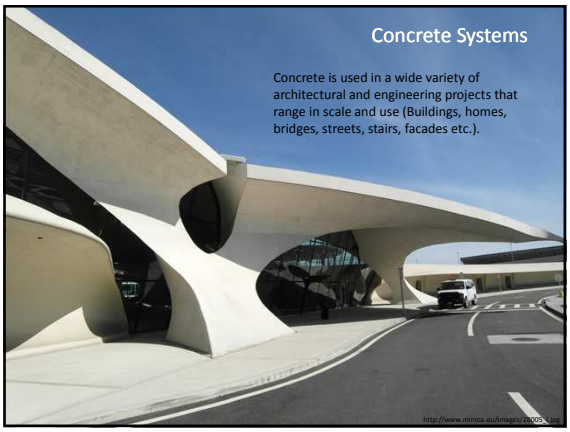

Concrete is used in a wide variety of architectural and engineering projects that range in scale and use (Buildings, homes, bridges, streets, stairs, facades etc.).

Concrete Structure
David Chipperfield Architects
Americas Cup Building
Valencia Spain

Structural Systems - Concrete

Concrete is used in a wide variety of architectural and engineering projects that range in scale and use (Buildings, homes, bridges, streets, stairs, facades etc.).

Concrete House
Frank Lloyd Wright
Falling Water
Mill Run Pennsylvania

Structural Systems - Concrete

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Boat Lift
Nicoll Russell Studios
Falkirk Wheel
Falkirk Scotland

Connects Forth and Clyde Canal
24M high

Structural Systems - Concrete

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http://www.youtube.com/watch?v=n61KUGDWz2A

Boat Lift
Nicoll Russell Studios
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Falkirk Scotland

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24M high

Structural Systems - Concrete

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Concrete Dome
Pantheon
Rome Italy

Largest unreinforced concrete dome
126AD

Structural Systems - Concrete

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Facade
Richard Meier
Jubilee Church
Rome Italy

Structural Systems - Concrete

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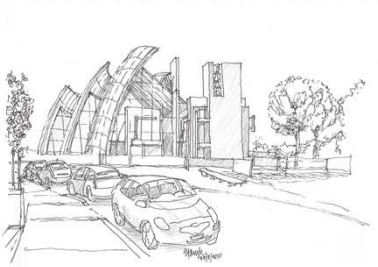

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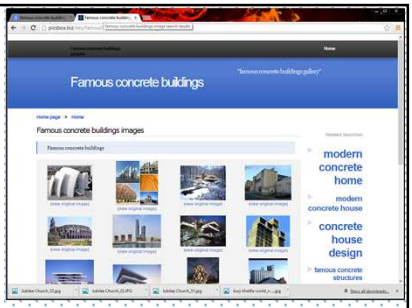


Famous Concrete Buildings
http://picsbox.biz/key/famous%20concrete%20buildings#

Structural Systems - Concrete

Concrete Materials:
- Portland Cement
- Water
- Fine Aggregate
- Coarse Aggregate

