

Comparative analysis of RCC and steel structure

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Abstract - In India concrete is very popular material of construction especially in case of medium and low rise buildings. In case of high rise buildings steel is generally used and Steel Tube is not such popular. As India is a fast developing country the demand of construction he is huge, hence finding out the best suitable material for construction is very important. The material used in construction should be the most economical, safe and easy to handle. Before modern engineering and the ability to manipulate concrete and steel, the world of Civil Engineering consisted of wood, Adobe, thatch and cave dwellings. We have come a long way today. Cities reveal skies filled by buildings so tall and austere. So, which material regains Supreme in the world of development today- concrete or steel? Both provide numerous benefits. Every material used for construction has its own pros and cons. RCC and steel are the materials that are mostly used in framing system for most of the building. Steel members have the advantages of high tensile strength and ductility while concrete members have the advantages of high compressive strength and stiffness. This project deals with the comparison between the RCC and steel structures in accordance to their structural behaviour, Cost and other factors which help in deciding the best suitable materials for construction. Finally it is the decision of contractors or the owners, that which type of the properties they required in the field and according to those properties the type of the materials can be chosen. In this project a G+2 building is considered for analysis. Three different types of 3D and 2D models of same building are prepared using stad Pro software. The different types of models are RCC, and Steel structures. These models are analysed for shear forces and bending moments using stad Pro software. The results obtained from each of the model are compared with each other to determine the best construction material.

Key Words: RCC , Steel structure , bending moment , Shear force ,Staad -Pro .

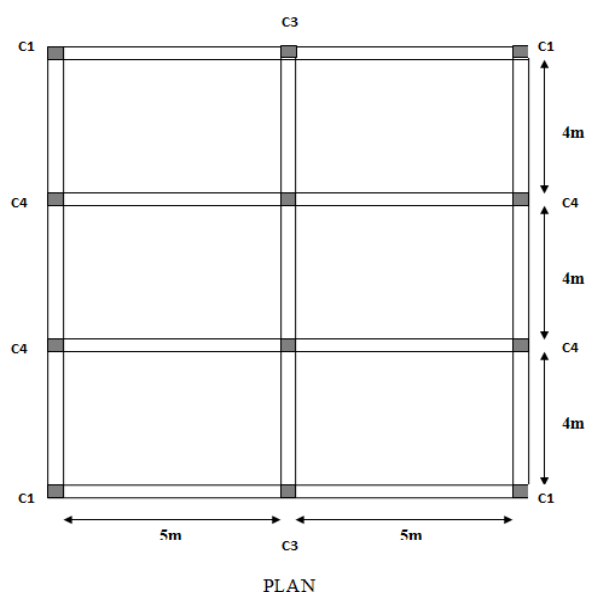
1.INTRODUCTION

A variety of modernized construction material options have recently become available due to ongoing research and support in innovative technologies. An ideal and modern construction material will aim to maintain structural strength while reducing its impact on the environment. In addition, modern construction materials must be able to adapt to various weather and site conditions . A French gardener by name Joseph Monier first invented the reinforced concrete in the year 1849. Reinforced concrete is one of the most widely used modern building materials. Steel reinforced concrete is a specific type that has had strong

steel rebar or fibers added to it while wet, creating a very strong type of concrete that is able to withstand almost anything when it has dried. Because the result of using steel reinforced are so good for the strength of the building, most modern building today use steel reinforced concrete in the construction process. By adding thin steel bars to concrete can increase the strength of the concrete, making it better to use in variety of application. The first used of steel structure in construction of countries can be traced back to the end of 18th century in British , steel structure are widely used in high-rise, residential high-rise steel structures are very common in the developed countries. The use of Steel in construction industry is very low in India compared to many developing countries. Experiences of other countries indicate that this is not due to the lack of economy of Steel as a construction material. There is a great potential for increasing the volume of Steel in construction, especially the current development needs in India. Exploring Steel as an alternative construction material and not using it where it is economical is a heavy loss for the country. In this work comparing RCC and steel structure by using Staad-pro models

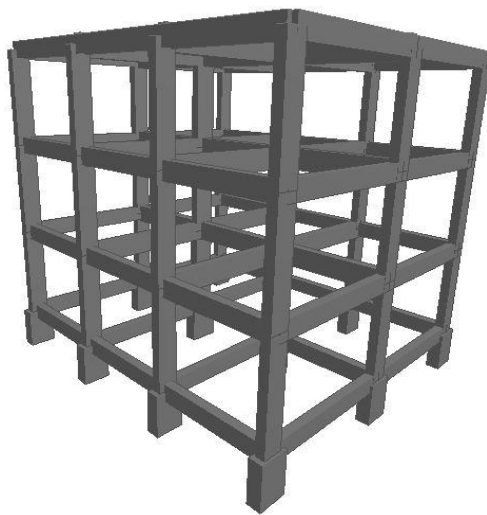
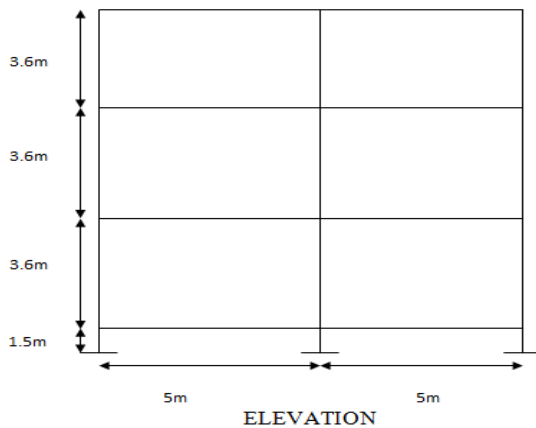
2. ANALYSIS OF THE STRUCTURE:

In this project we are considering a G+2 commercial building for analysis. The plan of the building was pre-determined and designed for RCC and Steel structures.

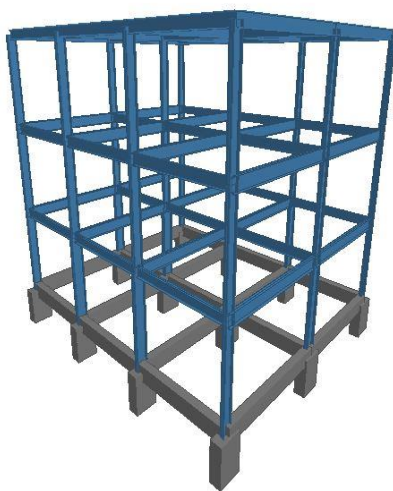


C1, C2, C3, C4 are the different columns.

