

## **Abstract**

Reinforced Concrete is being used in the most of construction activities. Present days the problem faced by the construction industry is acute shortage of raw materials. For simply supported reinforced concrete beam, the region below neutral axis is in tension and above neutral axis in compression. As concrete is weak in taking tension, steel reinforcement is provided in the tension zone. The concrete below the neutral axis act as a stress transfer medium between the compression and tension zone. Partial replacement of the concrete beam. weight and savings in materials. In this study, an experimental investigation on partial replacement of concrete below the neutral axis is done by using seeding trays and the results were compared with M35 grade concrete RCC beams and replaced beams by using polythene balls.

## **Introduction**

Concrete is the major structural component. With increasing demand and consumption of cement, researches use the various waste materials to replace the concrete. In recent days the problem faced by the construction industry is the acute shortage of raw materials. Researches have been investigating many alternative materials to suite the Indian scenario. Rice husk, saw dust, light weight aggregates, copper slag, fly ash, are some of the materials experimented. In simply supported reinforced concrete beam, the neutral axis divides the tension zone and compression zone. The region below the neutral axis is in compression. Since concrete is weak in taking up tension, steel reinforcements are provided at the tension zone of the beam.

We have responsibility to the effect of the application of concrete materials to environmental impact. In this study, the partial replacement of concrete below the neutral axis creating by using different percentage of seeding trays and the results were compared with normal M35 grade concrete RCC beams and replaced beams by using polythene balls.

## Literature View

### □ **B. Jose(2018)**

Reinforced concrete is being used in most of construction activities. Present days the problem faced by the construction industry is acute shortage of raw materials. For simply supported reinforced concrete beam, the region below neutral axis is in tension and above neutral axis is in compression. As concrete is weak in taking tension, steel reinforcements are provided in the tension zone. The concrete below the neutral axis act as a stress transfer medium between the compression and tension zone. Partial replacement of the concrete below the neutral axis is an idea that can create reduction in weight and savings in materials.

### □ **S. Kumar, A. Joy(2015)**

In case of simply supported reinforced concrete beam, the region below neutral axis is in tension and the region above neutral axis is in compression. The tension and compression in the neutral axis are zero. In RC beams strength of concrete lying in and near the neutral axis is not fully utilized. The concrete below the neutral axis acts as a stress transfer medium between the compression and tension zone. In this thesis work, experiment is conducted to partially replace the concrete both in and near the neutral axis and that below the neutral axis by creating air voids using waste plastic bottles. This helps in reduction in concrete used, there by reducing self-weight, cost, etc. Since waste plastic bottles are utilized to create air voids, it adds on to sustainability.

### □ **Asjad Khan (2016)**

This paper represents review on partial replacement of concrete in tension zone with different volume proportion and different percentage of replaced material (i.e., pieces of bricks, terra coat tile, PVC pipe, polythene balls). Concrete is weak in tension therefore steel reinforcement are provided in tension zone. The concrete in tension zone acts as a stress transfer medium between the both sides of neutral axis. In RC beam strength of concrete below the neutral axis is not fully utilized. This unutilized concrete is also called as sacrificial concrete. So, this sacrificial concrete can be replaced by some lightweight materials.

### □ **S. Sariman (2020)**

Nowadays research efforts are continuously looking for new, better and efficient construction material and method. We have responsibility to reduce the effect of the application of concrete materials to environmental impact. The concrete should be used as efficiently as much as possible. In this article, we focus on structural material optimization by introducing hollow core using Expanded Polystyrene Foam in tension zone of RC beams. By material optimization, we can reduce the dead loads

which contribute to seismic effect in high rise structures.

□ **S. Robert Ravi (2014)**

The objective of the investigation is to develop a Reinforced Concrete Beam with hollow neutral axis which may replace the position of reinforced concrete beam in near future. However, in RC beams strength of concrete lying in and near the neutral axis is not fully utilized. So, this unutilized concrete is removed by replacing with any lightweight material. The material incorporated in the concrete beam is PVC pipe, which occupy the concrete volume in the neutral axis, where the compression and tension is zero there by making the beam hollow.

## Objectives

1. To study the flexural behaviour of beams by partial replacement of concrete below neutral axis with seeding trays.
2. To compare the effect of replacement of concrete by seeding trays with other methods using Polythene balls.
3. To analyse the material saving for different methods of replacement.
4. To conduct a comprehensive cost analysis between partially replaced beam and conventional beam

## Methodology

