General Review on Fundamental Behavior of Composite Structural Members

[1]Ms. Dewangi Sailor, [2]Mr. Dhruv Parmar
[1]Masters of civil Engineering (Infrastructure Engineering),
[1]Kadi Sarva Vishwavidhyalaya, Gandhinagar, India
[1]dewangisailor@yahoo.com, [2]parmar.dhruv75@gmail.com

Abstract - The present paper reviews the fundamental structural response characteristics and technological issues of composite steel and concrete systems. It investigates the efficacy of beam-column members.

Index Terms – Composite Beam, Composite Column.

I. Introduction

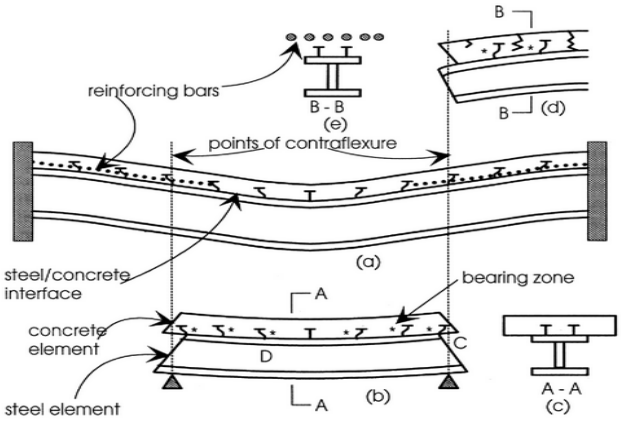
Composite steel and concrete systems are a viable alternative to both bare steel and reinforced concrete structures. They exhibit enhanced stiffness, strength and ductility. Moreover, their technology allows an easy of construction along with economy.[1] Composite columns are structural members which benefit more of the composite action. In fact, concrete cover and/or filler prevents the occurrence of local buckling. Fire and corrosion resistance can be achieved by using ordinary thicknesses of concrete. Composite frames benefit of the improved performance of steel and concrete columns; beams are generally in bare steel to yield at an early stage in compliance with the capacity design rules. Recently, different codes of practice have been issues for both static and seismic loads.[2] However, the implemented provisions should be further investigated and their reliability re-assessed. Interaction between steel and concrete, beam-to-column and base column connections require additional extensive experimental and numerical work as the corresponding design rules relies on limited datasets.

II. Literature Survey

R.P. Johnson, Composite structures of steel and concrete – Volume 1, Blackwell publishing
This volume contains the analysis and design of composite cross sections. The design is given for the Non-Sway composite frames. The criteria whether to consider a frame a sway or non-sway is given in this book. The allowable imperfections in the non-sway frame are also considered.

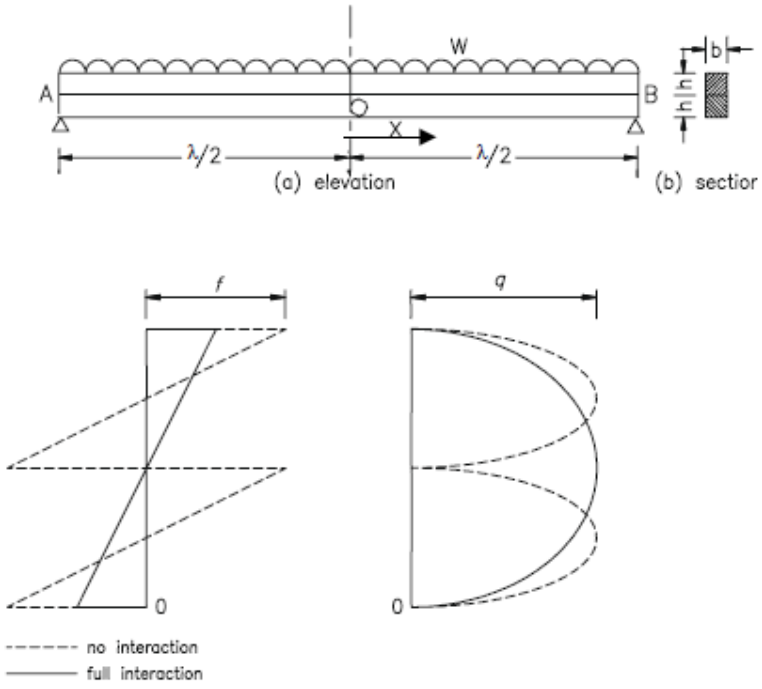
INSDAG
It covers the design aspects of a typical commercial building in composite construction. Detail design of G+3 and B+G+9 storeyed commercial and residential building is included. This also covers the design of composite slab with detailed worked examples.

