3.6.2.1 Design Procedure

The connection shall be designed so that yielding occurs either as a combination of beam flexure and panel zone yielding or as beam flexure alone. The design should be performed using the steps below. The various parameters used in the equations are defined in Figure 3-16 and in AISC-LRFD.

**Step 1:** Calculate \( M_f \) and \( M_c \) according to the methods of Section 3.2.7.

**Step 2:** Select end plate bolt size by solving Equation 3-31 for \( T_{ub} \) and selecting bolt type and \( A_{bolt} \) as required:

\[
M_f < 3.4T_{ub}(d_c + d_i)
\]  
(3-31)

where:

\( T_{ub} = 90A_{bolt} \) for A325 bolts  
\( = 113A_{bolt} \) for A490 bolts  
and \( d_c \) and \( d_i \) are as defined in Fig. 3-16

Confirm that \( T_{ub} \) satisfies the Equation:

\[
T_{ub} \geq \frac{0.00002305 p_f^{0.591} (F_{fu})^{2.583}}{t_p^{0.895} d_{bt}^{1.909} t_s^{0.327} b_p^{0.965}} + T_b
\]  
(3-32)

Where \( T_b \) is the minimum bolt pretension per Table J3.1 of AISC-LRFD and \( F_{fu} \) is as defined in Equation 3-36.

Adjust bolt size as required.

**Step 3:** Check the adequacy of the selected bolt size to preclude shear failure by ensuring that the area \( A_b \) of the bolts, satisfies the formula:

\[
A_b \geq \frac{2M_f}{L - d_c + V_g} + V_g
\]  
(3-33)

**Step 4:** Determine the minimum end plate thickness \( t_p \) required to preclude end plate flexural yielding as the larger of the values given by equations 3-34 or 3-35:

\[
t_p \geq \frac{0.00609 p_f^{0.9} g^{0.6} F_{fu}^{0.9}}{d_{bt}^{0.9} t_s^{0.1} b_p^{0.7}}
\]  
(3-34)

\[
t_p \geq \frac{0.00413 p_f^{0.25} g^{0.15} F_{fu}}{d_{bt}^{0.7} t_s^{0.15} b_p^{0.3}}
\]  
(3-35)

where: