

Western Bridge Conference 2007

Bridge Architecture of the 21st Century – An Architect's Perspective

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TY Lin International

Topics:

Common Misperceptions

Form Follows Function

Beyond Form Follows Function

Examples

Projects

Conclusion



Common Misperceptions

Architects add **fluff**



Engineers are **boring**



Who is the 'Designer'?

Designer

artist, builder, creator, draftsman,
inventor, maker, master builder,
originator, planner, prime mover

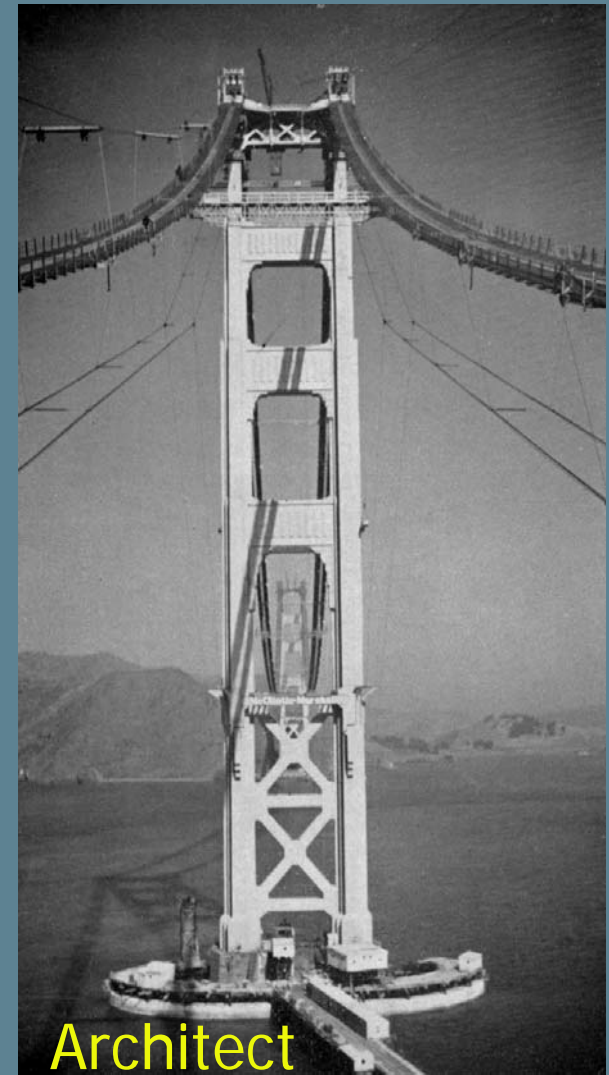
Both engineers and architects 'design'.

Best environment is one of exploration, collaboration,
and discovery!

