

Lecture 3

Steel Hall Buildings – Part 2: Purlins and cladding

Acknowledgement

I express my gratitude to doctor Dawid Mądry for creating this work and for professor Antoni Biegus for making available to me the materials incorporated in his book "Stalowe budynki halowe" (Steel industrial buildings), which were mainly used at drawing this work up

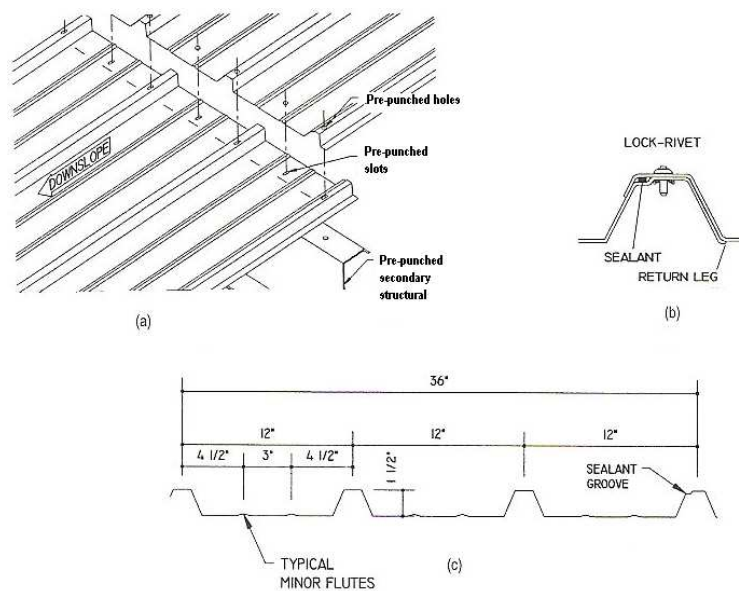
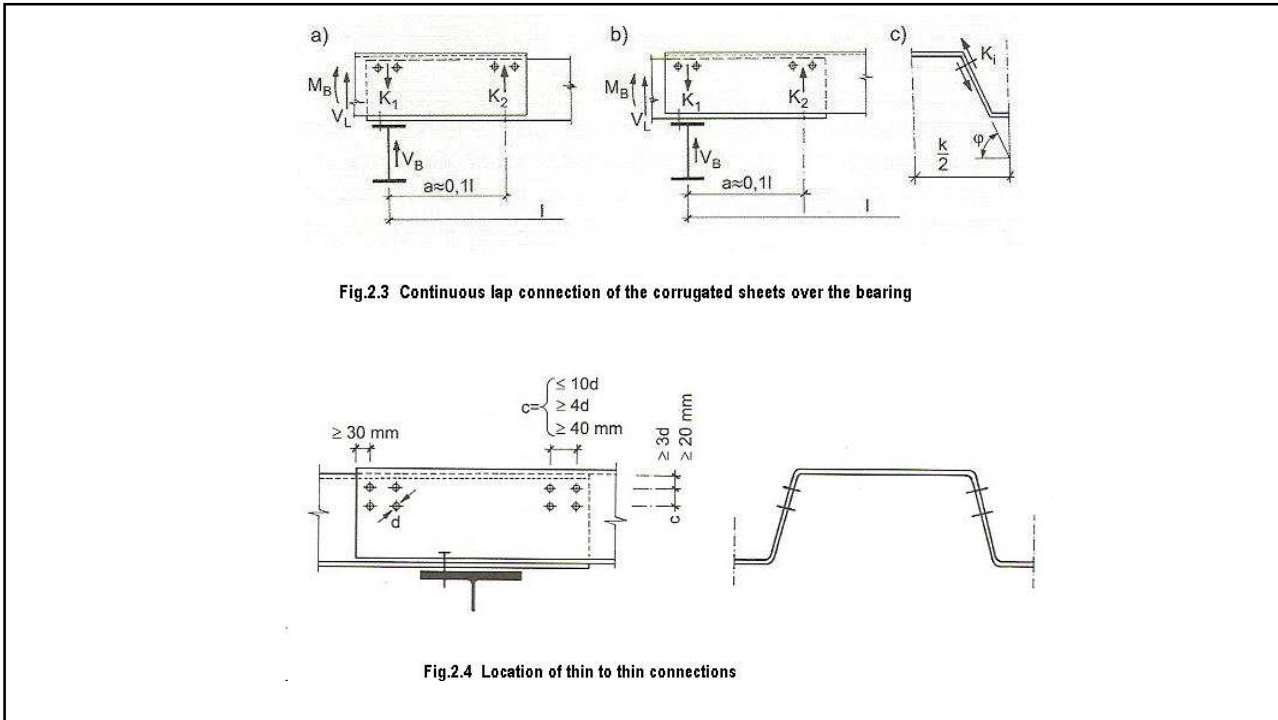
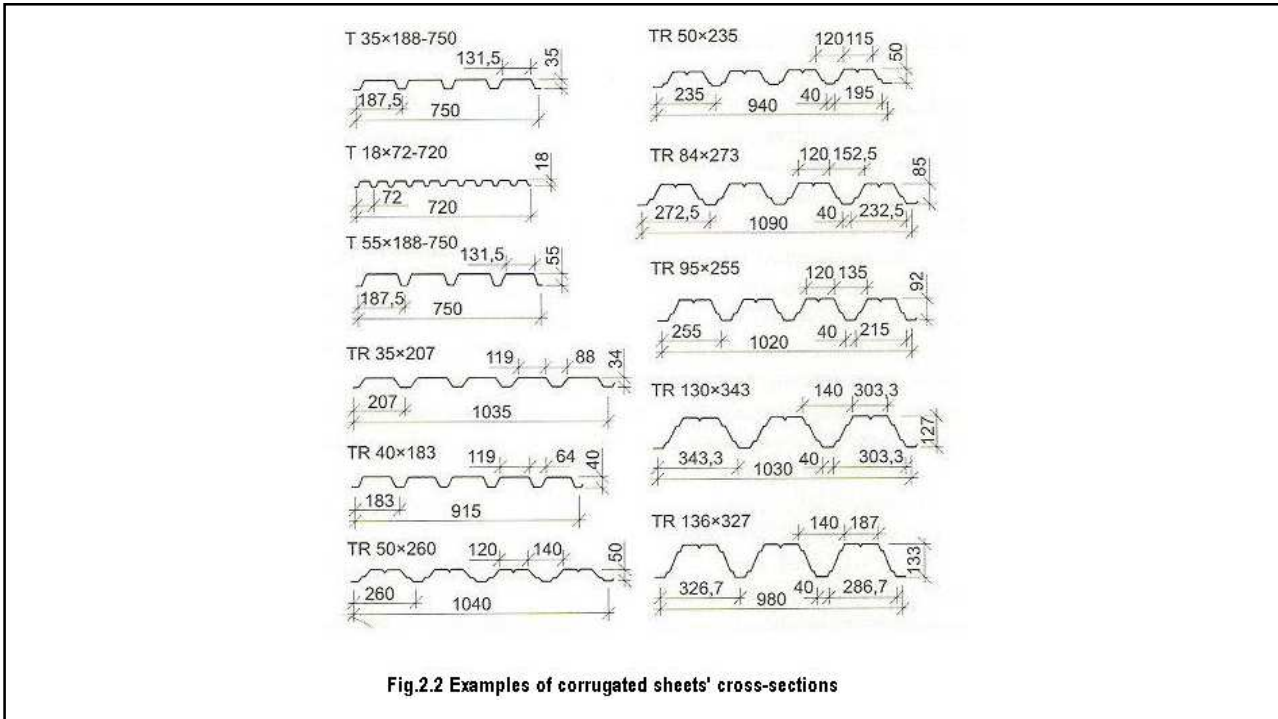


