. 8. Let m denote the bending moment for one angle, which if acting in the plane of O, bc, and de would produce the same deformations as those which result from the actual loading for the pair of angles. The actual moment must be equal to the resultant of the two moments m, or

$$M = 2m \sin \theta, \qquad \dots \qquad (29)$$

in which M =actual bending moment for the pair of angles; m =equivalent bending moment for one angle;

 θ = angle which the plane for *m* makes with the neutral axis for the pair of angles.

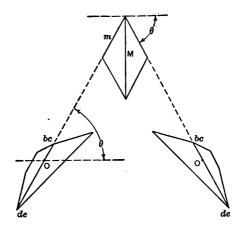


FIG. 8.

The bending stress for each angle is equal to m divided by the section modulus in its plane, or

$$f = \frac{M}{2s\sin\theta}, \quad \dots \quad \dots \quad \dots \quad (30)$$

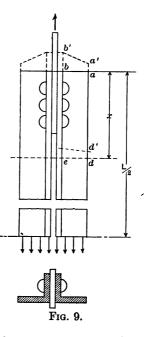
in which f = unit stress at the extreme fiber; s = section modulus for the plane of m.

In.Eq. (30), the value of $s \sin \theta$ may be considered as the equivalent section modulus for one angle of the pair for half of the total vertical load. For the case illustrated, this value is equal to the y-coordinate of bc, for the edge BC of the angle, or to the y-coordinate of de for the edge DE of the angle.

Thus, for angles in pairs, the equivalent section modulus for one angle can be obtained directly from a table of coordinates of section modulus polygons. However, even this is unnecessary if a table of properties of sections is at hand, for the values of the coordinates in question are each obtained by dividing the moment of inertia by the distance from the neutral axis to the extreme fiber. In other words, the stress for the pair of angles, for bending in the plane of symmetry, may be computed as for a single symmetrical section, provided the two angles are firmly attached to each other. For the case shown in Fig. 7, independent action upon the part of each angle would tend to crowd the angles toward each other at the midspan.

Art. 9. Transfer of Stress by Shear to an Outstanding Leg

In a member consisting of one or more angles, the critical stress is likely to occur at a section near the connection of the member to one of its connection planes, particularly in the case of tension members. At such a section there may be considerable variation in the distribution of the stress, due to a difference in the deformations of the connected and the outstanding legs of each angle. In order to make an approximate determination of the stress distribution, due to the transfer of stress to the outstanding leg by shear, consider the case shown in Fig. 9, in which there are two angles connected to opposite sides



of a connection plate. In this case the stress at a section

taken at the middle of the length of the member will be assumed * to be uniformly distributed, but at the end of the member the point a is subject to slightly less deformation than the point b. If it be assumed that the stress increases at a uniform rate from zero at point a to the average unit stress at the center of the length of the member, then at any section distant x from the point a the unit stress at the extreme fiber of the outstanding leg will be

$$f' = \frac{2x}{L} \cdot \frac{F}{A}, \quad \dots \quad \dots \quad \dots \quad (31)$$

in which f' = unit stress at the extreme fiber of the outstanding leg;

- $x = \text{distance from the end of the angle to the sec$ $tion at which f' is taken;}$
- L =length of the angle;
- F =total stress or force acting lengthwise of the angle;
- A =area of cross-section of the angle.

Also, let f be the unit stress in the connected leg of the angle at the section at which f' is taken. Then, for equilibrium at the section x distant from the end of the angle,

$$F = \frac{1}{2}(f+f')A_1 + fA_2, \quad \dots \quad (32)$$

in which A_1 = area of the outstanding leg;

 A_2 = area of the connected leg.

Or, substituting the value of f' from Eq. (31) in Eq. (32), and solving for f,

* The reasonableness of the assumptions of this article will be better understood by a study of the results of tests by Prof. Cyril Batho, reported in an article on "The Effect of End Connections on the Distribution of Stress in Certain Tension Members," Journal of the Franklin Institute, August, 1015.

Art. 10. Efficiency of End Connections

The efficiency of a member may be taken as the relation of the average to the maximum stress, or if, in Eq. (33), x is taken so that f will be the maximum stress, the equation for the efficiency for the transfer of stress by shear to the outstanding leg will be,

$$E_1 = \frac{I}{2} \left(\frac{A + A_2}{A - \frac{x}{L} A_1} \right), \quad \dots \quad \dots \quad (34)$$

in which E_1 is the efficiency, and the other quantities are as defined under Eqs. (31) and (32).

In place of the areas A_1 and A_2 the widths of the legs of the angle may be used. Using l_1 for A_1 and l_2 for A_2 , the equations corresponding to Eqs. (32), (33), and (34) become

$$\frac{F}{A}[l_1+l_2] = \frac{I}{2}(f+f')l_1+fl_2, \qquad . \qquad . \qquad (35)$$

or

$$f = 2 \frac{F}{A} \left[\frac{l_1 + l_2 - \frac{x}{L} l_1}{l_1 + 2l_2} \right], \quad . \quad . \quad (36)$$

and

For use in designing, the critical section will usually be taken through the connection rivet or rivets most distant from the end of the angle, in which case the net areas of the legs will be used for A_1 and A_2 , or in Eqs. (35), (36) and (37), the values of the widths of legs must be corrected to their net values. For such a case the equations become

$$\frac{F}{A}[l_1+l_2] = \frac{I}{2}(f+f')(l_1-n_1d) + f(l_2-n_2d), \quad . \quad (38)$$

or

20

$$f = 2 \frac{F}{A} \left[\frac{l_1 + l_2 - \frac{x}{L} l_1 + \frac{x}{L} n_1 d}{l_1 + 2l_2 - n_1 d - 2n_2 d} \right], \quad . \quad . \quad (39)$$

and

$$E_{1} = \frac{1}{2} \left[\frac{l_{1} + 2l_{2} - n_{1}d - 2n_{2}d}{l_{1} + l_{2} - \frac{x}{L}l_{1} + \frac{x}{L}n_{1}d} \right], \quad . \quad . \quad (40)$$

in which f = maximum unit stress at the critical section;

 E_1 = efficiency of net section relative to gross section;

 l_1 = width of the outstanding leg;*

 l_2 = width of the connected leg;*

- n_1 =number of rivet holes in the outstanding leg which are cut by the critical section;
- n_2 = number of rivet holes in the connected leg which are cut by the critical section;

d = diameter of each rivet hole;

x =distance from the end of the angle to the critical section;

L = total length of angle.

For a connection with lug angles, the length of the lug may be added to both x and $\frac{L}{2}$, in the equations just given, but this must be considered as a rather crude approximation.

Since the equations of articles 9 and 10 are developed upon the assumption that the angle is restrained from bending, they are applicable in particular to pairs of angles riveted to opposite sides of a connection plate, but, as will be shown later, they may also be used in the design of single angles. Structural specifications are inclined to be both indefinite and unsatisfactory with reference to the requirements for connections. If any clause relating to this matter is included,

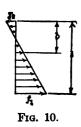
^{*} For exact work reduce the outside dimension of the leg by half the thickness of the angle.

it usually stipulates that each angle must be connected by both legs or that only one leg shall be considered as effective The results of tests indicate that the allowance of only area. one leg as effective area is too rigid a requirement, even though but one leg of the angle is connected; while on the other hand the use of a lug angle to connect the outstanding leg results in too liberal an allowance for the capacity of the angle. Eq. (40) furnishes a ready means for estimating the efficiency of angles used in pairs, and as already mentioned may be used for connections with or without lug angles. For an angle without lugs, n_1 will become zero. For this case the author has computed the efficiency of those angles which are most used, the values for which are given in Tables IV and V, at the back of the book. In the same tables, there is given for each angle, the area which if entirely effective at the maximum unit stress would be equal in strength to the connected angle for the computed efficiency. Also, the total allowable stress for a maximum unit stress of 16,000 pounds per square inch at the critical section is tabulated.

In the case of a single angle attached to a connection plate, there may be nearly complete restraint parallel to the plate with but little restraint perpendicular to the plate. In this case bending and shear each have an effect, but within the limits of working stresses the effect of the longitudinal shear may usually be neglected. In the development of Eqs. (31) to (40), inclusive, it was assumed that the stress at the center of the member was uniformly distributed. While this condition will be nearly fulfilled for angles in pairs, a single angle, with a small load, will be subjected to bending throughout its length, in which case the stress at the extreme edge of the outstanding leg will be less than the average stress, or may be of opposite sign. For the last-named case the stresses at the midsection may be as indicated in Fig. 10, in which f_1 represents the unit stress at the face of the connected leg and f_2 the unit stress at the extreme fibers of the outstanding leg.

22 STRESSES IN STRUCTURAL STEEL ANGLES

At some distance b from f_2 , the horizontal shear will be zero, and the stress which must be transferred by horizontal shear from the connected to the outstanding leg will be equal to the sum of the stresses between connected leg and the section



of zero horizontal shear. Furthermore, if it be assumed that the angle is restrained from bending until the horizontal shear necessary to transfer stress to the outstanding leg has occurred, then at the critical section the moment arm tending to produce bending will be the distance from the centroid of the stresses at the section to the line of action of

the applied force in the connection plate. But, on account of the variation of the stresses across the section, due to the longitudinal shear, the centroid of the stresses will lie between the center of area of the section and line of action of the force in the connection plate. In other words the neglect of the horizontal shear for this condition will be partially counterbalanced by the reduction in the moment arm due to the shear, and designs may be made on the basis of the bending and direct stresses. In this case for one angle in tension, the stress may be computed by Eq. (27), or the efficiency for direct tension and flexure will be

$$E_2 = \frac{\mathbf{I}}{\mathbf{I} + \frac{Ae}{s}}, \qquad \dots \qquad \dots \qquad (4\mathbf{I})$$

in which E_2 = efficiency of a single angle for eccentric tension;

> s = section modulus of the critical section for the given loading;

A = area of section;

e = eccentricity of the applied load at the critical section.

THEORY AND DISCUSSION

In using Eq. (41) the critical section will be at some distance from the extreme end of the angle. Hence, the value of e to be used will be less than that at the end section, due to the deflection of the angle. Since this reduction in emay result in an appreciable increase in the value of E_2 , its determination may be desired. In Fig. 11, e_c represents the resulting eccentricity at the center, e is the eccentricity



F1G. 11.

at the critical section, and e_1 is the eccentricity at the end. The maximum stress at the midsection in terms of e_e is

 $f = \frac{F}{A} \left(\mathbf{I} + \frac{A e_{e}}{s} \right), \quad . \quad . \quad . \quad . \quad . \quad (42)$

or in terms of e_1 it is

$$f = \frac{F}{A} + \frac{Fe_1}{s + \frac{FL^2}{KEz}}, \qquad (43)$$

in accordance with Eq. (28), to which the reader is referred for nomenclature.

Equating the values of f in Eqs. (42) and (43),

$$e_c = \frac{e_1}{1 + \frac{FL^2}{KEzs}}, \quad \dots \quad \dots \quad (44)$$

in which e_1 is eccentricity of the applied load at the end section, and the other values are as stated for Eq. (28).

At the instant that the angle begins to deflect, the moment at every section is Fe_1 and the elastic curve, for this value of the moment, would be a parabola. As the load increases, the deflection at the midsection approaches zero

as a limit, and if for this condition e be assumed proportional to $\left(\frac{L}{2}-x\right)^n$, the resulting elastic curve will give e proportional to $\left(\frac{L}{2}-x\right)^{n+2}$, or the limit toward which the curve tends is that for which the value of e is proportional to $\left(\frac{L}{2}-x\right)^{\infty}$. The significance of this may be appreciated by reference to

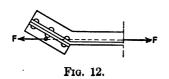


Fig. 12. The bending would all occur at the end of the unsupported length, and the centroid of the stresses throughout this unsupported length would coincide with the line of action of the

applied forces. In reality this limit can not be reached, for some bending occurs throughout the unsupported length, and at any section this resisting moment must balance the moment which is equal to the resultant force F multiplied



by the distance from the centroid of the stresses to the line of action of the applied force. Evidently, the curve of the neutral surface for the unsupported length of the angle will approximate the form of the parabola, and at the end of the unsupported length the maximum bending stresses will be developed. For an angle attached to a plate the section of the sharp bend will be transferred to the connection plate and will occur close to the end of the angle, as indicated in Fig. 13. Therefore, the curve throughout the length may ordinarily be taken as a parabola, for which the value of ein Fig. 11 becomes

$$e = e_c + 4(e_1 - e_c) \left(\frac{1}{2} - \frac{x}{L}\right)^2, \quad . \quad . \quad . \quad (45)$$

24 ·

in which e = eccentricity at the critical section;

• e_c = eccentricity at the midsection;

- $e_1 =$ eccentricity at the end section;
- x =distance from the end of the angle to the critical section;

L =length of angle.

It is evident that for large stresses and for practically all cases of ultimate loads the condition indicated in Fig. 12 will be nearly fulfilled and that the stresses at the critical section will tend to become identical with those which were determined in Art. 9. In this case the efficiency becomes identical with the value derived for pairs of angles, as given in Eqs. (34) and (40). Of the two efficiencies which have been derived, one for the transfer of stress to the web and the other for the bending stress, the lower of the two should control in the design. As the load becomes large the value of e at the critical section becomes small, and the efficiency for transfer of stress becomes dominant. That value may, therefore, reasonably be used as a basis for design, for tension members.

It may be of interest to compare some values obtained by experiment with the values for efficiency computed by Eq. (40). Table A contains a summary of the average values for tests made by Prof. F. P. McKibben and reported in Engineering News, Vol. 56, page 14, and Vol. 58, page 190.

In studying the results for Table A, it should be remembered that Eq. (40) is developed for a straight line relation of stresses at the critical section, whereas at the ultimate load the stress is not proportional to the deformation and that in this case it will cause the computed efficiency to be less than that observed for the tests. On the other hand, influences which produce bending parallel to the outstanding leg of the connection tend to make the efficiency obtained by experiment lower than the efficiency computed by Eq. (40), which neglects this bending. On the whole the results obtained

TABLE A

COMPARISON OF COMPUTED AND OBSERVED EFFICIENCIES OF CONNECTIONS FOR SPECIMENS TESTED BY PROF. MCKIBBEN

	M	[ain	And	LES.*		Lv	A	NGLES.			Ho	les.	EFFIC IN PEI	CIENCY RCENT.	
Reference Number.	Number.	lı In.	la In.	L'gth. <i>L</i> 1	Number.	ł1	I2	Length.	$\stackrel{\mathrm{H}}{:} L = L_1 + 2L_2$	x Ft.	211	<i>n</i> ₂	By Equation (40).	By McKibben's Tests.	Remarks.
$\overline{A_1}$	1	3	$3\frac{1}{2}$	5'-4''	0				5.33	1.20	0	1	69.4	68.0	
A_2	1	3		5'-4''	1	3	3	0'-91''	6.92				63.5		
B_1	1	3		5'-4''	0	• •	•••			1.20			72.1	64.1	
B ₂	1	3	4	5'-4''	1	3	3	0'- 91''	6.92			1 .	61.3		
B ₃	. 1	3		5'-4''	0	• •	• •			1.20			72.1		
C_1	1	4 4	6 6	5'-4'' 5'-4''	0 1	· · 4	•••	1'- 3''		$1.46 \\ 2.37$	0 1		$\begin{array}{c} 68.5 \\ 61.7 \end{array}$		
C_2 D_1	$\begin{array}{c} 1\\ 2\end{array}$	4 3	1	5'-4''	10	4	э	1-3	1.03 5.33				67.7		
D_1 D_2	$\begin{vmatrix} 2\\2 \end{vmatrix}$	3	3	5'-4''	2	 3		0'-10 ¹ / ₂ "					54.3		
D_2 A_3	1	3	-	5'-4"	1	3		$0'-11\frac{1}{2}''$			1		58.1	74.2	
A_4	1	3		5'-4''	1	3			7.25		1	_	58.1	75.9	
A_5	1	3		5'-4''	1	3		-	7.83		1		60.1		<i>L</i> ₂≈1′−3′
B ₄	1	3		5'-4''	1	3		-	7.25	1.52	1	1	61.5	77.4	-
B_{5}	1	3	4	5'-4''	1	3	3	$0' - 11\frac{1}{2}''$	7.25	1.52	1	1	61.5	79.0	
B_6	1	3	4	5′-4″	1	3	3	$0' - 11\frac{1}{2}''$	7.25	1.52	1	1	61.5	70.3	
B_7	1	3	4	5′–4″	1	3		-	7.21	1.50	1	_	61.5		
B_8	1	3	-	5'-4''	1	3	3		7.19		1		61.5	70.9	
C.	1	4		5′–4 ′	0	• •			5.33		0	_	79.7	71.6	
<i>C</i> 4	1	4		5'-4''	0				5.33		0		68.7	70.5	
C_{5}	1	4		5'-4''	1	3	4		7.49		0		68.7	69.4	
D_3	2	3		5'-4''	0	••	• •		5.33		0		67.7	68.9	
D_4	2	3	3	5′–4″	2	3	3	1′–0″	7.33	1.83	1	1	55.2	67.4	

* Thickness of metal for D_1 , D_2 , D_3 , and D_4 was $\frac{5}{16}$ inch, and for all other specimens $\frac{3}{8}$ inch,

by computation appear to be sufficiently conservative to warrant the presentation of the method for practical use, until a better method shall be proposed.

For a single angle in compression, the critical section for bending will be at the mid-length, the maximum stress may be computed by Eq. (28), and the efficiency for direct compression and flexure will be

$$E_3 = \frac{\mathbf{I}}{\mathbf{I} + \frac{Ae}{s - \frac{Fl^2}{KEz}}}, \quad \dots \quad \dots \quad (42)$$

in which E_3 = efficiency of a single angle for eccentric compression;

s = section modulus of the critical section for the given loading;

A =area of section;

e=moment arm at the end section of the couple
 producing flexure;

F =total applied force;

l = length of member;

- K = a constant, for which the value 10 may be used;
- E =modulus of elasticity of steel, usually taken as either 29,000,000 or 30,000,000;
 - z = distance from the extreme fiber to a line through the center of area of the section and parallel to the neutral axis.

The efficiency of the connection may be taken identical with the values given for tension, and if this is lower than the value obtained from Eq. (42), it should govern the design.

-. · · •

• • • • • 1

TABLE I

ą	as - 1	-20+	
	\mathbb{N}^{-}		l x
	ц <u>т</u>	4	x*

ELEMENTS OF ANGLES WITH EQUAL LEGS *

+

||-

J

+]]

I = moment of inertia J = product of inertia r = radius of gyration

1 3								<u>ن</u>
~	Weight			Axis 1-	1 and A	xis 2-2.		Axis 3–3.
Size.	per Foot.	of Section.	I	r	$\frac{I}{l-x}$	x	J	τ min.
Inches.	Pounds.	In. ²	In.4	In.	In. ³	In.	In.4	In.
$8 \times 8 \times 1\frac{1}{8}$		16.73	98.0	2.42	17.5	2.41	57.3	1.55
8×8×1냚	54.0	15.87	93.5	2.43	16.7	2.39	54.7	1.56
$8 \times 8 \times 1$		15.00	89.0	2.44	15.8	2.37	52.1	1.56
8×8×뵪	48.1	14.12	84.3	2.44	14.9	2.34	49.6	1.56
8×8× 1		13.23	79.6	2.45	14.0	2.32	47.1	1.56
8×8× 1 ≹		12.34	74.7	2.46	13.1	2.30	44.2	1.57
8×8× ≹	38.9	11.44	69.7	2.47	12.2	2.28	41.2	1.57
8×8× 1 ₽	35.8	10.53	64.6	2.48	11.2	2.25	38.3	1.58
8×8×§	32.7	9.61	59.4	2.49	10.3	2.23	35.4	1.58
8×8× 1	29.6	8.68	54.1	2.50	9.3	2.21	32.1	1.58
$8 \times 8 \times \frac{1}{2}$	26.4	7.75	48.6	2.51	8.4	2.19	28.9	1.58
6×6×1	37.4	11.00	35.5	1.80	8.6	1.86	20.6	1.16
6×6× 15	35.3	10.37	33.7	1.80	8.1	1.84	19.6	1.16
6×6×7	33.1	9.73	31.9	1.81	7.6	1.82	18.6	1.17
6×6× 1}	31.0	9.09	30.1	1.82	7.2	1.80	17.5	1.17
$6 \times 6 \times \frac{3}{4}$	28.7	8.44	28.2	1.83	6.7	1.78	16.4	1.17
6×6× 1	26.5	7.78	26.2	1.83	6.2	1.75	15.4	1.17
6×6×5	24.2	7.11	24.2	1.84	5.7	1.73	14.3	1.17
$6 \times 6 \times \frac{9}{16}$	21.9	6.43	22.1	1:85	5.1	1.71	13.1	1.18
$6 \times 6 \times \frac{1}{2}$	19:6	5.75	19.9	1.86	4.6	1.68	11.9	1.18
$6 \times 6 \times \frac{7}{16}$	17.2	5.06	17.7	1.87	4.1	1.66	10.6	1.19
$6 \times 6 \times \frac{3}{8}$	14.9	4.36	15.4	1.88	3.5	1.64	9.2	1.19

* The values of J were computed by the author. The remaining values in this table are from the Carnegie Pocket Companion, and are used with permission of the Carnegie Steel Company.

(+

C

1

TABLE I-Continued ELEMENTS OF ANGLES WITH EQUAL LEGS



I =moment of inertia duct of :-

	x	J =	product	t of iner	tia		J	
	x	r =	radius o	of gyrat	ion	l	-	+
	Weight	Area		Axis 1-1	L'AND A	X18 2- 2.		Axis 3–3.
Size.	per Foot.	of Section.	Ι	,	$\frac{I}{l-x}$	x	J	r min.
Inches.	Pounds.	In.º	In.4	In.	In. ³	In.	In.4	In.
5×5×1	30.6	9.00	19.6	1.48	5.8	1.61	11.1	0.96
5×5× 18	28.9	8.50	18.7	1.48	5.5	1.59	10.6	0.96
5×5× 1	27.2	7.98	17.8	1.49	5.2	1.57	10.1	0.96
5×5× 18	25.4	7.47	16.8	1.50	4.9	1.55	9.6	0.97
5×5׳	23.6	6.94	15.7	1.50	4.5	1.52	9.2	0.97
5×5× 11	21.8	6.40	14.7	1.51	4.2	1.50	8.6	0.97
5×5×ŧ	20.0	5.86	13.6	1.52	3.9	1.48	8.0	0.97
5×5× 1	18.1	5.31	12.4	1.53	3.5	1.46	7.4	0.98
5×5×1	16.2	4.75	11.3	1.54	3.2	1.43	6.7	0.98
5×5× 1	14.3	4.18	10.0	1.55	2.8	1.41	6.1	0.98
5×5×}	12.3	3.61	8.7	1.56	2.4	1.39	5.4	0.99
4×4×] ₿	19.9	5.84	8.1	1.18	3.0	1.29	4.6	0.77
4×4×₹	18.5	5.44	7.7	1.19	2.8	1.27	4.4	0.77
4×4× 1}	17.1	5.03	7.2	1.19	2.6	1.25	4.1	0.77
4×4×≸	15.7	4.61	6.7	1.20	2.4	1.23	3.8	0.77
4×4× ₽	14.3	4.18	6.1	1.21	2.2	1.21	3.5	0.78
4×4×1	12.8	3.75	5.6	1.22	2.0	1.18	3.2	0.78
4×4× ↓	11.3	3.31	5.0	1.23	1.8	1.16	2.9	0.78
4×4×1	9.8	2.86	4.4	1.23	1.5	1.14	2.6	0.79
4×4×♣	8.2	2.40	3.7	1.24	1.3	1.12	2.2	0.79
4×4×1	6.6	1.94	3.0	1.25	1.0	1.09	1.8	0.79
3}×3}× }	17.1	5.03	5.3	1.02	2.3	1.17	2.9	0.67
31×31×1	16.0	4.69	5.0	1.03	2.1	1.15	2.8	0.67
31×31×11	14.8	4.34	4.7	1.04	2.0	1.12	2.6	0.67
31×31×1	13.6	3.98	4.3	1.04	1.8	1.10	2.5	0.68
31×31×#	12.4	3.62	4.0	1.05	1.6	1.08	2.3	0.68
31×31×1	11.1	3.25	3.6	1.06	1.5	1.06	2.1	0.68

.

TABLE I—Concluded Elements of Angles with Equal Legs



I = moment of inertia	,
J = product of inertia	
r = radius of gyration	

	······							
•	Weight	Area		Axis 1	-1 AND	Ax18 · 2-2		Axis 3–3.
Size.	per Foot.	of Section.	I	r	$\frac{I}{l-x}$	x	3	r min.
Inches.	Lbs.	In. ²	In.4	In.	In. ³	In.	In.4	In.
31×31×1	9.8	2.87	3.3	1.07	1.3	1.04	1.9	0.68
3 <u>1</u> ×3 <u>1</u> ×1	8.5	2.48	2.9	1.07	1.2	1.01	1.7	0.69
31×31×16	7.2	2.09	2.5	1.08	0.98	0.99	1.5	0.69
$3\frac{1}{2}\times3\frac{1}{2}\times\frac{1}{2}$	5.8	1.69	2.0	1.09	0.79	0.97	1.2	0.69
3×3×≸	11.5	3.36	2.6	0.88	1.3	0.98	1.5	0.57
3×3×+	10.4	3.06	2.4	0.89	1.2	0.95	1.4	0:58
$3 \times 3 \times \frac{1}{2}$	9.4	2.75	2.2	0.90	1.1	0.93	1.3	0.58
3×3×14	8.3	2.43	2.0	0.91	0.95	0.91	1.1	0.58
3×3×¥	7.2	2.11	1.8	0.91	0.83	0.89	1.0	0.58
3×3×+	6.1	1.78	1.5	0.92	0.71	0.87	0.87	0.59
3×3×1	4.9	1.44	1.2	0.93	0.58	0.84	0.75	0.59
$2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{2}$	7.7	2.25	1.2	0.74	0.73	0.81	0.68	0.47
$2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{16}$	6.8	2.00	1.1	0.75	0.65	0.78	0.62	0.48
$2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{2}$	5.9	1.73	0.98	0.75	0.57	0.76	0.57	0.48
$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{16}$	5.0	1.47	0.85	0.76	0.48	0.74	0.49	0.49
$2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{4}$	4.1	1.19	0.70	0.77	0.39	0.72	0.41	0.49
$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{16}$	3.07	0.90	0.55	0.78	0.30	0.69	0.32	0.49
$2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{2}$	2.08	0.61	0.38	0.79	0.20	0.67	0.23	0.50
2×2×4	5.3	1.56	0.54	0.59	0.40	0.66	0.30	0.39
2×2×1	4.7	1.36	0.48	0.59	0.35	0.64	0.27	0.39
2×2× 1	3.92		0.42	0.60	0.30	0.61	0.24	0.39
$2 \times 2 \times \frac{1}{2}$	3.19		0.35	0.61	0.25	0.59	0.21	0.39
$2\times 2\times \frac{3}{16}$	2.44		0.28	0.62	0.19	0.57	0.16	0.40
2×2×1	1.65	0.48	0.19	0.63	0.13	0.55	0.11	0.40
	I							

33

+

<u>|-</u>

J

<u>+</u>]

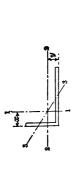
. . .