Form Follows Function



No Architect



Architect

Evolution of Form Follows Function

"ornament is a crime" Adolf Loos, 1908

*It is the pervading law of all things
organic and inorganic,*

*Of all things physical and
metaphysical,*

*Of all things human and all things
super-human,*

Of all true manifestations of the head,

Of the heart, of the soul,

*That the life is recognizable in its
expression,*

***That form ever follows function.
This is the law.***

Louis Sullivan, 1910



Barcelona Pavilion, Mies van der Rohe, 1929

Form Follows Function

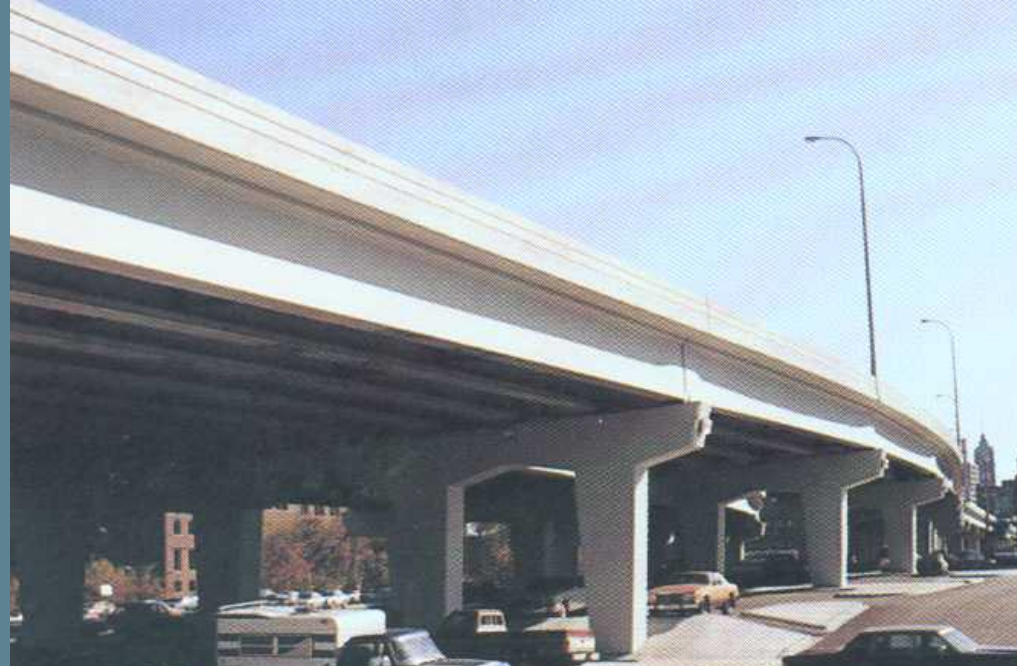
Function

Form

Means Function is the driving force.

Similar to balancing on a stool with one leg.

No place for beauty.



Formula for Aesthetics

GUIDELINES – SUBSTRUCTURE

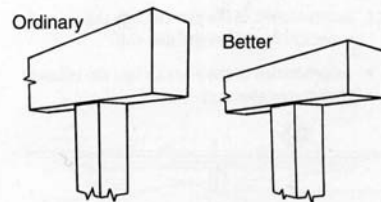


Fig. 5-18. Reducing pier cap height diminishes visual hot spot

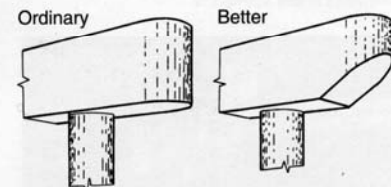


Fig. 5-19. Rounding the pier cap end reduces its prominence

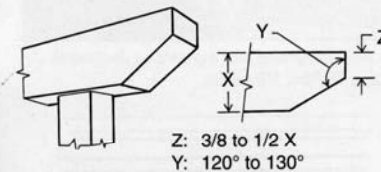


Fig. 5-20. Beveled pier cap end guidelines

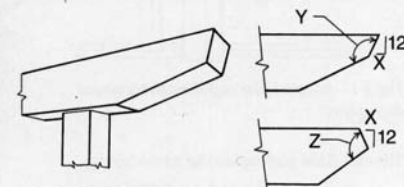


Fig. 5-21. Double beveled pier cap end guidelines

Pier caps supporting bridges with superelevation should follow the cross-slope of the deck at the point of support. Under these conditions, designers should use a constant height of the pier cap end on both sides of the bridge. If a beveled pier cap end is used, the angle of the bevel may need to be referenced to the slope of the bridge deck for proper appearance.

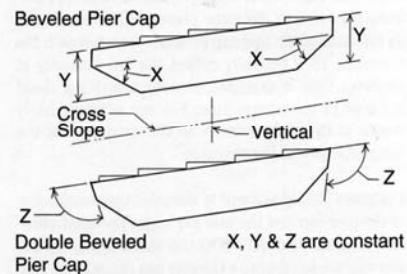


Fig. 5-22. Superelevated pier cap guidelines

Pilasters and closure walls are sometimes used on pier caps to hide bearings. Similar to the ends of pier caps, these elements visually interrupt the horizontal flow of the superstructure lines, breaking it up into individual segments. The effect of this is to make the structure appear thicker. Designers should avoid the use of closure walls on pier caps.

- Avoid the use of closure walls on pier caps

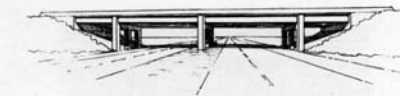


Fig. 5-23. Pilasters break up the horizontal flow.

