

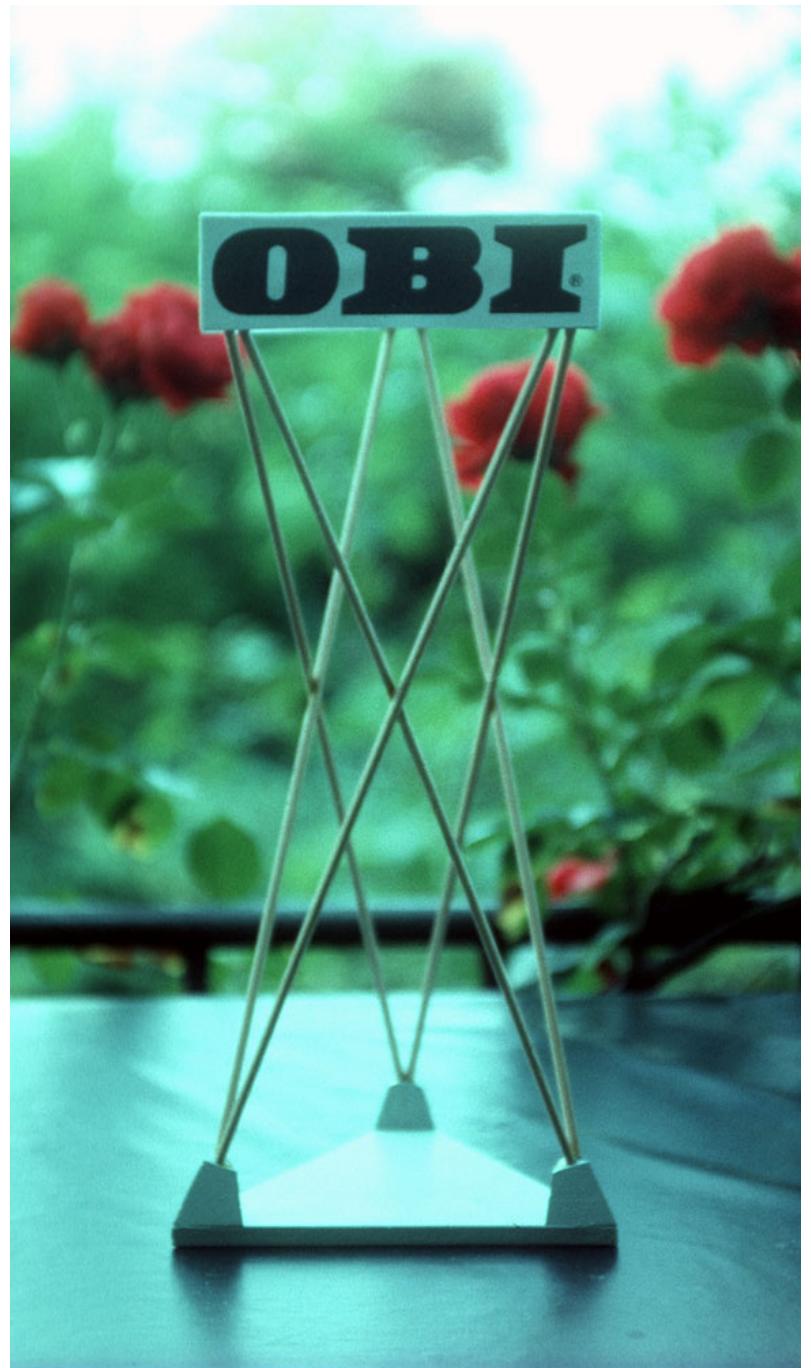
Poles und strut-tied beam

Natterer Johannes

Ing. dipl. EPFL



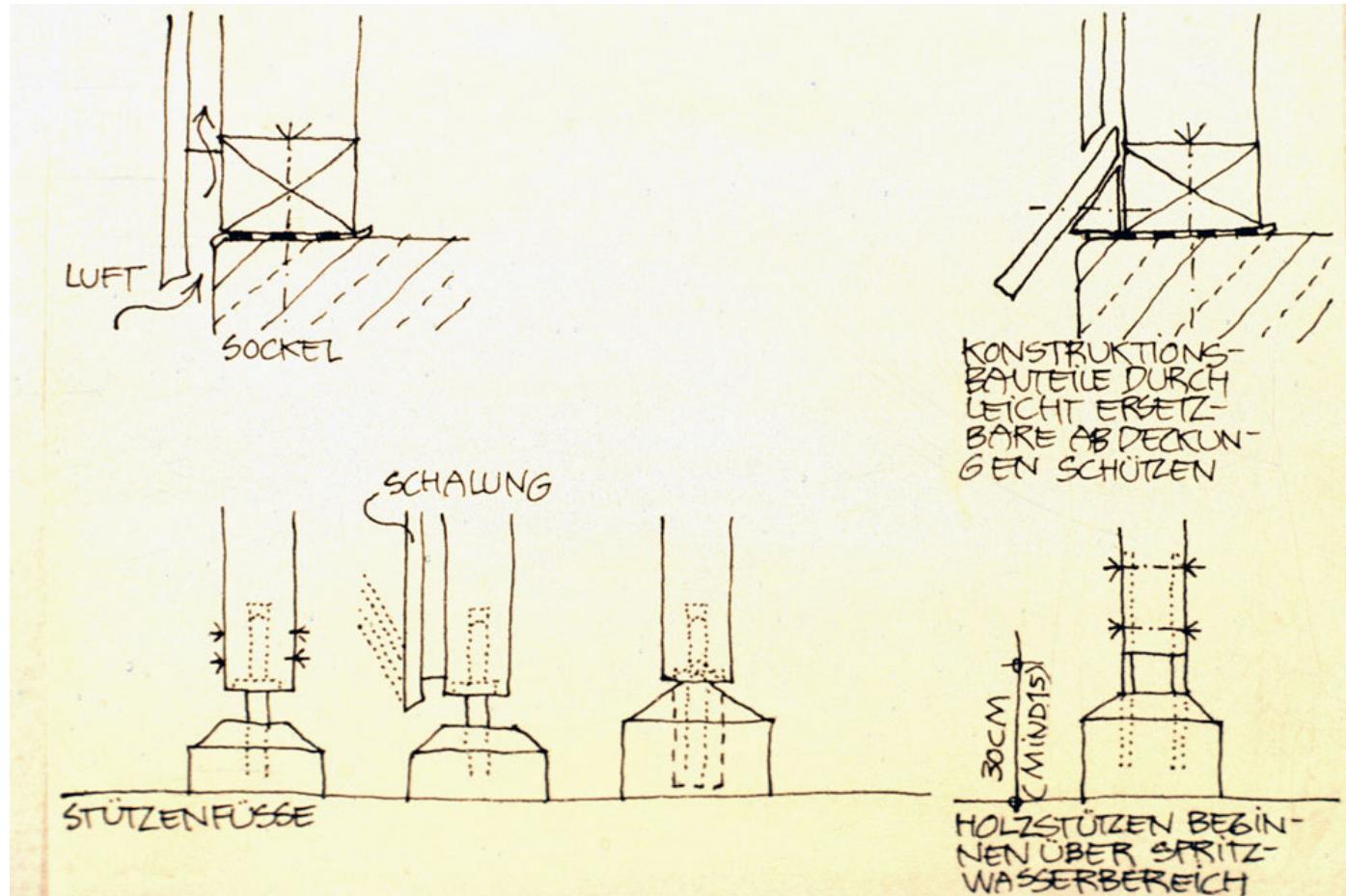






The foot of the pole

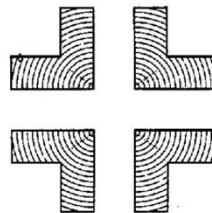
- The durability and the contact with the soil