Π	
Э	
H	
9	
F	

ELEMENTS OF ANGLES WITH UNEQUAL LEGS *

I = moment of inertia

J = product of inertia r = radius of gyration



+

1

+

r min. Ахия 3-3. $\begin{array}{c} 1.28\\ 1.28\\ 1.29\\ 1.29\\ 1.30\\$ 8 Ŀ. Ax18 1-1 and 2-2. 32.5 30.8 29.2 27.6 26.0 24.1 224.1 222.2 20.3 18.4 16.3 In.4 5 1.65 1.63 1.61 $\begin{array}{c} 1.59 \\ 1.56 \\ 1.54 \\ 1.52 \\ 1.50 \\ 1.50 \end{array}$ 1.47 1.45 Ŀ. 2 $\frac{I_1}{l_2-y}$ 6.4 5.9 5.3 4.8 4.2 In.3 8.9 8.4 7.9 7.4 6.9 AXIS 2-2. 1.73 1.74 1.75 1.75 1.75 1.76 1.77 1.77 1.77 1.78 1.78 1.80 Ip. c 38.8 36.8 34.9 32.8 30.7 28.6 28.6 28.3 21.7 19.3 In.4 5 Ę н $\frac{I_1}{I_1-x}$ In. 15.1 14.3 13.4 12.5 11.7 10.8 9.9 8.9 8.0 AxIS 1-1. 2.49c Ŀ. 80.8 76.6 67.9 63.4 58.8 54.1 44.3 39.2 49.3In.4 ï Area of Section. 12.25 11.48 9.94 9.15 9.15 8.36 7.56 6.75 5.93 10.72 $In.^2$ 13.0 Weight per Foot. Pounds. 36.5 33.8 31.2 28.5 28.5 25.7 25.7 25.7 23.0 39.1 44.2 41.7 Inches. Size. 8×6 8×6 8×6

TABLES

3 } ×1	35.7	10.50		2.51	13.7	3.17	4.8	0.86	3.0	0.92	11.6	0.73
3}× 1	33.7	9.90		2.52	12.9	3.14	7.4	0.87	2.9	0.89	11.2	0.73
$3\frac{1}{2} \times \frac{1}{2}$	31.7	9.30		2.53	12.2	3.12	7.1	0.87	2.7	0.87	10.8	0.73
3 <u>4</u> × 14	29.6	9.68		2.54	11.4	3.10	6.7	0.88	2.5	0.85	10.3	0.73
$3\frac{1}{2} \times \frac{2}{3}$	27.5	8.06		2.55	10.6	3.07	6.3	0.88	2.3	0.82	9.8	0.73
$3\frac{1}{3} \times \frac{1}{18}$	25.3	7.43	48.5	2.56	9.8	3.05	5.9	0.89	2.2	0.80	9.1	0.73
3 <u>1</u> ×§	23.2	6.80		2.57	0 .0	3.03	5.4	0.90	2.0	0.78	8.4	0.74
$3\frac{1}{2} imes \frac{3}{16}$	21.0	6.15		2.57	8.2	3.00	5.0	0.90	1.8	0.75	7.7	0.74
$3\frac{1}{2} \times \frac{1}{2}$	18.7	5.50		2.58	7.3	2.98	4.5	0.91	1.6	0.73	7.1	0.74
$8 \times 3\frac{1}{3} \times \frac{1}{16}$	16.5	4.84		2.59	6.4	2.95	4.1	0.92	1.5	0.70	6.4	0.74
$3\frac{1}{2} \times 1$	32.3	9.50	45.4	2.19	10.6	2.71	7.5	0.89	3.0	0.96	9.7	0.74
$3\frac{1}{2} \times \frac{15}{18}$	30.5	8.97	43.1	2.19	10.0	2.69	7.2	0.89	2.8	0.94	9.3	0.74
$3\frac{1}{2} \times \frac{7}{8}$	28.7	8.42	40.8	2.20	9.4	2.66	6.8	0.90	2.6	0.91	0.6	0.74
3 <u>4</u> × 14	26.8	7.87	38.4	2.21	8.8	2.64	6.5	0.91	2.5	0.89	8.6	0.74
$3\frac{1}{2} \times \frac{1}{2}$	24.9	7.31	36.0	2.22	8.2	2.62	6.1	0.91	2.3	0.87	8.1	0.74
$3\frac{1}{2} \times \frac{11}{16}$	23.0	6.75	33.5	2.23	7.6	2.60	5.7	0.92	2.1	0.85	2.6	0.74
$3\frac{1}{2} \times \frac{5}{8}$	21.0	6.17	30.9	2.24	7.0	2.57	5.3	0.93	2.0	0.82	7.1	0.75
$7 \times 3\frac{1}{2} \times \frac{1}{16}$	19.1	5.59	28.2	2.25	6.3	2.55	4.9	0.93	1.8	0.80	6.5	0.75
$3\frac{1}{2} \times \frac{1}{2}$	17.0	5.00	25.4	2.25	5.7	2.53	4.4	0.94	1.6	0.78	5.9	0.75
$3\frac{1}{2} \times \frac{1}{16}$	15.0	4.40	22.6	2.26	5.0	2.50	4.0	0.95	1.4	0.75	5.3	0.76
$3\frac{1}{3} \times \frac{3}{3}$	13.0	3.80	19.6	2.27	4.3	2.48	3.5	0.96	1.3	0.73	4.7	0.76

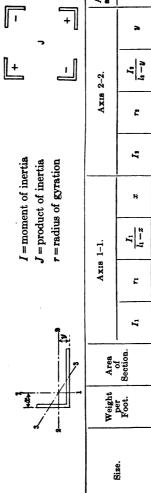
* The values of J given in this table were computed by the author. The remaining values are from the Carnegie Pocket Companion and are used with permission of the Carnegie Steel Company.

•

TABLE II—Continued

•

ELEMENTS OF ANGLES WITH UNEQUAL LEGS



Axis 1-1. Axis 2-2. Axis 2-2. Axis 2-2. I	1		r										
I_1 r_1 $\frac{I_1}{h-x}$ x I_3 r_1 I_1 r_1 I_1	Weight Area	Area			Ахів	1-1.			Ахів	2-2.		Axts 1-1 and 2-2.	Axis 3-3.
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		Section	4	Iı	ĩ	$\frac{I_1}{l_1-x}$	8	I1	E	$\frac{I_3}{l_3-v}$	7	7	r min.
30.8 1.85 8.0 2.17 10.8 1.09 3.8 1.17 9.9 29.3 1.86 7.6 2.14 10.8 1.10 3.6 1.17 9.9 27.7 1.86 7.2 2.12 9.8 1.11 3.6 1.14 9.6 26.1 1.87 6.7 2.10 9.2 1.11 3.4 1.12 9.3 26.1 1.87 6.7 2.10 9.2 1.11 3.2 1.10 8.8 24.5 1.89 6.2 2.08 8.7 1.12 3.0 1.08 8.3 22.8 1.89 5.8 2.06 8.1 1.13 2.8 1.06 7.8 21.1 1.90 5.3 2.03 7.5 1.13 2.8 1.06 7.8 21.1 1.90 5.3 2.03 7.5 1.13 2.7 1.06 7.8 21.1 1.91 4.3 1.99 6.3 <td>Pounds. In.²</td> <td>In.³</td> <td></td> <td>In.4</td> <td>In.</td> <td>In.³</td> <td>In.</td> <td>In.4</td> <td>In.</td> <td>In.^a</td> <td>In.</td> <td>In. C</td> <td>Ē</td>	Pounds. In. ²	In. ³		In.4	In.	In. ³	In.	In.4	In.	In. ^a	In.	In. C	Ē
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		9.00		30.8	1.85	8.0	2.17	10.8	1.09	3.8	1.17	6.6	0.85
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		8.50		29.3	1.86	7.6	2.14	10.3	1.10	3.6	1.14	9.6	0.85
1.87 6.7 2.10 9.2 1.11 3.2 1.10 8.8 1.88 6.2 2.08 8.7 1.12 3.0 1.08 8.3 1.89 5.8 2.06 8.1 1.12 3.0 1.08 8.3 1.90 5.3 2.06 8.1 1.13 2.8 1.06 7.8 1.90 5.3 2.03 7.5 1.13 2.5 1.03 7.3 1.90 4.8 2.01 6.9 1.14 2.3 1.01 6.6 1.91 4.3 1.99 6.3 1.16 1.8 0.99 6.0 1.92 3.3 1.94 4.9 1.17 1.6 0.94 4.8		7.98		27.7	1.86	7.2	2.12	6 .8	1.11	3.4	1.12	9.3	0.86
1.88 6.2 2.08 8.7 1.12 3.0 1.08 8.3 1.89 5.8 2.06 8.1 1.12 3.0 1.08 8.3 1.90 5.3 2.03 7.5 1.13 2.8 1.06 7.8 1.90 5.3 2.03 7.5 1.13 2.5 1.03 7.3 1.90 4.8 2.01 6.9 1.14 2.3 1.01 6.6 1.91 4.3 1.99 6.3 1.16 1.8 0.99 6.0 1.92 3.3 1.94 4.9 1.16 1.8 0.96 5.4 1.93 3.3 1.94 4.9 1.17 1.6 0.94 4.8		7.47		26.1	1.87	6.7	2.10	9.2	1.11	3.2	1.10	8.8 8	0.86
1.89 5.8 2.06 8.1 1.13 2.8 1.06 7.8 1.90 5.3 2.03 7.5 1.13 2.5 1.03 7.3 1.90 4.8 2.01 6.9 1.14 2.3 1.01 6.6 1.91 4.3 1.99 6.3 1.15 2.1 0.99 6.0 1.92 3.8 1.96 5.6 1.16 1.8 0.96 5.4 1.93 3.3 1.94 4.9 1.17 1.6 0.94 4.8		6.94		24.5	1.88	6.2	2.08	8.7	1.12	3.0	1.08	8.3	0.86
1.90 5.3 2.03 7.5 1.13 2.5 1.03 7.3 1.90 4.8 2.01 6.9 1.14 2.3 1.01 6.6 1.91 4.3 1.99 6.3 1.15 2.1 0.99 6.0 1.92 3.8 1.96 5.6 1.16 1.8 0.96 5.4 1.93 3.3 1.94 4.9 1.17 1.6 0.94 4.8	-	6.40		22.8	1.89	5.8	2.06	8.1	1.13	2.8	1.06	7.8	0.86
1.90 4.8 2.01 6.9 1.14 2.3 1.01 6.6 1.91 4.3 1.99 6.3 1.15 2.1 0.99 6.0 1.92 3.8 1.96 5.6 1.16 1.8 0.96 5.4 1.93 3.3 1.94 4.9 1.17 1.6 0.94 4.8		5.86	-	21.1	1.90	5.3	2.03	7.5	1.13	2.5	1.03	7.3	0.86
1.91 4.3 1.99 6.3 1.15 2.1 0.99 6.0 1.92 3.8 1.96 5.6 1.16 1.8 0.96 5.4 1.93 3.3 1.94 4.9 1.17 1.6 0.94 4.8		5.31		19.3	1.90	4.8	2.01	6.9	1.14	2.3	1.01	6 .6	0.87
1.92 3.8 1.96 5.6 1.16 1.8 0.96 5.4 1 1.93 3.3 1.94 4.9 1.17 1.6 0.94 4.8		4.75		17.4	1.91	4.3	1.99	6.3	1.15	2.1	0.99	6.0	0.87
1.93 3.3 1.94 4.9 1.17 1.6 0.94 4.8	14.3 4.18	4.18		15.5	1.92	3.8	1.96	5.6	1.16	1.8	0.96	5.4	0.87
		3.61		13.5	1.93	3.3	1.94	4.9	1.17	1.6	0.94	4.8	0.88

36

TABLES

•

•

1

5

i

0.74	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.76	0.76	0.77	0.77	,	0.84	0.84	0.84	0.84	0.84	0.85	0.85	0.85	0.86
7.8	7.5	7.2	6.8	6.4	6.0	5.7	5.2	4.8	4.3	3.8	3.3		6.9	9.9	6.3	5.9	5.5	5.1	4.7	4.1	3.6
1.01	0.99	0.97	0.95	0.93	0.00	0.88	0.86	0.83	0.81	0.79	0.76		1.21	1.18	1.16	1.14	1.12	1.10	1.07	1.05	1.03
2.9	2.7	2.6	2.4	2.3	2.1	1.9	1.8	1.6	1.4	1.2	1.0		3.3	3.1	2.9	2.7	2.5	2.3	2.0	1.8	1.6
0.92	0.93	0.93	0.94	0.94	0.95	0.96	0.96	0.97	0.98	0.99	1.00		1.14	1.15	1.15	1.16	1.17	1.18	1.18	1.19	1.20
7.2	6.9	6.6	6.2	5.8	5.5	5.1	4.7	4.3	3.8	3.3	2.9		9.2	8.7	8.2	7.7	7.1	6.6	6.0	5.3	4.7
2.26	2.24	2.22	2.20	2.18	2.15	2.13	2.11	2.08	2.06	2.04	2.01		1.71	1.68	1.66	1.64	1.62	1.60	1.57	1.55	1.53
7.8	7.4	7.0	6.6	6.1	5.6	5.2	4.7	4.2	3.7	3.3	2.7		5.0	4.7	4.4	4.1	3.7	3.4	3.1	2.7	2.3
1.85	1.86	1.87	1.88	1.89	1.89	1.90	1.91	1.92	1:93	1.94	1.95		1.52	1.53	1.54	1.54	1.55	1.56	1.57	1.58	1.59
29.2	27.8	26.4	24.9	23.3	21.7	20.1	18.4	16.6	14.8	12.9	10.9		16.4	15.5	14.6	13.6	12.6	11.6	10.5	9.3	8.1
8.50	8.03	7.55	7.06	6.56	6.06	5.55	5.03	4.50	3.97	3.42	2.87		7.11	6.65	6.19	5.72	5.23	4.75	4.25	3.75	3.23
28.9	27.3	25.7	24.0	22.4	20.6	18.9	17.1	15.3	13.5	11.7	9.8		24.2	22.7	21.1	19.5	17.8	16.2	14.5	12.8	11.0
6×3 } ×1	6×34×H	$6 \times 3\frac{1}{2} \times \frac{1}{4}$	6×34× 18	$6 \times 3 \times 2$	6 × 34 × H	6×34×8	6×34×#	$6 \times 3 \frac{1}{2} \times \frac{1}{2}$	$6 \times 3\frac{1}{2} \times \frac{1}{16}$	$6 \times 3 \times 2$	$6 \times 3\frac{1}{3} \times \frac{1}{3}$				5×4 ×						5×4 ×

TABLES

TABLE II-Continued

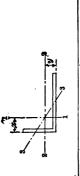
ELEMENTS OF ANGLE WITH UNEQUAL LEGS

I = moment of inertia

r = radius of gyration J = product of inertia

Γ

[+



	Ахів 3-3.	r min.	In.	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.76	0.76	0.76
	AxIS 1-1 and 2-2.	•	In.4	5.4	5.1	4.9	4.6	4.4	4.0	3.7	3.3	2.9	2.5
+]		a	In.	1.04	1.02	1.00	0.97	0.95	0.93	0.91	0.88	0.86	0.84
Ŀ	AXIS 2-2.	$\frac{I_3}{l_2-y}$	In. ³	2.5	2.4	2.2	2.1	1.9	1.7	1.6	1.4	1.2	1.0
	Ахів	٤	In.	0.96	0.97	0.98	0.98	0.99	1.00	1.01	1.01	1.02	1.03
Ū		۴ ۲.	In.4	6.2	5.9	5.6	5.2	4.8	4.4	4.0	3.6	3.2	2.7
r = radius of gyration		H	In.	1.79	1.77	1.75	1.72	1.70	1.68	1.66	1.63	1.61	1.59
= radius	1-1.	$\frac{I_1}{l_1 - x}$	In. ³	4.9	4.6	4.3	4.0	3.7	3.3	3.0	2.6	2.3	1.9
r	Ax18 1-1.	E	In.	1.53°	1.54	1.55	1.56	1.56	1.57	1.58	1.59	1.60	1.61
		Ιı	In.4 .	15.7	14.8	13.9	13.0	12.0	11.0	10.0	8.9	7.8	9.0
	Area	of Section.	In.²	6.67	6.25	5.81	5.37	4.92	4.47	4.00	3.53	3.05	2.56
	Weight	per Foot.	Pounds.	22.7	21.3	19.8	18.3	16.8	15.2	13.6	12.0	10.4	8.7
.	ŧ	bize.	Inches.	$5 \times 3\frac{1}{2} \times \frac{1}{8}$	$5 \times 3\frac{1}{2} \times \frac{13}{18}$	5 $\times 3\frac{1}{2} \times \frac{3}{2}$	5 $\times 3\frac{1}{2} \times \frac{14}{16}$	$5 \times 3\frac{1}{2} \times \frac{8}{3}$	$5 \times 3\frac{1}{2} \times \frac{1}{16}$	$5 \times 3\frac{1}{2} \times \frac{1}{2}$	5 $\times 3_{\frac{1}{2}} \times \frac{1}{16}$	$5 \times 3\frac{1}{2} \times \frac{3}{2}$	$5 \times 3\frac{1}{3} \times \frac{5}{16}$

.

38

TABLES

0.64	0.64	0.64	0.64	0.65	0.65	0.65	0.65	0.66	0.64	0.64	0.64	0.64	0.64	0.65	0.65	0.66	0.66	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.73	0.73
3.9	3.7	3.5	3.3	3.0	2.8	2.5	2.3	1.9	3.3	3.1	2.9	2.8	2.6	2.4	2.1	1.9	1.6	3.6	3.4	3.2	3.0	7 8	2.6	2.3	2.1	1.8
0.86	0.84	0.82	0.80	0.77	0.75	0.73	0.70	0.68	0.90	0.88	0.85	0.83	0.81	0.79	0.76	0.74	0.72	1.11	1.09	1.07	1.04	1.02	1.00	0.98	0.96	0.93
1.7	1.6	1.5	1.4	1.3	1.1	1.0	0.89	0.75	1.7	1.6	1.5	1.4	1.3	1.1	1.0	0.88	0.75	2.3	2.1	2.0	1.8	1.7	1.5	1.3	1.2	1.0
0.80	0.80	0.81	0.81	0.82	0.83	0.84	0.84	0.85	0.81	0.82	0.83	0.83	0.85	0.85	0.85	0.86	0.87	1.01	1.01	1.02	1.03	1.03	1.04	1.05	1.06	1.07
3.7	3.5	3.3	3.1	2.8	2.6	2.3	2.0	1.8	3.6	3.4	3.2	3.0	2.8	2.5	2.3	2.0	1.7	5.5	5.2	4.9	4.5	4.2	3.8	, 3.4	3.0	2.6
1.86	1.84	1.82	1.80	1.77	1.75	1.73	1.70	1.68	1.65	1.63	1.60	1.58	1.56	1.54	1.51	1.49	1.47	1.36	1.34	1.32	1.29	1.27	1.25	1.23	1.21	1.18
4.5	4.2	3.9	3.5	3.2	2.9	2.6	2.2	1.9	3.6	3.4	3.1	2.9	2.6	2.4	2.1	1.8	1.5	2.9	2.8	2.6	2.4	2.1	1.9	1.7	1.5	1.3
1.55	1.55	1.56	1.57	1.58	1.59	1.60	1.61	1.61	1.38	1.39	1.39	1.40	1.41	1.42	1.43	1.44	1.44	1.19	1.20	1.21	1.22	1.23	1.23	1.24	1.25	1.26
14.0	13.2	12.3	11.4	10.4	9.5	8.4	7.4	6.3	10.3	9.7	9.1	8.4	7.8	7.0	6.3	5.5	4.7	7.8	7.3	6.9	6.4	5.9	5.3	4.8	4.2	3.6
5.84	5.44	5.03	4.61	4.18	3.75	3.31	2.86	2.40	5.43	5.06	4.68	4.30	3.90	3.50	3.09	2.67	2.25	5.43	5.06	4.68	4.30	3.90	3.50	3.09	2.67	2.25
			15.7				9.8	8.2	18.5	17.3	16.0	14.7	13.3	11.9	10.6	9.1	7.7	18.5	17.3	16.0	14.7	13.3	11.9	10.6	9.1	7.7
×3	£ ×	×3	5 ×3 ×5	×3	×3	×3	×3	\times 3	$4\frac{1}{2} \times 3 \times \frac{13}{18}$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	° X	~ X	×3	$4\frac{1}{2}\times3$ $\times\frac{1}{2}$	× X	×3	×33	$4 \times 3\frac{1}{2} \times \frac{13}{18}$	$4 \times 3\frac{1}{2} \times \frac{3}{4}$	$4 \times 3\frac{1}{2} \times \frac{11}{3}$	$4 \times 3\frac{1}{2} \times \frac{5}{8}$	$4 \times 3\frac{1}{2} \times \frac{3}{16}$	$4 \times 3\frac{1}{2} \times \frac{1}{2}$	$\times 3\frac{1}{2}$	$4 \times 3\frac{1}{2} \times \frac{3}{8}$	$4 \times 3\frac{1}{2} \times \frac{5}{16}$

40

TABLES

	Ахів 3-3.	r min.	In.	2 .00 1	
	Ax18 1-1 and 2-2.	7	In.4	22.2 2.2 1.1 1.6 2.2 2.2 2.5 7 1.1 1.1 1.2 2.2 2.5 7 1.1 1.2 2.5 7 1.1 1.2 2.5 7 1.2 2.5 7 7 1.2 2.5 7 7 1.2 2.5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
		A	In.	0.94 0.92 0.87 0.85 0.85 0.85 0.85 0.83 0.83 0.78 0.78	
	Ахів 2-2.	$\frac{I_1}{l_2-y}$	In.ª	1.7 1.6 1.5 1.4 1.4 1.1 1.1 1.1 0.87 0.87 0.60	
	Ахів	E	In.	0.83 0.84 0.85 0.86 0.86 0.86 0.88 0.88 0.88 0.88	
tis ion		IJ	In.4	3.5 3.3 3.1 2.9 1.2 2.2 1.9 1.9 1.9 1.9	
it of iner it of iner of gyrati		#	In.	$\begin{array}{c} 1.44\\ 1.42\\ 1.42\\ 1.39\\ 1.37\\ 1.35\\ 1.33\\ 1.38\\ 1.28\\ 1.28\\ 1.26\\ 1.26\end{array}$	
<i>I</i> = moment of inertia <i>J</i> = product of inertia <i>r</i> = radius of gyration	1-1.	$\frac{I_1}{l_1-x}$	In. ³	2.9 2.5 2.3 2.1 1.9 1.0 1.2 1.2	
<u>и</u> р т	Ахив 1-1.	£	In.	$\begin{array}{c} 1.21\\ 1.22\\ 1.22\\ 1.23\\ 1.24\\ 1.25\\ 1.25\\ 1.26\\ 1.26\\ 1.28\end{array}$	
1 2;		IJ	In.4	7.3 6.6 6.0 7.6 6.0 8.5 7.6 7.6 8.5 7.6 8.5 8.5 8.5 8.5 8.5 8.5 8.5 8.5 8.5 8.5	
	Area	of Section.	In.²	$\begin{array}{c} 5.03\\ 5.03\\ 4.34\\ 3.98\\ 3.25\\ 2.87\\ 2.248\\ 1.69\\ 1.69\end{array}$	
	Weight	Weight per Foot.		17.1 16.0 14.8 112.4 11.1 9.8 9.8 7.2 7.2 5.8	
•• 🛓		Sile.	Inches.	4 × 3 × 4 4 × 3 × 4 4 × 3 × 4 4 × 3 × 4 4 × 3 × 5 4 × 3 × 5 5 4 × 3 × 5 5 5 7 6	

TABLE II—Continued

ELEMENTS OF ANGLES WITH UNEQUAL LEGS

0.62 0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.63	0.63		0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.54		0.52	0.52	0.52	0.52	0.53	0.53	
2.2	5.0	1.9	1.7	1.6	1.5	1.3	1.1	0.92	•	1.4	1.4	1.3	1.2	1.1	0.97	0.84	0.71		1.02	0.94	0.84	0.75	0.65	0.55	
0.98	0.94	0.92	0.00	0.88	0.85	0.83	0.81	0.79		0.77	0.75	0.73	0.70	0.68	0.66	0.64	0.61		0.77	0.75	0.73	0.71	0.68	0.66	
1.7	. 1	1.3	1.2	1.1	0.98	0.85	0.72	0.58	00	66.0	0.92	0.84	0.76	0.68	0.59	0.50	0.41		0.82	0.74	0.66	0.58	0.49	0.40	
0.85	0.86	0.87	0.87	0.88	0.89	0.90	0.90	0.91	0	0.69	0.69	0.70	0.70	0.71	0.72	0.73	0.74		0.72	0.72	0.73	0.74	0.74	0.75	
3.3 	3.0	2.8	2.5	2.3	2.1	1.8	1.6	1.3	נ י	1.7	1.6	1.5	1.4	1.2	1.1	9 .0	0.78		1.4	1.3	1.2	1.0	0.00	0.74	
1.23	1.19	1.17	1.15	1.13	1.10	1.08	1.06	1.04	Į	1.27	1.25	1.23	1.20	1.18	1.16	1.14	1.11		1.02	1.00	0.98	0.96	0.93	0.91	
2.2	1.9	1.8	1.6	1.5	1.3	1.1	0.96	0.78	,	Т.9	1.7	1.6	1.4	1.3	1.1	0.93	0.75		1.2	1.0	0.93	0.81	0.69	0.56	
1.04	1.05	1.06	1.07	1.07	1.08	1.09	1.10	1.11		90.T	1.07	1.08	1.09	1.09	1.10	1.11	1.12		0.91	0.91	0.92	0.93	0.94	0.95	
5.0	4.4	4.1	3.8	3.5	3.1	2.7	2.3	1.9	•	4.1	3.8	3.6	3.2	2.9	2.6	2.2	1.8		5.3 7	2.1	1.9	1.7	1.4	1.2	
4.62	4.00	3.67	3.34	3.00	2.65	2.30	1.93	1.56	2	3.00	3.36	3.06	2.75	2.43	2.11	1.78	1.44		2.78	2.50	2.21	1.92	1.62	1.31	
15.8	13.6	12.5	11.4	10.2	9.1	7.9	6.6	5.4	1	0.21	11.5	10.4	9.4	8.3	7.2	6.1	4.9	;	9.5	8.5	. 7.6	6.6	5.6	4.5	
34×3 ×4	° X	×3	×3	×3	×3	ž	×3	×33		34×23× 14	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{18}$	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$	$3\frac{3}{3} \times 2\frac{3}{3} \times \frac{3}{4}$	34×24×8	$3\frac{1}{3} \times 2\frac{1}{3} \times \frac{1}{3}$	$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$		X23	×24	$\times 2\frac{1}{2}$	$\times 2\frac{1}{2}$	3 ×2⅓×뷺	$\times 2\frac{1}{3}$	

		Ax18 3-3.	r min.	Ę	0.43	0.43	0.43	0.43	0.43	0.42	0.42	0.42	0.42	0.42	0.43	0.43
		Axis 1-1 and 2-2.	7	In.4	0.64	0.57	0.51	0.45	0.39	0.46	0.43	0.40	0.34	0.28	0.22	0.16
ſ	- · -]		a	In.	0.58	0.56	0.54	0.52	0.49	0.63	0.60	0.58	0.56	0.54	0.51	0.49
	+	Axis 2-2.	$\frac{I_3}{l_3-y}$	In."	0.47	0.42	0.37	0.32	0.25	0.46	0.41	0.36	0.31	0.25	0.20	0.13
LEGS		Ахів	2	Ē	0.55	0.55	0.56	0.57	0.57	0.56	0.57	0.58	0.58	0.59	0.60	0.61
TABLE II-Concluded Elements of Angles with Unequal Legs	ertia ertia tion		I,	In.⁴	0.67	0.61	0.54	0.47	0.39	0.64	0.58	0.51	0.45	0.37	0.29	0.20
TABLE II—Concluded of Angles with Unec	I = moment of inertia J = product of inertia r = radius of gyration		н	In.	1.08	1.06	1.04	1.02	0.99	0.88	0.85	0.83	0.81	0.79	0.76	0.74
BLE II- Angles	I = mome J = produ r = radiu	Axıs 1-1.	$\frac{I_1}{l_1-x}$	In. ³	1.0	0.89	0.78	0.66	0.54	0.70	0.62	0.55	0.47	0.38	0.29	0.20
TA INTS OF		Ахів	5	In.	0.92	0.93	0.94	0.95	0.95	0 75	0.76	0.77	0.78	0.78	0.79	0.80
Eleme	a,	,	ľ	In.4	1.9	1.7	1.5	1.3	1.1	1.1	1.0	0.91	0.79	0.65	0.51	0.35
		Area	of Section.	In.²	2.25	2.00	1.73	1.47	1.19	2.00	1.78	1.55	1.31	1.06	0.81	0.55
		Weight	per Foot.	Pounds.	7.7	6.8	5.9	5.0	4.1	6.8	6.1	5.3	4.5	3.62	2.75	1.86
	۳۶ م ر ب		Size.	Inches.		$3 \times 2 \times_{16}^{1}$	$3 \times 2 \times \frac{3}{8}$		3 ×2 × 1					$2\frac{1}{2} \times 2 \times \frac{1}{4}$	$2\frac{1}{3}\times2$ $\times\frac{1}{16}$	2 ¹ / ₃ ×2 × ¹ / ₈

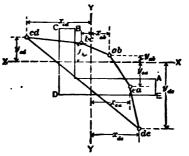
0.32	0.33	0.32	0.32	0.32	0.32	0.32	0.33
0.20	0.14	0.22	0.21	0.20	0.17	0.15	0.12
0.40	0.35	0.48	0.46	0.44	0.42	0.39	0.37
0.17 0.14	0.11	0.26	0.23	0.20	0.17	0.14	0.11
0.41	0.42	0.40	0.41	0.41	0.42	0.42	0.43
0.19 0.16	0.13	0.26	0.24	0.21	0.19	0.16	0.12
0.90	0.85	0.86	0.83	0.81	0.79	0.77	0.75
0.44 0.36	0.28	0.54	0.48	0.42	0.36	0.30	0.23
0.79	. 0.80	0.68	0.69	0.69	0.70	0.71	0.72
0.71 0.59	0.46	0.75	0.68	0.61	0.53	0.44	0.34
1.15 0.94	0.72	1.63	1.45	1.27	1.07	0.88	0.67
3.92 3.19	2.44	5.6	5.0	4.4	3.66	2.98	2.28
$2\frac{1}{2} \times 1\frac{1}{2} \times \frac{5}{16}$ $2\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{2}$	$2\frac{1}{3} \times 1\frac{1}{3} \times \frac{1}{16}$	$2\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{2}$	$2\frac{1}{4} \times 1\frac{1}{3} \times \frac{1}{4}$	$2\frac{1}{4} \times 1\frac{1}{2} \times \frac{3}{8}$	$2\frac{1}{4} \times 1\frac{1}{3} \times \frac{1}{3}$	24×14×4	$2\frac{1}{4} \times 1\frac{1}{3} \times \frac{1}{18}$