5.1.2.3 V-shaped Piers

Columns and pier caps can be eliminated entirely by using a wall that is narrower at the base than at the top. This type of pier is referred to as a V-shaped pier. While V-shaped piers eliminate the pier cap, they

Context Sensitive Design has expanded the number of options for designers.

What is missing is beauty!

What is Beauty?

Beauty can be defined by

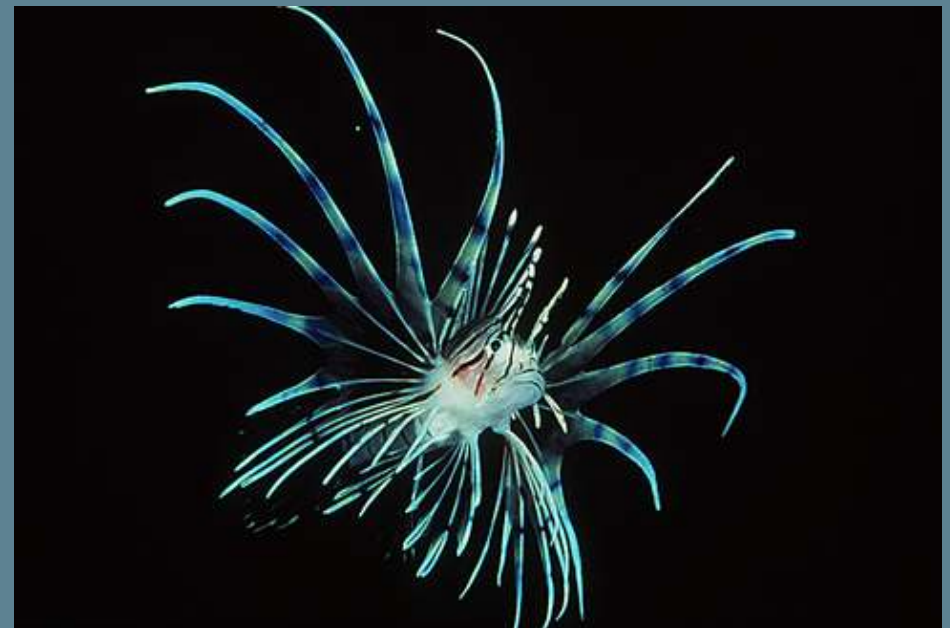
- Culture
- Education
- Experience

Beauty exists in two realms

- Man-made
- Nature

Can we create beauty in
everyday objects?

We don't say, "Medicine is in
the eye of the beholder."



Vitruvius, 1 Century BC

Commodity

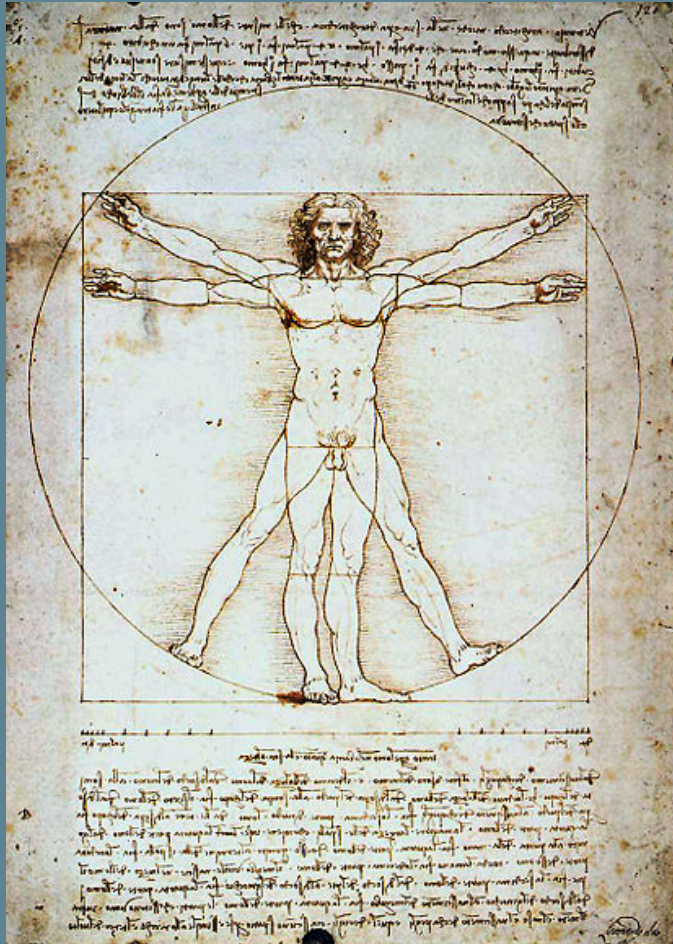
Firmness

Delight

*Utilitas, Firmitas,
Venustas*

Balance of use, structure, and beauty!

