

Lecture 6

Steel Hall Buildings – Part 5: Columns

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

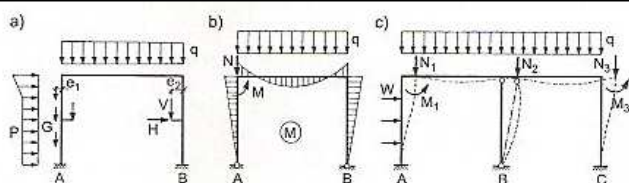


Fig.6.1 Primary frame columns under typical actions

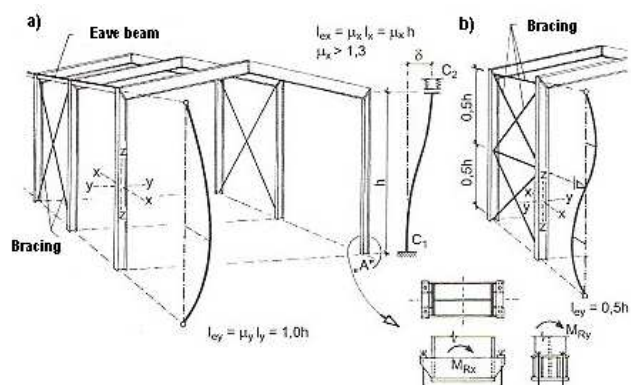
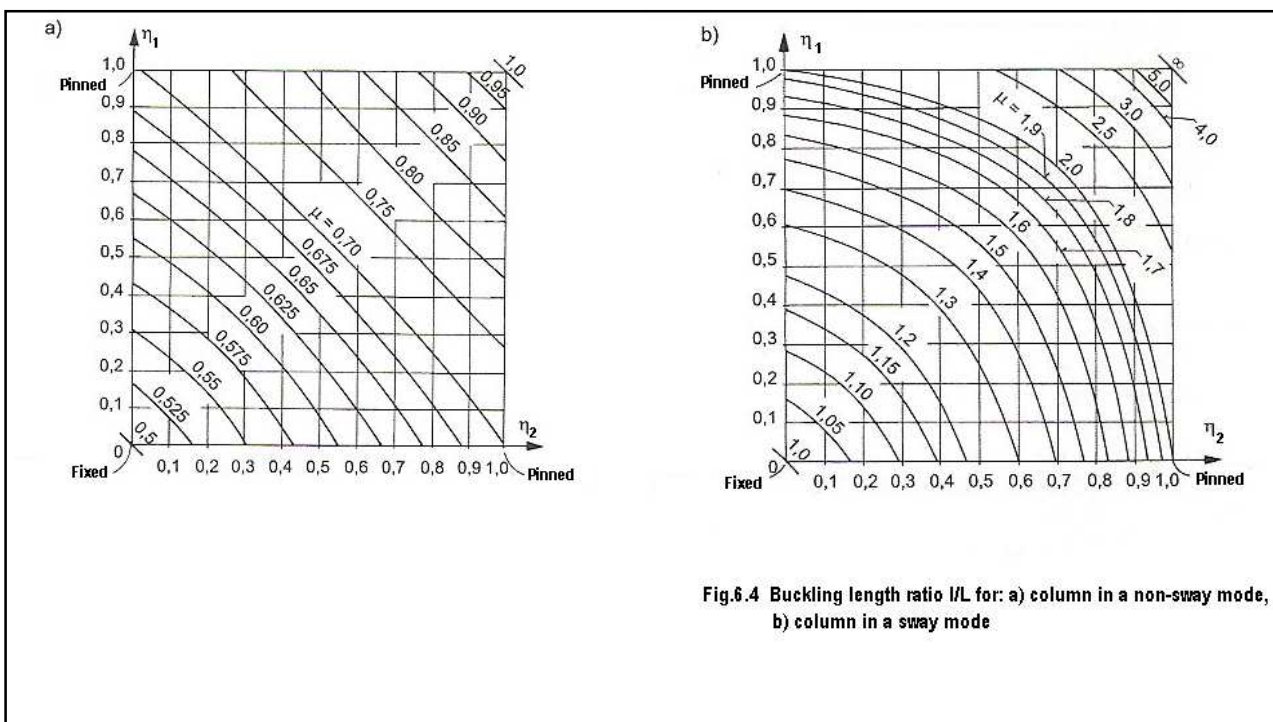
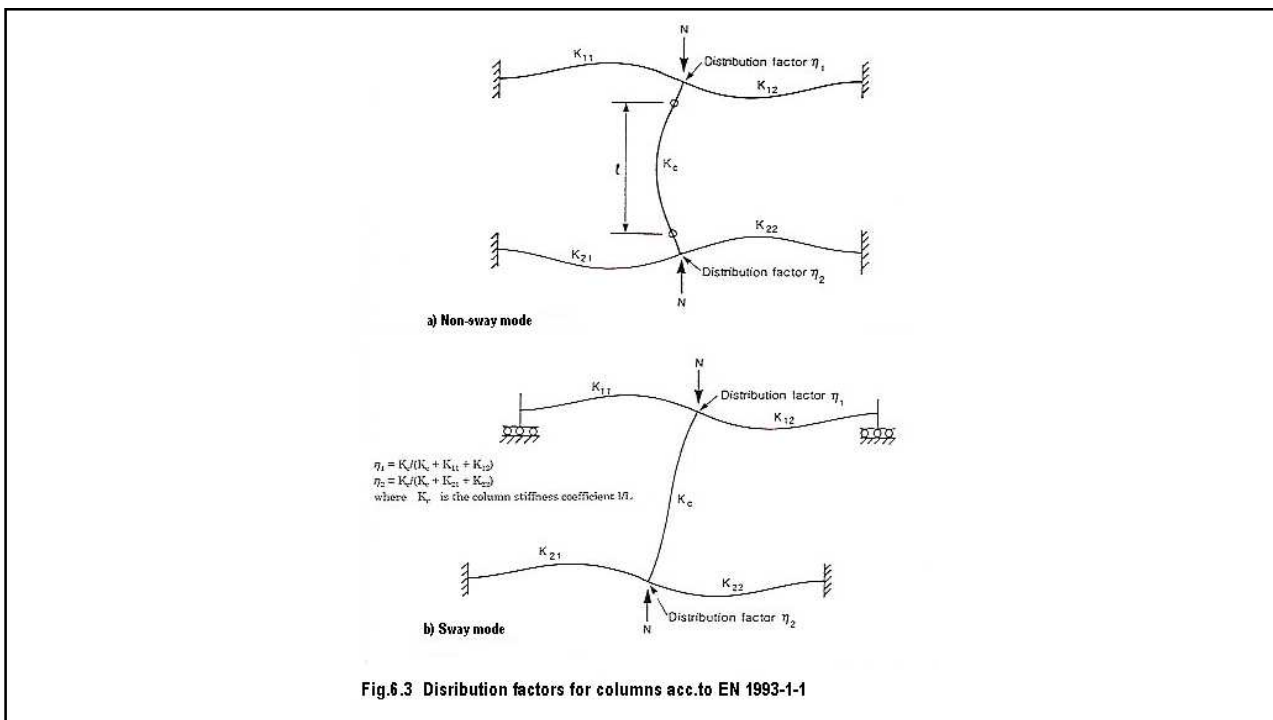


