Structural Design II

Philippe Block · Joseph Schwartz
Course overview

Structural design I

1. Introduction
2. Equilibrium and graphic static
3. + 4. Cables
5. + 7. Arches
6. + 8. Arch-cable-structures
9. Trusses
10. + 11. Beams and frames
12. Materials and dimensioning
13. Cable-net and membrane structures
14. + 15. Vaults, domes and shells
16. Spatial arch-cable-structures
17. Spatial trusses
18. Shear walls and plates
20. Columns

Structural design II

12. Materials and dimensioning
13. Cable-net and membrane structures
14. + 15. Vaults, domes and shells
16. Spatial arch-cable-structures
17. Spatial trusses
18. Shear walls and plates
20. Columns
19. Bending
Truss structure

- Spacial trusses
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Bruno and Fritz Haller, Emch & Berger: USM factory, Münsingen, 1964
Christian Kerez, Joseph Schwartz: School Leutschenbach, Zurich, 2009
Spacial trusses

Christian Kerez, Joseph Schwartz: School Leutschenbach, Zurich, 2009
Christian Kerez, Joseph Schwartz: School Leutschenbach, model 1:10
Spacial trusses
Alexander Graham Bell: Composite kite as spacial truss from prefabricated tetrahedrons, 1907
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Spacial trusses

Konrad Wachsmann: US Air Force Hangar Projekt, 1951
Richard Buckminster Fuller, Shoji Sado: US Expo pavilion, Montreal, 1967
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Structural design II

Course overview
Shear walls and plates

- Shear walls
  - Beam grid
  - Plate
  - Folded plate
  - Hybrid structures
Shear walls
Shear walls
Shear walls

Multiple dwelling Forsterstrasse, Zurich, 2003, Arch.: Christian Kerez, Ing.: Joseph Schwartz
Shear walls
Shear walls
Shear walls
Shear walls
Shear walls and plates

Shear walls
- Beam grid
  Plate
  Folded plate
  Hybrid structures
Beam grid
Sverre Fehn: Nordic Pavillon, Venice, 1958-1962
Beam grid

Brauen Wälchli, A. Muttoni: extension olympic museum, Lausanne, 2014
Beam grid

Brauen Wälchli, A. Muttoni: extension olympic museum, Lausanne, 2014
Martínez Lapeña-Torres Arquitectos, Esteyco: solar power plant Forum, Barcelona, 2004
Hollow-gauged brick floor
Beam grid
Albert Kahn: Continental Motors Corporation, Detroit, 1912
Beam grid
Beam grid

Albert Kahn: Ford motor company plant, Highland Park, 1909
Beam grid
Beam grid
Livio Vacchini, R. Rossi: Multipurpose hall, Losone, 1997
Beam grid
Louis Kahn, Henry A. Pfisterer: Art Gallery, Yale University, New Haven, 1953
Heinrich Degelo, Joseph Schwartz: Extension congress centre, Davos, 2011
Beam grid

Pier Luigi Nervi: Wool Factory Gatti, Rome, 1953
Shear walls and plates

Shear walls
Beam grid

- Plate
  Folded plate
  Hybrid structures
Pier Luigi Nervi: Wool Factory Gatti, Rome, 1953
Le Corbusier & Pierre Jeanneret: two family house, Weissenhof housing estate, Stuttgart, 1926
Frank Lloyd Wright: Johnson Wax Building, Racine, 1939
Shear walls and plates

Shear walls
Beam grid
Plate

- Folded plate

Hybrid structures
Folded plate
Folded plate
Marcel Breuer, Bernhard Zehrfuss, Pier Luigi Nervi: conference hall, UNESCO headquarters, Paris, 1952
Marcel Breuer, Bernhard Zehrfuss, Pier Luigi Nervi: conference hall, UNESCO headquarters, Paris, 1952
Marcel Breuer, Bernhard Zehrfuss, Pier Luigi Nervi: conference hall, UNESCO headquarters, Paris, 1952
Folded plate
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Folded plate
Shear walls and plates

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Beam grid
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● Hybrid structures
Hybrid structures

Hybrid structures

Heinrich Degelo, Joseph Schwartz: Extension congress centre, Davos, 2011
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