TABLES

- ----

TABLE III

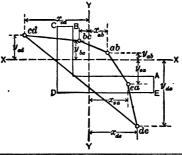
COORDINATES OF SECTION MODULUS POLYGONS FOR ANGLES



					Coord	INATES.				
Size of Angle.	xað +	Yab +	xbc _	уьс +	Xcd	yca +	Xde +	Yde —	xea +	Yea —
8×8×11	9.45	9.45	10.25	17.53	40.66	23.78	23.78	40.66	17.53	10.25
8×8×1	8.66	8.66		15.81						
8×8× 1	7.67	7.67	8.29	14.01	34.31	20.30	20.30	34.31	14.01	8.29
8×8×1	6.80	6.80	7.20	12.18	30.57	18.07	18.07	30.57	12.18	7.20
8×8×1	5.76	5.76	6.13	10.29	26.64	15.87	15.87	26.64	10.29	6.13
8×8×1	4.78	4.78	4.97	8.36	22.19	13.20	13.20	22.19	8.36	4.97
8×6×1	7.95	4.91	7.47	8.92	30.49	12.26	19.70	23.51	15.39	6.07
8×6× i	7.33	4.47	6.65	7.95	27.70	11.19	18.14	21.68	13.41	5.42
8×6×1	6.36	3.79	5.86	6.91	24.77	10.16	16.67	19.68	11.65	4.78
8×6×1	5.56	3.27	4.96	5.87	21.47	8.81	14.60	17.30	9.87	4.05
8×6×1	4.57	2.66	4.06	4.79	17.39	7.45	12.52	14.76	8.01	3.33
8×6×1	4.08	2.38	3.58	4.24	16.00	6.65	11.24	13.31	7.06	2.94
8×3}×1	6.76	2.15	4.50	3.02	20.88	3.66	12.61	8.48	13.71	2.40
8×31×1	6.15	1.73	4.11	2.70	19.04	3.46	12.41	8.16	12.17	2.21
8×31×1	5.58	1.43	3.66	2.35	17.04	3.19	11.95	7.68	10.61	1.99
8×31×1	5.06	1.19	3.09	1.98	14.75	2.77	10.77	6.92	8.99	1.69
8×31×1	4.26	0.93	2.56	1.62	12.31	2.38	9.73	6.16	7.31	1.41
8×31×1	3.79	0.85	2.29	1.46	11.02	2.17	9.14	5.86	6.44	1.27
7×3 <u>4</u> ×1	5.07	1.88	3.82	2.95	16.75	3.58	10.10	7.81	10.60	2.26
7×31×1	4.65	1.61	3.61	2.63	15.35	3.38	9.89	7.47	9.41	2.07
7×31×1	4.28	1.40	3.08	2.32	13.75	3.09	9.32	7.01	8.22	1.87
7×31×1	3.79	1.16	2.65	1.98	12.02	2.66	8.66	6.46	7.13	1.60
7×31×1	3.27	0.94	2.17	1.62	10.05	2.33	7.06	5.64	5.68	1.32
7×3 ×1	2.56	0.72	1.70	1.26	7.90	1.90	6.44	4.80	4.34	1.04
					1	I				

TABLE III—Continued

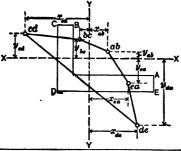
COORDINATES OF SECTION MODULUS POLYGONS FOR ANGLES



Size of Angle.	$\begin{array}{c} x_{ab} \\ + \end{array}$	<i>y</i> _{ab} +	x _{bc}	урс . +	x _{cđ}	Ус в +	x _{de} +	y _{de}	xea +	Yea	
6×6×1	4.54	4.54	4.98	8.57	19.10	11.08	11.08	19.10	8.57	4.98	
$6 \times 6 \times \frac{7}{8}$	4.11	4.11	4.45	7.64	17.54	10.21	10.21	17.54	7.64	4.45	
6×6×3	3.70	3.70	3.89	6.59	15.86	9.23	9.23	15.86	6.59	3.89	
6×6×§	3.13	3.13	3.35	5.67	14.00	8.26	8.26	14.00	5.67	3.35	
$6 \times 6 \times \frac{1}{2}$	2.55	2.55	2.75	4.61	11.84	7.08	7.08	11.84	4.61	2.75	
6×6×3	2.00	2.00	2.11	3.53	9.40	5.61	5.61	9.40	3.53	2.11	
6×4×1	4.03	2.28	3.50	3.82	14.20	4.56	8.46	9.23	8.05	2.58	
6×4ׇ	3.58	1.95	3.23	3.40	13.06	4.38	8.30	8.75	7.23	2.40	
$6 \times 4 \times \frac{3}{4}$	3.27	1.70	2.84	2.98	11.78	3.99	7.68	8.05	6.25	2.12	
6×4×≸	2.85	1.40	2.46	2.53	10.40	3.60	7.09	7.28	5.32	1.84	
$6 \times 4 \times \frac{1}{2}$	2.46	1.20	1.99	2.09	8.74	3.02	6.06	6.36	4.33	1.50	
6×4×3	1.90	0.88	1.57	1.60	6.96	2.47	5.11	5.21	3.32	1.18	
$6 \times 3\frac{1}{2} \times 1$	3.66	1.77	3.13	2.89	12.92	3.45	7.72	7.12	7.81	2.08	
6×3⅓×₮	3.43	1.58	2.84	2.61	11.89	3.24	7.42	6.80	6.99	1.90	
6×3⅓×⅔	3.19	1.34	2.49	2.26	10.69	2.94	6.88	6.24	6.10	1.68	
6×3⅓×≸	2.78	1.13	2.18	1.95	9.44	2.68	6.48	5.80	5.20	1.47	
$6 \times 3\frac{1}{2} \times \frac{1}{2}$	2.35	0.93	1.80	1.61	7.98	2.31	5.78	5.18	4.24	1.22	
6×3⅓×∛	1.89	0.66	1.40	1.22	6.32	1.86	4.81	4.18	3.26	0.96	
$6 \times 3\frac{1}{2} \times \frac{5}{16}$	1.57	0.59	1.20	1.06	5.42	1.64	4.34	3.82	2.73	0.83	
$5 \times 5 \times 1$	3,06	3.06	3.27	5.78	12.18	6.90	6.90	12.18	5.78	3.27	
$5 \times 5 \times \frac{7}{8}$	2.81	2.81	2.94	5.20	11.33	6.44	6.44	11.33	5.20	2.94	
$5 \times 5 \times \frac{3}{4}$	2.40	2.40	2.64	4.51	10.32	6.05	6.05	10.32	4.51	2.64	
5×5×§	2.10	2.10	2.27	3.84	9.20	5.40	5.40	9.20	3.84	2.27	
$5 \times 5 \times \frac{1}{2}$	1.74	1.74	1.88	3.16	7.90	4.69	4.69	7.90	3.16	1.88	
5×5×}	1.27	1.27	1.50	2.41	6.25	3.88	3.88	6.25	2.41	1.50	

TABLE III—Continued

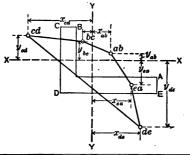
COORDINATES OF SECTION MODULUS POLYGONS FOR ANGLES



<u>.</u>	COORDINATES.										
Size of Angle.	xab +	Yad +	хьс —	уьс +	Xcd —	Yc d +	xae +	Yde —	xea +	Yea _	
5×4×1	2.56	1.84	2.47	3.30	9.59	4.04	5.70	7.60	4.99	2.10	
5×4ׇ	2.27	1.58	2.22	2.88	8.80	3.80	5.43	7.07	4.37	1.89	
5×4×§	2.00	1.35	1.91	2.46	7.78	3.40	4.91	6.34	3.72	1.63	
5×4×1	1.65	1.12	1.60	2.05	6.68	2.9 9	4.39	5.60	3.06	1.37	
5×4×	1.33	0.91	1.21	1.58	5.30	2.35	3.50	4.56	2.33	1.04	
5×31×1	2.44	1.48	2.19	2.52	8.77	3.02	5.19	5.96	4.89	1.68	
5×31×1	2.21	1.31	1.96	2.24	7.94	2.80	4.90	5.60	4.27	1.51	
5×3 <u>}</u> ×≸	1.89	1.03	1.72	1.88	7.06	2.59	4.63	5.06	3.63	1.33	
5×3}×}	1.63	0.84	1.43	1.54	6.02	2.23	4.06	4.40	3.00	1.11	
5×3}×}	1.31	0.69	1.10	1.21	4.84	1.80	3.37	3.72	2.30	0.86	
5×31×5	1.11	0.56	0.94	1.02	4.14	1.57	2.98	3.22	1.93	0.73	
5×3× 18	2.14	1.04	1.82	1.73	7.52	2.10	4.53	4.30	4.46	1.24	
5×3׳	2.08	0.97	1.71	1.62	7.18	2.01	4.40	4.16	4.17	1.17	
5×3×§	1.85	0.84	1.50	1.41	6.34	1.83	4.12	3.88	3.56	1.03	
5×3×1	1.59	0.67	1.24	1.16	5.42	1.60	3.73	3.47	2.92	0.86	
5×3×}	1.23	0.45	1.00	0.87	4.35	1.36	3.29	2.86	2.24	0.70	
$5 \times 3 \times \frac{5}{16}$	1.11	0.40	0.82	0.78	3.75	1.13	2.80	2.64	1.90	0.57	
4 <u>1</u> ×3× 11	1.75	1.02	1.57	1.72	6.24	2.00	3.67	4.00	3.62	1.16	
4 <u></u> 3×3×₹	1.71	0.97	1.46	1.60	5.95	1.90	3.53	3.87	3.38	1.08	
4 <u>₹</u> ×3×§	1.42	0.81	1.29	1.38	5.31	1.77	3.38	3.62	2.88	0.96	
$4\frac{1}{2}\times3\times\frac{1}{2}$	1.27	0.64	1.09	1.13	4.54	1.56	3.04	3.17	2.37	0.81	
$4\frac{1}{2}\times3\times\frac{3}{8}$	1.03	0.51	0.84	0.88	3.69	1.27	2.57	2.70	1.83	0.63	
$4\frac{1}{2} \times 3 \times \frac{5}{16}$	0.92	0.44	0.70	0.75	3.20	1.09	2.22	2.36	1.54	0.53	
		1	I				1	- 1			

TABLE III—Continued

COORDINATES OF SECTION MODULUS POLYGONS FOR ANGLES

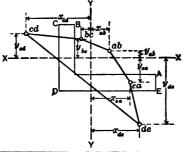


Size of Angle.	x _{ab} +	yab +	xbc _	уъс +	xcd _	ycđ +	x _{de} +	Yde —	xea +	Yea _			
4×4×13	1.57	1.57	1.70	2.99	6.28	3.57	3.57	6.28	2.99	1.70			
$4 \times 4 \times \frac{3}{4}$	1.49	1.49	1.61	2.82	6.06	3.47	3.47	6.06	2.82	1.61			
$4 \times 4 \times \frac{5}{8}$	1.34	1.`34	1.37	2.42	5.44	3.09	3.09	5.44	2.42	1.37			
$4 \times 4 \times \frac{1}{2}$	1.12	1.12	1.13	1.99	4.74	2.71	2.71	4.74	1.99	1.13			
4×4×≩	0.86	0.86	0.91	1.54	3.86	2.28	2.28	3.86	1.54	0.91			
$4 \times 4 \times \frac{1}{4}$	0.58	0.58	0.62	1.03	2.76	1.66	1.66	2.76	1.03	0.62			
$4\times3\frac{1}{2}\times\frac{13}{16}$	1.54	1.28	1.51	2.30	5.74	2.65	3.24	4.96	2.96	1.36			
$4 \times 3\frac{1}{2} \times \frac{3}{4}$	1.50	1.22	1.41	2.16	5.45	2.54	3.12	4.77	2.74	1.28			
4×3½×§	1.24	0.98	1.26	1.83	4.96	2.40	2.98	4.33	2.36	1.14			
$4 \times 3\frac{1}{2} \times \frac{1}{2}$	1.05	0.85	1.04	1.52	4.24	2.08	2.60	3.80	1.93	0.95			
$4 \times 3\frac{1}{2} \times \frac{3}{2}$	0.83	0.65	0.83	1.18	3.47	1.73	2.19	3.12	1.50	0.75			
$4 \times 3\frac{1}{2} \times \frac{5}{16}$	0.72	0.57	0.70	1.01	3.05	1.53	1.93	2.80	1.28	0.64			
4×3× 18	1.42	1.01	1.31	1.70	5.07	1.87	2.87	3.72	2.85	1.06			
$4 \times 3 \times \frac{3}{4}$	1.35	0.93	1.25	1.59	4.86	1.83	2.83	3.59	2.57	1.01			
4×3×§	1.13	0.75	1.13	1.36	4.38	1.75	2.76	3.33	3.28	0.91			
$4 \times 3 \times \frac{1}{2}$	1.00	0.62	0.92	1.10	3.76	1.50	2.41	2.89	1.87	0.75			
4×3×≩	0.83	0.47	0.72	0.86	3.12	1.25	2.05	2.43	1.47	0.59			
$4 \times 3 \times \frac{1}{4}$	0.57	0.37	0.49	0.62	2.26	0.89	1.49	1.89	1.01	0.40			
31×31×11	1.22	1.22	1.24	2.27	4.53	2.48	2.48	4.53	2.27	1.24			
$3\frac{1}{2}\times3\frac{1}{2}\times\frac{3}{4}$	1.13	1.13	1.19	2.13	4.35	2.43	2.43	4.35	2.13	1.19			
$3\frac{1}{2}\times3\frac{1}{2}\times\frac{5}{8}$	0.93	0.93	1.04	1.79	3.91	2.27	2.27	3.91	1.79	1.04			
$3\frac{1}{2}\times3\frac{1}{2}\times\frac{1}{2}$	0.80	0.80	.0.86	1.48	3.40	1.98	1.98	3.40	1.48	0.86			
$3\frac{1}{2}\times3\frac{1}{2}\times\frac{3}{2}$	0.65	0.65	0.68	1.16	2.87	1.68	1.68	2.87	1.16	0.68			
$3\frac{1}{2}\times3\frac{1}{2}\times\frac{1}{4}$	0.44	0.44	0.47	0.79	2.06	1.24	1.24	2.06	0.79	0.47			

i.

TABLE III—Continued

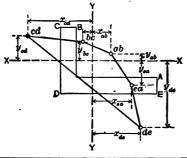
COORDINATES OF SECTION MODULUS POLYGONS FOR ANGLES



					Coord	INATES.				
Size of Angle.	xab +	Уад +	xbc —	уьс +	xcd —	Уса +	x _{de} +	Yde _	xea +	Yea _
3}×3×}	1.11	0.90	1.09	1.63	4.06	1.79	2.24	3.37	2.20	0.97
31×3×1	1.05	0.83	1.03	1.52	3.89	1.74	2.19	3.23	2.06	0.92
3 <u>1</u> ×3×§	0.91	0.75	0.91	1.34	3.51	1.62	2.07	3.04	1.76	0.82
3] ×3×]	0.82	0.61	0.75	1.08	3.10	1.41	1.82	2.61	1.48	0.68
3⅓ ×3×∦	0.61	0.45	0.60	0.83	2.50	1.20	1.57	2.17	1.11	0.54
3] ×3×1	0.45	0.34	0.42	0.59	1.83	0.88	1.16	1.64	0.77	0.37
3] ×2] ×]	0.85	0.59	0.85	0.98	3.23	1.18	1.90	2.21	1.84	0.65
3 <u>1</u> ×2 <u>1</u> ×{	0.80	0.51	0.80	0.91	3.04	1.12	1.87	2.13	1.69	0.62
3 <u>1</u> ×2 <u>1</u> ×1	0.70	0.45	0.67	0.78	2.67	1.00	1.72	2.00	1.39	0.52
3 <u>1</u> ×2 <u>1</u> ×1	0.61	0.34	0.53	0.60	2.24	0.84	1.47	1.67	1.11	0.41
3 <u>1</u> ×2 <u>1</u> × <u>1</u>	0.41	0.22	0.38	0.41	1.62	0.64	1.16	1.28	0.75	0.29
3×3× §	0.66	0.66	0.74	1.29	2.65	1.53	1.53	2.65	1.29	0.74
3×3× 1	0.55	0.55	0.63	1.06	2.36	1.40	1.40	2.36	1.06	0.63
3×3× 1	0.50	0.50	0.47	0.85	2.02	1.12	1.12	2.02	0.85	0.47
3×3ׇ	0.29	0.29	0.35	0.55	1.43	0.89	0.89	1.43	0.55	0.35
$3\times 2\frac{1}{2}\times \frac{9}{16}$	0.59	0.43	0.59	0.81	2.26	1.00	1.32	1.82	1.16	0.51
3×2½×½	0.55	0.41	0.54	0.74	2.10	0.94	1.25	1.73	1.05	0.47
3×2⅓×∦	0.48	0.30	0.42	0.56	1.77	0.78	1.06	1.41	0.83	.0.37
$3\times 2\frac{1}{2}\times \frac{1}{2}$	0.33	0.21	0.30	0.40	1.32	0.60	0.83	1.12	0.57	0.26
$3 \times 2 \times \frac{1}{2}$	0.47	0.27	0.45	0.47	1.76	0.59	1.10	1.16	0.99	0.33
3×2×≹	0.40	0.21	0.35	0.37	1.44	0.49	0.94	1.00	0.77	0.26
3×2×1	0.30	0.14	0.26	0.26	1.11	0.39	0.80	0.80	0.55	0.19

TABLE III—Concluded

COORDINATES OF SECTION MODULUS POLYGONS FOR ANGLES



	Coordinates.												
Size of Angle.	x _{ab} +	Уад +	xbc —	у _{рс} +	x _{cd}	yca +	xae +	Yde —	xea +	Yea —			
$2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{2}$	0.38	0.38	0.40		1.48	0.84	0.84	1.48	0.71	0.40			
$\begin{array}{c} 2\frac{1}{2}\times2\frac{1}{2}\times\frac{3}{2}\\ 2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{2} \end{array}$	0.30 0.22	$0.30 \\ 0.22$	$\begin{array}{c} 0.33 \\ 0.23 \end{array}$	0.56 0.39	1.29 0.97	0.75 0.57	$0.75 \\ 0.57$	1.29 0.97	0.56 0.39	0.33			
$\begin{array}{c} 2_{3} \times 2_{3} \times 1 \\ 2_{3} \times 2_{3} \times 2_{3} \times 1 \end{array}$	0.22	0.11	0.23	0.35	0.57		0.34	0.57	0.39	0.23			
$2\frac{1}{2}\times2\times\frac{1}{2}$	0.34	0.27	0.34	0.47	1.25		0.73	1.01	0.68	0.28			
$\begin{array}{c}2\frac{1}{2}\times2\times\frac{3}{2}\\2\frac{1}{2}\times2\times\frac{1}{2}\end{array}$	$\begin{array}{c} 0.28 \\ 0.22 \end{array}$	0.19 0.15	0.28 0.19	$0.36 \\ 0.25$	1.10 0.82	0.48 0.35	0.69 0.52	0.88 0.68	0.54 0.38	0.24 0.16			
$2\frac{1}{2}\times2\times\frac{1}{8}$	0.11	0.07	0.11	0.13	0.47	0.22	0.33	0.41	0.20	0.09			
2 <u>4</u> ×14×8		0.10	0.18		0.79	0.22	0.50	0.47	0.44	0.12			
2⅓×1⅓×┇ 2⅓×1⅓×╦	0.20 0.16	0.08 0.06	0.15 0.12	0.14 0.11	0.67 0.54	0.19 0.16	0.45 0.40	0.42 0.37	0.36 0.28	0.10 0.08			
$2\frac{1}{2}\times1\frac{1}{2}\times\frac{1}{2}$	0.26	0.16	0.22	0.25	0.87	0.26	0.48	0.54		0.16			
$\begin{array}{c}2\frac{1}{2}\times1\frac{1}{2}\times\frac{3}{8}\\2\frac{1}{2}\times1\frac{1}{2}\times\frac{1}{4}\end{array}$	0.21 0.16	0.12	0.19 0.14	0.20 0.14	$0.75 \\ 0.57$	0.25 0.19	0.45	0.48 0.41	0.42 0.30	0.14 0.10			
$2\frac{1}{2}\times1\frac{1}{2}\times\frac{3}{16}$		0.06	0.11	0.11	0.45	0.16	0.32	0.32	0.23	0.08			
$2 \times 2 \times \frac{7}{16}$	0.21	0.21	0.22	0.40	0.82		0.45	0.82	0.40	0.22			
2×2×≩ 2×2× 1	0.19 0.13	0.19	$\begin{array}{c} 0.20\\ 0.15 \end{array}$	$0.35 \\ 0.25$	0.75 0.59	0.42 0.36	0.42 0.36	0.75 0.59	0.35 0.25	0.20 0.15			
$2 \times 2 \times \frac{1}{2}$ $2 \times 2 \times \frac{1}{2}$	0.13	0.08	0.08	0.13	0.35	0.20	0.20	0.35	0.13	0.08			

2	
EE	
TAB	
AB	

EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGH CONNECTION PLATE

Two Holes for 1-inch Rivets Deducted from Connected Leg

F

			of	9	2	8
	r sq.in.		values	-	E-0	210 1
=1 inch) Ib. per		in The	0 0	0.0	196.8
hole =	=16,000	1	Tensior One and	0.0	7.0	184 6
Diameter of each hole =1 inch.	Allowable stress=16,000 lb. per sq.in.		Allowable Tension in Thousands of Pounds for One angle for Values of	1.0		8 1 ¹ / ₂ 61 765 169 073 578 584 210 3210 8911 5412 3013 1314 00165 1174 2184 6196 8910 192
ameter	lowable		Alle Pour	0.0	0.0	165 1
Di	All	1	ngle		0.0	14 00
		4	One A		1.0	3 13
0		ה	Efficiency in Per Cent for Values Bequivalent Area in Sq.in. of One Angle of $\frac{x}{L}$.	0.0	0.0	2 30
0000	00		rea in S r Value	0.0	7.0	1 54 1
0	0	ľ	dent Ar		1.0	0 801
			Equiva	0.0	0.0	0 32 1
			lues	M	0.0	34 2 10
Ð	0	T	for Va		# 'D	78 5 5
0000	000	K-8	Per Cent of $\frac{x}{L}$.	0.0	0.0	73.5
10		11×	in Per	0	9.0	69 0
		1	ency		1.0	35.1
	2	G	Effici		2.	1 7
- ·	2.	1 1		t	In.	11
			Size of Angle.	12	In.	oc
			01-4		-	-

TABLES

00 00 2 186.6 199.4 213.8 6 176.3 188.2 201.8 8 166.1 177.1 189.9 00 5 145.1 154.7 165.9 7 134.5 143.5 153.6 83 104.3 110.1 116.6 123.8 131.8 141.3 00 6 196.8 210.1 225.4 HÍN 8 116. 5 106.4 113.0 120.3 128. 0 103 2 155.5 165.9 177 96.2 102.1 108. 26 57 16 6 3 175. 5|126. 0 155. 0,136. 0 156.1 165. 72 10.37 11.11 130.9 138.1 146. 85. 77 9.60113.3119.51 3 5 165. 4 100. 38 11.07 11.87 139.3 147. 8 81 0 95. 66 12.46 13.36 156. 76 12.61 148. 86. F 6.49 8.05 9.67 10.37 7.27 8.97 6.80 6.06 24 52 02 11. 00 1 7.06 6.38 20 20 41 74 35 11. 74 10.5 9. 33 10.95 11. 100 20 14 53 92 29 65 01 37 76 10. 0 10 9. 6 2100 9 19 06 88 88 28 6.28 63 08 0 9. 6 0 1 00 00 10 781 25 Z 18 08 52 96 38 33 5 10 9 10 o. .5 78.4 84. .5 78.4 83. 2 83. .484. 5 78.3 83 5 78.484 5 78.3 83 5 78.3 83 578.584 5 78.484 5 78. 5 78.
 61.7
 65.1
 69.0
 73.1

 61.7
 65.1
 69.0
 73.1

 61.8
 65.2
 69.1
 73.3

 61.8
 65.2
 69.1
 73.1

 61.8
 65.3
 69.1
 73.1

 61.9
 65.3
 69.2
 73.1

 61.9
 65.3
 69.2
 73.1

 61.9
 65.3
 69.2
 73.1

 62.0
 65.3
 69.2
 73.1

 62.0
 65.4
 69.2
 73.1
 .0 73. 3 73 .065.469.373 5 69 . 169. 6 65. 1 65. 62. 61 53 In. 00

86.5 76.1 117.7 က ထဲထဲ 6 ø က္ ŋ 80 4 ŝ 6 ŝ 4 00 8 .7 130. .8 171. .5 161. .9|120. .0110. 9 99. .7127. .0107. 9 151. 0 157 8 147 97 18 3117.4126.9137 109.1 114.2 120.0 126.4 133.4 141 63 6 3 4 00 01 80 80 9.6 116.6 124.6 124.5 1145.0 2.9 109.4 117.0 125.8 135.8 6.2 102.4 109.3 117.4 126.9 9.4 95.0 101.4 109.1 117.7 .8 113. .5 104. 79. .5 108. . 89. 10.11 10.72 131.8 138.2 145.4 153.3 161. 9.53 10.11 124.5 130.4 137.0 144.5 152. 8.93 9.46 116.8 122.4 128.3 135.3 142. .4117.3123. 20 63 8 73 2 0 2 7 1 5 9 0142. .4 100. 4 107. 8 8 74 65 8 89. 62 69 4 93.4 85.4 77.3 ŝ Π. S 8 80 9 8101.3106.1111.4 8 93.3 97.6102.4 8 85.3 89.3 93.5 8 85.3 89.3 93.5 1 77.1 80.8 84.8 71132. 75. 68 69 8 5 .5 95.0 87.5 80.1 72.5 64.8 9 5. 3 46 116.0 123. 56 22 33 96.2 89.4 82.2 82.3 68.1 60.9 9 0 9 8 69. 9.86 109. 53 8 8.83] 8.18] 9.248.62 7.99 6.88 .53 5.55 .36 F 6.07 5.4176 6.21 5 62 10. 4. 1 . ق 1 6.19 8.49 7.93 7.36 5.59 7.73 7.12 8 4.99 4.39 8.34 6.50 5.87 5.2461 б. 6 4 8.38 7.34 6.82 6.28 5.73 5.19 58 9.03 8.46 7.90 7.33 6.74 6.16 5.57 4.97 89 2 5 3 ã 4 4. 6. 7.31 6.83 6.34 6.96 6.40 5.83 8.25 7.79 5.84 4.83 4.32 9.09 8.56 56 8.02 7.50 5.30 4.74 34 79 <u>ب</u> 3 -7.29 6.84 6.40 5.945.47 5.01 8.15 7.65 7.14 6.63 6.10 5.58 4.53 4.05 7.73 8.64 05 56 525 <u>ب</u> . . 4. က် 6.43 5.14 7.30 85 6.01 5.59 33 82 33 28 78 8 83 25 7 8 35 24 31 79 .0 3 5 4 4 3 ø 6 9 4 ŝ ŝ 4 က် 74.080.5 74.080.5 74.080.5 4 80.4 80.3 2 74.080.3 2 ō. 5 82.4 3 3 3 2 З 3 3.6 (68.4 74.0 80.5 3.7 (68.5 74.0 80.5 3.7 (68.5 74.0 80.4 3.8 (68.6 74.0 80.4 3.8 (68.6 74.0 80.4 8. 82. 8 80. 8 8 8 22 8 2 2 0 8 74.0 74.0 00 0 ø 00 00 ø. ø. 5 2 74 74 1 1 1 7 1 7 7 7 7 70.073.77 70.073.77 70.073.77 .868.6 968.6 973.7 0 68.7 2 7 2 7 .906. 973. 5|68 068 33. 73 6 70.1 3 3 .5<mark>63</mark>. 6 63. 8 63. 9 63. 63. 2 69. 69. 2. 69 64 6 ò ò. 20.00 .6 66.6 6 0 ~ ~ 0 00 0 .5|66. 0 59 1 59 2 59 4 59 .560. 666. 766 8 66. 866 59 59 8 8 8 0 9 6 0 80 4 88888888 3 63 55 2 12 9 80 g œ

