

# **EXPERIMENTAL STUDY ON STRENGTH & DEFORMATION BEHAVIOUR OF SLABS WITH OPENINGS**

**MOHAMMAD ADIL DAR<sup>1</sup>, A. R. DAR<sup>2</sup>, SAQIB FAYAZ<sup>3</sup> & JAYALAKSHMI RAJU<sup>4</sup>**

<sup>1,3</sup>PG Research Student, Department of Civil Engineering, Kurukshetra University, Haryana, India

<sup>2</sup>Professor & Head, Department of Civil Engineering, NIT Srinagar, Kashmir, India

<sup>4</sup>Student, Department of Civil Engineering, MSRIT, Bangalore, Karnataka, India

## **ABSTRACT**

A concrete slab is a common structural element of modern buildings. Horizontal slabs of steel reinforced concrete, typically between 100 and 500 millimeters thick, are most often used to construct floors and ceilings, while thinner slabs are also used for exterior paving. Slabs, in definition and the way of designing them, are structures that transmit loads normal to their plane. Concrete slabs are widely in use as floors not only in industrial and residential buildings but also as decks in bridges. The big advantage is flexibility in methods of manufacturing. They can be made in-situ as well as prefabricated and brought to construction site in full scale. For larger spans pre-stressed concrete is very often applied to increase capacity without extending slab height.

Openings in slabs are usually required for plumbing, fire protection pipes, heat and ventilation ducts and air conditioning. Larger openings that could amount to the elimination of a large area within a slab panel are sometimes required for stairs and elevators shafts, improving air circulation, lighting arrangement in multi-storey buildings, aesthetics etc. They also ensure full utilization of the building parts that would otherwise be cut off from natural light supply. However, these openings pose a break in the continuity of the slab causing weak points in the whole structure. They thus require special attention in analysis and design. They also limit the capacity of the slab to control the spread of fire. The structural effect for small openings is often not considered due to the ability of the structure to redistributed stresses. However, for large openings, the static system may be altered when it involves a significant amount of concrete and reinforcement bar that need to be removed. This may lead to decrease in ability of the structure to withstand the imposed loads and the structure needs.

**KEYWORDS:** Common Structural Element, Industrial Buildings, Prefabricated, Weak Points, Natural Light Supply