Khan and the (Chicago) Skyscraper

Themes:
Tension between architectural and structural expression in buildings
Fazlur Khan and expression of structure in buildings
Stiffness in skyscrapers
Chicago 1930-1955
“The depression that began in the 1930’s and was ended ten years later only by a massive program of military procurement was a disaster for the nation as a whole but an absolute and unmitigated calamity for Chicago. It was not only the collapse of the public and private economy; it was the Sophoclean reversal of fortune, from the expansive force of the twenties … to the impotence and hopelessness of the thirties.”

“It was 12 years after WWII ended before a new building would be built in the Chicago CBD.”

Chicago 1930-1970, Carl Condit
Chicago 1955-1970
Ludwig Mies van der Rohe

2nd Chicago School (now more Arch.)
Load Path?
Marina City

1967
Chicago Civic Center – now the Daley center
Lateral load on building frame

Frame

Braced frame
Bending Moment Diagram

Frame

Braced frame
Axial Force Diagram

Axial Force: 1st-Order Elastic, Incr #1, Applied Load Ratio = 1

Frame

Braced frame
Frame

Braced frame
Khan
1929-1982
marine
midland
bank
3 Premium for height is largely due to wind loads.
Prefabricated beam — Column modules
High rise form
Classification of tall building structural systems by Khan
Figure 4-2: Exterior structures.

Updated by Ali and Moon in 2007 paper, focusing on tall building forms with exterior stiffening structures.
Updated by Ali and Moon in 2007 paper, focusing on tall building forms with interior stiffening structures
Chicago 2000 - Today
proposed, approved, started 2006, axed 2014