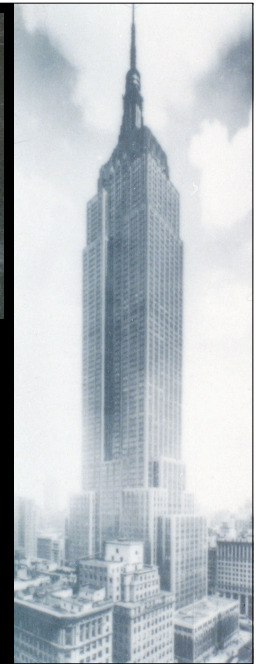
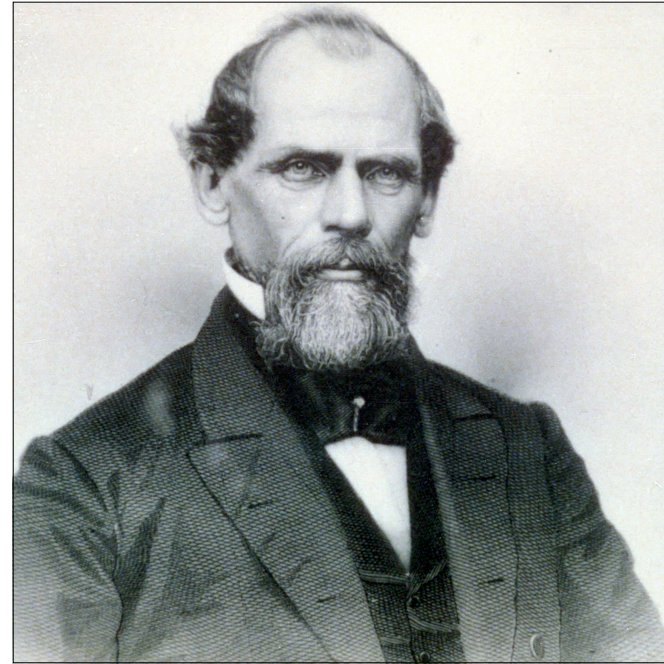
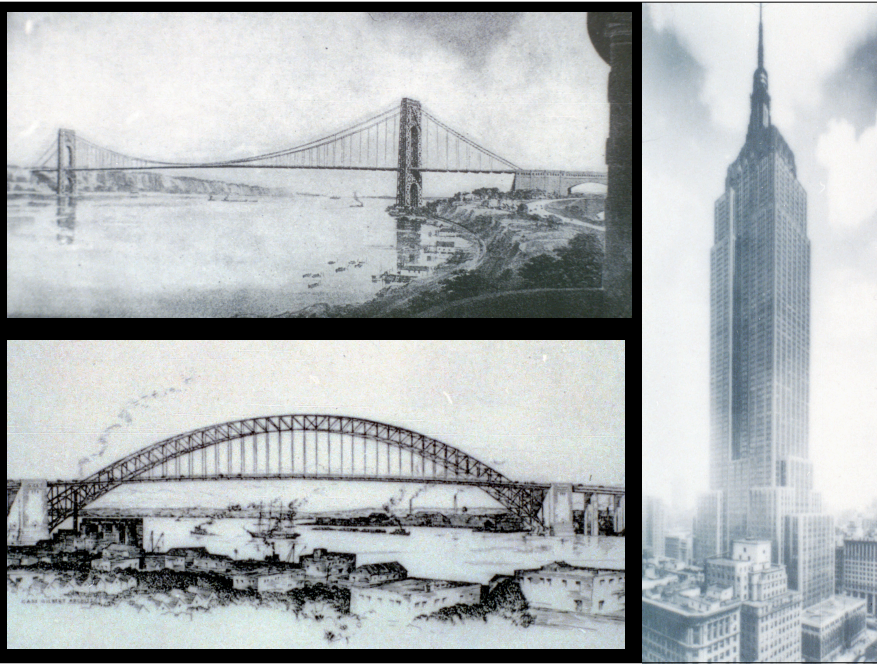


History and Aesthetics in Suspension Bridges

(Othmar Ammann, NYC Bridges,
and 20th century bridge engineering)

Social role of Ammann's bridges in New York
The Hellgate and Bayonne Arches: form and forces
Stiffness in suspension bridges (cont.)
Lindenthal and the RR vs. Amman and the automobile
Form, function, and aesthetics in suspension bridge towers





Othmar H. Ammann



Gustav Lindenthal (1850-1935)

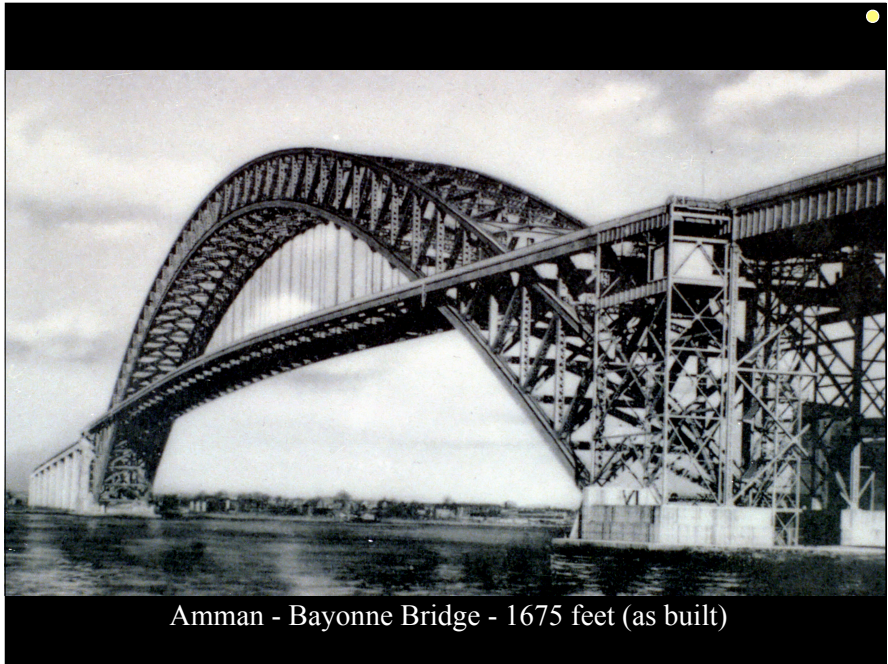
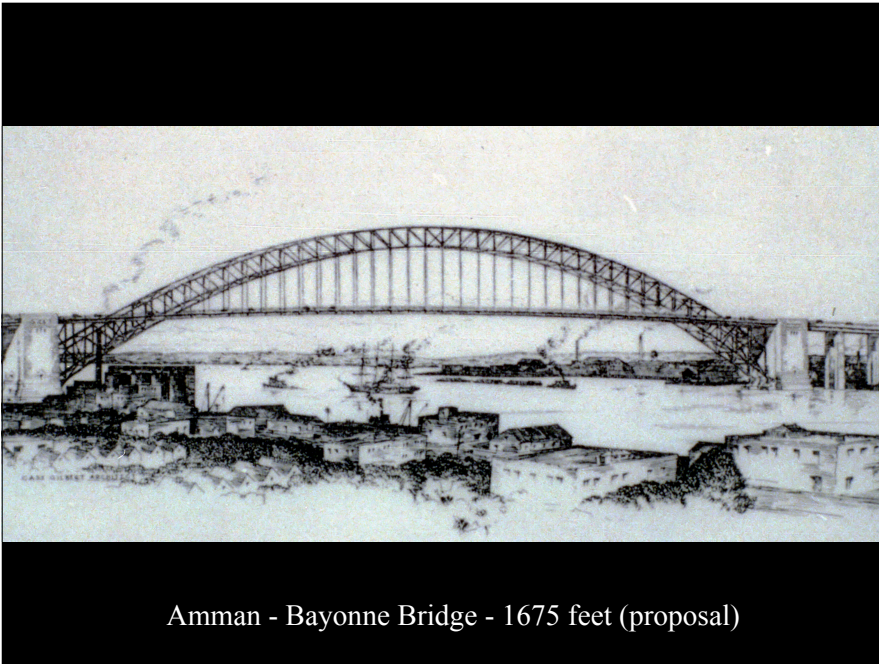


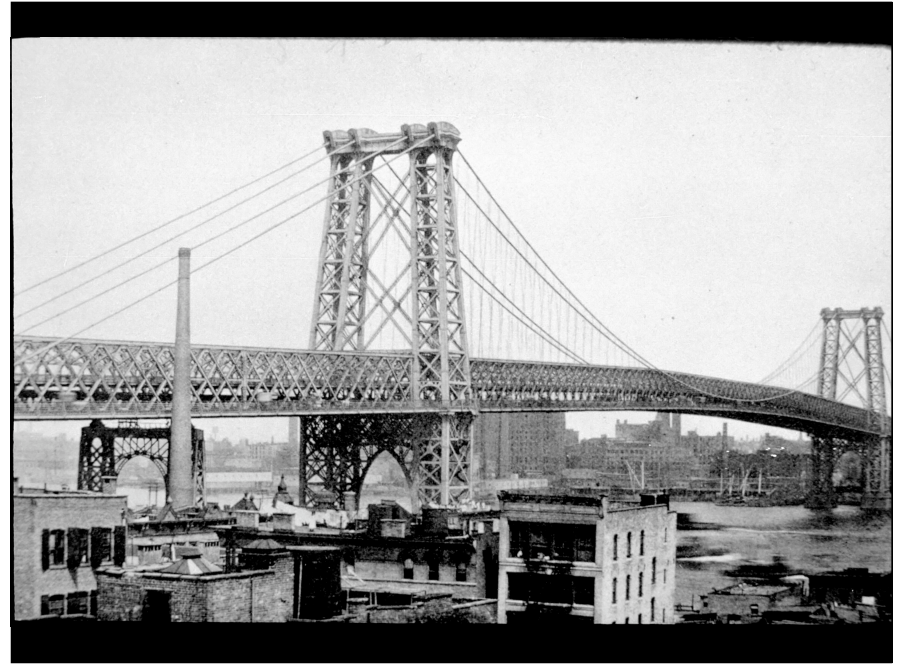
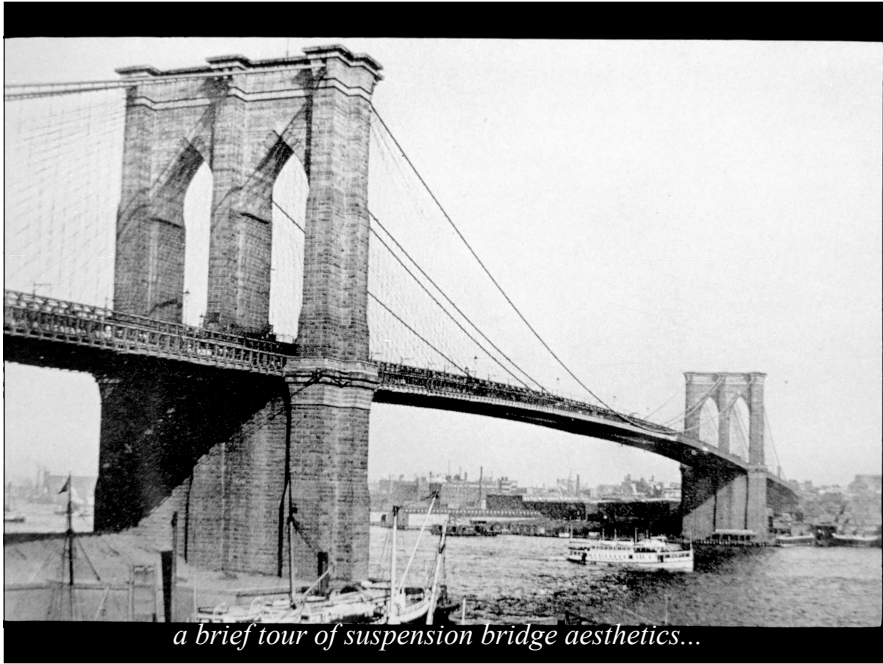
1880