Fig.2.1 Exposed-fastener panels: a) prepunched panels and purlins assure correct alignment
b) seal details with lock rivet, c) panel cross section



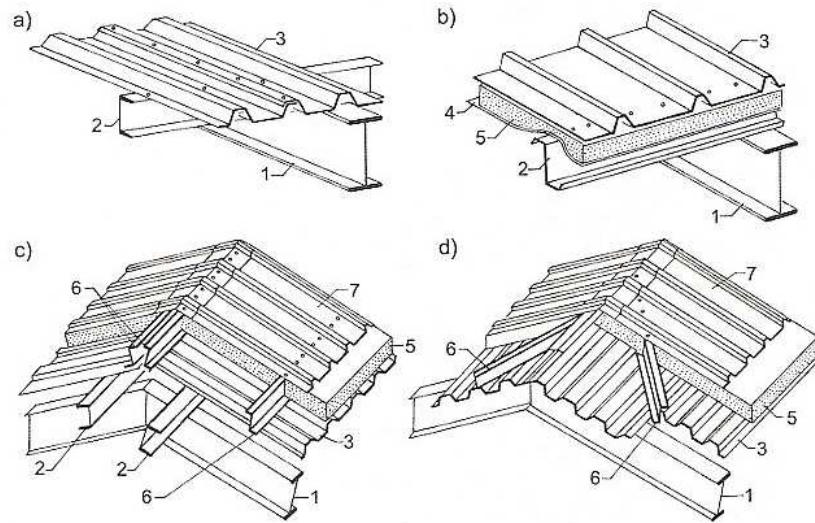


Fig.2.5 Isometric view of roof covering: 1- rafter, 2- purlin, 3- corrugated sheet, 4- textile, 5- insulation, 6- extra members, 7- external corrugated sheet

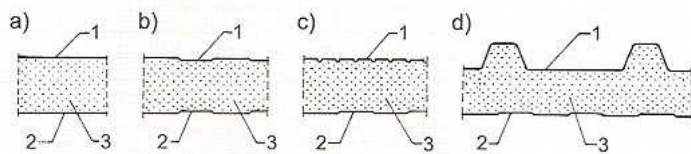


Fig.2.6 Examples of laminated panels: 1- external lining, 2- internal lining, 3- insulation

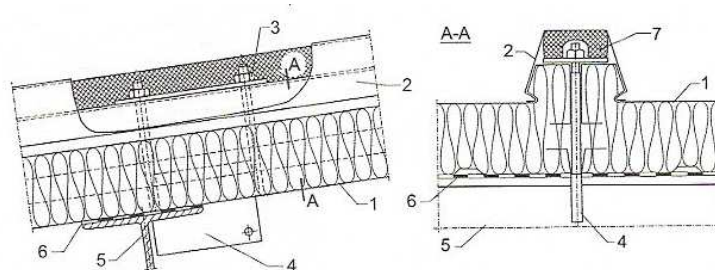


Fig.2.7 Laminated panel to purlin connection: 1- laminated panel, 2- finishing profile, 3- bolt, 4- cleat, 5- purlin, 6- foil strip, 7- polyurethane seal

