You can find values of $F_y$ and $F_u$ for various structural steels in Table 2-3 in the Manual. All of the steels that are available for various hot-rolled shapes are indicated by shaded areas. The black areas correspond to preferred materials, and the gray areas represent other steels that are available. Under the W heading, we see that A992

\[ \text{3/4} \phi \text{ BOLT} \]

13/16 drill

1/16 damage hole [16.1-18]

1/16 inch or punch standard holes (i.e., not oversized) with a diameter 1/16 inch larger than the fastener diameter. To account for possible roughness around the edges of the hole, Section B4.3 of the AISC Specification (in the remainder of this book, references to the Specification will usually be in the form AISC B4.3) requires the addition of 1/16 inch to the actual hole diameter. This amounts to using an effective hole diameter 1/8 inch larger than the fastener diameter. In the case of slotted holes, 1/16 inch should be added to the actual width of the hole. You can find details related to standard, oversized, and slotted holes in AISC J3.2, “Size and Use of Holes” (in Chapter J, “Design of Connections”).
3. **Gross and Net Area Determination**

3a. **Gross Area**

The gross area, $A_g$, of a member is the total cross-sectional area.

3b. **Net Area**

The net area, $A_n$, of a member is the sum of the products of the thickness and the net width of each element computed as follows:

In computing net area for tension and shear, the width of a bolt hole shall be taken as $1/16$ in. (2 mm) greater than the nominal dimension of the hole.

For a chain of holes extending across a part in any diagonal or zigzag line, the net width of the part shall be obtained by deducting from the gross width the sum of the diameters or slot dimensions as provided in this section, of all holes in the chain, and adding, for each gage space in the chain, the quantity $s^2/4g$,

where

\[ s = \text{longitudinal center-to-center spacing (pitch) of any two consecutive holes, in. (mm)} \]
\[ g = \text{transverse center-to-center spacing (gage) between fastener gage lines, in. (mm)} \]

For angles, the gage for holes in opposite adjacent legs shall be the sum of the gages from the back of the angles less the thickness.

For slotted HSS welded to a gusset plate, the net area, $A_n$, is the gross area minus the product of the thickness and the total width of material that is removed to form the slot.

In determining the net area across plug or slot welds, the weld metal shall not be considered as adding to the net area.

For members without holes, the net area, $A_n$, is equal to the gross area, $A_g$.

**User Note:** Section J4.1(b) limits $A_n$ to a maximum of $0.85A_g$ for splice plates with holes.
FOR BOLTED PLATES:

\[ A_{\text{effective}} = U A_{\text{net}} \]

(51a) \[ \text{[16.1-28]} \]

\[ U = 1.0 \text{ for plates} \]

WHY? NO OUTSTANDING UNCONNECTED ELEMENTS
$U = \text{SHEAR LAG FACTOR}$

L5" x 3" x 1/2" Effect of Length of Connection

$A_e = U A_m$

$U < 1$
$U = 0$

CENTROIDS

$\bar{y} = 1.74"$

$\bar{y} = 0.746$

Diagram shows a load P acting on a plate with dimensions and a shear lag factor U applied.
### Table 1-7 (continued)
#### Angles Properties

