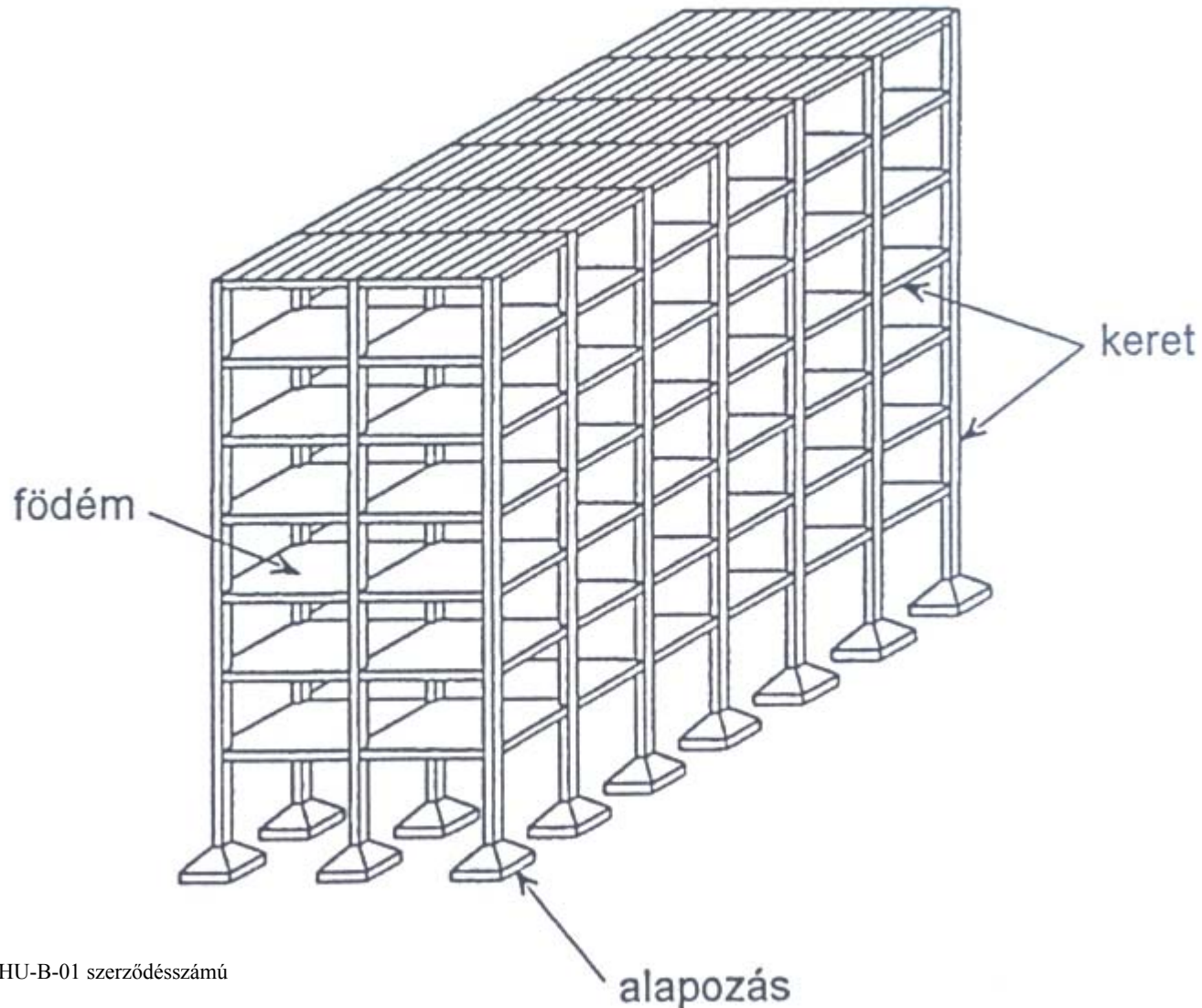
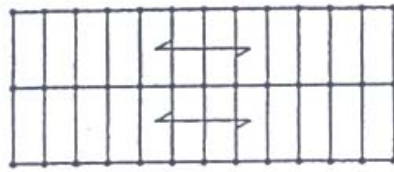


Többszintes acélvázás szerkezetek

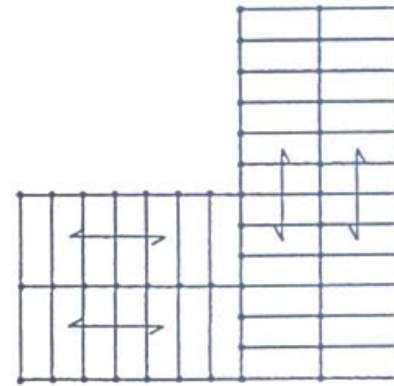
A többszintes épületek fő szerkezeti elemei



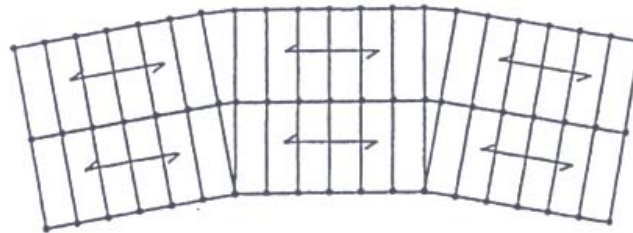
A szerkezeti rendszer



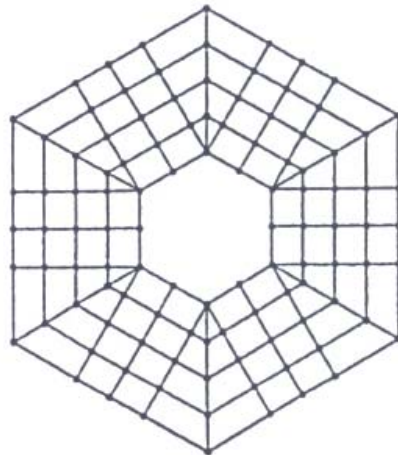
(a)



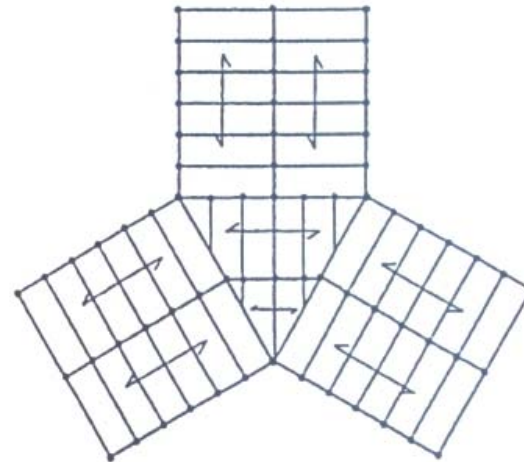
(b)



(c)

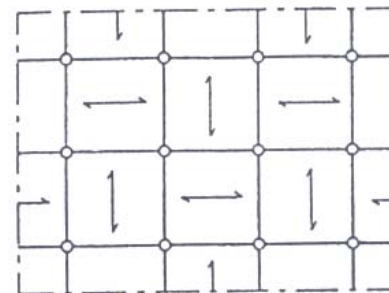
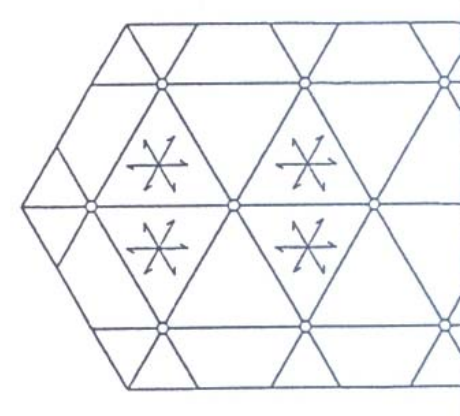
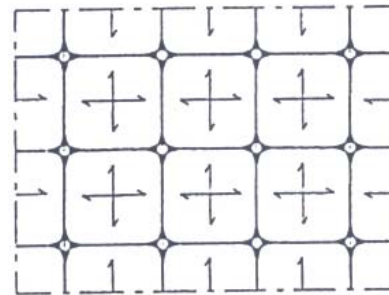
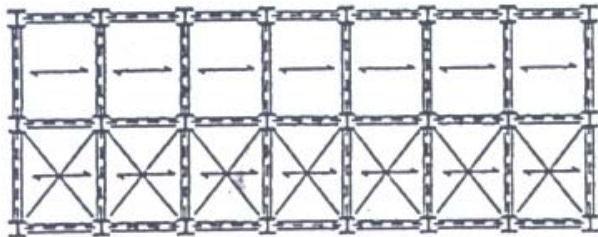
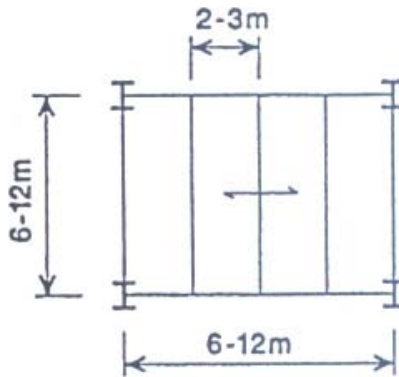
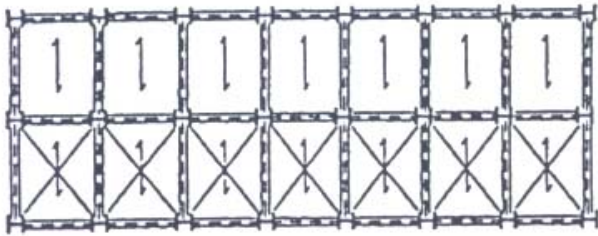


(d)

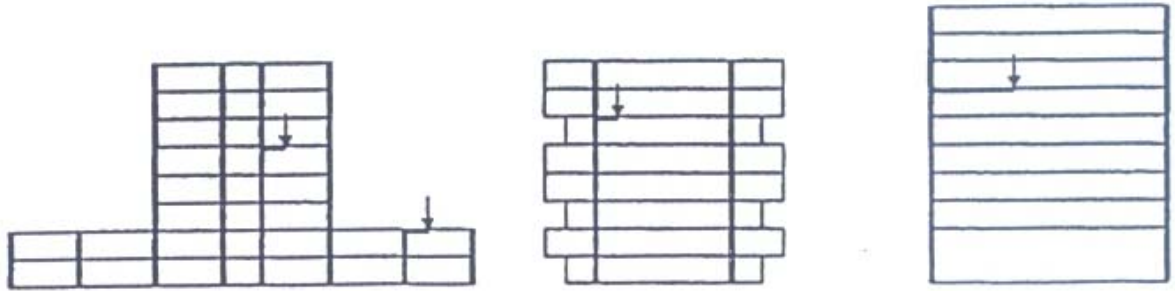


(e)

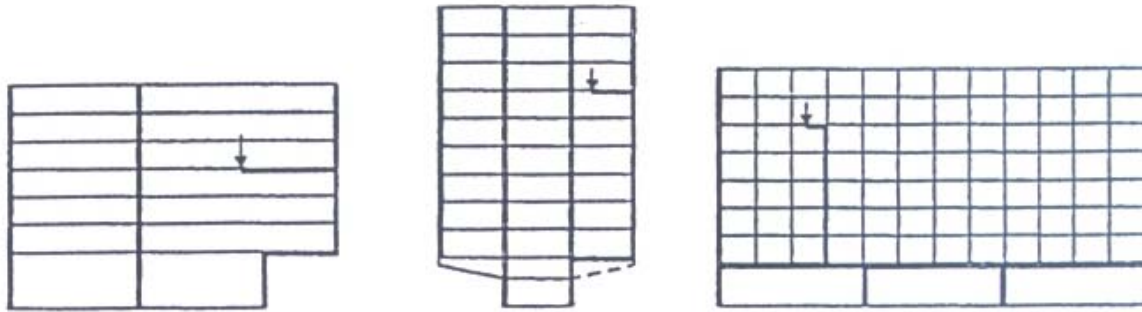
Különböző oszlop kiosztások



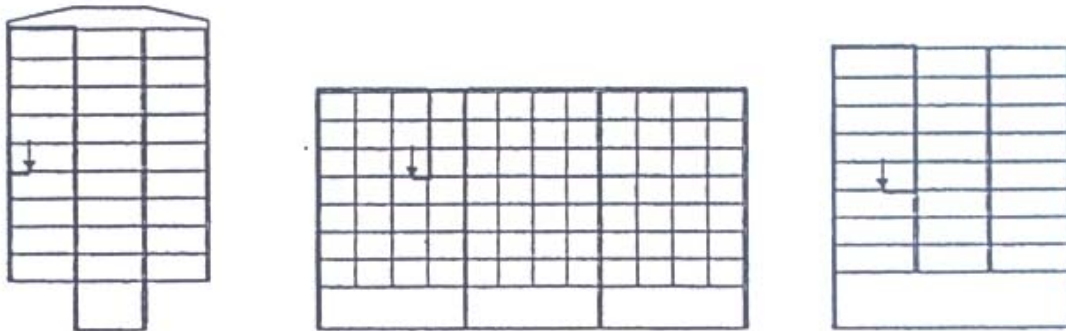
függőleges terhek



(a)



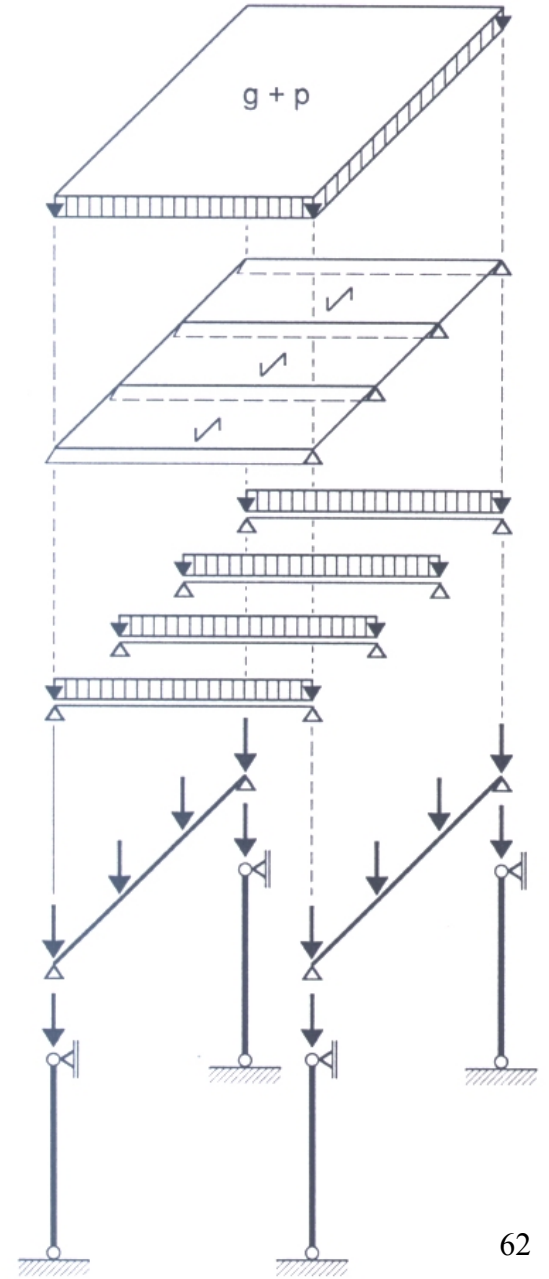
(b)



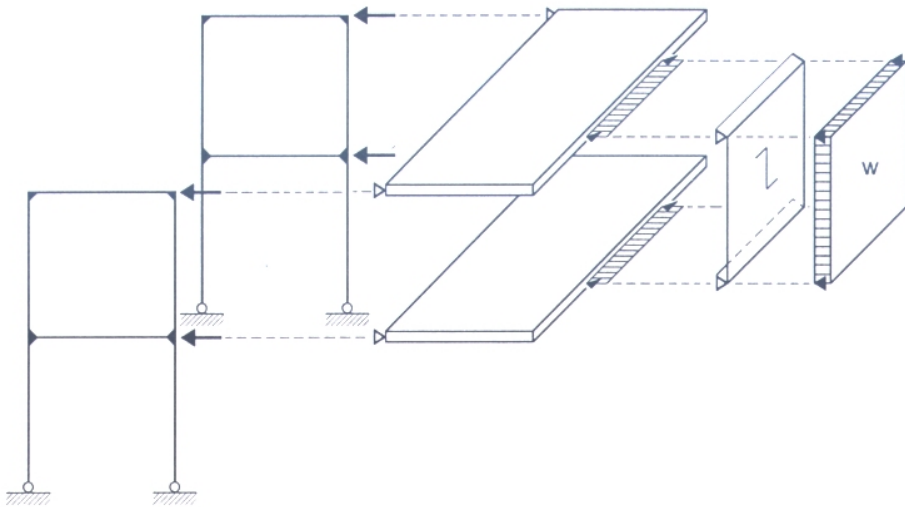
(c)