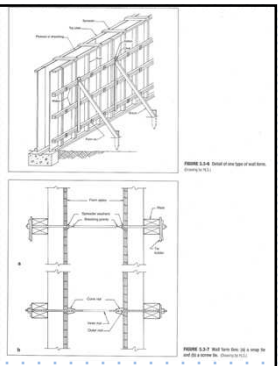
Structural Systems - Concrete

Concrete Formwork

Reusable Aluminum Formwork

Structural Systems - Concrete

Concrete Formwork



Structural Systems - Concrete

Concrete Formwork

Wood Formwork

Structural Systems - Concrete

Concrete Formwork

Experimental Formwork

Structural Systems - Concrete

Precast Concrete

Bridge Sections

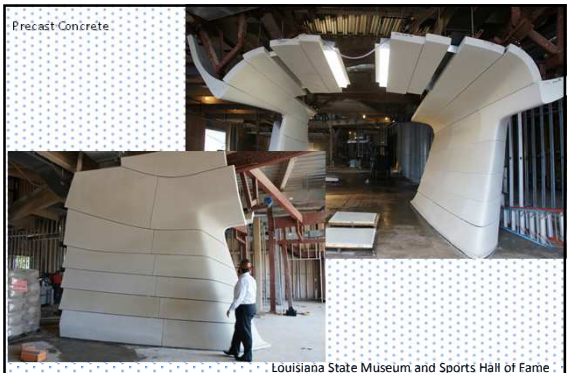
Structural Systems - Concrete

Precast Concrete

Beams, Columns, Decking

Structural Systems - Concrete

Precast Concrete



Louisiana State Museum and Sports Hall of Fame
Trahan Architects

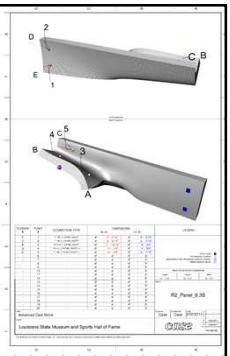
Structural Systems - Concrete

Precast Concrete

Louisiana State Museum and Sports Hall of Fame
Trahan Architects

Structural Systems - Concrete

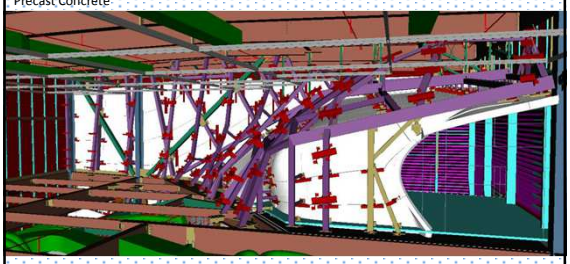
Precast Concrete



Louisiana State Museum and Sports Hall of Fame
Trahan Architects

Structural Systems - Concrete

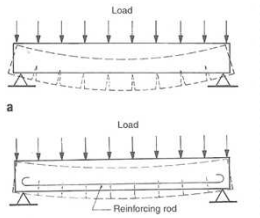
Precast Concrete

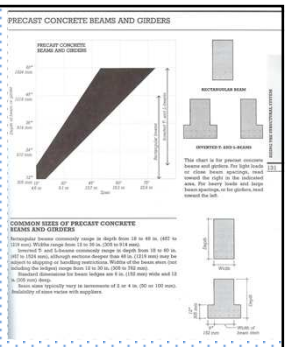


Louisiana State Museum and Sports Hall of Fame
Trahan Architects

Structural Systems - Concrete

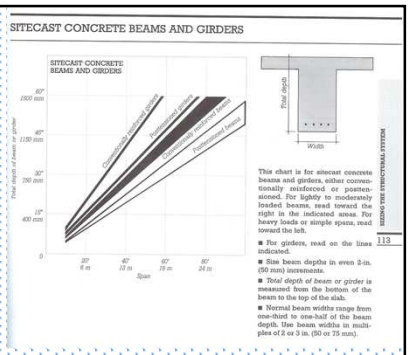
Precast Concrete Beams and Girders