TABLES

ä	FICI	ENCY	ANN.	D AI	AOT	VAB]	9	ľen	SIO	N FO	r An	GLE	s Ŗr	VETED	THR	DUGH (ONE L	EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE	A RIG	S g	NNECT	Ion P	LATE	_
							Two	Ħ	oles	for	₽-inc	H H	livets	Ded	ucted	from	Conne	Two Holes for 4-inch Rivets Deducted from Connected Leg	ŝ					
			뎍			ŧĮ					$\left \right $		Ν		ŦFi									
			alingua Alingu	_	1	00		$\left \begin{array}{c} \Phi \\ \Theta \end{array} \right $					00	0000			Dia	Diameter of each hole =1 inch.	f each l	ole = 1	inch.			
			and and a second se	+		Э	ŏ						<u>-</u>				Alla	Allowable stress = 16,000 lb. per sq.in.	itress =	16,000 1	b. per e	Ë		
		11		-	-	l₫Ŧ	8	1)T					P		ה									
	Size of Angle.	je e	<u>н</u>	Efficiency in Per Cent for Values of $\frac{x}{L}$.	acy in	o Pel	Per Cent of $\frac{x}{L}$.	nt fo	r Va	lues	କ୍ <u>ର</u>	luiva	lent A fo	r Valu	Area in Sq.in. c for Values of $\frac{x}{L}$.	Equivalent Area in Sq.in. of One Angle for Values of $rac{x}{L}.$	Angle	All Pour	owable ads for	Allowable Tension in Thousands of Pounds for One Angle for Valves of $rac{x}{L}$	ı in The gle for	valves		
lı I	13				-	с с		<u> </u>		0 1 0 5				°	6		<u>بر</u>	6	-	ĉ	6		4	,
In.	In.	In.		2		4.0			r.	0.0			1.0	7.0			\$	2			9 .0	.	0.0	1
9	9	1	56	56.8 60.1 63.7 67.9 72.6 78.1	0.1(63.7	67	97	2.6	78.1	6.25		6.61	7.01	7.47	7.99		8.59 100.0 105.8 112.1 119.5 127.8 137.4	105.8	112.1	119.5	127.8	137.	4
		16	56	56.960.163.768.072.678.1	0.1	63.7	8	5	2.6	78.1		8	6.23	6.61	7.05	7.53			99.7	94.4 99.7 105.8 112.8 120.5 129.6	112.8	120.5	129.(9
		t- 40	57	57.060.263.868.072.678.0	0.2	83.8	8	6	2.6	78.0	5.55	55	5.86	6.21	6.62	7.06	7.59	88 88 88	93.8	93.8 99.4 105.9 113.0 121	105.9	113.0	121	4
		#	57	.160	0.3	63.6	89	17	2.7	78.0	57.1 60.3 63.9 68.1 72.7 78.0 5.19		5.48	5.81	6.19	6.61	7.09	83.0	8: .7		92.9 99.0 105.8 113.	105.8	113.	4
		0 14	57	57.2 60.4 64.0 68.1 72.7 78.0	0.4	64.(88	17	2.7	78.0	4.83		5.10	5.40	5.75	6.14	6.58	77.3	81.6		86.4 92.0 98.2 105.3	98.2	105.	ŝ
		#	57	57.3 60.5 64.1 68.2 72.7 78.0	0.5	64.1	88	21	2.7	78.0	4.46	<u>46</u>	4.71	4.99	5.31	5.66	6.07	71.3	75.3	79.8		85.0 90.6	97.1	
		usies	57	57.4 60.6 64.2 68.2 72.8 78.0	0.6	64.5	368	21	2.8	78.0	4.08		4.31	4.56	4.85	5.18	5.55	65.3	68.9	72.9		82.9	88.88	80
		쌲	57	57.5 60.7 64.3 68.3 72.8 78.0	0.7	64.5	89	37	2.8	78.0	3.70		3.90	4.13	4.39	4.68	5.01	59.2	62.4	66.1	70.2	74.9	80.	-
		-40	57	57.760.864.468.472.978.0	0.8	64.4	89	47	2.9	78.0	3.32	32	3.50	3.70	3.93	4.19	4.48	53.1		59.2	62.9	67.0	11.	~
		*	57	.86	6.0	64.5	89	47	2.9	78.0	57.8 60.964.568.472.978.0 2.92	82	3.08	3.26	3.46	3.69	3.95	46.7	49.3	52.1	55.3	59.0	83	2
			57	.96.	1.0	64.(80	51	3.0	78.0	2.	22	57.9 61.064.668.573.078.0 2.52 2.66	2.82	2.99	3.18	3.40	40.3	42.5	45.1	47.8	50.9	54.4	4

TABLE IV—Continued

52

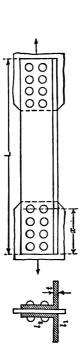
TABLES

					_			_					-				
2.6	5	00	2		<u>.</u>	-		0	-	80		?		ۍ ۲	80		<u>.</u>
95.7 89.6	88	76.	70.2	63.7	56.9	50.1	43.3	55.0	50.1	44.8	39.5	34.	28.6	41.3	36.8	32.1	27.3
90.7 84 8	68.1 71.3 74.9 78.9	72.6					F			4	35.7 37.4	32.3	27.2	3	33.6 35.0	30.7	
0.4	i œ	<u>c</u> i	9	60.3	54.0	47.7	-	52.0	~	42.4	5	3	5	39.3	5	Ö.	26.1
o x) [~	~	9	9	ŝ	4	4		4	4	က	က	2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	n		
85.9 80.5	.9	69.3	63.5 • 66.7	57.4	51.5	4.	39.2	49.3	6.	40.3	2	30.9	25.9	37.4	.6	4	24.9
38 2	7 (69	63	57	51	45	39	49	4	4	35	30	25	37	33	33	24
<u> 00 00</u>	0 00	6	60.5	54.9	49.1	43.3	4	47.0	42.7 44.9 47.3	38.4	33.9	29.4	00	00	-	28.1 29.4	23.8
81.8 76.8	5 -	5	0	4	6	3	37.4			ò	~	б	24.8	35.8	N	ø	~~·
00 1	· . ト	63.0 65.9	9	ŝ	4	4	က	4	4	ŝ	က	2	2			\$	2
73.3		0.	57.9	52.5	47.0	41.4	35.2	44 8	40.8	36.6	32.3	28.0	23.5	34.4	2	26.5	22.9
20 6	88	33	22	22	47	1	35	4	9	36	32	8	23	34	8	28	22
74.7	_			01	-	39.7	~		-		-	-					<u></u>
74.7	65.1	60.1	55.3	50.2	44.9	5	34.2	42.9	39.0	35.0	30.9	26.9	22.5	32.9		25.9	21.9
															čί	ର୍ଷ	2
5.98	5.20	4.80	4.39	3.98	3.56	3.13	2.71	3 44	3.13	8	2.47	2.14	1.79	80	2.30	Ы	1.71
20.10	5.0	₹.	4	3.6		8	2	~		~	2	2	-	2	2	<u>م</u>	1
												~	0		-	~	~
5.67	4.93	4.54	4.17	3.77	ૡૻ	2.98	2.57	3 25	2.96	2.65	2.34	2.02	1.70	4	2.19	6	1.63
														2	2	-	
5.37	4.68	4.33	3.97	3.59	23	*	2.45	3.08	2.81	22	2.23	1.93	1.62	2	2.10	1.84	1.56
10.10		-		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~	~	2		3	~	2	1		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~	<u> </u>	<u> </u>
5.11 4.80	4.46	4.12	3.78	3.43	3.07	2.71	2.34	2.94	6	2.40	2.12	1.84	1.55	2.24	2.01	1.76	1.49
10 4	4					3	3	2		2		-		2	0	-	
4.88 4.58	4.26	3.94	3.62	3.28	2.94	2.59	2.20	2,80	52	2.29	2.02	1.75	1.47	2.15	1.92	1.66	1.43
्य न			 	8	2	~	2	2	0	2	2	1	-	~	-	1	Ĩ.
								~				00				01	
4.67 4.38	88	2	₹.	÷.	õ	₹.	÷.	2,68	4	Ĩ.	õ	1.68	1.41	2.06	ဆိ	6	1.37
4 4	4	က	က	က	3	2	2	3	2	2	-	-	T	2	-	-	-
00	0	0	0	0	0	0	0	6	Ö	0	0	Ξ.	-	80	9	5	e.
12	22	75	75	25	75	75	75	69	2	2	2	2	20	്ജ	69	2	7
00	0	0	-	-	2	3	ŝ		2	3	3	4	5	2	3	2	0
25	12	E.	F	T.	F	E.	R	39	98	80	80	80.	80	35.	96	57.	ŝ
6 4	20	9	1	1	80	6	0	1	- œ	0	Ē	3	3	5	4	3	õ
2 64.1 67.3 71.0 75.0 3 64.2 67.4 71.0 75.0	5	564.467.671.075.0 3.76	7,64.5,67.7,71.1,75.0 3.46	5	2	867.971.275.0 2.48	968.071.375.0 2.14	23	2	23	.360.163.166.370.0 1.93	<u>.</u>	.660.463.366.570.1	23	23	7	<u>.</u>
100	3	4	5	00	2	8	6		8	8	Ť	3	4		90	5	3
* 3	. .	4	*	*	7	*	¥.	0	6	S.	ġ.	ŝ.	ġ.	.00	ò.	Ы.	22
2 20	4	5	7	8	8	6	ő		0	7	3	5	30	<u></u>	=	96	4
	. .	Ξ.	E.	Ξ.	Ξ.	Ξ.	3	ġ	1	5	5	5	5	5	ø	ø	6
.5 61. 6 61	100	8	-9	16	26	36	46	45	5	1	.857.		=	05	70	5	5
58.561.264.167.371.075.0 4.67	58.761.464.367.571.075.0 4.07	58.861.	59.061.	59.161.864.667.771.175.0 3.14	59.261.964.767.871.275.0 2.81	59.361.964.	59.4 62.0 64.	54 4 56 9 59 7 62 7 66 1 69 9	54.557.059.862.866.270.0 2.44 2.55	54.757.260.063.066.370.0 2.19	5	55.057.560.363.266.470.1	55.1 57.	55.057.359.862.565.568.8	55.758.160.663.466.369.6 1.84	56.558.961.564.267.270.51.62	57.259.762.365.068.071.3
_										_						_	
240 A	0 M 014	1	vojeo	201	-104	16	enjeo	NO IN	, 여드	-101	18	en 40	2 <u>6</u>	-40	, +¦#		16
9								'n						J.C			
4			•					31	•					3			

TABLE IV—Continued

EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE

Two Holes for ³/₄-inch Rivets Deducted from Connected Leg



Diameter of each hole = { inch. Allowable stress = 16,000 lb. per **ag.in**.

	(m o 4 o 4 o 0 m 4
Allowable Tension in Thousands of Pounds for One angle for Values of $\frac{x}{L}$.	$\frac{t}{\mathrm{In}} 0.0 0.1 0.2 0.3 0.4 0.5 0.0 0.1 0.2 0.3 0.4 0.5 0.0 0.1 0.2 0.3 0.4 0.5$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$
anda aes o	4	0.07.091
Valu	Ö	193 1170 1170 1181 1170 1181 1111 1111 1111
L I	0.3	21.0 28.0 29.5 26.9 26.9 26.9 26.9 26.9 26.9 26.9 26.9
ion i ngle		011100
Allowable Tension in Thousands of allowable Tension in Thousands of Junces of $\frac{x}{l}$	0.2	88.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0
for O	1	<u>8 - 5 0 2 3 4 3 8</u>
awo nds	ö	160 151 151 151 151 152 132 132 132 103 103 103 103 83
All Pou	0.	1.8 3.9 6.9 8.2 8.2 8.2
	0	7 8 9 11 12 12 12 12 12 12 12 12 12 12 12 12
gle	0.5	8.4.0.0.0.4.0.0
iA e		52566657253
Equivalent Area in Sq.in. for One Angle for Values of $\frac{x}{L}$.	0.4	6.5 9.10 6.5 8.5 9.10 9.10 9.10 9.10 9.10 9.10 10 10 10 10 10 10 10 10 10 10 10 10 1
Area in Sq.in. for for Values of $\frac{x}{L}$.	ŝ	84 54 93 93 93 93 93 93 93 93 93 93 93 93 93
Sq.i	Ö	1110.09.07.0.00
a in Val	0.2	0.63 0.63 0.63 0.63 0.63 0.63 0.63 0.63
for		052007000000000000000000000000000000000
alent	0.1	0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
tuivi	•	9491 9491 931 931 931 931
ĕ	o.	0.8.8.7.6.6.4.4
ues	0.5	6.4 6.2 5.9 5.9 5.9 5.9
Val	4	<u>v</u> .v.4.4.6.6.6.6.6
t for	<u>.</u>	<u> </u>
rin Cen	0.3	75.3 75.3 75.3 75.3 75.3 75.3 75.3
Efficiency in Per Cent for Values of $\frac{x}{L}$.	. 3	<u></u>
v in	0	070070070070
ienc	0.1	67. 67. 67. 67. 67. 67.
Effic	0.0	33.33 33.33 33.54 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.57 33.53 33.53 53.55 53.555
		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
e.	1 In	
	l ₁ l ₂ l ₂ In. In.	φ
Size of Angle.		

ł,

54

TABLES

	8.20.4.1.0.1.4.0.1.
$ \begin{array}{c} [36.8] [147.2] [159.0] [173.3] \\ [28.9] [138.7] [149.9] [163.0] \\ [20.9] [130.1] [140.5] [152.8] \\ [12.9] [12.9] [121.4] [131.2] [142.5] \\ [142.9] [123.8] [12.0] [121.4] \\ [123.9] [123.8] [12.0] [121.4] \\ [123.6] [123.8] [12.0] [121.4] \\ [123.6] [123.8] [12.0] [121.4] \\ [123.6] [123.8] [12.0] [121.4] \\ [123.6] [123.8] [12.0] [121.4] \\ [123.6] [123.8] [12.0] [121.4] \\ [123.6] [123.8] [123.6] \\ [123.6] [123.8] [123.6] \\ [123.6] [123.8] [123.6] \\ [123.6] [123.8] \\ [123.6] [123.6] \\ [123.6] [123.8] \\ [123.6] [123.6] \\ [123.6] \\ [123.6] \\ [123.6] [123.6] \\ [123.6] \\ [123.6] [123.6] \\ [1$	136.0 142.4 149.7 157.6 166.4 176.8 128.1 134.2 141.1 148.5 156.8 166.5 128.1 134.2 141.1 148.5 156.8 166.5 120.3 125.7 132.3 139.2 146.9 156.0 120.3 117.6 132.3 139.2 145.4 9 156.0 141.1 148.5 150.0 137.3 145.4 9 156.0 145.4 145.4 104.1 100.5 1014.5 1014.5 127.2 134.7 9 9 134.7 9 145.4 9 154.0 9 154.0 9 154.0 9 174.0 113.1 124.0 113.1 124.0 9 154.0 9 147.0 113.1 124.0 9 147.0 101.1 113.1 124.0 113.1 124.0 134.7 134.7 140.7 113.1 124.0 134.7 129.3 129.3 134.7 140.7 113.1 124.0 127.0 140.7 113.1 124.0 127.0
001111100000000000000000000000000000000	8 4 8 0 1 2 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
[59.0] [40.5] [40.5] [12.0] [1	66.4 56.8 27.3 27.2 27.2 27.2 27.2 27.2 27.2 27.2
2159. 21	
[47.2] [30.1] [30.1] [21.4] [21.4] [03.8] [0	[57.6] [48.5] [39.2] [39.2] [39.2] [30.0] [3
8 147. 9 138. 9 130. 9 121. 9 121. 5 94. 5 76. 85. 76. 67.	11 11 11 13 15 11 15 16 17 17 17 17 17 19 19 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	[49.7] [41.1] [32.3] [3
120.0 127.8 138. 113.3 120.8 123.8 106.4 113.3 120.8 99.5 105.7 112.9 92.3 92.5 105.7 112.8 92.4 71.12 82.104 96.5 77.7 82.7 89.6 96.7 77.7 82.7 88.7 86.9 71.1 65.3 66.9 71. 65.9 65.9 67.9	141 1114 1112 1123 1123 1123 114 1114 11
127.81 112.081 113.321 105.71 99.4 82.7 74.9 66.9 66.9 58.9	136.0 142.4 128.1 134.2 120.3 125.7 112.3 117.6 112.3 117.6 112.3 117.6 113.3 117.6 110.4 1000.1 96.0 100.5 70.3 33.0 70.9 74.2 62.4 65.3
22 20 20 20 20 20 20 20 20 20 20 20 20 2	25 25 34 50 00 00 00 00 00 00 00 00 00 00 00 00
0.04.7.1.0.4.00	<u>4 9 3 7 0 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</u>
120.01 106.41 106.41 106.41 106.41 20.4 20.4 20.4 20.4 25.3	136.0 128.1 128.1 120.3 96.0 96.1 96.1 70.9 62.4 62.4
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
10.83 10.19 9.55 8.91 6.94 6.94 6.27 4.92	11.05 9.75 9.75 9.09 9.09 9.09 9.09 6.40 6.40 5.70 5.01
$\begin{array}{c} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$	111 10 10 10 10 10 10 10 10 10 10 10 10
9.99.94 9.37 9.37 9.37 9.37 1.00 6.40 6.40 6.40 6.40 6.78 4.54	0.40] 0.40] 0.80] 0.18 0.18 0.85 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18
4 55 56 7 7 88 99.	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
	<u>00 12 42 42 53 13 70 88 51</u>
9.20 8.67 8.13 8.13 7.55 6.49 6.49 5.93 5.37 4.79 4.21	9.85 9.28 8.70 8.70 8.13 6.34 6.34 5.74 5.74 5.74 5.74
<u>84000000000000000000000000000000000000</u>	
8.55 8.55 7.06 6.56 6.04 8.47 3.93 3.93	9.36 8.82 8.27 7.72 6.60 6.03 6.03 6.03 4.28 4.28
7.99 6.61 6.61 6.14 5.65 5.65 5.17 5.17 5.17 3.68 3.68	8.39 8.39 6.28 6.28 7.7 8.39 4.08 4.08 4.08 4.08
7.99 7.65 7.08 6.61 6.14 6.14 5.65 5.17 5.17 5.17 5.17 5.17 5.17 5.17 5.1	
7.50 6.65 6.65 7.72 5.77 5.77 5.77 5.32 3.46 3.46	8.50 8.51 8.01 7.52 6.51 6.51 8.43 3.90 3.90
7.50 6.65 6.22 5.77 3.32 3.46 3.46	8.50 8.01 7.52 6.51 6.00 6.00 8.48 3.48 3.90 3.90
00000000000	22200478000
8888888888888888	085.0 085.0 084.9 084.7 084.7 084.6 084.6 084.6 084.6 084.6
<u>ີ </u>	00000000000
76 76 76 76 76 76 76 76 76	$\underbrace{\mathbf{x}}_{\mathbf{x}} \underbrace{\mathbf{x}}_{\mathbf{x}} \underbrace{\mathbf{x}} \underbrace{\mathbf{x}} \underbrace{\mathbf{x}} \underbrace{\mathbf{x}} \underbrace{\mathbf{x}} \underbrace{\mathbf{x}} \underbrace$
8 70.8 76.5 83.3 7.50 8 70.8 76.5 83.2 7.08 9 70.8 76.5 83.2 7.08 9 70.8 76.5 83.2 6.65 9 70.8 76.5 83.1 6.22 9 70.9 76.5 83.1 6.22 0 70.9 76.5 83.1 5.77 0 70.9 76.5 83.1 5.77 0 70.9 76.5 83.3 5.37 1 70.6 5.83.0 4.86 1 70 76.5 5.33 4.46 1 70 76.5 5.33 4.46 1 70 5 5 3 4.36 2 71 0 76.5 5 3 4 2 7 7 5 5 3 4	0 75.880.085.0 8.50 0 75.880.085.0 8.01 0 75.880.084.9 7.52 0 7.580.084.9 7.65 0 7.580.084.7 6.51 1 7.580.084.7 6.51 1 7.580.084.7 6.00 1 7.580.084.7 6.00 1 7.580.084.7 6.00 1 7.580.084.6 5.48 1 7.5980.084.6 5.48 1 7.5980.084.6 5.43 2 7.5980.084.6 5.43 2 7.5980.084.6 5.43 2 7.5980.084.6 5.43 2 7.5980.084.6 5.43 2 75.980.084.6 5.43
2222222111	722222222
00000000000000000000000000000000000000	2.
5655. 5655. 5655. 5655. 5665. 5666. 5666. 5666.	572 572 572 572 872 872
336 336 336 336 336 336 336 336 336 336	44666666666 000000000000000000000000000
$ \begin{array}{c} 57.7 \left[61.5 \left[55.8 \right] 70.8 \left[76.5 \right] 83.3 \right] 7.50 \right] 7.99 \\ 57.8 \left[61.6 \left[55.8 \right] 70.8 \left[76.5 \right] 83.2 \right] 7.50 \right] 7.55 \\ 57.9 \left[61.7 \left[55.9 \right] 70.8 \left[76.5 \right] 83.2 \right] 7.08 \right] 7.55 \\ 58.0 \left[61.7 \left[55.9 \right] 70.8 \left[76.5 \right] 83.2 \right] 6.65 \right] 7.08 \\ 58.0 \left[61.8 \left[6.0 \right] 70.9 \left[76.5 \right] 83.1 \right] 6.22 \right] 6.01 \\ 58.1 \left[61.9 \left[6.0 \right] 70.9 \left[76.5 \right] 83.1 \right] 5.77 \right] 6.14 \\ 58.1 \left[61.9 \left[60.1 \right] 70.9 \left[76.5 \right] 83.0 \right] 5.32 \\ 58.1 \left[61.9 \left[60.1 \right] 70.9 \left[76.5 \right] 83.0 \right] 5.32 \\ 58.2 \left[61.9 \left[60.1 \right] 70.9 \left[76.5 \right] 83.0 \right] 4.40 \\ 4.66 \\ 58.2 \left[61.9 \left[66.1 \right] 71.0 \left[76.5 \right] 83.0 \right] 3.93 \\ 4.18 \\ 58.3 \left[52.0 \left[66.2 \right] 71.0 \left[76.5 \right] 82.9 \right] 3.93 \\ 3.68 \\ 58.3 \left[52.0 \left[66.2 \right] 71.0 \left[76.5 \right] 82.9 \right] 3.93 \\ 3.68 \\ 58.3 \left[52.0 \left[66.2 \right] 71.0 \left[76.5 \right] 82.9 \right] 3.93 \\ 3.68 \\ 58.3 \left[53.2 \right] 66.2 \\ 71.0 \\ 76.5 \\ 58.2 \\ 68.2 \\ 74.6 \\ 7$	
9	00
00	60

TABLE IV—Continued

EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE

Two Holes for ³-inch Rivets Deducted from Connected Leg

		0.5	126.2 117.9 100.8 33.2 83.2 65.4 56.3									
é	es of -		117.7 126.2 100.1 100.4 94.1 100.8 94.1 100.8 94.1 100.8 94.1 100.8 94.1 100.8 94.1 100.8 94.1 100.8 94.1 100.8 85.9 92.0 77.6 83.2 69.4 74.4 61.1 65.4 61.1 65.4 62.6 56.3									
ù.pe 1	housa Valu	0.4	1 117 5 109 5 109 5 85 8 77 8 77 8 77 6 1 69 4 61 69 1 69 1 69									
inch. Ib. pe	in T le for	0.3	110.11 102.91 95.51 95.5 88.0 80.5 83.0 80.5 65.1 65.1									
Diameter of each hole = { inch. Allowable stress = 16,000 lb. per sq.in.	Allowable Tension in Thousands of Pounds for One Angle for Values of <u>-</u>	0.2	92.3 97.4 103.3 110.1 117.7 126.2 86.4 91.2 96.6 102.9 109.9 117.9 86.4 91.2 96.6 102.9 109.9 117.9 80.3 84.8 89.7 95.5 102.1 109.4 74.1 78.2 82.7 88.0 94.1 100.8 67.8 71.5 75.7 80.5 85.9 92.0 61.3 64.6 68.5 72.8 77.6 83.2 54.9 57.9 61.3 65.1 69.4 74.4 48.5 51.0 54.1 57.4 61.1 65.4 41.7 44.1 46.7 49.4 52.6 56.3									
f each itress =	wable Is for (0.1	97.4 91.2 91.2 91.2 78.8 78.8 771.5 771.5 57.9 51.0 51.0									
meter o wable r	Allo Pound	0.0										
Dia	ngle	0.5	7.89 6.84 6.30 5.75 5.20 4.65 3.52 3.52									
	Equivalent Area in Sq.in. for One Angle for Values of $rac{x}{L}$	0.4	7.36 6.87 5.38 5.37 4.34 4.34 3.20 3.20									
		0.3	6.88 6.43 5.97 5.03 5.03 4.07 3.59 3.09									
	rea in S or Value	0.2	6.46 6.04 5.61 5.17 4.73 3.83 3.38 3.38 3.38 3.38									
	alent A fe	0.1	6.09 5.70 5.30 4.47 4.04 3.62 3.19 2.76									
	Equiv	0.0	5.77 5.40 5.40 4.24 3.83 3.83 3.83 3.83 3.83 3.63									
	alues	0.4 0.5	$\begin{array}{c} 59.3 \left(62.6 \left(66.4 \\ 70.7 \\ 756.6 \\ 81.1 \right) \\ 59.4 \left(62.7 \left(66.4 \\ 70.7 \\ 756.6 \\ 81.1 \right) \\ 5562.8 \left(66.5 \\ 70.7 \\ 756.6 \\ 81.0 \right) \\ 5.40 \\ 5.00 \\ 5.$									
TOONT	for V	0.4	75.6 75.6 75.6 75.5 75.5 75.5 75.5 75.5									
	Efficiency in Per Cent for Values of $\frac{x}{L}$.	(ey in Per Cent of $\frac{x}{L}$.	icy in Per Cent of $\frac{x}{L}$.	acy in Per Cent of $\frac{x}{L}$.	0.0 0.1 0.2 0.3	7.07 7.07 7.07 7.08 7.08 7.08 8.07 8.07						
					acy in Per of	ncy in Per of	icy in Per of -	icy in Per of -	icy in Per of $\frac{1}{2}$	toy in Per of $\frac{2}{1}$	0.2	6.6 6.5 6.6 6.6 6.7 7 7 6.9 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
+											ıcy ir	icy ir
		0	963 85 65 65 65 65 65 65 65 65 65 65 65 65 65									
	<u>8</u>											
	s of zle.	t In.										
	Size of Angle.	ln.	9									
		h In.	co									

TABLES

đ

ľ

V 0 1 0 0 8 4 1 V	58.2 52.9 47.3 41.7 36.1 30.2	43.7 39.2 33.4 28.0
103.7 96.9 90.1 82.9 82.9 68.8 61.4 61.4 54.1	58. 52. 52. 52. 53. 30.	8 8 8 8 8
	<u>0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</u>	4 00 00 00
96.5 96.5 90.4 84.0 77.4 77.9 64.1 57.4 43.7 50.5 50.5	55.0 50.1 33.5 33.5 28.8 28.8	41.6 36.8 31.8 26.7 26.7
90.2 84.5 72.5 66.1 60.1 472.3 53.7 53.7 40.9	ະ ເມີດ ເມີດ.	00 01 4 00
6 7 8 6 6 6 7 3 8 6 6 6 7 3 8 6 7 9 6 6 7 7 8 6 7 7 8 6 7 7 8 7 9 6 7 7 8 7 9 7 7 8 7 9 7 7 8 7 9 7 7 8 7 9 7 7 8 7 7 7 7 7 7 7 7 7 7	52.3 47.5 42.5 37.6 32.5 28.3 28.3	39.8 35.2 30.4 25.6
007041730	6 173801	
84.8 773.7 78.1 68.1 662.4 56.6 50.7 50.7 38.5	49.6 45.1 40.5 35.8 31.0 26.1	38.1 33.6 29.1 24.5
80.0 74.9 69.7 64.3 55.0 64.3 55.0 64.3 53.6 48.0 36.5 36.5	<u> </u>	ບ່ວຍອີບ
8 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	4488282	36.5 32.3 27.8 23.5
75.7 71.0 66.1 66.1 66.3 55.8 55.8 55.8 40.0 34.7 34.7	45 .3 36.9 23.6 23.8 23.8	35.0 31.0 26.9 22.6
6.48 6.66 6.06 6.06 7.13 4.75 3.84 2.92 2.92	3.64 3.31 2.96 2.26 1.59	2.73 2.45 2.09 1.75
10 m m + + m m m	- 10 10 10 00	N N N H
6.03 5.65 5.25 5.25 4.48 4.84 4.84 3.3.59 3.3.59 2.73 2.73	3.44 3.13 2.80 2.47 1.80	2.60 2.30 1.67 1.67
5.64 5.28 4.91 4.53 3.76 3.76 2.96 2.56	3.27 2.97 2.66 2.66 2.35 2.35 1.71	2.49 2.20 1.90 1.60
2233344460	- 6 6 6 6	
5.30 5.30 5.30 3.54 5.61 3.354 5.41 5.41 5.41 5.41 5.41 5.41 5.41 5.	3.10 2.82 2.53 2.55 1.94 1.94	2.38 2.10 1.82 1.53
5.00 4.68 4.68 3.35 3.35 2.264	2.97 2.70 2.42 2.14 2.14 1.85 1.85	28 02 47 47
v 4 4 4 0 0 0 0 0 0	2.97 2.70 2.42 2.14 1.85 1.85	2.28 2.02 1.74 1.47
73 44 113 81 12 12 12 12 12 12 12 12 12 12 12 12 12		
4.73 4.44 4.14 3.81 3.81 3.17 2.50 2.58 2.17 2.17	2.83 2.58 2.58 2.31 2.04 1.77	2.19 1.94 1.68 1.41
8 0 0 0 0 8 8	000000	<u> </u>
681. 681. 682. 680. 680.	.074.0 .074.0 .174.0 .174.0 .174.0 .174.0 .274.0	.472. .573. .673. .773.
0 0 0 0 0 0 0 0	0.0.1.1.1.0.0	4.0.7
	470. 570. 670. 870. 870.	. 3 69 . 4 69 . 5 69 . 6 69
470.775 470.775 570.875 570.875 570.875 670.875 670.875 670.875 7770.975 870.975 870.975	.166.470.074.0 266.470.074.0 366.570.174.0 366.570.174.0 466.770.174.0 566.870.174.0	.466.369 .566.469 .666.569 .766.669
470 570 670 670 870 870 870 870	1000 100 1000 1	.466. .566. .666. .766.
44000000000	004905	7 63. 4 66. 3 69. 4 72 9 63. 5 66. 4 69. 5 73 0 63. 6 66. 5 69. 6 73 2 63. 7 66. 6 69. 7 73
5511009846	0 4 D 0 L 00	
362 662 663 7663 863 963 963		.360 .560 .661 .861
 59.3 59.3 59.4 59.5 59.6 59.6 59.9 63 59.9 63 60.0 63 	57.6 60 57.7 60 57.8 60 57.9 60 58.0 60 58.1 60	
59.3 62 59.4 62 59.5 62 59.6 63 59.6 63 59.6 63 59.7 63 59.8 63 59.9 63 59.9 63 59.9 63 59.9 63 59.9 63	57 57 57 58 58 58	00 00 00 20 00 00
	¹ ²² ∞,∞ ¹ ² →, ¹ ²⁰ ∞,∞	
o	с,	• Cr
4	3	က

.