Origins of Proportions

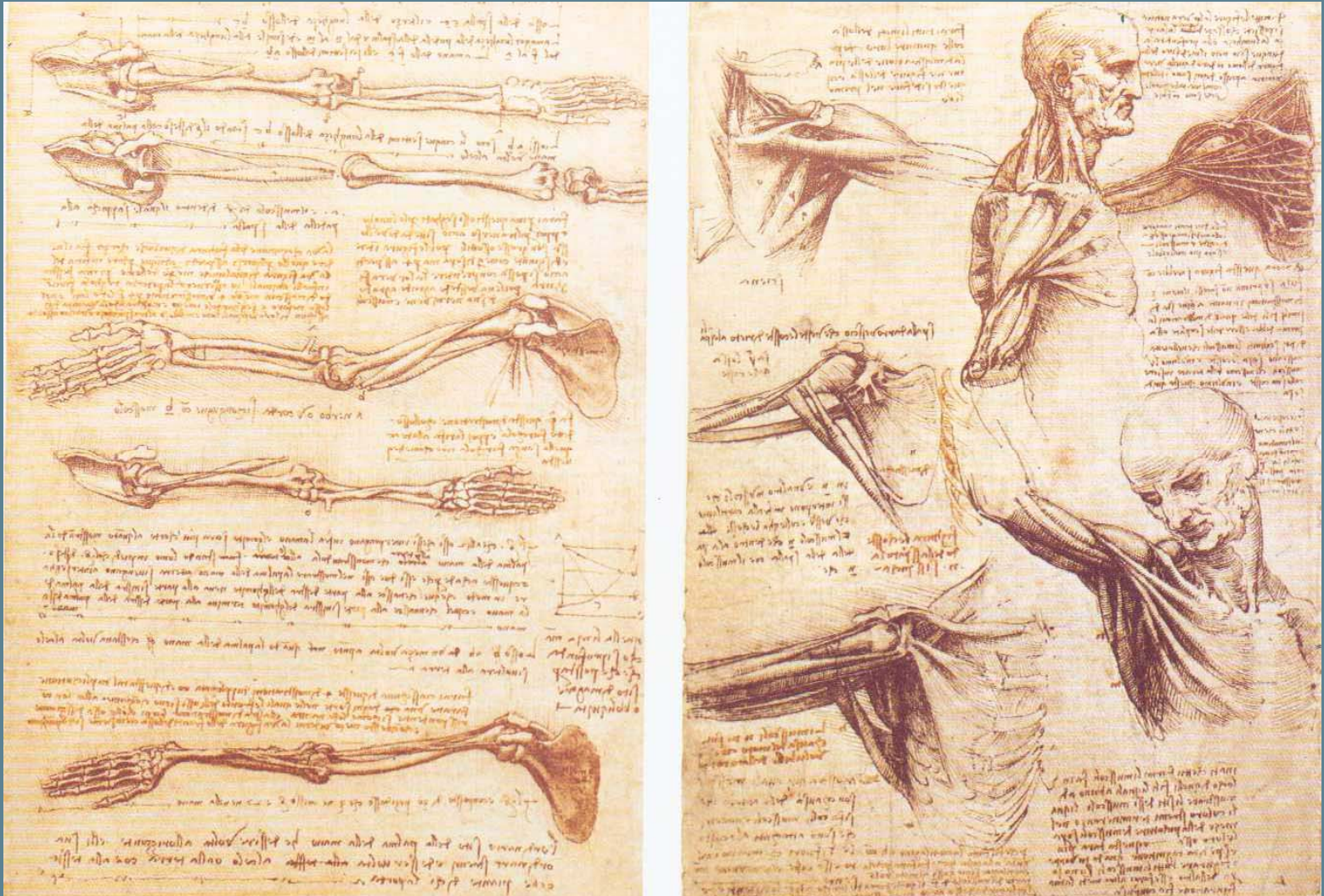


According to Vitruvius, architecture is an imitation of nature. When perfecting this art of building, the ancient Greek invented the architectural orders: Doric, Ionic and Corinthian.