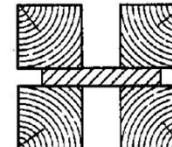
Massif wood pole



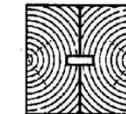
section carrée avec gorges de décharge



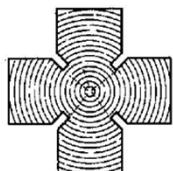
sections en L



section rectangulaire composée d'un bastaing et de quatre madriers



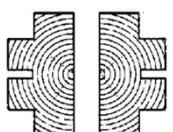
à partir de madriers à cœur refendu,
avec gorge de décharge à l'intérieur



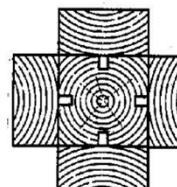
section en croix



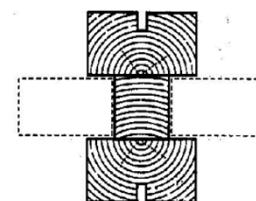
grand L



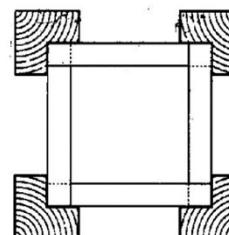
sections en croix à partir de profils à cœur refendu et gorge de décharge



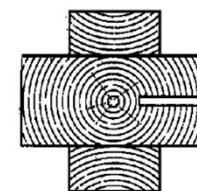
section en croix avec madrier et quatre bastaings



profil en I à partir de madriers



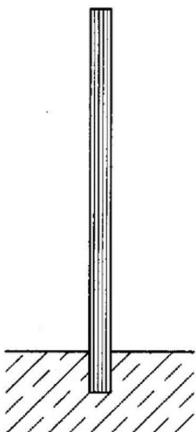
poteau non massif



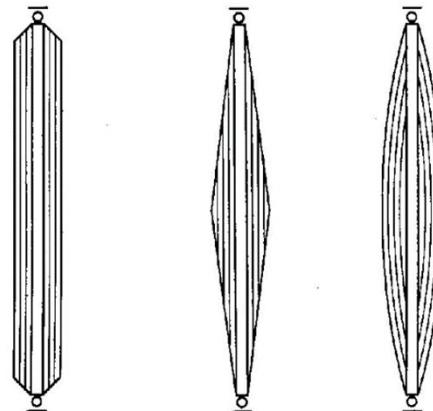
section en croix à partir de trois madriers