Fig.6.2 Buckling modes of a primary column in a portal frame



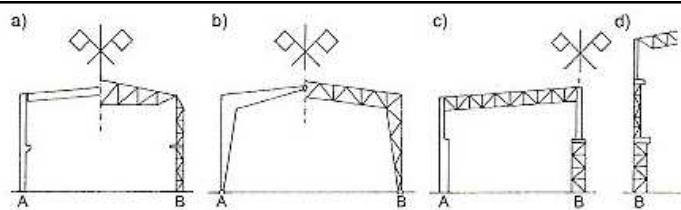


Fig.6.5 Typical shapes of primary columns

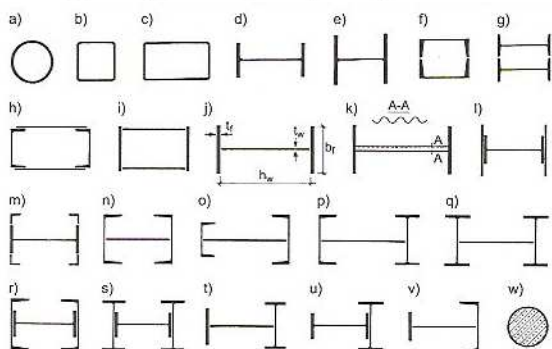


Fig.6.6 Examples of solid and built-up columns' cross-sections

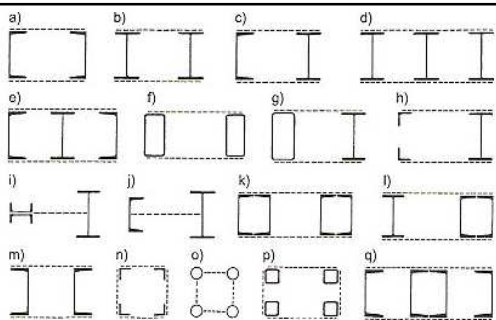


Fig.6.7 Examples of columns' built-up cross-sections

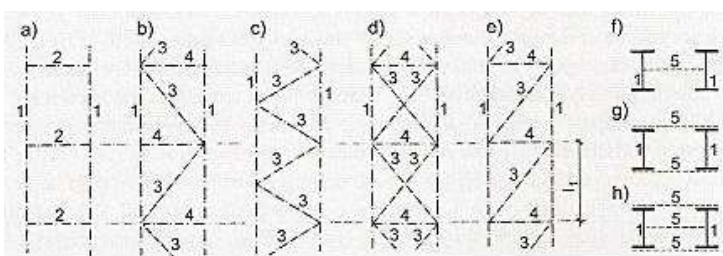


Fig.6.8 Geometry of battened and laced columns: 1- column chord, 2- batten plates, 3- diagonals, 4- studs, 5- battens and lacing