Készült az ERFP-DD2002-HU-B-01 szerződésszámú projekt támogatásával

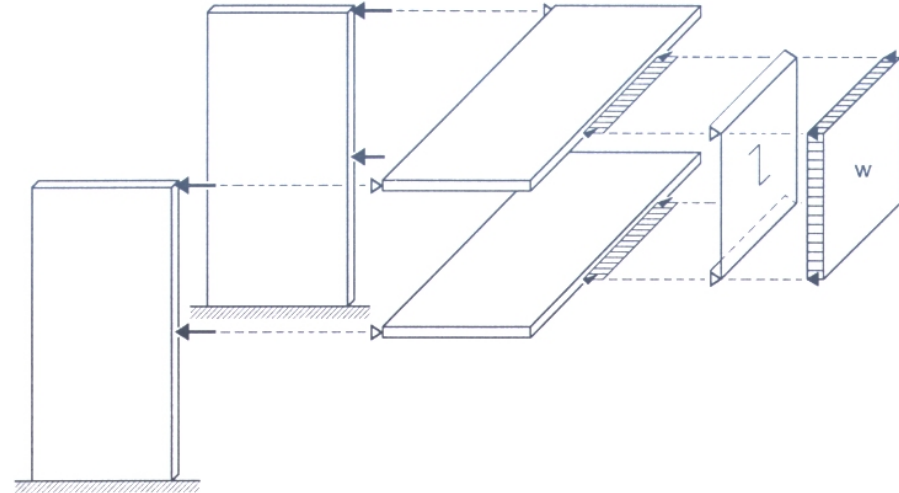
Függőleges terhek felvétele



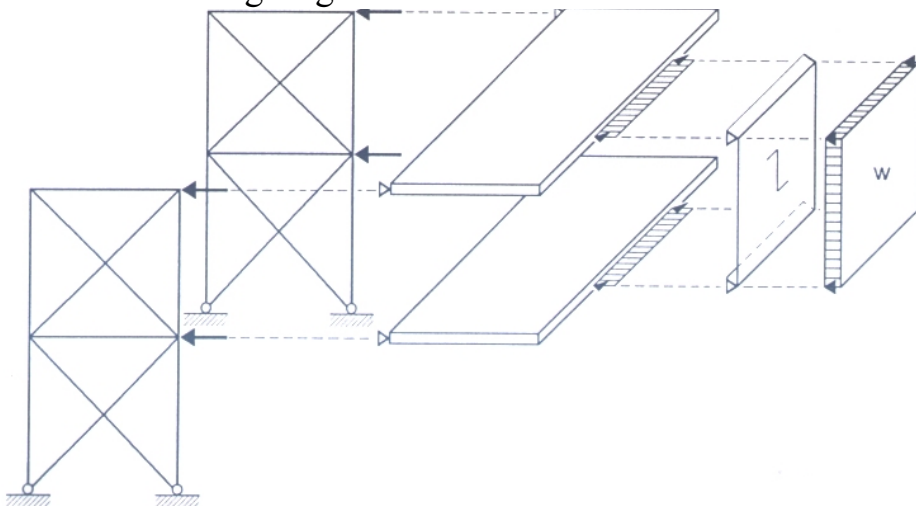
(A) Vízszintes terhek felvétele a födémek és függőleges síkú keretek segítségével



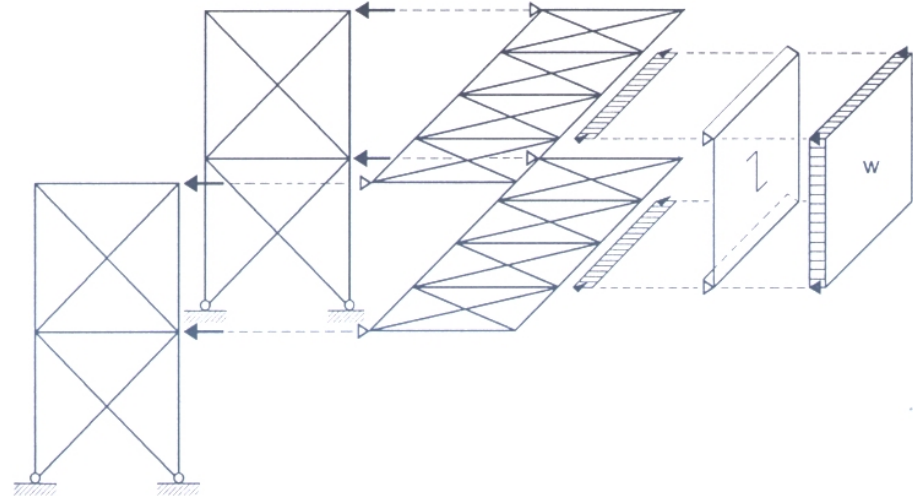
(B) Vízszintes terhek felvétele a födémek és függőleges síkú merev falak segítségével



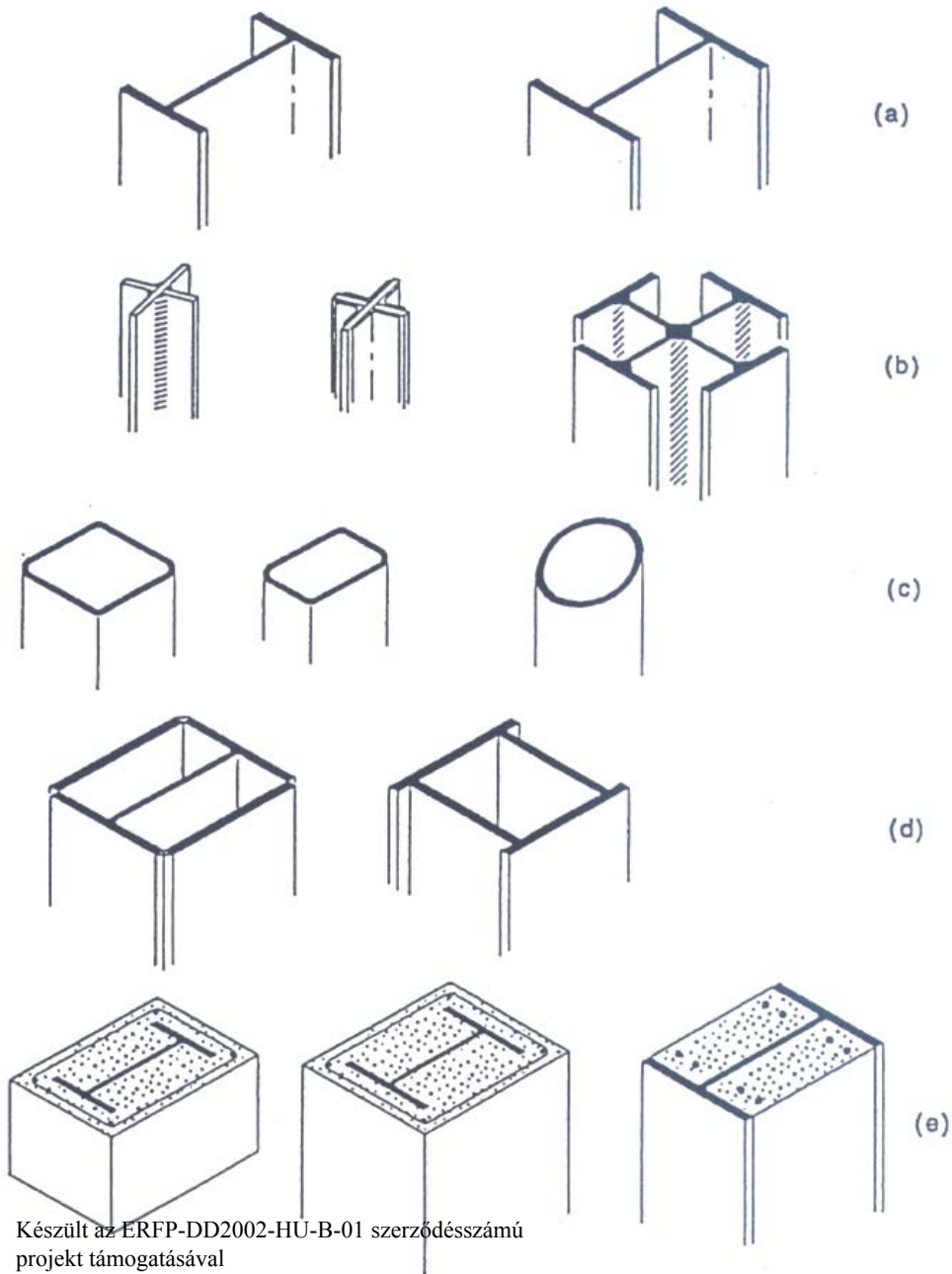
(C) Vízszintes terhek felvétele a födémek és függőleges síkú merevítők segítségével



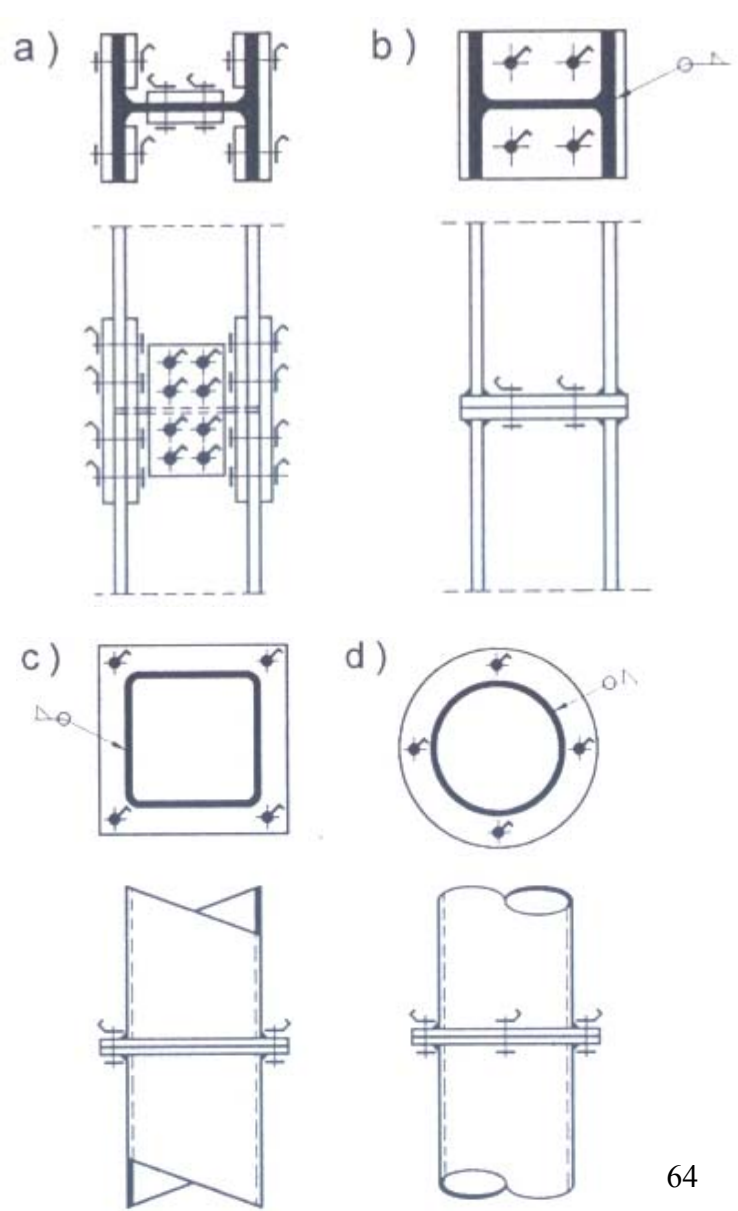
(D) Vízszintes terhek felvétele vízszintes és függőleges merevítők segítségével



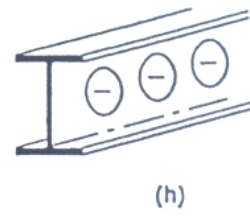
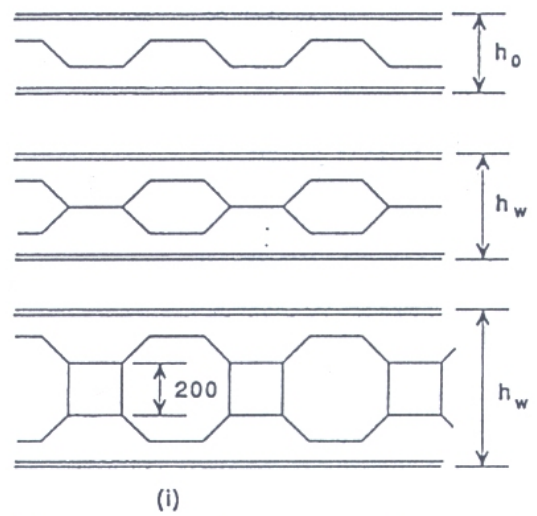
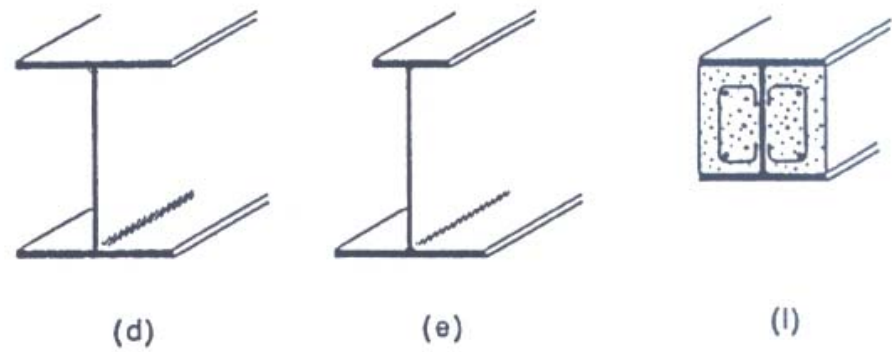
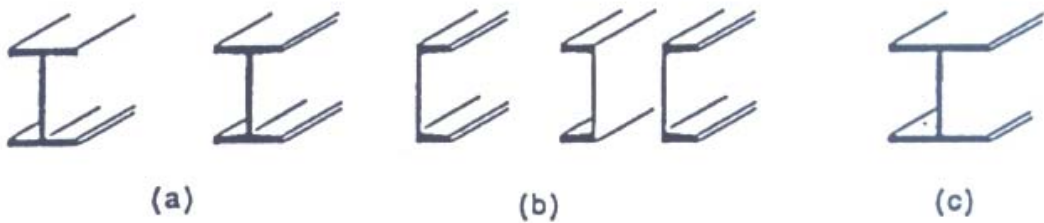
Különböző oszlopkeresztmetszetek



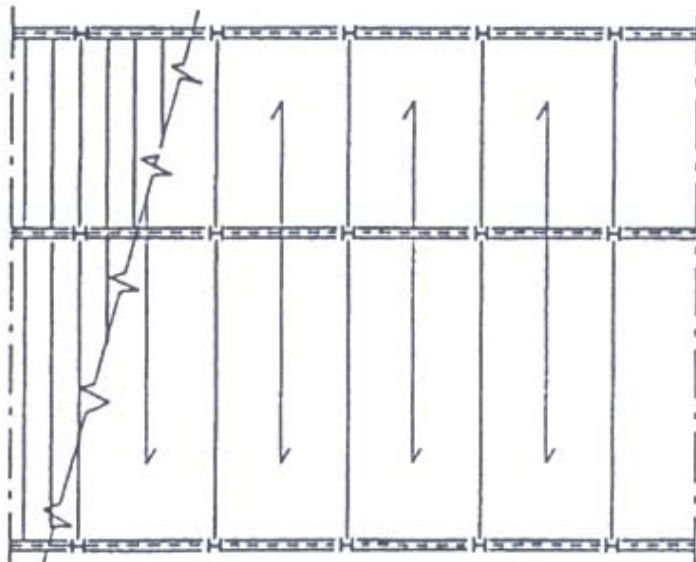
Oszlop keresztmetszetek illesztése



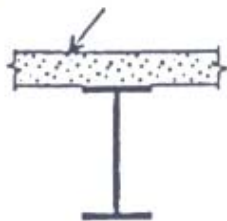
Különböző gerenda-keresztmetszetek



Födémek

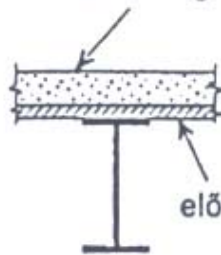


tömör helyszíni
vasbeton födémlemez



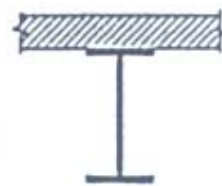
(a)

helyszíni vb.
fedőréteg

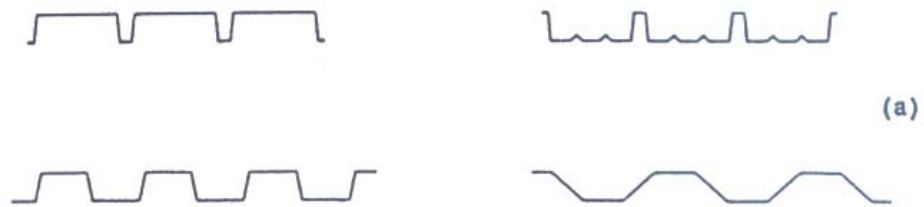


(b)

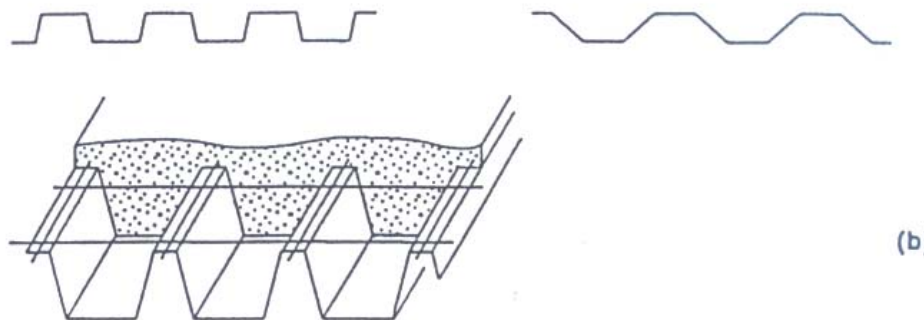
előregyártott
vasbeton lemez



(c)



(a)



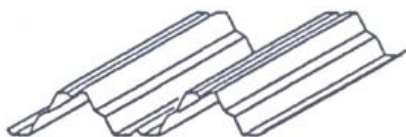
(b)



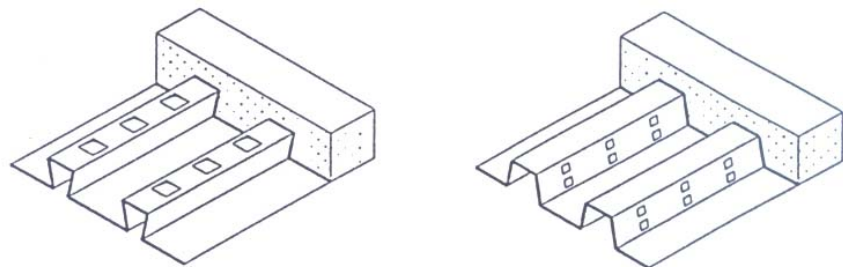
(c)



