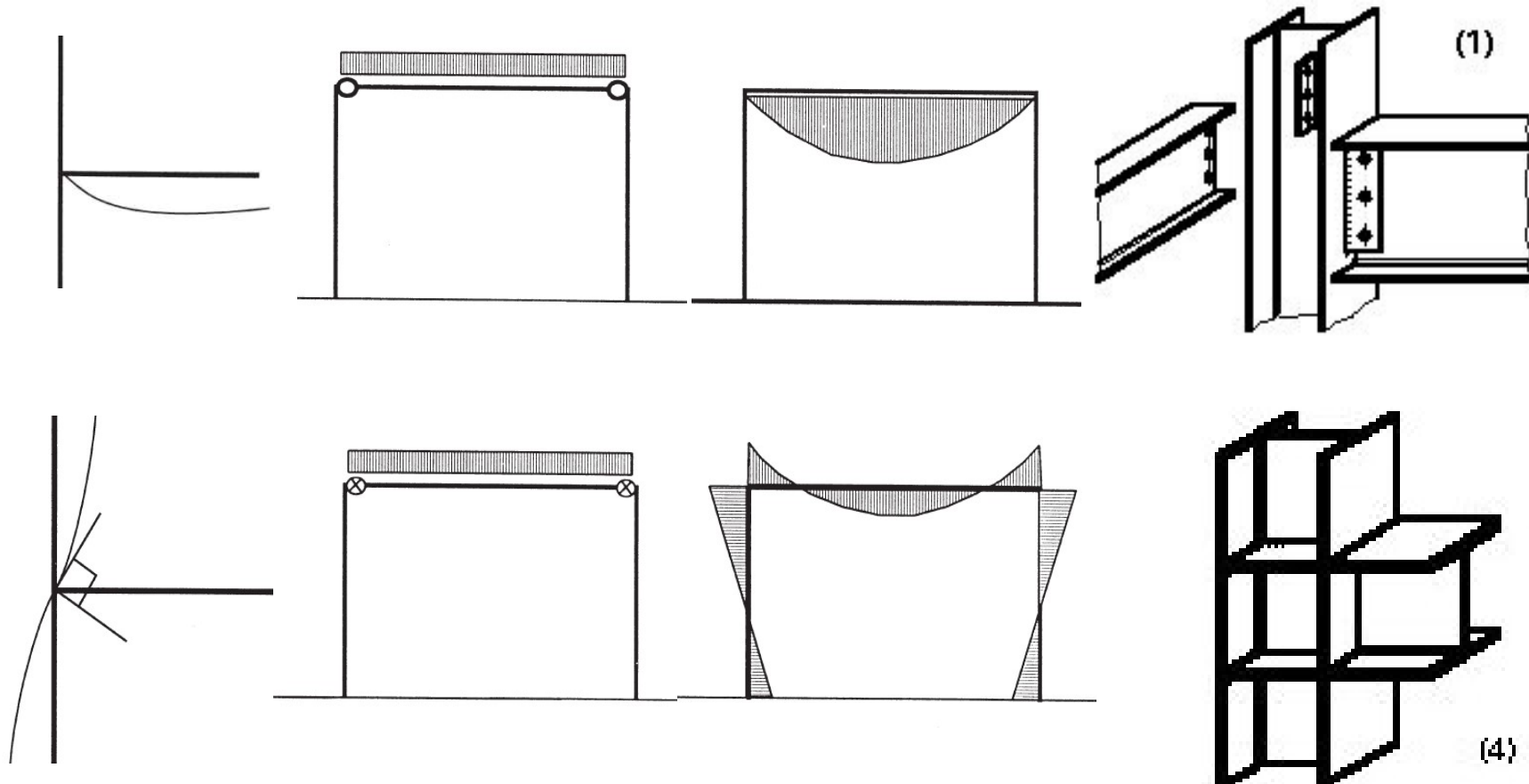


- Strength relates to the connection's ability to safely transfer the design *shear force* (and/or *bending moment*) assumed in analysis.
- Stiffness affects the beam deflections and the horizontal displacements of moment resisting frames.
- Connection details have to be *compatible with design assumptions*.



