Comparison of Shear Wall and Core Wall Systems in Multi-Story RC Buildings

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***Abstract*—This paper presents a comparative seismic analysis of reinforced concrete buildings using shear wall and core wall systems. Models of G+10, G+15, and G+20 buildings were analyzed using ETABS as per IS 1893:2016. Results indicate that core wall systems reduce storey displacement and drift significantly compared to shear wall systems. Central core configuration provides better torsional resistance and stiffness.**

***Index Terms*—Shear Wall, Core Wall, ETABS, Seismic Analysis, Storey Drift**

I. INTRODUCTION

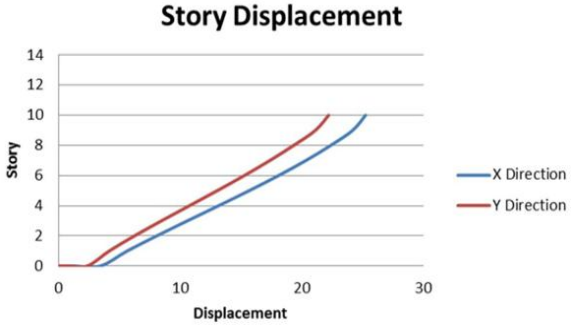
Tall buildings are increasingly subjected to lateral loads such as earthquakes and wind forces. Structural systems like shear walls and core walls are commonly used to enhance stability and reduce drift.

II. METHODOLOGY

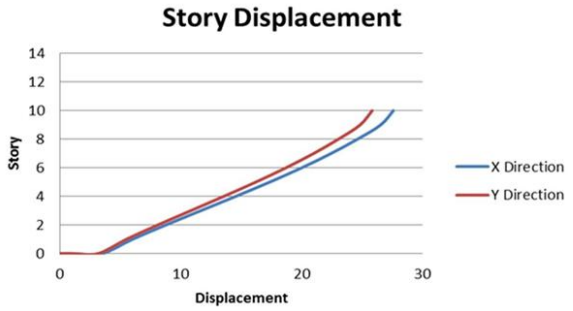
Three models were developed in ETABS:
Model 1: Shear wall system
Model 2: Core wall system
Model 3: Bare frame system
Analysis was carried out using IS 1893:2016, IS 456:2000 and IS 13920:2016.

