

Civil Engineering History: Relevant Successes and Failures

A Comparison of Structural Design Aspects of Rana Plaza and the Philadelphia City Hall

BACKGROUND

Rana Plaza was a garment factory building in Bangladesh, and Philadelphia City Hall is a municipal building in the United States. Rana Plaza's collapse, due to a cracked corner column from a water heater explosion on the eighth floor, caused 1129 deaths and 2515 trapped workers inside.

EVIDENCE

Rana Plaza:

- columns, floors, and foundation all had concrete poured in-situ
- no protection from external loads

Philadelphia City Hall:

- lateral movement was allowed in column attachment and reinforced in iron frame

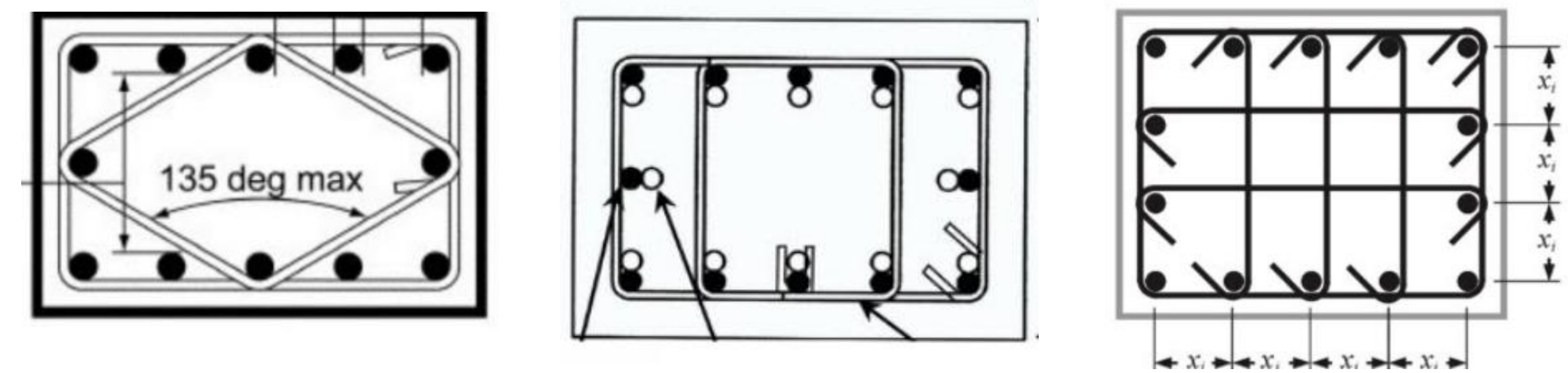
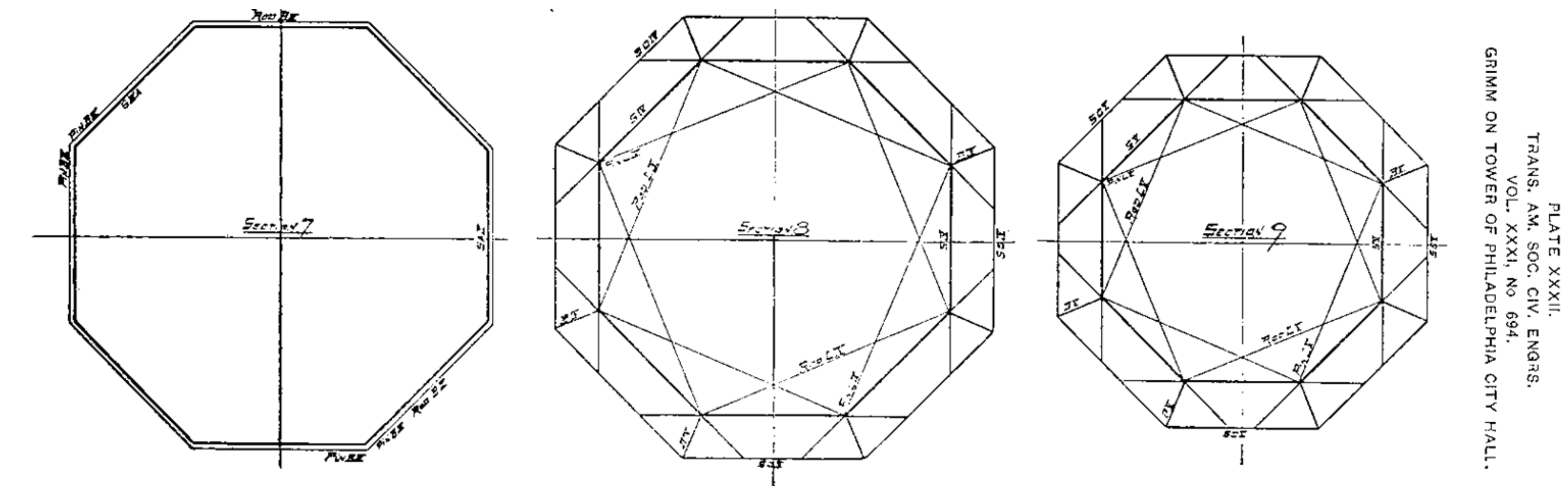