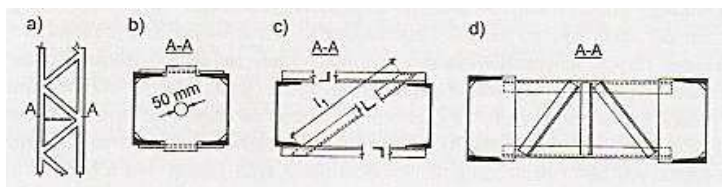


Fig.6.9 Construction of diaphragms in typical columns

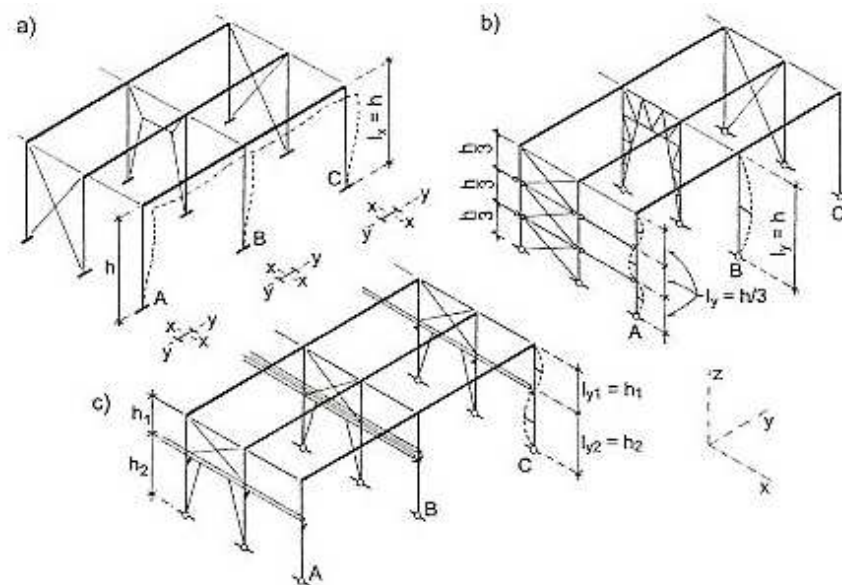


Fig.6.10 Theoretical lengths of primary columns in different constructions

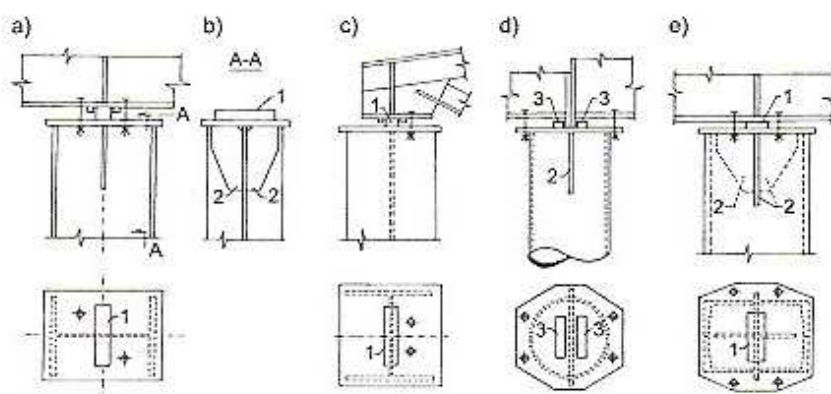


Fig.6.11 Heads of solid columns axially loaded: 1,3- pinn bearing, 2- ribb

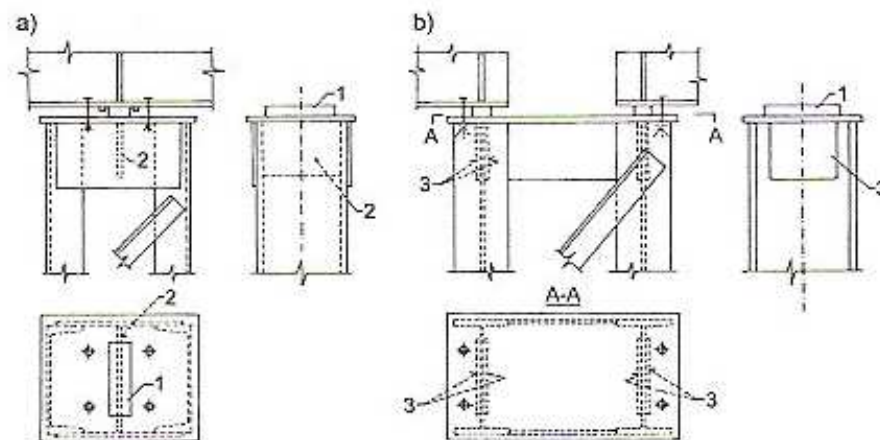


Fig.6.12 Heads of two-arm columns: 1- centre plate, 2- ribb, 3- strengthening plates