It gave them a sense of proportion, culminating in understanding the proportions of the greatest work of art: the human body. This led Vitruvius in defining his Vitruvian Man, as drawn magnificently by Leonardo da Vinci: the human body inscribed in the circle and the square (the fundamental geometric patterns of the cosmic order).

Beauty is a set of **balanced proportions.**

Understanding Form and Function



The Renaissance



Cathedral of Florence, Brunelleschi, 1436

Integrity

Clarity

Simplicity

Timeless

Developed equations
for beauty!

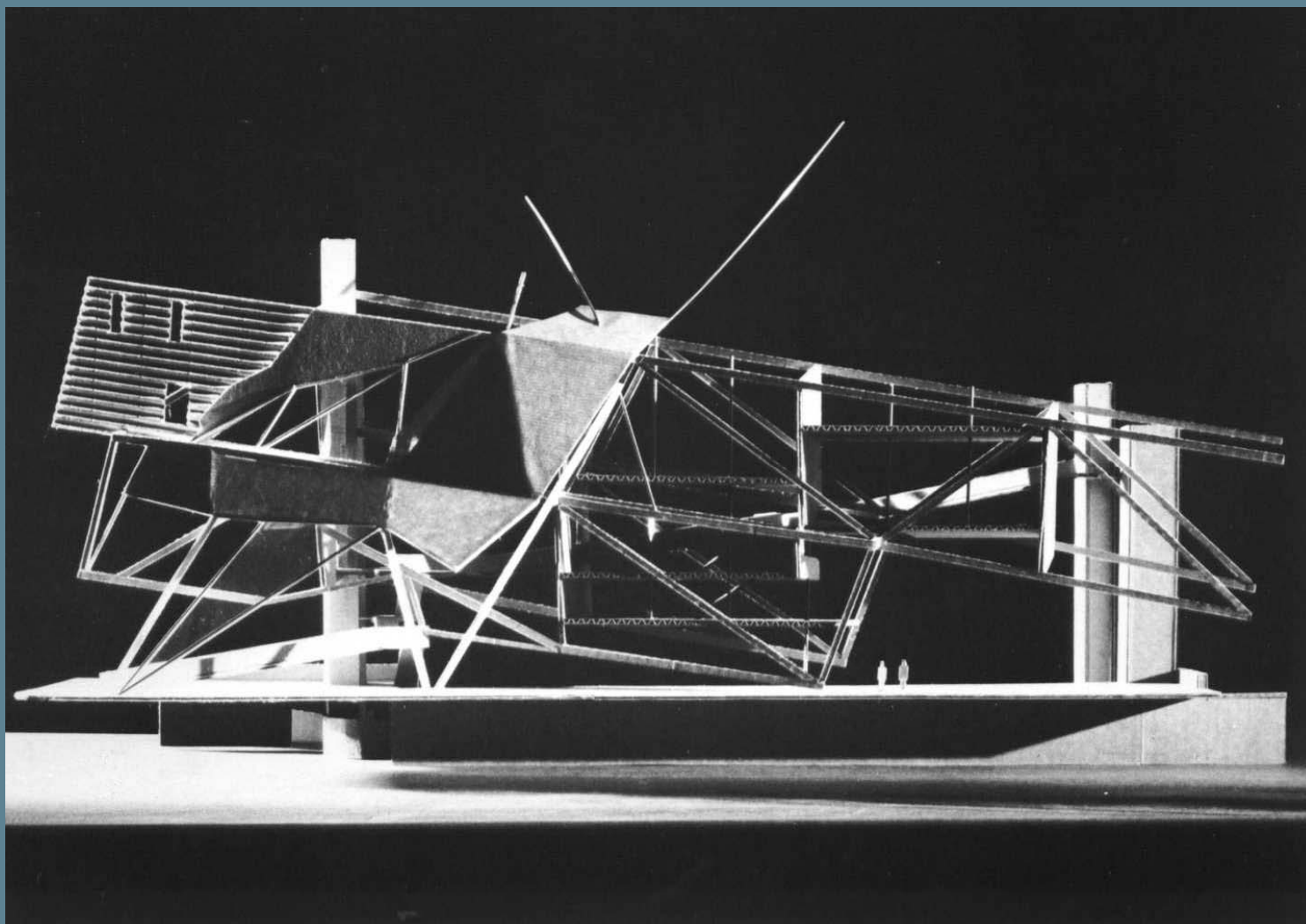
Eastern Approach to Beauty

Length of time depends upon our ideas.
Size of space hangs upon our sentiments.
For one whose mind is free from care,
A day will outlast the millennium.
For one whose heart is large,
A tiny room is as the space between
heaven and earth.

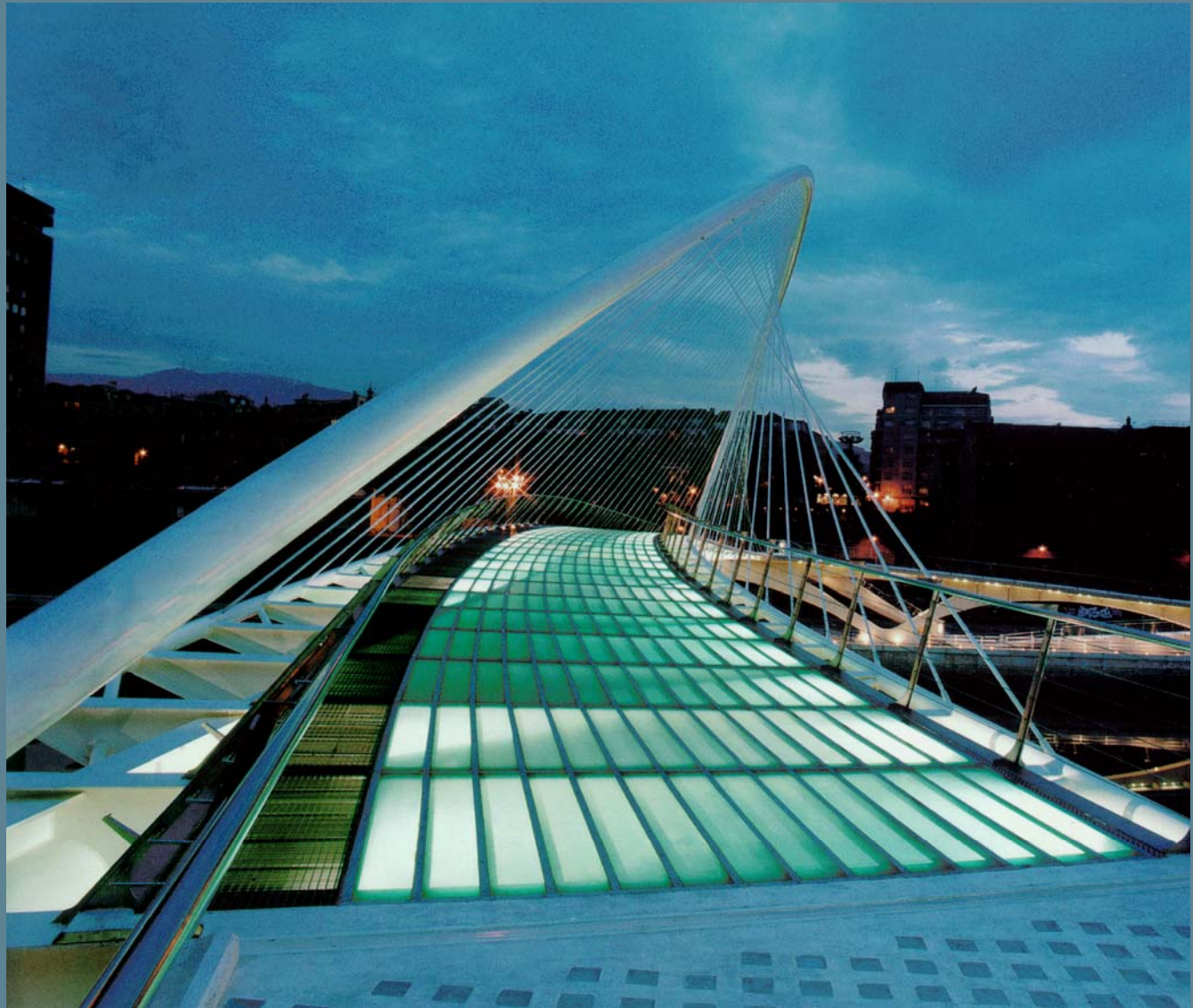
Beauty is in blurring the
distinctions 'between'
space.