<table>
<thead>
<tr>
<th>Shape</th>
<th>k</th>
<th>Wt.</th>
<th>Area, $A$</th>
<th>$I$</th>
<th>$S$</th>
<th>$r$</th>
<th>$ar{y}$</th>
<th>$Z$</th>
<th>$y_p$</th>
<th>J</th>
<th>$C_w$</th>
<th>$T_o$</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>in. lb/ft</td>
<td>in.$^2$</td>
<td>in.$^4$</td>
<td>in.$^3$</td>
<td>in.</td>
<td>in.$^3$</td>
<td>in.</td>
<td>in.$^4$</td>
<td>in.$^3$</td>
<td>in.$^4$</td>
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<td>13.9</td>
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<td>1.55</td>
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<td>7.60</td>
<td>1.10</td>
<td>1.09</td>
<td>1.52</td>
<td>2.36</td>
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<tr>
<td>1 1/4 x 3/8</td>
<td>3/4</td>
<td>19.8</td>
<td>13.9</td>
<td>4.28</td>
<td>1.55</td>
<td>1.74</td>
<td>7.60</td>
<td>1.10</td>
<td>1.09</td>
<td>1.52</td>
<td>2.36</td>
<td></td>
</tr>
<tr>
<td>1 1/4 x 3/8</td>
<td>3/4</td>
<td>19.8</td>
<td>13.9</td>
<td>4.28</td>
<td>1.55</td>
<td>1.74</td>
<td>7.60</td>
<td>1.10</td>
<td>1.09</td>
<td>1.52</td>
<td>2.36</td>
<td></td>
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<td>1 1/4 x 3/8</td>
<td>3/4</td>
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<td>13.9</td>
<td>4.28</td>
<td>1.55</td>
<td>1.74</td>
<td>7.60</td>
<td>1.10</td>
<td>1.09</td>
<td>1.52</td>
<td>2.36</td>
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<tr>
<td>1 1/4 x 3/8</td>
<td>3/4</td>
<td>19.8</td>
<td>13.9</td>
<td>4.28</td>
<td>1.55</td>
<td>1.74</td>
<td>7.60</td>
<td>1.10</td>
<td>1.09</td>
<td>1.52</td>
<td>2.36</td>
<td></td>
</tr>
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**Note:** For workable gages, refer to Table 1-7A. For compactness criteria, refer to Table 1-7B.

**American Institute of Steel Construction**
### Table 1-7 (continued)

#### Angles Properties

<table>
<thead>
<tr>
<th>Shape</th>
<th>Axis Y-Y</th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$l$</td>
<td>$S$</td>
<td>$r$</td>
<td>$\bar{X}$</td>
<td>$Z$</td>
<td>$\chi_p$</td>
<td>$l$</td>
<td>$S$</td>
<td>$r$</td>
<td>$\tan \alpha$</td>
<td>$F_{y} = 36$ ksl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in.$^4$</td>
<td>in.$^3$</td>
<td>in.</td>
<td>in.</td>
<td>in.$^3$</td>
<td>in.</td>
<td>in.$^4$</td>
<td>in.$^3$</td>
<td>in.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L6x4x7/8</td>
<td>9.70</td>
<td>3.37</td>
<td>1.10</td>
<td>1.12</td>
<td>6.26</td>
<td>0.657</td>
<td>5.82</td>
<td>2.91</td>
<td>0.854</td>
<td>0.421</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>L5x3x11/8</td>
<td>2.15</td>
<td>1.13</td>
<td>0.824</td>
<td>0.748</td>
<td>2.08</td>
<td>0.375</td>
<td>1.55</td>
<td>0.953</td>
<td>0.362</td>
<td>0.357</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>L6x4x11/8</td>
<td>2.29</td>
<td>1.00</td>
<td>0.831</td>
<td>0.722</td>
<td>1.82</td>
<td>0.331</td>
<td>1.37</td>
<td>0.840</td>
<td>0.644</td>
<td>0.361</td>
<td>1.00</td>
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</tr>
<tr>
<td>L6x3x11/8</td>
<td>2.01</td>
<td>0.874</td>
<td>0.893</td>
<td>0.694</td>
<td>1.57</td>
<td>0.286</td>
<td>1.20</td>
<td>0.726</td>
<td>0.646</td>
<td>0.384</td>
<td>0.983</td>
<td></td>
</tr>
<tr>
<td>L6x3x11/8</td>
<td>1.72</td>
<td>0.739</td>
<td>0.848</td>
<td>0.673</td>
<td>1.31</td>
<td>0.241</td>
<td>1.01</td>
<td>0.610</td>
<td>0.649</td>
<td>0.388</td>
<td>0.912</td>
<td></td>
</tr>
<tr>
<td>L6x4x11/8</td>
<td>1.41</td>
<td>0.600</td>
<td>0.853</td>
<td>0.546</td>
<td>1.05</td>
<td>0.194</td>
<td>0.825</td>
<td>0.491</td>
<td>0.652</td>
<td>0.371</td>
<td>0.804</td>
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</tr>
<tr>
<td>L6x3x11/8</td>
<td>7.62</td>
<td>2.79</td>
<td>1.18</td>
<td>1.27</td>
<td>5.02</td>
<td>0.680</td>
<td>3.25</td>
<td>1.81</td>
<td>0.774</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>L6x4x11/8</td>
<td>6.62</td>
<td>2.38</td>
<td>1.20</td>
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<td>2.76</td>
<td>1.59</td>
<td>0.774</td>
<td>1.00</td>
<td>1.00</td>
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</tr>
<tr>
<td>L6x3x11/8</td>
<td>5.52</td>
<td>1.96</td>
<td>1.21</td>
<td>1.18</td>
<td>3.50</td>
<td>0.469</td>
<td>2.25</td>
<td>1.35</td>
<td>0.776</td>
<td>1.00</td>
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</tbody>
</table>

