

# Térbeli szerkezetek erőjátéka, térbeli felületszerkezetek

Különleges szerkezetek

# Héjak belső erői

- **Nyírásmentes héjak (hártyák)**

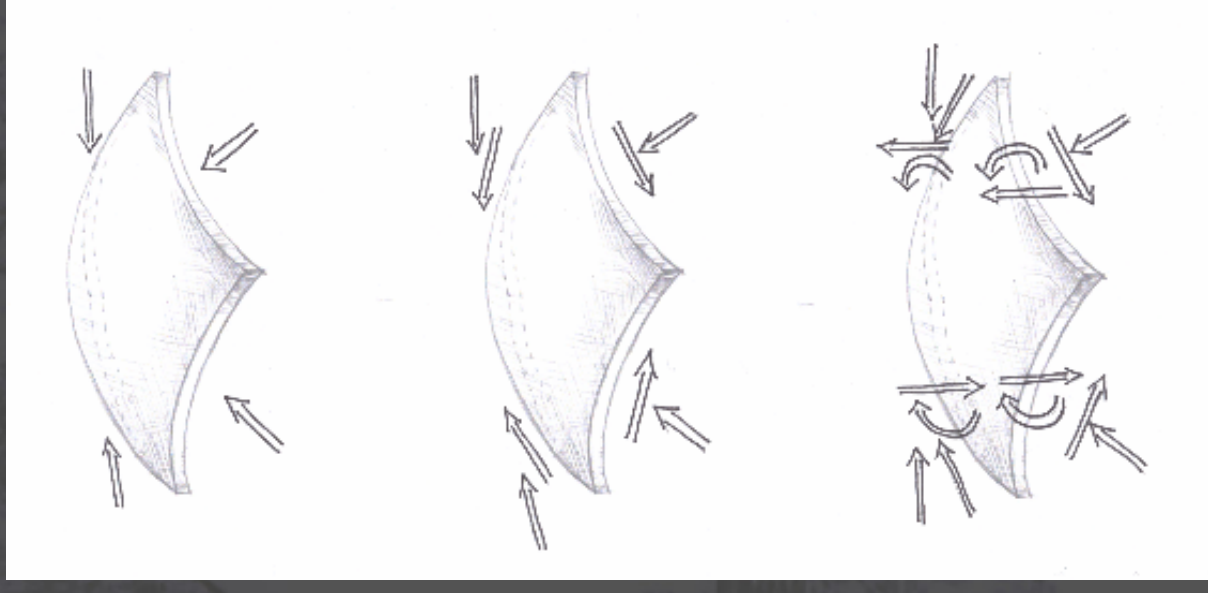
- Húzás
- Nyomás
- (az érintő sík minden irányában azonos)

- **Hajlítás mentes héjak (membránok)**

- Húzás és/vagy nyomás
- Nyírás (síkban)

- **Hajlított héjak**

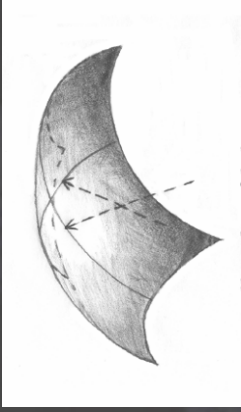
- Húzás és/vagy nyomás
- Nyírás (síkban)
- Hajlítás
- Nyírás (síkra merőleges)
- csavarás



# Az erőjátékot befolyásoló tényezők

- Alak
  - elliptikus, parabolikus, hiperbolikus
- Peremek megtámasztása
  - teljes, részleges, szabad
- Teher
  - főteherhez illeszkedő alak, speciális alakok és terhek
- Keresztmetszet kialakítása
  - alakváltozások és igénybevételek kölcsönhatása