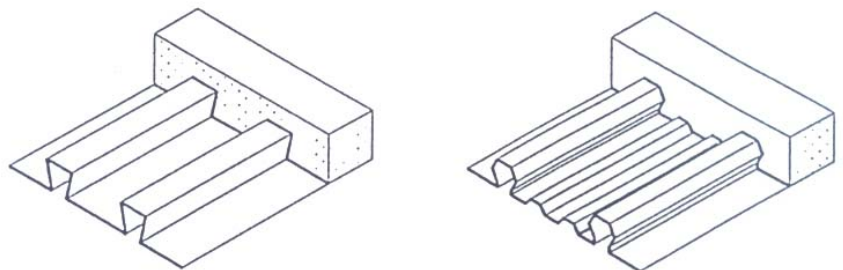
(d)



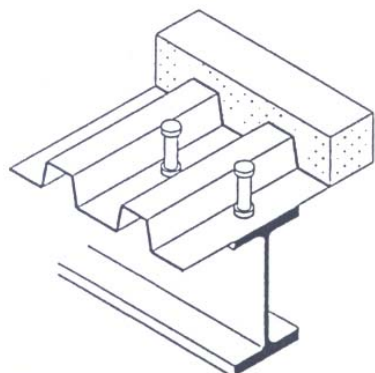
(f)



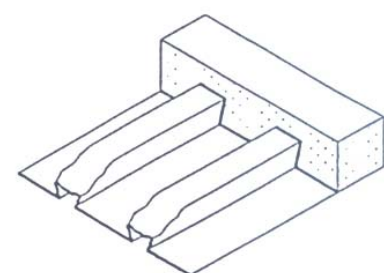
(a) Mechanikai kapcsolat



(b) Surlódásos kapcsolat

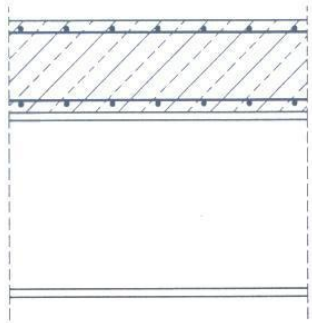


(c) Véglekötés

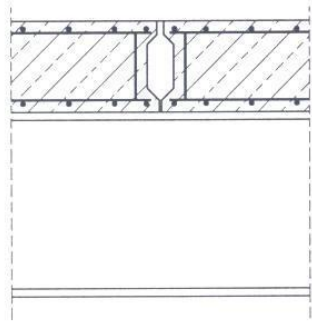
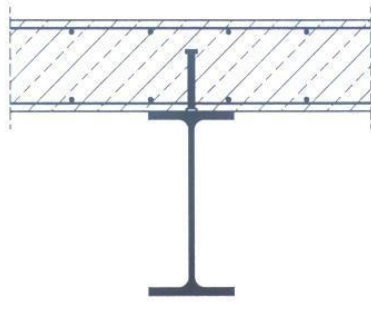


(d) Véglekötés

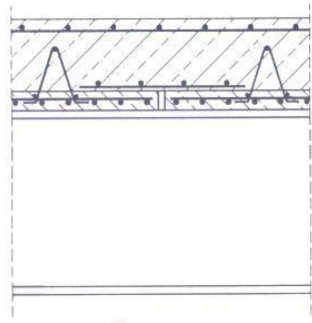
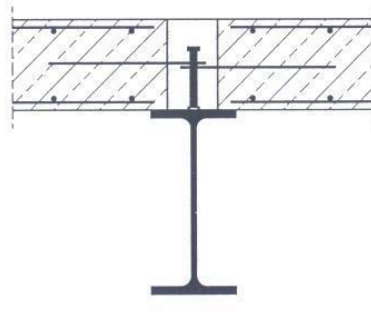
Teherhordó együttdolgozó födémek



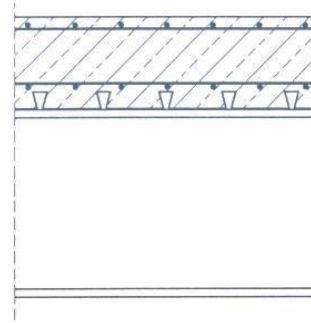
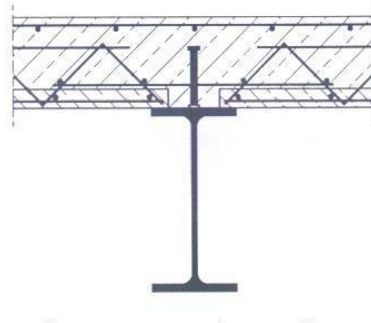
(A) Helyszínen készített vasbeton lemezzel



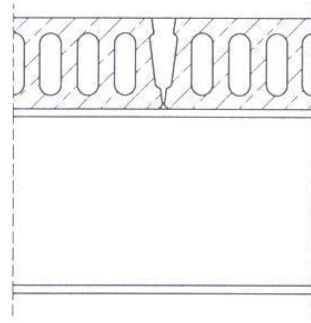
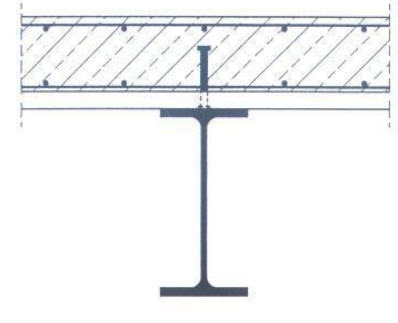
(B) Előregyártott vasbeton lemezzel



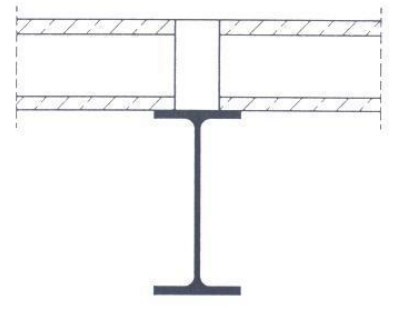
(C) Előregyártott panelekre készített vasbeton lemezzel



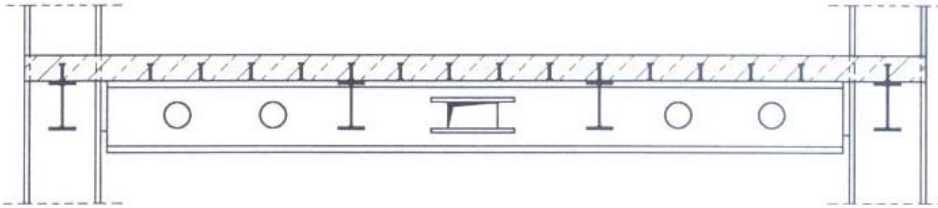
(D) Acél trapézlemezre készített vasbeton lemezzel



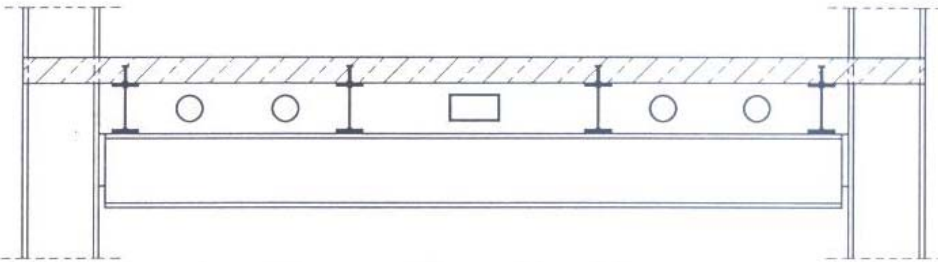
(E) Előregyártott beton panelekkel



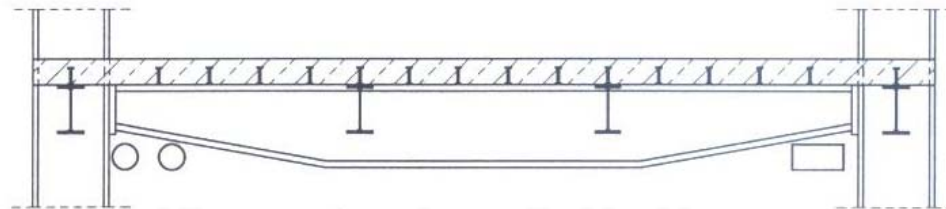
A különböző installációk, infrastruktúra elhelyezése a födém rendszerben



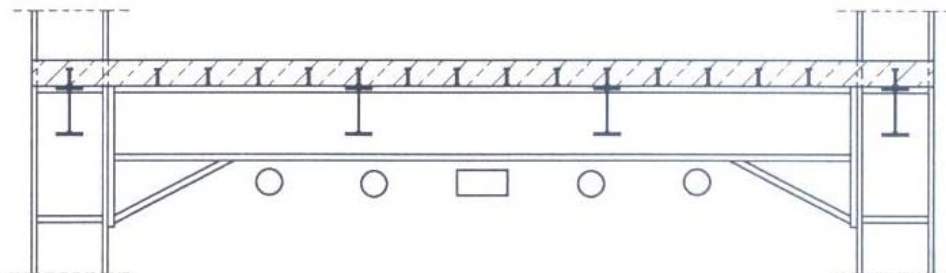
(A) Az acélgerenda gerinclemeznének kivágásával



(B) Az acélgerenda ráhelyezett mellékgerendák sávjában

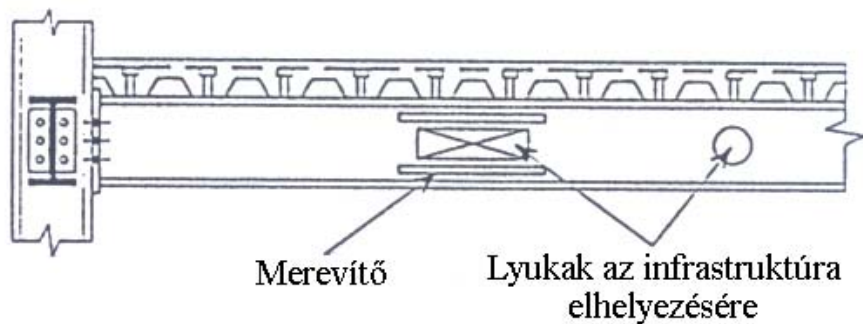


(C) Csuklós bekötésű gerenda esetében az oszlopok közelében

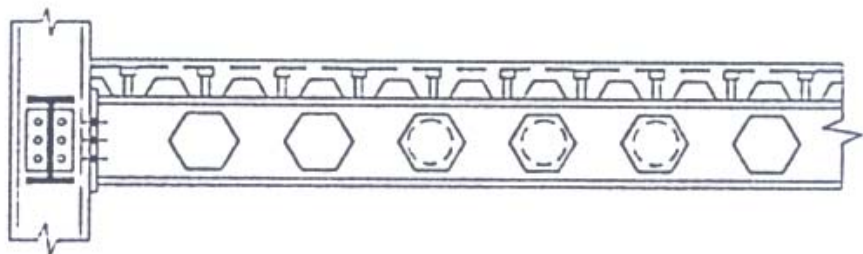


(D) Befogott bekötésű gerenda esetében a födém közepén

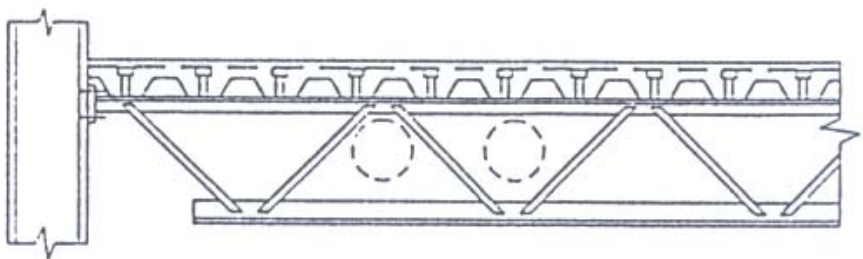
Különböző módszerek az infrastruktúra elhelyezésére



(a) Gerenda gerinc lyukakkal

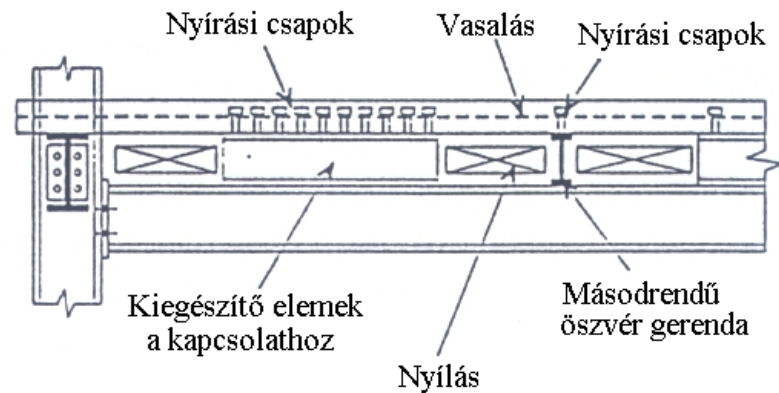


(b) Magasított I tartó

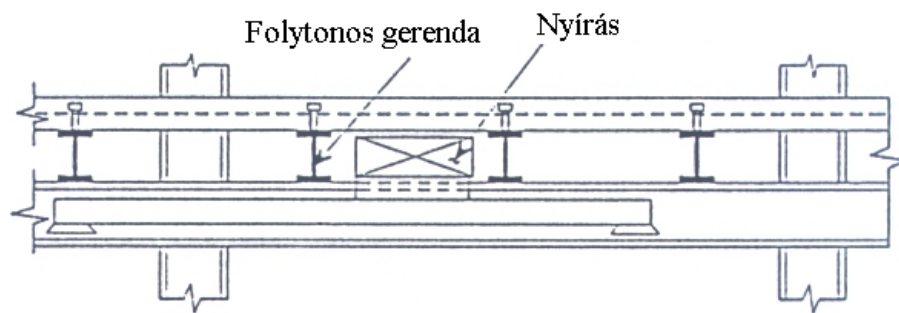


(c) Rácsos tartó

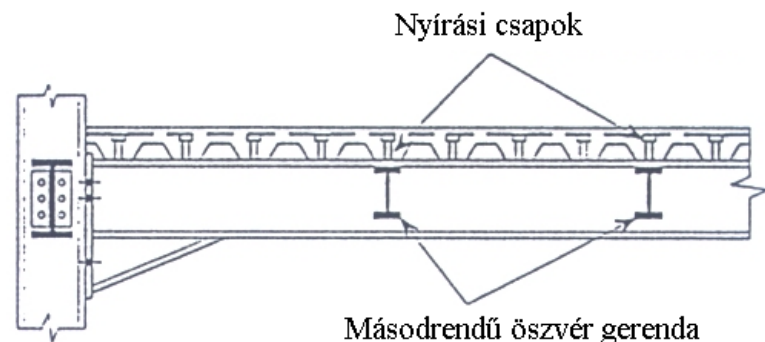
Készült az ERF-2002-HU-B-01 szerződésszámú projekt támogatásával



(d) Gerenda

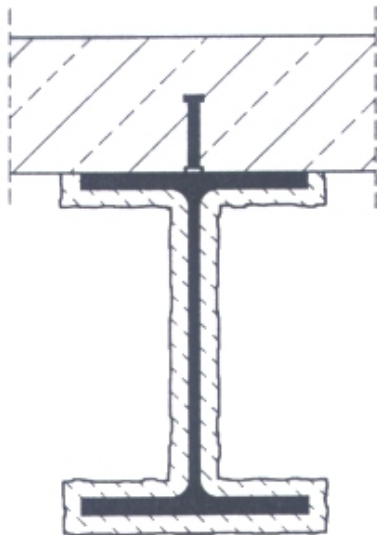


(e) Párhuzamos gerenda

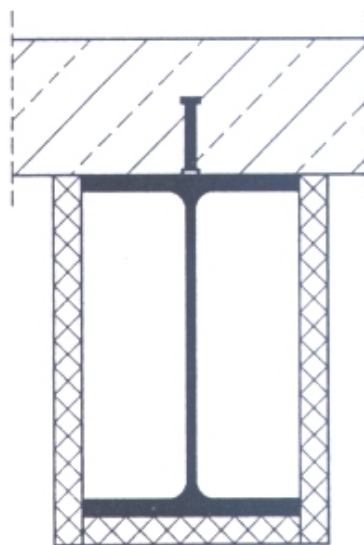


(f) Kiekelt gerenda

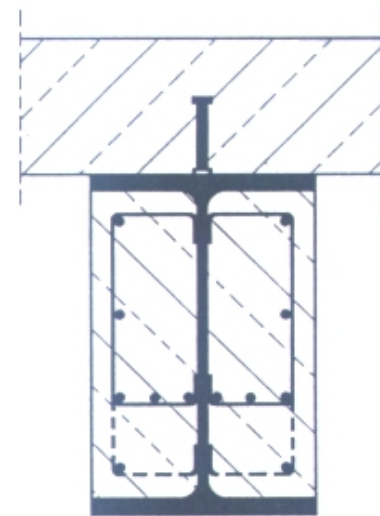
Tűzvédelem:



(A) Fuvatással felvitt anyag: ásványgyapot, cement vagy gipsz kötőanyaggal



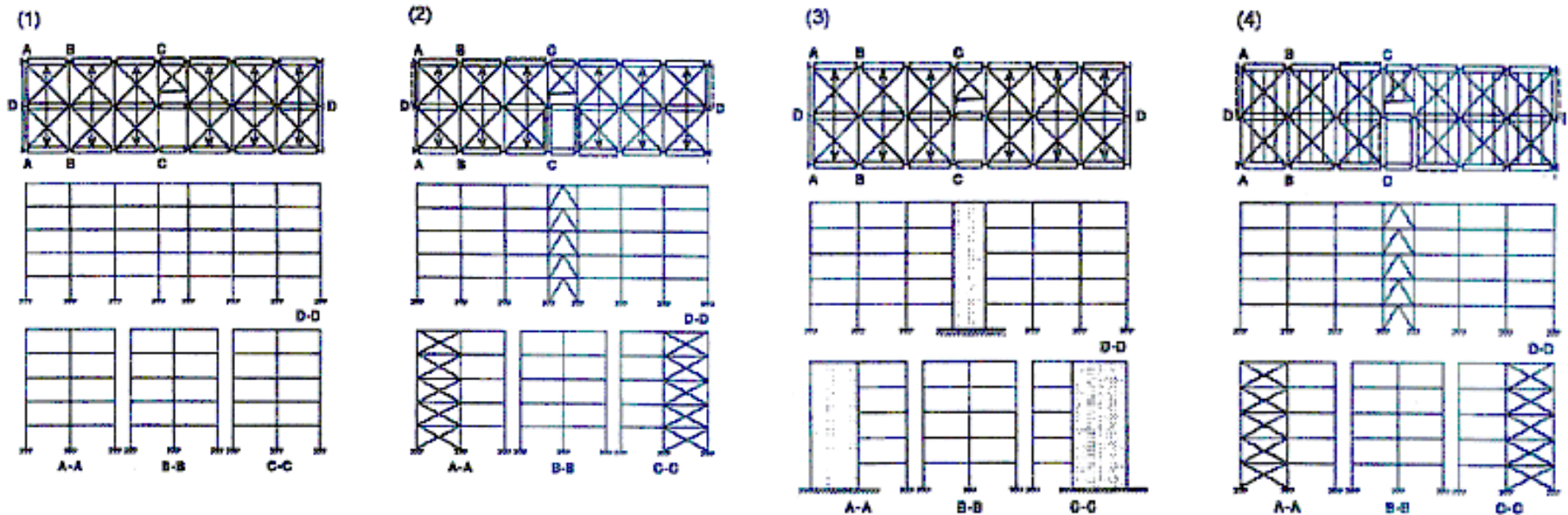
(B) Táblás/lemezes kőszigetelés: gipszkarton lemez



(C) Kibetonozás

Többszintes acélvázás rendszerek merevítése

Alacsony többszintes épület szerkezeti rendszerei



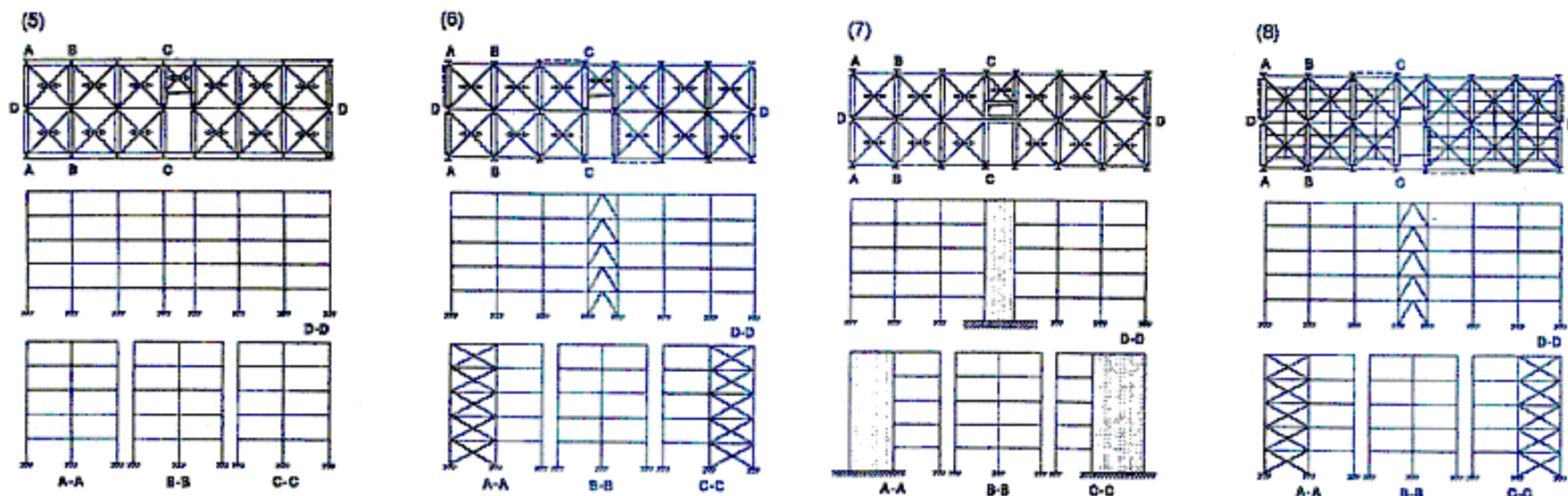
Alacsonyabb többszintes épületek szerkezeti rendszerei:

(1) – hosszirányú merev keret, keresztirányban teherhodó födém;

(2) – hosszirányú keret függőleges síkú rácsozással, keresztirányban teherhodó födém;

(3) – hosszirányú keret vasbeton falakkal vagy maggal, keresztirányban teherhodó födém;

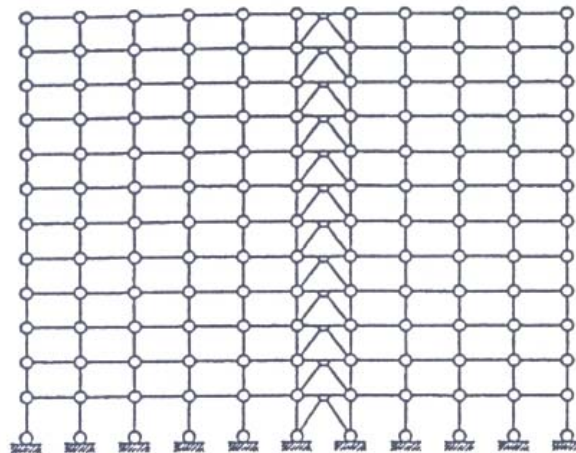
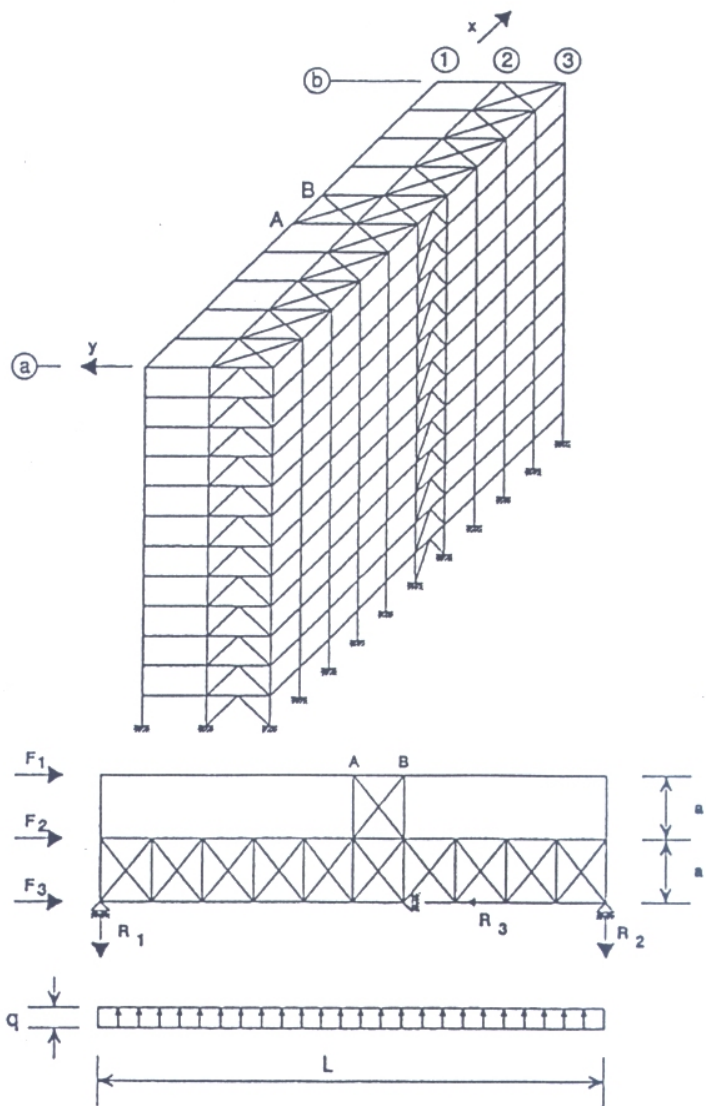
(4) – hosszirányú keret bármely előző merevítéssel, hosszirányban teherhodó födém



Alacsonyabb többszintes épületek szerkezeti rendszerei:

- (5) – keresztirányú merev keret, keresztirányban teherhodó födém;*
- (6) – keresztirányú keret függőleges síkú rácsoszással, keresztirányban teherhodó födém;*
- (7) – keresztirányú keret vasbeton falakkal vagy maggal, keresztirányban teherhodó födém;*
- (8) – keresztirányú keret bármely előző merevítéssel, hosszirányban teherhodó födém*

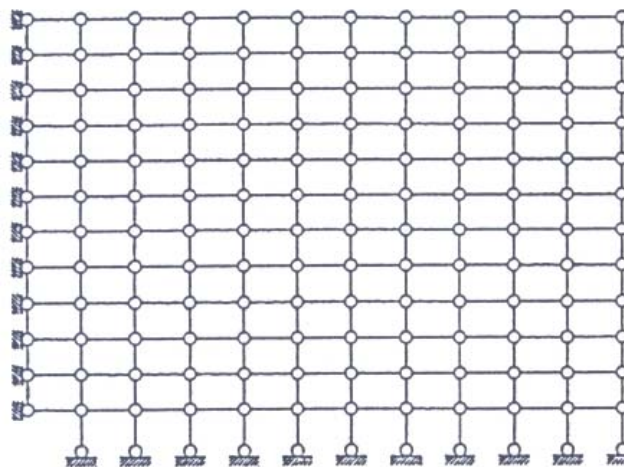
Tervezés követelmények



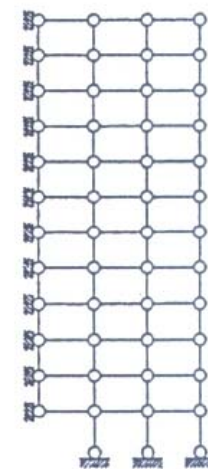
3



a & b



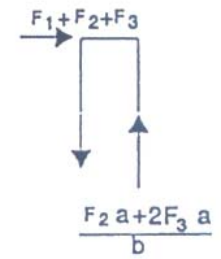
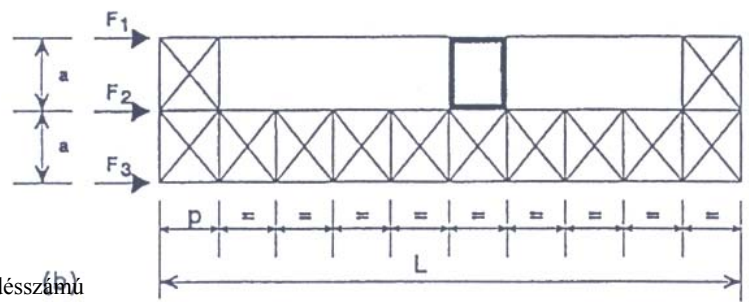
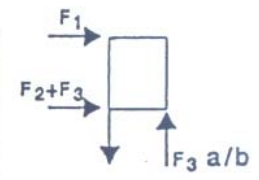
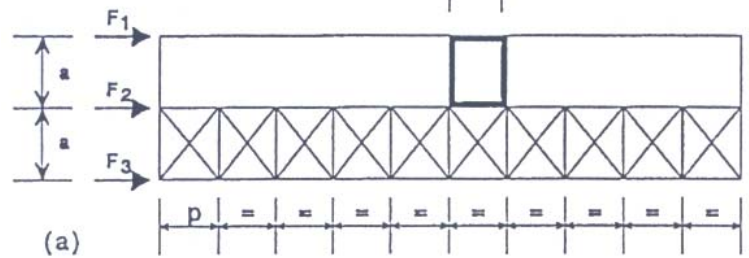
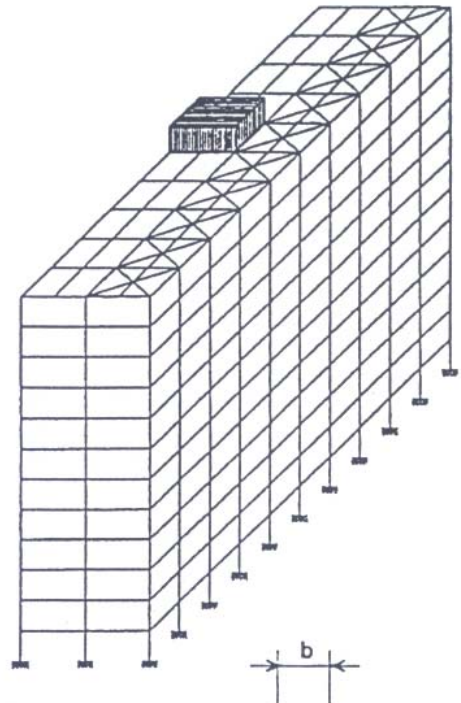
1 & 2



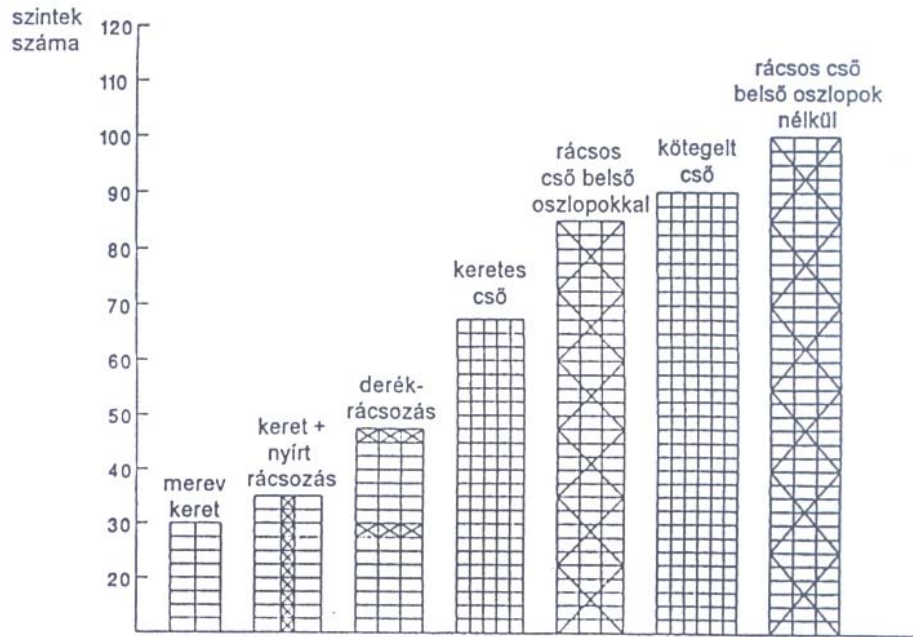
közbelső
keretállások
(keresztirányban)

Többszintes épület vízszintes síkú merevítő rácsozással

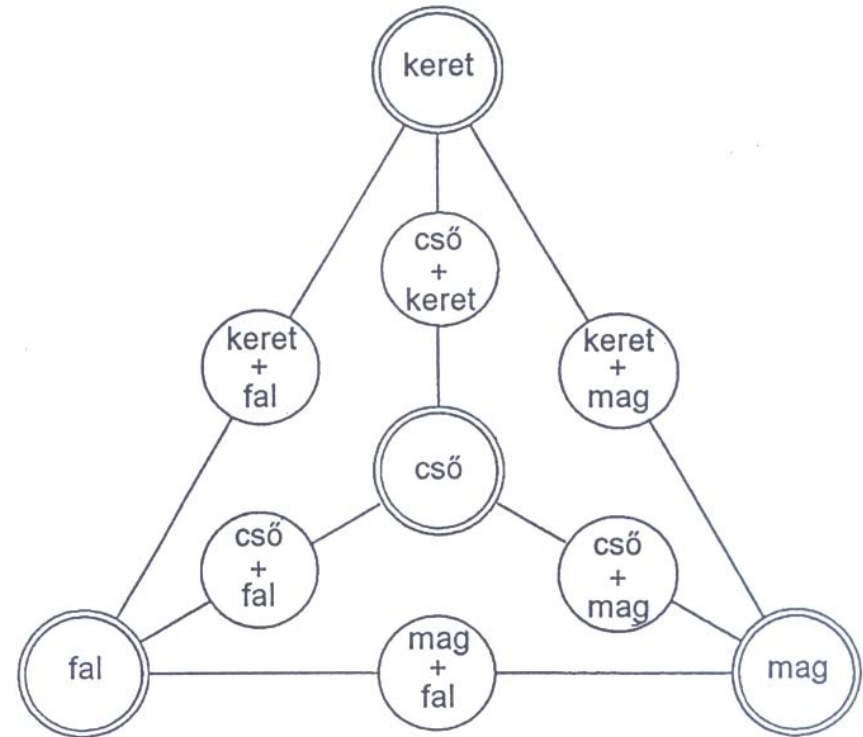
Hosszanti és keresztirányú keretállások



Magasépületek szerkezeti rendszerei



Többszintes acélvázás épületek szerkezeti rendszerei és a szintek száma



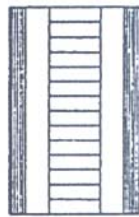
Többszintes épületek szerkezeti rendszereinek csoportosítása Drosdov és Lishak szerint