III. General Behavior Of Composite Beam

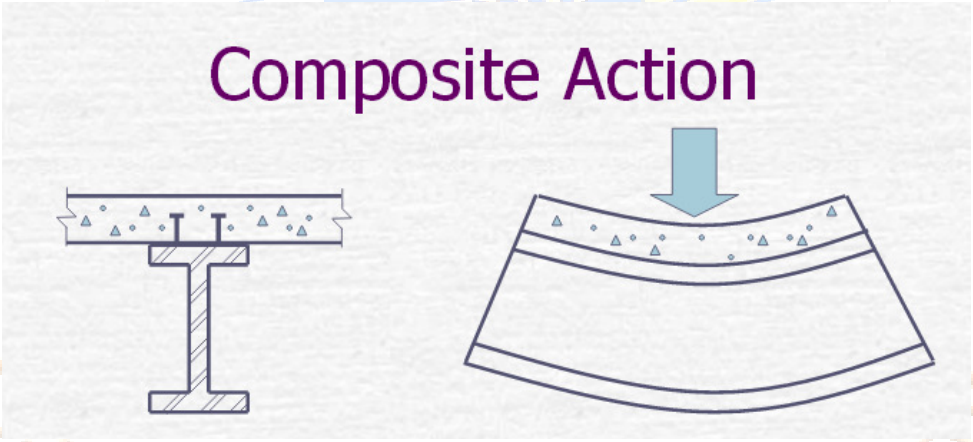


a. ELASTIC BEHAVIOUR OF COMPOSITE BEAM[4]

The behaviour of composite beams under transverse loading is best illustrated by using two identical beams, each having a cross section of *b*×*h* and spanning a distance of λ, one placed at the top of the other. The beams support a uniformly distributed load of *w*/unit length as shown in Figure.



IV. GENERAL BEHAVIOR OF COMPOSITE COLUMN UNDER SEISMIC CONDITION



1. Behaviour of encased column

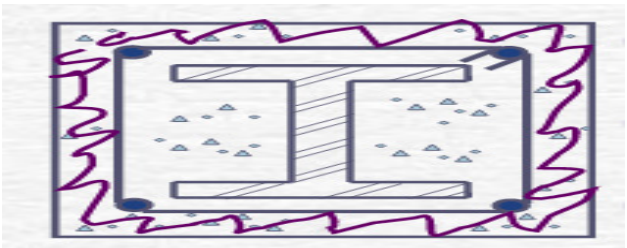


Figure: 1.1

2. Behaviour of filled column

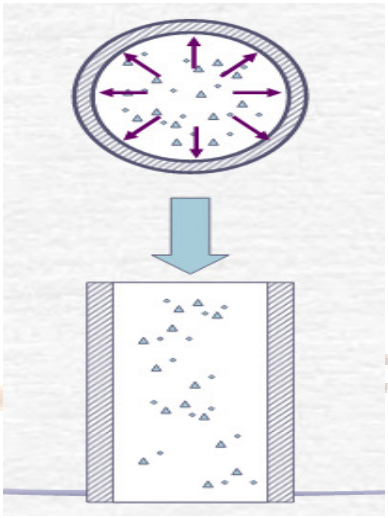


Figure: 2.1

V. CONCLUSIONS

There are many advantages associated with steel concrete composite construction. The most effective utilization of steel and concrete is achieved. Keeping the span and loading unaltered; a more economical steel section (in terms of depth and weight) is adequate in composite construction compared with conventional non-composite construction. As the depth of beam reduces, the construction depth reduces, resulting in enhanced headroom. Because of its larger stiffness, composite beams have less deflection than steel beams. Composite construction provides efficient arrangement to cover large column free space. Composite construction is amenable to *"fast-track"* construction.

VI. REFERENCES

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