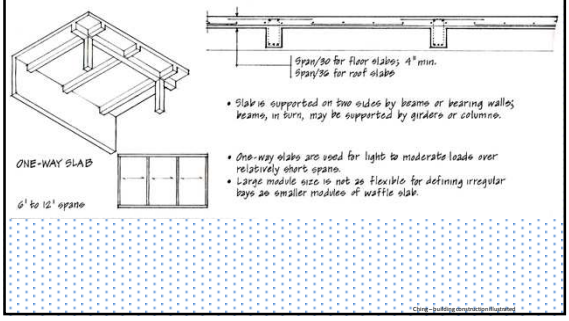
Structural Systems - Concrete

Concrete Beams and Girders

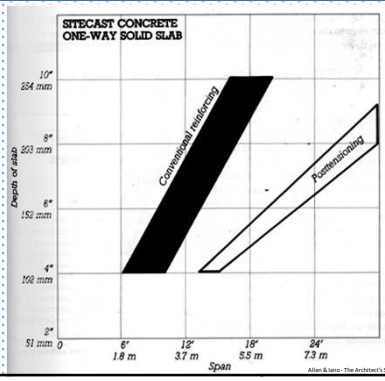


Structural Systems - Concrete

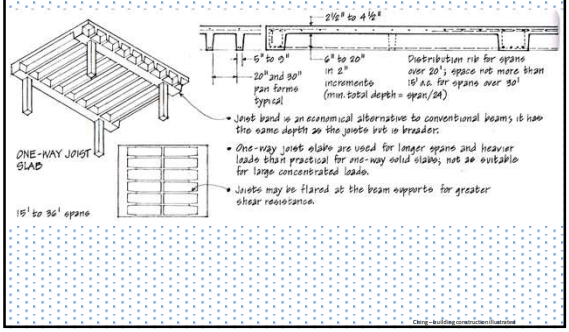
Concrete Systems – one way slab



Concrete Systems – one way slab

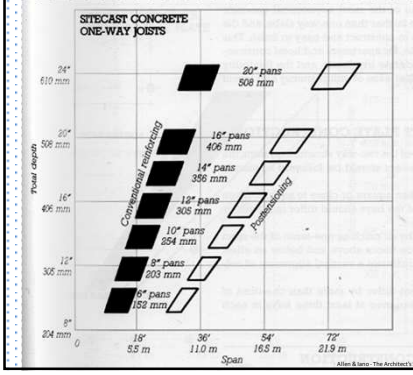


Concrete Systems – one way joist



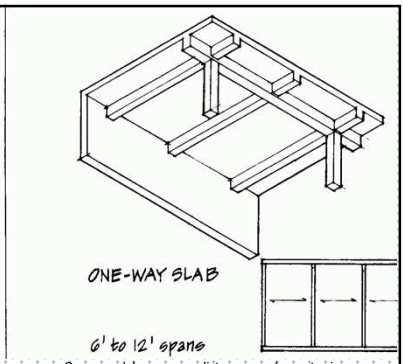
Ching – Building Construction Illustrated

Concrete Systems – one way joist



Allen & Iano - The Architect's Studio Companion: Rules of Thumb for Preliminary Design

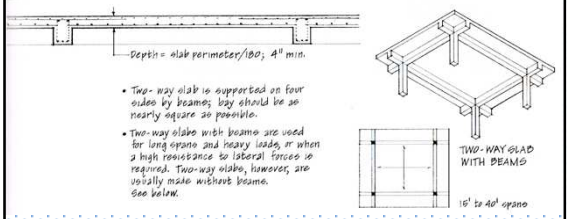
Concrete Slabs
- One way slab
- Two way slab
- Flat plate slab
- Waffle slab



One way slab – spans a distance much greater in one direction then in the other

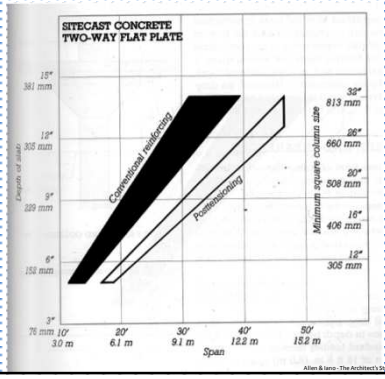
Structural Systems - Concrete

Concrete Systems – two way slab



Ching – Building Construction Illustrated

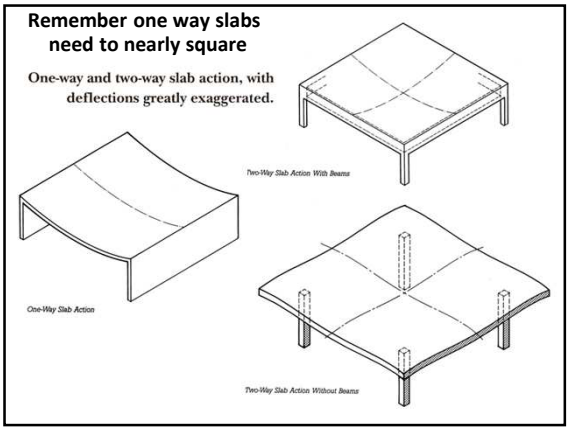
Concrete Systems – two way slab



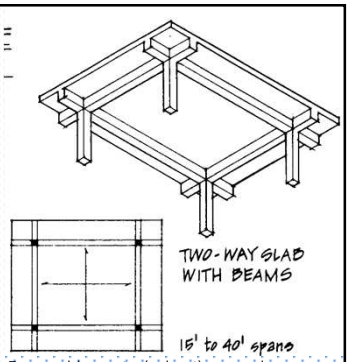
Allen & Iano - The Architect's Studio Companion: Rules of Thumb for Preliminary Design

Remember one way slabs need to nearly square

One-way and two-way slab action, with deflections greatly exaggerated.