Effect of connections on cost

- Overall cost includes cost of material and labour
- For a steel building 20-40% of the overall cost is the material cost, with the remaining being spent on design and drawings, fabrication, erection, protection (e.g. anti-corrosion painting, fire protection) etc.
- The choice of connection type significantly affects the fabrication and material cost

Some old figures:

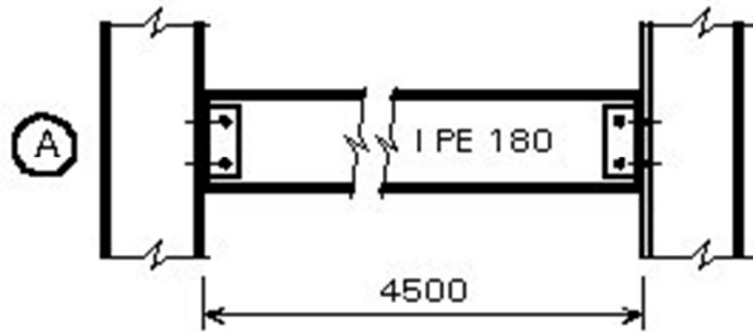
1cm³ of weld=0.7 kg of steel

Drilling of 1 hole= 2kg of steel

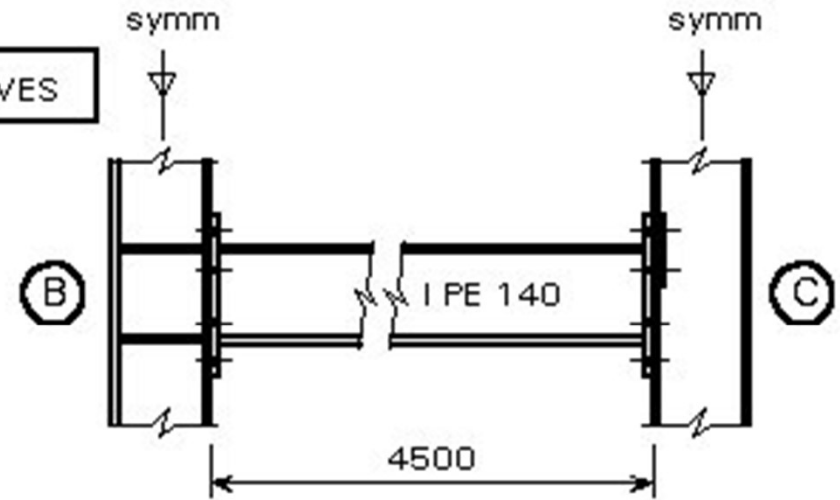
Cost of welding of stiffening plates=material cost of stiffening plates

Effect of connections on cost

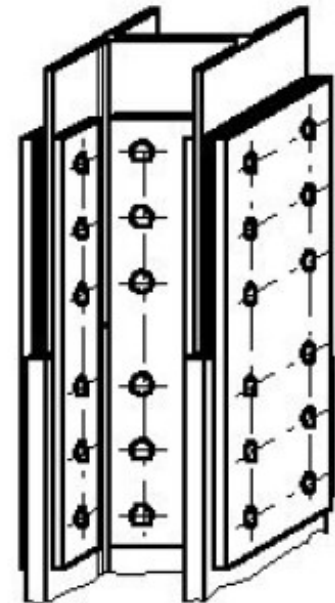
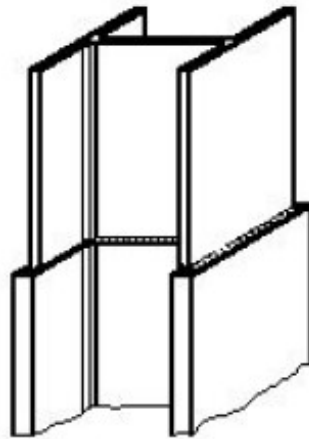
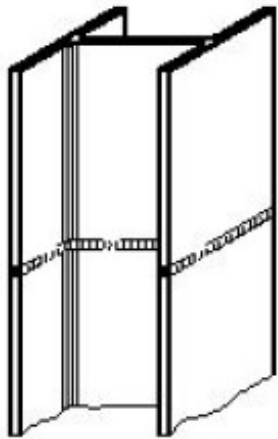
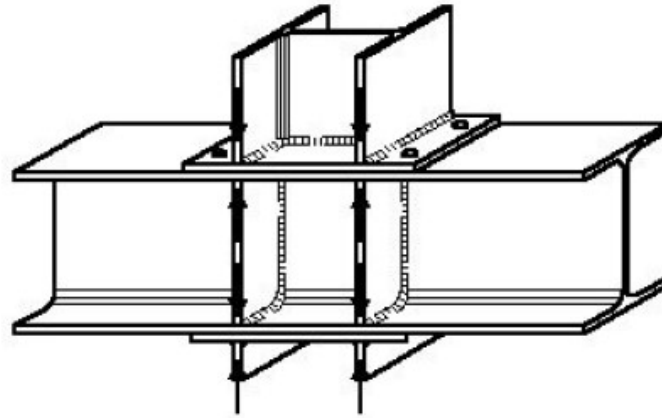
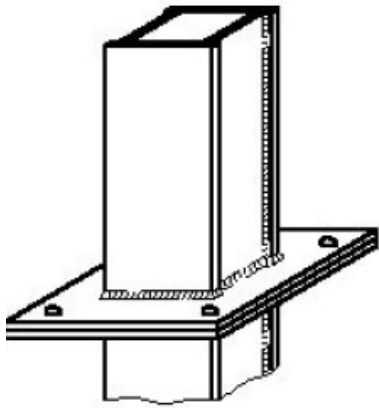
BASIS



