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 bui in Bangladesh, and Philadelphia City F a municipal building in the United State Rana Plaza's collapse, due to a cracke corner column from a water heater explosion on the eighth floor, caused 1 deaths and 2515 trapped workers insid

Hall

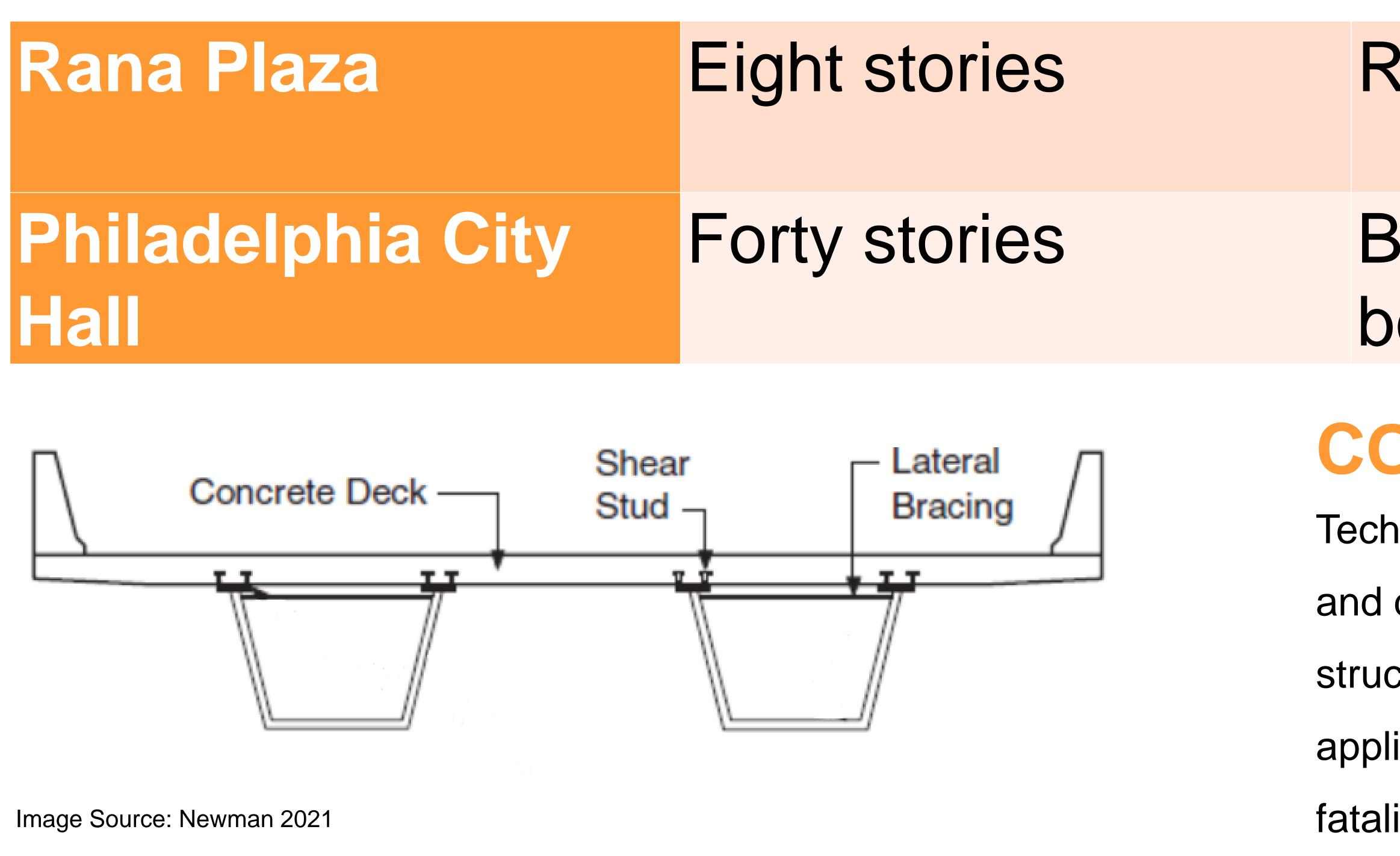


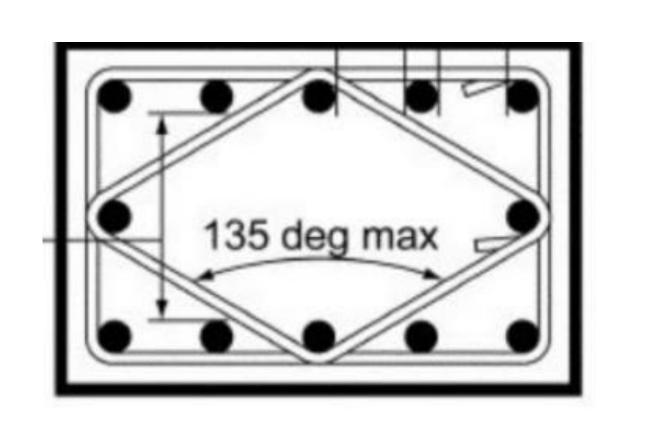
Image Source: Newman 2021

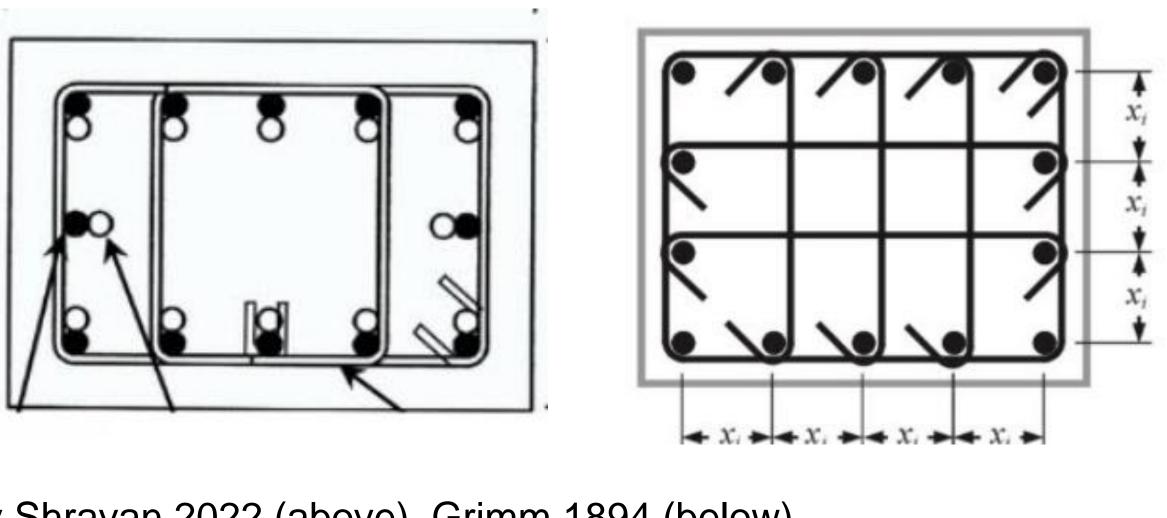


EVIDENCE

ilding	Rana Plaza:
Hall is	 columns, floors, and foundatio
tes.	had concrete poured in-situ
ed	 no protection from external loa
	Philadelphia City Hall:
1129	 lateral movement was allowed
ide.	column attachment and reinfo
	iron frame

Linnea Johnsen ljohnsen@vols.utk.edu CE 205 OP02 *reference WA02 for further reference info