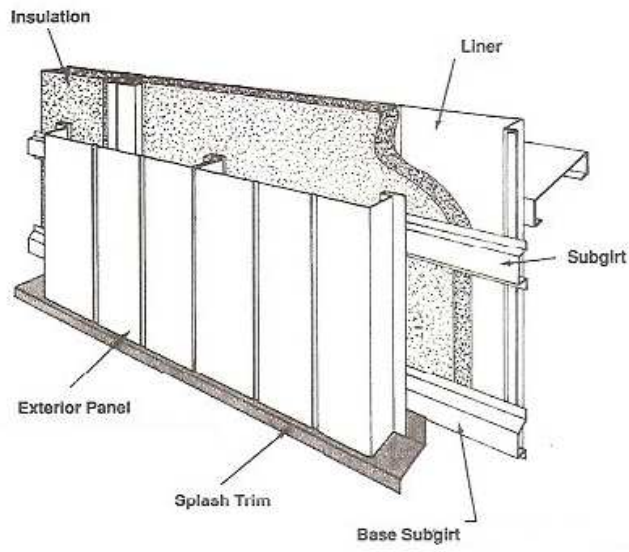


Fig.2.8 Field-assembled insulated panel

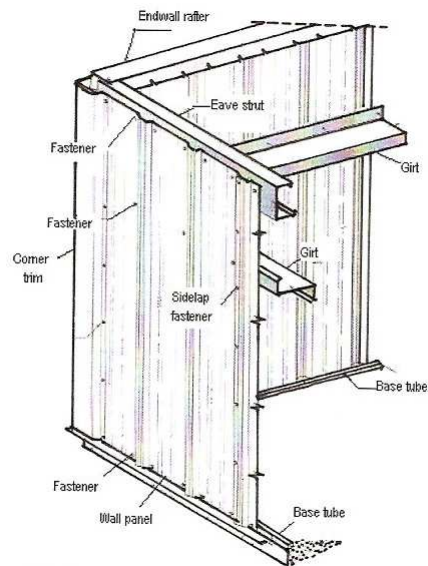
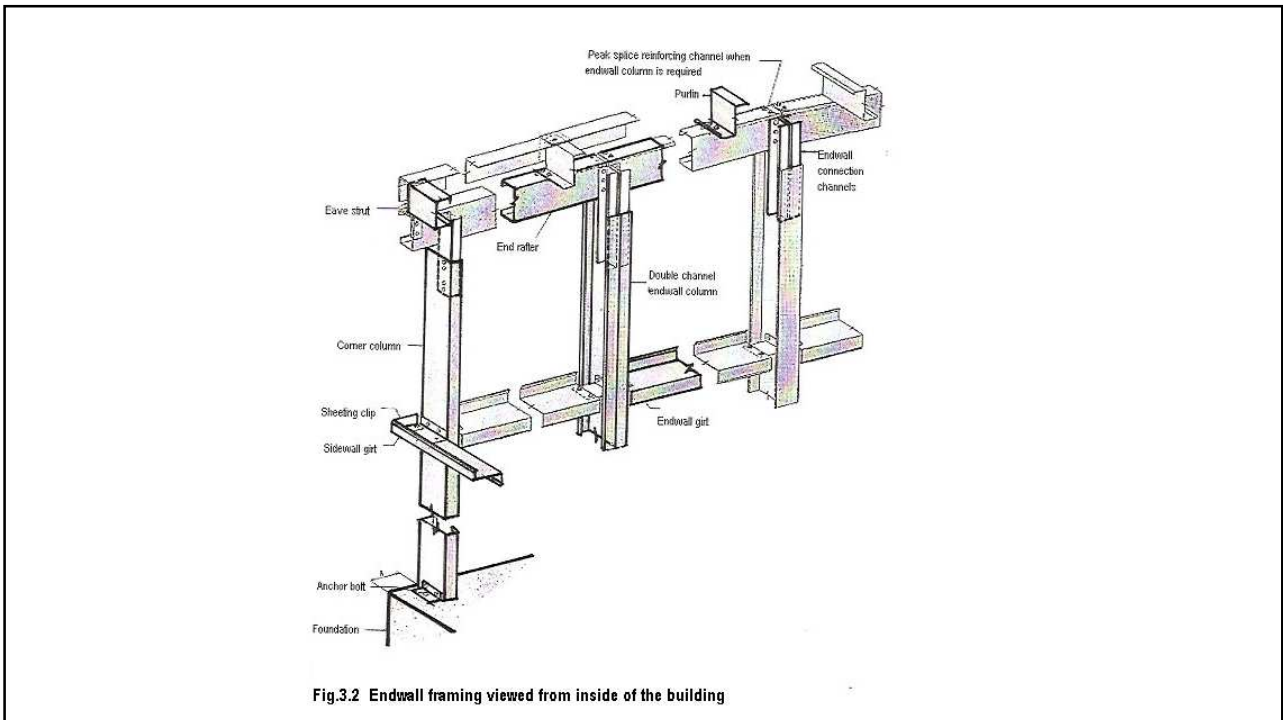
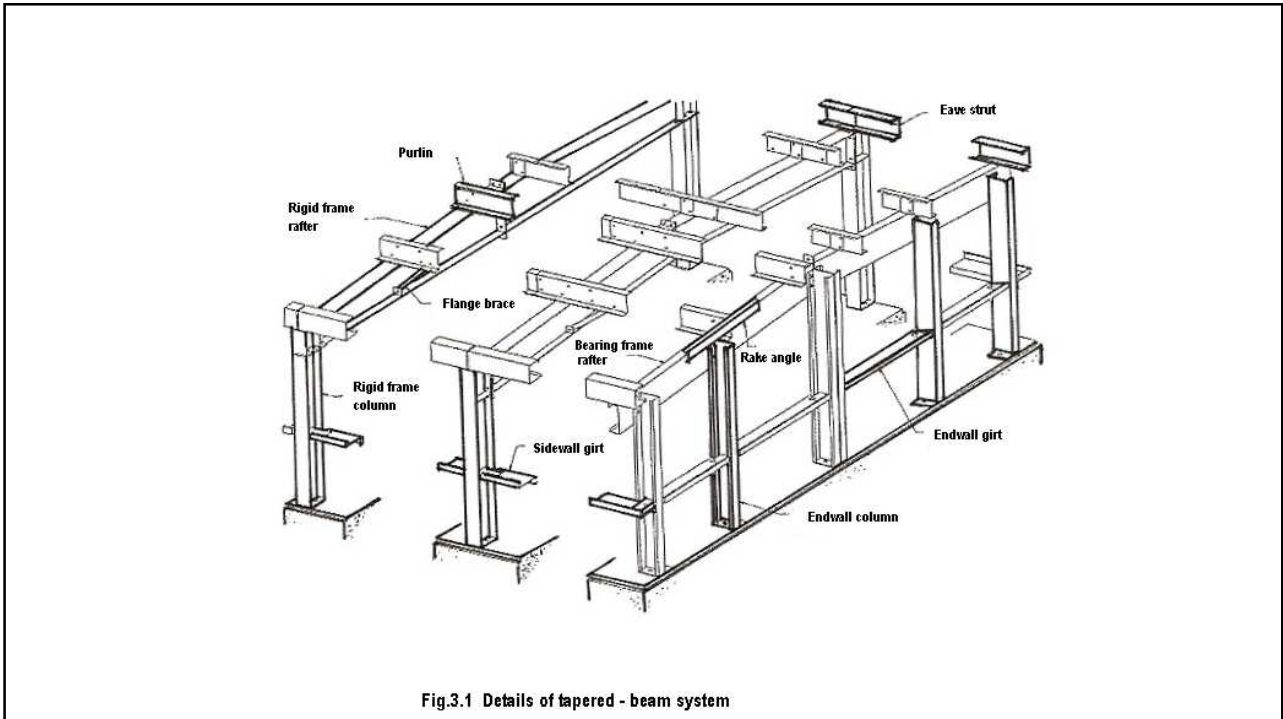