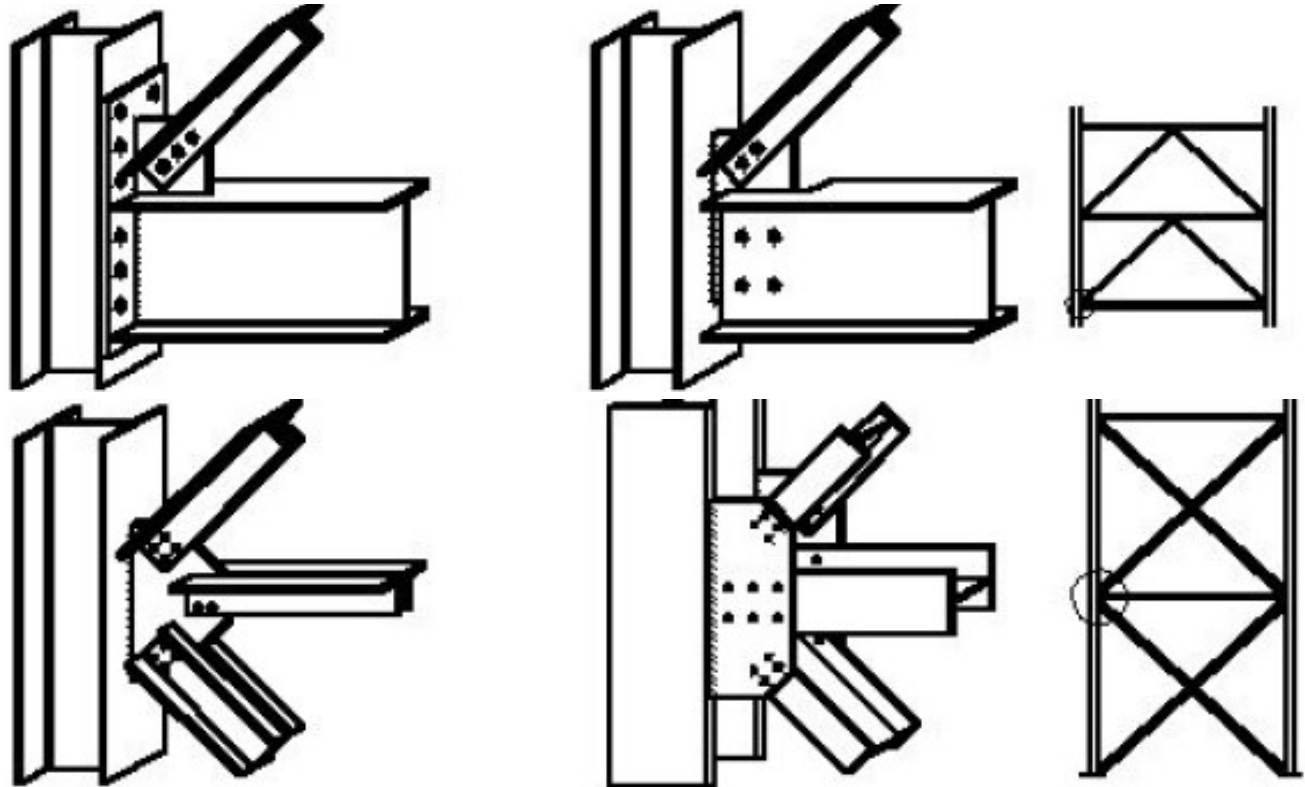
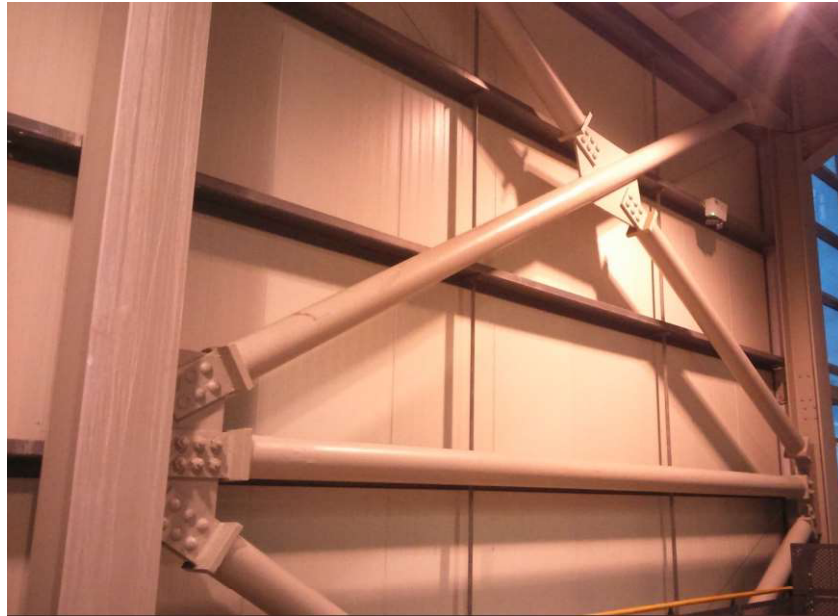
ALTERNATIVES