Glulam pole

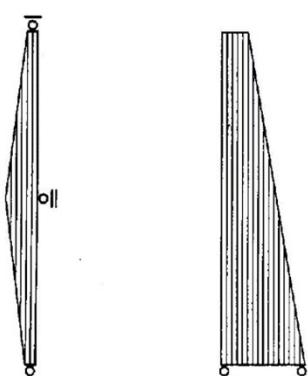
Formes de poteaux en élévation



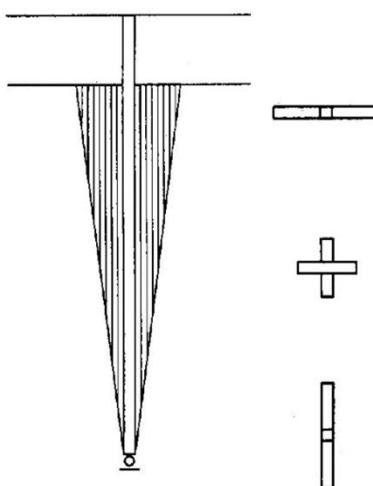
poteau encastré dans du béton



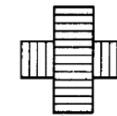
poteau sur appui articulé



poteau avec encastrement



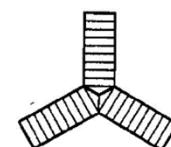
formes spéciales



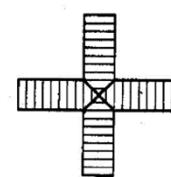
à éléments croisés



profils en I



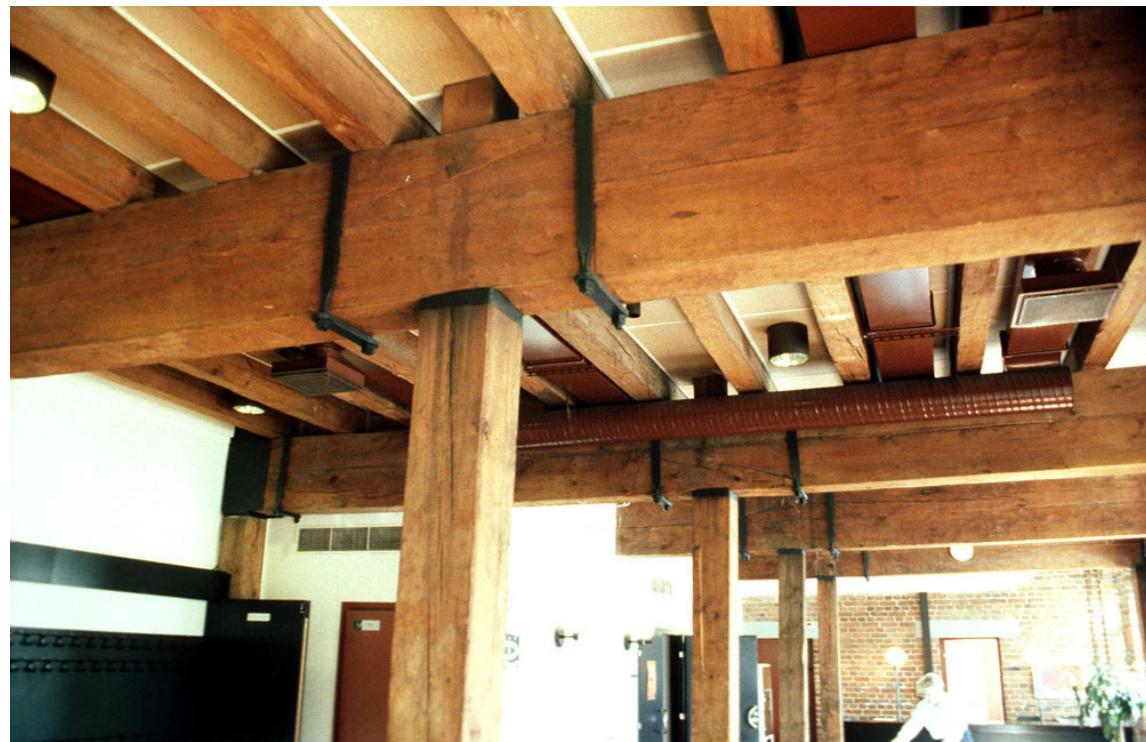
poteau triangulaire non massif



poteau en croix

Anchored pole







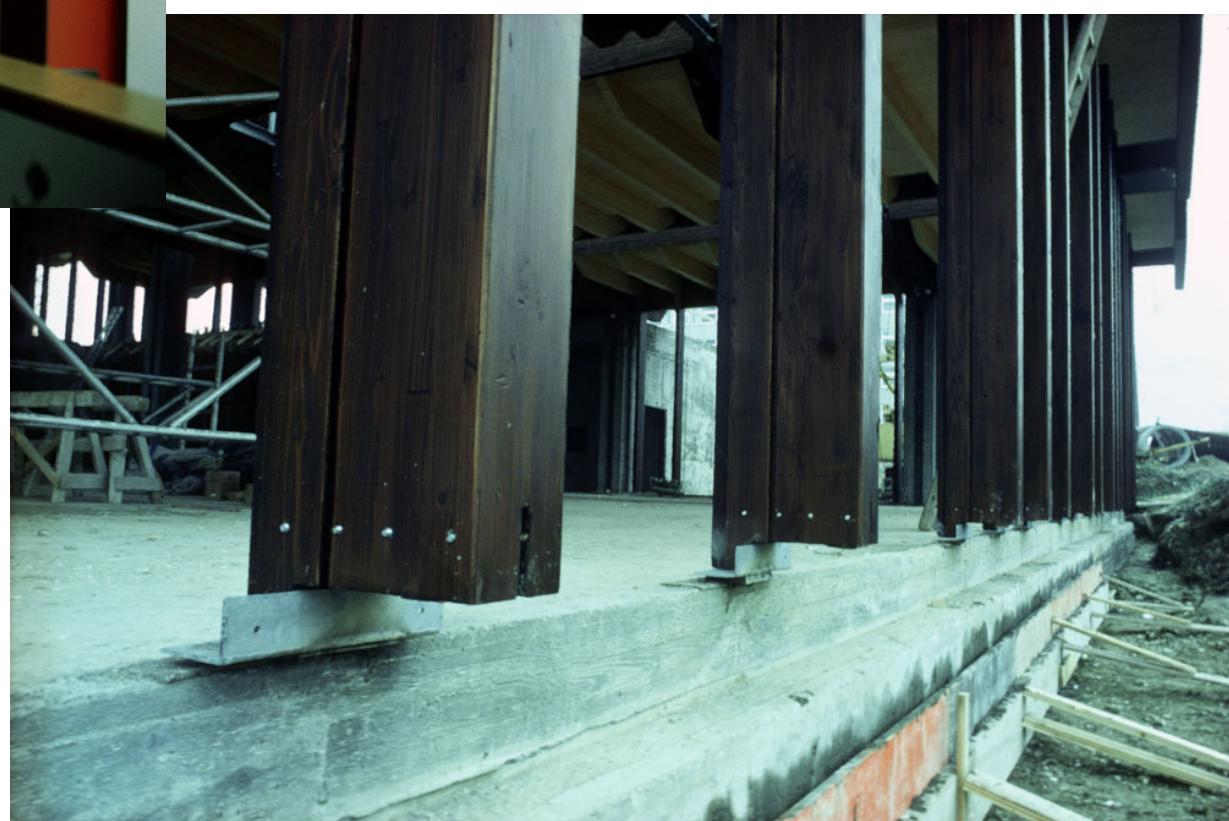










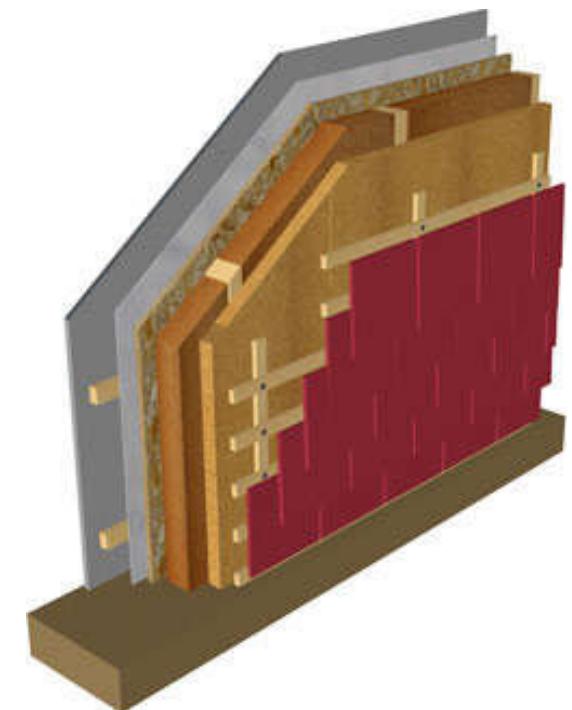








Wood frame – 2 by 4

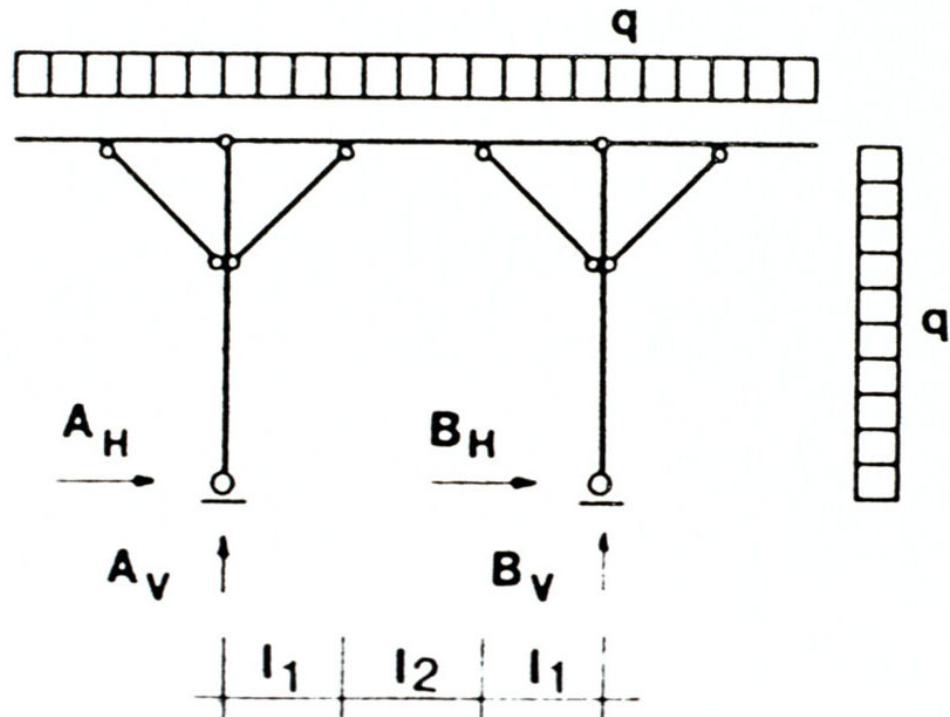


Wood frame – 2 by 4

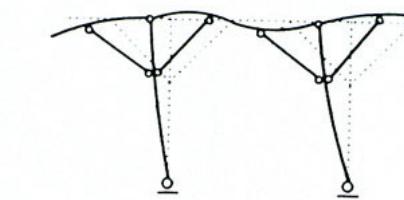


The system with crutches

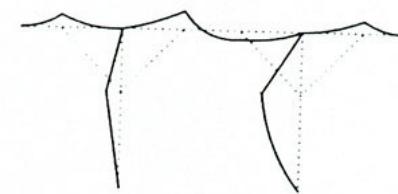
Beam with crutches



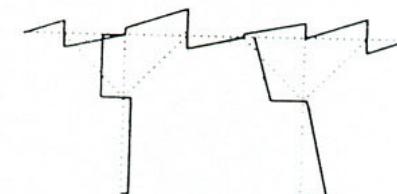
charges:
charges uniformément réparties,
horizontales et verticales



