



SZÉCHENYI
ISTVÁN
EGYETEM

DESIGN OF STRUCTURES 2.

***1. The role and importance of
structural design in civil
engineering***

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2019. 09. 18.

Schedule

Date	Topic
2019. 09.12.	Introduction Discussion of homework
2019. 09.19.	Structural materials Selection of projects
2019. 09.26.	Effects and design states
2019. 10.03.	Design questions
2019. 10.10.	Special aspects of structure designing (expansion, stability, stiffness)
2019. 10.17.	Approximation of structures' sizes
2019. 10.24.	Presentation I.
2019. 10.31.	Economical, durability and environmental questions of structure design
2019. 11.07.	Break
2019. 11.14.	Interaction between foundation and structure I.
2019. 11.21.	TMDK
2019. 11.28.	Interaction between foundation and structure II.
2019. 12.05.	Test
2019. 12.12.	Presentation II., Deadline for homework

Content

- * The importance of structure design in civil engineering
- * Function of the structures
- * Relationship between form and structure
- * Relationship between mechanical engineering and structure



„The architect, who is the creator of the whole art, may not do the detailed calculation, but shall take a part in considering the possible solutions with proper expertise and not be a mere spectator of the structural solutions created by others.”

Czakó Adolf

The importance of structure designing in civil engineering

Structure: the part of the building created for load bearing with sufficient safety

Function of the structures

The building loads and effects

- * are taken by the load-bearing structures
- * and transmitted to the subsoil

The main requirement for the entire building is to keep it's balance.

Structure-form-fuction







Importance of the structures by different facilities

Function, form architecture			Structure statics		
Monument Sculpture	Residential building Communal building Cultic building	High building, Wide-span hall	Industrial hall Agricultural hall Warehouses	Bridge, silo, container, chimney, cooling tower, water tower, Tv-tower, crane-girder, sewage treatment plant	Machine foundation, Hídraulic engineering projects, Dam, retaining wall, oil-rig, Underground container

Connection between disciplines

- Architecture - Structure

- The form choice determines the usable area, the aesthetic appearance and the structural behaviour



- Mechanical engineering – Structure

- The relationship between ribbed slab and MEP systems (ventilation pipes)