Concrete Slabs
- One way slab
- Two way slab
- Flat plate slab
- Waffle slab

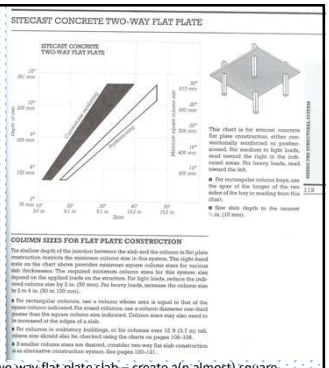


Two way slab – create a(n almost) square column spacing

Structural Systems - Concrete

Concrete Slabs
- One way slab
- Two way slab
- Flat plate slab
- Waffle slab

Simple to construct and easy to finish

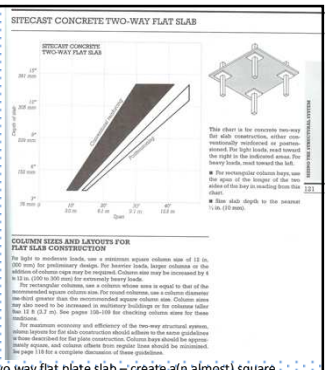


Two way flat plate slab – create a(n almost) square column spacing

Structural Systems - Concrete

Concrete Slabs
- One way slab
- Two way slab
- Flat plate slab
- Waffle slab

Column caps



Two way flat plate slab – create a(n almost) square column spacing

Structural Systems - Concrete

Concrete Slabs
- One way slab
- Two way slab
- Flat plate slab
- Waffle slab

Structural Systems - Concrete

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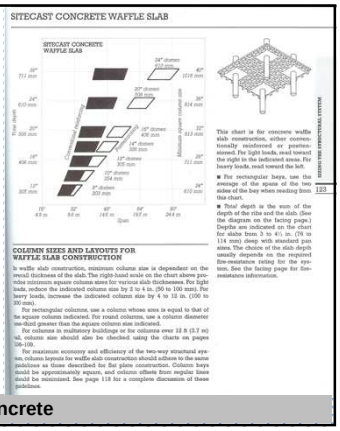


Structural Systems - Concrete

Concrete is used in a wide variety of architectural and engineering projects that range in scale and use (Buildings, homes, bridges, streets, stairs, facades etc.).

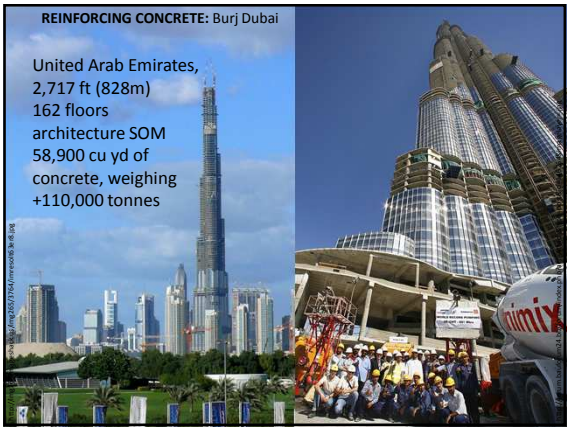
Tower
Adrian Smith @ SOM
Burj Khalifa
Dubai UAE

2722 Feet tall
163 floors

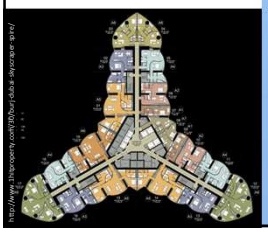
Structural Systems - Concrete

REINFORCING CONCRETE: Burj Dubai

United Arab Emirates,
2,717 ft (828m)
162 floors
architecture SOM
58,900 cu yd of concrete, weighing +110,000 tonnes