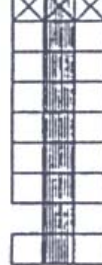
mervítő fal



mervítő fal és mag



mervítő fal és merev keret



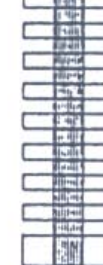
függesztett felső rácsozás



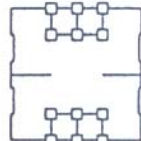
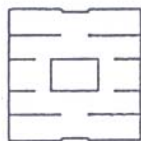
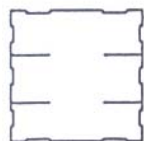
függesztett alsó rácsozás



konzolos födémek



konzolos, kapcsolt födémek



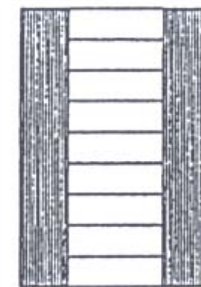
Mervítő falas szerkezeti rendszerek



sarokmag



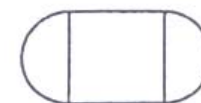
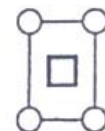
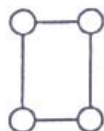
sarok- és belső mag



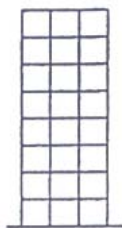
független külső mag



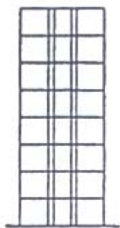
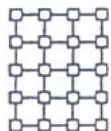
független külső és belső mag



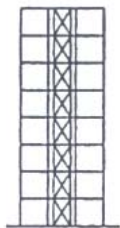
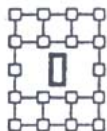
Mervítő magos rendszerek



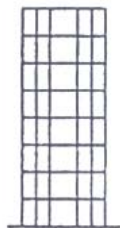
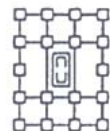
keret



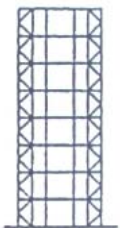
keret és mag



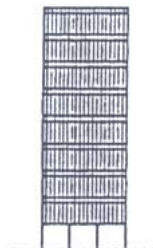
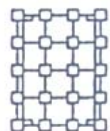
keret és rácsos mag



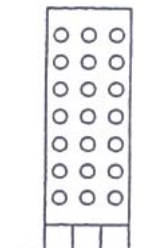
keret és merevítő falak



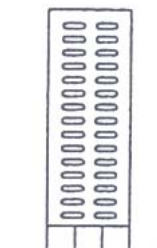
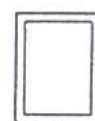
keret és oldalsó rácsozás



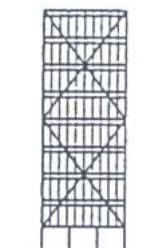
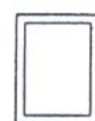
keretes cső



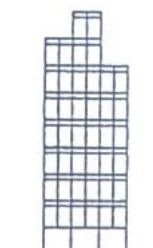
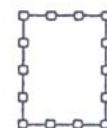
nyílásokkal áttört héjcső



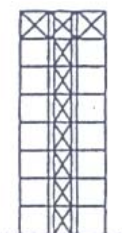
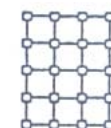
magas boltívcső



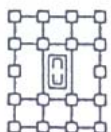
rácsos cső



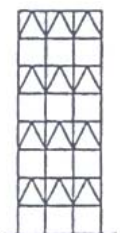
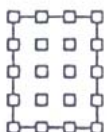
kötөгelt cső



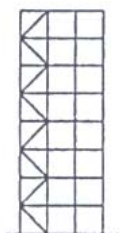
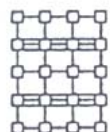
felső rács és rácsos mag



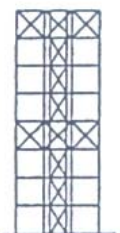
sík födémlemez



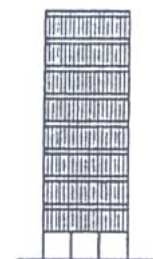
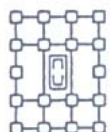
szakaszos rácsozás



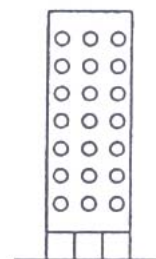
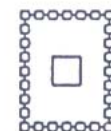
rácsos keret



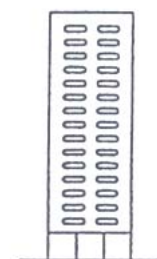
felső rács, derékrács és rácsos mag



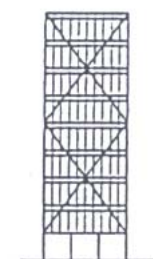
keretes csőben cső



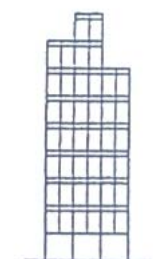
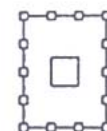
nyílásokkal áttört csőben cső



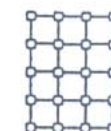
magas boltívcső belső oszlopokkal



rácsos csőben cső



keretes cső felső ráccsal és derékráccsal



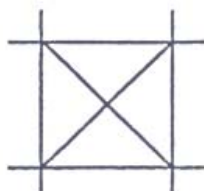
Keretes rendszerek

Csőes rendszerek

Rácsozás típusok



egyszerű
átlós
rácsozás



andráskereszt
rácsozás



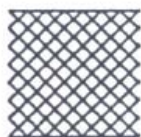
függőleges
K rácsozás



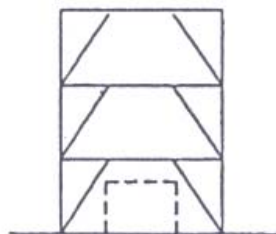
vízszintes
K rácsozás



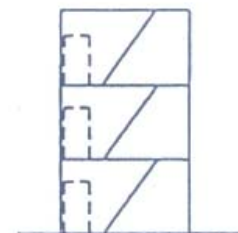
sarok-
merevítés



raszteres
rácsozás



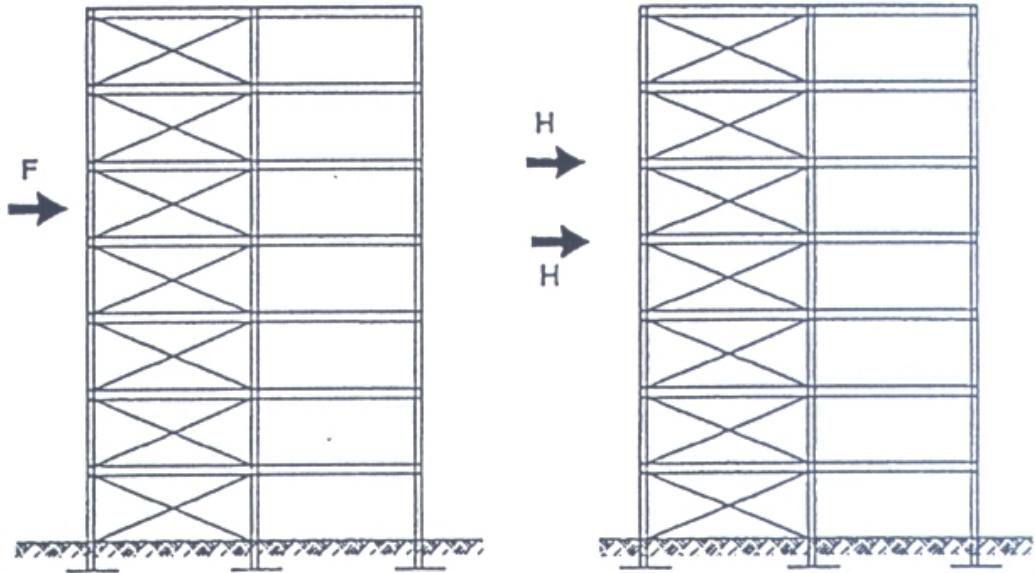
külpontos
K rácsozás



külpontos
átlós rácsozás

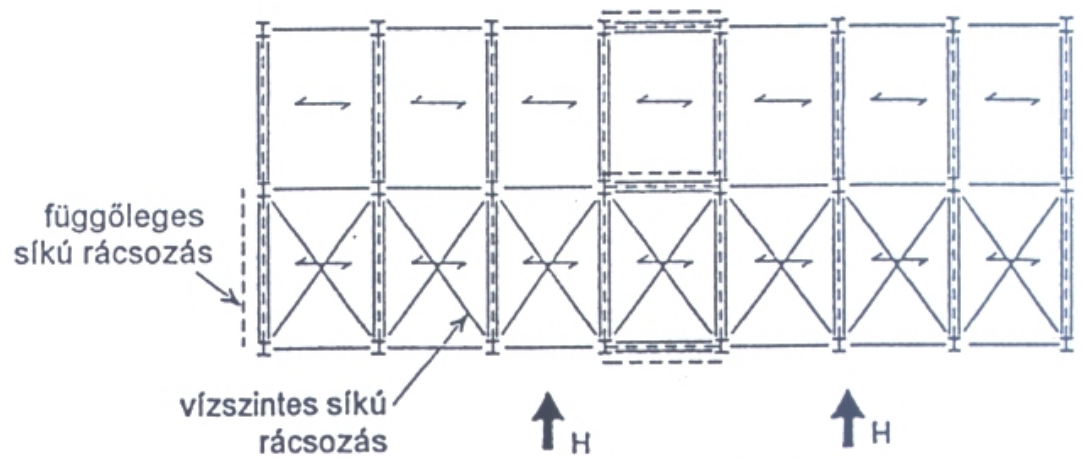
Rácsozástípusok

Merevítő rácsozás

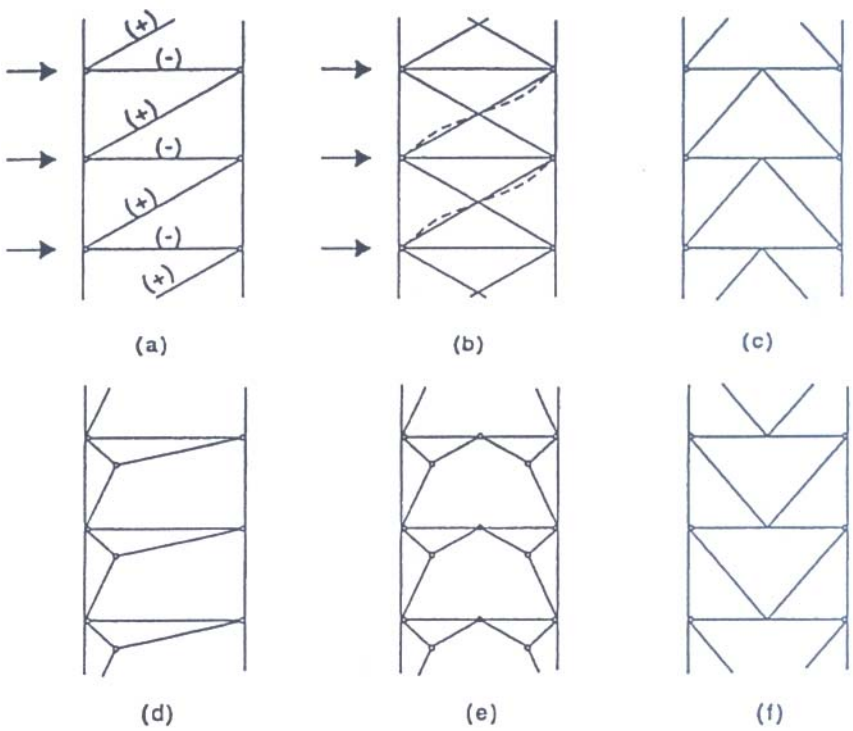


(a)

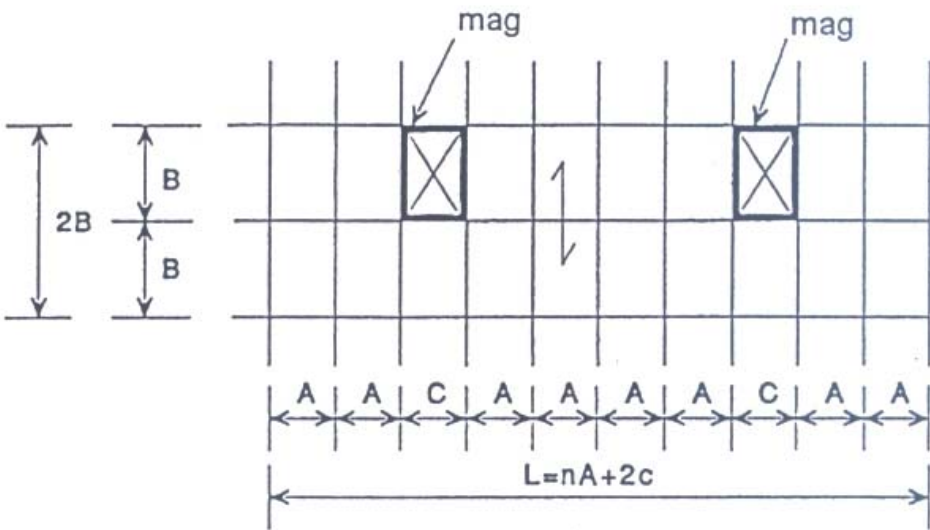
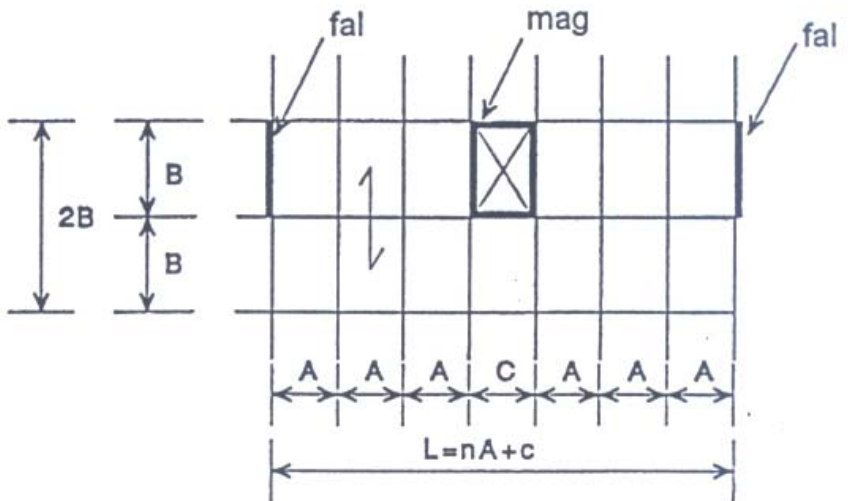
(b)



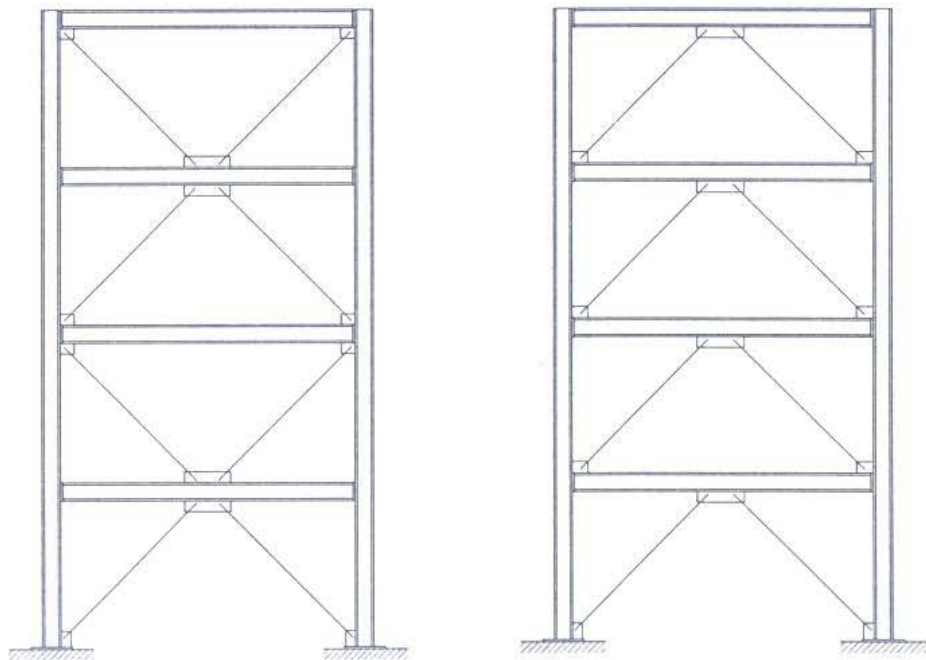
(c)