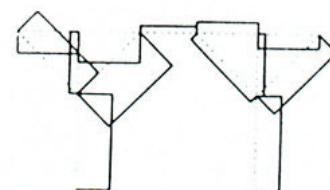
déformation



moments

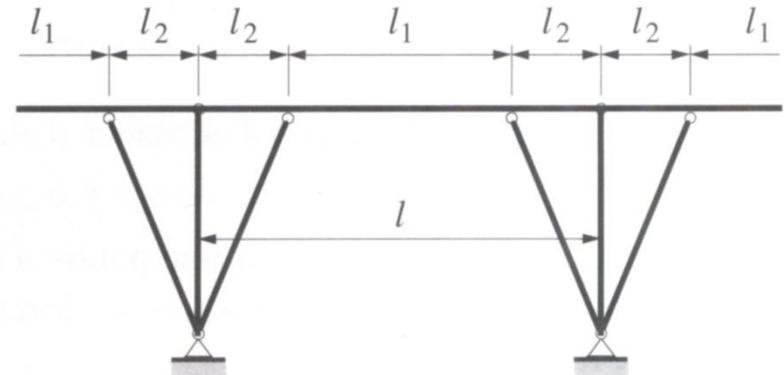
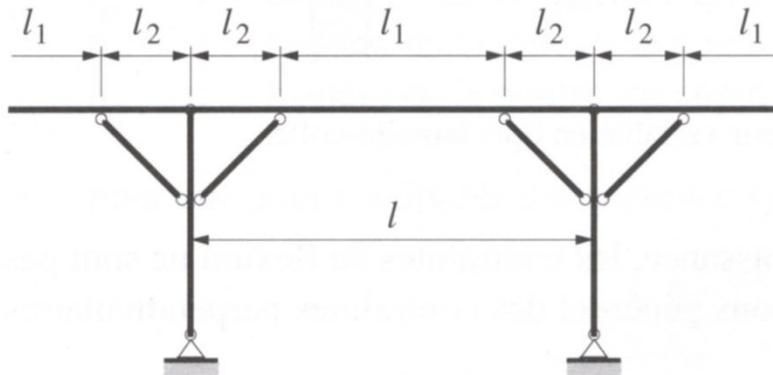


efforts tranchants

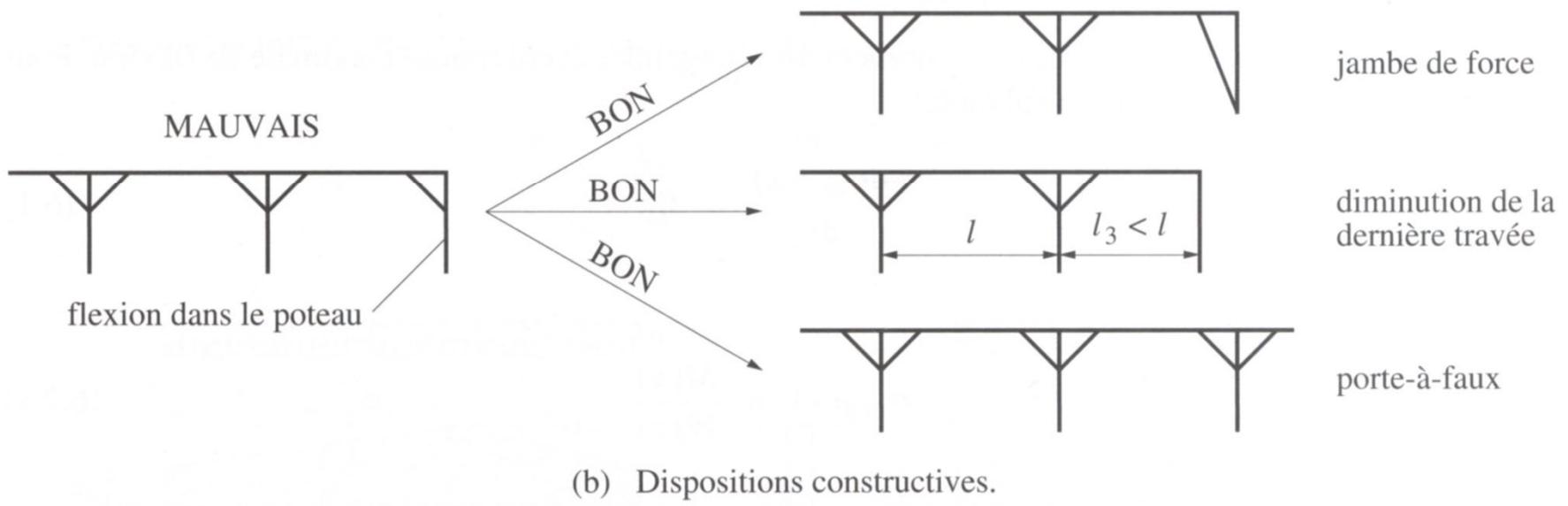


efforts normaux

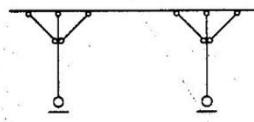
Conception



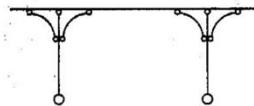
(a) Systèmes statiques.