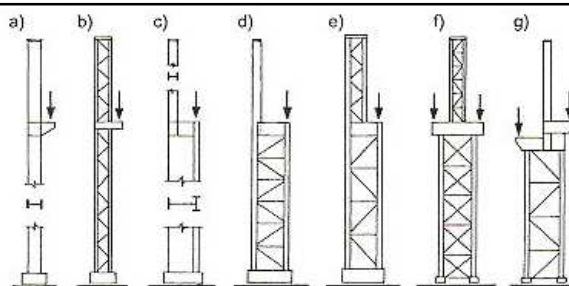


Fig.6.13 Shapes of columns loaded by crane runway be

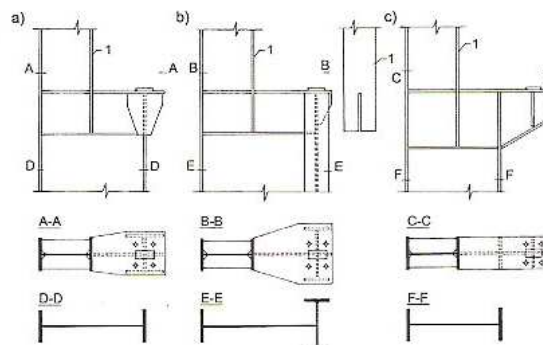


Fig.6.14 Examples of built-up columns with changes in cross-sections

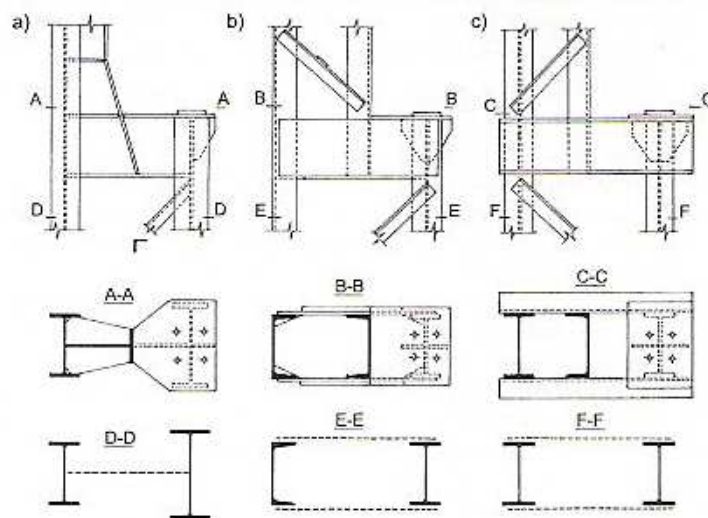


Fig.6.15 Examples of two-arm columns with changes in cross-sections

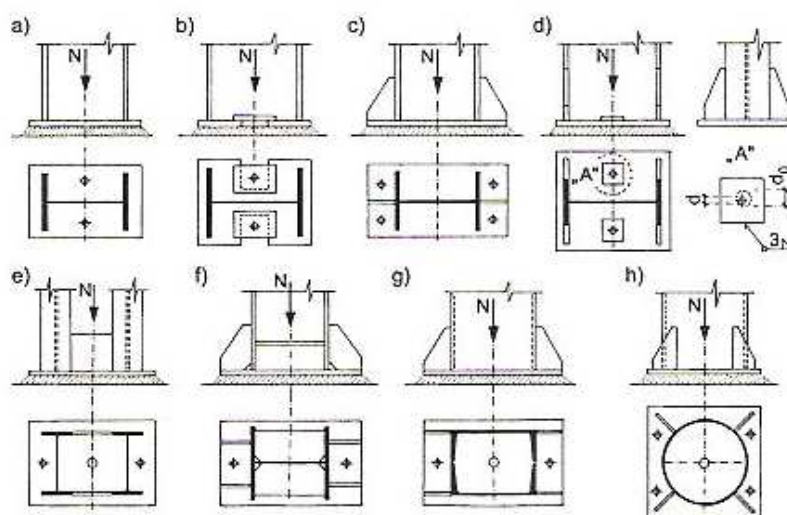


Fig.6.16 Examples of columns' bases under axial load

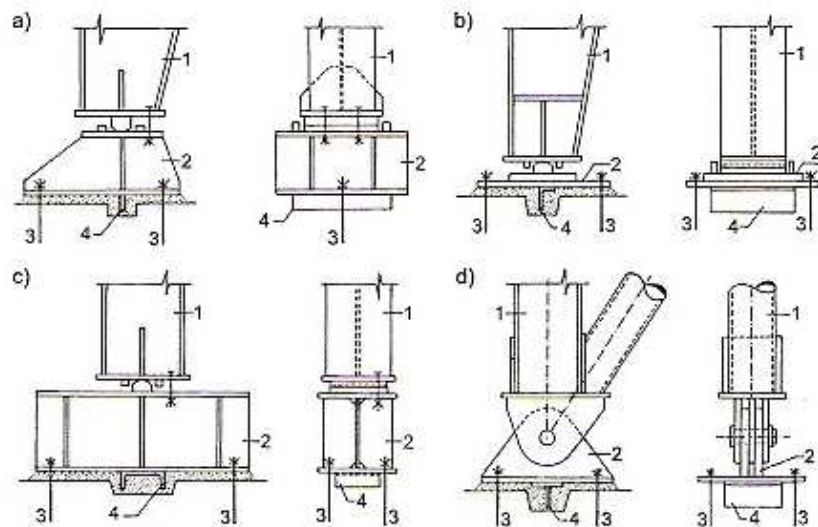


Fig.6.17 Examples of pin-base columns: 1- column, 2- bearing plate, 3- anchor bolt, 4- cleat