# Alak

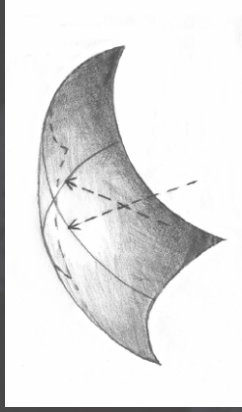


- Elliptikus

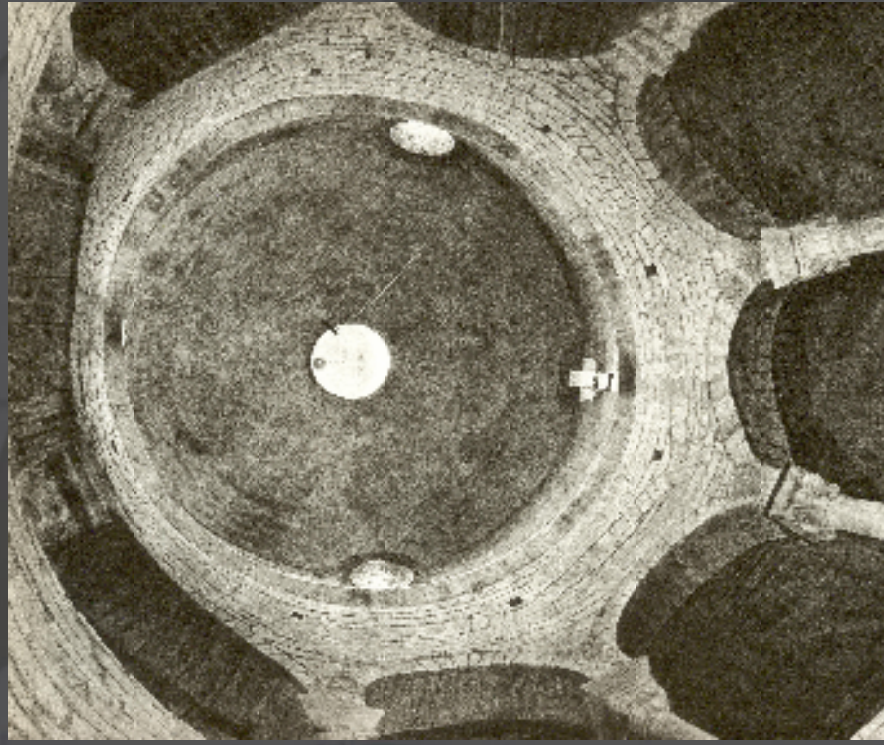




# Alak



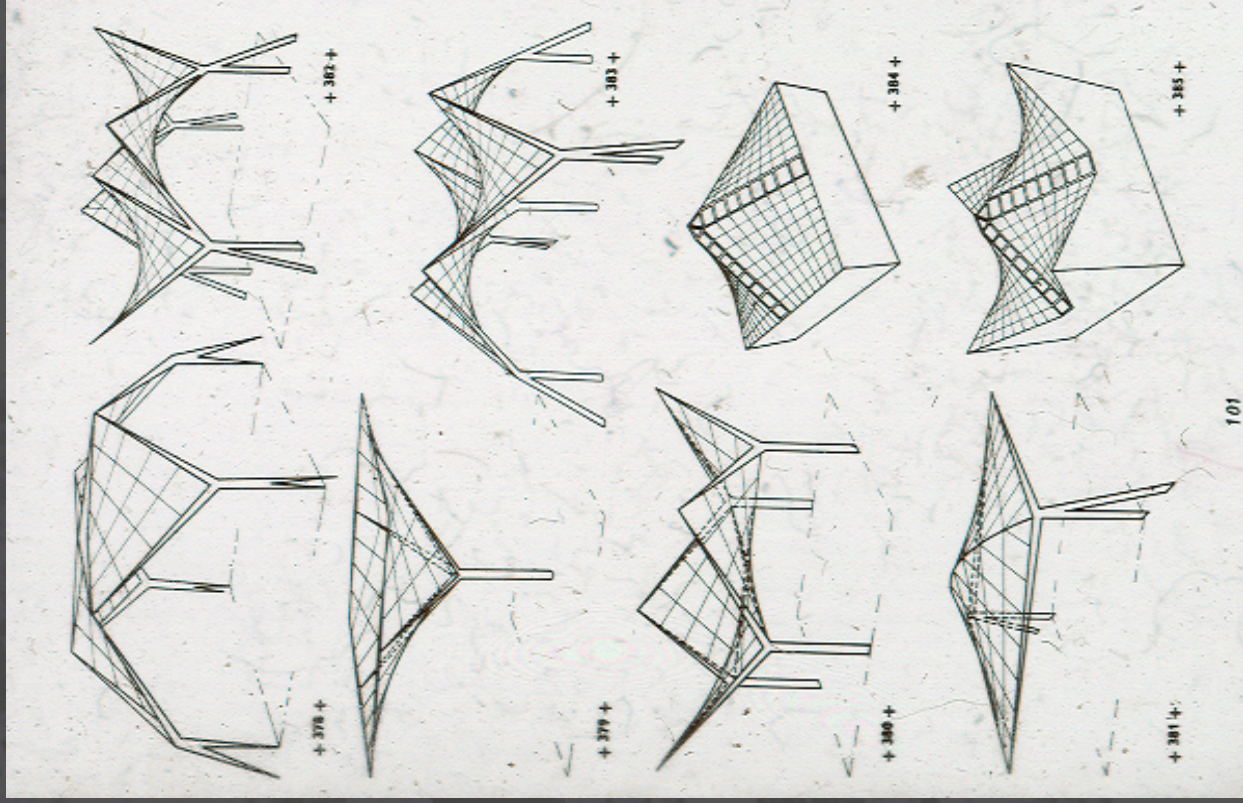
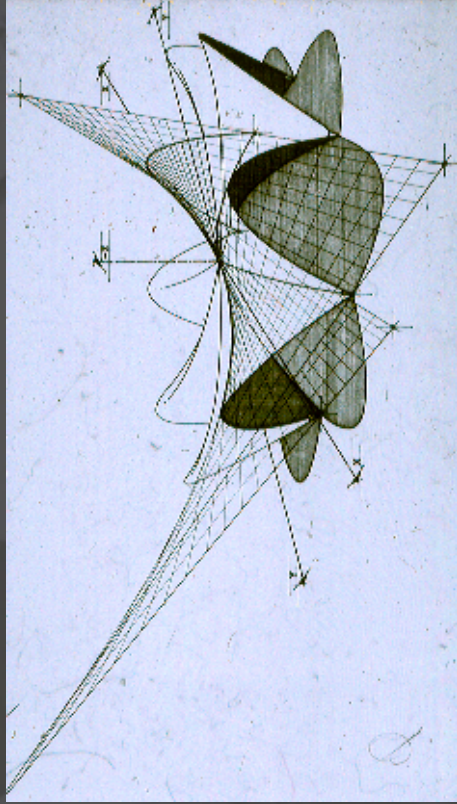
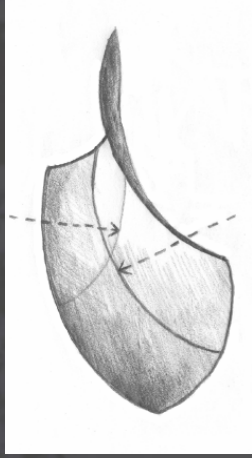
- Elliptikus