Note: For workable gages, refer to Table 1-7A. For compactness criteria, refer to Table 1-7B.
Example 3.1

A \( \frac{3}{4} \times 5 \) plate of A36 steel is used as a tension member. It is connected to a gusset plate with four \( \frac{3}{8} \)-inch-diameter bolts as shown in Figure 3.3. Assume that the effective net area \( A_e \) equals the actual net area \( A_n \) (we cover computation of effective net area in Section 3.3).

a. What is the design strength for LRFD?

**Solution**

For yielding of the gross section,

\[
A_g = 5(1/2) = 2.5 \text{ in.}^2
\]

and the nominal strength is

\[
P_n = F_y A_g = 36(2.5) = 90.0 \text{ kips}
\]

For fracture of the net section,

\[
A_n = A_g - A_{holes} = 2.5 - (\frac{1}{2})(\frac{3}{4}) \times 2 \text{ holes}
\]

\[
= 2.5 - 0.75 = 1.75 \text{ in.}^2
\]

\[
A_e = A_n = 1.75 \text{ in.}^2 \text{ (This is true for this example, but } A_e \text{ does not always equal } A_n)\]

The nominal strength is

\[
P_n = F_y A_e = 58(1.75) = 101.5 \text{ kips}
\]

a. The design strength based on yielding is

\[
\phi P_n = 0.90(90) = 81.0 \text{ kips}
\]

The design strength based on fracture is

\[
\phi P_n = 0.75(101.5) = 76.1 \text{ kips}
\]
### Table 2-4

**Applicable ASTM Specifications for Various Structural Shapes**

<table>
<thead>
<tr>
<th>Steel Type</th>
<th>ASTM Designation</th>
<th>$F_y$ Min. Yield Stress (kSI)</th>
<th>$F_u$ Tensile Stress (kSI)</th>
<th>Applicable Shape Series</th>
<th>HSS</th>
<th>Rect.</th>
<th>Round</th>
<th>Flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASB</td>
<td>36</td>
<td>58-80P</td>
<td></td>
<td>W, M, S, HP, C, MC, L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS3 Gr. B</td>
<td>35</td>
<td>60</td>
<td></td>
<td>W, M, S, HP, C, MC, L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gr. B</td>
<td>42</td>
<td>58</td>
<td></td>
<td>W, M, S, HP, C, MC, L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Preferred material specification**
- **Other applicable material specification, the availability of which should be confirmed prior to specification**
- **Material specification does not apply**

*Minimum unless a range is shown.*
ANSWER The design strength for LRFD is the smaller value: $\phi P_n = 76.1$ kips.

The effects of stress concentrations at holes appear to have been overlooked. In reality, stresses at holes can be as high as three times the average stress on the net section, and at fillets of rolled shapes they can be more than twice the average (McGuire, 1968). Because of the ductile nature of structural steel, the usual design practice is to neglect such localized overstress. After yielding begins at a point of stress concentration, additional stress is transferred to adjacent areas of the cross section. This stress redistribution is responsible for the “forgiving” nature of structural steel. Its ductility permits the initially yielded zone to deform without fracture as the stress on
Flat bars with holes
EXAMPLE 3.2

A single-angle tension member, an L3\(\frac{1}{2}\) \times 3\(\frac{1}{2}\) \times 3\(\frac{3}{8}\), is connected to a gusset plate with \(7/8\)-inch-diameter bolts as shown in Figure 3.4. A36 steel is used. The service loads are 35 kips dead load and 15 kips live load. Investigate this member for compliance with the AISC Specification. Assume that the effective net area is 85% of the computed net area.

a. Use LRFD.

