RCC BEAM WITH SPIRAL REINFORCEMENT

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ABSTRACT

In reinforced cement concrete generally the main steel reinforcements are in use in horizontal form. But the replacement of this form of horizontal type of main reinforcement into spiral form leads to increase the bending moment, torsional moment, shear, ductility with reduced deflection which consider also considers the effect of reversal of loading as per substitute frame method. This also leads to better earthquake performance.

Keywords: RCC Beam, Spiral Reinforcement, Ductility, Earthquake Performance, Reversal of Loading, Substitute Frame Method.

INTRODUCTION

In present theory and practice in RCC beams the main steel reinforcement is used to resist the bending moment and to increase the ductile behavior. In addition to this the shear reinforcements are provided perpendicular to main reinforcements to resist the shear force.

But the replacement of this type of main longitudinal and transverse shear reinforcement into only one form leads to increase its bending moment, torsional moment, shear with reduced deflection with enhancing better ductile behavior along with better earthquake performance. Also it takes into account the reversal of loading as per substitute frame method.

The further strength of this type of beam can be increased by the concept of ferrocement.

To avoid the splitting of concrete at corners of square and rectangular beams the additional small diameter bars can be used.

The spiral form for square and rectangular beams are circular and oval shaped can easily made.

The time-dependent effects of concrete, due to creep and shrinkage, leads to a growth in strain with its age. It causes considerable impact on the performance of concrete structures causing an increase in deflection as well as affecting the stress distribution. Creep and shrinkage also cause dimensional changes in the material under the influence of sustained loading.
RCC Beams

RCC beams structural elements are designed to carry transverse external loads that cause bending moment, shear forces and in some cases torsion across their length. Concrete is strong in compression and very weak in tension. Steel reinforcement is used to take up tensile stresses in reinforced concrete beams.

The detailing of beams is normally associated with

i) Size and number (or spacing) of bars,
ii) Lap and curtailment (or bending) of bars,
iii) Development length of bars,
iv) Clear cover to the reinforcement and
v) Spacer and chair bars.

Beam is a structural member which is normally placed horizontally. It provides resistance to bending when loads are applied on it.

Various types of materials such as wood, steel, aluminum, etc are used for making RCC beam. Most commonly used material is RCC (Reinforced Cement Concrete).

RCC beam can be various types depending on different criteria. Such as depending on shape, beam can be rectangular, T-beam, etc. Depending on reinforcement placement, beam can be double reinforced beam, single reinforced beam, etc.

Types of RCC Beam

RCC beams are 4 types depending on their supporting systems.

1. Simply supported beam or simple beam
2. Semi-continuous beam
3. Continuous beam, and

The explanation of each type of beam is given below –

Simple beam: This type of beam has a single span. It is supported by two supports at both ends.

Semi-continuous beam: This beam doesn't have more than two spans. And supports are not more than three. Technically this beam is a continuous beam.

Continuous beam: This type of beam has more than two spans and has more than three supports along its length. The supports are in one straight line thus the spans are also in a straight line.

Cantilever beam: It has only one support in one end, another end is open.
CONCLUSIONS AND SALIENT FEATURES

1. Increase in bending moment capacity
2. Increase in torsional moment capacity
3. Increase in shear carrying capacity
4. Reduced deflection
5. More ductile behavior
6. Better earthquake performance
7. Accounts the reversal of loading as per substitute frame method.
8. Economical

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