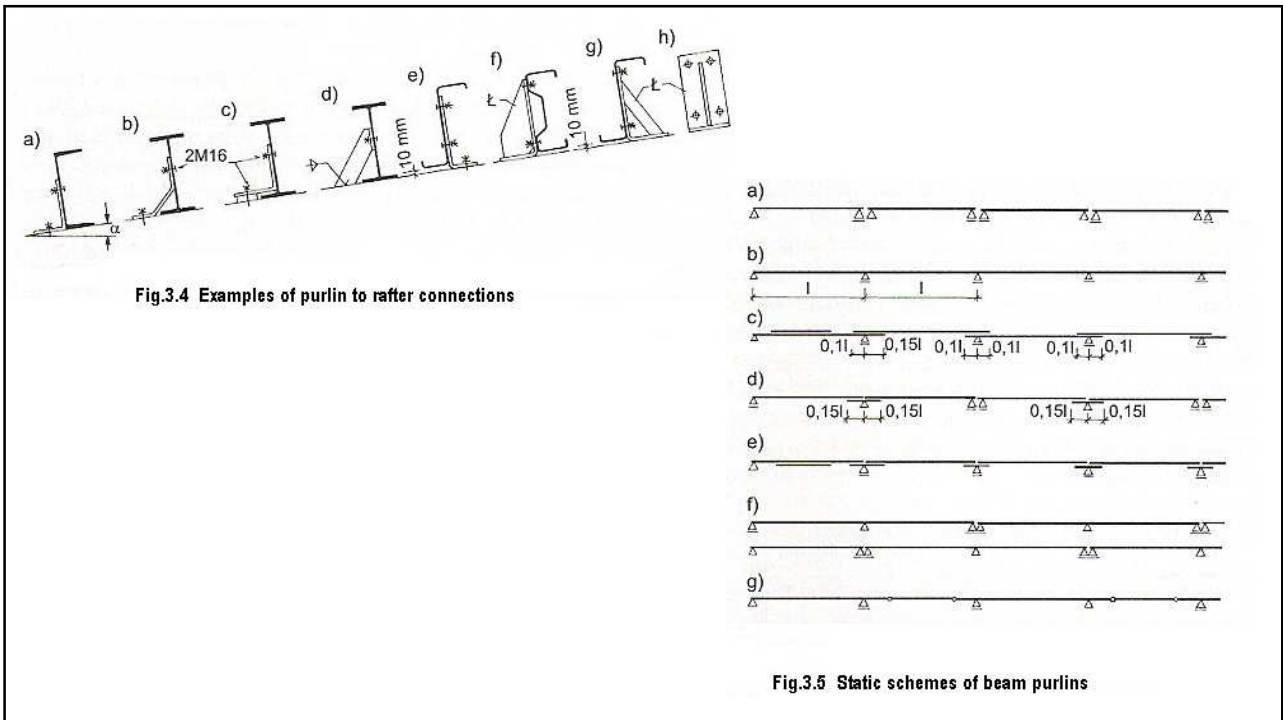
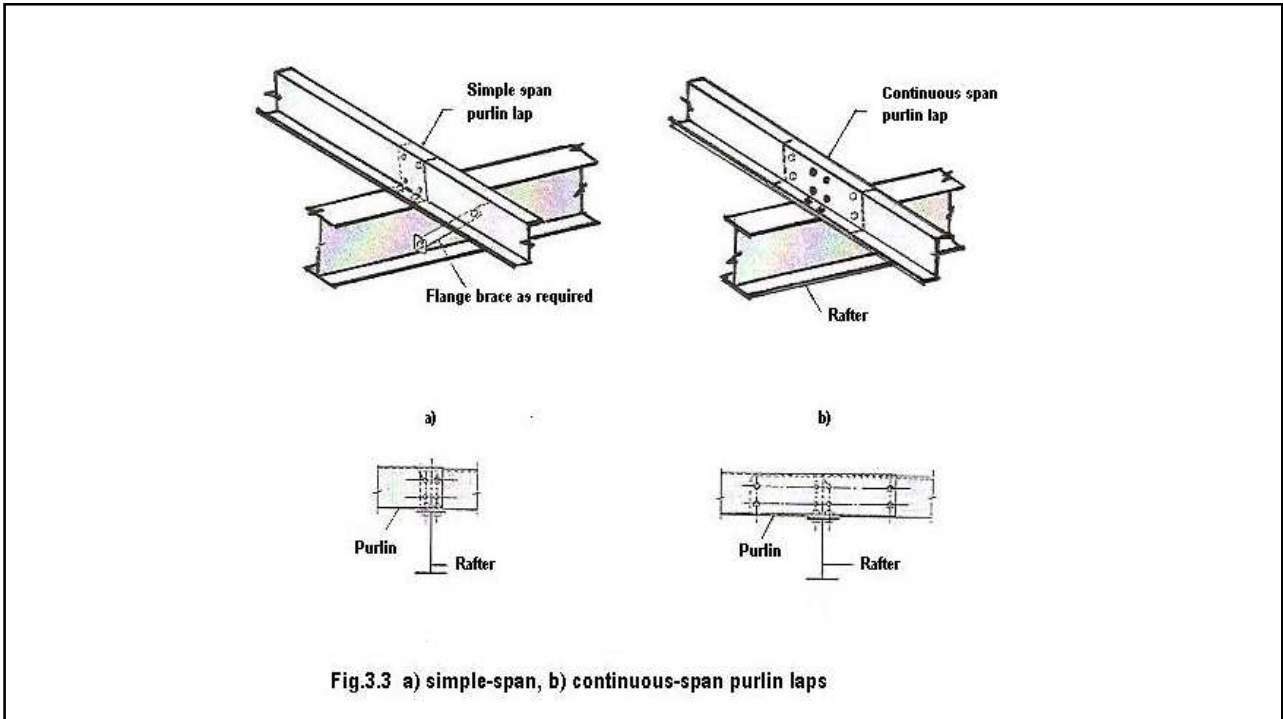