Image Source: Civil Engineering by Shraavan 2022 (above), Grimm 1894 (below)



Rana Plaza	Eight stories	Rigid connections	No lateral reinforcement
Philadelphia City Hall	Forty stories	Box girders/anchor bolts	Rings and diagonals

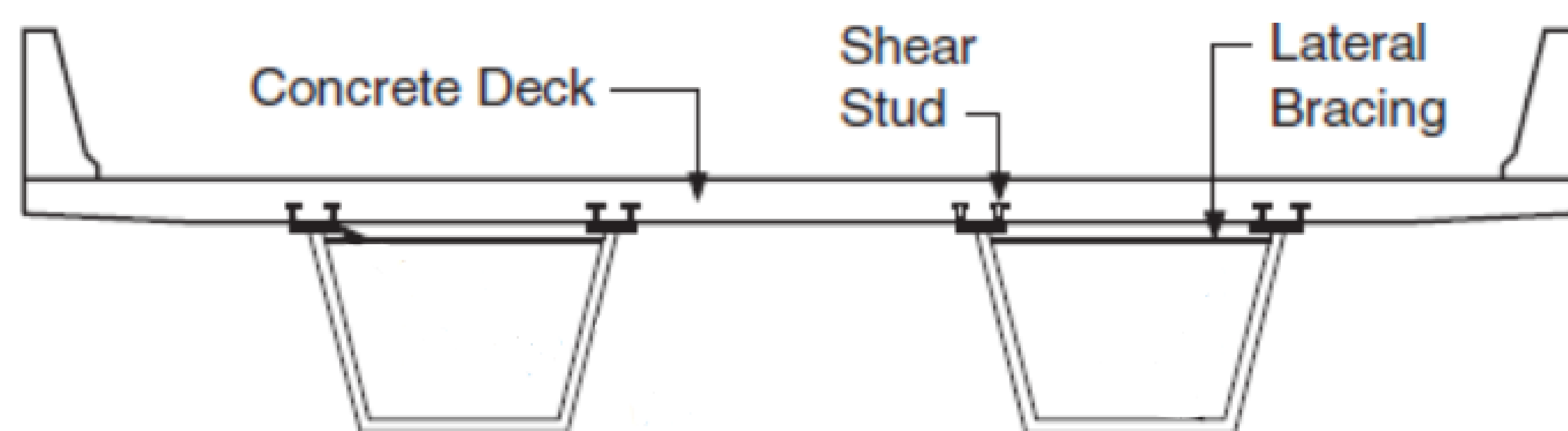


Image Source: Newman 2021

CONCLUSION

Technical structural differences between column-to-foundation attachments and direction of steel reinforcement determined the fate of these two structures, and the usage of box girders and steel rings could have been applied to prevent Rana Plaza's collapse. This is important in light of the fatalities that occurred.