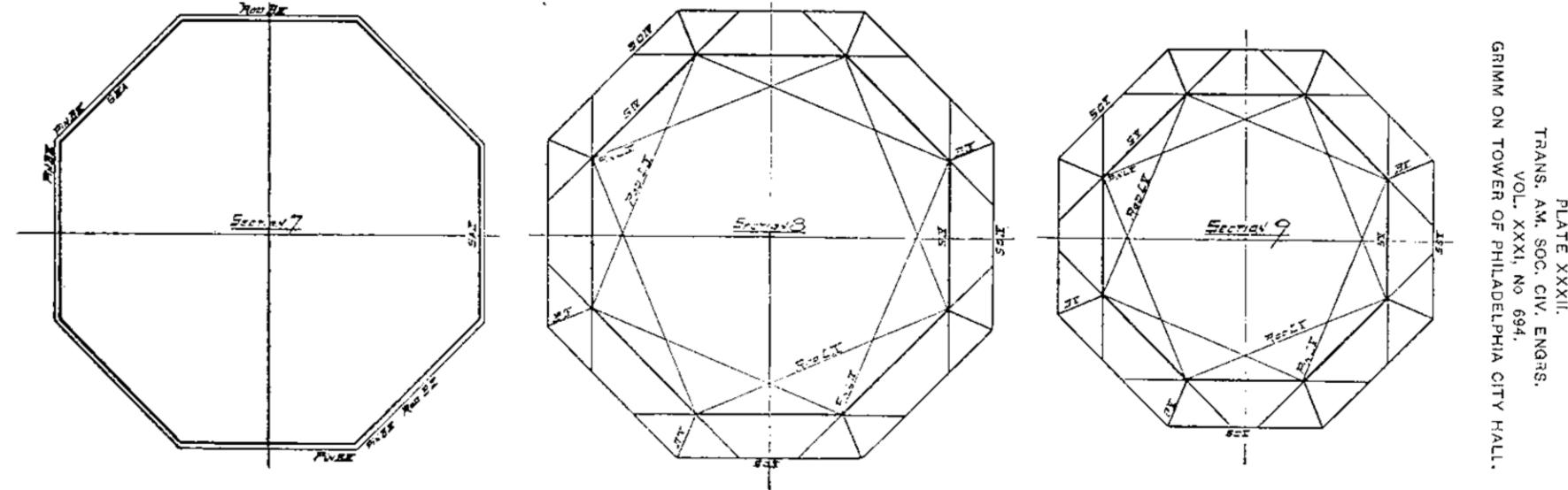


on all

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

ads

d in prced in



Rigid connections

Box girders/anchor bolts

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.

*Credit: Grimm, C.R. 1984. "The Tower of the New City Hall at Philadelphia, PA." Islam, R., Azad, M.A.K., Sinha, A., Lixon, M. 2017. "An Investigation of Recent Building Collapses around the World with Special References to Rana Plaza." Manzur, T., Mahmood M.H., Baten, B., et.al. 2020. "Assessment of Progressive Collapse Proneness of Existing Typical Garment Factory Buildings in Bangladesh."

Newman, A. 2021. Structural Renovation of Buildings: Methods, Details, and Design Examples. 2nd Ed.

No lateral reinforcement Rings and diagonals