Figure 3-14   Geometry of Unstiffened End Plate Connection

3.2.2   Bolted Stiffened End Plate Connection

This bolted stiffened end plate (BSEP) connection is made by shop-welding the beam to the end plate using (1) a CJP welded joint for the beam flanges to the end plate and (2) fillet welds for the beam web to end plate. The endplate is then field-bolted to the column. The CJP groove weld of the beam flange is made without using a weld access hole, and is therefore not a prequalified weld in the area of the beam flange, where backing cannot be installed. However, qualification of this joint detail to meet AWS requirements is not necessary. The outstanding flanges of the end plate at the top and bottom of the beam are stiffened by a vertical fin plate that extends outward from the beam flanges. These stiffener plates are CJP double-bevel groove welded to the beam flanges and end plates. This type of connection can be used in either Ordinary Moment Frame or Special Moment Frame systems within the limitations given in Table 3-9. A detail of this connection type is shown in Fig. 3-15.

Commentary: The behavior of this type of connection can be controlled by a number of different behavioral modes including flexural yielding of the beam section, flexural yielding of the end plates, yielding of the column panel zone, tension failure of the end plate bolts, shear failure of the end-plate bolts, and failure of the various welded joints. Some of these modes are brittle, and therefore are undesirable while others have significant ductility. Flexural yielding of the beam and shear yielding of the column panel zone are behavioral modes capable of exhibiting acceptable levels of inelastic behavior. Other modes are not. The design procedure contained in this section is based on inelastic action occurring in preferred modes. The various elements of the connection are then designed with sufficient strength so that other modes are unlikely to occur. FEMA-355D, State Of Art Report on Connection Performance, provides further discussion of the performance of these connections and summaries of test data and references.