TABLE IV-Concluded

EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE

Two Holes for §-inch Rivets Deducted from Connected Leg

Diameter of each hole - } inch.

		م	2.4.6	1.1355
	5 5	0	12 13	01 02 08 08
Ė	Allowable Tension in Thousands of Pounds for One Angle for Values of $\frac{x}{L}$	0.4	126.7 114.2 102.1	80.3 85.3 91.2 97.9 105.6 114.5 72.6 77.3 82.5 88.5 95.4 103.5 64.9 69.1 73.7 79.0 85.1 92.3 67.1 60.6 64.8 69.4 74.7 81.1
er aq.i	in Tho e for V	0.3	18.9 07.5 96.0	97.9 88.5 79.0
Allowable stress = 16,000 lb. per sq.in.	nsion i e Angle	.2	2.01 1.31 0.4	4 3 2 7
6,00	0 Te	0	112	0 0 0 0
cas = 1	owable ids for	0.1	105.7 95.4 85.4	85.3 77.3 69.1
ole str	Alle Poun	0.0	00.3 90.7 81.1	80.3 72.6 64.9 57.1
wa			20 17 10 20 17 10	9440
Alk	Angle	0.5	8.8 9.7 6.8	7.1 6.4 5.7
	Equivalent Area in Sq.in. for One Angle for Values of $\frac{x}{L}$.	0.4 0.5 0.0 0.1 0.2 0.3 0.4 0.5	# 65.3 68.8 77.3 82.4 88.2 6.27 6.61 7.00 7.43 7.92 8.48 100.3 105.7 112.0 118.9 126.7 135.7 1 65.3 65.3 6.72 7.14 7.65 90.7 95.5 101.3 107.5 114.2 2122.4 1 65.4 68.9 72.3 5.34 5.65 6.00 6.38 6.83 81.1 85.4 90.4 96.0 102.1 109.3 1 65.4 69.0 6.38 6.38 6.83 81.1 85.4 90.4 96.0 102.1 109.3	# 60.0 063.8 68.2 73.2 78.9 85.7 5.02 5.33 5.70 6.12 6.60 7.16 80.3 85.3 91.2 97.9 105.6 114.5 1 60.163.9 68.2 73.2 78.9 85.6 4.54 4.83 5.16 5.53 5.96 6.47 72.6 77.3 82.5 85.5 95.4 103.5 1 60.164.068.3 73.278.8 85.5 4.06 4.32 4.61 5.33 5.77 64.9 69.1 73.7 79.0 85.1 92.3 2 60.264.068.3 73.2 78.8 85.5 3.770 4.06 5.32 5.77 64.9 69.1 73.7 79.0 85.1 92.3 4 60.264.068.3 773.278.8 855.5 3.770 4.05 5.07 5.71 64.9 69.1 73.7 79.0 82.1 92.3 5 60.264.068.3 773.2778.8 855.5 3.770
	in. for $\frac{x}{L}$.	0.3	7.43 6.72 6.00	6.12 5.53 4.94 4.34
	Area in Sq.in. fo for Values of $\frac{x}{L}$.	.2	. 65	. 70 16 16
5111	Area		2.9.2	10 10 4 4
	alent	0.1	6.6 5.9 5.3	5 4 4 6 8 8 8 7
	Equiv	0.0 0.1 0.2 0.3 0.4 0.5 0.0 0.1 0.2 0.3	6.27 5.67 5.07	5.02 4.54 4.06 3.57
		10	115	2001
	alue	0.	88 88 88	25 25 25 25 25 25
	r Vi	.4	22.3	80 80 80 80 50 50 50 50
	t fc	0	8 8 8	5557
5]		0.3	111	73. 73.
	Per Cel of $\frac{x}{L}$.	.2	2.9	00 00 00 00 00 00
<u> </u>	к Ц	0	8 8 6	8888
•	enc)	0.1	8888	
	Efficiency in Per Cent for Values of $\frac{x}{L}$.	0.0	35.3 35.3 35.4	80.0 80.1 80.2
	.	t In.	200 algo algo	§ 60.063 868.273 278.985.7 5.02 5.33 5.70 6.12 6.60 7.16 80.3 85.3 91.2 97.9 105.6 114.5 1 60.163 968.273 278.985.6 4.54 4.83 5.16 5.53 5.96 6.47 72.6 77.3 82.5 85.4 103.5 1 60.164 068.373 278.885.5 4.06 4.32 4.61 4.94 5.32 5.77 64.9 69.1 73.7 79.0 85.1 92.3 1 60.264.068.373 278.885.5 3.67 3.79 4.05 4.34 4.67 5.07 67.1 60.6 64.4 73.7 79.0 85.1 92.3 1 60.264.068.377 278.885.5 3.57 3.79 4.05 4.34 4.67 5.07 57.1 60.6 64.4 7.7 81.1 92.3
ß	Size of Angle.	la In.	80	9
	-	lı In:	00	00

58

Ъ Т

.

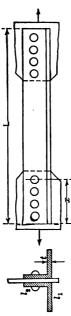
TABLES

٠.

8124	10 01 - 00 4	64010	4860-0	0 10 00 10
110.1 116.3 99.3 105.1 88.8 93.7 77.9 82.4	95.5 86.2 77.1 67.8 58.4	76.6 69.4 61.9 54.5 47.0	61.4 55.8 49.9 44.0 38.1 32.0	46.2 40.8 35.2 29.6
10.1 99.3 88.8 77.9	89.1 80.6 72.0 63.3 54.5	72.6 65.7 58.9 51.8 44.8	58.1 52.8 47.2 41.7 36.0 30.2	44.0 38.9 33.6 28.1
78.87			<u>0 - 0 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</u>	
99.2 104.5 110. 89.8 94.4 99. 80.2 84.1 88. 70.4 74.1 77.	83.5 75.7 67.7 59.5 59.5 51.2	69.1 62.7 56.0 49.3 42.5	55.0 50.1 39.7 33.2 28.8	41.9 37.1 32.1 27.0
99.21 89.8 80.2 70.4	30402	0 10 0 10	861110	1000
		65 59 40 40		40. 35. 25.
94.6 85.4 76.3 67.0	74.2 67.2 60.1 52.9 45.7	62.9 57.1 51.2 44.9 38.9	45.4 40.8 36.0 31.2 26.2	38.5 34.1 29.4 24.8
0 4 8 0		<u></u>		<i>10 10 00 00</i>
90.2 81.8 72.9 64.1	70.2 63.7 56.9 50.2 43.3	60.3 54.7 48.9 43.2 37.3	47.8 43.5 39.0 34.4 25.1	36.9 32.6 23.3 23.8
7.27 6.57 5.86 5.15	5.97 5.39 4.82 4.24 3.65	4.79 4.34 3.87 3.41 2.94	3.84 3.49 3.12 3.12 2.75 2.38 2.38 2.00	2.89 2.55 2.20 1.85
				1 10 10 1
6.88 6.21 5.55 4.87	5.57 5.04 4.50 3.96 3.41	4.54 4.11 3.68 3.24 2.80	3.63 3.30 3.30 2.95 2.61 1.89	2.75 2.43 2.10 1.76
6.53 5.90 5.26 4.63	5.22 4.73 4.23 3.72 3.20	4.32 3.92 3.50 3.08 2.66	3.44 3.13 3.13 2.80 2.14 2.14 1.80	2.62 2.32 1.69
6.20 5.61 5.01 4.40	4.91 4.44 3.98 3.50 3.02	4.12 3.74 3.35 2.95 2.54	3.28 2.98 2.67 2.67 2.36 2.04 1.71	2.51 2.22 1.92 1.61
				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5.91 5.34 4.77 4.19	4.64 4.20 3.76 3.31 2.86	3.93 3.57 3.20 2.81 2.43	$\begin{array}{c} 3.12\\ 2.84\\ 2.55\\ 2.55\\ 1.95\\ 1.64\end{array}$	$\begin{array}{c} 2.41 \\ 2.13 \\ 1.84 \\ 1.55 \end{array}$
	<u> </u>	553667	<u>70047007</u>	0445
5.64 5.11 4.56 4.01	4.39 3.98 3.56 3.14 2.71	3.7 3.0 2.3 3.0 2.3 3.0	$\begin{array}{c} 2.99\\ 2.72\\ 2.44\\ 1.86\\ 1.57\\ \end{array}$	2.31 2.04 1.77 1.49
0.0.0.8	0.0.0.0.0	66677	000000	0000
387.0 286.9 286.9 186.8	4 84 0 4 83 9 3 83 9 3 83 8	5 81 5 81 5 81 5 81	.878. 878. 978. 978. 978. 978.	577
.182. 082. 082.	78 78 78 78 78 78	1111	.073. 173. 173. 273. 273. 373.	.073.577.0 173.577.0 273.577.0 373.577.0
278.182.387.0 278.082.286.9 278.082.286.9 278.082.186.8	.173.478 .173.578 .273.578 .273.578 .373.578		0.0 0.1 0.2 0.2 0.3	0.0
278. 278. 278.	32777		.670. 670. 870. 970.	3777
774 774 774 774	2 69.1 73.4 78.4 84.0 3 69.1 73.5 78.4 84.0 4 69.2 73.5 78.3 83.9 4 69.2 73.5 78.3 83.9 5 69.3 73.5 78.3 83.8	<u>0200</u>	5 66. 6 70. 0 73. 8 78. 0 6 66. 6 70. 1 73. 8 78. 0 7 66. 7 70. 1 73. 8 78. 0 8 66. 8 70. 2 73. 9 78. 0 9 66. 9 70. 2 73. 9 78. 0 9 66. 9 70. 2 73. 9 78. 0 0 67. 0 70. 3 73. 9 78. 0	267.070.073.577.0 2.31 367.170.173.577.0 2.04 467.270.273.577.0 1.77 567.370.373.577.0 1.77
570.774.278.182.387.0 670.774.278.082.386.9 670.774.278.082.286.9 670.774.278.082.286.9 770.774.278.082.186.9	865.5 965.5 165.4 265.4	67 67 67 67 67		7 64 8 64 9 64 0 64
		64. 3 67. 170. 373. 8 77. 5 81. 7 3. 77 3. 64. 4 67. 2 70. 4 73. 8 77. 5 81. 7 3. 42 3. 64. 5 67. 3 70. 5 73. 8 77. 5 81. 6 3.06 3.06 3.06 3.07 5 877. 5 81. 6 3.06 3.06 3.06 3.07 5 13. 8 77. 5 81. 6 2.70 2. 64. 7 67. 4 70. 5 73. 8 77. 5 81. 6 2.33 2.	10 0 0 10	61.764 61.864 61.964 62.064
		<u></u>		
240 040 140 140	2010 H 10 H 10 000			
00	မ	9	с,	с)
9	9.	4	÷.	

⊳	
Э	
H	
7	
à	

One Hole for 4-inch Rivet Deducted from Connected Leg



Allowable stress = 16,000 lb. per sq.in.

Diameter of each hole =1 inch.

6 9.53|10.30|11.22|124.5|132.5|141.7|152.5|164.8|179.59.65 10.50 116.8 124.3 132.8 142.9 154.4 168.0 109.1 116.1 124.1 133.4 144.0 156.8 99.2 105.9 113.9 122.9 133.3 96.8 104.0 112.1 121.7 93.9101.3116.2 83.8 90.4 97.9 101.3 107.8 115.2 123.7 133.6 145.1 0.5 132.0 140.6 150.4 161.7 175.2 190. 85. Pounds for One Angle for Values of $\frac{x}{L}$. Allowable Tension in Thousands of 79.3 0.4 73.7 0.3 87.7 78.2 68.8 0.2 73.3 64.5 90.7 82.1 0.1 93.3 85.3 60.6 0.0 1 88. 9.80 6.12 9.07 8.33 6.86 9.40 10.11 10.95 11.92 7.61 5.37 0.5 Equivalent Area in Sq.in. of One Angle for Values of $\frac{x}{L}$. 9.00 8.35 7.68 6.33 5.65 4.96 7.01 0.4 8.93 7.73 7.12 6.50 5.87 5.248.34 4.61 0.3 8.86 8.30 6.626.05 5.48 7.76 7.20 4.89 4.300.2 5.13 4.03 7.77 7.26 6.74 6.20 5.67 4.58 29 28 0.1 ò ø. 6.82 .33 3.79 7.78 7.30 6.33 5.83 82 4.3125 0.0 ø ц, 63.9|67.9|72.5|77.7|83.6|90.6| 33.567.672.377.884.191.633.667.772.377.884.191.5**63**. 7 67. 8 72. 4 77. 8 84. 0 91. 3 63. 7 67. 8 72. 4 77. 8 83. 9 91. 1 63. 8 67. 8 72. 4 77. 8 83. 9 91. 0 63.8|67.9|72.5|77.7|83.7|90.8| .5|67.6|72.3|77.8|84.2|91.7 63.667.772.477.884.091.4 33.967.972.577.783.790.7 Efficiency in Per Cent for Values of $\frac{x}{L}$. 0.5 0.4 0.3 2 0 0.1 0.0 83 20 ±2 Ip. Size of Angle. Гı. ľ2 9 ľp. ø 7

60

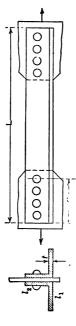
80000000000000000000000000000000000000	111.3 104.1 96.6 88.9 81.3 73.6 65.7 57.7 57.7 57.7	1113.6 98.5 90.7 82.9
48.3 3159.3 339.6 150.3 339.6 150.3 339.6 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 339.9 140.5 44.5 112.0 96.5 3102.1 96.5 3102.1 96.5 302.3 76.9 82.4 667.7 72.5 58.2 62.4	93.1 101.4 111.3 87.2 94.9 104.1 81.1 88.1 96.6 74.7 81.1 88.9 68.5 74.4 81.3 62.1 67.2 73.6 62.1 67.2 73.6 48.8 52.9 57.7 48.8 52.9 57.7	97.3 102.1 107.7 113.6 91.0 95.7 100.6 106.2 84.6 88.8 93.4 98.5 78.1 81.7 85.9 90.7 71.3 74.9 78.7 82.9
	101.4 94.9 88.1 81.1 74.4 67.2 60.1 52.9 45.6	102.1107.71 95.7100.61 88.893.4 81.785.9 74.978.7
138.71 130.71 130.71 122.51 114.41 116.21 100.21 100.21 100.21 100.21 100.21 100.21 100.21 100.21 100.21 10	93.11 87.2 81.1 74.7 68.5 68.5 42.3 42.3	102.11 95.71 88.8 81.7 74.9
		200010
9.96 116.1 122.7 130.2 138.7 148.3 159.3 9.38 109.4 115.7 122.7 130.7 139.6 150.1 8.78 102.9 108.5 115.2 130.7 139.6 150.1 8.78 102.9 108.5 115.2 122.7 130.9 140.5 8.20 96.1 101.4 107.7 114.4 122.2 131.2 7.60 89.3 94.2 100.7 113.4 121.6 7.60 89.3 94.2 100.6 113.4 121.6 6.38 75.3 79.5 84.1 89.2 95.3 102.1 6.38 75.3 79.5 84.1 89.4 95.3 102.1 6.38 75.3 79.5 84.1 89.2 92.3 5.15 60.9 64.3 63.6 67.7 72.5 3.90 46.2 48.8 53.3 54.7 58.2 62.4	86.1 86.1 74.9 69.3 63.5 57.4 557.4 39.2 39.2	97.31 91.0 84.6 78.1 71.3
1222.71 101.410000000000	00000010	92.8 86.9 80.6 88.1 74.4 68.1
1115 1115 1115 1115 1115 1115 1115 111	79. 74. 53. 53. 36. 36.	92 86 7 88 86 86 86 86 86 86 86 86 86 86 86 86
[16.1] [122.7] [09.4] [115.7] [002.9] [115.7] [002.9] [115.7] [002.9] [115.7] [002.9] [115.7] [002.9] [115.7] [002.9] [115.7] [002.9] [1101.4] [002.9] [1011.4] [003.9] [1011.4] [003.9] [11.8] [003.9] [11.8] [003.9] [11.8] [003.9] [11.8] [003.9] [11.8] [003.9] [11.8] [003.9] [11.8] [003.9] [11.8] [003.9] [11.8] [11.8] [11.8] [11.8] [11.8] [11.8] [11.8] [12.8] [11.8] [12.8] [12.8] [13.8] [13.8] [14.8] [15.8] [15.8] [15.8] [16.8] [17.8] [17.8] [17.8]	74.7 70.1 65.3 60.3 50.2 50.2 34.9 34.2	88.8 83.2 77.3 65.3 65.3
90 15 15 13 28 10 10 10 10 10 10 10 10 10 10 10 10 10		
		7.10 6.64 6.16 5.67 5.18
9.27 8.73 8.73 8.73 8.73 6.53 5.96 5.39 6.53 5.39 5.39 5.39 5.39 5.39 5.39 5.39 5	6.34 5.93 5.51 5.51 5.51 4.65 3.76 3.31 2.85 2.85	6.73 6.29 5.84 5.37 4.92
8.67 8.17 7.15 6.64 6.11 5.59 5.55 5.05 5.05 3.97 3.97 3.97	5.82 5.45 5.07 5.07 4.67 4.28 3.88 3.47 3.05 2.64	6.38 5.98 5.11 4.68
8.14 7.67 6.73 6.73 6.73 6.73 6.73 6.73 5.57 6.25 5.76 5.76 3.76 3.74 3.33 3.74 3.33	5.38 5.04 4.68 3.59 3.59 3.22 3.22 2.83 2.83 2.83	6.08 5.69 5.29 4.88 4.46
7.67 6.78 6.38 6.34 6.34 78 6.34 78 6.34 78 6.34 32 54 33 54 33 54 33 55 8 33 55 8 33 55	4.99 4.68 4.68 3.35 3.35 2.64 2.264 2.29	5.80 5.43 5.04 4.65 4.65
7.26 6.84 6.92 6.01 7.55 7.15 7.15 7.15 8.33 3.31 2.89 3.35		5.55 5.20 4.83 4.45 4.08
	4440000000	<u>0 0 8 0 0 0</u> 70 70 4 4 4
078 884 390.6 078 884 290.5 078 784 190.3 078 784 190.3 078 684 090.1 078 683 989 8 077 683 989 7 077 683 789 7 078 583 7 078 683 989 7 077 683 7 889 7 077 583 7 078 583 7 077 583 7 078 58 583 7 078 58 58 58 7 078 58 58 7 000 58 58 7 000 58 58 58 7 000 58 58 58 58 58 7 000 58 58 58 58 58 58 58 58 58 58 58 58 58	87.1 87.1 887.1 886.1 886.1 886.4 886.4 886.4 886.4 886.4 886.4	
44444468888	9.	4.3
<u> </u>	<u>6.0.0.0.0.1.1</u>	<u> </u>
0 78 0 78 0 78 7 70 7 8 7 70 7 8 7 70 7 8 7 0 7 8 7 0 7 8 7 0 7 8 7 0 7 8 7 0 7 8 7 0 7 8 7 0 7 7 8 7 8 7 9 7 8 7 8 7 9 7 8 7 8 7 9 7 8 7 9 7 8 7 9 7 8 7 8 7 8 7 9 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8	b 123 c 12	<u>222888</u>
66.069.774.078.884.390.6 66.169.774.078.884.390.6 66.169.774.078.884.290.5 66.169.874.078.884.290.5 66.169.874.078.784.190.2 66.169.874.078.784.190.2 66.269.974.078.684.090.1 66.269.974.078.683.989.8 66.269.974.078.683.989.8 66.370.074.078.583.789.5 66.370.074.078.583.789.5	$\begin{array}{c} 58.5 \left(67.4 \right) \left(72.9 \right) \left(79.5 \right) \left(87.2 \right) \left(4.73 \right) \left(87.1 \right) \left(4.38 \right) \left(572.9 \right) \left(79.4 \right) \left(77.3 \right) \left(79.4 \right) \left(77.3 \right) \left(79.3 \right$	69.6 72.7 76.2 80.0 84.3 89.0 5.55 69.6 72.7 76.2 80.0 84.2 88.9 5.20 69.6 72.7 76.2 80.0 84.1 88.8 4.83 69.6 77.7 76.2 70.9 84.0 88.6 4.45 69.7 72.7 76.2 70.9 84.0 88.5 4.08
7.9 9.9 9.9 9.9 9.9 9.9 0.0	2.6 2.7 2.9 3.3 3.3 3.3 3.3	22.777
66.0 69 66.1 69 66.1 69 66.1 69 66.1 69 66.2 69 66.2 69 66.2 69 66.3 69 66.3 70 66.3 70 66.4 70	 58.5 62 58.7 62 58.8 62 58.9 62 59.0 63 59.1 63 59.2 63 59.4 63 	.672. 672. 672. 672. 772.
	9월 1월 995 대 <mark>송</mark> 949 대 149 명이 949	
9	4	G

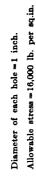
61

. ,

Z
- 3
Ē
3
E
5
Y
≻
E
П
р
•
E.







								-																							
,	Size of Angle.	of ile.	Eff	icier	Efficiency in Per Cent for Values of $\frac{x}{L}$	n P	Per Cen of $\frac{x}{L}$.	ent	for	Val	ues		Equi	ivale	ent A f	Equivalent Area in Sq.in. of One Angle for Values of $rac{x}{L}$	in Sc alue	a.in.	لان وا	De A	ngle		A Poi	nods unds	able	Tens One	ion i Angl	n Th e for	Allowable Tension in Thousands of Pounds for One Angle for Values of $\frac{x}{L}$	nda o es of	<u>.</u>
ľ	12	1			-		<u> </u>	6			и С		4		-	6					2		0.0					• •			
I.	In. In.	In.				5	- 		; 	r.			2	>					>	ŧ.	5		2.0	, 	-	5					
4	9	16 16		772	2.8	76.	2	6.6	83	<u> </u>	80.		.70	3	86.	4.(22	4.2%	4	45	4.	69	59.	2 6	1.7	64.	8	67.8	69.7 72.8 76.2 79.9 83.9 88.4 3.70 3.86 4.05 4.24 4.45 4.69 59.2 61.7 64.8 67.8 71.2 75.0	2	75.0
		-40	69.772.876.279.883.988.3 3.31 3.46 3.62 3.79 3.98 4.19	1 1	2.8	76.	5	9.8	83	<u>.</u>	80	67) 67	.31	<u></u>	.46	3.6	53	3.75	3	98	4.	19	52.	9	5.3	52.9 55.3 57.9	6	60.6	63.7	<u>,</u>	37.0
			. 69	8 4	2.8	76.	1	9.8	83	<u>x</u>	88	21 27	.92	ŝ	2	69.8 72.8 76.1 79.8 83.8 88.2 2.92 3.04 3.18 3.33 3.50 3.69	80	3.25	ŝ	50	ŝ	69	46.7 48.6	4	8.6	50.9	6	53.3	8	56.0	59.0
		00 00	69	87.	8.2	76.	17	9.8	83	~	88	1 2	52	67	.63	2	15	2.8	<u>8</u>	.02	3	18	1 0.	34	2.1	69.872.876.179.883.788.1 2.52 2.63 2.75 2.88 3.02 3.18 40.3 42.1 44.0	<u>.</u>	46.1	48		50.9
Q	31		57.	561	1.5	65.	6	1.1	1	Ŧ	25	50	8.	3	.02	3.5	2	3.5(79	4	15	45.3	3 4	8.3	51	80	56.0	8	<u>.</u>	§ 57.561.565.971.177.184.3 2.83 3.02 3.24 3.50 3.79 4.15 45.3 48.3 51.8 56.0 60.6 66.4
			57.	66	1.6	66.	6	1.1	1	Ē	34.5	24 70	.57	2	.75	2.5	22	3.15	3	45	ŝ	76	41	1 4	4.0	47.	2	50.9	55	2	30.1
		-40	57	86	1.7	66.	17	1.2	1	Ē	27	1 2	3.31	2	.47	2.0	*	2.8	3 2	8	ŝ	36	36.	3	9.5	42	5	45.6	49	m.	53.7
			28 28	00	1.8	<u>6</u> 6.	27	1.2	11	Ē	34.(2 0	3°.05	10	.18	2	7	2.5	1	.72	~	86	32.5	00 00	4.9	37	4	<u></u>	\$	2	47.3
		esteo	<u>8</u> 8.	16.	1.9	66.	37	1.2	1	Ť.	8	<u>–</u>	1		89	ъ.	2	2.1	10	35	~	56	28.	<u>6</u>	0.2	32	<u></u>	34.7	37	0.	4 0.9
		- 19-	58.	200	S.0	<u>6</u> 6.	37	1.3	1	Ť	83.5	8	. 46	-	.59	1.	2	1.8	i m	26	~	15	33	67 00	5.4	27	2	29.3	31	<u>.</u>	34.4