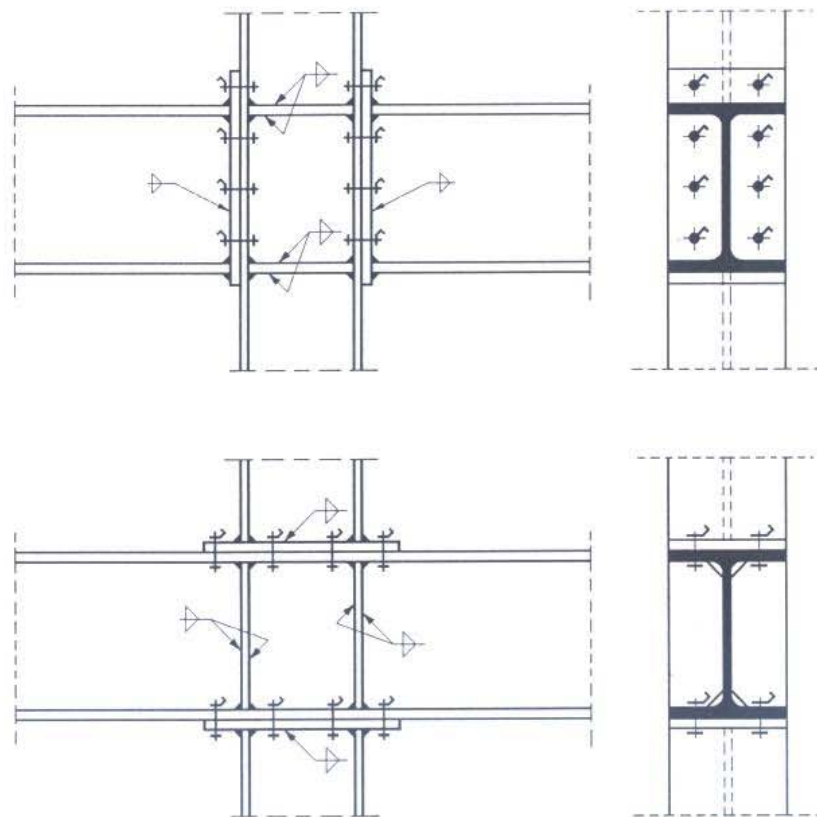
A merevítő rácsozás típusai



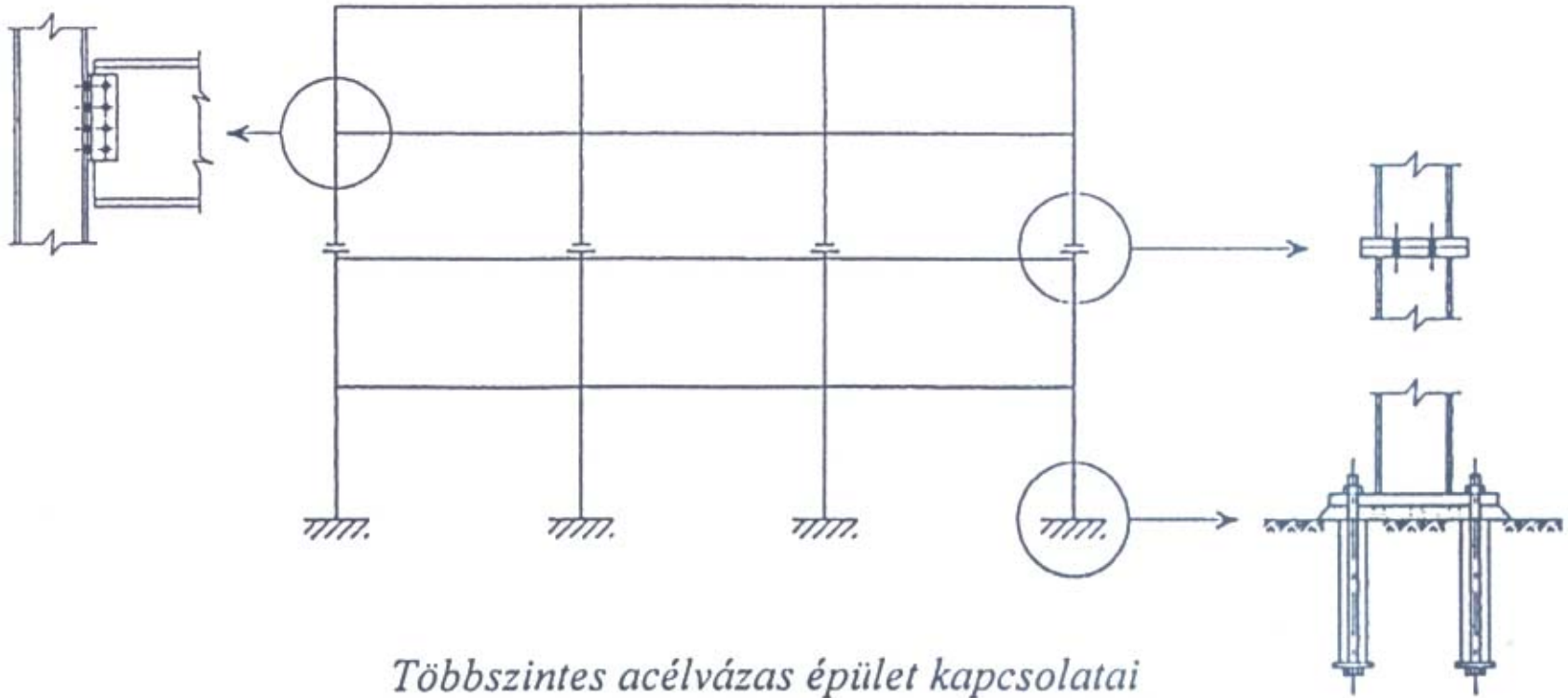
Merevítő rácsos



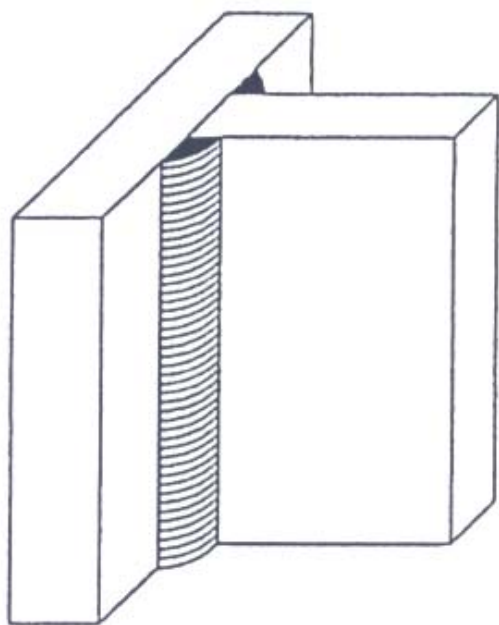
Keretsarok kialakítások homlokfalak illesztésekkel



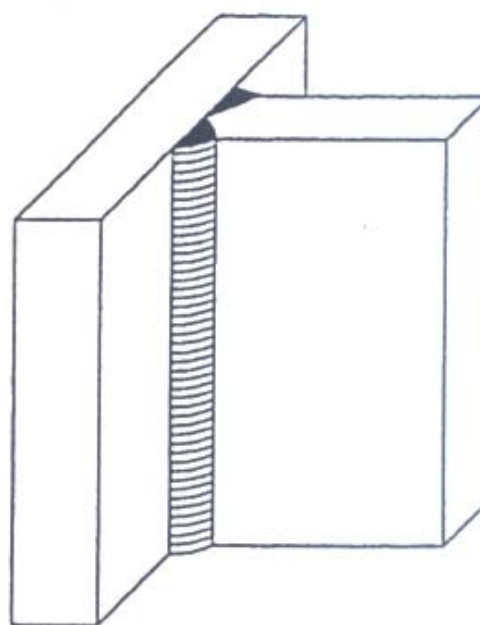
Többszintes acélvázás rendszerek kapcsolatai



Hegesztési varratok



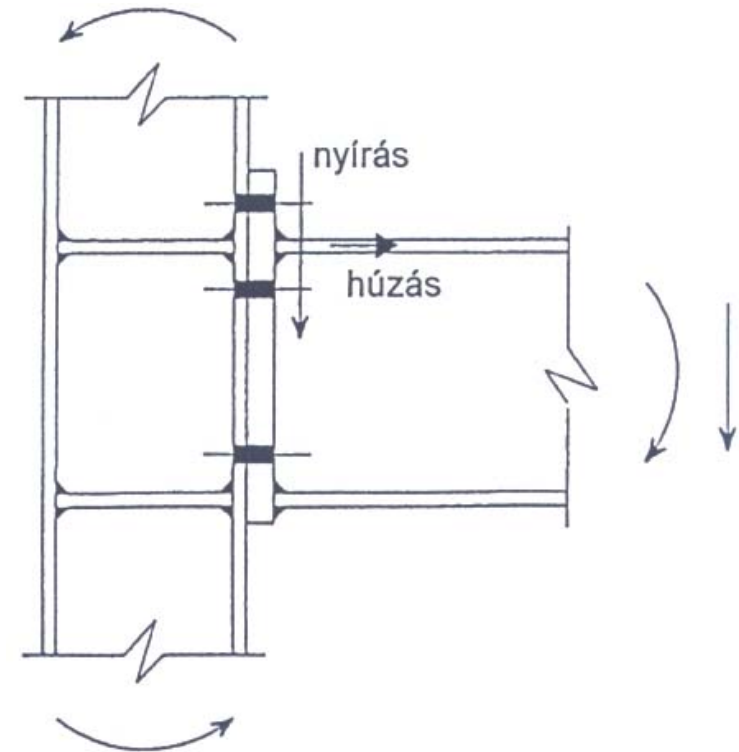
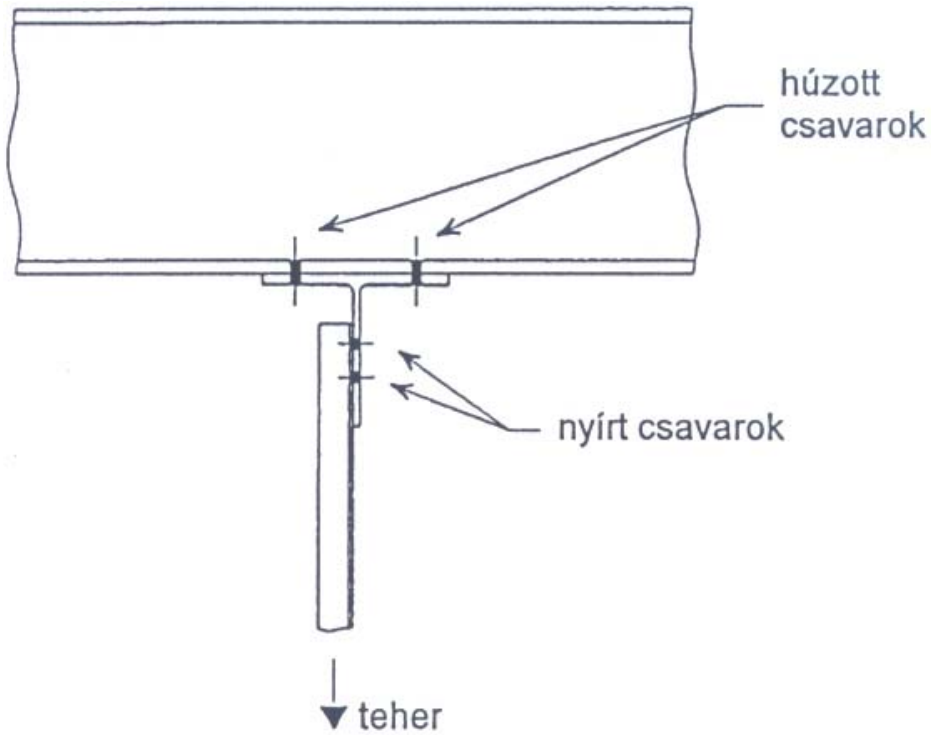
(a) Sarokvarrat



(b) Tompavarrat

A T kötés kialakítási módjai

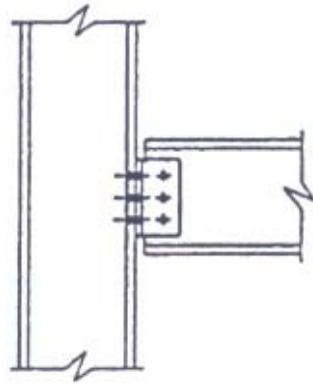
Csavarok



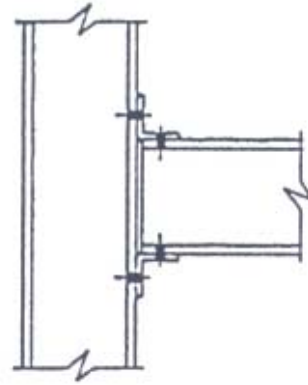
Csak húzott és csak nyírt csavarok

Húzásra és nyírásra egyaránt igénybe vett csavarok

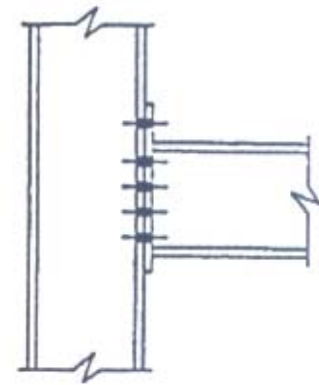
Más kapcsolóelemek



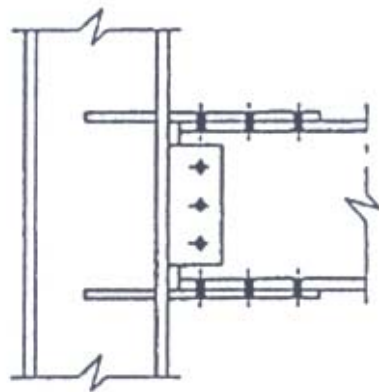
gerincbekötő
szögacélok



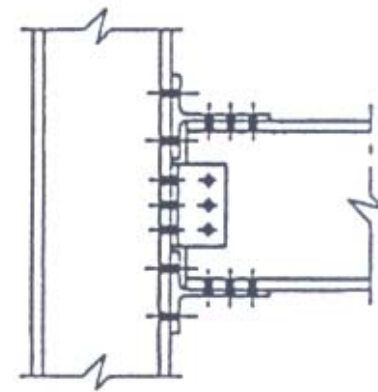
övbekötő
szögacélok



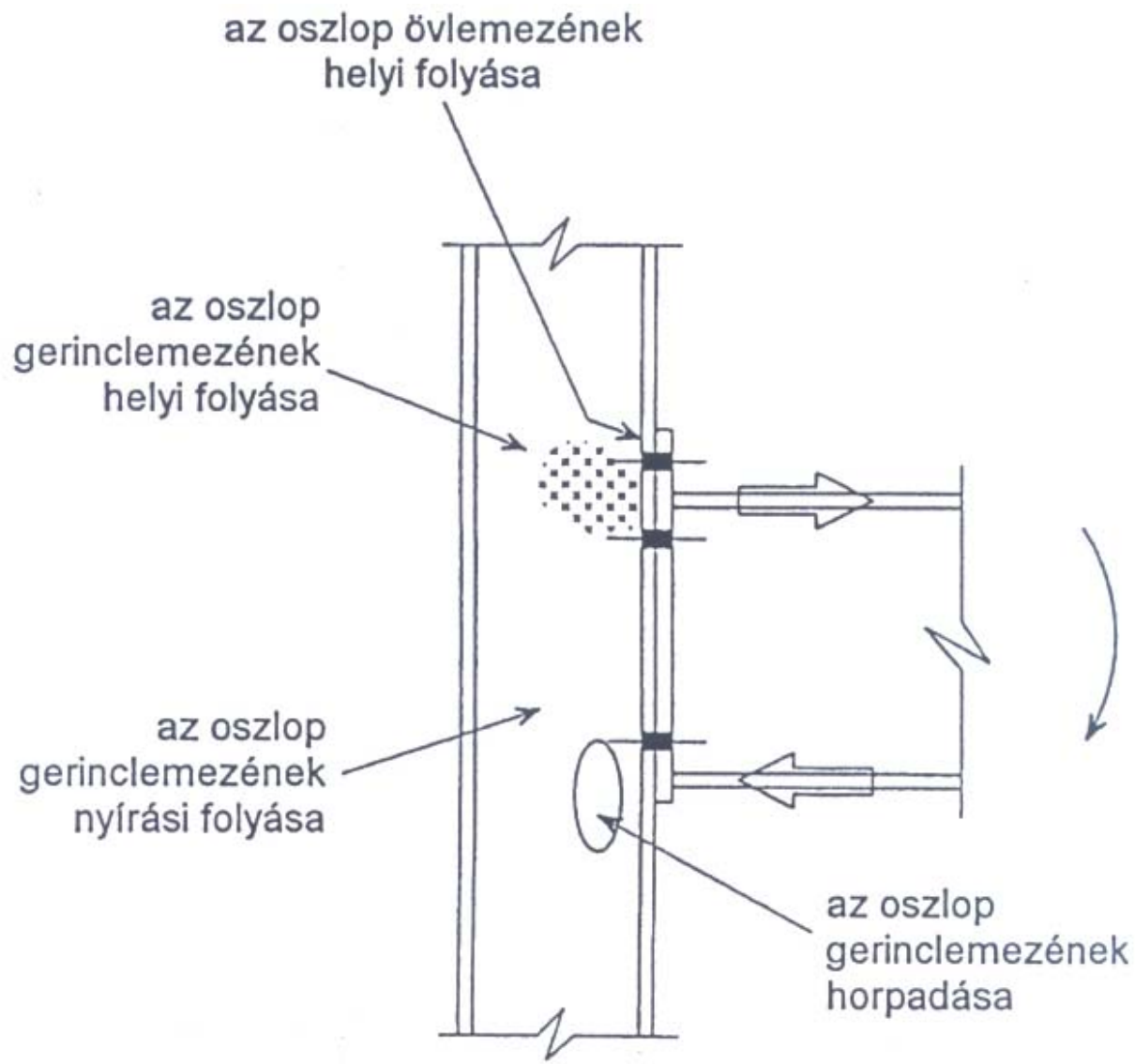
homloklemez



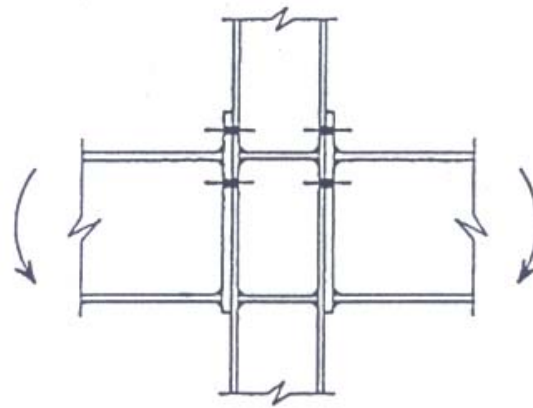
átkötőlemezek



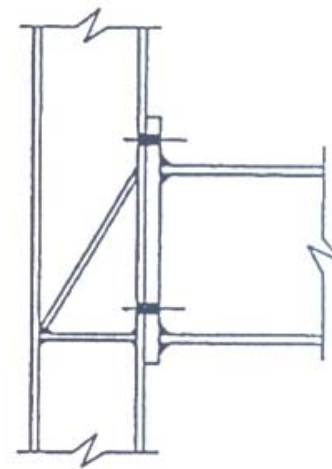
T idomok



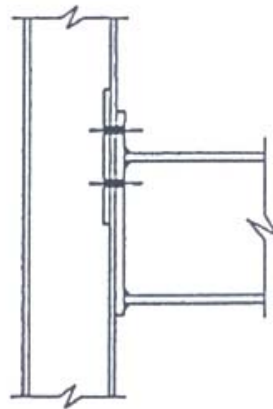
Erősítetlen oszlop–gerenda kapcsolat helyi tönkremeneteli formái