REINFORCING CONCRETE:
Burj Dubai



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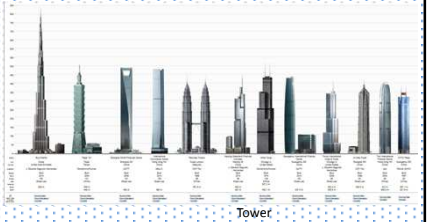
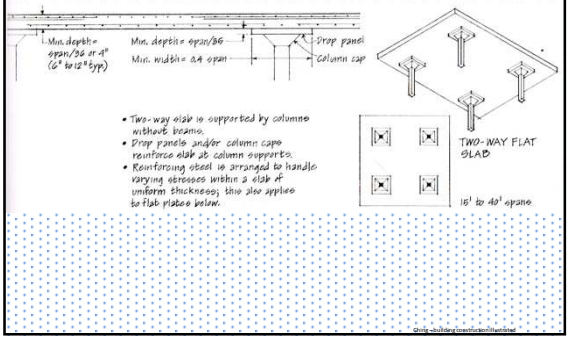


2722 Feet tall
163 floors

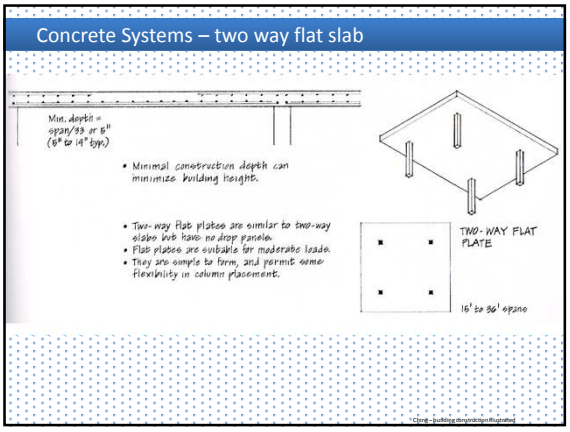
Tower
Adrian Smith @ SOM
Burj Khalifa
Dubai UAE

