HBRP PUBLICATION

Journal of Engineering Analysis Design
Volume 2 Issue 3

Comparative Study on Steel Framed and Reinforces Concrete Buildings- A Review

Er. Surya Nand[1*], Er. Sumit Sharma[2]
[1,2]Assistant Professor, Department of Civil Engineering,
R.N. College of Engineering & Technology, Panipat, Haryana, India.

****Corresponding Author***
Email Id:-*suryanand.sn@gmail.com*

ABSTRACT

An examination on RC and steel outlined structures with different floor frameworks is important to assess better basic framework with respect to generally economy, auxiliary execution, transportation cast and development. This investigation will be exceptionally useful in choosing auxiliary framework for multistory mechanical structures. Past examinations to establish that multistory modern structure structures are very little enough. This restricts our capacity in settling on choice about basic arrangement of modern structures. Various kinds of steel and RC structures with various floor frameworks are utilized for multistory structures. Before, workmanship structures were significantly utilized for building development. Presently innovation has created and steel auxiliary frameworks are begun for multistory structures. Presently a day, utilization of workmanship structure is extremely restricted. RC structure is ruling and steel structure is entering slowly for multistory structure structures in India. So, comparative study is required to identify most effective structural system for a particular building. From the comparative study of the two types of structure major findings and conclusions about structural behavior and other structural matters are as follows. When same building is designed as reinforced concrete and steel structure then structural behavior and performance varies widely. The following conclusions are drawn from comparative study of both building, considering lateral drift and vertical deflections; stiffness of RC building is higher than of steel. Considering Shear Force in both the building, both have the same shear capacity as fined. Considering moment in both the building, steel building is showing more moment & we can say that can bear higher moment under permissible limit.

Keywords:-*DL = Dead Load, LL = Live Load SN = Snow Load, EQ=Earthquake Load, WL=Wind Load*

INTRODUCTION

Previously, brick work structures were majorly utilized for building development. Presently innovation has created and steel auxiliary frameworks are begun for multistory structures. With the presentation of fortified cement, RC auxiliary frameworks began for multistory structure development. RC floor framework upheld on steel shaft was planned before as non-composite. With the approach of welding, it got useful to give mechanical shear connectors to think about composite activity. Because of disappointment of numerous multi-celebrated and low-ascent RC and brick work structures because of seismic tremor, basic architects are searching for the elective strategies for development. Utilization of composite or mixture material is quite compelling. Exposed steel structure is delicate to fire. Now a day, different fire proofing system has developed significantly. During some past

years, steel structural systems are being popular in India. So, alternative structural systems are gradually developing to compete with RC structural systems.

PROBLEM FRMULATION

To achieve this objective, architectural design of a three-story building has been prepared. Following the architectural plan, a RC framed structure has been formed. Again, following same plan, steel structural systems with non-composite floor have been formed. Then structural modeling and analysis have been performed by STADD Pro software. Loads are assigned as per IS-875 & IS-1893. From analytical results, RC structural members are designed following IS-456 2002. Steel structural members, joints etc. are designed as non-composite following IS-800 2007. Complete information related to structural behavior is obtained.

STRUCTURAL FORM OF THE BUILDING

Following architectural design of the building, RC structural system is formed with RC framed structure. Again, for the same building, steel structural system is formed with non-composite floor**.**

RC Structural Forms

Following the architectural plan of the three-storied building, RC structural system is formed with column & beam, supported slab. Structural system is considered as intermediate moment resisting rigid frame. Floor slab is assumed as rigid in plane which acts as diaphragm to transfer lateral load horizontally. All columns are interconnected by beams at finished ground level. Foundations are initially assumed as shallow foundation.

Steel Structural Form

According to same architectural plan, steel structural system is formed with non-composite floor. For steel structure with non-composite floor, minimum numbers of shear connectors are used and composite action is neglected. For non-composite systems, columns are use as steel I-sections. For sub-structure, initially shallow foundations are considered with RC pedestals which are interconnected by beams at finished ground level. Super structure columns, floor beams, girders etc. are built-up steel I-sections. RC slab with or without cold formed steel deck is supported on steel framed floor system. This RC floor slab is connected with supporting steel beams or girders with the help of mechanical shear connectors.

Fig.1:*-Steel framed structure*

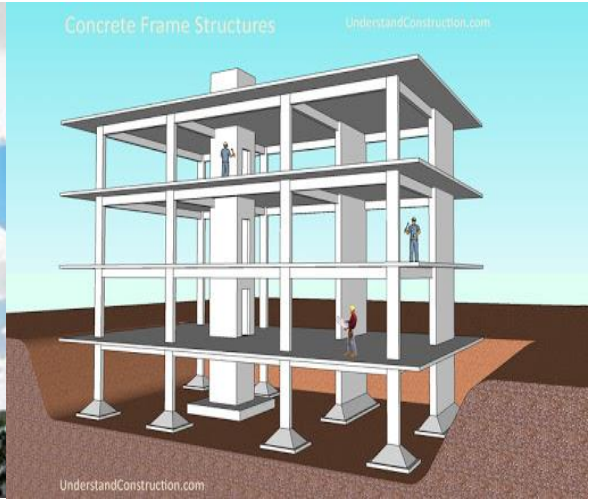

Fig.2:*-RCC framed structure*

CONCLUSIONS

When same building is designed as reinforced concrete and steel structure then structural behavior and performance varies widely. The following conclusions are drawn from comparative study:

- Considering lateral drift and vertical deflections, stiffness of RC building is higher than of steel.
- Considering Shear Force in both the building, both have the same shear capacity as fined.
- Considering moment in both the building, steel building is showing more moment & we can say that can bear higher moment under permissible limit.
- Considering torsion in both the building, steel building is showing vey less torsion & we can make the larger span with the less size of sections.

REFERENCES

1. AISC (2011). Design Examples. American Institute of Steel Construction, Chicago, Illinois, United States.
2. AISC (2005).Specification for Structural Steel Buildings. American Institute of Steel Construction, Chicago, Illinois, United States.
3. Fisher, J. M., & Kloiber, L. A. (2006). Steel Design Guide 1-Base Plate and Anchor Rod Design. In *AISC* (pp. 801-06).
4. Fintel, M. (Ed.). (1974). *Handbook of concrete engineering* (p. 801). New York: Van Nostrand Reinhold.
5. Johnson, R. P., & Buckby, R. J. (1994). *Composite structures of steel and concrete* (Vol. 1). Oxford, UK: Blackwell Scientific.
6. Murray, T. M., Allen, D. E., & Ungar, E. E. (1997). *Floor vibrations due to human activities*. American Institute of Steel Construction.
7. Murray, T. M., & Sumner, E. A. (2003). *Extended end-plate moment connections: Seismic and wind applications*. American Institute of Steel Construction
8. Miller, D. K. (2015). Design Guide 21: Welded Connections-A Primer for Engineers (2006). *27*(4), 71-71.