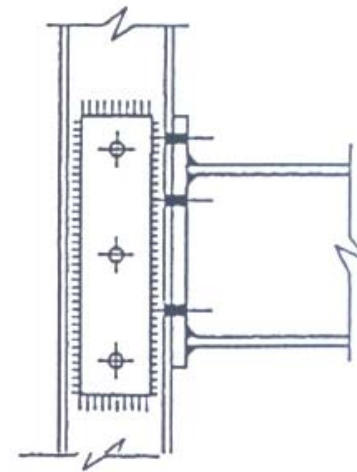
gerincmerevítő bordák



gerincmerevítő bordák



övlemez-erősítő lemez
(övalátétlemez)

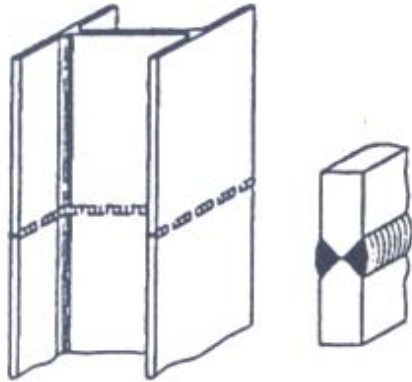


gerinclemez-erősítő lemez
(gerinchízaló lemez)

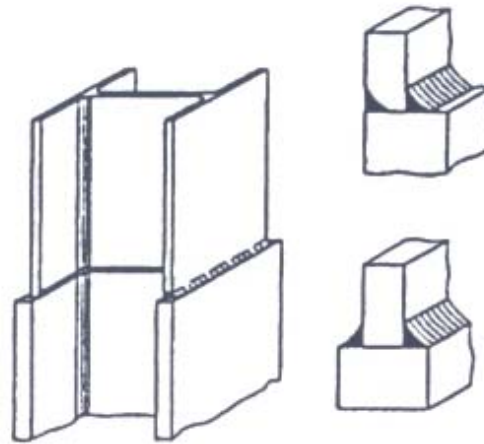
*Az oszlop–gerenda kapcsolatok potenciálisan gyenge területeinek
megerősítési lehetőségei*

A kapcsolatok típusai

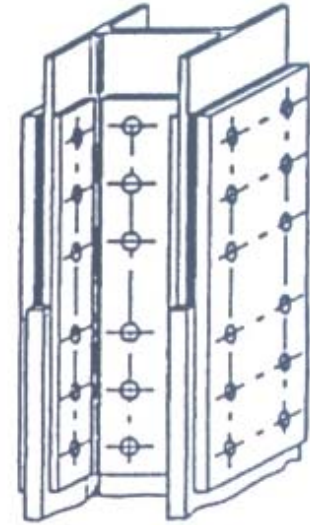
Oszlopillesztések



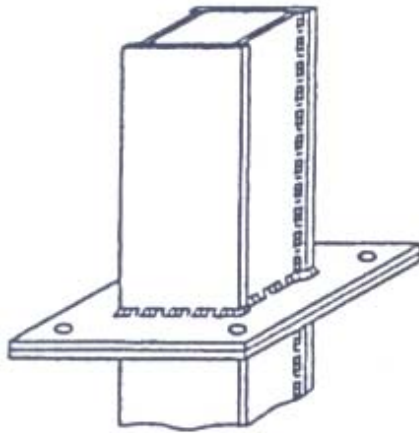
(1)



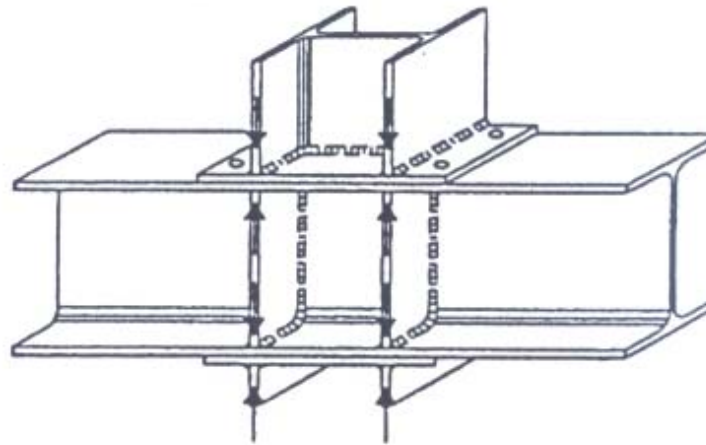
(2)



(3)

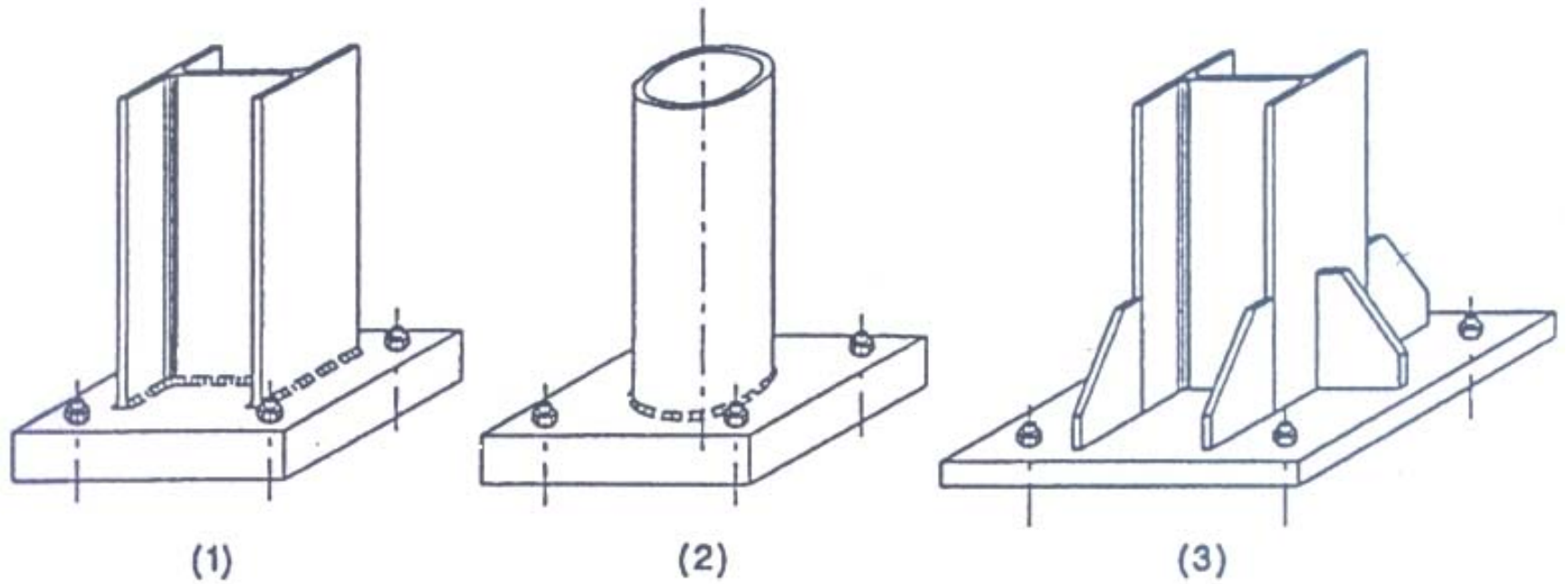


(4)

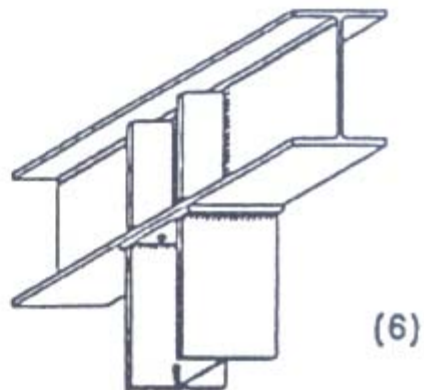
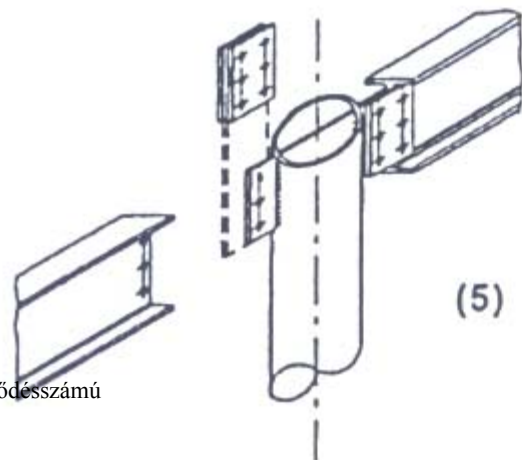
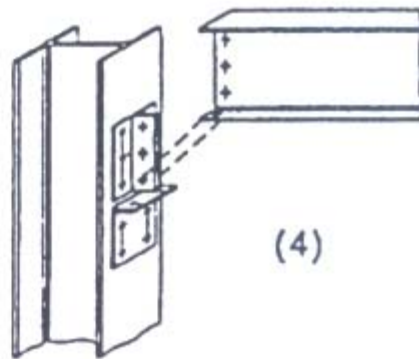
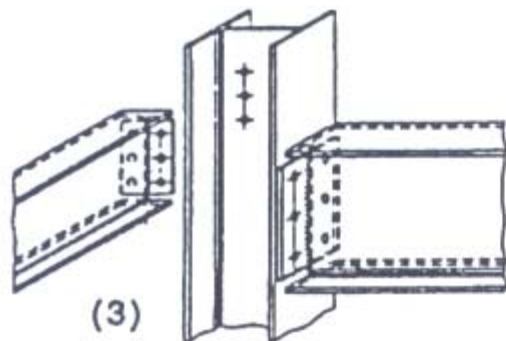
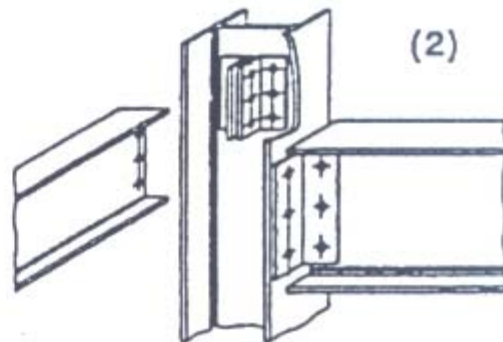
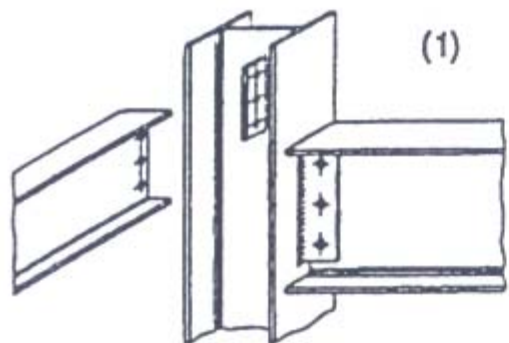


(5)

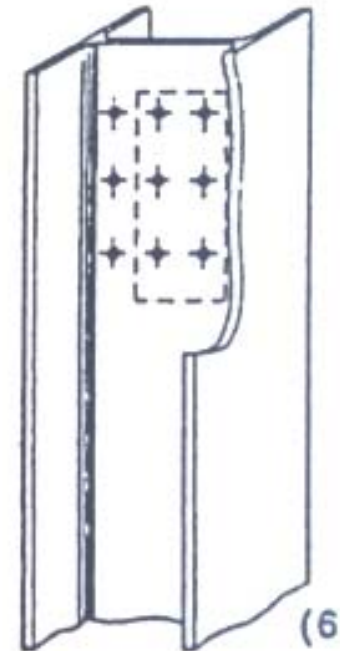
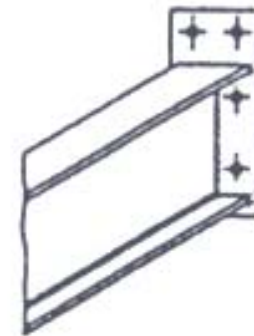
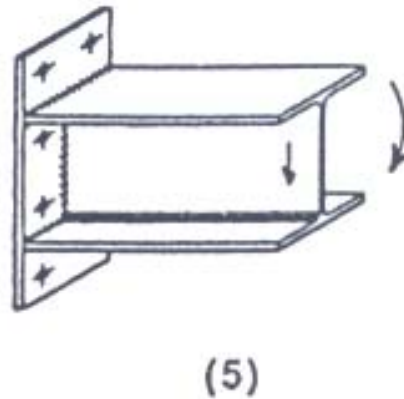
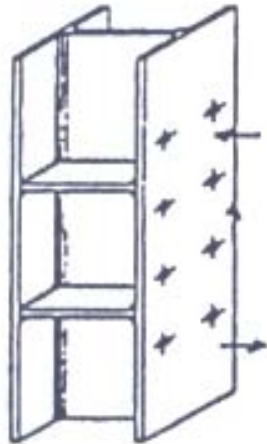
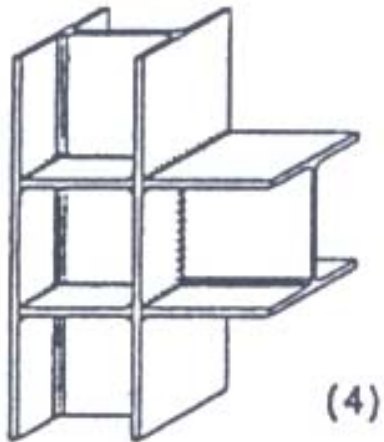
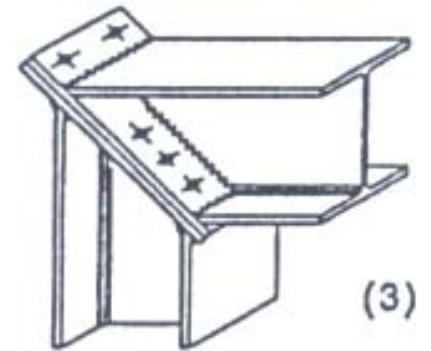
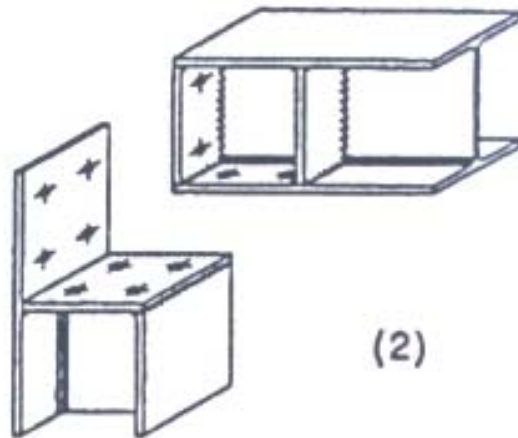
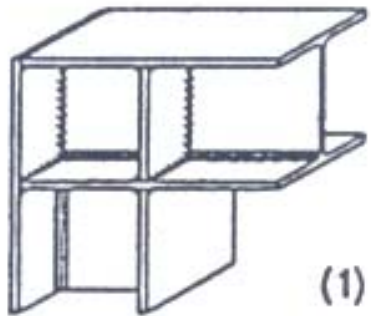
Oszloptalpak