Hellgate Bridge - Gustav Lindenthal - 1916 - 977 feet

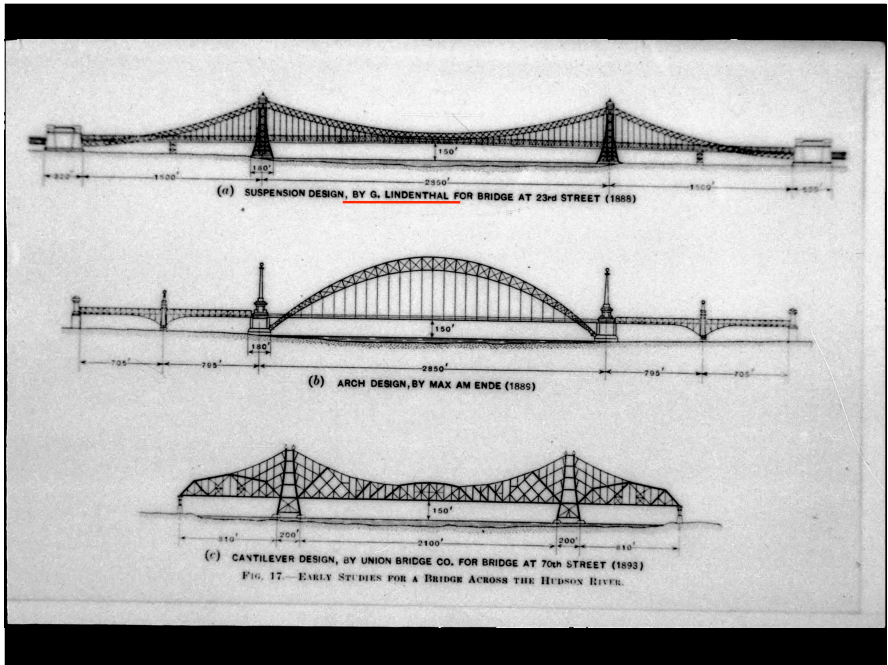


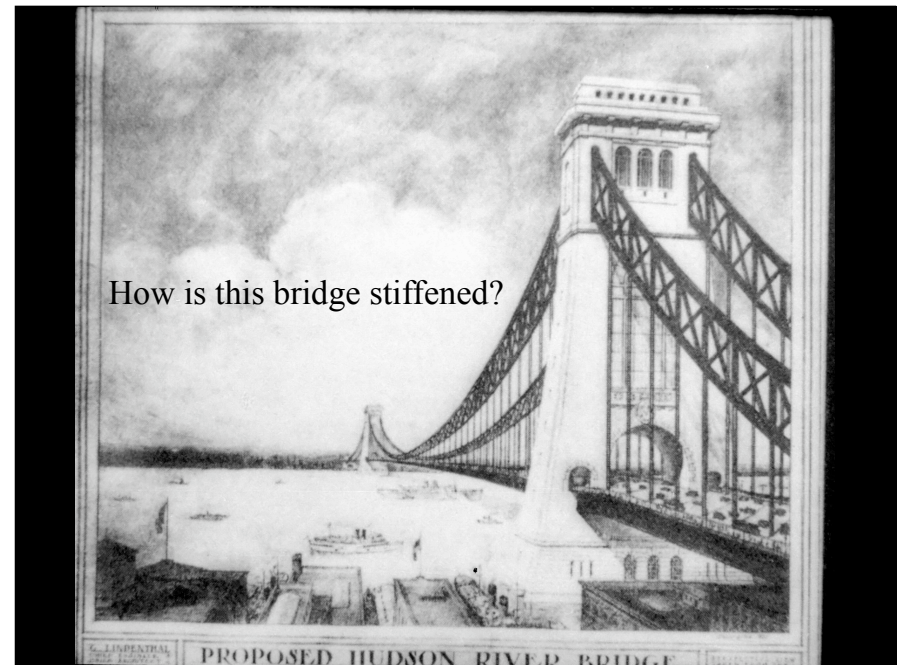
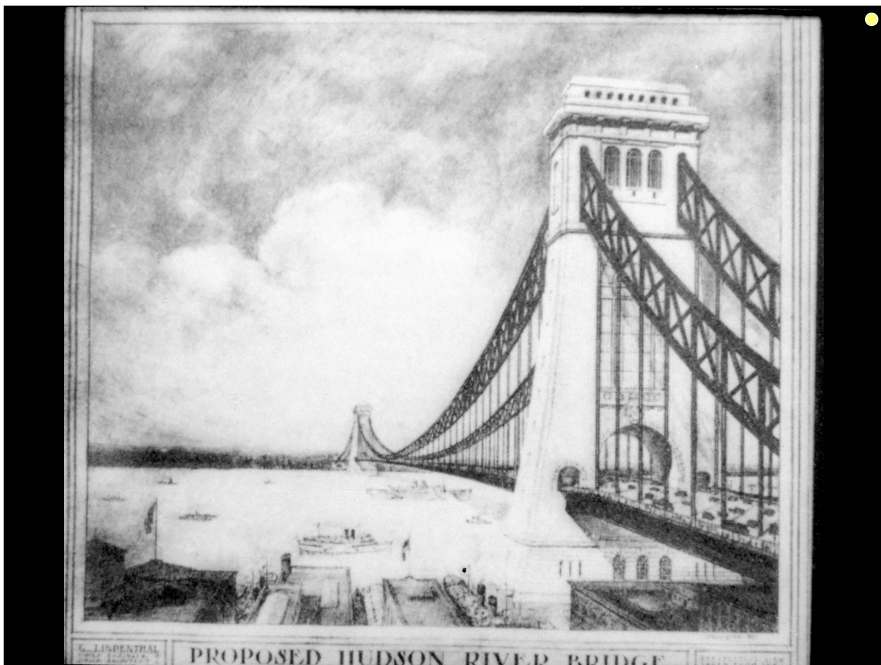
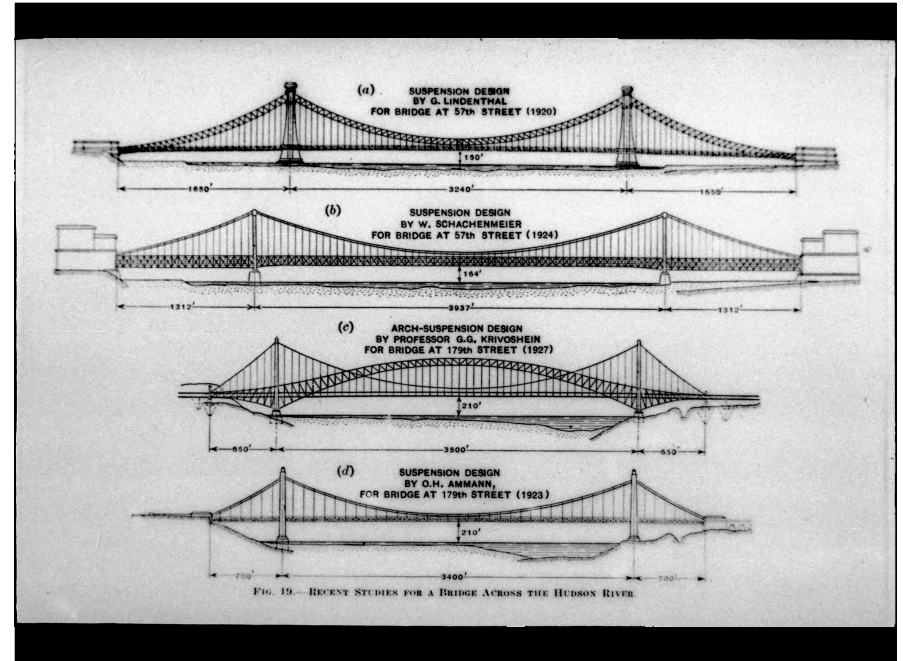
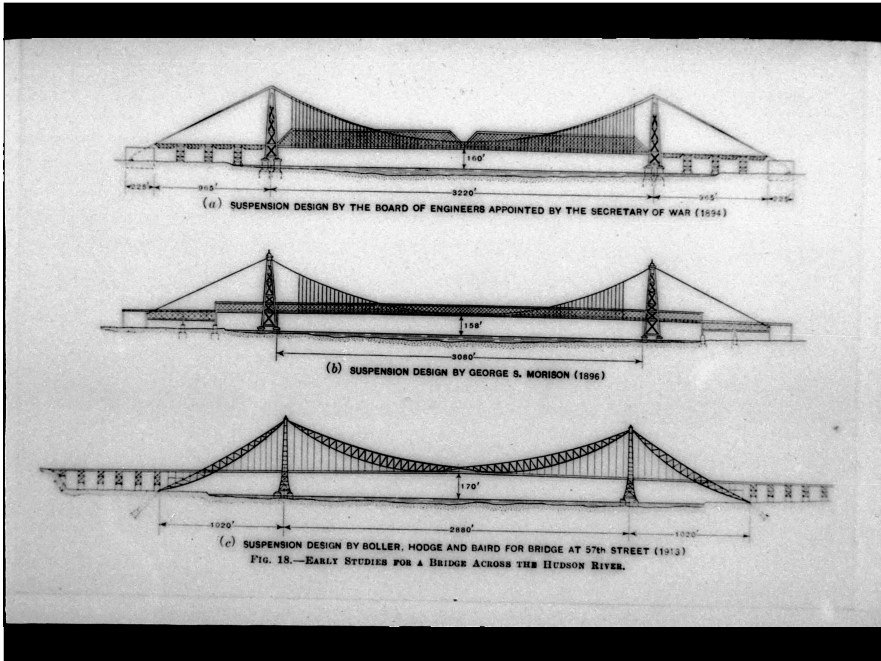