B1, B2, B3 are the different beam



3d view of RCC structure

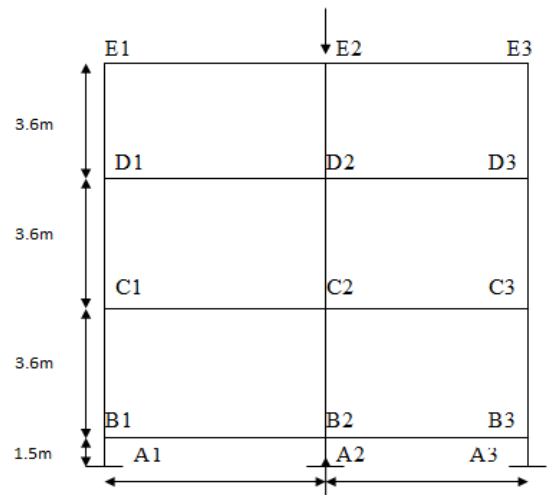


3d view of steel structure

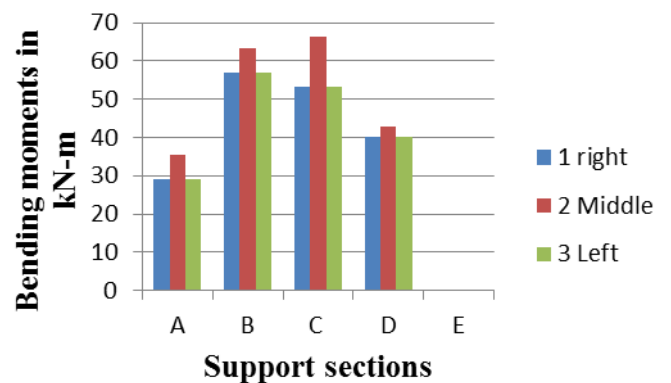
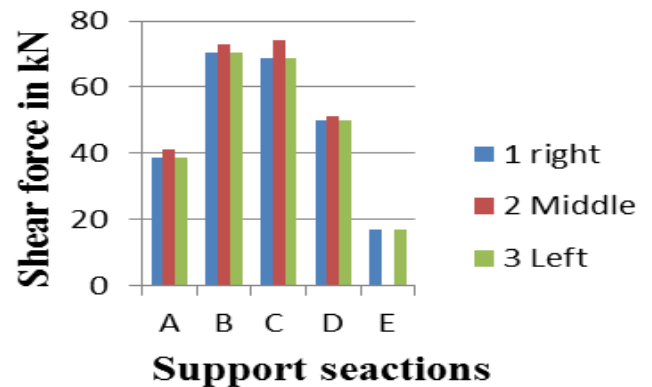
2.1 Results and Discussions

COMPARISON OF SHEARS FORCE AND BENDING MOMENTS

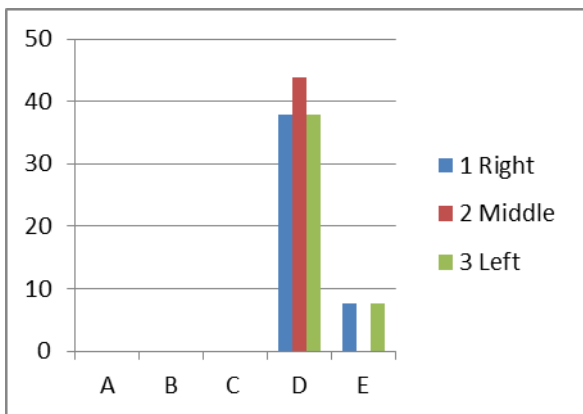
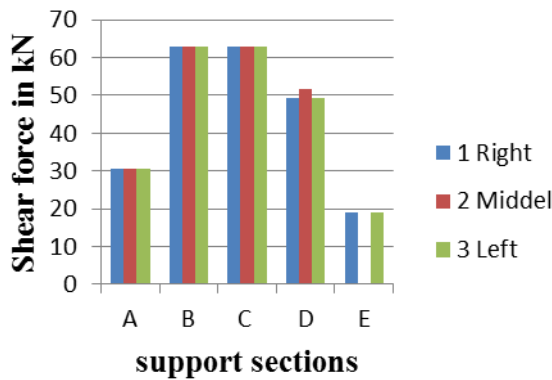
The shear forces and bending moments from the software at the below points are determined and used to plot the graph for analysis.



SF AND BM OF THE RCC STRUCTURE



SF AND BM OF STEEL STRUCTURE



3. CONCLUSIONS

From the above it is conclude that steel structure is more resist as compared to the normal concrete structure . A building constructed using steel has less dead load on it, even the beding moment and shear forces acting are less as determined in this work . It has high strength per unit mass. Hence even for large structures, the size of steel structures elements is small, saving space in construction and improving aesthetic view. Speed of construction is another important advantage of steel structure. Since Standard sections of steel are available which can be prefabricated in the workshop, they may be kept ready by the time the site is ready and the structure erected as soon as the site is ready. Hence there is lot of saving in construction time.

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