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Structural Schemes for Lateral Load Resistance

Systèmes structuraux pour résister à des charges latérales

Tragsysteme für horizontale Einwirkungen

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Preamble

Majority of institutional buildings in India and New Zealand are moderately tall (6 to 10 stories). The resistance to lateral load in them are provided by rigid jointed frames, shear walls, prefabricated shear walls or frames infilled with bricks. This paper summarises the findings of experimental investigation of these systems subjected to lateral cyclic loads. The Systems considered are shown in Figure 1.

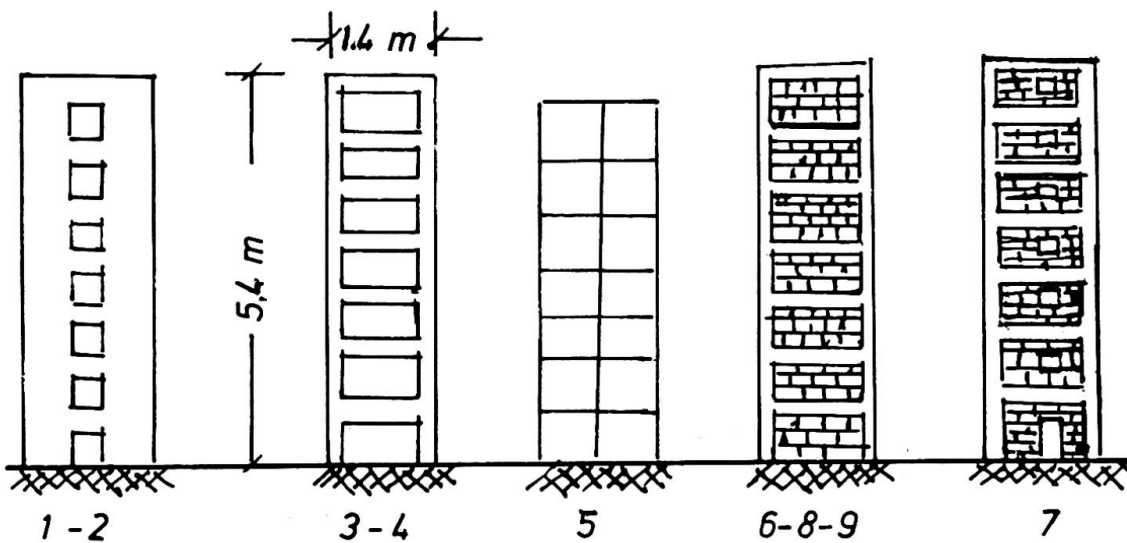


Fig.1 Systems Considered

Philosophy

The system efficiencies were studied with respect to

- * Strength
- * Stiffness
- * Ductility
- * Preferred sequence of failure and damage control.

**Efficiency**

The efficiency of the system is worked out using the equation

$$\eta = \frac{\mu P_u}{\mu_f P_{us}} \times 100$$

Where

- η = Efficiency of the system
- μ = Ductility of the system
- P_u = Ultimate load of the system
- μ_f = Ductility of the rigid jointed frame
- P_{us} = Ultimate load capacity of shear wall

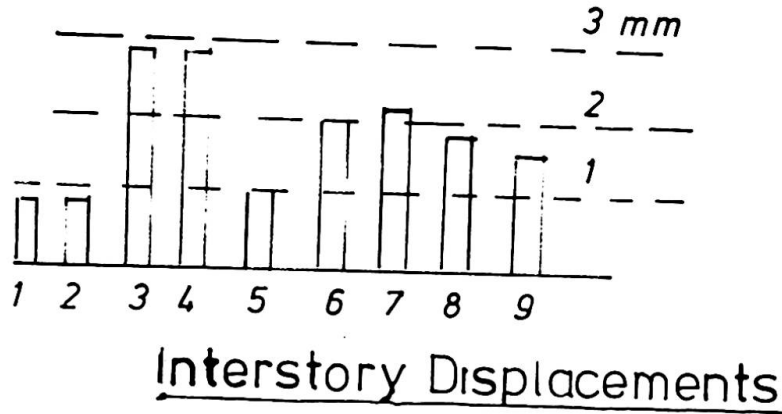
Results

Fig.2 Results of tests on quarter full size seven storey models

Conclusion

The table summarises the relative efficiency of the systems.

System Number	Cumulative Ductility	Ultimate Load (P_u) kN	Efficiency %
1	50	237	29.6
2	85	300	63.7
3	90	72	16.2
4	100	70	17.5
5	80	312	62.4
6	12	147	4.4
7	18	131	5.9
8	20	97	4.8
9	16	161	6.4

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