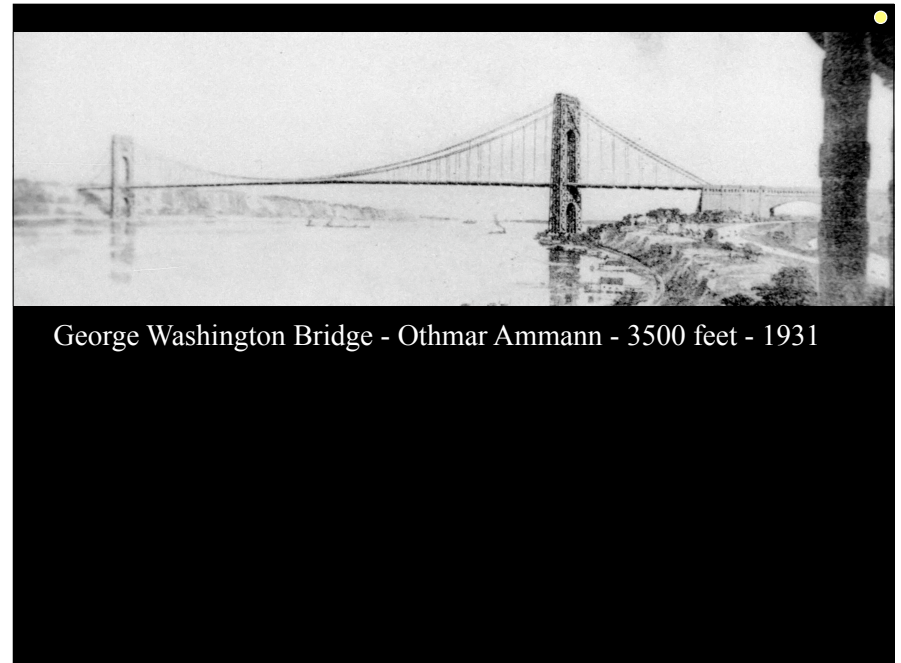
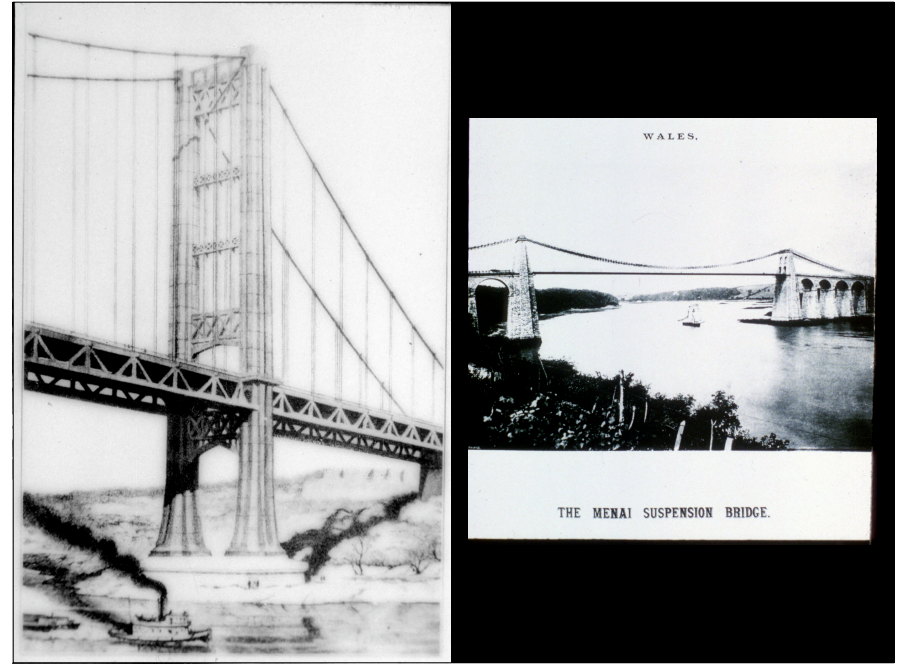
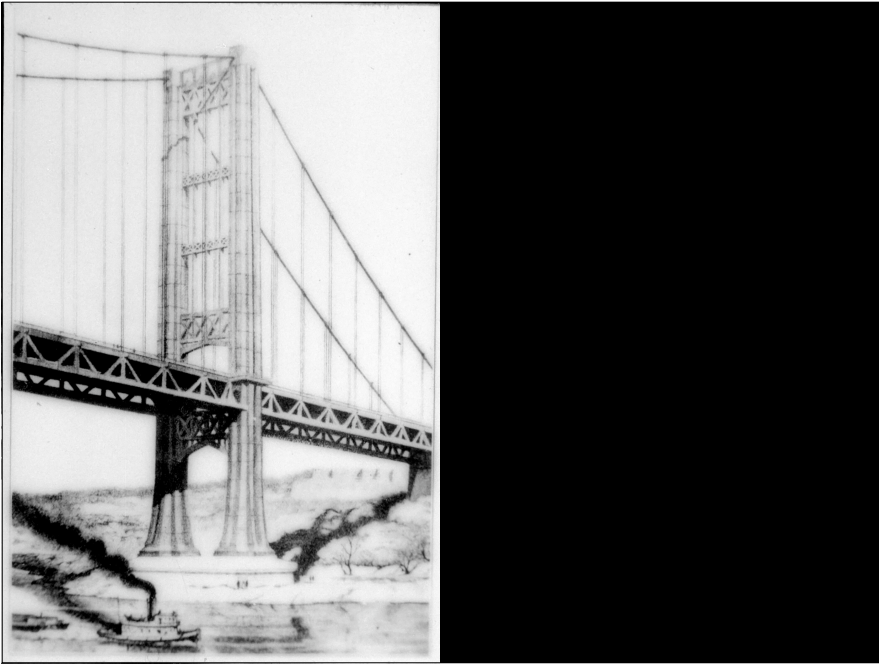


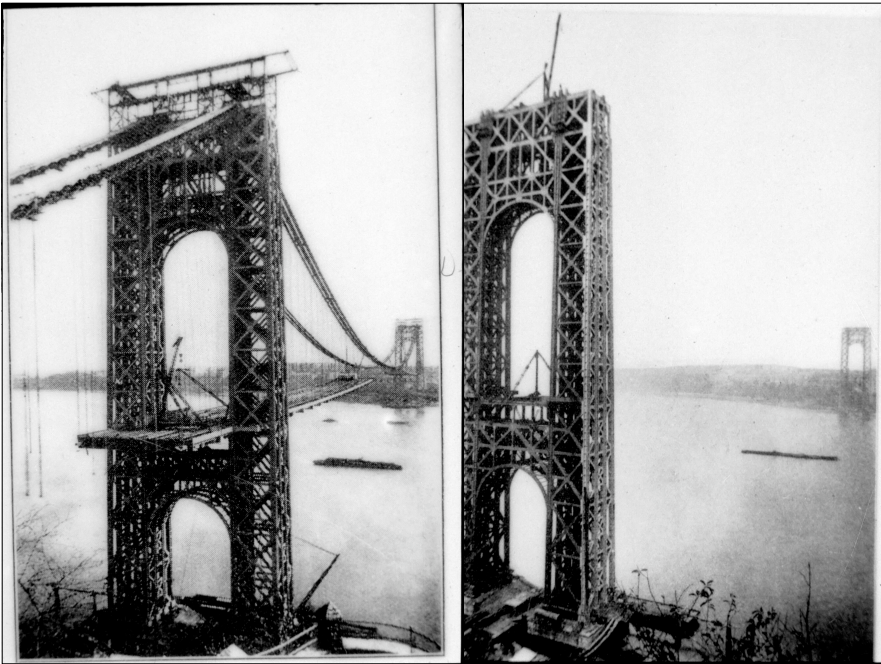
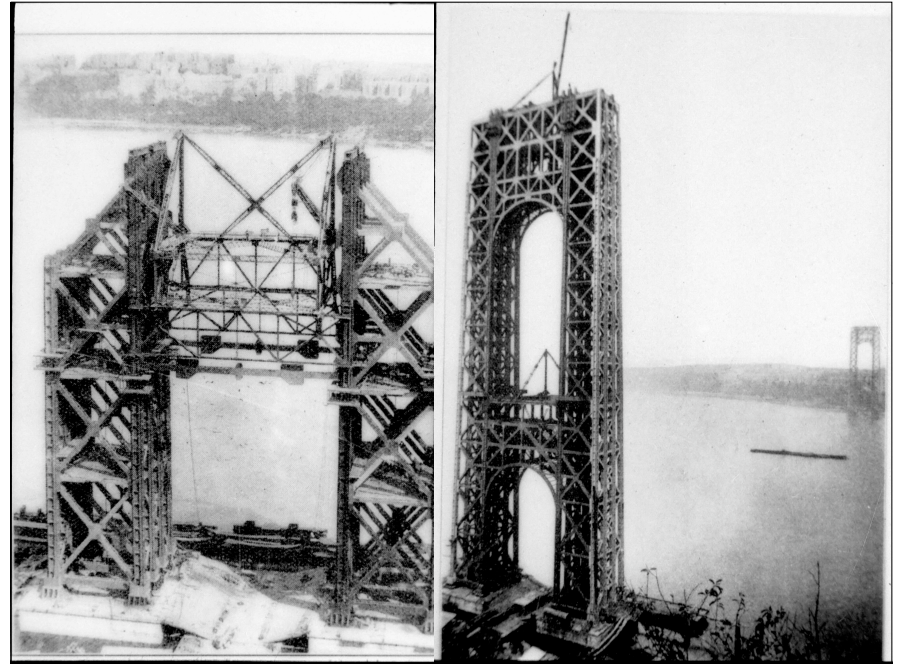
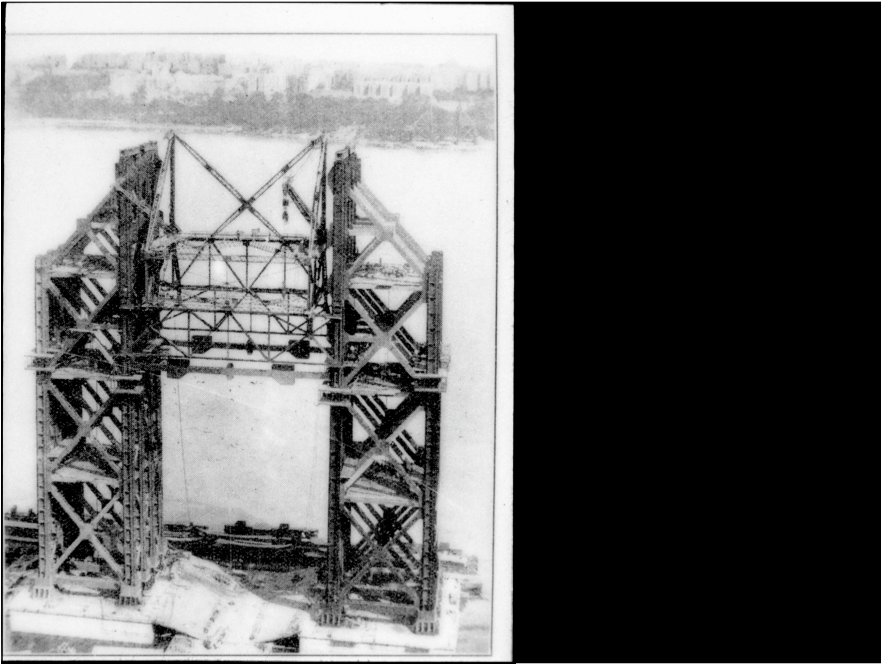