III. RESULTS AND DISCUSSION

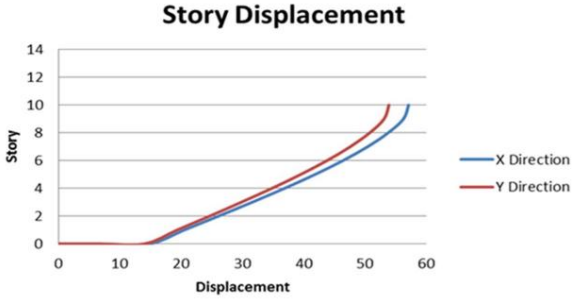
Fig 1: Storey Displacement Graph



Displacement of 10 story with cw

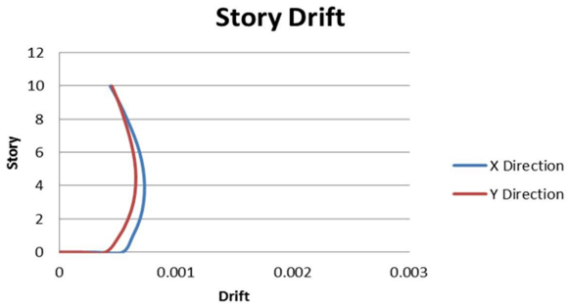


Displacement of 10 story with sw

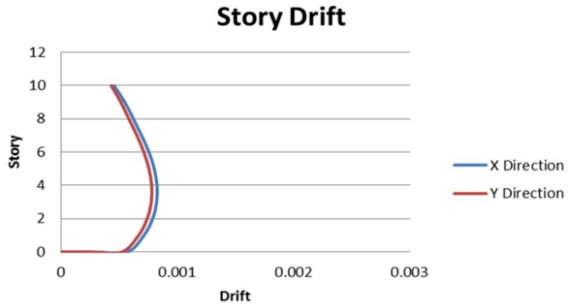


Displacement of 10 story concrete frame building

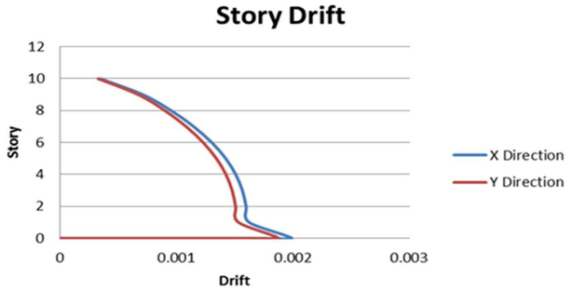
Figure- Displacement of 10 story Reinforced concrete building



Relative drift of 10 story with cw

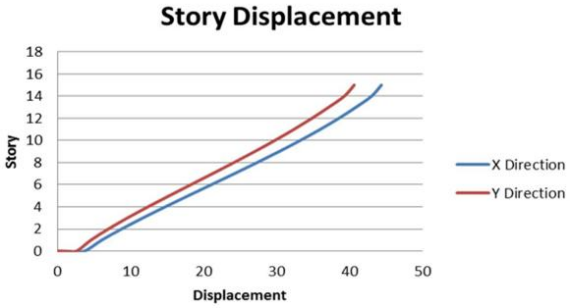


Relative drift of 10 story with sw

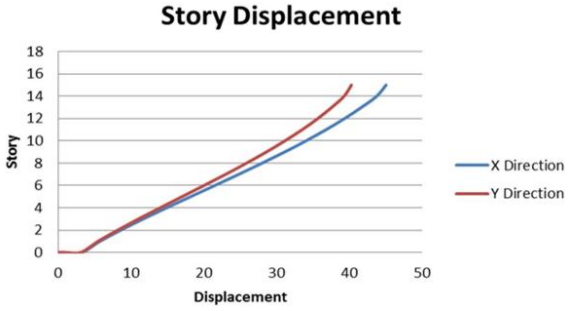


Relative drift of 10 story concrete frame building

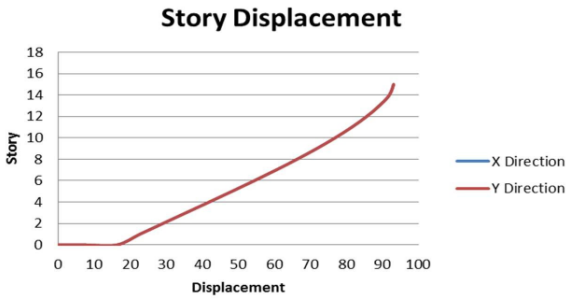
Figure - Relative drift of 10 story Reinforced concrete building