# Alak

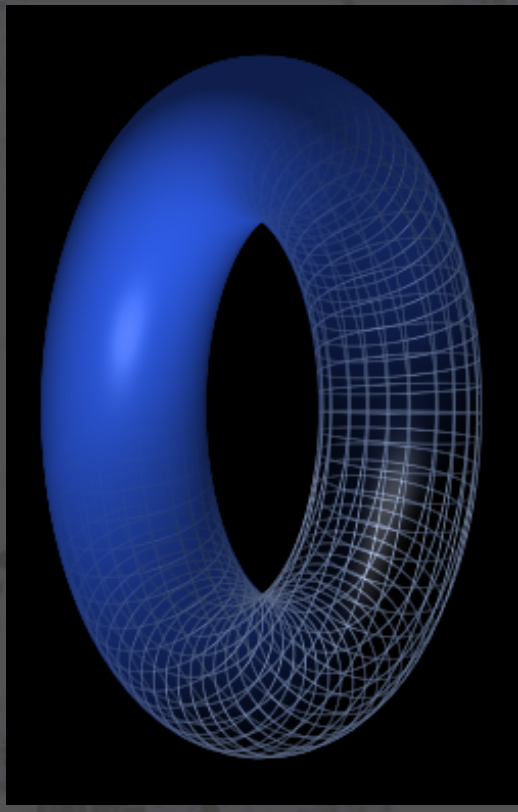
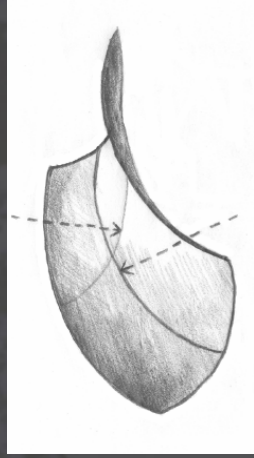
• Hiperbolikus



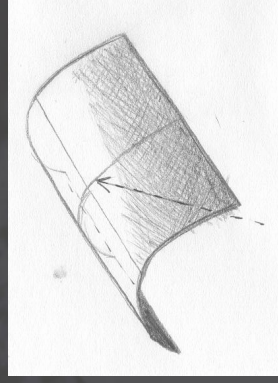


# Alak

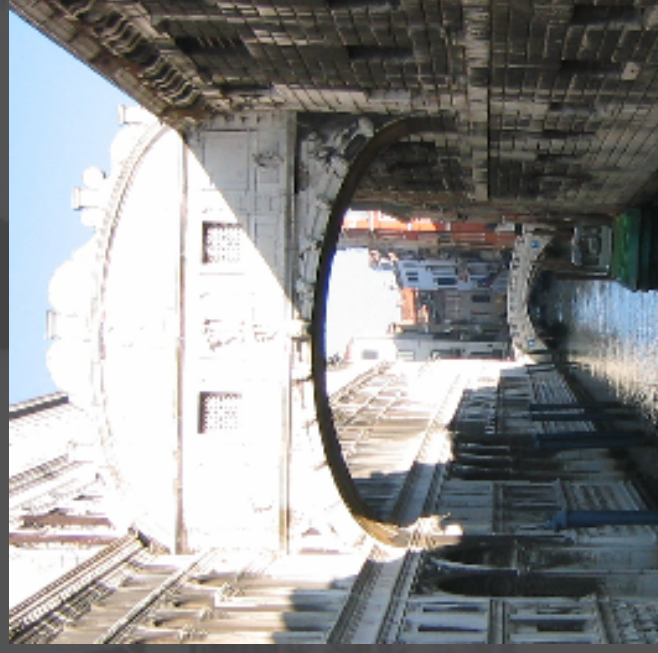
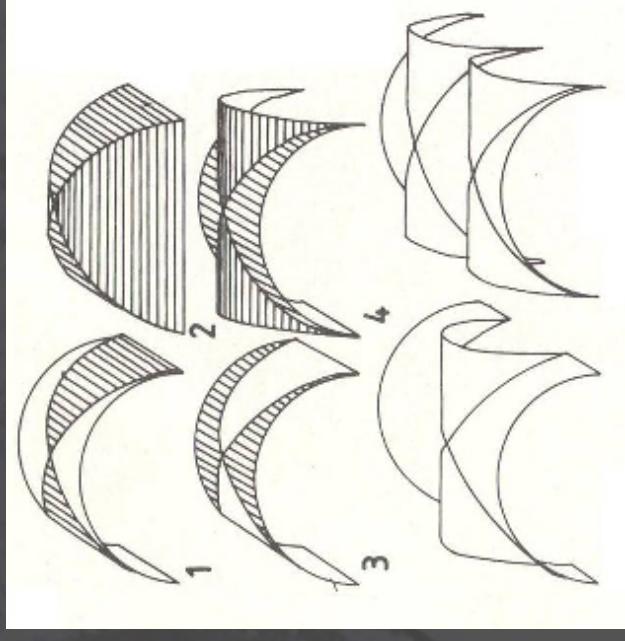
- Hiperbolikus