returning now to Lindenthal, Amman, and the design and development of the GWB







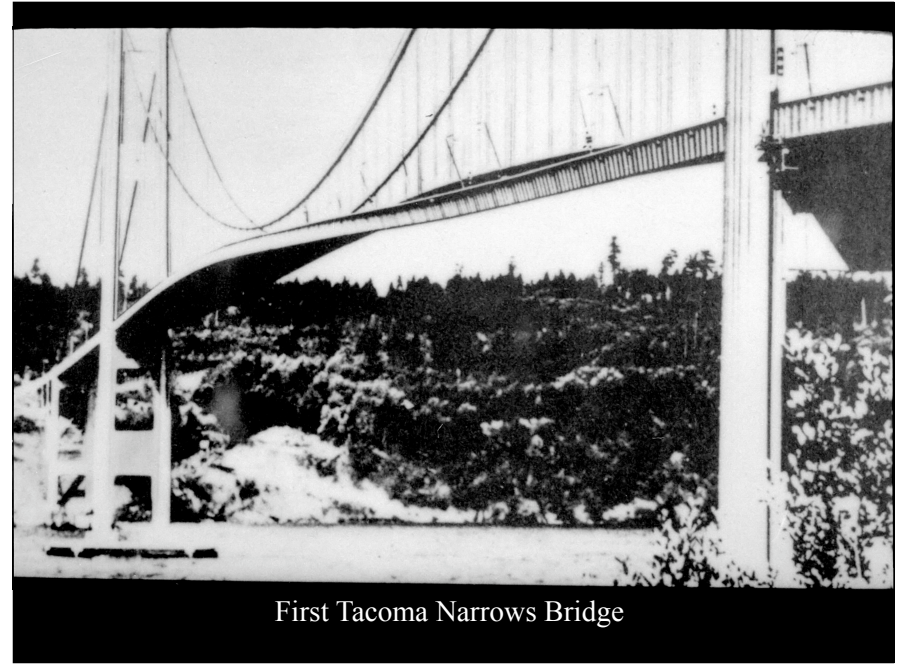
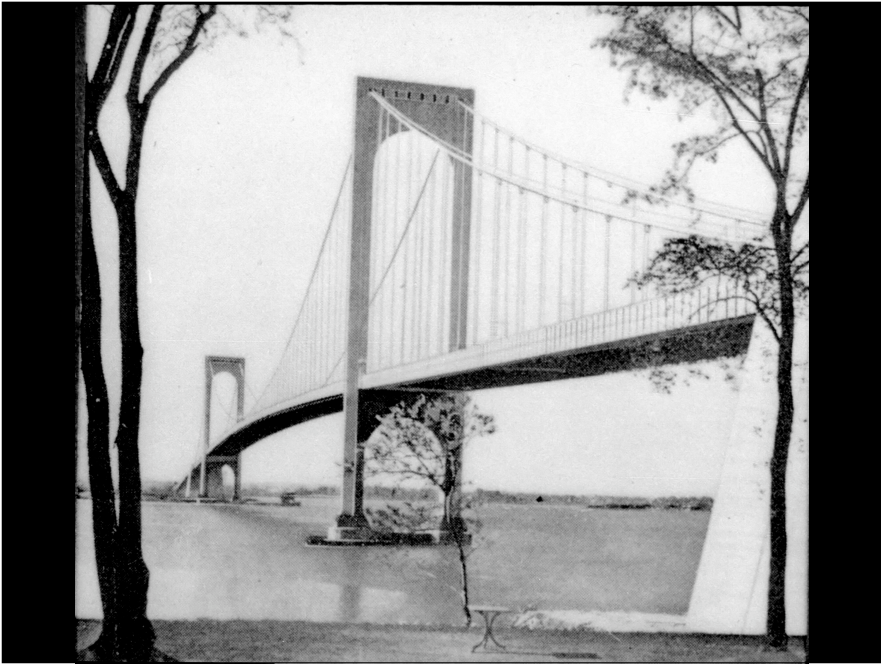




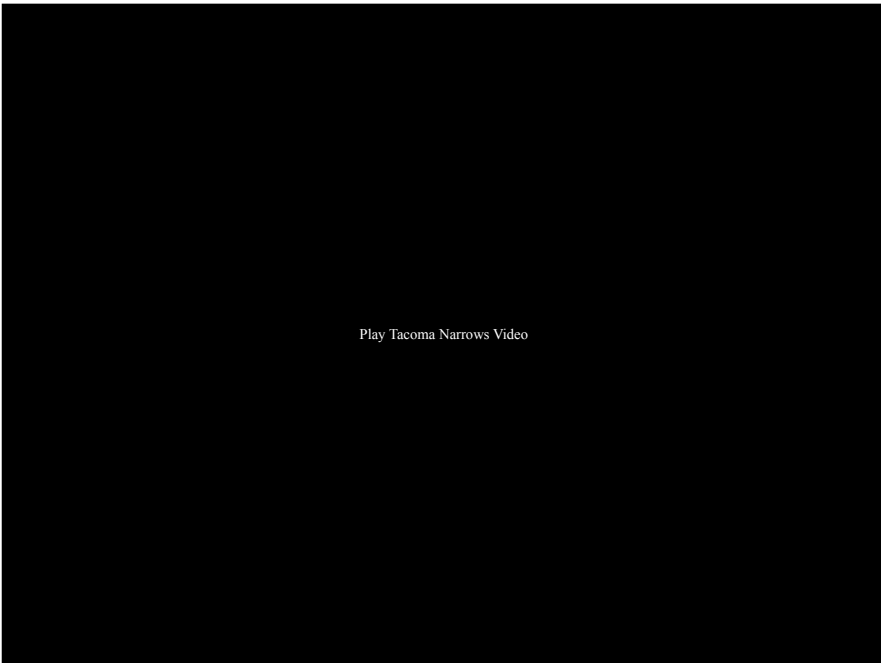
George Washington Bridge - Othmar Ammann - 3500 feet - 1931



Deer Isle Bridge - David Steinman

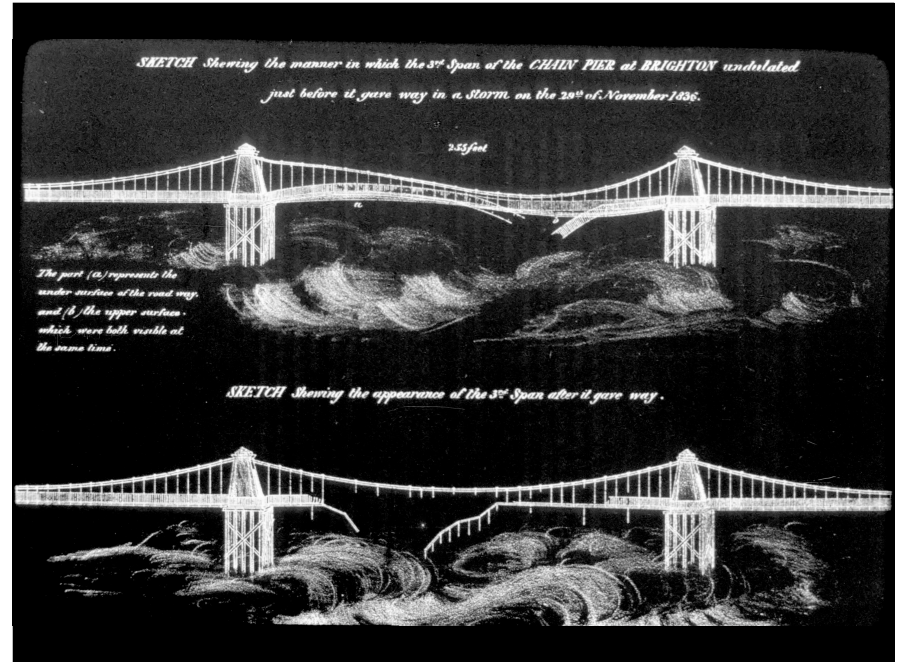
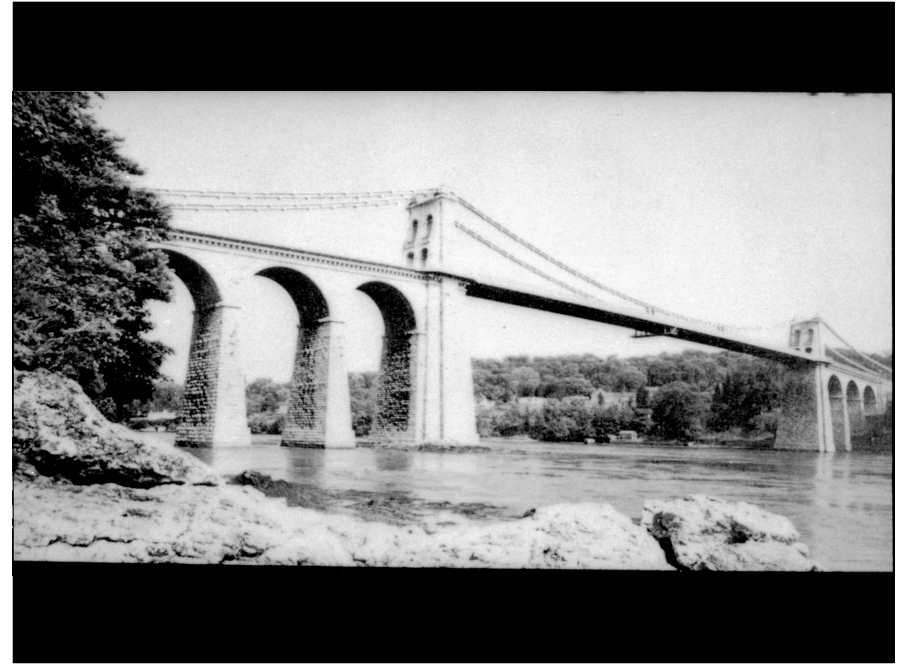