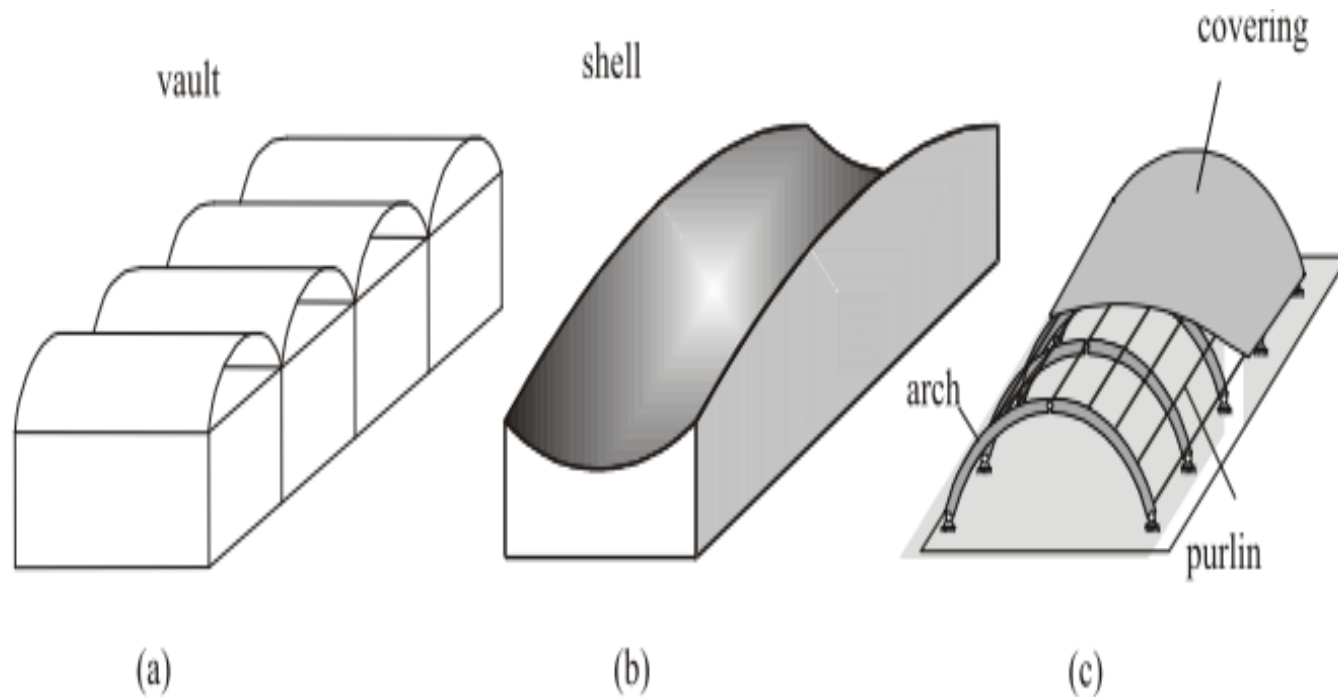


- Construction - Structure

- Construction of Pentele bridge



Architecture - Structure

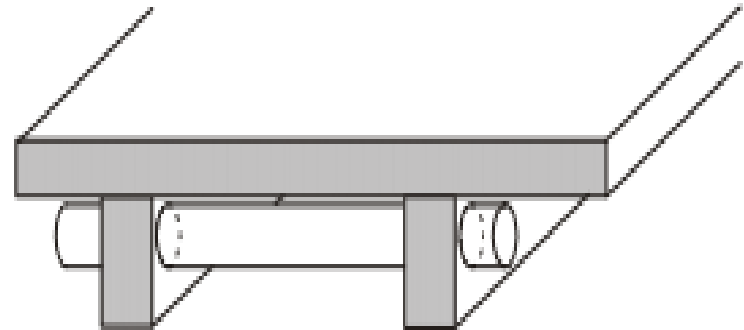
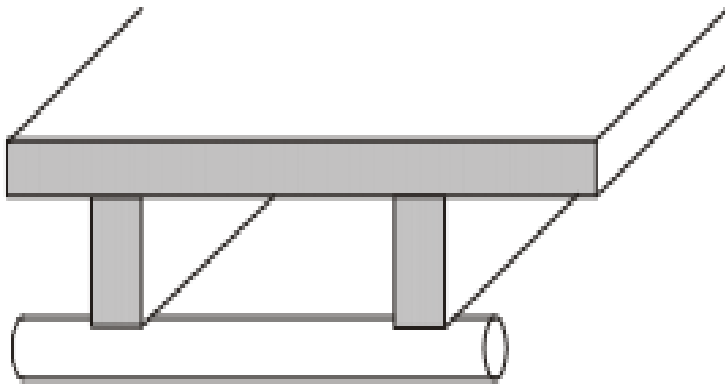


The form choice determines the usable area, the aesthetic appearance and the structural behaviour

Mechanical engineering - Structure

The relationship between

- ❖ Ribbed slab
- ❖ and MEP systems



Construction - Structure



Design requirements

For a building, there are

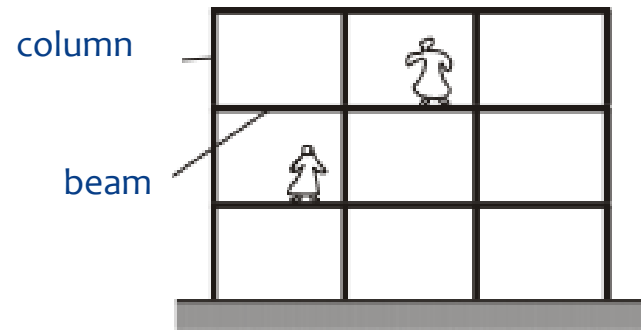
- ❖ functional
 - ❖ aesthetic
 - ❖ technical
 - ❖ economical
- requirements.

What is the meaning of a „good” structure?

- A structure can be defined as good, if it trasmits the loads to the subsoil in a simple way
- Example:
 - * Frame

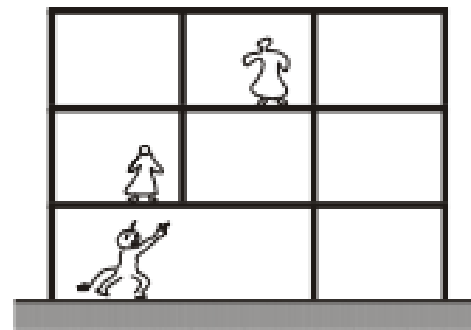
„Good” structure?

