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## Thin Walled Steel Hollow Sections with Concrete Infill

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### Summary

To overcome the difficulties of hot rolled open steel sections, cold formed hollow sections are used as structural elements. Use of concrete as infill material for the hollow sections may overcome the difficulty of local buckling. This paper presents an experimental and theoretical study on concrete filled column members. Results show that the filled sections are much more efficient than equivalent hollow or concrete sections.

**Keywords:** Thin walled section; Closed section; steel-concrete composite; infilled section; Finite Element Technique; Experimental Study.

### 1. Introduction

The hot rolled open steel sections, used as structural members, suffer from a few drawbacks such as buckling about weaker axis, torsional instability etc. Thin walled closed sections are proved to be a viable solution in this direction. Use of infill concrete further enhances the capability of the closed sections.

Several researchers have presented their studies on the behaviour of concrete filled light gauge steel tubular members.

This paper presents an experimental study on the behaviour of concrete filled column members with circular, rectangular and square cross sections along with the development of a theoretical model for the infilled circular section.

### 2. Experimental Study

An experimental study has been performed with the circular, square and rectangular sections to study the behaviour of the closed form infilled sections. The columns are tested under direct compressive load. Fig.1 shows the test set up and arrangement adopted for testing the specimens.

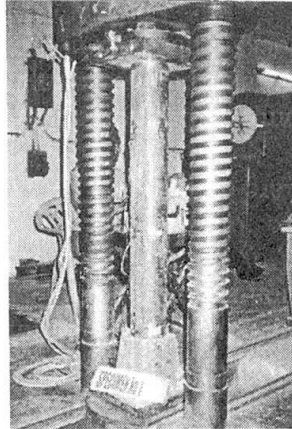


Fig.1: Arrangement for Testing Columns

### 3. Theoretical Formulation

The circular infilled section is analysed using finite element technique. A computer code is developed for the analysis of concrete filled closed circular columns.

### 4. Results & Discussion

The results of observed strain data and of theoretical analysis are presented in graphical form.

### 5. Conclusions

Based on the experimental study and theoretical analysis a set of meaningful conclusions are drawn.

### 6. References

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