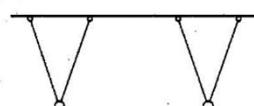
Contre-fiches



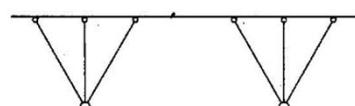
aisseliers simples



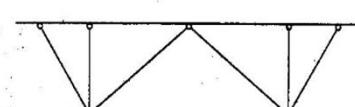
aisseliers cintrés



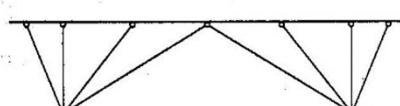
arbalétriers en V



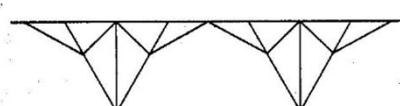
faisceau d'arbalétriers



ouvrage à contre-fiches

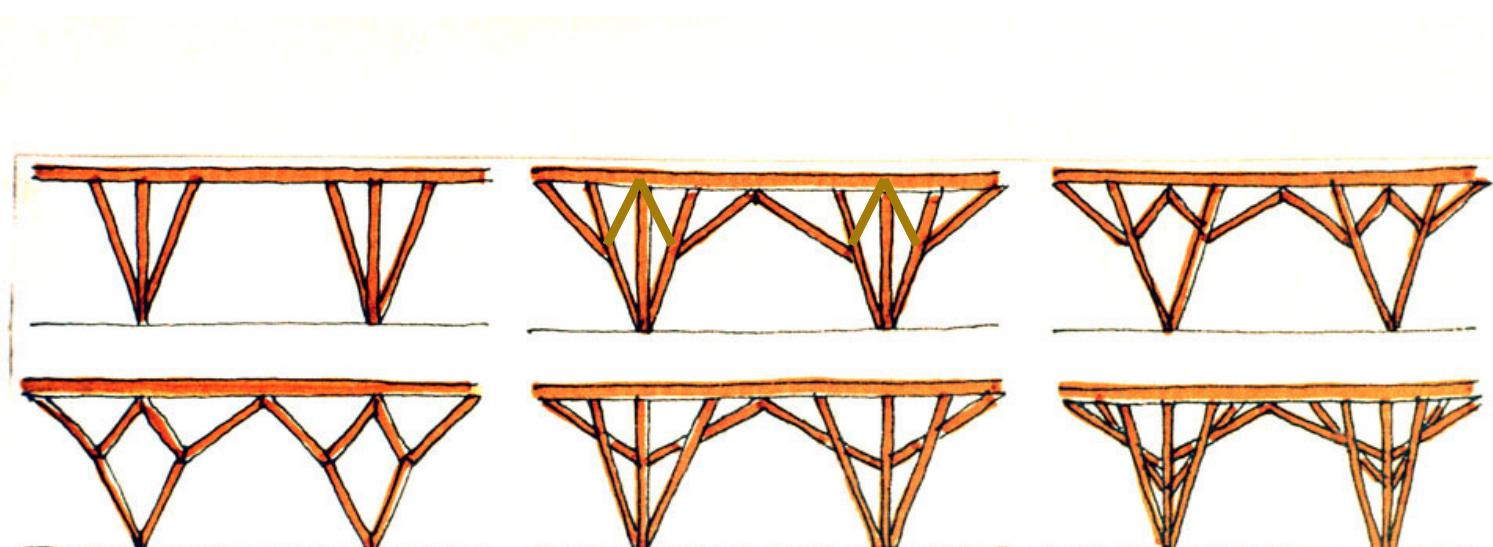


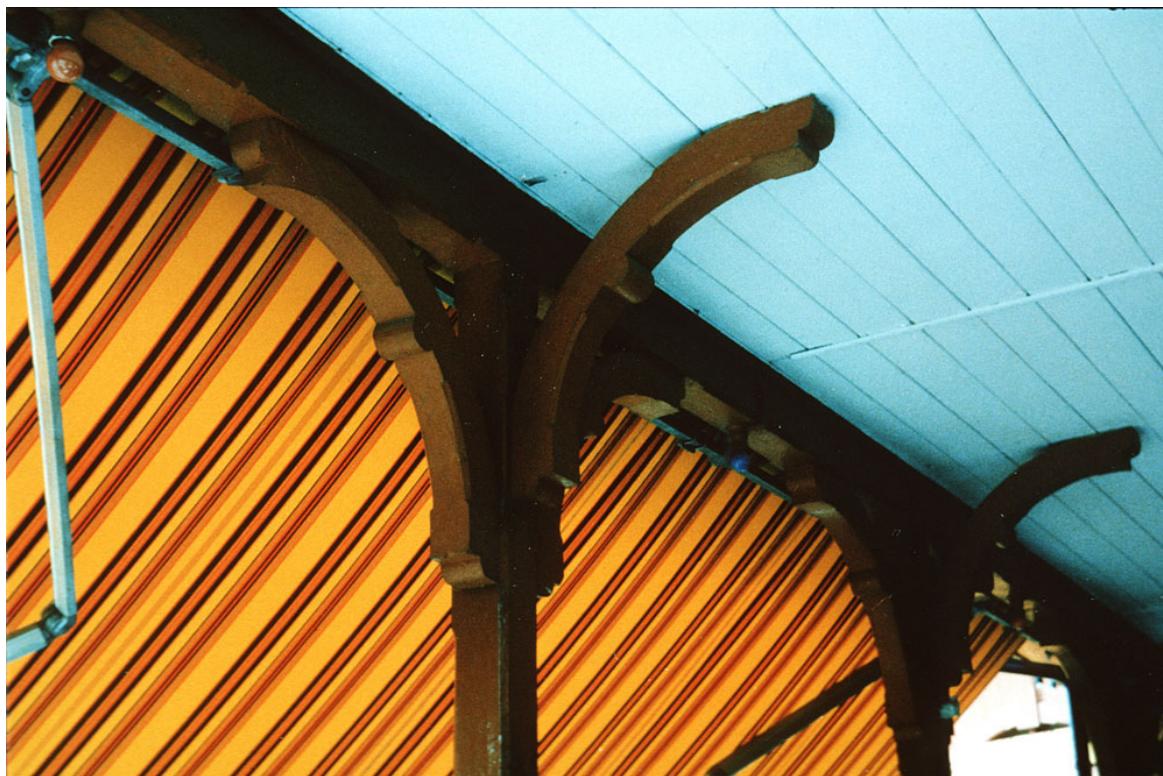
ouvrage à contre-fiches multiples



ouvrage à contre-fiches avec aisseliers

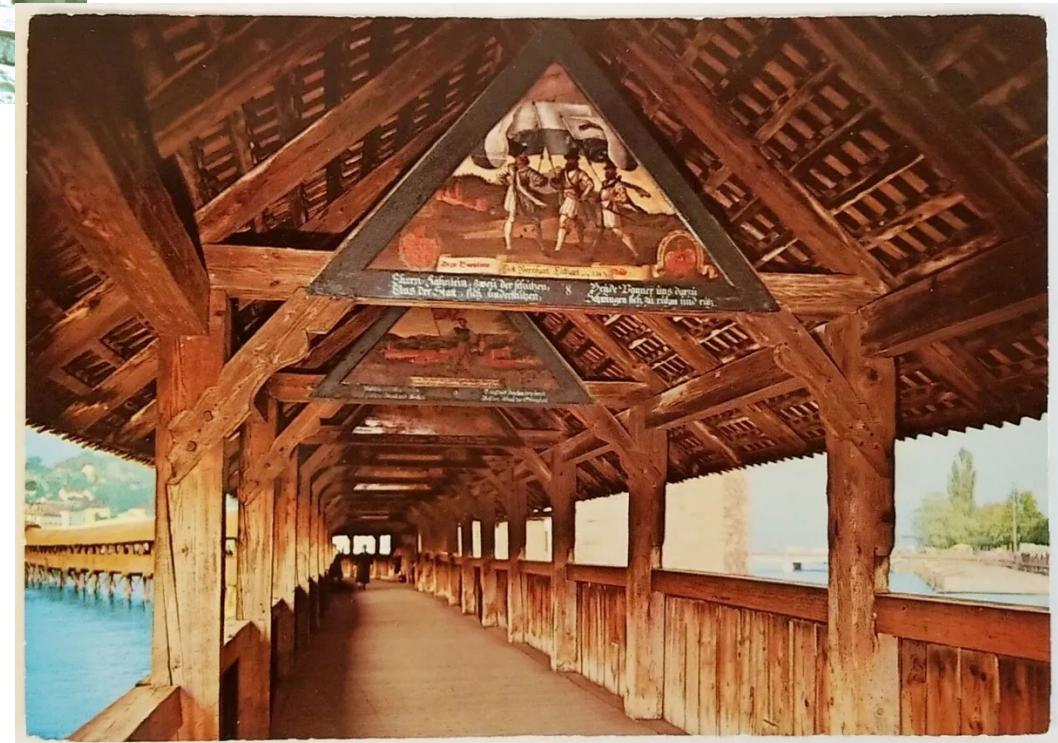
System with crutches

















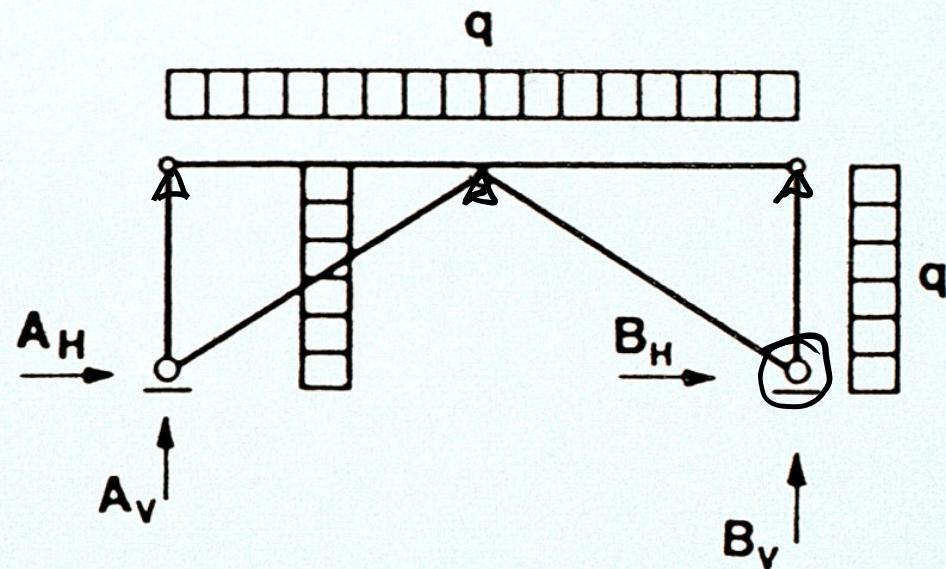




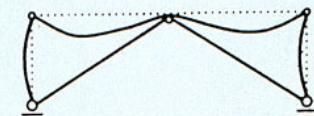


Girder with crutches

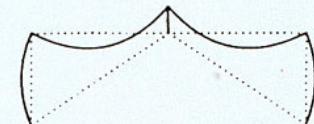
Fermes à contre-fiches



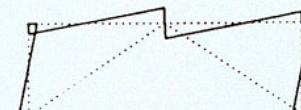
charges:
charges uniformément réparties,
horizontales et verticales