# Alak

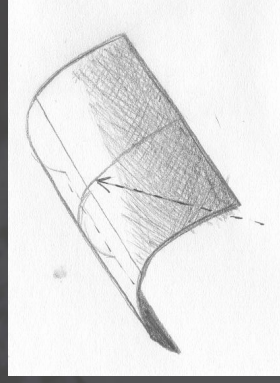


- Parabolikus

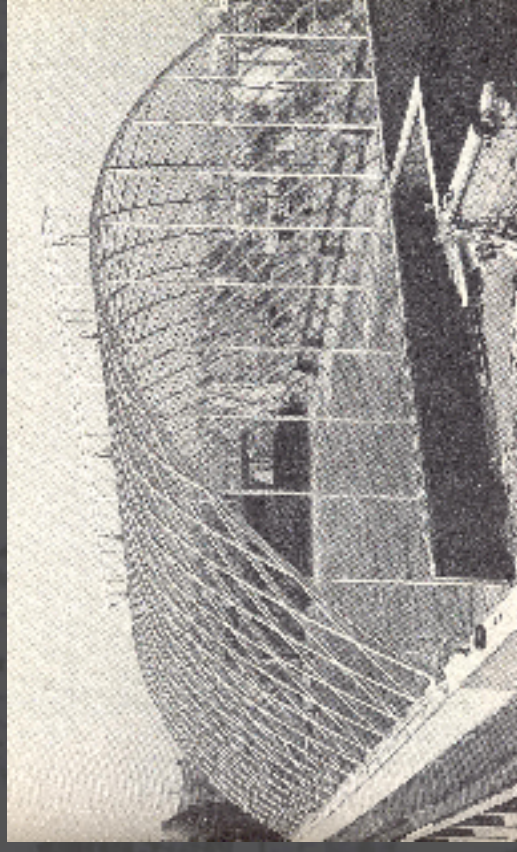




# Alak



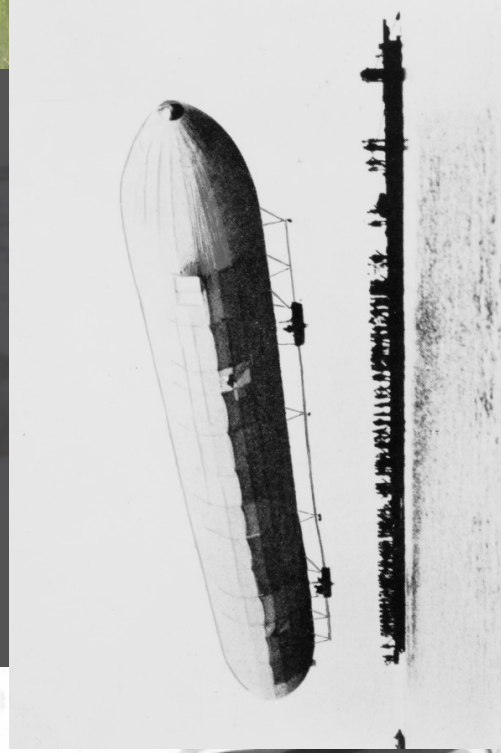
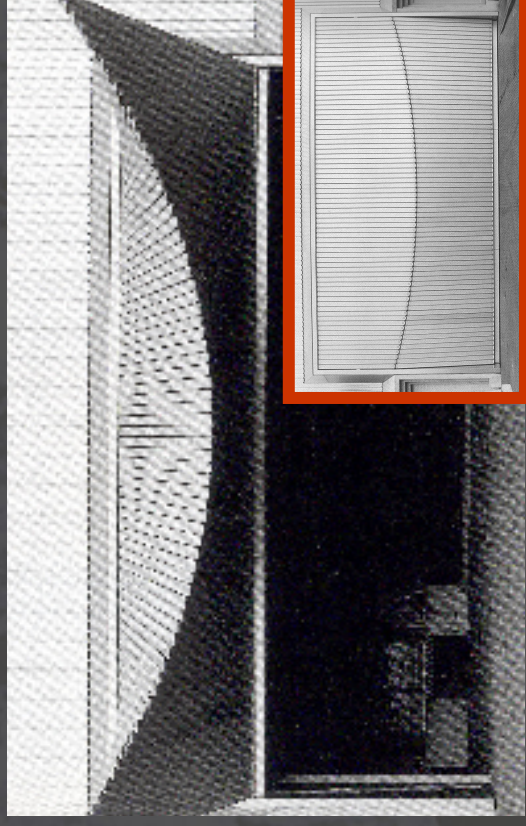
•Parabolikus





# Alak

- Vonalfelületek

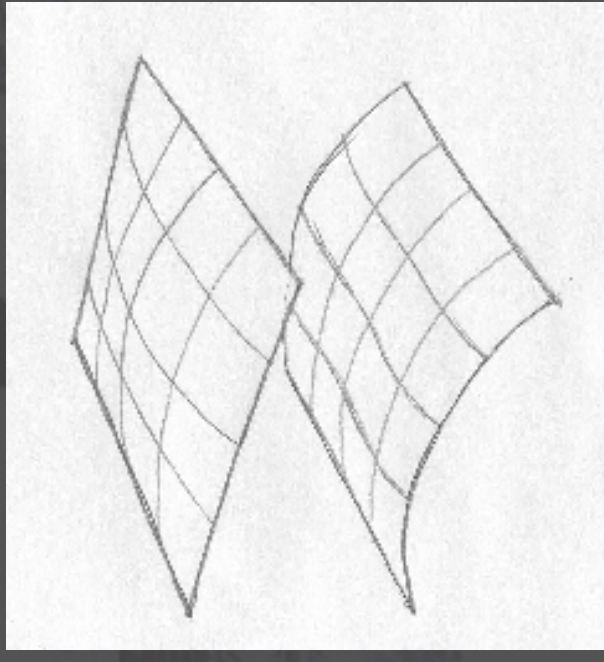
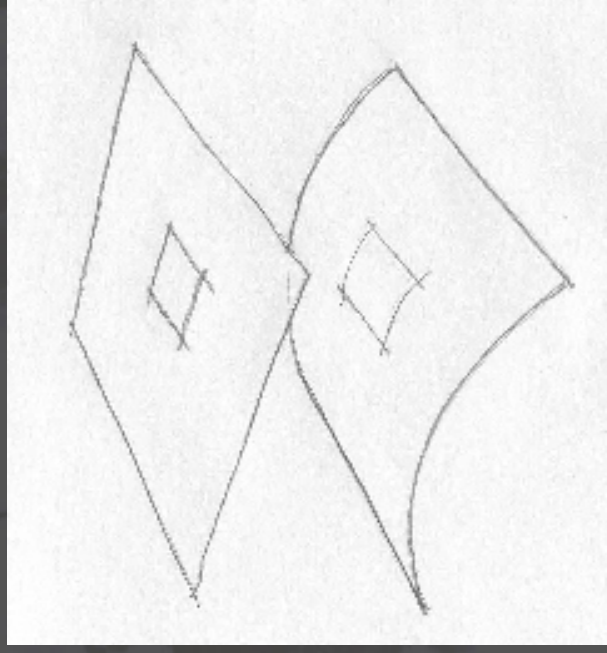
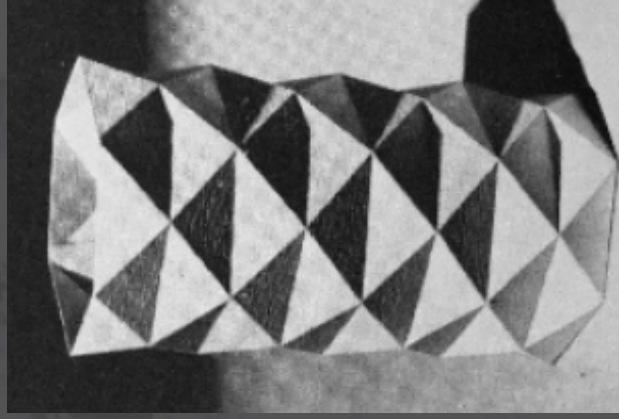