Fig.2.9 Exposed - fastener panels





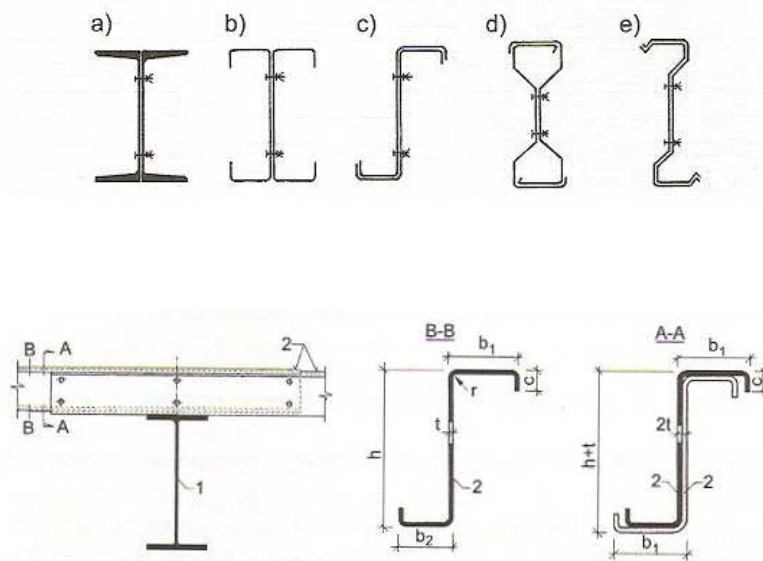


Fig.3.6 Doubled purlin cross-sections and the example of their connection to a roof rafter:
 1- rafter, 2- cold-formed purlin

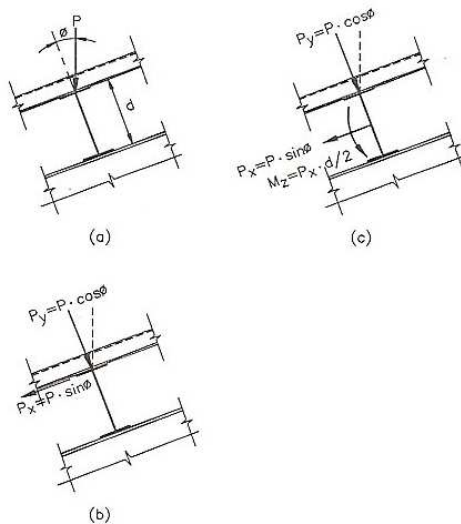


Fig.3.7 Forces acting on wide-flange purlins (channel purlins are subjected to an additional twisting component due to asymmetry) a) original force, b) force distribution if roofing provides support for top flange, force P_x resisted by deck diaphragm, c) force distribution if roofing provides no support, force P_x resisted by sag rods