`

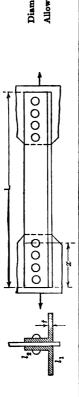
.,

62

800208	004450	00-10-00	
	60.9 555.5 49.4 37.6 31.4	63.2 57.1 51.2 45.1 39.0 32.6	62.1 56.1 50.4 50.4 38.4 32.1 25.9
67 61 75 75 75 75 75 75 75 75 75 75 75 75 75			
100000	55.3 50.1 44.9 39.7 34.2 28.8	60.0 54.4 48.8 43.0 37.1 31.2	57.9 52.5 47.0 41.4 35.8 30.1 24.3
64.1 58.2 52.0 45.9 33.3 33.3	55.3 50.1 44.9 39.7 34.2 28.8	60 43 43 31 31 31	52 24 33 35 4 4 7 25 2 52 52 52 52 52 52 52 52 52 52 52 5
60.8 55.2 49.4 37.7 31.7	50.5 45.9 41.3 36.5 31.5 26.5	57.3 52.0 46.5 41.1 35.5 29.7	54.1 440.1 444.0 338.9 333.6 228.1 222.9
	2449999		
690980	46.7 42.4 38.1 33.6 33.6 29.1 24.5	54.7 49.6 44.5 39.3 33.9 33.9 28.5	50.9 46.1 41.4 336.5 31.7 21.4 21.4
57 57 4 4 7 4 1 4 1 30 30 30	46.7 42.4 38.1 33.6 33.6 29.1 24.5	4 4 5 6 7 7 6 7 7 7 7 7 7 7 7 7 7	233341
55.2 50.2 34.9 34.2 28.8		52.5 47.5 42.7 37.7 32.6 32.6 27.3	47.8 43.5 39.0 34.5 29.9 229.9 20.3
800084	<u></u>	50.2 45.6 40.9 36.1 31.3 26.2	45.3 41.1 36.9 32.6 32.6 28.3 19.2 19.2
52.8 48.0 43.0 37.9 32.8 27.5	40.3 36.6 32.9 29.3 25.3 21.3	50.2 45.6 40.9 36.1 31.3 26.2	45.3 41.1 36.9 32.6 32.6 28.3 28.3 19.2 19.2
4.24 3.85 3.44 3.44 2.20 2.20	3.81 3.45 3.45 3.09 2.73 2.35 2.35 1.97	3.95 3.57 3.57 3.20 2.82 2.44 2.94	3.88 3.51 3.15 3.15 3.15 2.78 2.78 2.40 1.62
4.01 3.64 3.25 2.87 2.48 2.48 2.08	3.46 3.13 2.81 2.48 2.14 1.80	3.75 3.40 3.40 3.05 2.69 2.32 2.32 1.95	3.62 3.28 2.94 2.59 2.25 1.88 1.52
4 0 0 0 0 0 0	- 00000	- 10 10 00 00	
3.80 3.45 3.45 3.09 2.73 2.36 1.98	3.16 2.87 2.58 2.58 1.97 1.97 1.66	3.58 3.25 3.25 2.91 2.57 2.57 1.86	3.38 3.07 2.75 2.75 2.43 2.10 1.76 1.76
3.62 3.29 2.94 1.89	$\begin{array}{c} 2.92\\ 2.65\\ 2.65\\ 2.38\\ 2.10\\ 1.82\\ 1.53\end{array}$	3.42 3.10 2.78 2.46 1.78 1.78	3.18 2.88 2.59 1.98 1.98 1.34
- 10 10 10 00 00		- 10 10 10 10	
		822947	99 44 16 87 87 27 27
3.45 3.14 3.14 2.81 2.48 2.14 1.80	2.70 2.45 2.45 1.95 1.69 1.42	3.28 2.97 2.67 2.67 2.67 2.04 1.71	2.99 2.72 2.44 2.16 1.87 1.57 1.27
3.30 3.00 2.69 2.37 2.37 1.72	$\begin{array}{c} 2.52\\ 2.29\\ 1.83\\ 1.58\\ 1.33\\ 1.33\end{array}$	3.14 2.85 2.85 2.56 1.96 1.96	2.83 2.57 2.57 2.04 1.77 1.49 1.49
3.30 3.00 2.69 2.37 2.05 1.72			~ ~ ~ ~ ~ ~ ~ ~
.586.2 .586.1 .486.0 .485.9 .385.8	082.7 082.6 082.5 082.5 082.3 082.3	1.234.55	1000010
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	222222222	485.6 485.5 385.4 385.3 385.3 285.3 285.1	5 84.2 5 84.1 4 84.0 3 84.0 3 84.0 2 83.9 2 83.9 2 83.9 2 83.7
.586.2 .586.1 .486.0 .485.9 .385.8	80 82 82 82 82 82 82 82 82 82 82 82	.485.6 .485.5 .385.4 .385.4 .385.3 .285.2 .285.2	283.384 283.387 283.387 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 283.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 293.397 203.397 203.397 203.397 203.39
	675.082.7 675.082.6 775.082.5 875.082.4 975.082.3 075.082.3		
173.677.381. 273.677.381. 273.677.381. 373.677.381. 373.677.381. 373.677.381. 473.677.381.	675. 675. 775. 875. 975. 075.	174.277.781 174.277.781 274.277.681 274.377.681 374.377.681 374.377.681 374.377.681 374.377.681	.564.968.973.478 665.068.973.478 765.169.073.478 865.269.073.478 965.369.173.578 965.469.173.578 065.469.173.578
22222	3 68 5 68 6 68 8 69 8 69	222222	973. 973. 173. 173. 173.
273.677 273.677 273.677 373.677 373.677 373.677 473.677	663.368. 763.468. 963.568. 063.668. 263.768. 363.869.	174.277 174.277 274.277 274.377 374.377 374.377 374.377	0000110
1 73. 2 73. 2 73. 3 73. 4 73.	888888	174. 174. 274. 374. 374.	968.9 068.9 169.0 369.3 569.9
173. 273. 273. 373. 373. 473.	663. 963. 963. 363.	174 174 274 374 374	969 569 569 569 569 569 569 569 569 569
02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 0		22222	564 665 765 865 965 165
	6 58 59 59 59 59 59 59 59 59 59 59 59 59 59	2271 2271 3271 571 571	564 655 965 965 165
67. 67. 67. 67.	54.658 54.858 55.058 55.259 55.359 55.555	68.271 68.271 68.371 68.371 68.471 68.571	61. 61. 61. 62. 62. 62.
		یں <u>-</u>	4
37	22	ຕ	4
-			

2
2
3
8
Ϋ
7
2
E
B
2

One Hole for 4-inch Rivet Deducted from Connected Leg



inch.	
hole = 1	
f each	
Diameter of	

	ea.in.
inch.	Der
1 in	0 Ib.
Pole =	6.000
<u> </u>	Ĩ
each	reas
ster of	ole at
met	wab