# Alak

- Külső jellemző:
  - térbeli helyzet



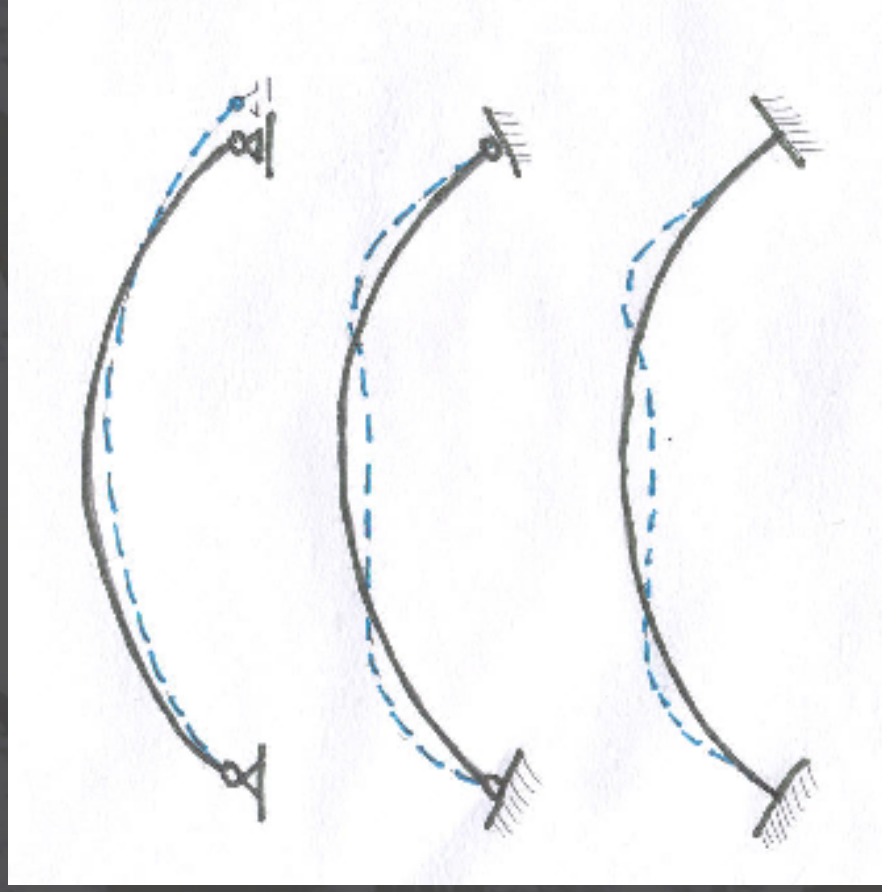
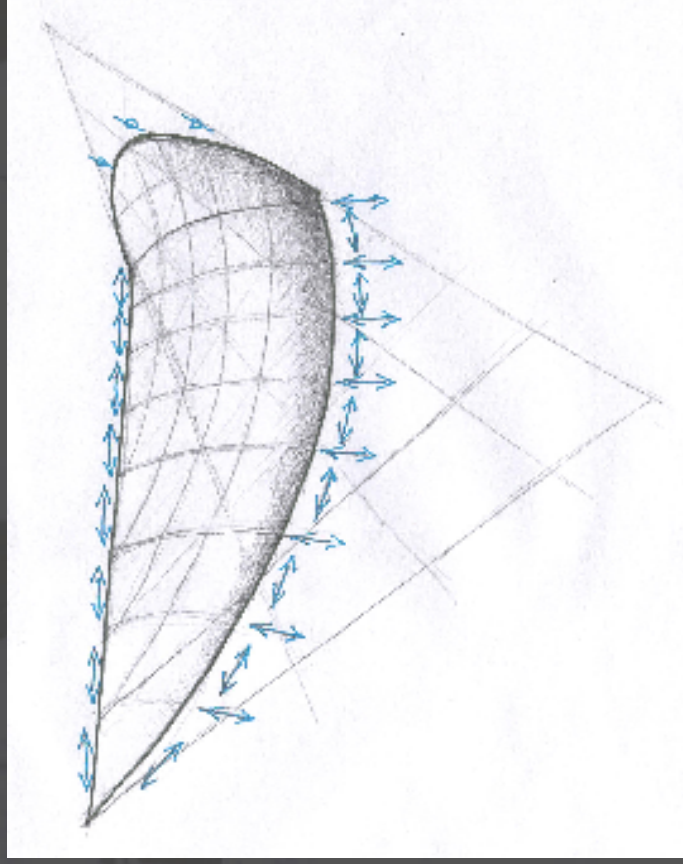
- Belső jellemzők
  - felület
  - távolság
  - szög





