Lecture 13:
New Building Forms of Maillart & Isler

Discipline and Play

Industrial flooring systems: capitals and ribs
The Chiasso shed roof and the cement hall: Maillart and roof structures
Isler: form finding for thin shells
Heinz Isler (1926-2009)
Kresge Auditorium (1955)
Eero Saarinen, architect
49 m span
M.I.T, Cambridge, MA
St. Gallen Gasholder (1902)
Robert Maillart
40 m diameter
Switzerland
City design

Maillart design
St. Gallen Concert Hall (1906)
Robert Maillart
Switzerland
St. Gallen Warehouse (1908)
Robert Maillart
Zurich Warehouse (1910)
Robert Maillart

Switzerland
Two Way Load Distribution
Johnson-Bovey building in Minneapolis, in the October 4, 1906 issue of Engineering News. Sharp criticism are indicative of Turner's relationship with the structural engineering establishment throughout his career. Sewell's statement: "No extensive system of reinforced concrete forming, together with a portion of the floor slab in each case, what is practically a T-beam." Sewell's statement and Turner's reaction are a good example of the debate between the two engineers. Turner never intended the term mushroom to refer to the small column capital. The Engineering News of 17th June 1905b mentions that egg-shaped mushroom heads were used in the reinforcement shown and another of the underside of the flat slab. Turner used octagonal columns with capitals of floor, with a maximum deflection of 5/8 of an inch in the center of the slab. When the test load was applied, "the elastic deflection was a scant quarter of an inch." The Engineering News of 17th June 1905b mentions the mushroom head, which provided shear reinforcement, was probably very similar to that shown in Fig. 6, consisting of large diameter radial and circumferential bars. Turner recounted that: "In applying for a permit for this building, the building department refused to grant one, except for an experimental building, it being agreed and understood between the owner, the engineer and the contractor that the construction should stand a test load of 700 lb./ft.

The mushroom system of construction was elegantly adaptable to a range of column sizes and forms were used. The flat slab flexural reinforcement consisted of 14 ft. 10 in. and a 7 1/2 in. bars in each of the four belts. More importantly, the mushroom head, which provided shear reinforcement, was probably very similar to that shown in Fig. 6, consisting of large diameter radial and circumferential bars. Turner recounted that: "In applying for a permit for this building, the building department refused to grant one, except for an experimental building, it being agreed and understood between the owner, the engineer and the contractor that the construction should stand a test load of 700 lb./ft."

Flat Slab System of C.A.P. Turner (1905)
Magazzini Generali (1924)  
Robert Maillart  
Chiasso, Switzerland  
25 m span
BENDING MOMENT DIAGRAM

UNIFORM LOAD

SUPPORT

b

a

b
(a) CONSTANT FORCE TRUSS

(b) CABLED CONSTANT FORCE
Cement Hall (1939)  
Robert Maillart  
Zurich, Switzerland  
6 cm thick
Cosmic Ray Lab (1951)
Felix Candela
Mexico City
Heinz Isler (1926-2009)
Schalenbau
System Isler Ing.
Burgdorf
Ausführung
W. Bösiger AG
Langenthal
Eschmann Company Building (1958)
Heinz Isler
Switzerland
Wyss Garden Center (1961)
Heinz Isler

Switzerland
Kilcher Co. Building (1965)
Heinz Isler
26 m span, 8-10 cm thick
Switzerland
Tension

Compression
Grötzingen Theater (1977)
Heinz Isler
Switzerland
Grötzingen Theater (1977)
Heinz Isler
Switzerland
Deitingen Service Station (1968)
Heinz Isler
Switzerland
Sicli Co. Building (1970)
Heinz Isler

Switzerland
Heimberg Tennis Center (1973)
Heinz Isler
Switzerland
Ice Shell (2009)