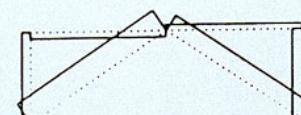
déformation



moments:
on calculera la membrure supérieure
comme une poutre sur deux travées
avec appui intermédiaire élastique



efforts tranchants



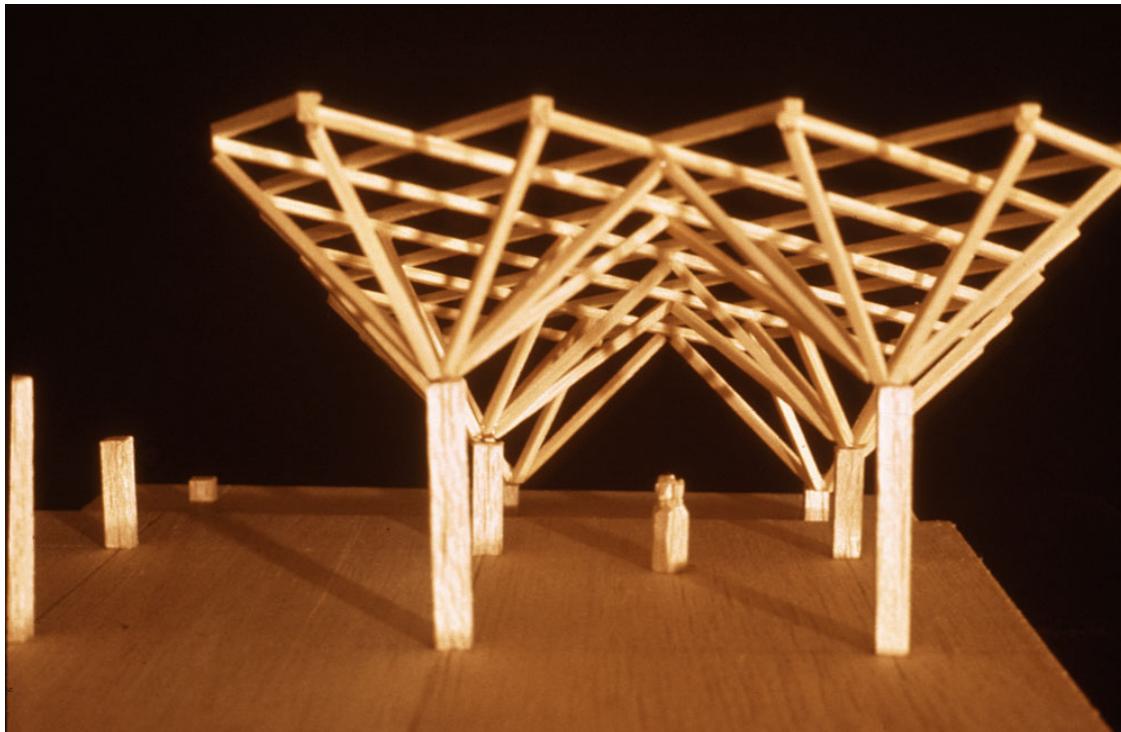
efforts normaux

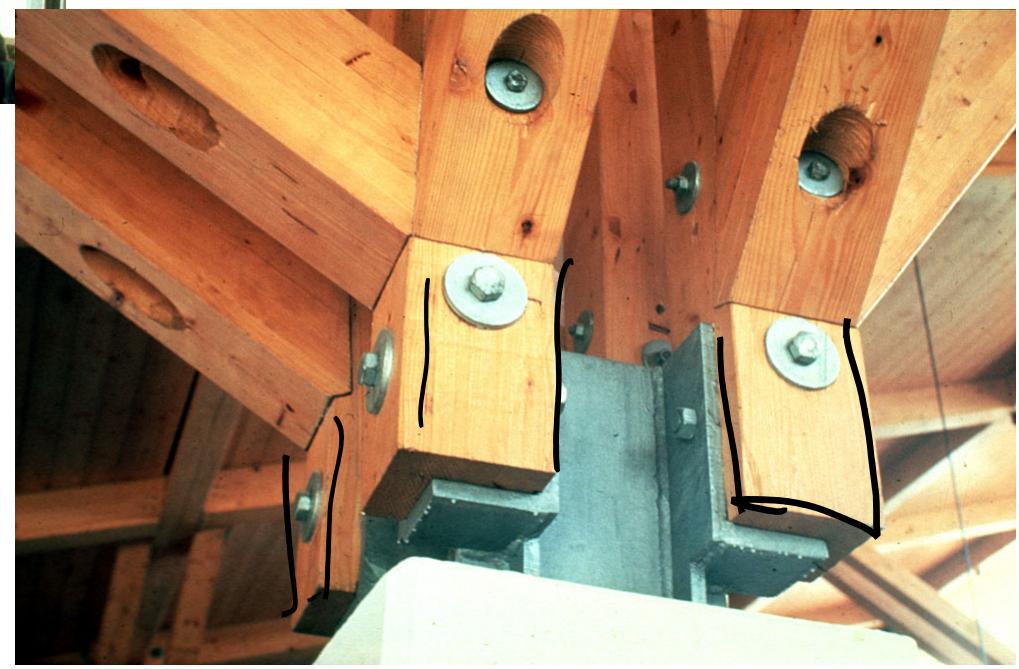