„good”

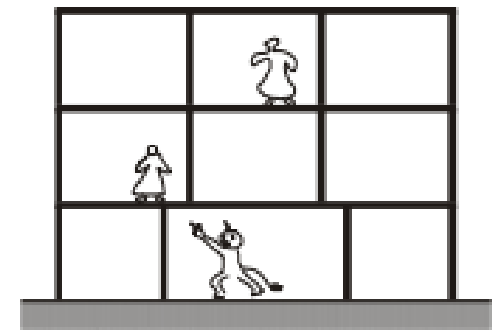


(a)

„bad”



(b)



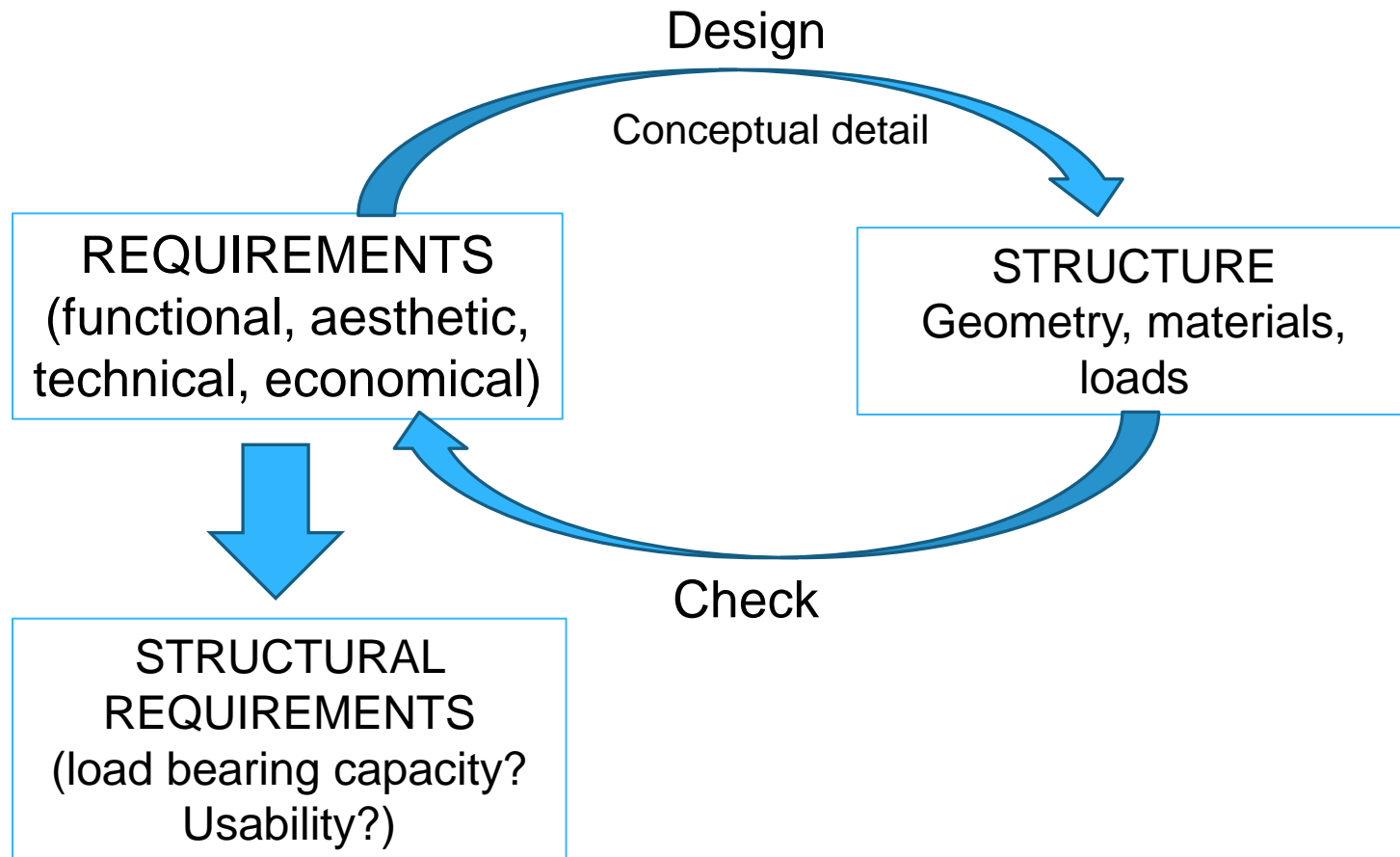
(c)

„Good” structure?

- * „bad” example: Sydney Opera House
 - * Original cost plan: 7 million australian dollar



Structural requirements



Thank you for your attention!