Displacement of 15 story with cw

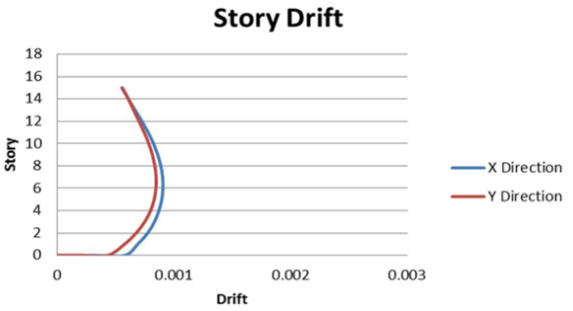


Displacement of 15 story with sw

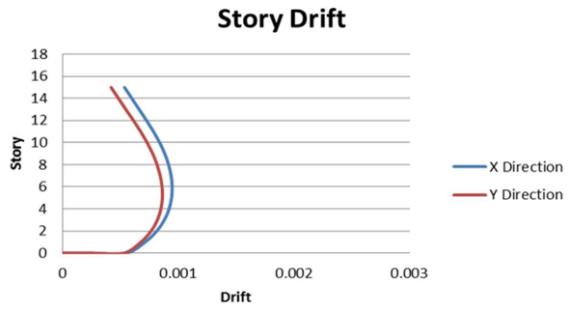


Displacement of 15 story concrete frame building

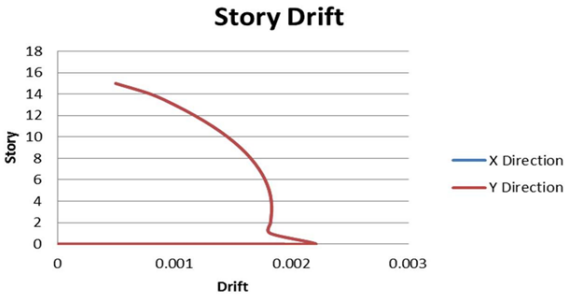
Figure - Displacement of 15 story Reinforced concrete building



Relative drift of 15 story with cw

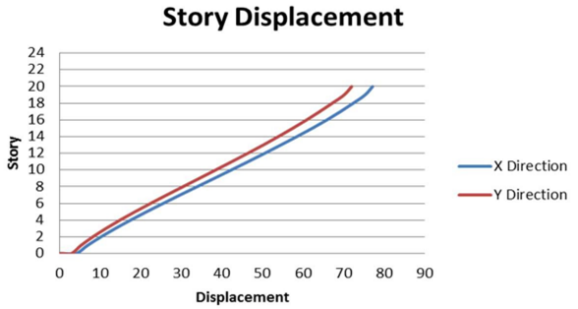


Relative drift of 15 story with sw

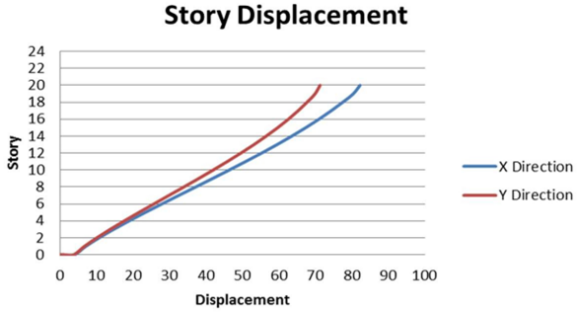


Relative drift of 15 story concrete frame building

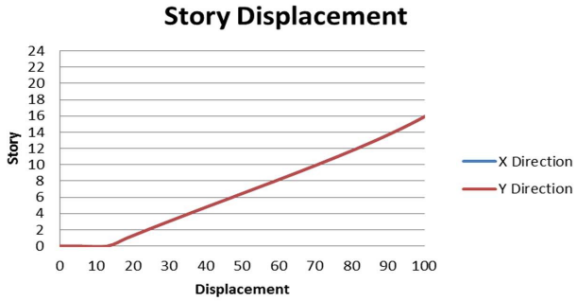
Figure - Relative drift of 15 story Reinforced concrete building



