

Design of apartment building

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Abstract :Design of Apartments building have been analysed for years on the assumption that whole of the load is applied on the complete frame. Looking in to the mode of incidence of the load, it is evident that part of the load is applied in stages as the construction of the frame proceeds, whereas the remaining part of it is imposed on completion of the frame.

The main factors affecting the limit state of serviceability of building are:-

1. Creep and shrinkage
2. Span and cross section of the structural members
3. Cycle time for floor to floor construction and strength of concrete

In present paper the main factor which we are considering is Cycle time for floor to floor construction and strength of concrete.

Due to architectural requirements some of the columns are designed as floating columns which rests on the transfer girder which intern rests on the shear walls in the multistoreyed building. Two cases have been considered for the study and comparison. Whereas in Case 1 the building will be analysed as a whole for the subjected loading (DL, LL, WL, SL) by using ETABS software and in Case 2 the building will be analysed with reference to the construction sequence or staged construction for the subjected loading by using ETABS software.

OBJECTIVE

- 1) Analysing the multistoreyed building as a whole for the subjected loading (DL, LL, WL, SL) using ETABS software.
- 2) Analysing the multistoreyed building with reference to the construction sequence or staged construction using ETABS software.
- 3) Comparison of the variation in deformations and forces for the

transfer girders and the frames which is above the transfer girders.

2.1 SCOPE:

Deformations and forces for the transfer girders and the frame which is above the transfer girders for **Twenty Two Storeyed building** with reference to the conventional analysis and construction sequence analysis.

REVIEW OF LITERATURE

Chakrabarti, Nayak and Agarwala had done the analysis on effect of sequence of construction in the analysis of multistoreyed building frame and concluded that the

simulation of sequence of construction in the analysis leads to considerable variations in the design moments obtained by conventional one step analysis. It is therefore, necessary that for multistoreyed

building frame the effect be taken into consideration.

Vafai, Ghabdian and Estekanchi had done the analysis on calculation of creep and shrinkage in tall concrete buildings using nonlinear staged construction analysis and recommended that a nonlinear stage construction analysis can be undertaken for regions with 60% relative humidity or less. In the design stage, it is better to avoid sudden changes in the cross section geometry or rebar percentages in adjacent members. If nonlinear staged construction analysis is to be used, critical values of relative humidity, rate of construction etc should be applied.

Kim and Shin had done the analysis on column shortening analysis with lumped construction sequences and concluded that saw-tooth shape of post-installation shortening can be modified by curve fitting and the modified shortenings show good agreement with the exact values.

Yip and Smith had done the analysis on serviceability performance of prestressed concrete buildings taking into account long-term behavior and construction sequence and concluded that modeling of construction sequence is important for columns as the sequential jacking of floors increases the column moments especially at the lower part of the structure. The column moments are significantly affected by the boundary conditions at the foundation.

CONCLUSION

It is evidenced that simulation of sequence of construction in the analysis leads to considerable variations in deformations and design forces obtained by conventional analysis.

Rosenboom, Paret and Searer had done the analysis on chronological construction Sequence, creep, shrinkage, and Pushover Analysis of an Iconic 1960s Reinforced Concrete Building and concluded that Expanding a non-linear static analysis to include time-dependent material properties,

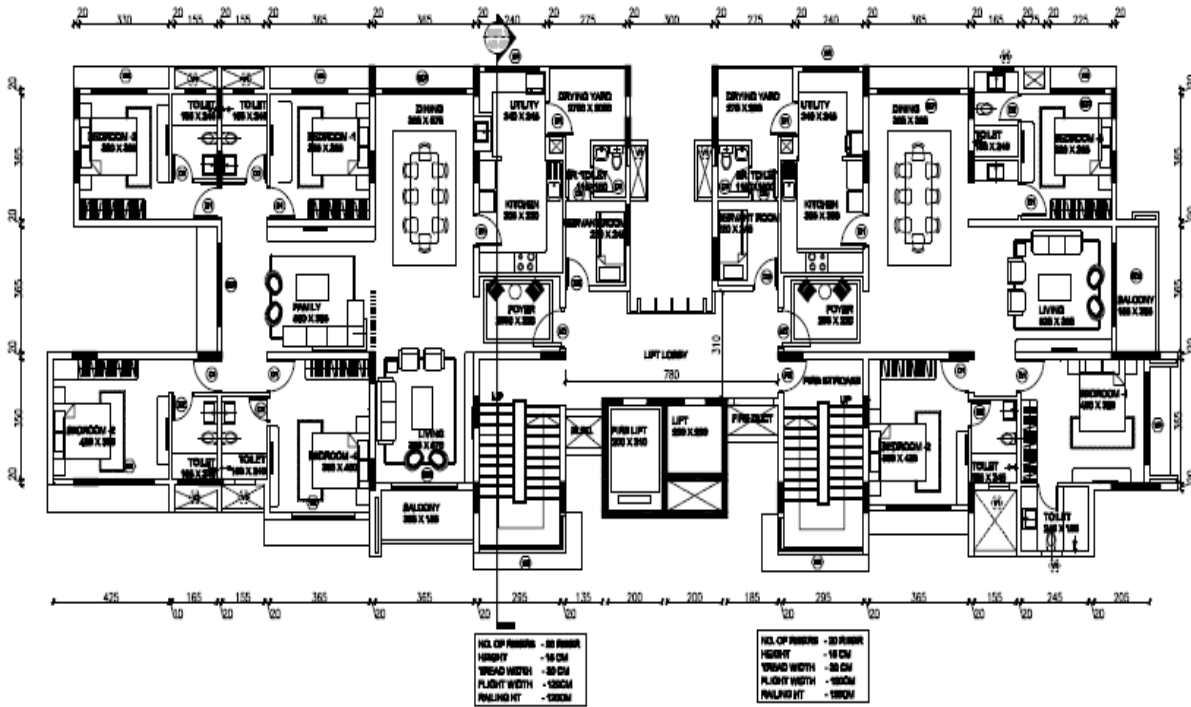
construction sequence, and the effect of creep and shrinkage reveals the importance of these effects on structural behavior, particularly when complex gravity load paths and restraint conditions create non-intuitive stress fields. For the subject building, a historic reinforced concrete shear wall building with unique lightweight aggregates, the chronological pushover confirmed field observations that cracking due to shrinkage and tensile creep from dead load and construction sequencing was more predominant in the building than any damage related to the 2006 earthquakes.

Adanur and Gunaydin had done the analysis on Construction stage analysis of Humber Suspension Bridge. Suspension bridges are widely used as engineering structures to across long spans and give rise to the usage of domains under the bridge. Construction period of this type of the structures continue along time and loads may be change during this period. Therefore, construction stages and time dependent material properties should be considered in the analysis to obtain the reliable and healthy results.

It is, therefore necessary that for apartment building frames with transfer girders and floating columns system, the construction sequence effect shall be taken into consideration.

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1 TYPICAL FLOOR PLANS