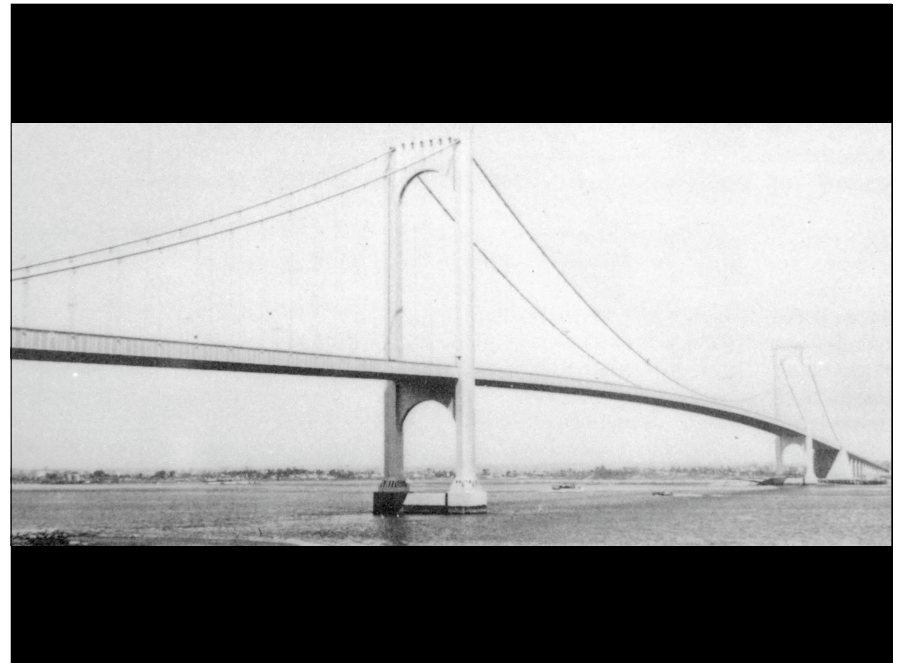
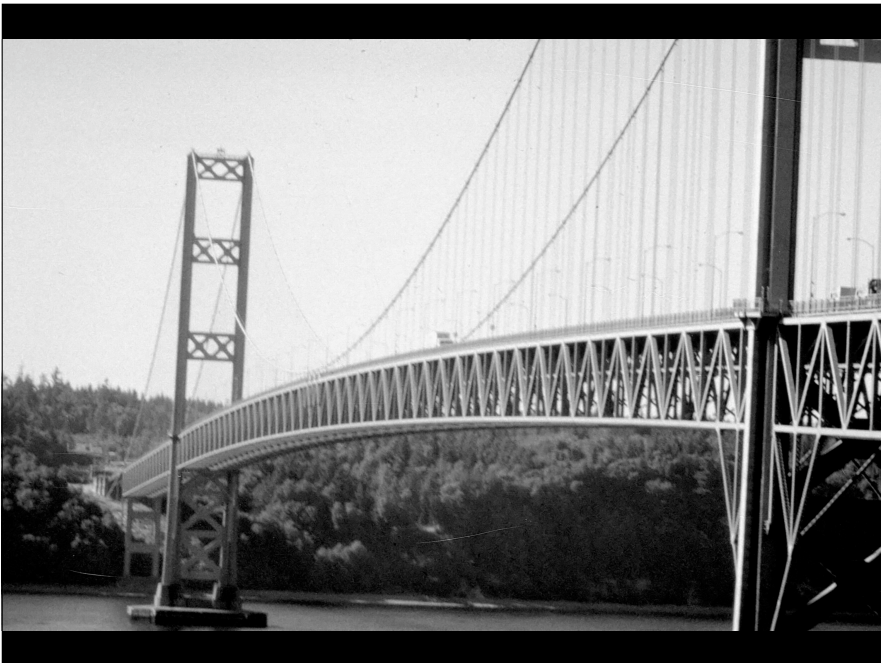
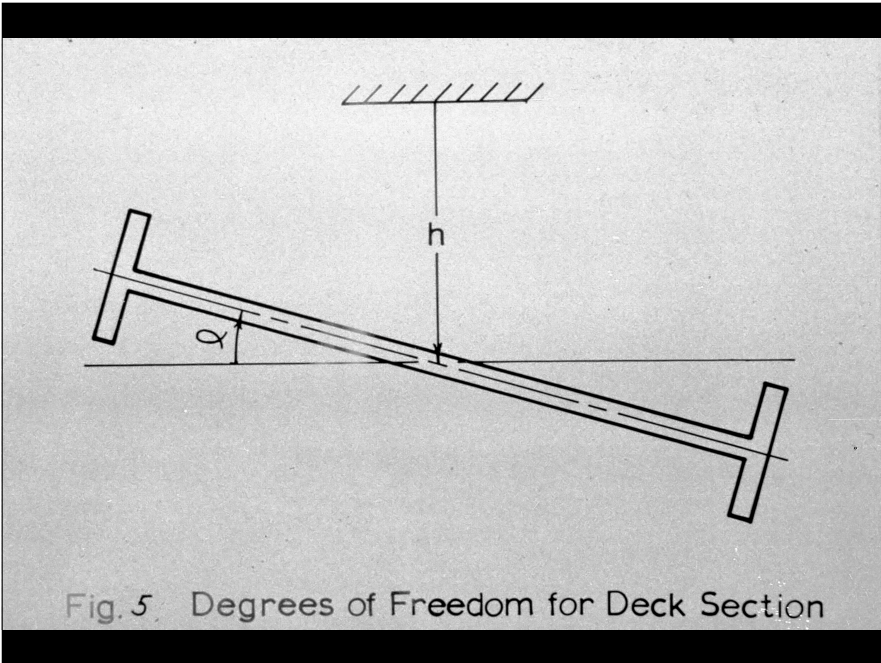
First Tacoma Narrows Bridge

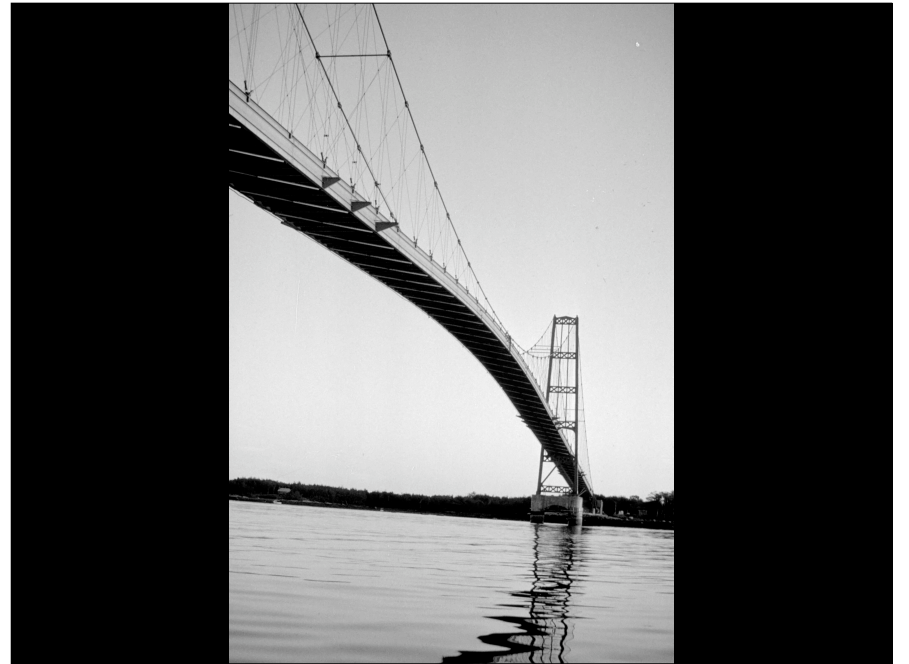


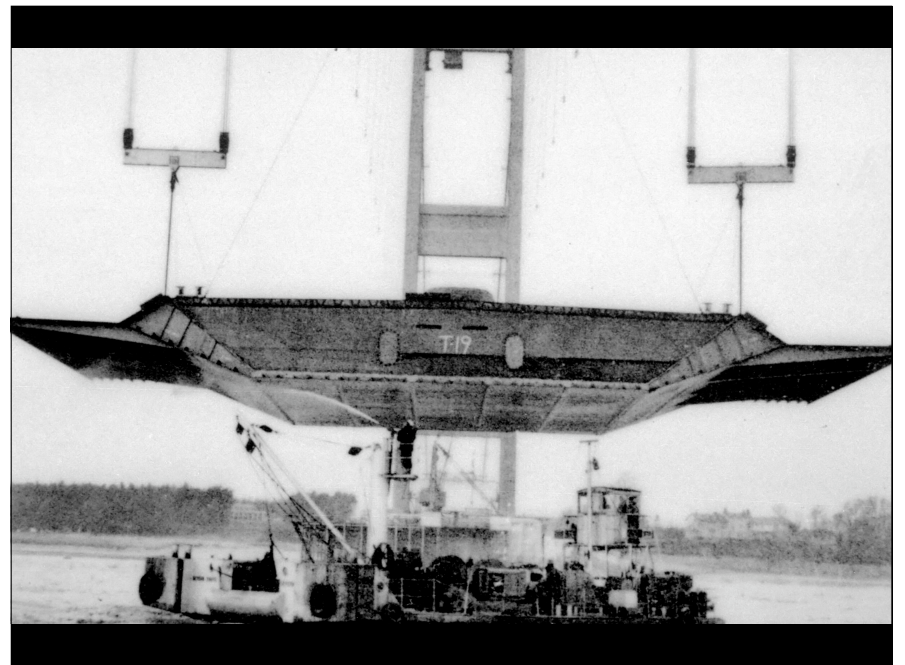
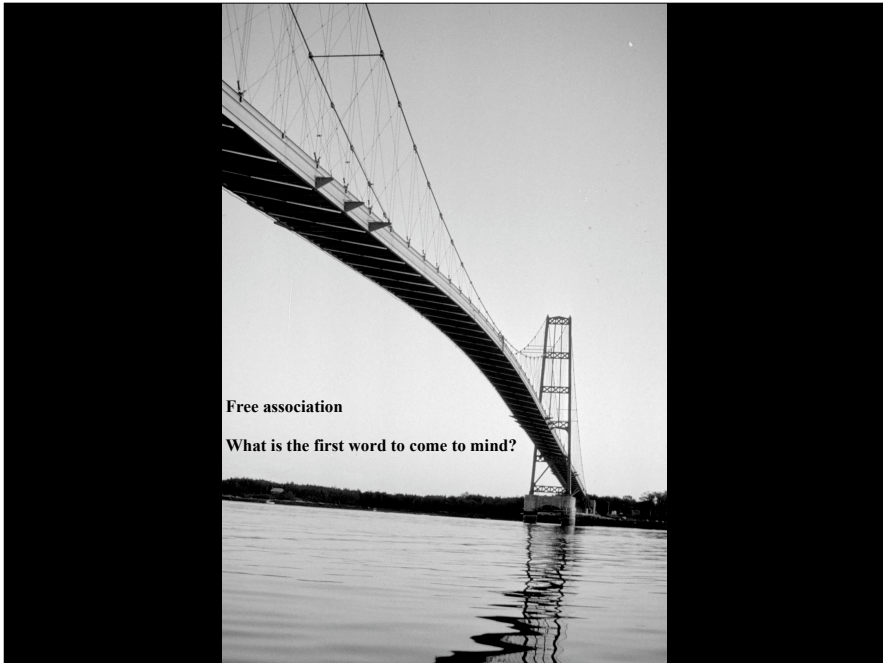


