SEISMIC ACCELERATION AMPLIFICATION MODELS FOR RC FRAME STRUCTURES

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by

RAVINDER KUMAR AGRAHARI

DEPARMENT OF CIVIL ENGINEERING

INDIAN INSTITUTE OF TECHNOLOGY

(BANARAS HINDU UNIVERSITY)

VARANASI – 221 005

Roll Number: 17061005

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CHAPTER 8

CONCLUSIONS AND RECOMMENDATION

8.1 GENERAL

A building is constructed by two components such as primary components and secondary components. During seismic action, sometimes the NSCs are more damaged than the main components. The amplification factor plays a major role in controlling the effect of the seismic force acting on the NSCs. ASCE and UBC codes provided some provision for determining the acceleration amplification factors; some researchers also gave mathematical formulas for determining the acceleration amplification factor. The nature of the amplification factor is changed as the support condition of the structures is changed. Following points are to be concluded for the determination of the amplification factor of the RC frame structures when the buildings are fixed, and the proposed model is linear:

- As the height of the building increases, the amplification factor also increases.
- The Wiser model considers the fundamental natural period but accounts maximum structural period as 2.5 sec, which is not always true.
- The values of structural period are not constant for all types of ground motion. It varies between 2.5 to 5.5 sec. with the range of the ground motion. Based on this to proposed the amplification models for low to moderate hazards level. Which performed better results compared to the wiser models.
- Furthermore, it was also observed that as the height of the building increases, the nature of the amplification factor is nonlinear. So, to proposed the non-linear mathematical amplification model for determine the amplification factors.

- The amplification factor is also depending on the range of the ground motion.
- The shape of the amplification factor obtained by the proposed model is close to the shape of the Mean + SD results.
- The a_p values given by the ASCE are conservative, and its values are 2 to 2.5 times lower than Mean + SD results at sometimes.
- Furthermore, when the support condition at the base of the structures is changed, the amplification values are also changed.
- The floor spectral acceleration for the fixed support condition is found higher than the pin support condition.
- Based on the support condition, propose the new mathematical amplification model and compare it with the other model.

For the nonlinear dynamic analysis of the structures, it was observed that the amplification values decreased as compared to the linear time history method. Some of the major point for determine the amplification factors are summarised as follow:

- The amplification values decrease at the top of the buildings as compared the amplification values obtained by linear time history approaches.
- The floor response spectra decrease as the natural period of the buildings increases.
- The obtained amplification values have been compared with the different codes and the other previous models, and observed that the previous models results are conservative as the natural period of the structures increases.
- The amplification factor not only depends on the height of the buildings, as defined by the ASCE and UBC codes, but it also depends on the other factor as ductility ratio and the fundamental period of the structures, respectively.

- Based on these parameters, proposed the amplification factor formula and compared the previous models.

8.2 FUTURE SCOPE OF STUDY

In the present study, to obtain the acceleration amplification factor of the moment resisting RC frame model based on the support condition, ductility ratio and the natural period of the building, respectively. However, the type of the soil condition is also affected the amplification factor of the structures. From the study presented, the following areas of research can be further explored.

- To study the behaviour of amplification factor of the RC frame Structures based on the change of the damping ratio of the structures.
- To determine the amplification factor based on the change of the soil conditions.