**To determine $T_r$ of a Tension Member**

- Ensure $L/r$ ratio limit is met (**S16 10.4.2.2**)

**Main components (not pin-connected)**
- Determine $F_y$, $F_u$ (**HB Tables 6-3, 6-7, 6-8**)
- Determine relevant dimensions, gross area $A_g$ (**HB Part 6**), (**S16 12.2**)
- Compute $T_r$ for gross area yielding (**S16 13.2 a) i)**)

**Bolted connection:**
- Determine bolt hole allowance (**S16 12.3.2 22.3.5**)
- Determine net area $A_n$ (minimum over all potential failure paths) (**S16 12.1, 12.3**)
- Determine effective net area for shear lag, $A_{ne}$ (**S16 12.3.3.1, 12.3.3.2, 12.3.4**)
- Compute $T_r$ for net section fracture (**S16 13.2 a) iii)**)
- Compute $T_r$ for block shear (minimum over all potential failure modes) (**S16 13.2 a) ii), 13.11**)

**Welded connection:**
- Determine effective net area for shear lag (**S16 12.3.3.1, 12.3.3.3, 12.3.3.4, 12.3.4**)
- Compute $T_r$ for net section fracture (**S16 13.2 a) iii)**)

**Main components (pin-connected, except eye-bars)**
- Ensure detail requirements are met (**S16 12.4.2**)
- Compute $T_r$ for gross section yield (**S16 13.2 b) i)**)
- Determine effect net areas $A_{net}$ and $A_{nes}$ (**S16 12.4.1**)
- Compute $T_r$ for net section fracture (**S16 13.2 b) ii), 13.2 b) iii)**)

**Fasteners**

**Bolts in shear (bearing-type connection)**
- Determine $F_u$ of bolt material (**S16 13.12.1.2**)
- Determine if threads are intercepted by a shear plane (usually assumed if not otherwise known).
- Determine shear resistance, $V_r$ (**S16 13.12.1.2 c)**)
- Determine bearing resistance, $B_r$ (**S16 13.12.1.2 a)** or **b)**)

**Slip-critical connections**
- In *addition* to the above, compare slip resistance, $V_s$ (**S16 13.12.2**) to service loads

**Bolts in Tension**
- Factored resistance: (**S16 13.12.1.3**) (prying action is important bu not covered this year).

**Bolts in Combined Shear and Tension**
- Interaction limit: (**S16 13.12.1.4**).

**Fillet Welds in shear**
- Determine electrode strength $X_u$ (**S16 Table 4**)
- Determine factored resistance $V_r$ (**S16 13.13.2.2**)

### Connection Details

**Bolts**

- Detailing: min distances, usual gauges, etc. (**S16 22.3**) (**HB 6-172, 6-173, 6-181**)

**Welds**

- Min, Max size (**HB 6-186**)

### Axially Loaded Compression Members

- Determine effective length factors (**S16 Annex F, G**).
- For built-up shapes, compute section properties (normally $A$, $r_x$ and $r_y$).
- Ensure slenderness limits are met, (**S16 10.4**).
- Determine width-thickness ratios of elements in compression, (**S16 11.2, 11.3**).
- (**S16 13.3.1**) gives $C_r$ for doubly-symmetric shapes meeting the width-thickness ratio limits of (**S16 Table 1**).
- (**S16 13.3.5**) gives $C_r$ for shapes that exceed the limits of (**S16 Table 1**).

### Flexural Members (Beams)

- Ensure deflection limits are met (**S16 6.3.1, Annex D**), (**HB 5-130 to 5-142**), usually by ensuring $I \geq I_{req}$.
- Ensure shear strength is OK, (**S16 13.4.1.1 a)**) (for unstiffened webs)
- Determine section class, (**S16 11.1, Table 2**)

**Laterally supported members** (continuous support or when $L <= L_u$)

- Bending strength given by (**S16 13.5**).

**Laterally unsupported members**

- Bending strength given by (**S16 13.6 a)**) for class 1 & 2, and (**S16 13.6 b)**) for class 3 & 4.

### Beam Columns

- Given a stress distribution, compute $C$, $M$, $C/C_y$ and $M/M_p$.
- (**S16 13.8.2**) Member strength and stability.
- (**S16 13.8.2 a)**) provides cross-sectional strength checks for class 1 and 2 I-shaped members.
- (**S16 13.8.2 b)**) provides overall member strength checks for class 1 and 2 I-shaped members.
- (**S16 13.8.2 c)**) provides lateral torsional buckling strength checks for class 1 and 2 I-shaped members.

**Useful Tables**

- Bolts: Specified Minimum Tensile Strengths (**HB Table 3-1**).
- Basic Bolt Data (**HB Table 3-2**).
- Bearing-Type Connections: CSA S16-14 Summary (**HB Table 3-3**).
- Factored Shear and Tensile Resistances per Bolt (**HB Table 3-4**).
- Unit Factored Bearing Resistance (**HB Table 3-5**).
- Factored Bearing Resistance per Bolt (**HB Table 3-6**).
- Factored Axial Compressive Resistance (**HB 4-17 to 4-100**).
- Width-To-Thickness Ratios, Elements in Flexural Compression, S16-14 (**HB Table 4-6**).
- Class of Sections, Combined Axial Compression and Bending (**HB Table 4-7**).
- Values of $\omega_1$ (**HB Table 4-8**).
- Amplification Factor (**HB Table 4-9**).
- Factored Moment Resistance (**HB 4-108 to 4-110**).
- Beam Selection Tables (**HB 5-14 to 5-29**).
- Beam Diagrams and Formulae (**HB 5-130 to 5-142**).
- Properties of Geometric Sections (**HB 7-81 to 7-86**).
- Properties of Geometric Sections and Structural Shapes (**HB 7-87 to 7-90**).
- Other geometric formulae (**HB 7-91 to 7-94**).

**Revisions**

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