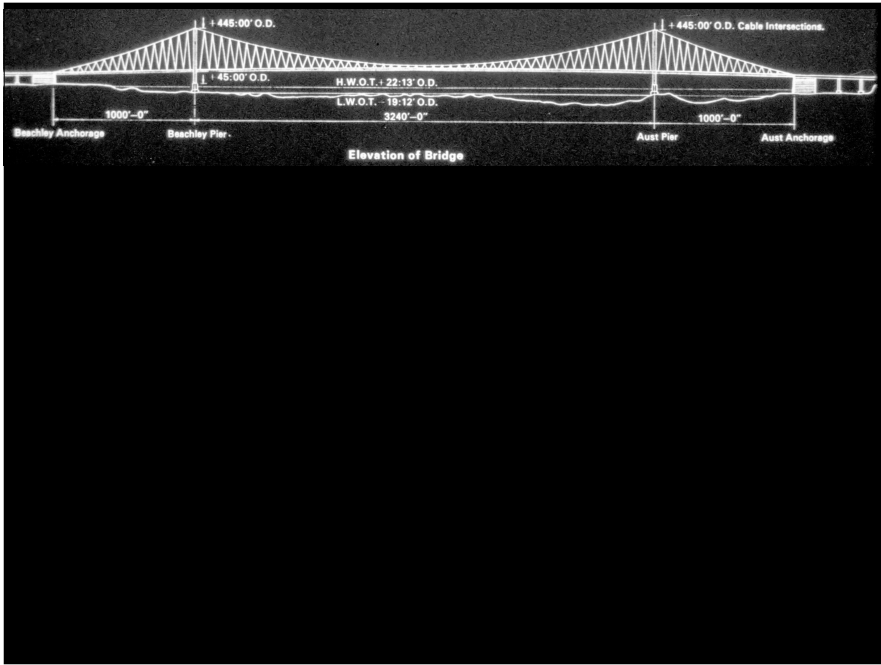
minnesota.publicradio.org



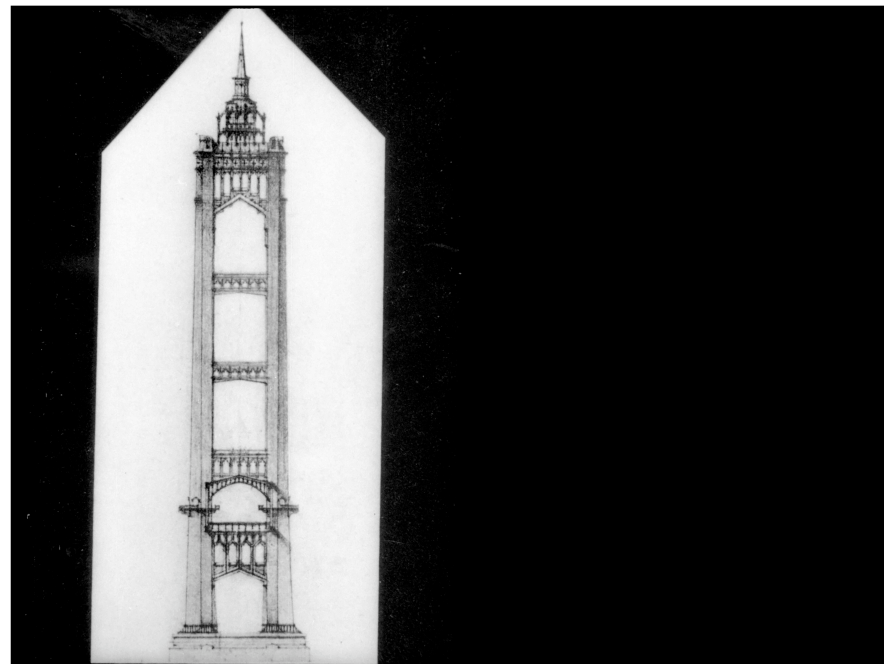
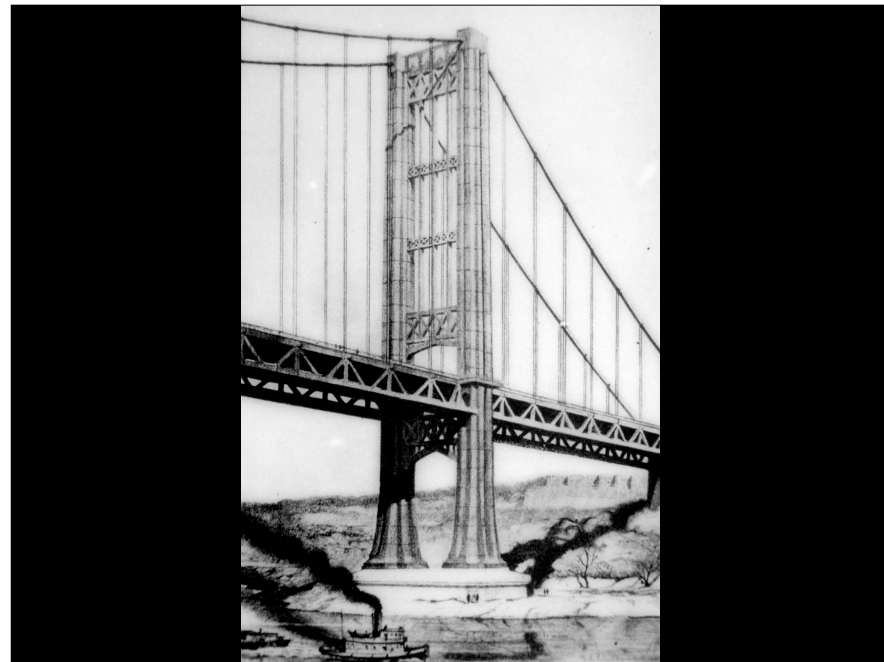


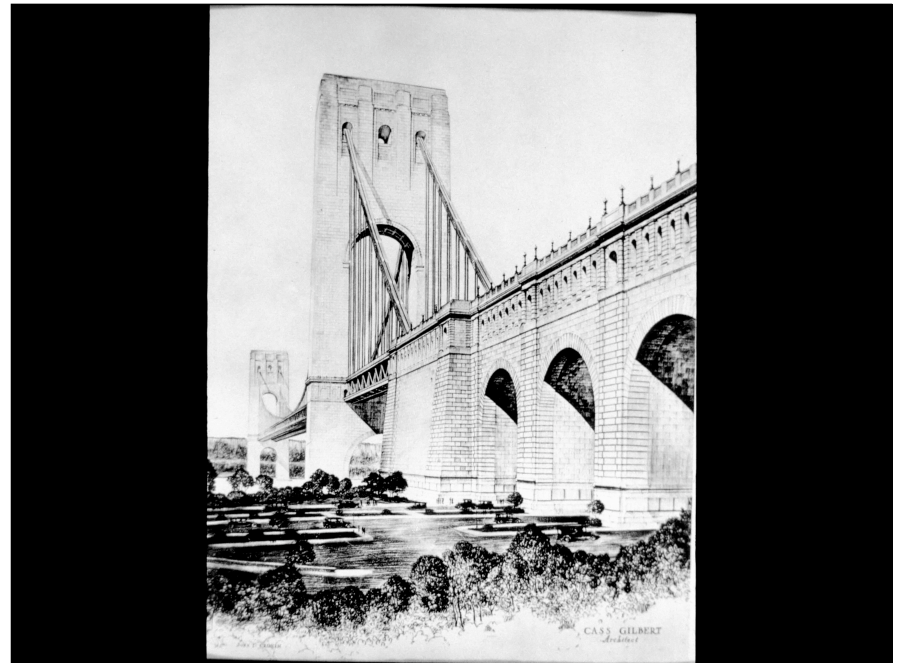
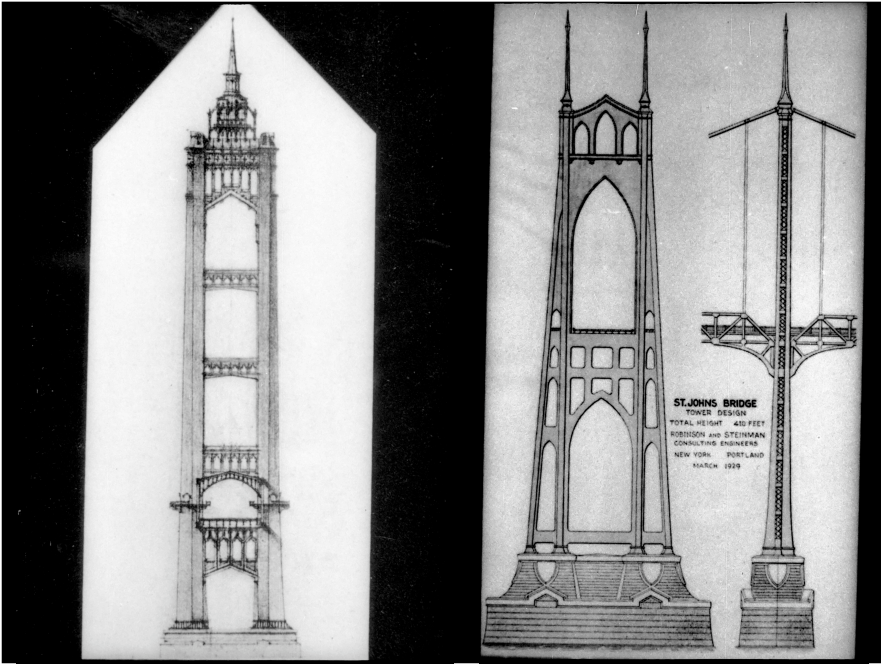






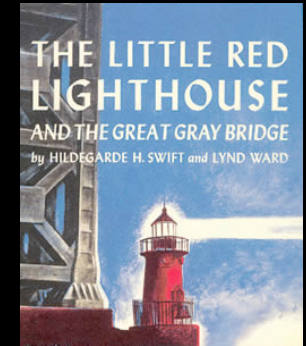
Consider the aesthetics and scientific function of towers particularly Ammann's vs. Steinman's towers