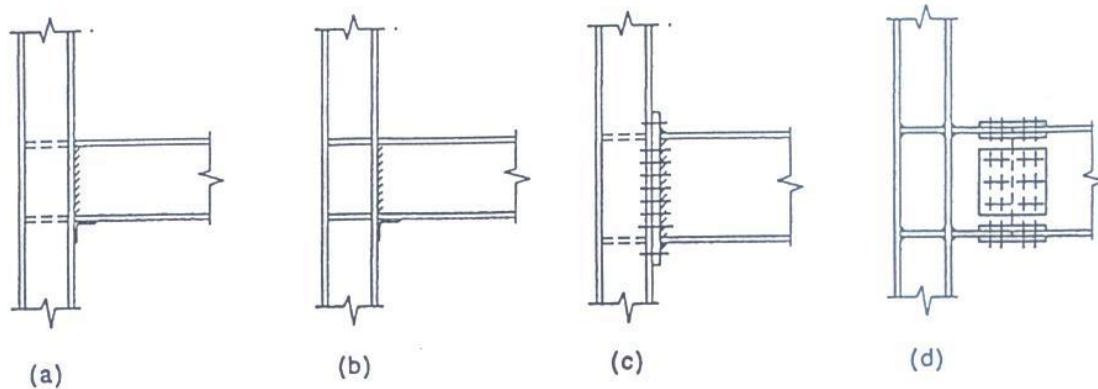
Csuklós oszlop–gerenda kapcsolatok



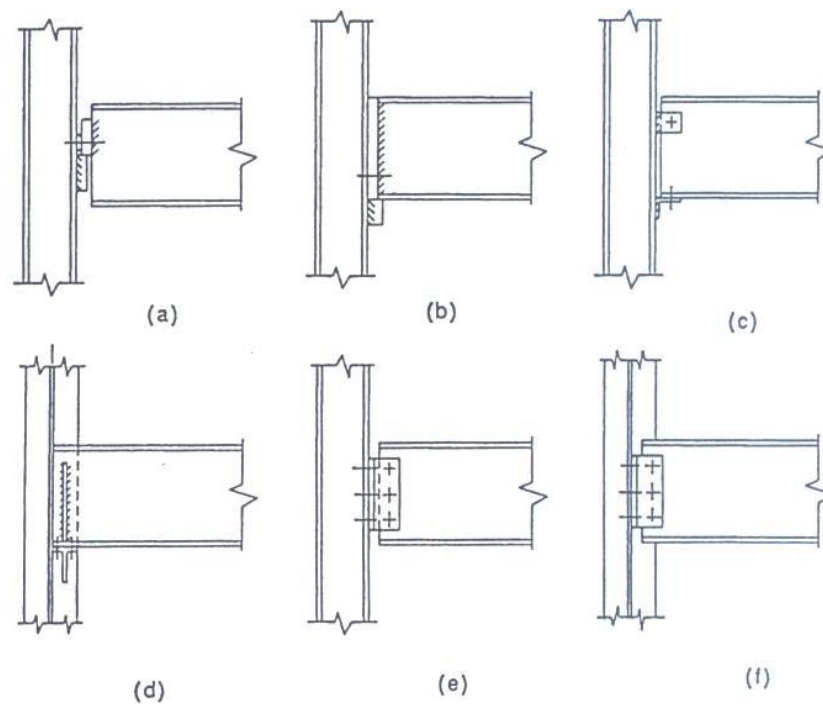
Nyomatékbíró oszlop–gerenda kapcsolatok



Szerkezeti rendszerek

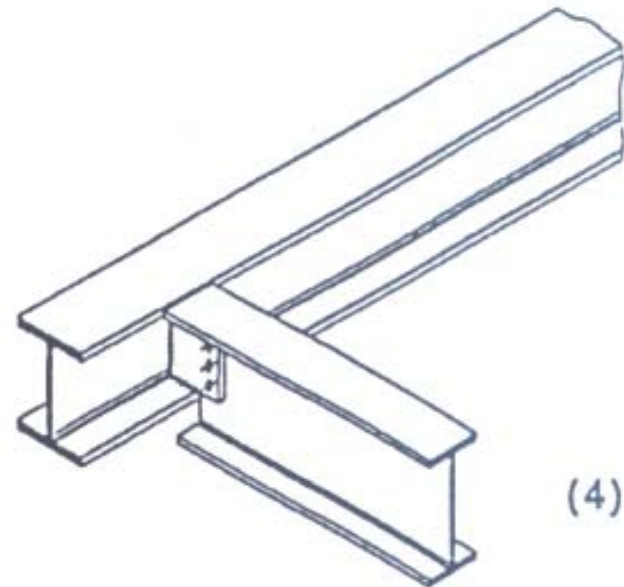
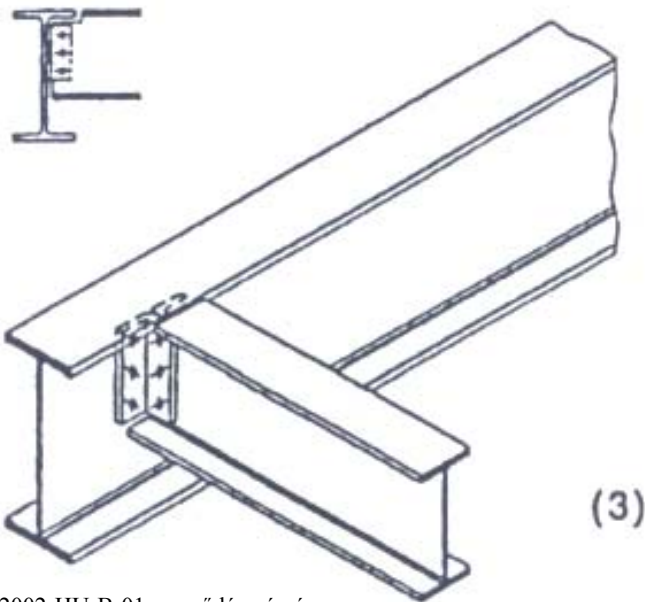
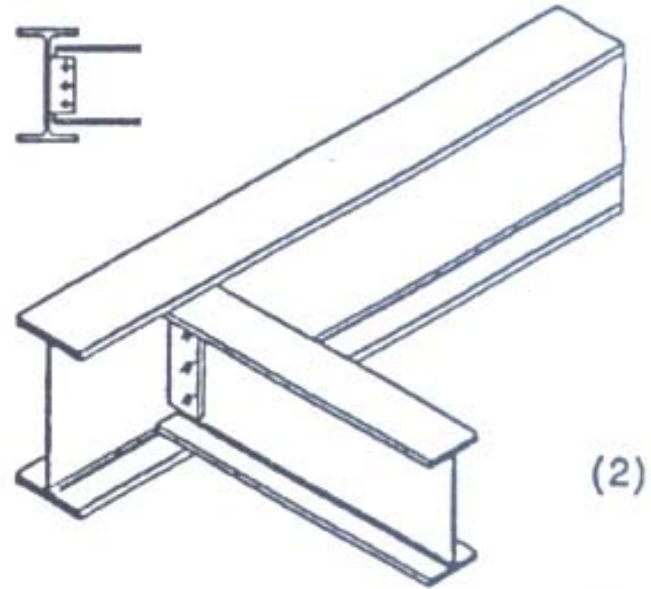
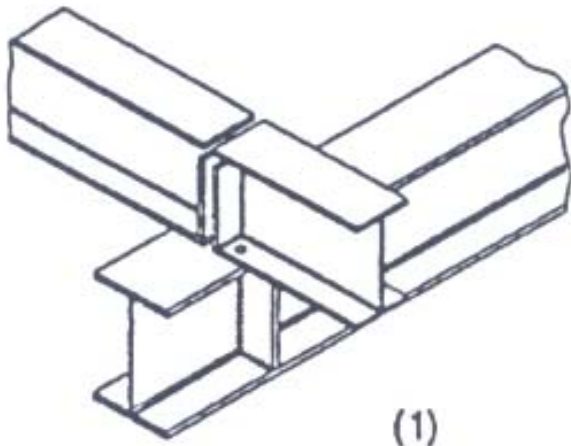


Merev (folytatólagos) keretek oszlop-gerenda kapcsolatai

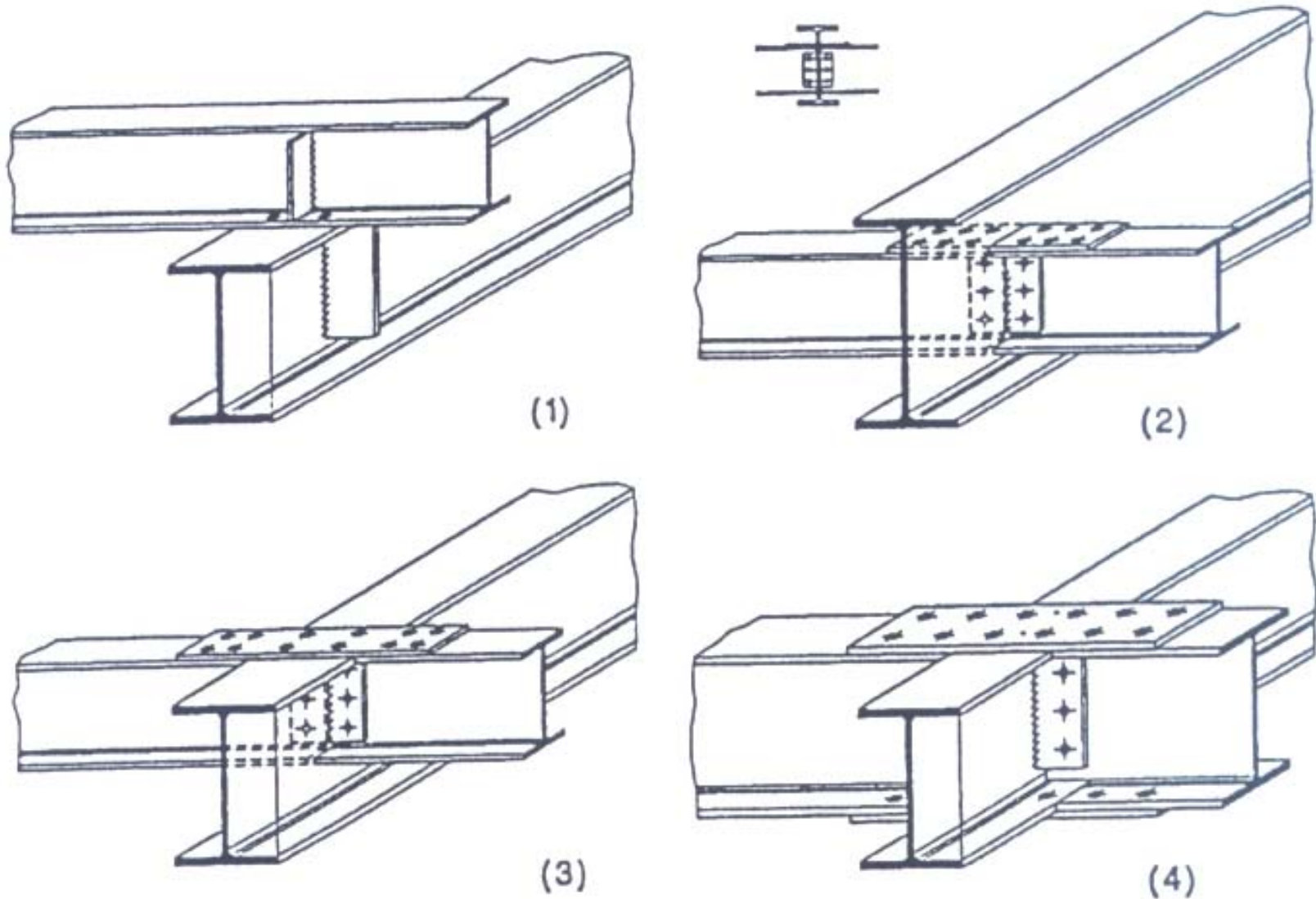


A csuklós (egyszerű) keret oszlop-gerenda kapcsolatai

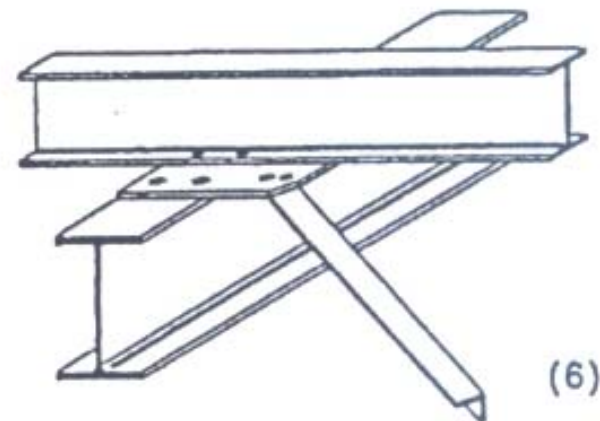
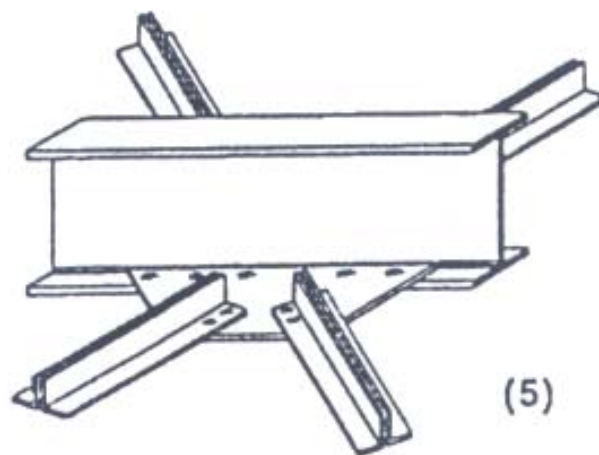
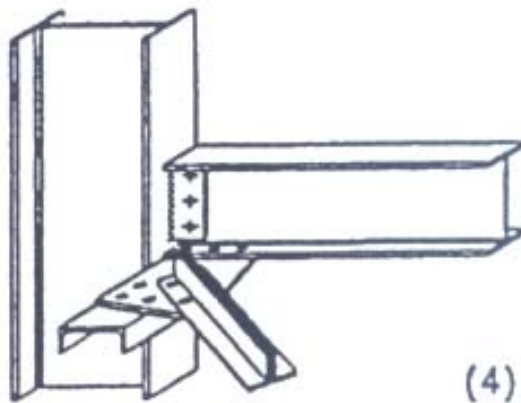
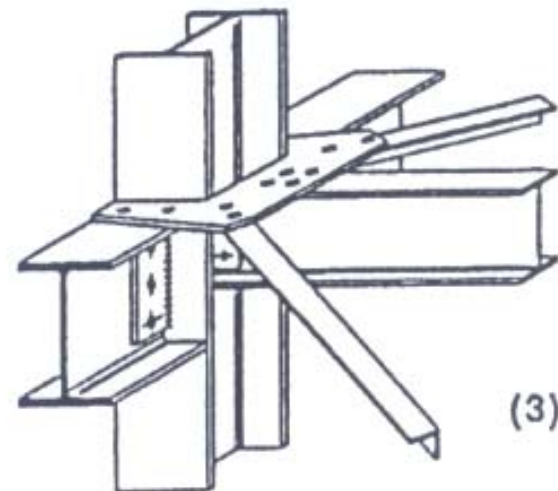
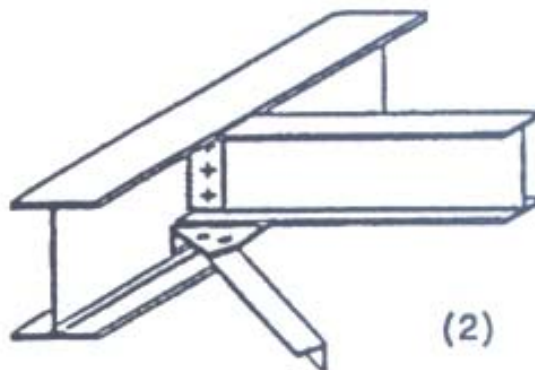
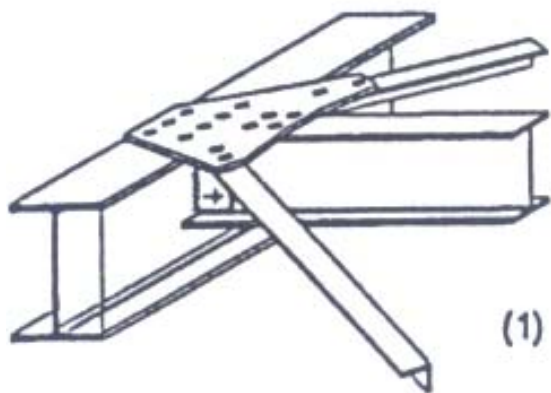
Csuklós gerenda-gerenda kapcsolatok



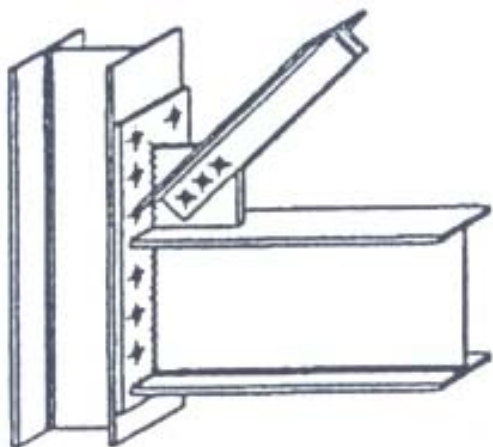
Nyomatékbíró gerenda-gerenda kapcsolatok



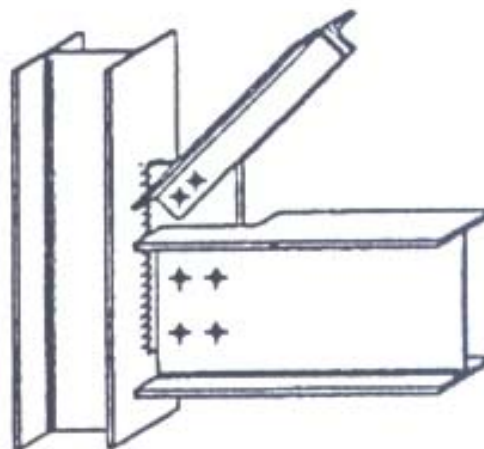
A szélrács kapcsolatai



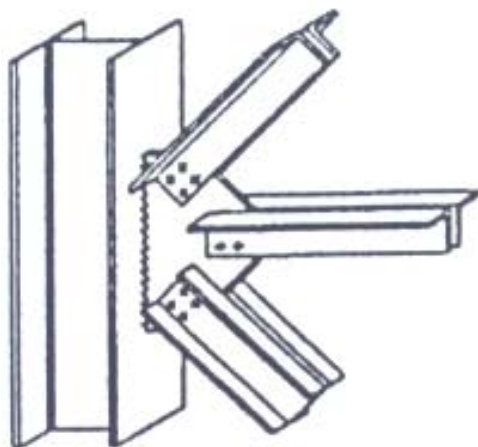
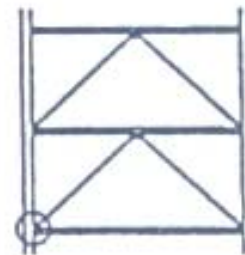
A hosszkötés kapcsolatai



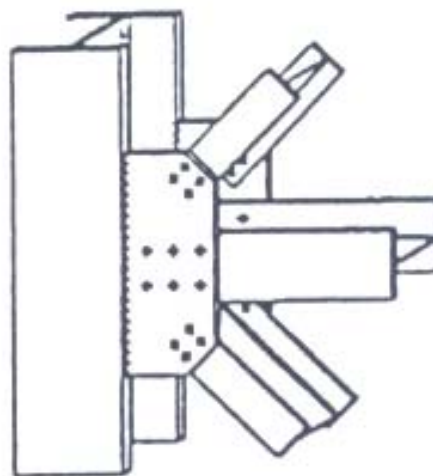
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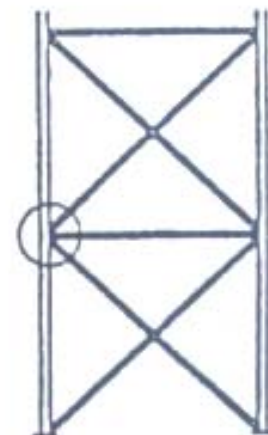
(2)



(3)



(4)



Merevítőrácsozás csomópontjai:

