

## 7 CALCULATION OF DESIGN ACTIONS

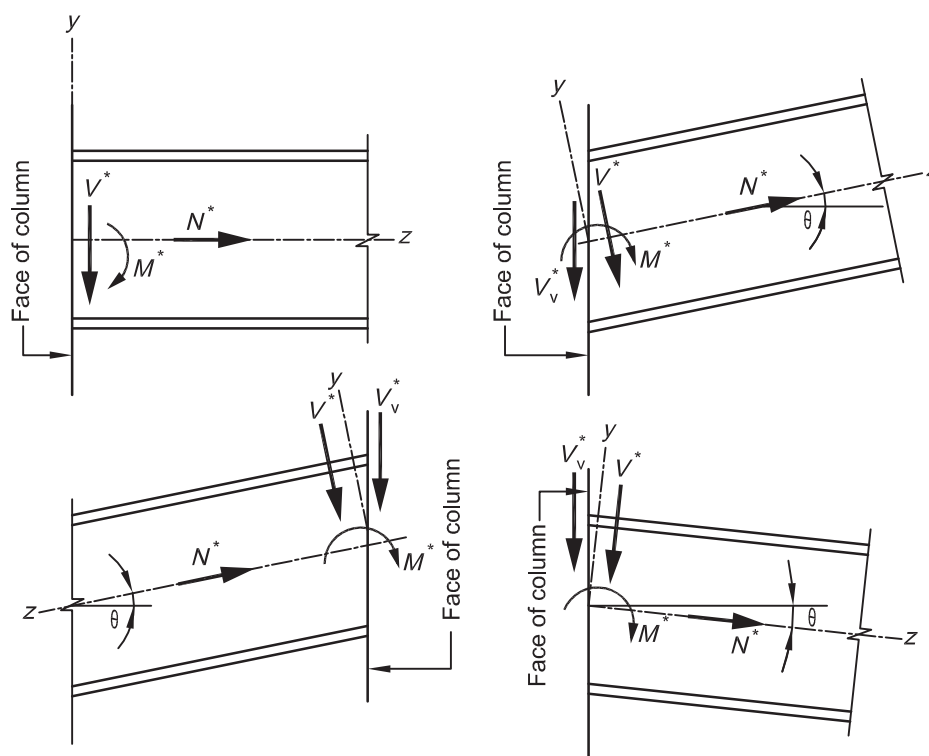


FIGURE 11 DESIGN ACTIONS ON BEAM AT COLUMN

The design action effects at the connection can be determined from either:

- (a) elastic analysis (Clause 4.4 of AS 4100) which could in turn be either—
  - (i) a first order elastic analysis with moment amplification (Clause 4.4.2 of AS 4100); or
  - (ii) a second order elastic analysis (Appendix E of AS 4100);
- or
- (b) plastic analysis (Clause 4.5 of AS 4100).

Applied actions at a connection are assumed to be those shown in Figure 11:

- a design bending moment about the section x-axis  $M^*$
- a design shear force parallel to the section y-axis  $V^*$
- a design axial force parallel to the z-axis  $N^*$

In the recommended design model, the design moment capacity of the bolt group and the endplate is determined using nominated formulae and these capacities must exceed  $M^*$ . The design capacity of the bolts and welds in shear are also evaluated and these must exceed  $V_v^*$  as calculated subsequently, from components of  $V^*$  and  $N^*$ .

For other design checks, the beam flange force is required.

### Simplified method

The most common assumption made about the distribution of forces in the beam is that—

- bending moment is resisted entirely by the beam flanges;
- vertical shear is resisted entirely by the beam web;
- any axial load in the beam is shared between the flanges.



**Design Guide 12**  
**Bolted end plate to column moment connections**

**by**

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