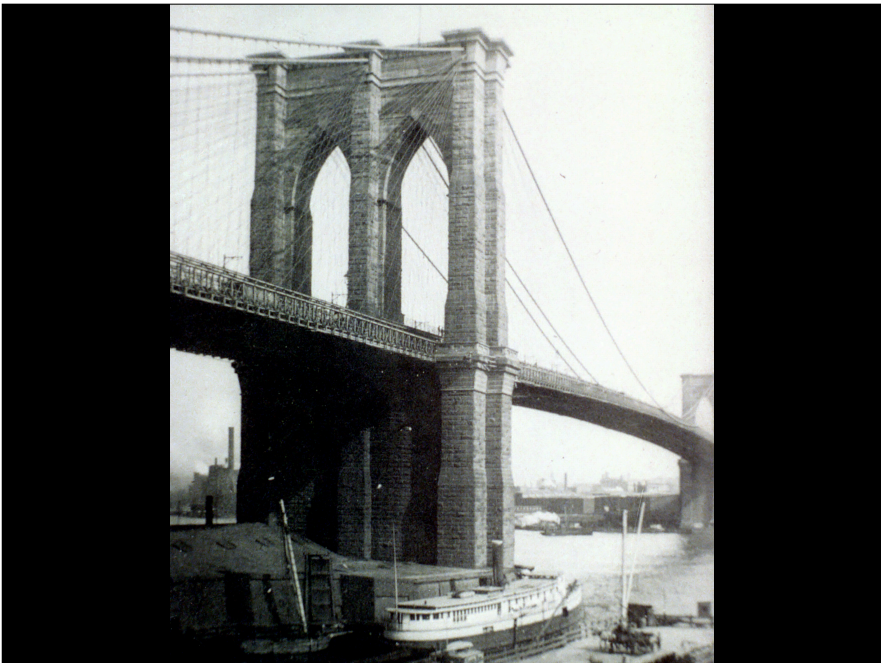
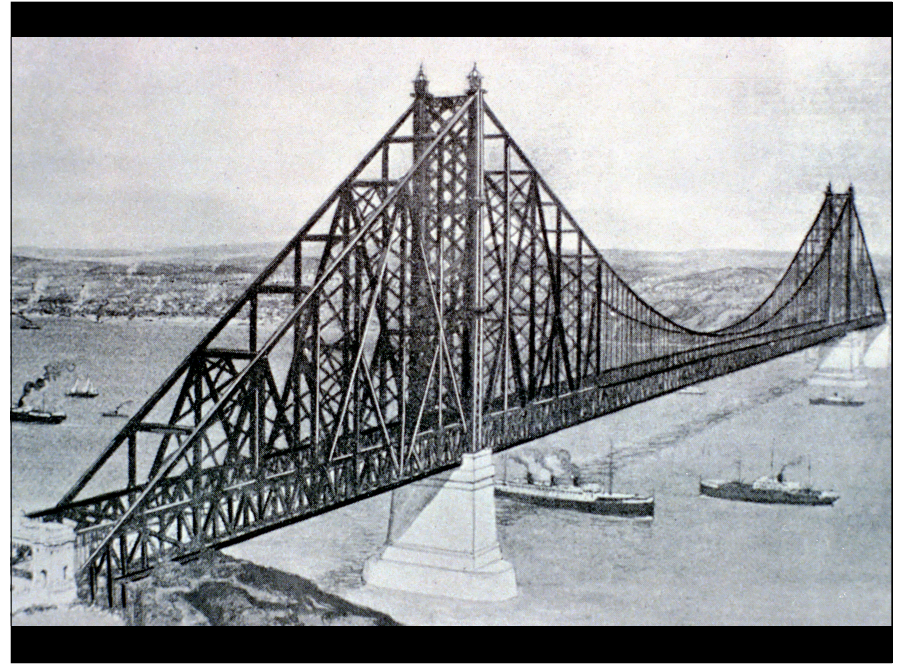


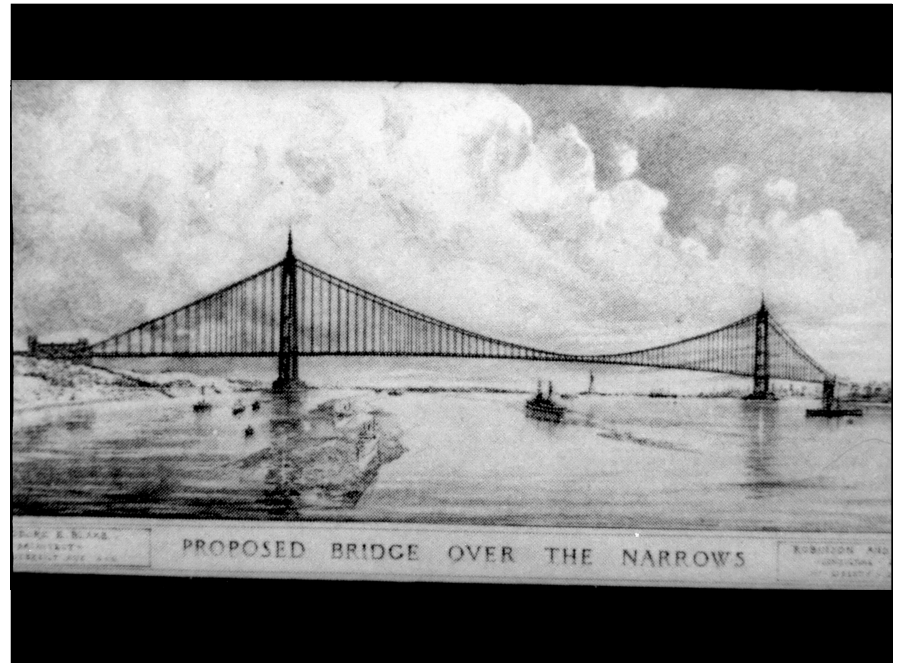
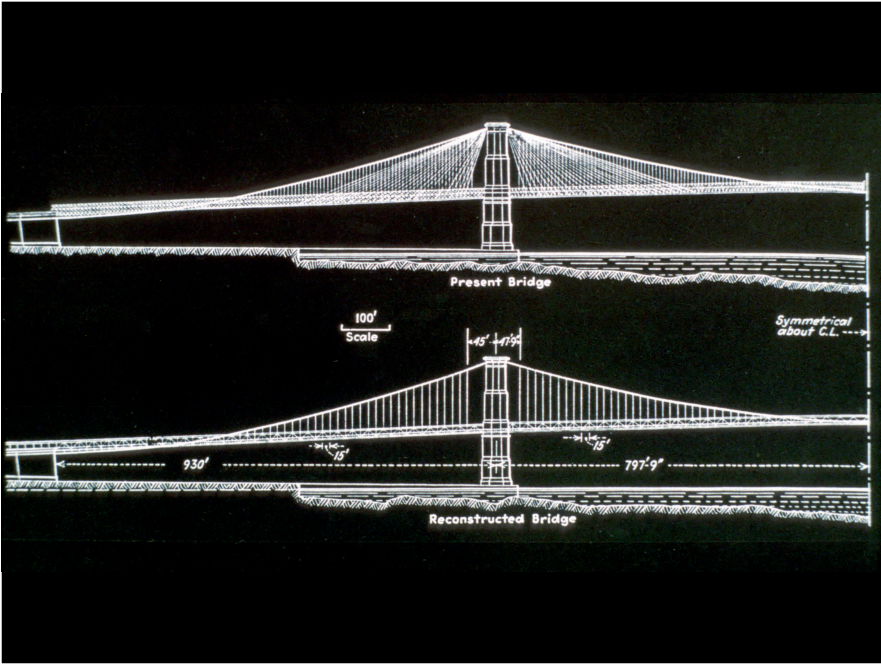


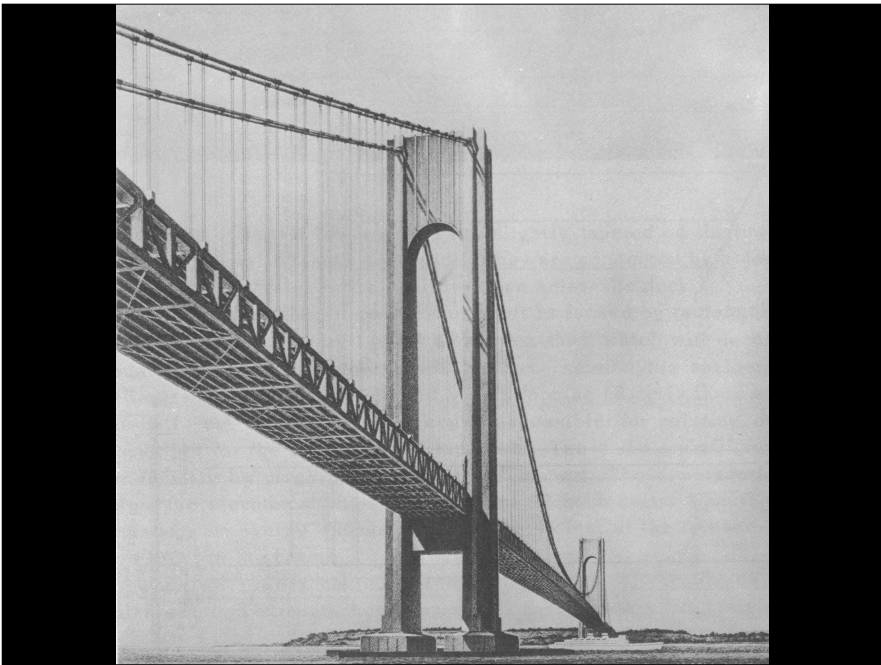
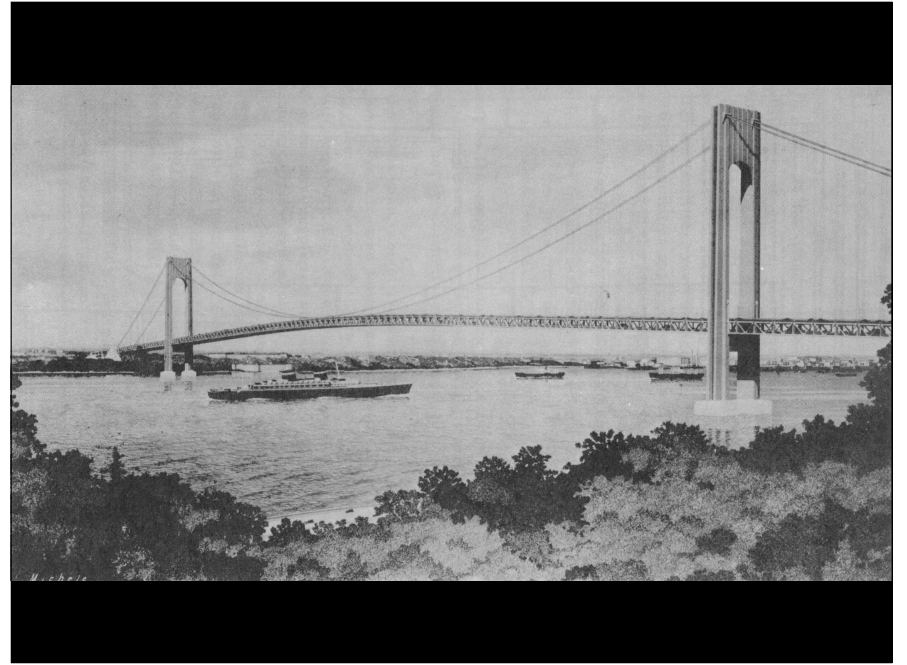
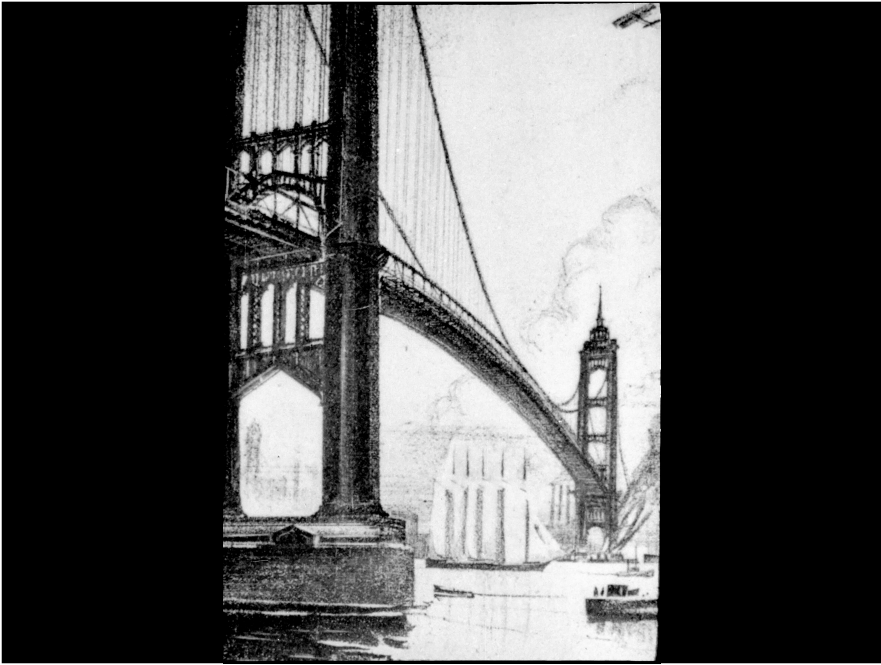
GWB Today
(NY Port Authority Site)



