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Abstract

Compressive testing is a fundamental procedure in the evaluation of building materials, offering critical insights into their ability to withstand axial loads. This article explores the significance of compressive testing in the construction industry, detailing its methods, and emphasizing its importance in ensuring structural integrity and safety. Various

K : Compressive Testing; Building Materials; Structural Integrity; Safety Assurance; Quality Control; Material Selection; Universal Testing Machine; Non-Destructive Testing; Cylinder Testing

I c

Building materials play a pivotal role in the construction industry, where the integrity and durability of structures are paramount. To ensure the safety and longevity of buildings, it is essential to evaluate the compressive strength of these materials. Compressive testing is a critical procedure used for assessing the ability of building materials to withstand axial loads or compressive forces. In this article, we will delve into the signi cance of compressive testing in evaluating building materials, its methods, and its importance in the construction industry [1].

U a c

Compressive testing, also known as compression testing, is a method used to determine a material's resistance to deformation when subjected to compressive forces. In the context of building materials, it helps assess how well a substance can withstand vertical loads, such as those experienced by columns, walls, and foundations in a structure. e results of compressive testing provide valuable insights into a material's load-bearing capacity and its suitability for construction purposes [2].

S ca c b a a a a

S c a : Compressive testing is crucial in evaluating the structural integrity of building materials. It helps engineers and expected loads without deformation or failure.

Sa a a c : e safety of occupants and the public relies on the strength of building materials. By conducting compressive testing, potential weaknesses can be identi ed early, preventing catastrophic failures.

Q a c : Compressive testing serves as a quality control measure during the manufacturing and production of building materials. Manufacturers can verify that their products meet speci ed strength requirements.

Ma a c : Architects and engineers use compressive test data to select appropriate materials for speci c applications. For example, a high-rise building's columns require materials with di erent compressive strengths than those used in a residential home's walls [3].

M c

Several methods are employed to conduct compressive testing on building materials:

U a ac (UTM): is is the most common method for conducting compressive tests. A UTM applies a controlled axial load to a test specimen until it fails, measuring stress and strain throughout the process.

N - c (NDT): NDT methods, such as ultrasonic testing and rebound hammer testing, can assess compressive strength without damaging the material. ese techniques are valuable for in-situ testing of existing structures [4].

C : Commonly used for testing concrete, cylindrical specimens are subjected to compressive loads until they fail. e results help determine concrete's compressive strength.

R : is method is suitable for evaluating materials like bricks and tiles. A compressive load is applied to a ring-shaped specimen until it fails, providing data on the material's compressive strength.

I a c c c

In the construction industry, compressive testing is indispensable for various reasons:

C c a c : Building codes and regulations o en stipulate minimum compressive strength requirements for materials used in construction. Compressive testing ensures compliance with these standards [5].

Ma a a c a : Ongoing research and development e orts seek to improve the performance of building materials. Compressive testing allows researchers to assess new

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materials and formulations.

S c a : Engineers rely on compressive test data to design