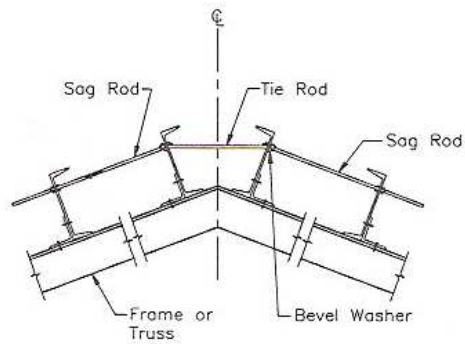


Fig. 3.8 Typical sag rod details for hot-rolled purlins

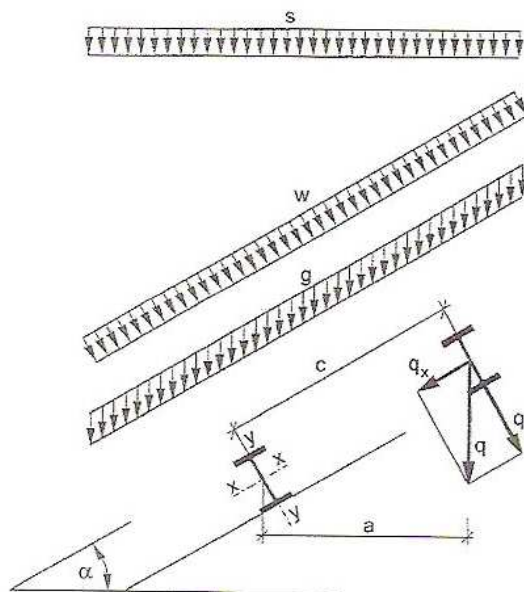


Fig.3.9 Two-way load for a typical purlin

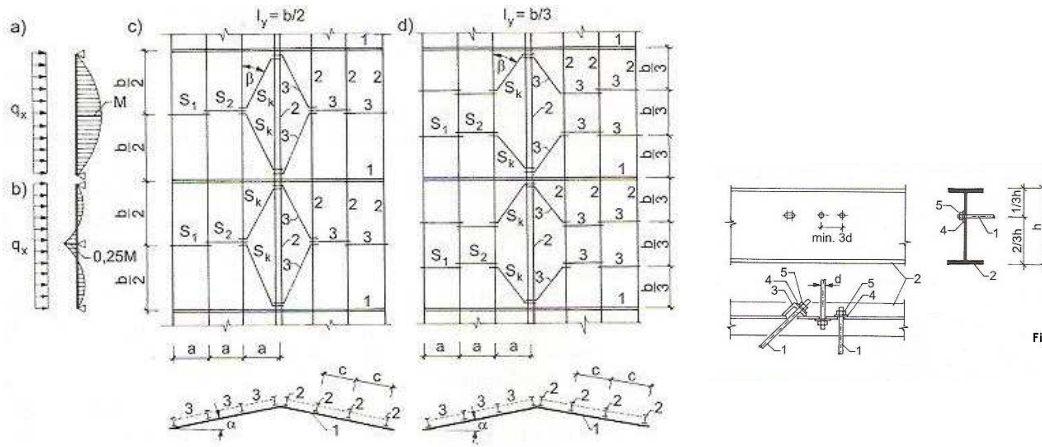


Fig.3.11 Detail of the sag rod to purlin connection: 1- sag rod, 2- purlin, 3- angle, 4- washer, 5- nut

Fig.3.10 Static schemes of purlins: a) without and b) with sag rods placed in: c) single row and d) double row, 1- roof rafter, 2- purlin, 3- sag rod

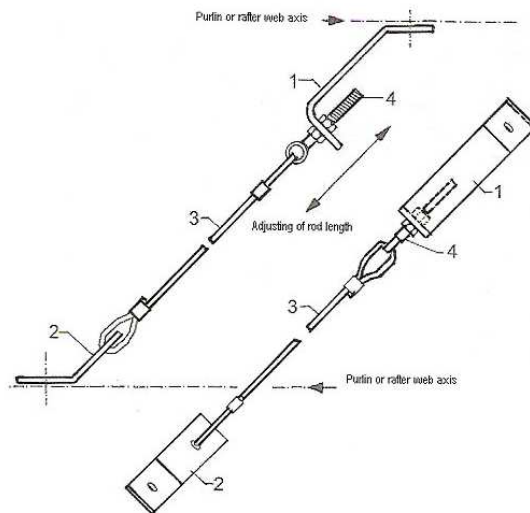


Fig.3.12 Rod bracing of purlins or wall girts in Sadeif system: 1- clip, 2- gusset plate, 3- rod, 4- tapped bar

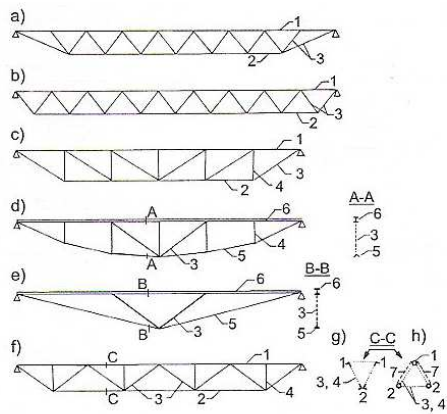


Fig.3.13 Examples of truss purlins: 1- upper chord, 2- bottom chord, 3- diagonal, 4- vertical, 5- tie, 6- beam, 7- glazing

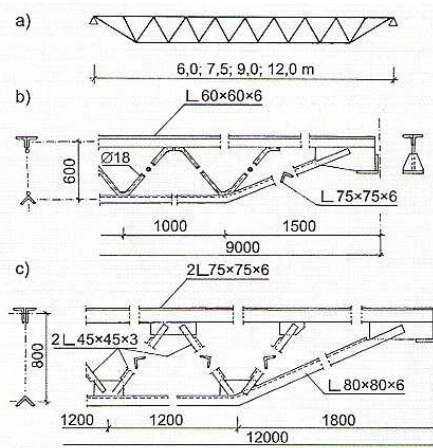


Fig.3.14 Typical lightweight truss purlin: a) geometry, b) purlin 9m spanned, c) purlin 12m spanned