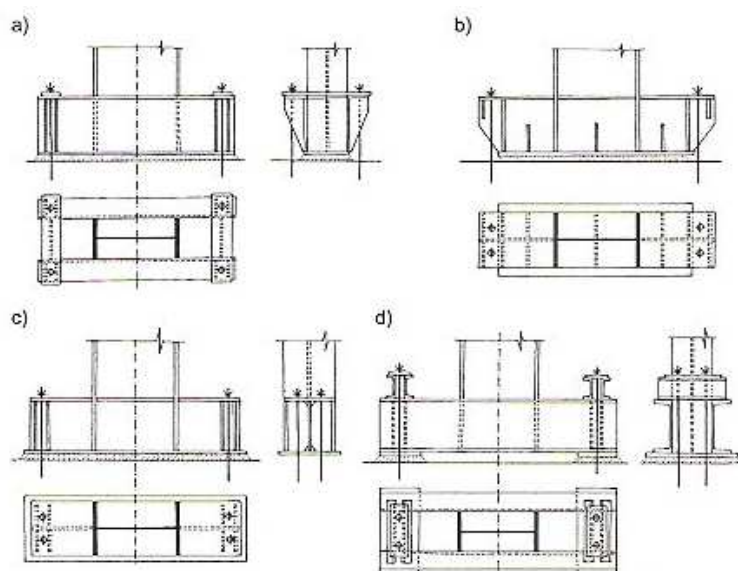


Fig.6.18 Fixed-base of solid columns

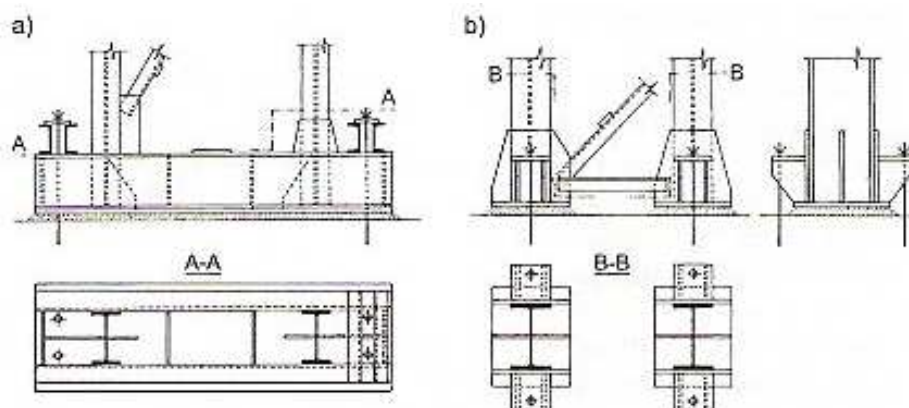


Fig.6.19 Fixed-base of built-up columns: a) fixed in one plane, b) fixed in both planes

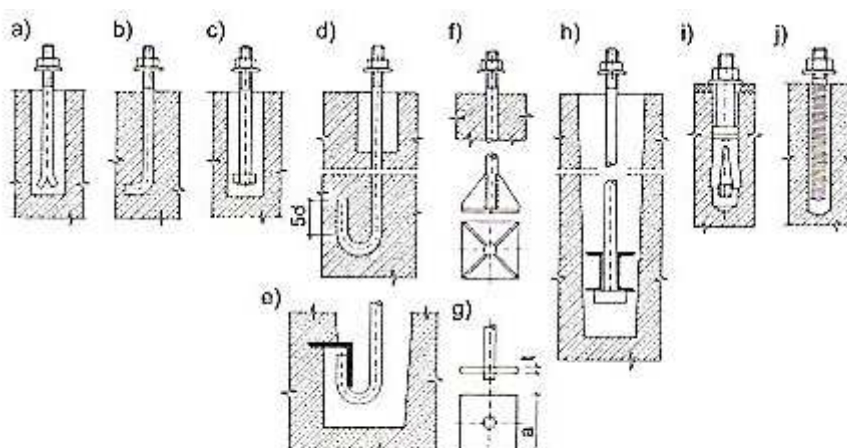


Fig.6.20 Anchor bolts

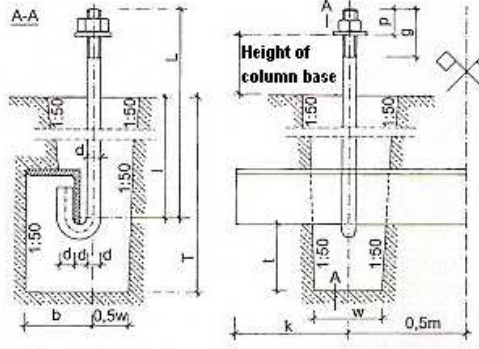


Fig.6.21 Column anchorage by a hook-bolt

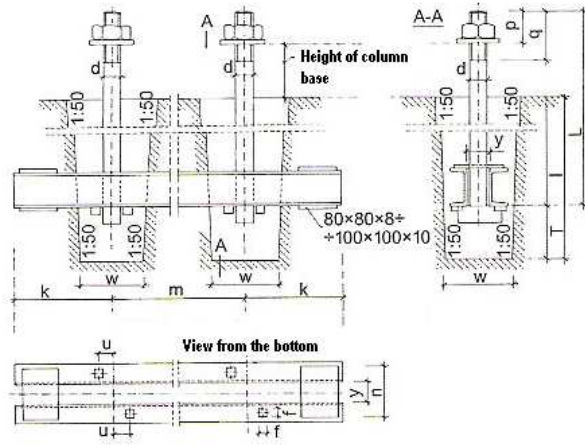


Fig.6.22 Anchor block with tee-head bolts