	0.5	6.9 6.9 6.9 6.9	42.9 37.7 32.6 27.5 22.2
1 a of		4 8 8 8 8	10 10 00 FF
lues	0.4	23.53 23.59 20.00	25.52 20.92
Thou r Vs	~~~~~	000000	000010
n in '	0.3	18 53 33 38 18 53 33 38	26 75 33 38 26 75 73 88
Allowable Tension in Thousands of Pounds for One Angle for Values of $\frac{x}{L}$	0.2	$\begin{array}{c} 55.759.463.668.474.080.51.811.93\\ 55.959.563.7689.5774.080.411.60\\ 55.1769.463.668.474.080.411.60\\ 55.111.831.97\\ 55.1222.2.40\\ 2.6222.2.312.56.62\\ 2.6222.2.312.56.23\\ 2.6222.2.312.56.23\\ 2.6222.2.37\\ 2.52.322.22.327\\ 2.5.32.31.55\\ 3.6.9\\ 36.956.560.064.168.774.080.3\\ 1.1811.251.341.143\\ 1.551.165\\ 1.6811.89\\ 20.021.422.9\\ 24.826.9\\ 24.826.9\\ 26.00171\\ 1.0811.10\\ 1.0811.10\\ 1.0511.10\\ 1.0511.10\\ 1.0511.10\\ 1.0511.10\\ 1.0511.00\\ 21.422.9\\ 24.826.9\\ 26.00171\\ 20.0021.422.9\\ 24.826.9\\ 26.00171\\ 20.0021.422.9\\ 24.826.9\\ 26.1721180.3\\ 20.0111081.110\\ 1.0811.10\\ 1.0511.10\\ 1.0511.10\\ 1.0511.10\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.0211111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.021111\\ 1.$	#         63.566.569.973.7777.882.5         2.06         2.16         2.27         2.39         2.53         2.68         32.9         34.5         36.3         38.2         40.5         42.9           #         63.566.669.973.7777.882.5         2.06         2.19         2.01         2.11         2.23         2.68         32.9         34.5         36.3         38.2         40.5         42.9           #         63.666.669.973.7777.82.4         1.82         1.91         2.01         2.11         2.23         2.36         29.1         30.5         32.1         33.7         35.7         37.7           #         63.766.7770.073.7777.782.3         1.58         1.65         1.74         1.83         1.93         2.04         27.8         29.3         30.9         32.6           #         63.866.770.073.7777.682.2         1.33         1.81         1.62         1.72         21.3         23.2         23.6         23.3         24.6         25.9         27.5           #         63.966.870.1/33.7777.682.2         1.38         1.46         1.54         1.31         1.39         17.3         17.3         21.3         21.4         21.3         23.5         23.1         37.6         23.2
ble ]		0.0	L.5 0.5 2.2 2.2 2.2
lowa ds f	0.1		****
All	0.0	5.2 5.2 5.2 5.2	2.9 9.1 7.3 7.3
gle	0.3 0.4 0.5	1.36.50	37.03.0
An		99888	88882
Equivalent Area in Sq.in. of One Angle for Values of $rac{x}{L}.$	0.4	1.2.1	111222
	~~~~~	22 97 16 18	339 24 83 24 24
Sq.ij	ö	8	5 6 F F F
Area in Sq.in. of for Values of $\frac{x}{L}$.	69	07 83 58 34 08	.27 01 74 46 .18
Area or V	•	0	
f			2.16 1.91 1.65 1.39 1.13
ui val		2 2 2 0 0 1 1	000000
Ба	0.0 0.1 0.2	1.8 1.6 1.3 1.3 0.9	2.0 1.8 1.3 1.0
		<i>r</i> 0.4.4.0.0	104001
alue	<u>.</u>	88888	<u>888888</u>
Efficiency in Per Cent for Values of $rac{x}{L}$	0.0 0.1 0.2 0.3 0.4 0.5	2 7 7 7 7 0 0 7 7 7 0 0 0 7 7	
nt f	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	40001	11114
Per Ce $\frac{x}{L}$.	<u> </u>	88888	973 973 173 173 173
n Per Cent 1 of $\frac{x}{L}$.	0.2	8 8 8 7 7	39.9 20.0 20.0
cy i		4.7.0.0.	001100
cien		7 59 9 59 1 59 3 59 3 59	9000 00000 00000
E E E	0.0	$\begin{array}{c} 55.7 \\ 59.4 \\ 55.7 \\ 59.5 \\ 56.5 \\ 56.1 \\ 59.5 \\ 56.2 \\ 56.2 \\ 56.2 \\ 56.2 \\ 56.0 \\ 0 \\ 64.1 \\ 65.7 \\ 108.2 \\ 74.1 \\ 80.3 \\ 1.18 \\ 1.39 \\ 56.5 \\ 60.0 \\ 64.1 \\ 68.7 \\ 74.1 \\ 80.3 \\ 0.95 \\ 108.3 \\ 10.3 \\ 0.95 \\ 108.3 $	63.5 66.5 69.9 73.7 77.8 82.5 2.06 63.6 66.9 9 73.7 77.7 8 82.5 2.06 63.7 66.7 70.0 73.7 77.7 8 82.3 1.58 63.8 66.7 70.0 73.7 77.6 82.2 1.33 63.9 66.8 70.1 73.7 77.6 82.2 1.33
ji	r In	-10 -10 000 000 -110	*** Ha ala H
Bise of Angle.	la.	ro N	4
ר 20 	12 4	4	n

ł

64

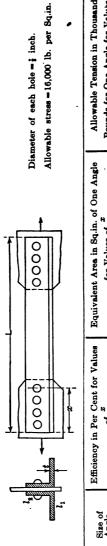
TABLES

.

0 0 4 4 0 0 0 - 0 - 5 8 5000 9 9 9 9 9 9 **H H** 10 80.33 ଚ୍ଚ ଷ୍ଟ ଷ୍ଟ 52 47 35 27 23 24 19 88 28 28 8 34 5 18 14 5 20 44.0 39.5 34.9 30.1 25.4 20.5 0.1. 1.95.03 - 0 4 0, 0, 0, 0 -5 9 00 00 9 7 327 33 28.28.29 19 13 8 18 16 32.6 28.1 23.8 19:2 32.6 28.9 23.0 3 1.0.9 25.1 21.1 30.1 26.1 0.1 9 .1 .1 4 33 0 1 9 36. 34. 26. 5 19. **1**5 41 8 15 12 16 18 21 17 -38.5 34.7 30.7 26.5 500 4 -0.0 23.5 19.7 28.5 24.8 20.8 16.8 ~ 0 0.8 9 0 5 <u>20 0 1</u> 8 30 8 16 8 3 27 18. **4** 32 14 5 2 2 28.6 25.3 22.1 5 30.5 27.0 0 2 2 0 0 --0 j. 00 1 Ξ. 7 4 3 3 ŝ 0 -1 2 2 2 3 3 40 18. 15. 23. 19. ສສສ 16. 13. 16. 14. 17 Π 3 3 0.10 27.0 23.8 20.8 28.9 25.6 22.4 18.7 24.9 22.1 7 4 5 0 3 9.07 3 3 0 9 0 37. 34. 23. 23. ສ່ 14. г. 16 17 15. 19. 16. 13 10 13 Π 3.25 2.96 2.65 2.34 2.02 2.13 2.141.70 38 2.101.82 1.53 1.851.55 1.89 1.64 1.39 1.121.321.13 41 25 24 91 2 1 сi 0 3.02 2.75 2.47 2.18 1.59 1.88 1.28 2.20 1.94 1.69 1.42 1.15 2.262.00 1.74 1.46 1.18 2.8 1.76 1.53.29 .05 1.06 86 24 Ö 1.76 1.49 1.20 1.321.07 2.13 1.88 1.63 1.37 1.651.00 57 31 04 2 1.81 1.57 1.11 1.87 1.44 1.21 0.98 1.17 83 81 ~~~~ 2 Ö 1.13 1.78 92 1.66 1.40 1.69 1.47 1.00 1.55 1.30 1.05 1.75 1.35 1.14 41 17 33 .55 1.11 46 33 93 16 0 1 ~ ~ ~ 2 ÷. 0 0 Ö 2.50 2.28 2.05 1.57 1.32 1.58 1.38 1.16 1.07 . 79 0.94 1.691.47 1.231.00 1.65 1.46 1.27 1.08 .81 .91 87 8 88 0 -0 Ö 2.15 1.94 1.72 1.47 1.251.021.49 1.10 69 1.30 1.60 1.40 1.561.02 $1.00 \\ 0.85$ 36 89 1.17 95 38 1.21 0.83 8 69 0 N C 0 0 75.5 80.5 1 .1 75.5 80.4 .1 75.5 80.4 1.2 75.5 80.3 1.3 75.5 80.3 3 80 .6 ŗ, 4. 4 30 30 .3 3 3 Õ õ õ 0 0. 9 1 0 6 73.379. 73.379. 73.479. 76.081. 76.081. 76.081. 73.4 79. 78. 78. 0/76. 0 76. 081 081 80 78. 78. 79 76 267.071.276.081 .072.6 172.7 272.7 372.8 5 .972.6 1 71.276. 71.376. 26. 13. 22.22 22 .4]7 Ť. .968.3 ò .971.1 e. 20 ٦ 80,00 -.060.263.968.0 .260.464.068. 67.271. 867.371. 67.471. 67.571. 6 68. 068. .268. 368. 7 89 .2<mark>67</mark>. 367. 1 .863.868 れ 67 88 ò 9 1 3 2 -7 Ō ۲. .367 .063. .264. .564. 764. .066. 166. 567. 8 63 25 8<u>64</u> 0<u>64</u> 8 67 3 2 6 4 .5 63.7 63.8 .8|63.9| 80 2 9 Õ -3 860. .460. 362. 8 8 8 59. 59. 8. 88 8 8 ß 63. 064. 8 88 63 61 5 0 00 õ 2 6 3 4 9 00 ٢. 4 0 9 8 57.5 53 59 59 8 8 5 2 22 22 20 8 8 8 57 57 57 51 58 61 80 · · · · · ~~ ___ 19 12 - H $3\frac{1}{2}$ 33 ŝ က ŝ 33 33 5 က က

nec
onti
V-C
BLE
F

One Hole for 3-inch Rivet Deducted from Connected Leg



1				0	8	0	-	0	6	00	~	ŝ	6	ю	6
	Allowable Tension in Thousands of Pounds for One Angle for Values of $\frac{x}{L}$		5	8.95 104.5 110.5 117.1 124.6 133.4 143.2	97.6 103.2 109.3 116.5 124.5 133.6	6.76 7.22 7.75 90.7 95.8 101.6 108.1 115.5 124.0	6.65 7.13 83.7 88.3 93.6 99.5 106.4 114.1	6.07 6.50 76.5 80.8 85.6 91.0 97.1 104.0	<u>8</u> .	61.9 65.4 69.1 73.4 78.4 83.8	73.	63.	59.964.169.074.781.389.2 4.78 5.11 5.51 5.96 6.49 7.12 76.5 81.7 88.1 95.3103.8114.9	60.0[64.2[69.0]74.7[81.2[89.1] 4.48] 4.80 5.15 5.58 6.06 6.66 71.7 76.8 82.4 89.3 96.9[106.5	[60.1]64.3[69.1]74.7[81.2[89.0] 4.17] 4.46[4.80] 5.18] 5.63[6.18] 66.7] 71.3] 76.8] 82.9 90.1 98.9
	a bas			4	5	5	4	Ξ	2	4	6	4	8	6	-
	aan Juè		# 	8	4	5.	ġ	5	₽.	80	ģ	6	<u></u> .	ġ.	ġ
	not V.			1	<u><u><u></u></u></u>	Ξ	ž	~			-	<u>.</u>	E		-
	for T	, ,	•	4 .		2	<u>.</u>	2	2.2	<u>*</u>	9.4	2.7			8.0
	n in gle			15	Ξ	5	ත	6	õõ	1	ଡ	õ	6	õ	80
	An	0.2	9	.1	ŝ	9	9.	ø	ŝ	-	ø.	5	۲.	4.	ø.
	Allowable Tension in Thousands of ounds for One Angle for Values of -		5	17	8	0	93	8	1	69	8	52	88	82	76
	le J r O			5	5	8	3	80	-	4	9	9	~	80	3
	rab s fo		1.0	ġ	33.	5.	ģ	Š.	33.	55.	5.	6	Ξ.	20.	Ľ.
	Ilov				ž	~	~	<u>~</u>		-		<u>,</u>	- <u></u>	-	-
	Pot	0.0	?	4	2.6	6		0.5	9.3	1.2	4	2	9.5	1.7	
			>	9	6	ð	òŏ	7	ö	6	ŋ	4	ř	1	õ
	-		•	95	8.35	75	13	50	5.87	5.24	4.61	3.97	12	66	18
	Equivalent Area in Sq.in. of One Angle for Values of $\frac{x}{L}$.	*	5	ø	80	~	ч.	9	5	5	4	3	~	6.0	9
	A.					2	5	1	5.48	0		F	6	9	3
	One		*	8.34		2.	3.6	0.0	4.0	4.90	4.31	3.71	.4	2	9
	J.			00	7.28 7.78			-			7				
	f <u>*</u> .0	•	•	12.	8	76	6.22	5.69	5.14	4.59	4.04	3.48	ଞ	58	18
	20	0.3	2	~		9	ŝ			4		ŝ	ŝ	ŝ	
	Area in Sq.in for Values of	0.2		32	6.83	6.35	5.85	5.35	4.83	4.32	3.80	3.28	51	15	8
	ee v		5	~	9.0	.0	5.	5	4	4	3	3	5	ő.	4
	for					0	2	Q	1-					0	9
	len	-	1.0	6.0	9.4	6.3	5.5	2.0	5.5	3				~	4.
	IVB				÷	-	~	~	<u>4</u> ,	N. N	3.41 3.60	2.94 3.10		~	
	nbg	• •	?	1 23	Ħ.	ö	Ř	2	ŝ	òò	4	8	32.	3 .	F.
			>	9	8	ŝ	ŝ	4	4	ဗ	က	0	4	4	4
		v	Ċ.	0.	6.	80	9,	5.	.3	2	.1	0.	2	.1	਼
	Efficiency in Per Cent for Values of $\frac{x}{L}$.		<u> </u>	8	16	91	91	91	61	91	91	91	89	8	89
	>		*		.0	.0	5	4.		5	Ξ	0.	3	2	2
-	for			- 60	80	80	8	8	30	8	8	8	8	8	8
	ent	°		1.			0.0	0.0	0.0	9.6	9.6	9.6	.1		
2	Per Ce of $\frac{x}{L}$.		>	8	<u>x</u>	8	8	8	8	<u>×</u>	1	14	4	3	7
	of	.2 of	4	10	10	20	5.1	10	10	5	10	10	.6	0.0	
-	ii.	0.0 0.1 0.2 0.3 0.4 0.5 0.0		3	2	2	2	2	2	2	1	1	<u></u>	8	<u>80</u>
	ncy		-	1	1	1		1.0	2	-	2	7	4	4	4
	cie				7	2	5	3	3	47	47	2	-9	8	10
	Eff			67.171.075.280.185.792.0 6.53 6.91 7.32 7.79	67.171.075.230.185.691.9 6.10 6.45	67.271.075.280.185.691.8 5.67 5.99	67.271.075.280.085.591.6 5.23 5.52	67.371.075.280.085.491.5 4.78 5.05	27.	67.471.175.279.985.291.2 3.87 4.09	67.471.175.279.985.191.1	67.571.175.279.985.091.0	6	õ	2
			1					<u> </u>					40		<u> </u>
	o e	- 7	Ч.	1-400	1	~} ≠	72	uskoo	•[²	-40	-12	60/00	2-40	: #1	coj-4
	Size of Angle.	l3	In.	9									4		
		11	Ŀ.	9					•		•		9		

66

 1109.7
 115.8

 7.4
 102.7
 108.3

 0.5
 95.2
 100.5

 1.3
 87.7
 92.5

 1.3
 80.3
 84.6

 0.1
 72.6
 76.5

 0.1
 72.6
 76.5

 1.2
 56.9
 60.1

 1.2
 56.9
 60.1

 1.3
 51.8
 6 000000 55.2 48.8 41.9 35.2 69.4 63.0 56.3 49.6 -6 00 59. 80. 67 91 83 25 20 61 4 35 61.6 54.1 46.7 62.4 56.5 50.5 65.7 59.7 53.3 53.3 47.0 33.9 000 6.0.6 44. 8 2 83 88. 33 6. 83.3 61.7 00 62.4 56.6 50.5 44.6 -5 46.7 2 5 2 4 6 -1 ŝ 8 2 8 56. 49. 2 8 76. 69 54. 52. 35. 29. 43 97 46 88 41 32 5 70.7 64.8 58.7 52.6 46.2 46.2 99.2 92.8 86.2 86.2 779.5 65.9 58.9 51.8 38.4 33.1 27.8 1.0 00 ຕີມີ 7 10 00 6 4 8 8 8 43. 59. 53. . 28 . 8 94.5 88.5 82.2 75.8 69.4 62.556.3 LWL 6 0, 0, .0 2 49.6 45.1 40.5 35.8 31.0 56.5 51.3 46.1 35.0 35.0 29.4 4. -8 **4**2. 88. 83. **4**9. 26. đ 65 37 61.6 56.5 51.3 45.9 40.535.0 90.5 84.8 78.9 72.6 66.5 60.3 53.9 47.5 46.5 44.0 38.7 33.6 28.1 42.4 38.1 33.6 29.1 53.9 49.1 5 Ξ. 4 24 5.20 4.70 4.20 3.18 5.78 4.78 3.45 69 3.69 7.24 6.77 6.2827 3.76 3.52 29 26 3.87 3.05 62 3.94 3.10 27 20 34 68 24 5 2 2 າວ. 4. 3 4 4 **લં લં** 5.19 4.75 3.85 3.38 2.92 56 4.30 6.86 6.42 5.955.485.024.54 4.06 3.90 3.53 3.16 2.79 2.41 4.11 3.73 3.33 3.33 2.94 2.53 2.12 8 02 3 3 3 4.78 4.38 3.97 3.55 3.12 6.51 6.09 5:66 5.21 4.77 4.323.86 3.39 2.93 3.59 3.26 2.92 2.58 1.87 3.90 3.54 3.16 2.79 2.41 2.02 2 42 4.053.67 3.292.89 6.20 5.80 5.39 4.554.12 3.68 2.72 4.97 3.33 3.03 2.40 2.07 1.74 3.70 3.36 3.01 2.66 2.30 27 80 27 93 4 3 Ę. 2 **4**.11 3.77 3.42 3.06 2.33 5.915.535.144.74 4.34 3.52 3.10 2.67 3.91 3.10 $2.82 \\ 2.53 \\ 2.24 \\ 2.24 \\ 3.52 \\$ 1.94 1.63 3.53 3.21 2.88 2.54 2.19 84 3.85 3.53 3.21 3.21 2.87 2.53 2.19 5.66 5.30 4.93 4.54 4.16 3.37 3.77 2.91 2.65 2.65 2.38 2.38 1.82 1.82 3.37 3.07 2.75 2.42 2.42 1.76 67 57 . 0 [74.1] (7. 0 [02.1] 3. 5 5 [90.1] 3. 7 . 0 [74.1] [77.6] 81.3 [85.5] 90.1] 3. 7 1.0 [74.1] [77.5] 81.3 [85.3] 89.9 2 . 7 1.1] [74.1] [77.5] 81.2] 85.3 [89.9] 2
 59.263.167.773.079.286.6
 2

 59.363.267.873.079.186.5
 2

 59.463.367.973.079.186.4
 2

 59.463.367.973.079.186.3
 2

 59.563.467.973.079.186.3
 2

 59.663.073.079.186.3
 2

 68.671.875.379.283.588.3
 3

 68.671.875.379.283.488.1
 3

 68.671.975.379.183.388.0
 2

 68.771.975.379.182.388.0
 2

 68.771.975.379.182.388.0
 2

 68.771.975.379.182.388.0
 2

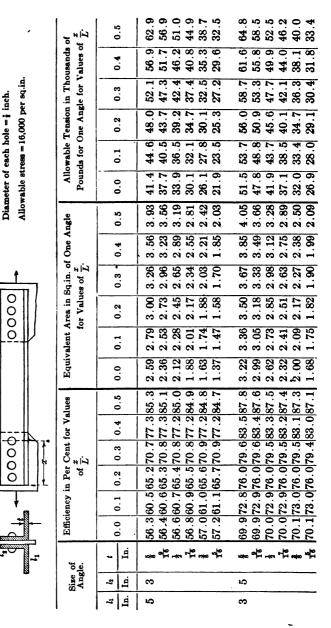
 68.8771.975.379.187.8
 2

 68.877.075.379.187.8
 2
 .2 64.3 69.1 74.7 81.1 88.9 3 64.4 69.1 74.7 81.1 88.7 4 64.5 69.2 74.7 81.0 88.5 .974.177.781.686.090.7 974.177.781.585.990.6 .074.177.781.585.890.6 .790.4 . 6 64. 6 69. 2 74. 7 80. 9 88. 3 . 7 64. 7 69. 3 74. 7 80. 9 88. 2 .690.2 .564.569.274.781.088.4.663.568.073.079.086.1 .763.668.073.079.086.0 70.974.177.781.585.9 71.074.177.781.585.8 71.074.177.681.485.7 074.177.681.485 71.074.1 71.074.1 <u>88888</u> R. F 8 12 2 59 ᅾᇔᄰᇾᄰᇔ *E *E 33 9 ŝ $3\frac{1}{2}$ 20 -

TABLE V—Continued

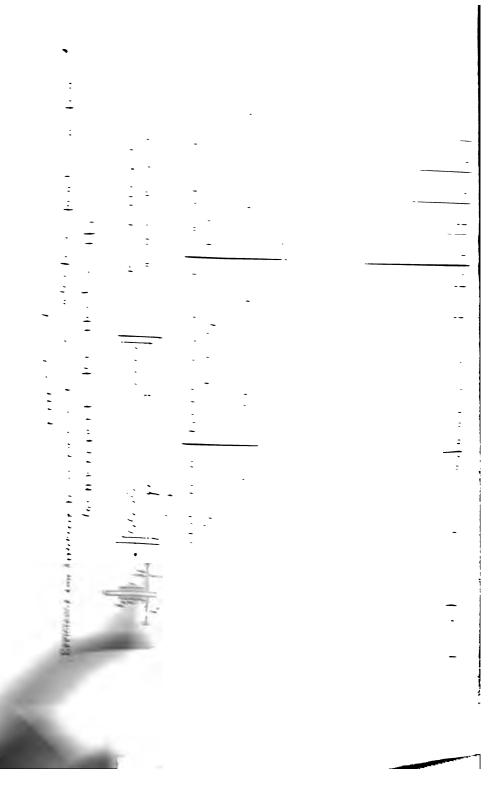
EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE

One Hole for ³/₄-inch Rivet Deducted from Connected Leg



TABLES

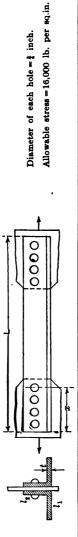
00 1- 00 00 00 00 10	60004		108858	0 0 0 0 0 0
63 51 39 26 33 26 26 26 26	$ \begin{array}{c} 38 \\ 53 \\ 53 \\ $	4 8 8 8 8 8	8 4 4 8 8 8 8 8	8 8 8 8 8
59.3 53.7 42.5 36.8 30.9 24.9	39.8 35.0 30.4 25.6 20.6	41.6 36.8 31.7 26.7 21.6	49.9 45.4 40.8 38.0 31.0 26.2 27.1	36.5 32.3 28.0 19.0
55.5 50.4 45.3 39.8 34.5 23.3 23.3	36.8 32.5 28.1 28.1 19.2	39.3 34.7 30.1 25.4 20.5	46.7 42.5 38.1 33.7 33.7 29.1 19.8	33.9 29.9 26.1 26.1 21.9 17.7
1520231			1031808	
$ \begin{array}{c} 52 \\ 42 \\ 52 \\ 32 \\ 52 \\ 52 \\ $	28 8 8 7 1 × 28	33 33 28 33 19 19 19 19 19 19 19 19 19 19 19 19 19	40 40 35 40 40 35 18 23 23 23 23 23 23 23 23 23 23 23 23 23	16 22 28 31 16 20 24 28
49.1 44.6 44.6 35.5 30.7 20.8 20.8	32.0 28.3 24.5 20.6 16.8	35.7 31.5 27.2 22.9 18.5	41.3 37.6 33.7 29.9 22.9 21.7 17.6	5.5 2 9.7
			· · · · · · · · · · ·	0 29 2 20 2 19 2 19 2 19 2 19 2 19
46.5 37.9 33.6 29.1 19.7	29.9 26.5 23.0 19.3 15.8	33.9 30.1 26.1 21.9 17.7	38.9 35.5 32.0 32.0 28.3 28.3 28.3 16.8 16.8	28.0 24.8 21.6 18.2 14.7
		2.76 2.44 2.10 1.77 1.43	3.36 3.05 2.74 2.41 2.81 1.75 1.75	
3.71 3.36 3.36 2.66 2.66 1.93 1.93	2.49 2.19 1.90 1.60 1.29	2.60 2.30 1.98 1.67 1.35	3.12 2.84 2.55 2.25 1.94 1.64 1.32	2.28 2.02 1.75 1.47 1.47 1.19
3.47 3.15 3.15 2.83 2.83 2.83 2.83 2.49 1.81 1.81	2.30 2.03 1.76 1.48 1.48	2.46 2.17 1.88 1.59 1.28	$\begin{array}{c} 2.92\\ 2.66\\ 2.38\\ 2.11\\ 1.82\\ 1.54\\ 1.24\end{array}$	2.12 1.87 1.63 1.63 1.37 1.11
	$\begin{array}{c} 2.14 \\ 1.89 \\ 1.64 \\ 1.38 \\ 1.38 \\ 1.12 \end{array}$		2.74 2.50 2.50 2.24 1.98 1.98 1.71 1.45	1.98 1.75 1.52 1.28 1.04
3.07 2.79 2.51 2.51 1.92 1.92 1.30	2.00 1.77 1.53 1.53 1.05	2.23 1.97 1.70 1.43 1.43	$\begin{array}{c} 2.58\\ 2.35\\ 2.11\\ 1.87\\ 1.87\\ 1.62\\ 1.36\\ 1.10\\ 1.10\end{array}$	$\begin{array}{c} 1.86 \\ 1.64 \\ 1.43 \\ 1.43 \\ 1.20 \\ 0.97 \end{array}$
				_
$\begin{array}{c} 2.91 \\ 2.64 \\ 2.37 \\ 2.37 \\ 1.82 \\ 1.53 \\ 1.23 \end{array}$	$\begin{array}{c} 1.87\\ 1.66\\ 1.44\\ 1.21\\ 1.21\\ 0.99\end{array}$	$\begin{array}{c} 2.12\\ 1.88\\ 1.88\\ 1.63\\ 1.37\\ 1.11\\ 1.11\end{array}$	$\begin{array}{c} 2.43\\ 2.22\\ 2.22\\ 1.77\\ 1.53\\ 1.29\\ 1.05\\ \end{array}$	$\begin{array}{c} 1.75\\ 1.55\\ 1.55\\ 1.35\\ 1.14\\ 0.92\end{array}$
0400-00	<u></u>	0.081	4.1.2.8.8	00-00
80.686. 80.586. 80.586. 80.486. 80.486. 80.386. 80.385. 80.385.	<u> </u>	.185 .185 .084 .084 .084 .084	25 28 28 28 28 28 28 28 28 28 28 28 28 28	76.182. 76.182. 76.182. 76.182. 76.182.
S S S S S S S S	.776.583 .876.583 .976.583 .076.583 .076.583		8 68. 9 73. 4 78. 5 84. 9 66. 0 73. 4 78. 5 84. 0 66. 0 73. 4 78. 4 84. 1 66. 1 73. 4 78. 4 84. 2 66. 1 73. 5 78. 4 84. 3 66. 2 73. 5 78. 3 83. 4 69. 2 73. 5 78. 3 83.	7 76.1 82 7 76.1 82 8 76.1 82 8 76.1 82 8 76.1 82 9 76.1 82
70.875.4 70.875.4 70.975.4 70.975.4 71.075.4 71.075.4		15.9 15.9 15.9 15.9	868.973.478 969.073.478 069.073.478 169.173.478 169.173.478 269.173.578 269.173.578 269.273.578	70.7 70.7 70.8 70.8
.875. .875. .975. .975. .075. .075. .175.	.565.870. .665.970. .866.070. .966.171.	.572.075. 572.075. 772.175. 772.175.	868.973. 969.073. 069.073. 169.173. 269.173. 369.273. 469.273.	0 66.0 70 1 66.1 70 2 66.3 70 4 66.4 70 5 66.5 70
770. 870. 970. 070. 171. 371.	565. 665. 866. 966.	572. 572. 772. 872. 872.	.868. .969. .069. .169. .369. .369.	0 66 1 66 5 66 5 66
			264. 264. 565. 665. 965. 965.	
63.166 63.266 63.366 63.467 63.467 63.567 63.67 63.67 63.67 63.767	57.761 57.861 58.061 58.161 58.362	65.468 65.568 65.668 65.768 65.868	61.2 61.4 61.5 61.6 61.7 61.9 61.9 62.0	58.362 58.562 58.762 58.962 59.062
			うののののののの また ¹⁴⁰ mm 1 ⁴⁰ mm	
		unita harangan dari katal		
4	က	4	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ຕ
4	4	က	÷	31



	00	231	21	5
00	23	00	53 23	5 ²¹
	* I 1 0 00 00 00 00 00 00 00 00 00 00 00 00	4/H 192 38(33	$\frac{1}{16} \frac{5}{6}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
59 59 59 59	55 55 55	60 60	56 56 56	
	0 1 01		100	2441
1 62 3 62 4 62 6 62 8 63	58 59 59	4 63 5 63 7 63	59. 59. 59.	
			0 1 01 0	
5 66 6 66 7 66 8 66 0 66	9 62 1 63 3 63	5 66 6 67 7 67	3 62 5 63 7 63 9 63	7 62 0 63 2 63 4 63
	1 0 8	0.0	8004	6.1.0.10
370 570 670 770	67.67	970 070 170	8 67 0 67 2 67 4 67	666. 67
	2 72. 3 72. 5 72.	.775. .775. .875.	071 171 271 371	4980
7 75 7 75 7 75 8 75 8 75	72.	775.	121.1	470. 670. 870.
00000	4 78 4 78 5 78	. 079. . 079.	10.0 2	
81. 80. 80.	.478.4 478.3 578.2		.576. .676. .676. .776.	575.0 575.0 575.0 575.0
21-000	4 00 01	100	00 00 00 00	
01111	1.0	1.00.	0.0	.000
41 255 06 86	$ \begin{array}{c} 1.06\\ 0.90\\ 0.73 \end{array} $	$\begin{array}{c} 1.16 \\ 0.98 \\ 0.79 \end{array}$	97 83 67 51	0.88 0.75 0.61 0.47
32 32 32	$1.13 \\ 0.96 \\ 0.78 \\ 0.78$	$1.22 \\ 1.03 \\ 0.83$	$\begin{array}{c} 1.03 \\ 0.88 \\ 0.71 \\ 0.54 \end{array}$	$\begin{array}{c} 0.93\\ 0.79\\ 0.64\\ 0.64\end{array}$
1.40	$1.20 \\ 1.02 \\ 0.83$	$1.28 \\ 1.08 \\ 0.88$	$\begin{array}{c} 1.09 \\ 0.93 \\ 0.75 \\ 0.57 \end{array}$	0.9
10118	83 83 83			97 83 67 51
	1.1.	1.0	1.00.0	1.00.
19 10 26	.29	$\frac{1.36}{1.14} \\ 0.93$	$\begin{array}{c} 1.16\\ 0.99\\ 0.80\\ 0.60\end{array}$	03 87 71 71
	015			
-34 -09	.39	$1.44 \\ 1.21 \\ 0.98$	$ \begin{array}{c} 1.24 \\ 1.05 \\ 0.85 \\ 0.64 \end{array} $	$\begin{array}{c} 1.09\\ 0.92\\ 0.75\\ 0.57\end{array}$
HHH				
				1.16 0.98 0.79 0.79
1 4 10	50 27 02	533 29		
39.6	16 14	$15 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ 12 \\ $	15 13 8 8	$\begin{array}{c} 14.1 \\ 12.0 \\ 9.8 \\ 7.5 \end{array}$
-16	041	0.1.0	1 1 3 35	10.8 5
14	15.112.	19 16 13		14. 12. 10.
0, 10	3.1	3.5	6.5 4.1 1.3 8.6	1.9
0.0.1	19.2 16.3 13.3	20.5 17.3 14.1	17.4 14.9 12.0 9.1	15.5 13.3 10.7 8.2 8.2
			4 0 1	
189	20. 17.	21. 18.	18. 15. 9.	119.
03	14.6	1.0.6	0 00 00 01	5000
121	22 18 15	$23 \\ 19 \\ 15 $	19 16 13 10	17 14 12 9 9 12 12 12 12 12
	10 -1 10	1.00	10 00 00 00	4101
125 12	24 20 16	24 20 16	21 18 14 11	18. 15. 12.
0.10	0.3	6.0	0.1.3	10 10 00
		Contraction of the	Street Target	de la com
	TABI	JEB -		7

_
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
÷
~
دخة
~
ذ خد ا
- 25
_
- 2
- 2-
0
55
5
~
~
-
•
Ξ
m
_
3
< T.
_ ~
<b>_</b>





					Ł	ľ		7-																				
	Size of Angle.	of e.	Effi	cienc	ni ye	of	Per Cei of $\frac{x}{L}$ .	nt fc	or V	Efficiency in Per Cent for Values of $\frac{x}{L}$ .	I	Equ	ival	ent /	Equivalent Area in Sq.in. of One Angle for Values of $\frac{x}{L}$ .	n Sq lues	$\frac{in}{L}$	of On	e An	gle	Pot	unds	able 1 for O	Censior ne An	ı in Tl gle for	Allowable Tension in Thousands of Pounds for One Angle for Values of $\frac{x}{L}$	Is of $\frac{x}{L}$ .	
lı In.	ln.	t In.	0.0	·0	1	0.2	0	3	0.4	0.0 0.1 0.2 0.3 0.4 0.5		0.0		0.1	0.2		0.3	0.4		.0.5	0.0		0.1	0.2	0.3	0.4	0.5	
9 9	o 4	해야 다 <mark>나 가는 다</mark> 는 30억 34억 11년 31년 31억 21억 21억 21억 21억 21억 21억 21억 21억 21억 2	$\begin{array}{c} 68.\ 472.\ 176.\ 581.\ 286.\ 792.\ 9 \ 4.\ 86 \ 5.\ 13 \\ 68.\ 572.\ 276.\ 581.\ 286.\ 692.\ 7 \ 4.\ 40 \ 4.\ 64 \\ 68.\ 572.\ 276.\ 581.\ 186.\ 592.\ 5 \ 3.94 \ 4.\ 15 \\ 68.\ 572.\ 276.\ 581.\ 186.\ 592.\ 3 \ 2.99 \ 3.\ 15 \\ 68.\ 672.\ 276.\ 581.\ 186.\ 392.\ 3 \ 2.99 \ 3.\ 15 \\ 68.\ 672.\ 276.\ 581.\ 186.\ 392.\ 3 \ 2.99 \ 3.\ 15 \\ 61.\ 665.\ 970.\ 776.\ 382.\ 990.\ 6 \ 3.\ 61 \ 3.\ 2.99 \ 3.\ 15 \\ 61.\ 765.\ 970.\ 776.\ 382.\ 990.\ 6 \ 3.\ 61 \ 3.\ 2.99 \ 3.\ 15 \\ 61.\ 765.\ 970.\ 776.\ 382.\ 990.\ 6 \ 3.\ 61 \ 3.\ 2.99 \ 3.\ 15 \\ 61.\ 766.\ 870.\ 382.\ 790.\ 3 \ 2.99 \ 3.\ 13 \\ 61.\ 766.\ 870.\ 382.\ 790.\ 3 \ 2.99 \ 3.\ 13 \\ 61.\ 766.\ 870.\ 382.\ 790.\ 3 \ 2.99 \ 3.\ 13 \\ 61.\ 766.\ 870.\ 382.\ 790.\ 3 \ 2.99 \ 3.\ 13 \\ 61.\ 760.\ 32.\ 790.\ 32.\ 790.\ 3 \ 2.99 \ 3.\ 13 \\ 61.\ 760.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 32.\ 790.\ 790.\ 32.\ 790.\ 790.\ 790.\ 700.\ 790.\ 790.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 700.\ 70$	172 172 172 172 172 172 172 172 172 172	11222001	. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9.	81 881 881 881 881 881 881 881 881 881	<u>8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 </u>	80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5 80.5	7 92 5 92 5 92 8 90 7 90 7 90 7 90	0 ~ 7 4 8 0 4 8 1 0	446660 860000 84666 9600000	50420 10004	64 15 15 15 15 15 15 15 15 15 15 15 15 15	$\begin{array}{c} 68.472.176.581.286.792.9 \\ 4.865572.276.581.286.692.7 \\ 44.40 \\ 4.64 \\ 4.92 \\ 5.27 \\ 68.5772.276.581.186.592.5 \\ 3.94 \\ 4.15 \\ 4.40 \\ 4.64 \\ 4.92 \\ 5.22 \\ 68.672.276.581.186.592.5 \\ 3.94 \\ 4.15 \\ 4.40 \\ 4.66 \\ 5.87 \\ 4.10 \\ 61.86 \\ 5.87 \\ 4.10 \\ 61.86 \\ 65.970.776.382.990.6 \\ 3.61 \\ 3.86 \\ 4.14 \\ 4.47 \\ 61.76 \\ 5.970.776.382.890.4 \\ 3.28 \\ 3.50 \\ 3.51 \\ 3.33 \\ 3.54 \\ 4.05 \\ 61.86 \\ 60.070.776.382.890.4 \\ 3.299 \\ 3.13 \\ 3.36 \\ 3.61 \\ 3.62 \\ 61.96 \\ 61.70.876.382.790.3 \\ 2.99 \\ 3.13 \\ 3.36 \\ 3.05 \\ 4.05 \\ 61.96 \\ 61.70.876.382.790.1 \\ 2.59 \\ 2.76 \\ 2.96 \\ 3.19 \\ 3.62 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.75 \\ 2.$	5.44         5.77           4.92         5.22           4.40         5.22           4.40         5.22           3.87         4.10           3.33         3.54           4.14         4.47           3.75         4.05           3.75         4.05           3.75         4.05           3.76         3.62           2.96         3.19           2.56         2.75	5.77 5.22 4.66 4.10 3.54 4.47 4.47 3.54 3.62 3.62 3.19 2.75	5.44         5.77         6.16           4.92         5.22         5.57           4.492         5.62         5.57           3.87         4.10         4.37           3.87         3.54         3.76           4.14         4.47         4.86           4.16         4.47         4.86           3.33         3.54         3.76           3.75         4.05         4.40           3.75         3.93         3.46           3.75         3.93         3.49           2.96         3.19         3.46           2.96         2.19         3.46           2.96         2.919         3.46	6.16 5.57 4.97 3.76 4.86 4.86 3.93 3.46 2.98	6.16 6.60 5.57 5.96 4.97 5.39 4.37 4.67 3.76 4.02 4.80 5.31 4.40 4.80 3.93 4.29 3.46 3.77 2.98 3.25		<u> </u>	77.7 82.1 70.4 74.2 630.6 66.4 47.8 50.4 47.8 50.4 57.7 61.7 52.5 56.0 46.9 50.1 35.8 38.2	87.0 70.4 61.9 66.2 68.2 69.0 47.3 70.4 47.3 70.0 80.0	92.3 83.5 83.5 83.5 65.6 56.6 56.6 71.5 71.5 71.5 64.8 57.9 57.9 51.0	3     98.5     1       5     79.5     5       6     60.1     6       6     77.7     7       8     70.4     6       9     62.9     6       0     55.3     0       47.7     7     7	98.5 105.6 89.1 95.3 79.5 85.1 60.9 74.7 60.1 64.3 77.7 84.9 70.4 76.8 62.9 68.6 55.3 60.3 47.7 52.0	
4	9	740 042 1940 042	12.2	375 375	99	79.]	$\frac{182}{82}$	<u> </u>	87.1	$\frac{292}{191}$	0. %	4.2 3.8	ৰ ক	4.43 4.01	4 4	88	4 8 <del>4</del>	<u>5</u> .4.	11 62	<b>5</b> .39 <b>4</b> .87	67. 61.	84	0.9	8         72.3         75.6         79.1         82.9         87.2         92.0         4.24         4.43         4.63         4.86         5.11         5.39         67.8         70.9         74.1         4.13         4.63         4.440         4.62         4.451         67.8         70.9         74.1         67.2         4.13         4.61         4.40         4.62         4.87         61.4         64.1         67.2         67.2         67.2         40.2         4.40         4.62         4.87         61.4         64.1         67.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2         41.2	77.7	7 81.7 4 73.9	72.375.679.182.987.292.0 4.24 4.43 4.63 4.86 5.11 5.39 67.8 70.9 74.1 77.7 81.7 86.2 72.375.679.182.987.191.8 3.84 4.01 4.20 4.40 4.62 4.87 61.4 64.1 67.2 70.4 73.9 77.9	0 0

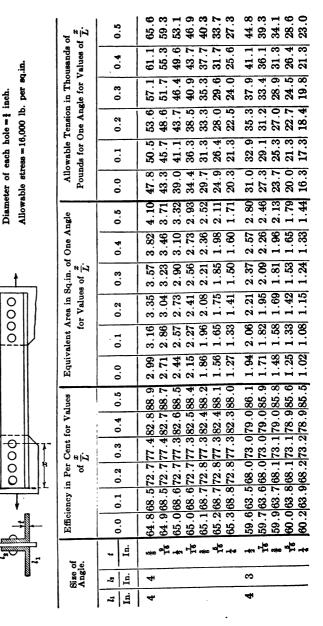
1

72

69.6 61.1 52.8 69.9 63.3 56.6 49.9 43.0 36.1	71.0 64.5 57.6 50.7 43.7 36.6	64.8 58.5 52.5 52.5 339.8 339.8 333.4	66.2 53.7 47.3 34.2 34.2
<u></u>	7405592	<b>L. W. L. U. 4</b>	0.1.0.10.0
66. 50. 52. 53. 33. 33.	67 69 54 48 41 34 34	53 53 36 36 30 30	63 57 51 51 45 39 32 32 32
0.84.0004.01	1.3.6.8.9.7	<u> </u>	1200001
62.9 55.3 47.7 59.0 53.6 53.6 48.0 42.4 30.7 30.7	63.7 57.9 51.8 51.8 39.3 33.1	53.7 48.8 43.8 38.7 33.4 28.0	60.1 54.5 48.9 48.9 37.3 31.2