Architecture



Form Following Function?



Beauty at what cost?



Architecture or Engineering?



Palace of Labor, Nervi, 1960



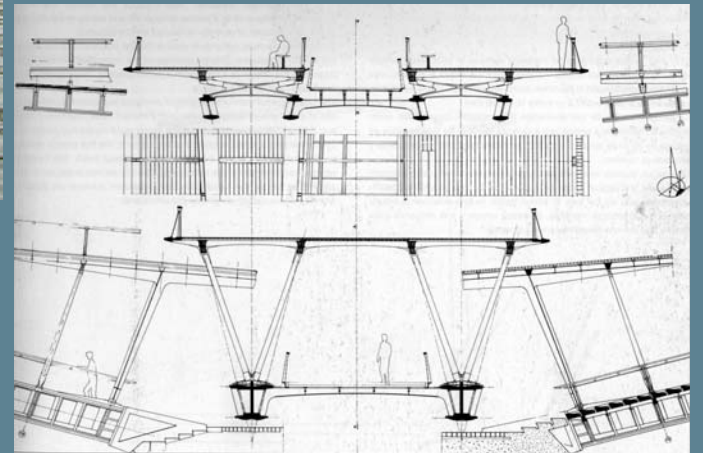
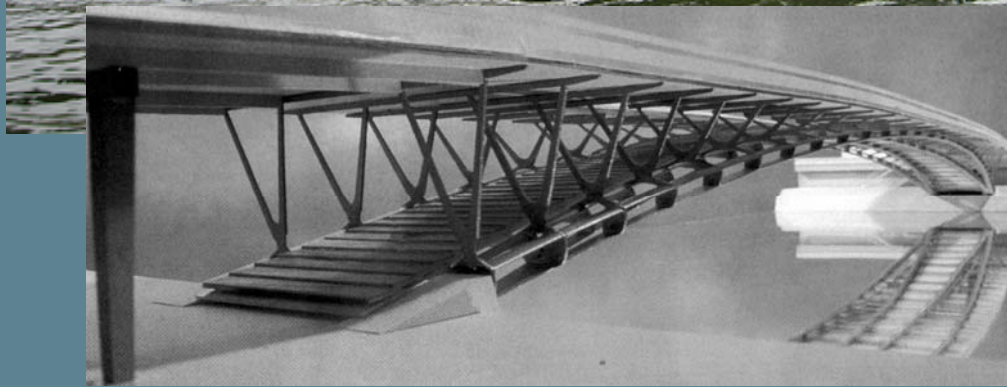
Kintai bridge, Japan, 1673