# Peremek

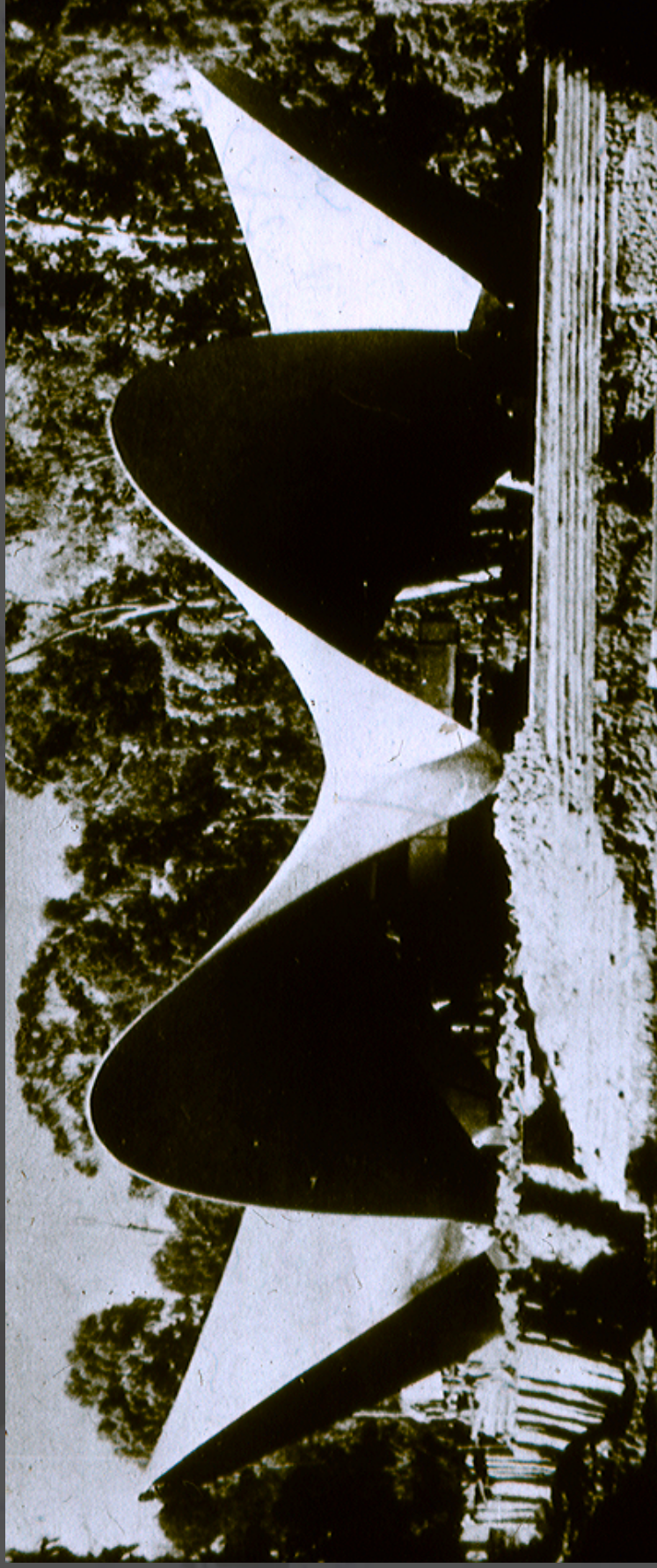
- Permek megtámasztása
  - szabad
  - részleges membrán
  - teljes membrán
  - merev





# Peremek

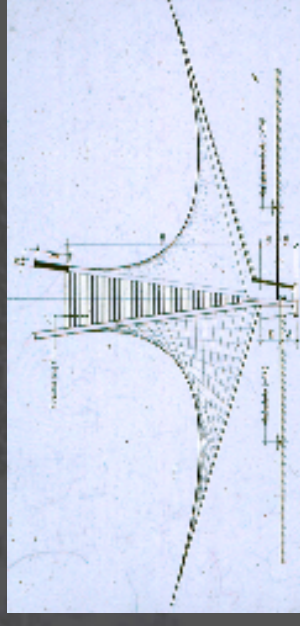
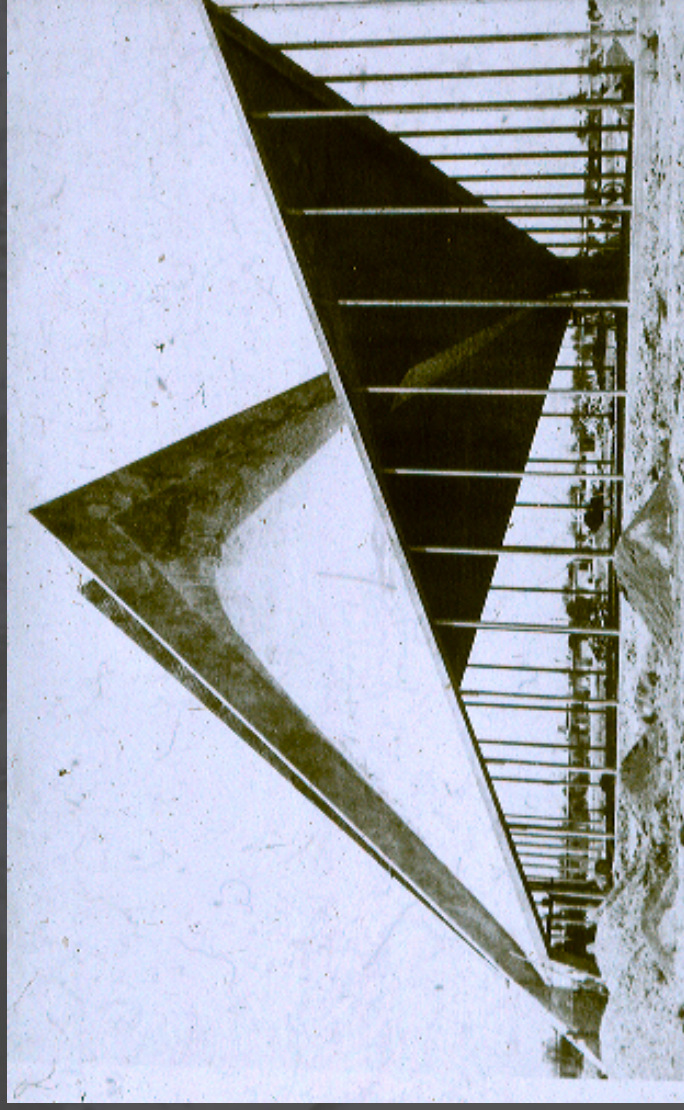
•szabad