60.0 52.8 54.7 54.7 445.6 339.3 339.3 28.6	60.6 55.0 49.3 37.6 31.5	49.6 44.9 40.3 35.7 30.9 25.9	57.4 52.1 46.7 41.3 35.7 29.7
•			
57.4 50.5 51.0 51.0 51.0 51.0 51.0 51.0 31.8 31.8 31.8 26.7	57.9 52.5 47.0 41.6 35.8 30.1	45.9 41.7 37.4 33.1 28.6 24.1	55.0 44.8 39.5 38.6 28.6
55.0 41.9 41.9 47.8 39.0 334.4 25.1	55.2 50.2 39.7 34.4 28.8	42.7 38.9 35.0 30.9 26.7 22.5	52.8 47.8 43.0 37.9 32.8 27.5
25 29 29 29 29 29 29 29 29 29 29 29 29 29	55. 50. 33. 28. 28.	5 8 3 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	52 47 37 32 27
$\begin{array}{c} 35\\ 35\\ 32\\ 54\\ 56\\ 69\\ 26\\ 26\\ 26\\ 26\\ 26\\ 26\\ 26\\ 26\\ 26\\ 26$	29 1 20 03 <del>1</del> 4 29 29 29 29	39 80 80 92 90 92 90 92 90 92 90 92 90 92 90 92 90 92 90 92 90 92 92 92 92 92 92 92 92 92 92 92 92 92	14 75 36 96 14
4.35 3.30 3.30 3.30 4.37 3.36 3.54 3.54 3.54 2.69 2.26	4.44 4.03 3.60 3.17 2.73 2.29	4.05 3.66 3.28 2.89 2.49 2.09	4.14 3.75 3.36 2.96 2.55 2.14
4.13 3.63 3.13 3.13 3.13 3.63 3.63 3.63 3	4.20 3.81 3.41 3.41 2.59 2.59	3.67 3.33 2.98 2.98 2.63 2.27 1.90	3.94 3.57 3.57 3.20 2.82 2.44 2.64
3.93 3.46 2.98 3.69 3.35 3.35 3.35 1.92 1.92	3.98 3.62 3.24 2.85 2.46 2.07	3.36 3.05 3.05 2.74 2.42 2.42 1.75	3.76 3.41 3.41 3.06 2.69 2.33 1.95
3.75 3.30 2.85 3.11 3.11 3.11 3.11 3.11 2.78 2.78 2.78 2.12 1.79	$\begin{array}{c} 3.79\\ 3.44\\ 3.44\\ 3.08\\ 2.72\\ 2.35\\ 1.97\end{array}$	$\begin{array}{c} 3.10\\ 2.81\\ 2.52\\ 2.52\\ 1.93\\ 1.62\end{array}$	3.59 3.26 2.92 2.58 2.23 1.87
		н н ю ю ю ю	
3.59 3.16 3.16 2.73 3.19 2.90 2.90 2.90 1.99 1.67	82 4 0 2 8 8 8 8 8 8 8 9 4 8 8 8 8 8 8 8 8 8 8 8	87 61 07 51 51	3.44 3.12 2.80 2.47 2.47 1.79
3.59 3.16 3.16 2.73 3.19 3.19 2.60 2.60 1.99 1.67	3.62 3.28 2.94 2.24 1.88	2.87 2.61 2.34 2.34 1.79 1.51	3.44 3.12 2.80 2.47 2.14 1.79
44 62 99 99 86 57 57 57	2 4 - 8 2 9	1233937	
3.44 3.44 2.62 2.62 2.99 2.44 2.44 1.57 1.57	3.45 3.14 2.81 2.48 2.48 1.80	2.67 2.43 2.19 1.93 1.67 1.41	3.30 2.99 2.69 2.37 2.37 1.72
704 010000	2 4 8 0 1 3	<u>8 9 9 9 7 7 7 8 9 8 9 8 9 8 9 8 9 8 9 8 </u>	6.2.9
91. 91. 888. 888. 888. 888. 888. 888. 88	90.08 80.08 80.08 80.08	87. 87. 87. 87. 87.	80 80 80 90 . 80 80 80 80 80 9
$\begin{array}{c} \begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $	4 90 2 90 9 89 9 89	787 687 687 587 587 587 487	1 2 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
87. 86. 86. 87. 87. 87. 87.	8 8 8 8 8 8 8 . 	9 79. 9 79. 0 79. 0 79. 0 79.	
888 886 886 886 886 886 881 886 881 881	.085. 985. 885. 885.	979 979 979 979 979 979	3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
82 82 82 82 82 82 75 75 75 75 75 75	70.2 73.5 77.0 81.0 85 70.2 73.5 77.0 81.0 85 70.3 73.5 77.0 81.0 85 70.3 73.6 77.0 80.9 85 70.4 73.6 77.0 80.9 85 70.4 73.6 77.0 80.8 85 70.4 73.6 77.0 80.8 85	.272.372.372.373.4473.4573.573.573.573.573.5573.5573	8 I 8 8 1 8 8 1 8 8 1 8 8 1 8 8 1 8 8 1 8 8 1 8 8 1 8 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 1 8 1 1 8 1 8 1 8 1 8 1 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
811000000000	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0,00,4,4,0	77.981 77.981 77.981 77.981 77.981 77.981 77.981
72.475.679 72.575.679 60.764.969 60.764.969 60.865.069 60.865.069 61.065.169 61.065.169 61.165.269 61.165.269 61.265.369	.5 77 .5 77 .5 77 .6 77 .6 77 .6 77	67 67 67 67	22222
377 <u>10</u> 00,000	0.0.0.0.0	<u>8 4 7 9 7 8</u>	
2 4 75 6 2 4 75 6 2 5 75 6 2 5 75 6 2 5 75 6 2 5 6 2 5 0 6 5 0 0 9 6 5 0 0 9 6 5 0 0 9 6 5 0 1 6 5 2 3 2 6 5 3 3 2 6 5 3 3 5 7 5 6 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7	2 73 2 73 3 73 4 73 4 73	58.0 62 58.1 62 58.3 62 58.4 62 58.6 62 58.6 62 58.7 62	.674.6 .674.6 .774.7 .774.7 .774.7 .874.7 .874.7
72.4 72.5 60.7 60.8 60.9 61.1 61.1 61.2	70.2 70.2 70.3 70.3 70.4	58.0 58.1 58.3 58.4 58.6 58.7	
	100 000 110 000 000	다. 300 대 20 전 300 전 300 10 00 00 00 00 00 00 00 00 00 00 00 0	100 0000 <b>117 10</b> 0 000
тк со	ъ	<i>ლ</i>	υ
Ŋ	n 10 10	сı	(C)

~~
- 55
- 22
-5
- 25
- 33
-
- 52
-0
<b>r</b> >
$\sim$
-
×'
[7]
_
-
~
<u> </u>
_
_

One Hole for 4-inch Rivet Deducted from Connected Leg



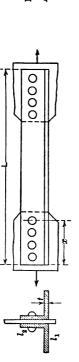
74

#010 H 10	<b>70 4 1 1 00 01 00 00</b>		ເດັກວ່າຊີ ເບັ	99
45.4 40.0 34.5 29.1 23.5	55.5 50.4 39.8 28.8 23.3 23.3 23.3 23.3	40.9 36.0 31.2 26.2 21.1	41.3 36.5 31.5 26.4 21.3	36.6 32.3
42.9 37.7 32.6 22.5 22.2	51.7 46.9 42.1 37.1 32.0 26.9 21.7	37.7 33.3 28.9 28.9 24.3 19.7	38.7 34.1 29.6 24.8 20.0	33.4 29.6
			0010	
40.6 35.8 31.0 26.1 21.1	48.1 43.8 39.3 34.7 30.1 25.3 20.5	35.2 31.0 26.9 18.2	36.5 32.1 28.0 28.0 18.9	30.9
4.0.000	4400000		444-0	<u></u>
38.5 34.1 29.4 24.8 20.0	45.1 41.1 36.9 32.6 28.1 28.1 19.2	32.8 28.9 25.1 21.1 17.1	$\frac{34}{22}$	28.6 25.3
04020	5101040	30.7 27.2 23.7 19.8 16.1	0.00 - 0.0	26.7
36.6 32.5 23.7 19.0	42.5 38.7 34.9 30.7 20.7 22.4 18.2		32.6 28.8 25.1 25.1 16.9	
100100	40.1 36.6 32.9 29.1 29.1 21.3 21.3	0.0410	30.9 27.3 23.8 23.8 20.0 16.1	24.9 22.1
35.0 30.9 26.7 28.7 18.2				
$\begin{array}{c} 2.84 \\ 2.50 \\ 2.16 \\ 1.82 \\ 1.47 \\ 1.47 \end{array}$	3.47 3.15 3.15 2.82 2.89 2.14 1.80 1.80	$\begin{array}{c} 2.56\\ 2.25\\ 1.95\\ 1.64\\ 1.32\\ 1.32 \end{array}$	$\begin{array}{c} 2.58\\ 2.28\\ 1.97\\ 1.65\\ 1.33\\ 1.33\end{array}$	2.29
				ରାରା
2.68 2.36 2.04 1.72 1.39	3.23 2.93 2.63 2.63 2.32 1.68 1.68	2.36 2.08 1.81 1.52 1.52	$\begin{array}{c} 2.42 \\ 2.13 \\ 1.85 \\ 1.55 \\ 1.26 \end{array}$	2.09 1.85
5 5 5				1.2
2.54 2.24 1.94 1.63	3.01 2.74 2.46 2.46 1.88 1.88 1.58	2.20 1.94 1.68 1.68 1.41 1.14	2.28 2.01 1.75 1.47 1.18	1.93
			00	
$\begin{array}{c} 2.41 \\ 2.13 \\ 1.84 \\ 1.55 \\ 1.25 \\ 1.25 \end{array}$	$\begin{array}{c} 2.82\\ 2.57\\ 2.57\\ 2.04\\ 1.76\\ 1.49\\ 1.20\\ \end{array}$	$\begin{array}{c} 2.05\\ 1.81\\ 1.57\\ 1.57\\ 1.32\\ 1.07\\ 1.07\end{array}$	$\begin{array}{c} 2.15\\ 1.90\\ 1.65\\ 1.38\\ 1.12\\ 1.12 \end{array}$	1.67 1.79 1.48 1.58
0.01 H H		81111	01	
$\begin{array}{c} 2.29 \\ 2.03 \\ 1.75 \\ 1.48 \\ 1.48 \\ 1.19 \end{array}$	$\begin{array}{c} 2.66\\ 2.42\\ 2.18\\ 1.92\\ 1.66\\ 1.40\\ 1.14\end{array}$	$   \begin{array}{c}     1.92 \\     1.70 \\     1.48 \\     1.24 \\     1.21 \\     1.01 \\   \end{array} $	2.04 1.80 1.57 1.31 1.31	.67 .48
001111				
2.19 1.93 1.67 1.41 1.14	2.51 2.51 2.29 2.06 1.82 1.82 1.33 1.33	1.81 1.60 1.40 1.17 0.95	$\begin{array}{c} 1.93 \\ 1.71 \\ 1.49 \\ 1.49 \\ 1.25 \\ 1.01 \end{array}$	1.56
89999				
7.2 7.2 9.0 0.0	6.2 6.3 7.2 8.5 7.0 7.2	5.0.4 8.0.0 8.0 8.0	5 5 8 9 9 9 5 9 8 9 9 9	. T. 3
<u> </u>	<u> </u>	<u> &amp; &amp; &amp; &amp; &amp; &amp; &amp; </u>	<u> လ်လ်လ်လ်</u>	<u> 00 00</u>
282.587.5 182.487.3 182.387.2 082.387.0 082.286.9	81.187.2 81.087.0 80.986.9 80.886.7 80.786.5 80.686.3 80.686.3	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		76. 76.
8 0 0	~~~~~	0 0 0 0 0 0	<u> </u>	<u>0</u> 0
278.278.278.278.278.278.278.278.278.278.	871.075.7 971.175.7 071.175.7 071.175.7 071.275.7 171.275.7 271.375.7 271.375.7 271.375.7	13 23 23	775 76 76 76 76	20
44444				5.2
574. 674. 674. 774. 774.	321077	1666666	907 117 2777 2777	86
370. 470. 570. 670.	2 66. 3 66. 5 67. 6 67. 8 67.	222222	67. 68. 68.	<b>8</b>
. 4 0	00 7 00 0 F 00 10	60.4         64.1         68.3         73.2         78.8         85.2         1.81           60.5         64.2         68.4         73.2         78.7         85.1         1.60           60.7         64.4         568.4         73.2         78.7         85.1         1.60           60.7         64.4         568.5         73.3         778.7         85.0         1.40           60.8         64.5         568.6         773.3         778.6         84.9         1.17           60.8         64.5         568.6         773.3         778.6         84.8         0.95           61.0         64.6         68.7         773.3         78.6         84.8         0.95	4.567.971.775980.686.0         4.668.071.775980.685.9         4.668.171.775980.685.9         4.688.171.876.080.685.9         4.968.171.876.080.585.8         4.968.271.976.080.585.5	<b>56.860.765.170.276.283.3</b> <b>57.060.865.270.376.283.1</b>
$ \begin{array}{c} 67.3 \\ 70.5 \\ 74.2 \\ 76.4 \\ 70.6 \\ 74.2 \\ 77.1 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 77.2 \\ 78.2 \\ 82.2 \\ 86.9 \\ 1 \end{array} $	63. 2       66. 8       71. 0       75. 7       81. 1       87. 2       2. 51       2         63. 3       66. 9       71. 1       75. 7       81. 0       87. 0       2       29       2         63. 4       67. 0       71. 1       75. 7       80. 9       86. 0       2       20       2         63. 5       67. 0       71. 1       75. 7       80. 9       86. 7       1. 82       1         63. 5       67. 0       71. 1       75. 7       80. 9       86. 7       1. 82       1         63. 5       67. 1       71. 2       7       80. 8       7       1. 58       1         63. 6       67. 1       7       2       80. 8       86. 7       1. 33       1         63. 6       67. 3       7       80. 6       86. 3       1. 33       1         63. 8       67. 3       7       80. 6       86. 2       1. 08       1		<u></u>	
*** *** *** *** *** ***	144 140 140 141 140 140 144	*************	*** H ⁰ and H ¹ n?*	* 12
4		<b>က</b>		24
ຕ	÷	3	eo	31

TABLE V—Concluded

EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE

One Hole for §-inch Rivet Deducted from Connected Leg



Allowable stress = 16,000 lb. per sq.m.

	Size of Angle.	of e.	E	Efficiency in Per Cent for Values of $\frac{x}{L}$ .	y in	Per of	$\frac{\pi}{L}$	t for	Valu	a l	Equ	iivale	ent Ai for	rea in r Valu	Area in Sq.in. o for Values of $\frac{x}{L}$ .	Equivalent Area in Sq. in. of One Angle for Values of $\frac{x}{L}$ .	Angle	Pot	llowa ands f	ble T or On	ension ie Ang	in Tho le for V	Allowable Tension in Thousands of Pounds for One Angle for Values of $rac{x}{L}$	
lı lı. In. In.	la In.	t In.	0.0	0.1	1 0	0.2	0.3	0	0.2 0.3 0.4 0.5	.5	0.0		0.1	0.2	0.3	0.4	0.5	0.0		0.1	0.2	0.3	0.4	0.5
31	$2\frac{1}{2}$	50 00 00 00 00 00 00 00 00 00 00 00 00 0	57. 57. 57.	2 61 5 61 7 61	.3 <u>0</u> .3 <u>0</u>	5 5 3 5 5 3	70.4 70.4	3 76 4 76 5 76	<u>80 80 80</u> 17 17 17	2.8	1.2 1.0 8.0	321	. 53 88 . 09	1.38 1.17 0.94	1.45 1.21 1.01	3 1.6 1.3( 1.1(	$ \begin{array}{c} 57.2 & 61.0 & 65.3 & 70.3 & 76.2 & 83.0 \\ 57.5 & 61.1 & 65.5 & 70.4 & 76.2 & 83.0 \\ 57.5 & 61.1 & 65.5 & 70.4 & 76.2 & 82.9 \\ 57.7 & 61.3 & 65.6 & 70.5 & 76.2 & 82.8 \\ 57.7 & 61.3 & 65.6 & 70.5 & 76.2 & 82.8 \\ 57.7 & 61.3 & 65.6 & 70.5 & 76.2 & 82.8 \\ 57.7 & 61.3 & 65.6 & 70.5 & 76.2 & 82.8 \\ 57.7 & 61.3 & 65.6 & 70.5 & 76.2 & 82.8 \\ 57.7 & 61.3 & 65.6 & 70.5 & 76.2 & 82.8 \\ 57.7 & 61.3 & 65.6 & 70.5 & 76.2 & 82.8 \\ 57.7 & 51.3 & 51.4 & 13.3 & 14.1 & 15.0 & 16.1 & 17.6 & 19.0 \\ 57.7 & 51.3 & 51.4 & 51.4 & 15.0 & 16.1 & 17.6 & 19.0 \\ 57.7 & 51.3 & 51.4 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.3 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.3 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.3 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.3 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.3 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.3 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 57.7 & 51.4 & 51.4 & 51.4 & 51.4 \\ 5$	16. 16. 13.	33 20	.1	22.1 18.7 15.0	23.7 20.0 16.1	23.7 25.7 28.0 20.0 21.7 23.5 16.1 17.6 19.0	28.0 23.5 19.0
2 ³¹	3F		66 . 65 . 65 . 65 . 65 . 65 . 65 . 65 .	65.9 69.0 72.5 76.3 80.5 85.3 66.0 69.1 72.5 76.3 80.4 85.1 66.1 69.2 172.5 76.3 80.4 85.0 66.1 69.2 72.5 76.3 80.4 85.0 66.2 69.2 72.6 76.2 80.3 84.8 66.3 66.3 87.5 6 76.2 80.3 84.8 75.0 66.3 67.5 80.3 84.8 75.0 66.3 67.5 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 80.3 84.8 75.0 86.3 80.3 84.8 75.0 86.2 850.3 84.8 75.0 86.2 850.3 84.8 75.0 86.2 850.3 84.8 75.0 86.2 850.3 84.8 75.0 850.3 84.8 75.0 86.2 850.3 84.8 75.0 86.2 850.3 84.8 75.0 86.2 850.3 84.8 75.0 850.3 84.8 75.0 850.3 84.8 75.0 850.3 84.8 75.0 850.3 84.8 75.0 850.3 84.8 75.0 850.3 84.8 75.0 850.3 850.3 84.8 75.0 850.3 850.3 84.8 75.0 850.3 850.3 84.8 75.0 850.3 850.3 84.8 75.0 850.3 850.3 84.8 75.0 850.3 850.3 84.8 750.2 850.3 84.8 750.2 850.3 84.8 750.2 850.3 84.8 750.2 850.3 84.8 750.2 850.3 84.8 750.2 850.3 84.8 750.2 850.3 84.8 750.2 850.3 850.2 850.3 84.8 750.2 850.3 850.2 850.3 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850.2 850	35510	<u></u>	76. 76. 76. 76.	8080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 88080 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8800 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000 8000	<u>v. 4. 4. 0. 0</u> <u>og og og og og</u>	.576.380.585.3 .576.380.485.1 .576.380.485.0 .676.280.384.8 .676.280.384.7	1.81 1.60 1.60 1.39 1.18		1.90 1.68 1.46 1.23	1.90 1.99 1.68 1.76 1.46 1.53 1.23 1.29	2.10 1.85 1.61 1.61	2.21 2.21 1.95 1.95 1.43 1.43	$ \begin{array}{c} 65.9 \\ 66.0 \\ 69.0 \\ 72.5 \\ 76.3 \\ 80.4 \\ 86.0 \\ 69.1 \\ 72.5 \\ 76.3 \\ 80.4 \\ 85.1 \\ 1.60 \\ 1.60 \\ 1.60 \\ 1.60 \\ 1.60 \\ 1.60 \\ 1.60 \\ 1.60 \\ 1.61 \\ 1.76 \\ 1.95 \\ 1.61 \\ 1.70 \\ 1.70 \\ 1.70 \\ 1.70 \\ 1.70 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1.71 \\ 1$	t 28.9 25.6 22.2 18.9	20 30 30 30 30 30 30 30 30 30 30 30 30 30	30.4 26.9 23.3 19.7 16.0	31.8 28.1 24.5 20.6	33.6 29.6 25.7 21.7 17.6	33.6 35.3 29.6 31.2 25.7 27.2 21.7 22.9 17.6 18 4	37.4 33.1 28.6 24.1 19.5
n	രം.		61.	61.3 64.9 68.9 73.3 78.5 84.3 61.6 65.0 69.0 73.3 78.4 84.2 61.6 65.1 [69.0 73.3 78.4 84.1]		0.00	73. 73. 73.	378 178 178	<u> </u>	1.23	9 <del>1</del> 1 1		. 78 .58 .37	1.68 1.68 1.45	1.26	1.9(1)		888	572 80 7	<u><u> </u></u>	20.2 26.9 23.2	32.1 28.5 24.8	34.5 30.4 26.4	

76

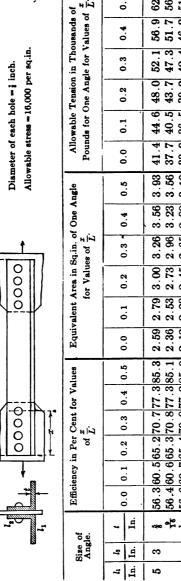
23.8 19.3	25.1 21.1 17.1	25.4 21.4 17.3	22.22 18.9 15.3 11.5	19.0 16.1 13.1 9.9	19.5 16.5 13.4 10.2	16.3 13.7 11.2 8.5	11.5 9.4 7.2
10	00 01 10	0 1 0	1000				180
18.	19 23	<b>16.2</b>	8749 12	17.6 14.9 12.0 9.1		15.2 12.8 10.5 8.0	10. 8. 6.
20.9 16.9	21.6 18.2 14.7	22.5 19.0 15.3	19.3 16.5 13.4 10.1	16.3 13.7 11.2 8.6	17.3 14.7 11.8 11.8 9.1	14.1 12.0 9.9 7.5	10.2 8.3 6.4
3.0	3.9	4.1 8.1 5.1	9.6 9.6	<b>5.2</b> <b>0.4</b> <b>8.0</b>	6.5 3.9 8.6 8.6	3.3 1.2 9.3 7.0	9.7 8.0 6.1
5 19 0 16	.9 20 .0 16 .9 13	.3 21 .9 14				.5 13 .5 11 .5 11 .5 13 .5 13	7.5.3
18.1	18. 16. 12.	20 17 13	17.3 14.7 11.8 9.1	14.2 12.0 9.8 7.5	15. 13. 8.	12.1 8.8 6.4	9.7.7
17.6 14.2	17.7 15.0 12.1	19.2 16.3 13.3	16.3 13.9 11.2 8.5	13.3 11.3 9.3 7.0	14.9 12.6 10.2 7.8	11.8 10.1 8.3 6.2	8.8 7.2 5.6
.49	.57 .32 .07	. 59 . 34 .08	$\begin{array}{c} 1.39 \\ 1.18 \\ 0.96 \\ 0.72 \end{array}$	$ \begin{array}{c} 1.19\\ 1.01\\ 0.82\\ 0.62\end{array} $	1.22 1.03 0.84 0.64	1.02 0.86 0.70 0.53	. 72 . 59 . 45
1 1							8 0. 2 0.
1.39	$1.45 \\ 1.22 \\ 0.99$	$1.50 \\ 1.26 \\ 1.02$	$\begin{array}{c} 1.30 \\ 1.10 \\ 0.89 \\ 0.76 \end{array}$	1.10 0.93 0.75 0.57	1.15 0.97 0.79 0.60	0.95 0.80 0.66 0.50	0.68 0.55 0.42
1.31 1.06	1.35 1.14 0.92	$1.41 \\ 1.19 \\ 0.96$	1.21 1.03 0.84 0.63	$ \begin{array}{c} 1.02\\ 0.86\\ 0.70\\ 0.54 \end{array} $	$\begin{array}{c} 1.08 \\ 0.92 \\ 0.74 \\ 0.57 \end{array}$	0.88 0.75 0.62 0.47	0.64 0.52 0.40
$1.23 \\ 1.00$	$1.26 \\ 1.06 \\ 0.86$	$1.34 \\ 1.13 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ 0.91 \\ $	$\begin{array}{c} 1.14 \\ 0.97 \\ 0.78 \\ 0.60 \end{array}$	0.95 0.80 0.65 0.50	1.03 0.87 0.70 0.54	0.83 0.70 0.58 0.44	0.61 0.50 0.38
	0						
1.16 0.94	1.18 1.00 0.81	$1.27 \\ 1.07 \\ 0.87 $	$\begin{array}{c} 1.08 \\ 0.92 \\ 0.74 \\ 0.57 \end{array}$	0.89 0.75 0.61 0.47	0.97 0.83 0.67 0.51	0.78 0.66 0.55 0.41	0.58 0.47 0.36
1.10 0.89	1.11 0.94 0.76	1.20 1.02 0.83	1.02 0.87 0.70 0.53	0.83 0.71 0.58 0.44	0.93 0.79 0.64 0.49	0.74 0.63 0.52 0.39	0.55 0.45 0.35
0.6	0.00 1-	0.0.00	20.044		0000	0000	400
383	.681 .681 .681	0 83 0 82 82 83	175.080 275.080 375.080 475.080	0.77.0. 1.770. 1.770. 1.770.	279 279 278	r 8 6 0	272 372 472
.478. 578.	.275. 375. 475.	578 578 678	175 275 375 475	771 971 171 371	074. 174. 274. 374.	.169. 369. 770.	5 68 9 68 9 68
.1 73.4 2 73.5	670.5 .770.3 .870.4	673.5 673.5 773.6	970.1 170.2 270.5	.265.771 465.971 666.171 .866.371	2 70.0 74 4 70.1 74 5 70.2 74 7 70.3 74	0 65.1 3 65.5 8 65.1	164.5 464.7 764.9
9.173. 9.273.	65.6 65.7 65.8	9.6			0401		• • •
.369. 469.	5 65 7 65 9 65	.069. .169. .369.	6 5 3 2	.261 .561 .861 .161	0.1.0.7	.561 .861 .161 .461	.161 .561 .961
865 065	961 161 361	866 966 166	862 062 462	757 057 457 758	5 63 62 5 63 62 5 63 62	357 757 158 158 558	4 58 28 58 2
61.8 62.(	57.9 58.1 58.3	62.5 63.1	59.5 59.5 59.4	53.7 54.0 54.7	8, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9,	54.3 54.7 55.13	55.4 55.8
81 H4		500 20 H	aka ≄⊨ Aka ∞ka				
<b>.</b>	23	ŝ	24	8	23	69	2
	n	23	23	23	8	8	13

SFP 25 1919

TABLE V—Continued

EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE

One Hole for ³-inch Rivet Deducted from Connected Leg



	2		62.5	56.5	51.0	44.9	38.7	32.5	0 1 0	5	58.5	52.5	46.2	40.0	33.4
usanus alues c	4 0		56.9	51.7	46.2	40.8	35.3	29.6	0 10	0.10	55.8	49.9	44.0	38.1	31.8
Allowable renator in thousands of $\frac{x}{L}$ . Pounds for One Angle for Values of $\frac{x}{L}$ .			56.3 60.5 65.2 70.7 77.3 85.3 2.59 2.79 3.00 3.26 3.56 3.93 41.4 44.6 48.0 52.1 56.9 62.9	56.460.665.370.877.385.1 2.36 2.53 2.73 2.96 3.23 3.56 37.7 40.5 43.7 47.3 51.7 56.9	56.660.765.470.877.285.0 2.12 2.28 2.45 2.65 2.89 3.19 33.9 36.5 39.2 42.4	1.88 2.01 2.17 2.34 2.55 2.81 30.1 32.1 34.7 37.4 40.8 44.9	1.63 1.74 1.88 2.03 2.21 2.42 26.1 27.8 30.1 32.5 35.3 38.7	57.261.165.770.977.284.7 1.37 1.47 1.58 1.70 1.85 2.03 21.9 23.5 25.3 27.2 29.6 32.5	1	03.4/2.5/10.0/2.0/03.0/20.0 2.5/ 3.20 3.00 3.0/ 3.00 4.00 10.0 00.0 00.0 00.0 00.0	69.9 72.9 76.0 77.0 76.0 79.6 83.4 87.6 70.9 73.3 75.8 75.8 75.5 75.8 75.8 75.8 75.7 75.8 75.8	70.072.976.079.583.387.5 2.62 2.73 2.85 2.98 3.12 3.28 41.9 43.7 45.6 47.7 49.9 52.5	42.1	36.3	30.4
re Angl	â		48.0	43.7	39.2	34.7	30.1	25.3	0	0.00	6.03	45.6	<b>40.1</b>	34.7	29.1
for Or			14.6	FO.5	36.5	32.1	8.73	3.5	1	2.2	8.8	13.7	8.5	33.4	0.8
Pounds	0	2	1.4	7.7	3.9	0.1	6.1	1.9		0.1	7.8 4	1.9 4	7.1 8	2.0	6 9 5
	2	, ,	93 4	56 3	19 3	81 3	42 2	03 2		0	66 4	28 4	89 3	50 3	ool 2
e Angl		5 F	56 3.	23	89 3.	55 2.	21 2.	85 2.		8 4	49 3.	12 3.	75 2.	38 2.	00
		; 	6 3	<u>8</u>	5	<u>4</u>	5	0 1.	0 1	<u>,</u>	 	80 80		1 2	-
Area in Eq. in . of for Values of $\frac{x}{L}$ .		· · ·	0 3.2	3 2.9	5 2.6	7 2.3	8 2.0	8 1.7	, , 	0.0 0	3.3	5 2.9	1 2.6	7 2.2	2 1 9
for Va	Ċ		3.0	2.7	2.4	2.1	1.8	1.5	ن د	0.0	3.1	50 00 00	2.5	2.1	õ
valent	-	1.5	2.79	2.53	2.28	2.01	1.74	1.47	2 0	0.0 0.0	3.05	2.73	2.41	2.09	1 75
Emcency in fer Cent for values bequivalent Area in Sq.in. of One Angle of $\frac{x}{L}$ .		2	2.59	2.36	2.12	1.88	1.63	1.37	00	0.22	2.99	2.62	2.32	2.00	1.68
aiuea		2. 2	85.3	85.1	85.0	84.9	84.8	84.7	0	0.10	87.6	87.5	87.4	87.3	87.1
IOI A		н >	77.3	877.3	877.2	877.2	977.2	77.2		00.00	83.4	83.3	83.2	83.1	83.0
of $\frac{x}{L}$ .			2 70.2	3/70.8	4 70.8	5 70.8	6 70.9	770.9		<u>u 19.5</u>	0 79.(	079.8	079.8	079.1	079.4
		-	.565.	.6 65.	.7 65.	.965.	.0 65.	.1 65.	010	0/0.	.9/76.	.9/76.	976.	.0/76.	076.
mclenc		>	.360	.460	.660	56.860.965.570.877.284.9	57.061.065.670.977.284.8	.261		216.	.972	0.72	.072	.173	.173
	li la l' 0.0 0.1 0.0 0.0 0.0 0.5	In.		<del>1</del> 8  56			¥ 27	fa 57		80 8	<del>3</del> 9 <del>%</del>	₹ [70	년 10	E 70.173.076.079.583.187.3 2.00 2.09 2.17 2.27 2.38 2.50 32.0 33.4 34.7 36.3 38.1	~ 170
Size of Angle.	13	Ę	3							0 0					
<b>.</b>	4	Ę	S						c	0				_	

•

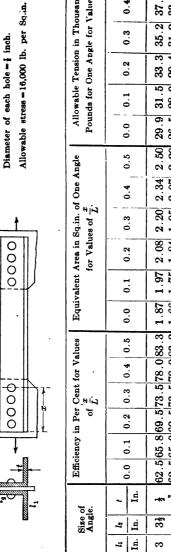
TABLES

30 33 32 33 39.5 35.0 30.4 25.6 20.6 45.4 40.8 26.0 6 36.8 31.7 26.7 21.6 31.0 5 3 ~ 3 50 00 6 0. 0 3 3 ō 20 02 8.12 10 22 28 23 29 8 8 7 49 553 42 42 41 39.3 34.7 30.1 25.4 20.5 4 . . . . . . . . 5 1 1 2 3 1.011 0 00 20 -00 6 -1 555 550 339 34 10 23 28 39 <del>6</del> 29. 33 88 88 8 8 19 2 0 2 3 1 5 2 1 2 20 6 4 9. 5 8 0 ~ 1 00 3 2 10 Ξ -Ξ. 0 6 9 0 28. 24. 37.23 33.17.28 19 35. 24. 52 22 34 <del>4</del>3 27 33 18 31 28 ຊ 16 0.0 80230 20 010010 1915778 100010 10 28 28 28 19 35 22 18 23 33 25 19 41 37 17 8 8 8 15 21 2 0 00 0 0 9 20 6 0000 3 9 80 00 2 1 6 Ξ -6.7 0 9 10 19. 19.23.23 12 28.33 16. 21 29 33 42 29 33 24 29 33 2 28 23 23 28 8 83 18 2.10 3.99 3.61 3.24 2.85 2.46 2.71 2.39 2.06 1.73 1.40 76 3.36 3.05 2.74 2.41 2.08 1.75 1.42 8 66 43 47 18 4 1 88 58 80 Ξ 4 R બં બં 2 a. -i 8  $1.93 \\ 1.56$ 1.98 1.32 1.75 49 .19 1.90 29 300 67 35 2 2 55 25 94 1.64 28 8 47 19 71 36 66 30 30 Ľ. 00 00 00 00 c i R --R R ÷. ŝ 2 ci. R *c*i *c*i -2.03 3.47 3.15 2.83 2.49 2.16 1.46 1.48 1.88 1.592.92 2.66 2.38 2.12 1.81 2.30 1.2046 2.17 28 1.54 1.24 1.87 1.63 .82 .37 Ξ 2 1.89 1.38 1.12 1.79  $\begin{array}{c} 2.74 \\ 2.50 \\ 2.24 \\ 1.98 \end{array}$ 1.45 1.75 1.523.26 2.96 2.35 2.35 2.35 1.70 1.70 14 1.6420 1.51 22 98 34 71 . 17 28 2 2 ai સં 1.70 1.16 2.792.512.221.921.61 1.30 2.00 1.53 1.291.05 1.97 1.43 2.582.352.11 1.87 1.62 1.361.10 1.86 1.64 1.43 33 5 97 <u>___</u> 0 , m 2.64 2.37 2.10 1.82 1.53 87 1.66 1.44  $1.21 \\ 0.99$ .12 88 1.63 1.11 2.43 2.222.00 1.77 1.53 1.29 1.051.75 1.55 1.35 23 .37 92 6 ~~~~ Ξ. 2 સં Ö **F** 4 6 0 1 0 õ 9 5 84.4 0 6 Ó 6 3 3 0 80 7 3 3 8 3 2 9 1 1 Õ 0 -.876.583. 976.583. 076.583. .076.583. 80.185. 80.184. 80.084. 484. 86. 76.583. 84. 25. 84. 85. 78.484. 78.383. 8 8 8 80 86 86 82 86 86 83 83 0 78.58 78.58 78.48 20 78.38 80.3 80.3 Ö 76.1 5 S 4 4 ۲. 6 80.08 78. 8 8 8 . 8 76. 8 2 00 00 00 6 5 2 2 4 4 4 4 4 9 4 4 5 5 80 80 6 4 75. 75. 75. 75. 75. 75. 75. 71. 75. 75. 5 2 2 2 75. 75. 75. 33 73 73 73 73 73. 133 2 71.0 6 0 72.1 Õ 3 0 3 6 0 o 8000 00 1 1. 1 .1 2 2 0 ŝ 4 5 80 --72. 72. 1. .99 12. 2 88. 69. 69. 69. 65. 33 99 99 69 69 69 66. 2222 99 99 99 8 .9|e 61.56 0 61.8 õ 6 õ 65.36 õ 2 0 5 2710 00 2 0 Ξ. ŝ -4 80 9 2 5 <u>68</u>. 88. 65. 065. 66. 67. 67. 61. 62 જી જી 88 4 64 5 65 6 65 7 65 65. 61 2 2 62 62 62 99 62 2 1001 01 00 4 1 40010 6 3 101 0 8888.8 65. 65. 65. 558 57 58 33 82 80.80 28 60 63 31 က 4 က 33 31 ŝ

TABLE V—Continued

EFFICIENCY AND ALLOWABLE TENSION FOR ANGLES RIVETED THROUGH ONE LEG TO A RIGID CONNECTION PLATE

One Hole for **‡**-inch Rivet Deducted from Connected Leg



of M <u>T</u> .	50	2	<b>4</b> 0.0	35.2	30.5	25.6	20.6	35.2	31.0	26.9	22.7	18.4
ueande alves c	4		37.4	33.1	28.6	24.0	19.5	32.1	28.5	24.6	20.8	16.8
in Tho le for V	 0	2	35.2	31.2	27.0	22.7	18.4	 29.6	26.2	22.9	19.2	15.7
Allowable Tension in Thousands of Pounds for One Angle for Values of $\frac{\pi}{L}$	 c		33.3	29.4	25.6	21.4	17.4	 27.5	24.3	21.1	12.9	4.5
rable T s for O			31.5	0.8	24.3	20.3	16.5	 25:6	22.7	8.6	6.8	3.6
Allor Pound			<u>4</u> 62.565.869.573.578.083.3 1.87 1.97 2.08 2.20 2.34 2.50 29.9 31.5 33.3 35.2 37.4 40.0	26.5	23.0	19.3	1.22 1.29 15.7 16.5 17.4 18.4 19.5	 24.0 Z	1.3 2	8.5]	$\frac{1}{16} 55.258.862.967.773.279.7 0.98 1.05 1.12 1.20 1.30 1.42 15.7 16.8 17.9 19.2 20.8 22.7 10.8 17.9 10.2 10.2 10.2 10.2 10.2 10.2 10.2 10.2$	4         155.4         159.0         63.1         67.2         79.7         0.80         0.85         0.91         0.98         1.05         1.15         12.8         13.6         14.5         15.7         16.8         18.4
gle	4	I.	2.50	5.20	1.91	[ 09.]		 5.20	.94	.68	.42]	. 15 1
Equivalent Area in Sq.in. of One Angle for Values of $rac{x}{L}.$	¥ C		.34	20.3	. 79	. 50	.22	 .01	. 78	.54 1	.30 1	.05
in. of $\frac{x}{L}$	3	2	20	.95 2	.69	.42 ]	.15 1	 .85	.64 1	.43 1	201	.98
Area in Sq.in. of for Values of $\frac{x}{L}$ .			.08 2	.84 1	.60	.34 1	63.0 66.2 69.7 73.7 78.0 82.9 0.98 1.03 1.09 1.15	 .72 1	.52 1	.32 1	.12 1	.91 0
ent Are for		, :	.97 2	.75 1	.52 1	.27] 1	.03 1	 .60 1	.42 1	.24 1	.05 1	.85 0
3quival	• •	2	.87 1	.66 1	.44 1	.21 1	.98	 50 1	.33 1	16 1	98 1	80 0
		> 	.31	.2 1	.1	.0	0 6.	 0.	-1 0	<u>.</u>	.7	.7 0.
r Valu	0		8.083	8.083	8.083	8.083	8.082	 3.280	3.2/79	3.2/79	3.279	3.2/79
Cent for $L$ : L:	0 3 0		73.57	73.57	73.67	73.67	73.77	 37.47	37.57	37.67	37.77	37.8/7
Efficiency in Per Cent for Values of $\frac{f_{x}}{\hat{L}}$	6 0	•	69.5	69.5	69.69	69.6	69.7	 62.5	62.6	62.8	62.9	63.1
îciency	- 0	5	565.8	5 65.9	766.0	8 66.1	0 66.2	5 58.2	7 58.4	0 58.6	2 58.8	<u>4</u>  59.0
E	-		62.	62.	62.	62	63.	 54.	5	55.0	55.	55.
Size of Angle.		In	31 3	-191	eo eo	¶م 	-14	 -401	- <b>P</b>	0400	192	-14
Sin	l1 l2	In. In.	3 3 3					 31 21				
	l1	ц Ц	3					က်				

TABLES