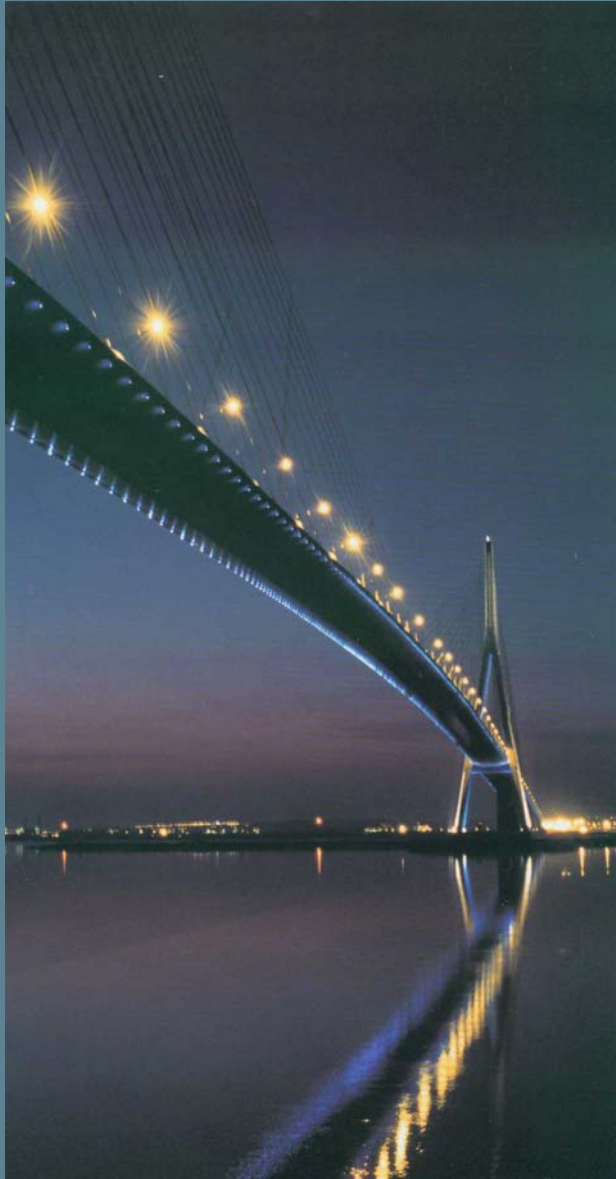
Ponte degli Alpini, Palladio, 1568



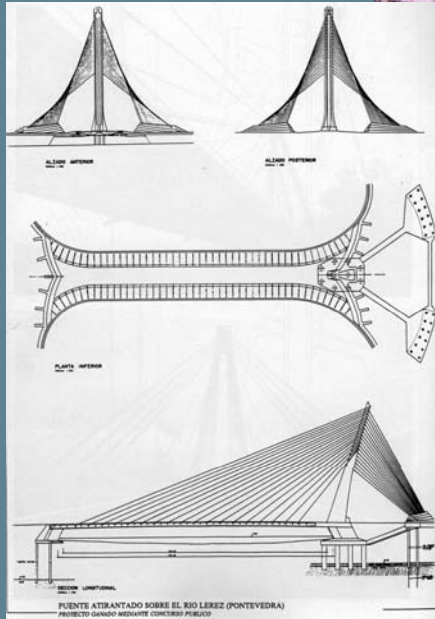
Solferino Bridge, Mimram, 2003



Normandy and Salgina Gorge



Puente atirantado sobre el Rio Lerez



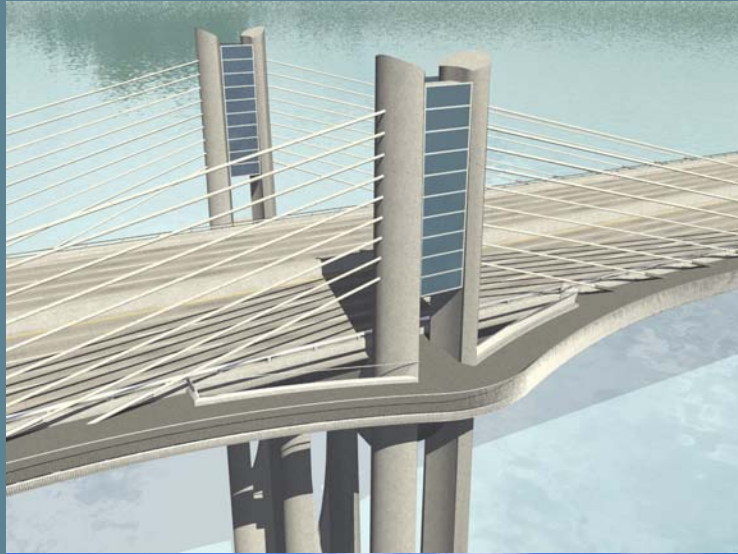
Caiyuanba, Chongqing, China



Cypress Avenue, Redding, CA



St. Croix River Crossing, MN and WI



Dagu, Tainjin, China



Royal Park Bridge, Palm Beach



Conclusion, Part 1

- Our transportation system can be beautiful
 - Intention at the beginning of the project
 - Collaboration between Engineer and Architect
 - Willingness to go beyond typical solutions
 - Identify local character

Successful projects express and enhance civic pride – signature structure.

Conclusion, Part 2