# Peremek

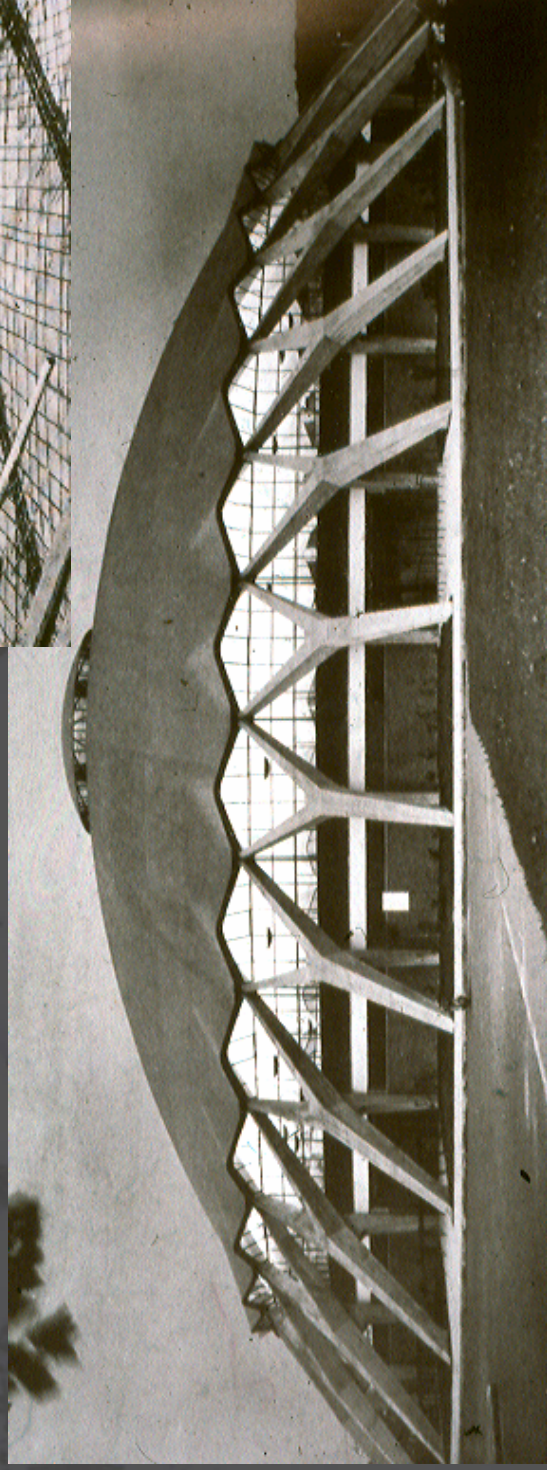
•félmerev





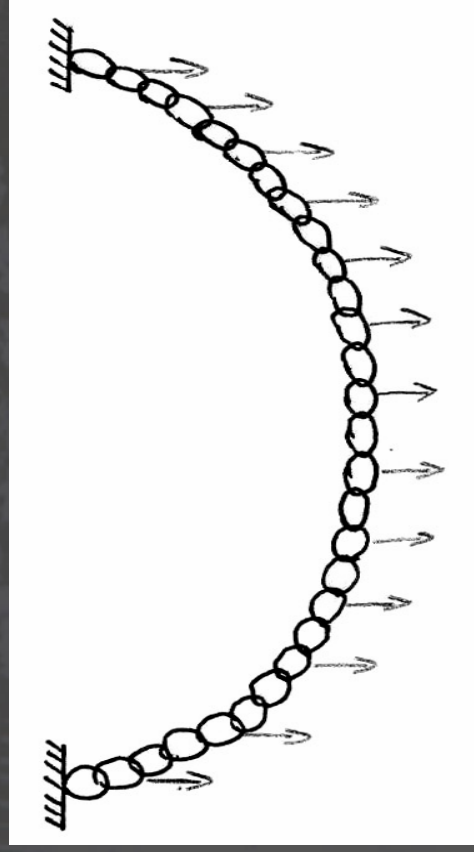
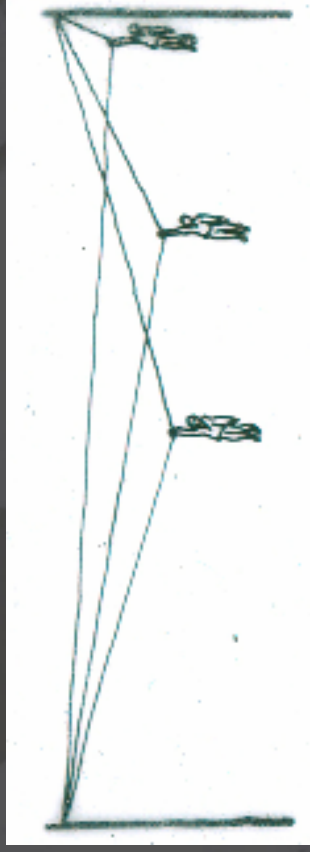
# Peremek

