

Revision of Industry Residence with Two Different Materials Considering Construction Framework using Staad.Pro

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ABSTRACT

In our study we are performing analysis of such structure considering material other than General steel (hot rolled). In this study we are analyzing the same structure with same loading conditions using Cold formed steel structure. In this study we are comparing both the structures for lateral pressure using analysis tool Staad.pro which is an advanced analysis tool with optimization option for cost effective design. Comparative analysis was done while creating a structure using Hot rolled Steel sections and Cold Formed Steel (CFS) and results were presented on Shear Force, Axial Force, Support Reaction, Node Deflection and Cost analysis where Cold formed Steel was found durable in every case.

KEYWORDS: Cold Formed Steel, Staad.Pro, Gantry Cranes, Hot Rolled Steel and Cost Analysis

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INTRODUCTION

Cold formed steel (CFS) sections are manufactured from steel sheets, strips or plates at room temperature. The thickness of the steel sheets, strips or plates used in cold formed steel sections is mostly in a range from 0.4mm to 6.4mm, and in exceptional cases, a steel plate with a thickness of up to 25mm can be cold formed into a section (Yu, 2000).

It is the common term for products made by rolling or using stamping, rolling (including roll forming), or presses to deform it into a usable product.

The use of cold-formed steel construction materials has become more and more popular since its initial introduction of codified standards in 1946. In the construction industry both structural and non-structural elements are created from thin gauges of sheet steel. These building materials encompass columns, beams, joists, studs, floor decking, built-up sections and other components. Cold-formed steel construction materials pressing steel into semi-finished or finished goods at relatively low temperatures (cold working). Cold-formed steel goods are created by the working of steel billet, bar, or sheet differ from other steel construction materials known as hot-rolled steel (see structural steel). The manufacturing of cold-formed steel products occurs at room temperature using rolling or

pressing. The strength of elements used for design is usually governed by buckling. The construction practices are more similar to timber framing using screws to assemble stud frames.

Cold forming has the effect of increasing the yield strength of steel, the increase being the consequence of cold working well into the strain-hardening range. These increases are predominant in zones where the metal is bent by folding. The effect of cold working is thus to enhance the mean yield stress by 15% - 30%. For purposes of design, the yield stress may be regarded as having been enhanced by a minimum of 15%.

- Cross sectional shapes are formed to close tolerances and these can be consistently repeated for as long as required.
- Cold rolling can be employed to produce almost any desired shape to any desired length.
- Pre-Galvanized or pre-coated metals can be formed, so that high resistance to corrosion, besides an attractive surface finish, can be achieved.
- They are usually light making it easy to transport and erect.
- High strength to weight ratio is achieved in cold-rolled products.

Objectives of the Study

Main Objectives of our study are as follows:

- A. To Analyze the Industrial structure for hot rolled and cold formed sections for comparison.
- B. To determine the cost effective structure.
- C. To determine the safe section for industrial structure with Gantry crane.

Literature Review

Raffaele Landolfo (2019) this research paper presented various research applications related to Cold formed steel carried at University of Naples Federico II from last two years concerning the seismic behavior of “Stick-Built” constructions and various developments of structural components and a detailed description was presented.

The generally perceived basic execution furnished by CFS structural system together with the elevated levels of construction, security, strength and supportability, are spreading this development framework throughout the world. Simultaneously, the real need explicit structure codes, for the most part for the applications in a seismic zone, requires the improvement of new research in the field. In 50X50X3.0mm. Five joints were made at the accordance with the anticipated development, a few looks into have been