Displacement of 20 story with cw

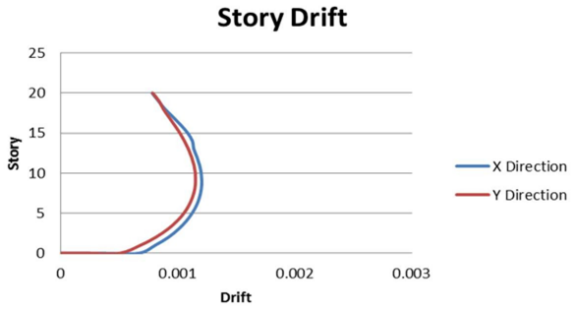


Displacement of 20 story with sw

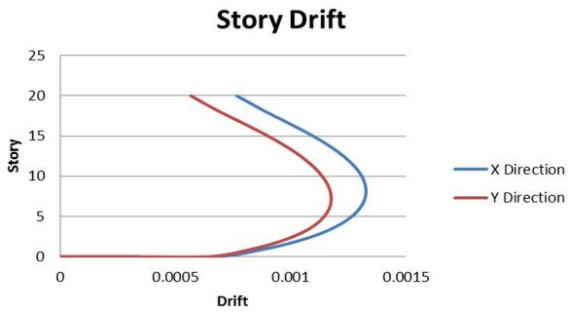


Displacement of 20 story concrete frame building

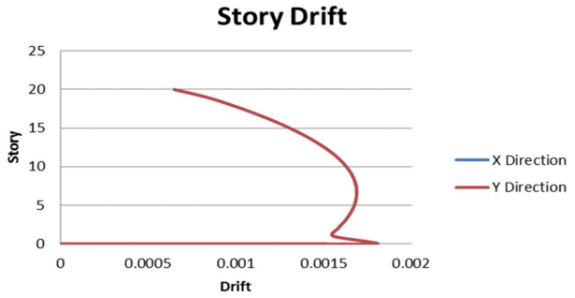
Figure6.28 Displacement of 20 story Reinforced concrete building



Relative drift of 20 story with cw



Relative drift of 20 story with sw



Relative drift of 20 story concrete frame building

Figure - Relative drift of 20 story Reinforced concrete building

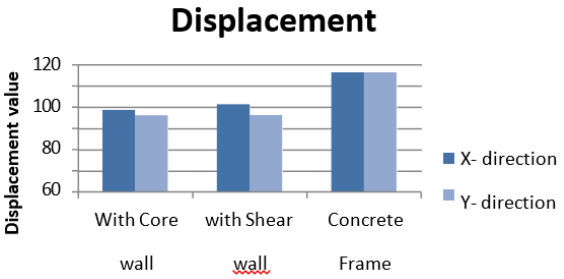


Figure - displacement for comparison of different building type of 20 story

Fig 2: Storey Drift Graph

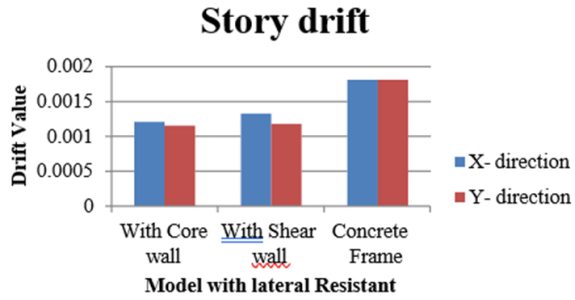


Figure - Maximum drift for comparison of different building type of 20 story

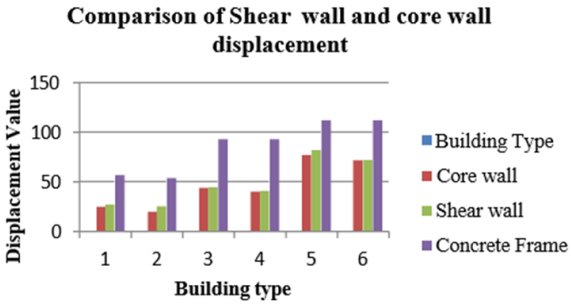


Figure - Comparison of shear wall and core wall displacement

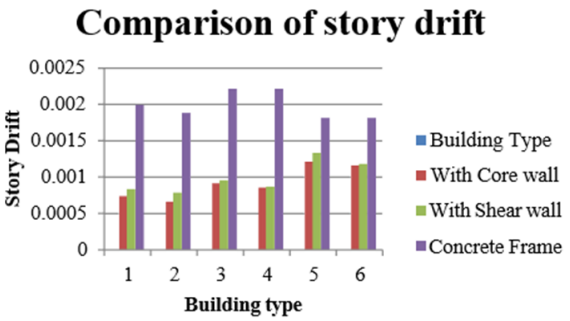


Figure - Comparison of story drift

Results show that maximum displacement occurs at top storey. Core wall system reduces displacement and drift significantly. Central core wall configuration provides better performance compared to edge locations.

IV. CONCLUSION

Core wall systems are more efficient in resisting lateral loads and controlling drift. Central placement of core wall is recommended for high-rise buildings.

REFERENCES

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[3] IS 13920:2016 Ductile Detailing of RC Structures
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[6] Nagrale et al., 2015
[7] Reddy et al., 2024