- teljes és merev



# Teher

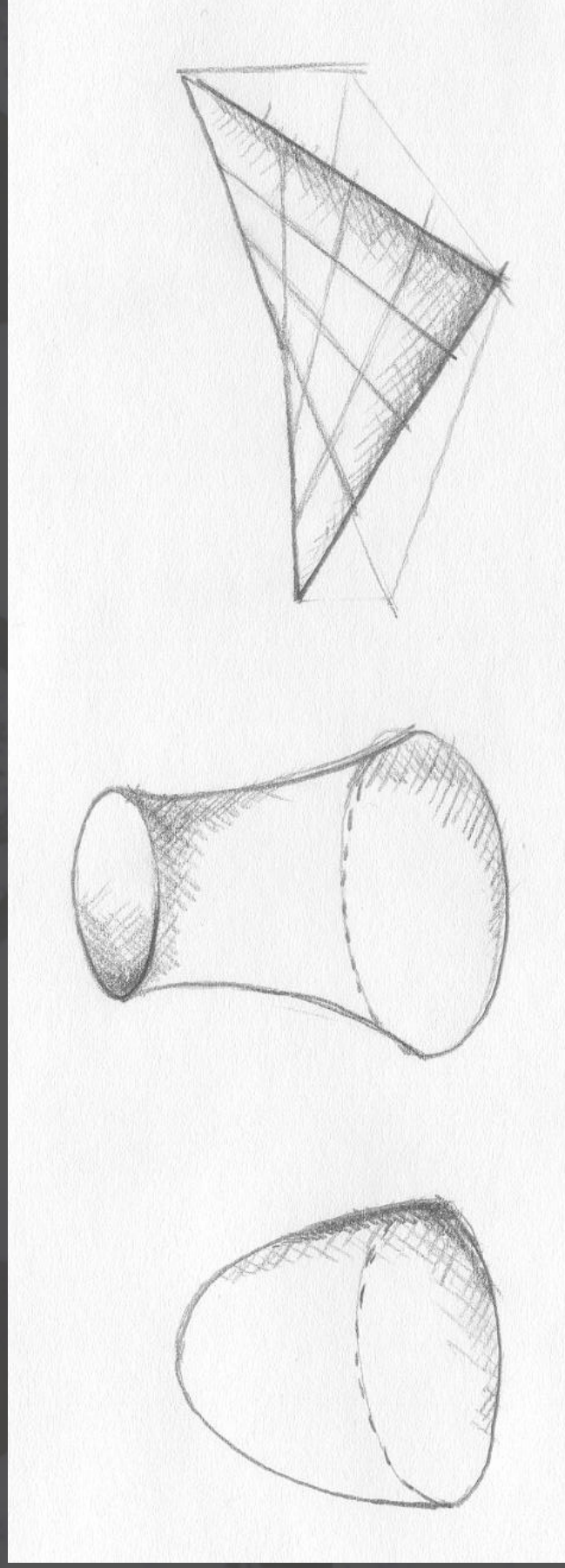
- Teherhez illeszkedő alak  
ALAK < > FŐTEHER





# Teher

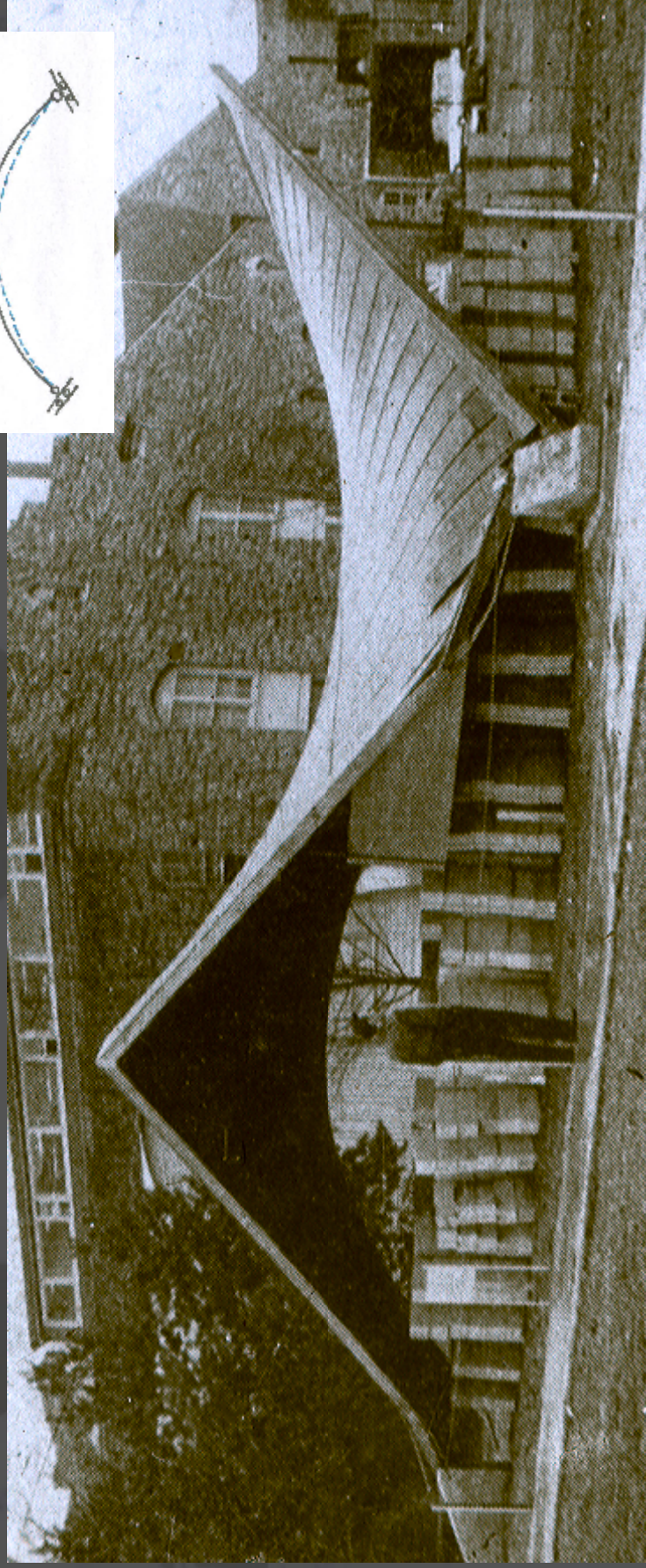
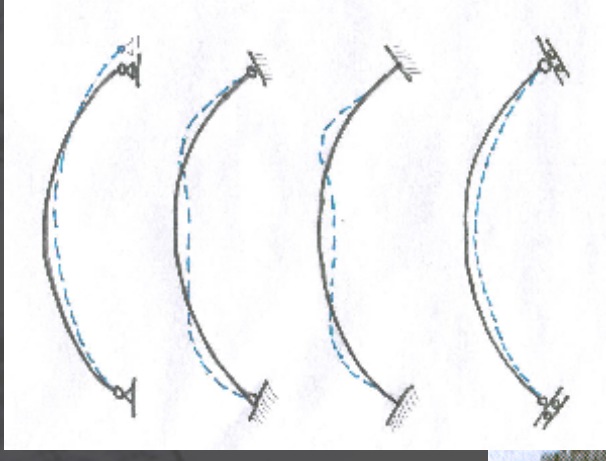
- membrán alakok





# Héj keresztmetszet

- beton: 4-10cm





# Héj keresztmetszet

•vagy több....