• Less steel	-16 kg	-22 kg
• More welding: 4,5m 5 ≈	+ 79 kg	
1,1m 5 ≈		+ 20 kg
• Fabrication of plates etc	+ 79 kg	+ 20 kg
• Extra holes + 2 holes ≈	+ 4 kg	
+ 6 holes ≈		+ 12 kg
Difference	+ 146 kg	+ 30 kg

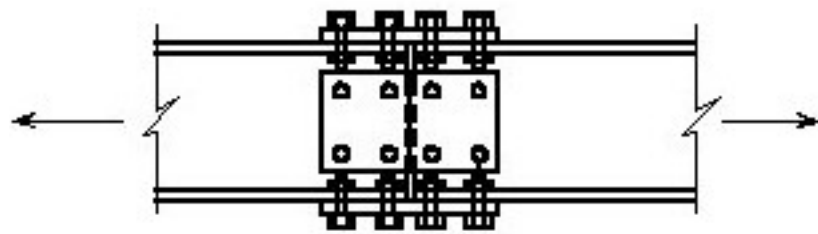


column splices

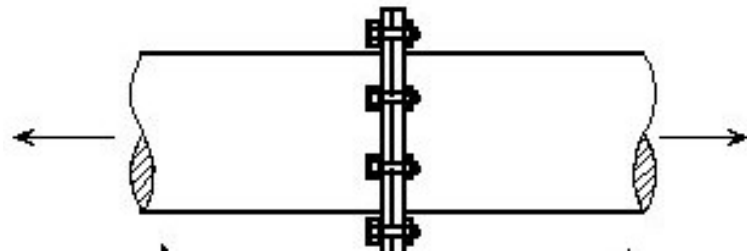


Connections of vertical bracing members

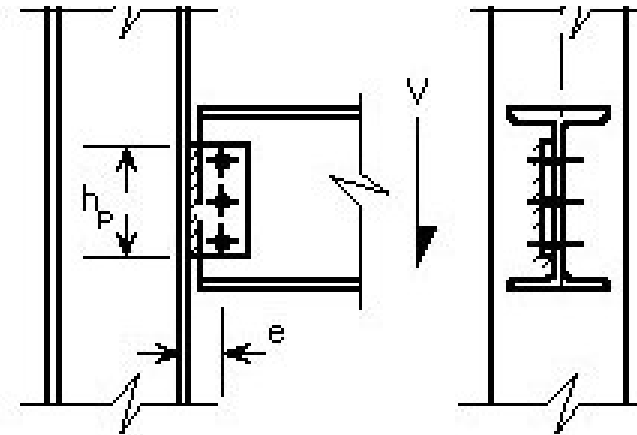
Connections consist of a number of elements. They are required to transmit forces and/or moment between the connected parts. The fasteners may be either bolts or welds.



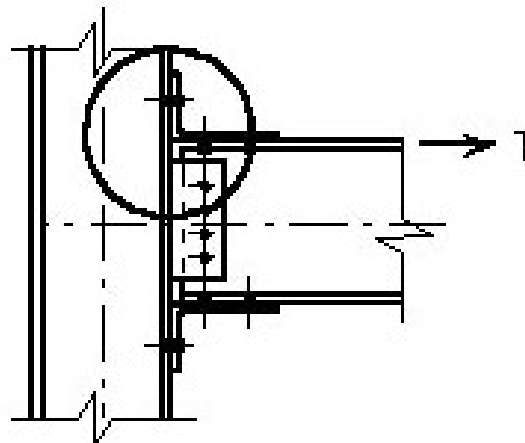
(c) Bolted cover plate



(d) Bolted flange joint for use with tubular construction



(c) Web plate



(e) Angle cleats