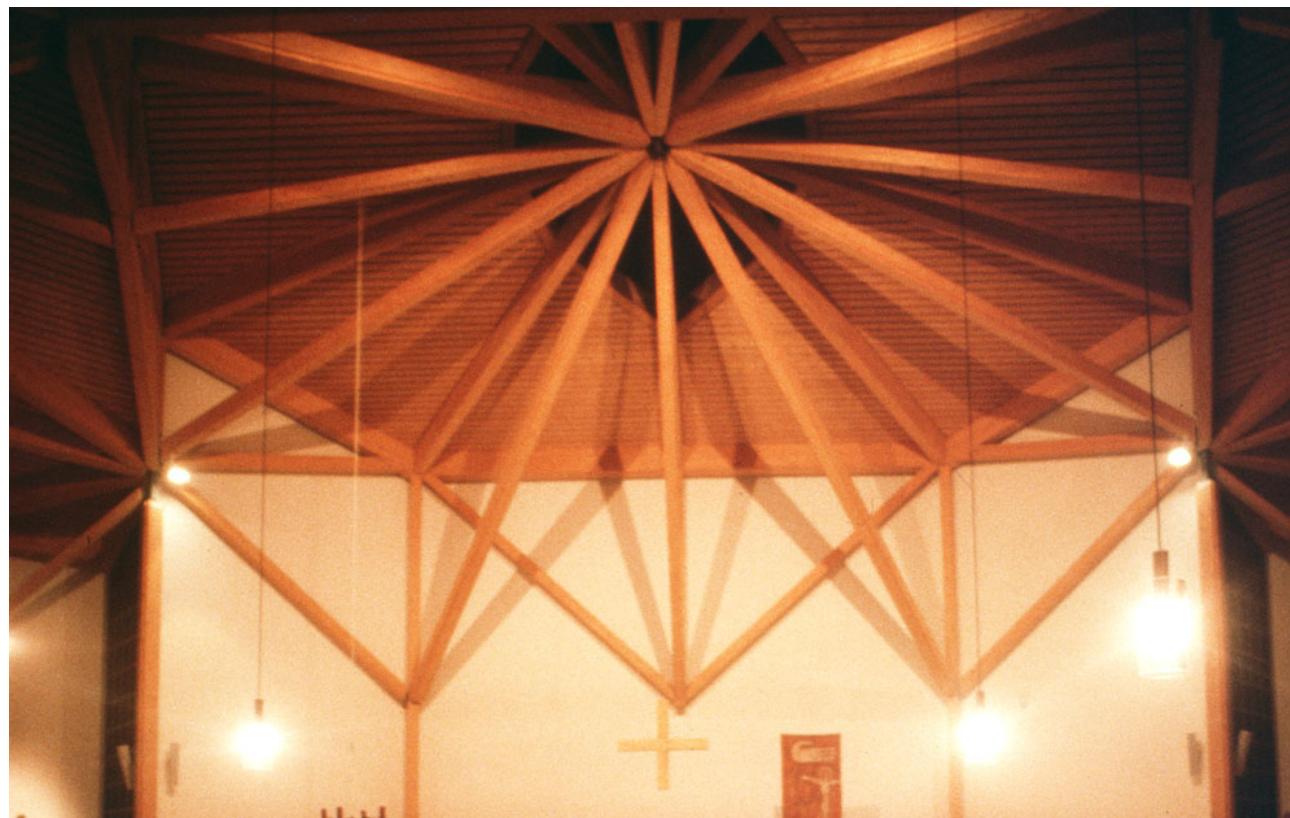










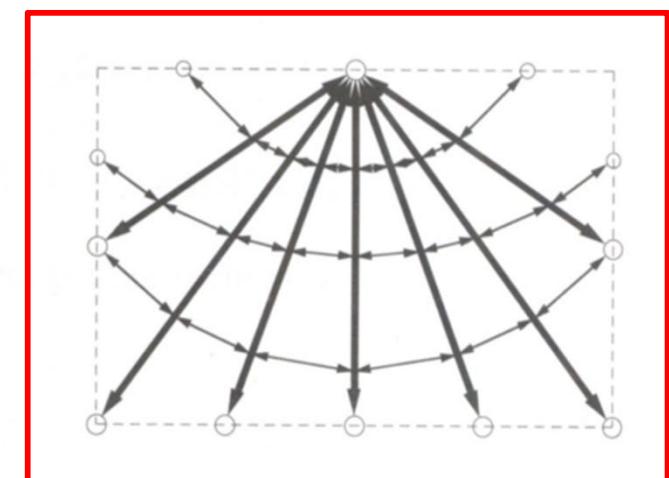
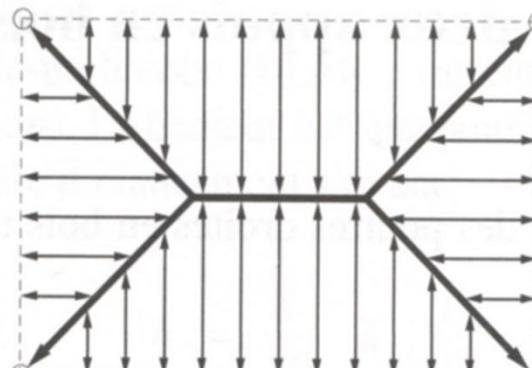
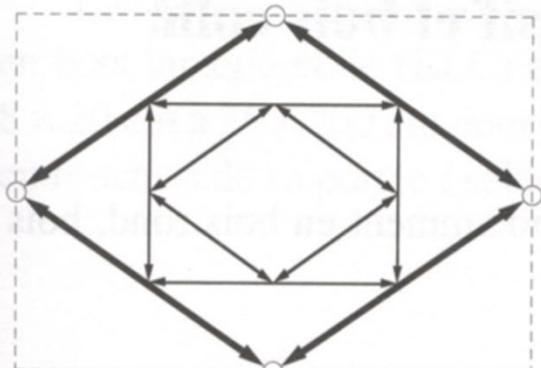
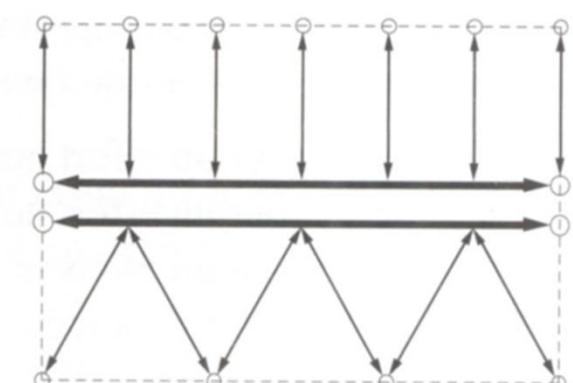
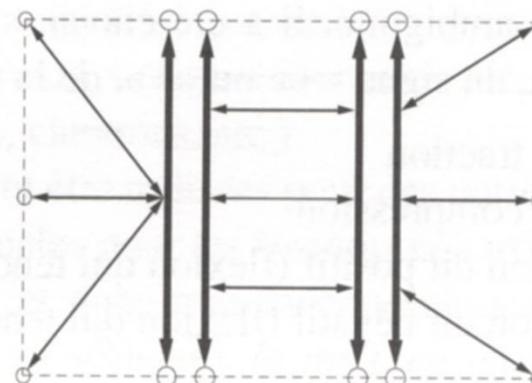
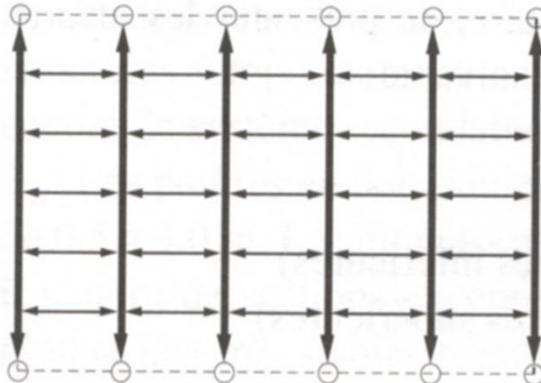