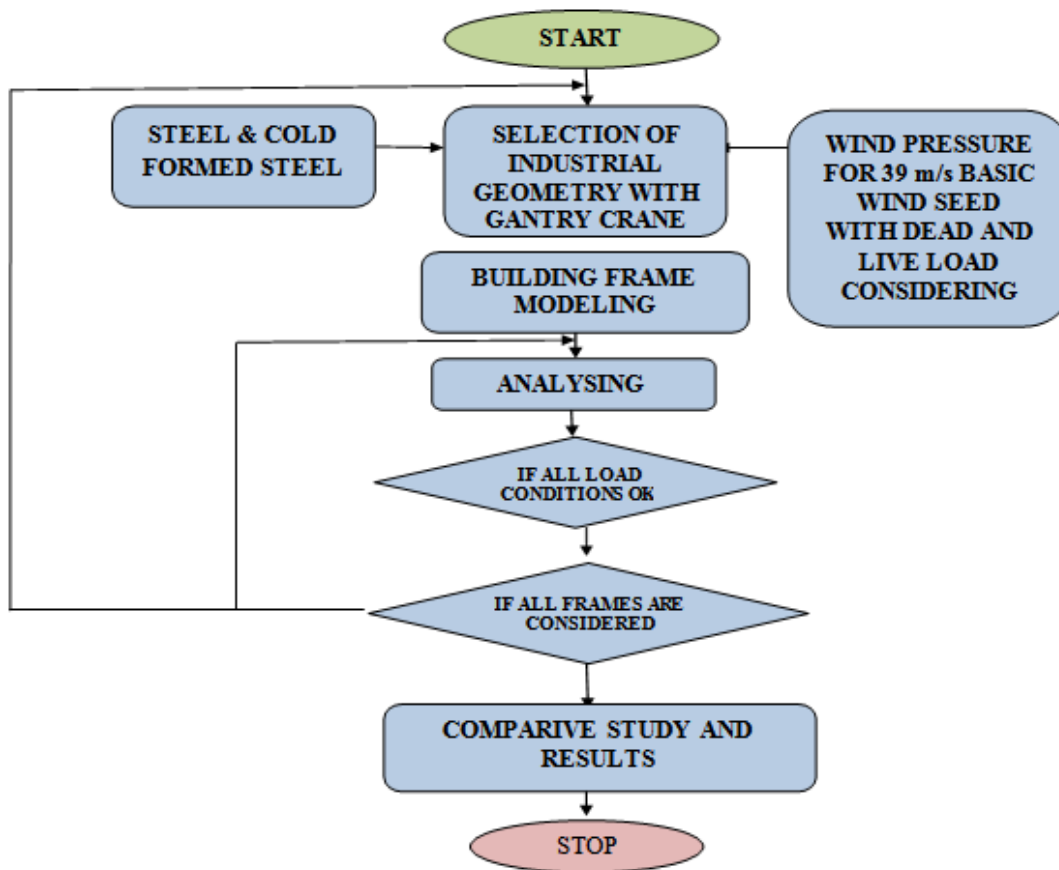
completing in the most recent years at the University of Naples was outlined in the paper.

Padmanaban R, Suresh babu S (2019) This paper exhibited the test conduct of a flat pratt truss which is completely prepared utilizing cold-formed steel (CFS) edge segments. Three different models of cold-framed Flat pratt support of each 1m range were prepared with consecutive point areas of intersection of top chord individuals and the vertical chord, Similarly, five joints were likewise prepared at base chord individuals. The convergence of harmony individuals and vertical individuals were associated by jolts to the gusset plates at the intersection. Experimental analysis was performed by applying five aggregated loads at every intersection until the distortion of the frame was seen. The numerical investigation was likewise completed for the truss with the use of finite element analysis and the acquired outcomes were contrasted with test results

METHODOLOGY

General

The main motive of this dissertation work is to justify the use of C.F.S material as a replacement of hot rolled steel in industrial structures and to justify the structure stability under wind pressure.



In this study, we are performing Analysis of a mid rise industrial structure with gantry crane assigned using analysis tool STaad.pro

Steps assigned for progress of the work are as follows:

Conclusion

As in this study we have presented comparative analysis of an industrial building with gantry crane load at the mid of the structure using analysis tool Staad pro, where we have

utilized hot rolled steel structure and cold formed steel structure to determine the utilization of cold formed steel structure for small industries, here following points which we have observed are concluded as follows:

Shear force: Shear Force is the unbalance forces generated due to weak distribution of compression and tension load over the truss structure. Here it is observed that cold formed steel structure is resisting unbalance forces more accurately as compared to hot rolled structure.

Axial force: Axial forces are the vertical pressure generated due to distribution of pressure in vertical members; hot rolled steel structure is observing more forces in comparison which results in instability of the structure.

Support reactions: Support reaction at the bottom shows the forces which are to be distributed to the soil beneath. As observed in chapter above it can be state that C.F.S structure are light weighted structures which results in less dead load in comparison.

Node Deflection: Node deflection due to connection of different members results in weak spring which is observed more in hot rolled structure due to heavy sections.

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