FIGURE 3.4

SOLUTION

First, compute the nominal strengths.

Gross section:

\[ A_g = 2.50 \text{ in}^2 \] (from Part 1 of the Manual)
\[ P_n = F_y A_g = 36(2.50) = 90 \text{ kips} \]

Net section:

\[ A_n = 2.50 - \left( \frac{3}{8} \right) \left( \frac{7}{8} + \frac{1}{8} \right) = 2.125 \text{ in}^2 \]
\[ A_e = 0.85 A_n = 0.85(2.125) = 1.806 \text{ in}^2 \] (in this example)
\[ P_n = F_y A_e = 58(1.806) = 104.7 \text{ kips} \]

a. The design strength based on yielding is

\[ \phi_f P_n = 0.90(90) = 81 \text{ kips} \]

The design strength based on fracture is

\[ \phi_f P_n = 0.75(104.7) = 78.5 \text{ kips} \]

The design strength is the smaller value: \( \phi_f P_n = 78.5 \text{ kips} \)

Factored load:
Table 1-7 (continued)
Angles
Properties

<table>
<thead>
<tr>
<th>Shape</th>
<th>k</th>
<th>Wt.</th>
<th>Area, A</th>
<th>l</th>
<th>S</th>
<th>r</th>
<th>y</th>
<th>Z</th>
<th>y_p</th>
<th>J</th>
<th>C_w</th>
<th>T_o</th>
</tr>
</thead>
<tbody>
<tr>
<td>L3 1/2 x 3 1/2 x 1/2</td>
<td>7/8</td>
<td>10.2</td>
<td>3.02</td>
<td>3.45</td>
<td>1.45</td>
<td>1.07</td>
<td>1.17</td>
<td>2.61</td>
<td>0.44</td>
<td>0.090</td>
<td>0.191</td>
<td>1.75</td>
</tr>
<tr>
<td>L3 1/2 x 3 1/2 x 1/2</td>
<td>7/8</td>
<td>11.1</td>
<td>3.25</td>
<td>3.63</td>
<td>1.48</td>
<td>1.05</td>
<td>1.05</td>
<td>2.66</td>
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<td>0.238</td>
<td>1.87</td>
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<tr>
<td>L3 1/2 x 3 1/2 x 1/2</td>
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<td>9.80</td>
<td>2.50</td>
<td>2.86</td>
<td>1.15</td>
<td>1.07</td>
<td>1.00</td>
<td>2.06</td>
<td>0.357</td>
<td>0.123</td>
<td>0.106</td>
<td>1.90</td>
</tr>
<tr>
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<td>8.50</td>
<td>2.50</td>
<td>2.86</td>
<td>1.15</td>
<td>1.07</td>
<td>1.00</td>
<td>2.06</td>
<td>0.357</td>
<td>0.123</td>
<td>0.106</td>
<td>1.90</td>
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</table>

Note: For workable gages, refer to Table 1-7A. For compactness criteria, refer to Table 1-7B.
### Table 1-7 (continued) Angles Properties

<table>
<thead>
<tr>
<th>Shape</th>
<th>Axis Y-Y</th>
<th>Axis Z-Z</th>
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<th>( \tan \alpha )</th>
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<td>( l )</td>
<td>( S )</td>
<td>( r )</td>
<td>( x )</td>
</tr>
<tr>
<td></td>
<td>( \text{in.}^4 )</td>
<td>( \text{in.}^3 )</td>
<td>( \text{in.} )</td>
<td>( \text{in.} )</td>
</tr>
<tr>
<td>( \times \frac{1}{4} )</td>
<td>1.33</td>
<td>0.565</td>
<td>0.887</td>
<td>0.725</td>
</tr>
<tr>
<td>( \times \frac{3}{4} \times \frac{3}{4} \times \frac{1}{2} )</td>
<td>3.63</td>
<td>1.48</td>
<td>1.05</td>
<td>1.05</td>
</tr>
<tr>
<td>( \times \frac{1}{2} )</td>
<td>6.25</td>
<td>1.32</td>
<td>1.06</td>
<td>1.03</td>
</tr>
<tr>
<td>( \times \frac{3}{4} )</td>
<td>2.86</td>
<td>1.15</td>
<td>1.07</td>
<td>1.00</td>
</tr>
<tr>
<td>( \times \frac{1}{4} )</td>
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<td>0.979</td>
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<tr>
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<td>2.50</td>
<td>1.05</td>
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<td>0.954</td>
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</table>