Golden Gate Bridge
1937
4200 feet









Othmar Ammann (1879 - 1965)

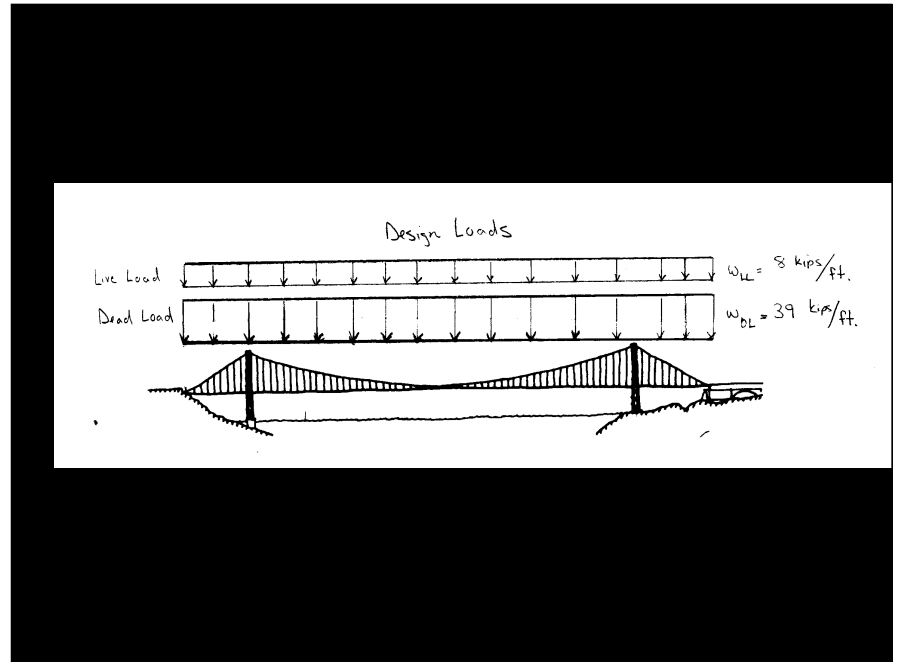
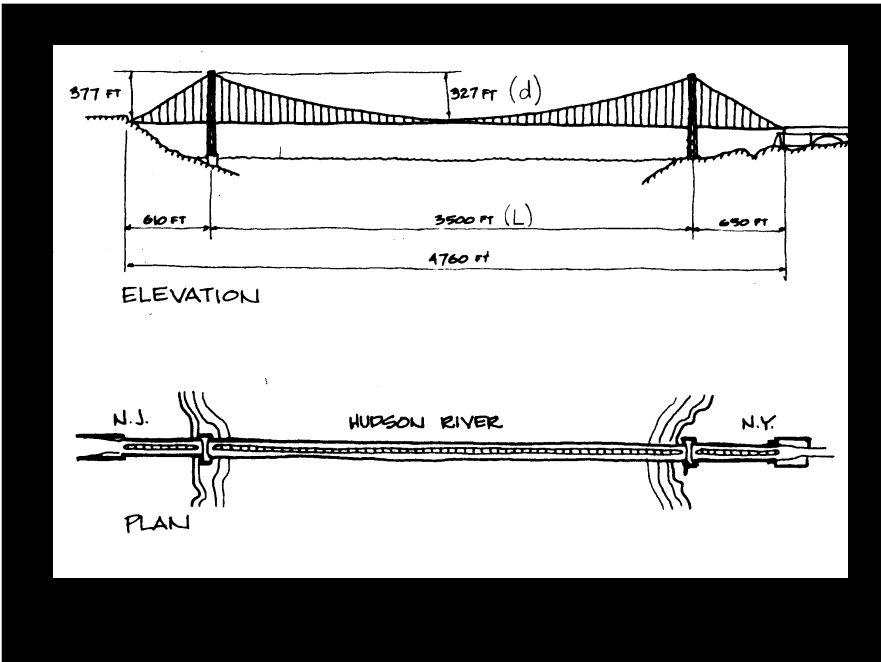
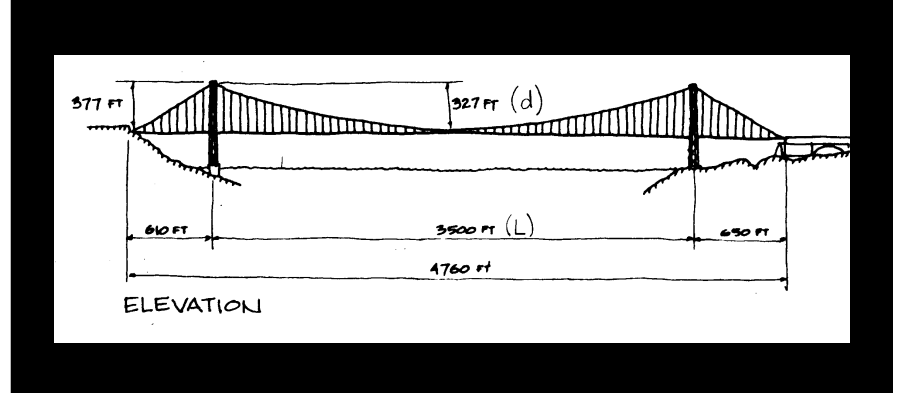
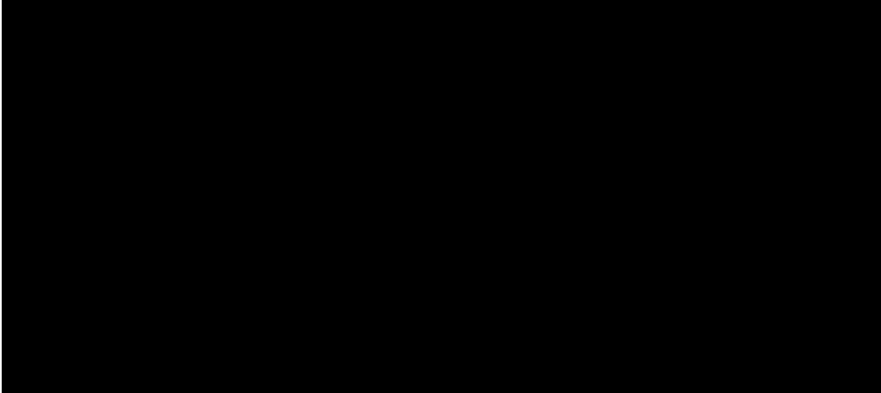
"For a half-century of distinguished leadership in the design of great bridges which combine beauty and utility with bold engineering concept and method."



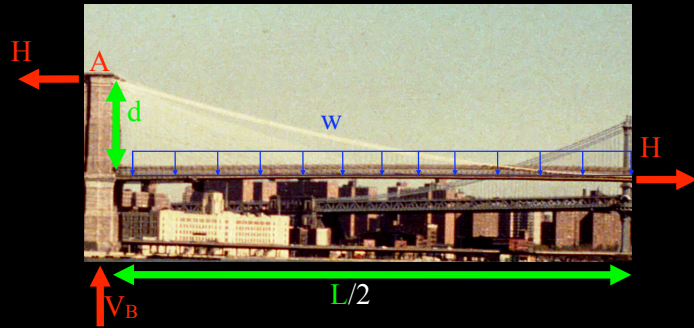
George Washington Bridge Study



<http://www.sbe.hw.ac.uk/staff/arthur/frbpc/GoldenGate%20Bridge.htm>



Cable tension



$$H = wL^2/8d$$

$$H = w \frac{L^2}{8d}$$

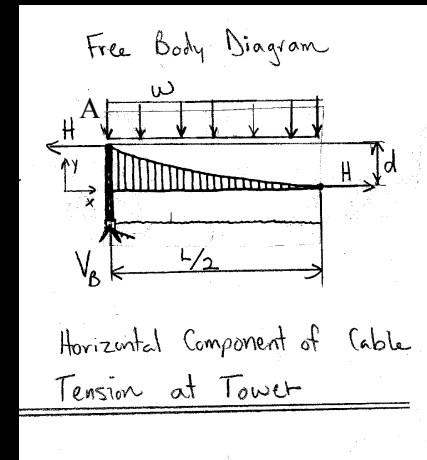
w = load

L = size

R = form

H = function

R, L transform w into H



$$H = \frac{wL}{8} R$$

$$R = \frac{L}{d}$$

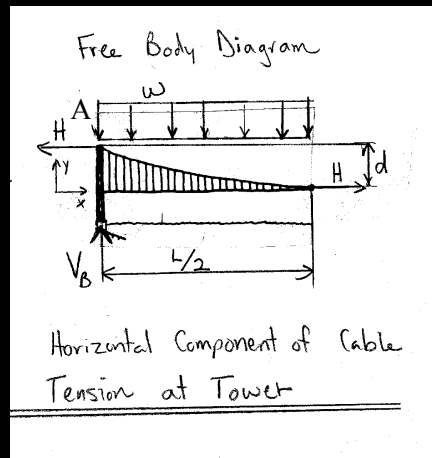
$$\text{safety factor} = \frac{\text{allowable stress}}{\text{cable stress}}$$

safety factor > 1 ?

safety factor < 1 ?

safety factor = 1 ?

efficiency versus safety



$$H = \frac{wL}{8} R$$

cable stress = $\frac{\text{cable tension}}{\text{cable area}}$

$$\sigma = H/A$$

Announcements

GWB calculation assignment due Wednesday
5:00 PM at 223 Marston

Extra help available immediately after class

Second journal assignment due Thursday
midnight