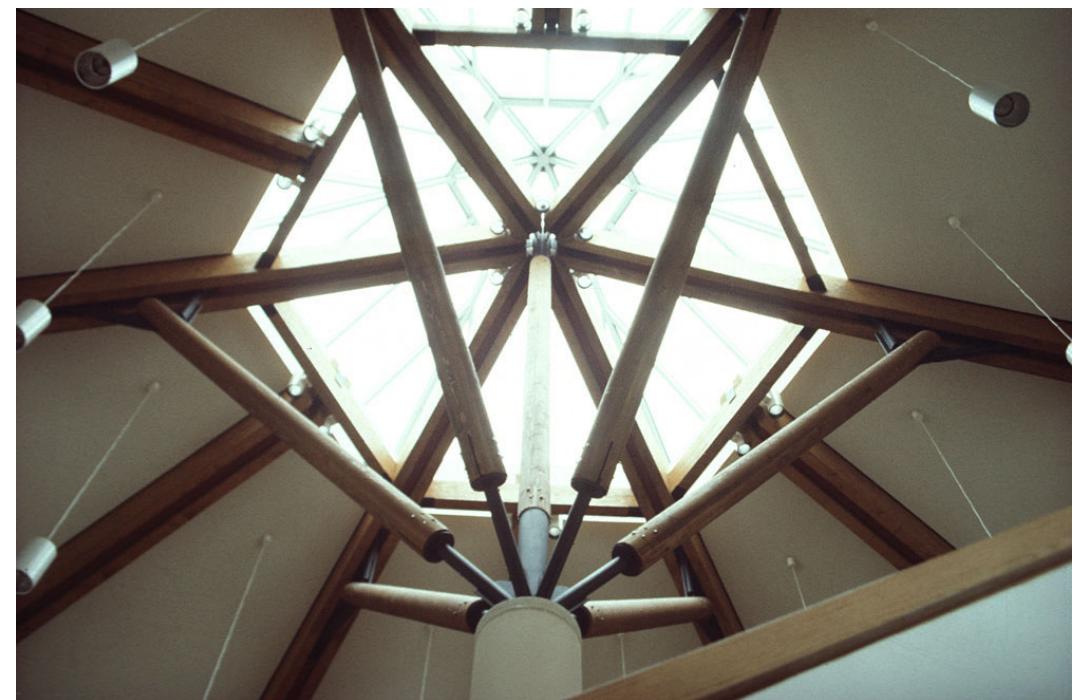


Radial support systems



→ système principal
↔ système secondaire





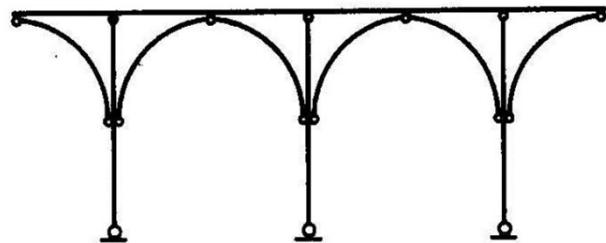




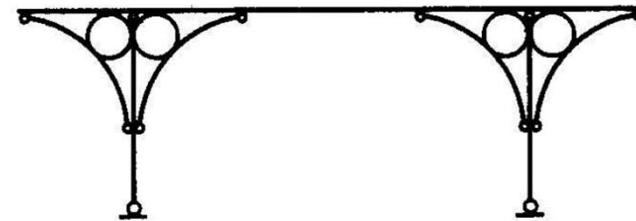




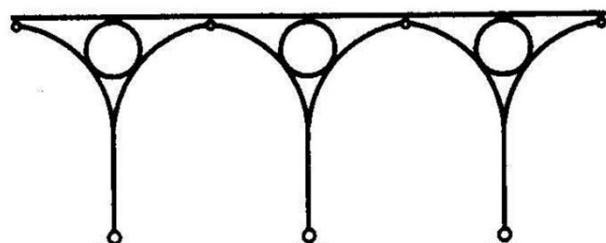
Structural systems wiht Rings



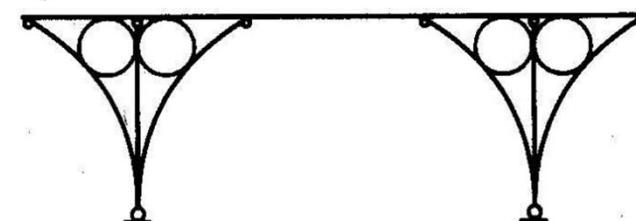
avec montants



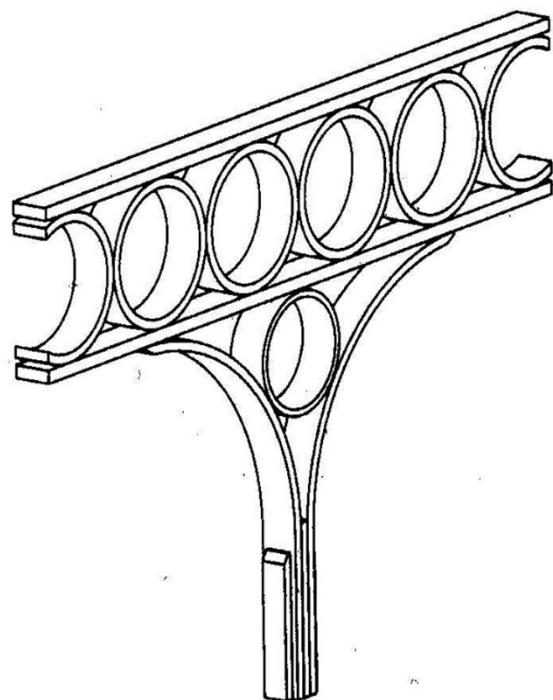
avec montants et anneaux



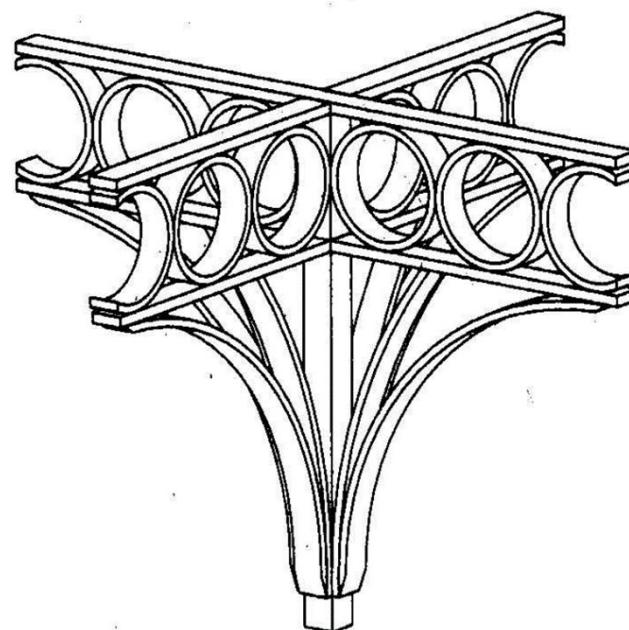
avec anneaux



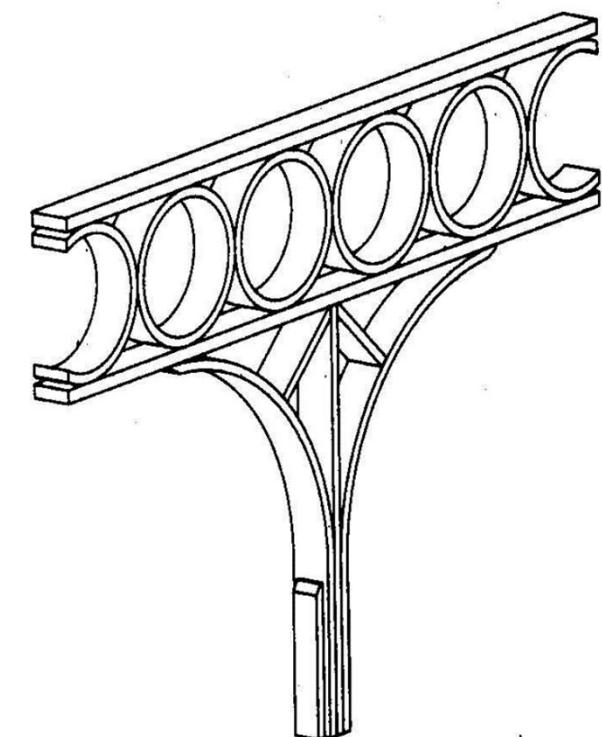
faisceau de barres avec montants et anneaux



avec anneaux de stabilisation



avec doubles aisseliers en rayons



avec planches de stabilisation contre le flambage