American Institute of Steel Construction
Table 1-7 (continued)

Angles

Properties

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<tr>
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<th>$k$</th>
<th>Wt.</th>
<th>Area, $A$</th>
<th>Axis X-X</th>
<th>Flexural-Torsional Properties</th>
</tr>
</thead>
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<td></td>
<td>in.</td>
<td>lb/ft</td>
<td>in.²</td>
<td>$l$</td>
<td>$S$</td>
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<td>39</td>
<td></td>
<td></td>
<td>40</td>
<td>400</td>
</tr>
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<td>L2½×2</td>
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<tr>
<td>L2½</td>
<td></td>
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</tr>
<tr>
<td>L2½×1</td>
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<td>L2</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>L2½x2</td>
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Table 1-7A

Workable Gages in Angle Legs, in.

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<thead>
<tr>
<th>Leg</th>
<th>g</th>
<th>g₁</th>
<th>g₂</th>
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<th>5</th>
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<tr>
<td>g</td>
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<td></td>
<td>3/2</td>
<td>3</td>
</tr>
<tr>
<td>g₁</td>
<td></td>
<td>2'</td>
<td>2'</td>
<td>2'</td>
<td>2</td>
</tr>
<tr>
<td>g₂</td>
<td></td>
<td></td>
<td>2'</td>
<td>2'</td>
<td>3/2</td>
</tr>
</tbody>
</table>

Note: Other gages are permitted to suit specific requirements subject to clearances and edge distance limitations.
Combination 1: \[1.4D = 1.4(35) = 49 \text{ kips}\]
Combination 2: \[1.2D + 1.6L = 1.2(35) + 1.6(15) = 66 \text{ kips}\]

The second combination controls; \(P_u = 66 \text{ kips}\).

(When only dead load and live load are present, combination 2 will always control when the dead load is less than eight times the live load. In future examples, we will not check combination 1 [1.4D] when it obviously does not control.)

**ANSWER**

Since \(P_u < \phi P_m\) (66 kips < 78.5 kips), the member is satisfactory.
EXAMPLE 3.3

A double-angle shape is shown in Figure 3.5. The steel is A36, and the holes are for 1/2-inch-diameter bolts. Assume that $A_s = 0.75A_n$.

a. Determine the design tensile strength for LRFD.

b. Determine the allowable strength for ASD.

FIGURE 3.5

Plate

SOLUTION

example, we consider one angle and double the result. For one angle, the nominal strength based on the gross area is

$$P_n = F_y A_g = 36(2.41) = 86.76 \text{ kips}$$

There are two holes in each angle, so the net area of one angle is

$$A_n = 2.41 - \left( \frac{5}{16} \right) \left( \frac{1}{2} + \frac{1}{8} \right) \times 2 = 2.019 \text{ in.}^2$$

The effective net area is

$$A_e = 0.75(2.019) = 1.514 \text{ in.}^2$$
The nominal strength based on the net area is
\[ P_n = F_u A_n = 58(1.514) = 87.81 \text{ kips} \]

\( A_n = 1.0 A_m \)

a. The design strength based on yielding of the gross area is
\[ \phi P_n = 0.90(86.76) = 78.08 \text{ kips} \]

The design strength based on fracture of the net area is
\[ \phi P_n = 0.75(87.81) = 65.86 \text{ kips} \]

**ANSWER** Because 65.86 kips < 78.08 kips, fracture of the net section controls, and the design strength for the two angles is 2 \times 65.86 = 132 \text{ kips},

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### 3.3 **EFFECTIVE AREA**

Of the several factors influencing the performance of a tension member, the manner in which it is connected is the most important. A connection almost always weakens the member, and the measure of its influence is called the **joint efficiency**. This factor is a function of the ductility of the material, fastener spacing, stress concentrations at holes, fabrication procedure, and a phenomenon known as **shear lag**. All contribute to
\[ A_e = A_n U \]

For welded connections, we refer to this reduced area as the effective area (rather than the effective net area), and it is given by

\[ A_e = A_g U \]

where the reduction factor \( U \) is given in AISC D3, Table D3.1. The table gives a general equation that will cover most situations as well as alternative numerical values.