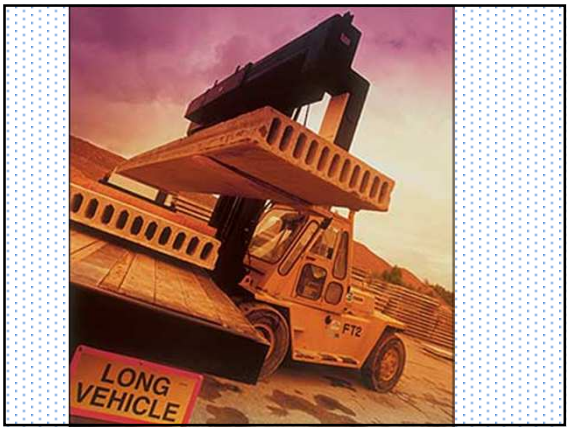
Structural Systems - Concrete

Concrete Systems – two way flat slab

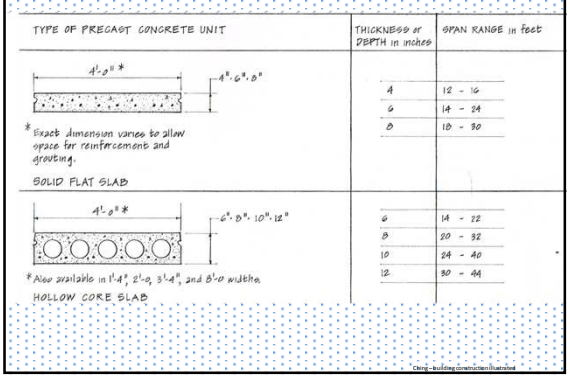


Concrete Systems – two way flat slab

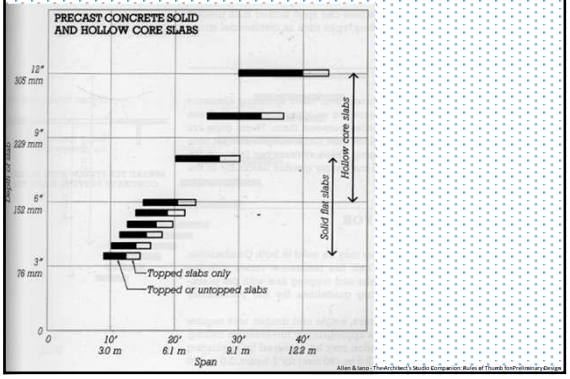




Concrete Systems – Precast Units



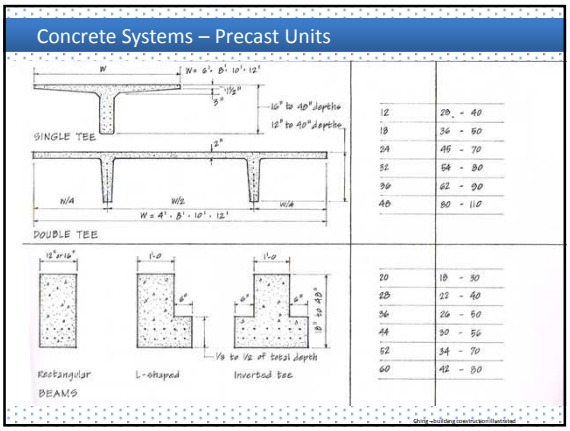
Concrete Systems – Precast Units



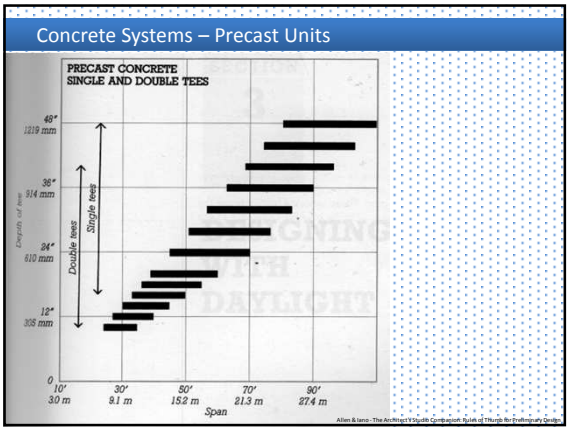
Precast Concrete Slabs
- Solid flat
- Hollow Core
- Single Tee
- Double Tee

Structural Systems - Concrete

Concrete Systems – Precast Units



Concrete Systems – Precast Units



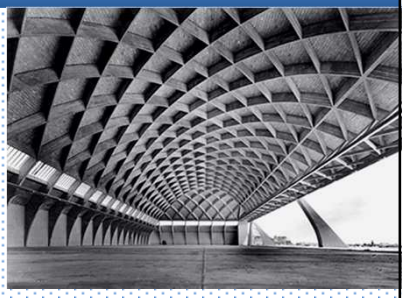
Concrete Systems – Thin Shell Structures

Concrete "Umbrella"
Felix Candela
Mexico

Concrete Systems – Precast Units

Concrete Warehouse
Felix Candela
Mexico

Concrete Systems – Precast Units



Airplane Hanger
Pier Luigi Nervi
Italy

Concrete Systems – Precast Units

Concert Hall
Jorn Utzon, Ove Arup
Sydney Australia

Concrete Systems – Precast Units

http://www.columbia.edu/cu/gsapp/BT/BSI/GRAVSYS/grav1.html

http://faculty.delhi.edu/hultendc/AECT480-Lecture%207.pdf

http://picsbox.biz/key/famous%20concrete%20buildings#

http://lebbeuswoods.wordpress.com/2009/12/02/big-tops/

http://thepost-it-effect.blogspot.com/2010/09/new-structuralism-designengineering-and.html

http://www.generativeart.com/on/cic/papers2005/37.SemraArslanSelcuk.htm

http://en.wikipedia.org/wiki/Concrete_shell

Architect's Studio Companion, Rules of Thumb For Preliminary Design [pg 19 – 29, 107 – 135]
Construction Principles, Materials, And Methods [chapter 3]