1. A general category for any type of tension member except plates and round HSS with \( \frac{l}{D} \geq 1.5D \) (See Figure 3.7e.)
2. Plates
3. Round HSS with \( \frac{l}{D} < 1.5D \)
4. Alternative values for single and double angles
5. Alternative values for W, M, S, and HP shapes

1. For any type of tension member except plates and round HSS with \( \frac{l}{D} < 1.5D \)

Shear Lag Factor: \[ U = 1 - \frac{x}{l} \]

(See Eq. 3.1)
# TABLE D3.1
Shear Lag Factors for Connections to Tension Members

<table>
<thead>
<tr>
<th>Case</th>
<th>Description of Element</th>
<th>Shear Lag Factor, $U$</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All tension members where the tension load is transmitted directly to each of the cross-sectional elements by fasteners or welds (except as in Cases 4, 5 and 6).</td>
<td>$U = 1.0$</td>
<td><img src="https://example.com/diagram1" alt="Diagram" /></td>
</tr>
<tr>
<td>2</td>
<td>All tension members, except plates and HSS, where the tension load is transmitted to some but not all of the cross-sectional elements by fasteners or longitudinal welds or by longitudinal welds in combination with transverse welds. (Alternatively, for W, M, S and HP, Case 7 may be used. For angles, Case 8 may be used.)</td>
<td>$U = 1 - \frac{x}{l}$</td>
<td><img src="https://example.com/diagram2" alt="Diagram" /></td>
</tr>
<tr>
<td>3</td>
<td>All tension members where the tension load is transmitted only by transverse welds to some but not all of the cross-sectional elements.</td>
<td>$U = 1.0$ and $A_p = \text{area of the directly connected elements}$</td>
<td><img src="https://example.com/diagram3" alt="Diagram" /></td>
</tr>
</tbody>
</table>
| 4    | Plates where the tension load is transmitted by longitudinal welds only. | a) $l \geq 2w...U = 1.0$

b) $2w > l \geq 1.5w...U = 0.87$

c) $1.5w > l \geq w...U = 0.75$ | ![Diagram](https://example.com/diagram4) |
| 5    | Round HSS with a single concentric gusset plate | a) $l \geq 1.3D...U = 1.0$

d) $D \leq l < 1.3D...U = 1 - \frac{x}{l}$

$\bar{x} = \frac{D}{\pi}$ | ![Diagram](https://example.com/diagram5) |
| 6    | Rectangular HSS with a single concentric gusset plate | $l \geq H...U = 1 - \frac{x}{l}$

$\bar{x} = \frac{B^2 + 2BH}{4(B + H)}$ | ![Diagram](https://example.com/diagram6) |
|      | with two side gusset plates | $l \geq H...U = 1 - \frac{x}{l}$

$\bar{x} = \frac{B^2}{4(B + H)}$ | ![Diagram](https://example.com/diagram7) |
| 7    | W, M, S or HP Shapes or Tees cut from these shapes. (If $U$ is calculated per Case 2, the larger value is permitted to be used.) | a) $b_1 \geq 2/3d...U = 0.90$

c) $b_1 < 2/3d...U = 0.85$

c) $U = 0.70$ | ![Diagram](https://example.com/diagram8) |
| 8    | Single and double angles (If $U$ is calculated per Case 2, the larger value is permitted to be used.) | a) $U = 0.80$

c) $U = 0.60$ | ![Diagram](https://example.com/diagram9) |

$I = \text{length of connection, in. (mm)}$; $w = \text{plate width, in. (mm)}$; $\bar{x} = \text{eccentricity of connection, in. (mm)}$; $B = \text{overall width of rectangular HSS member, measured 90° to the plane of the connection, in. (mm)}$; $H = \text{overall height of rectangular HSS member, measured in the plane of the connection, in. (mm)}$.