International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 12 | Dec 2022 www.irjet.net p-ISSN: 2395-0072

A REVIEW ON EFFECT OF FRESH CONCRETE PROPERTIES ON THE COMPRESSIVE STRENGTH OF CONCRETE

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Abstract -*The characteristics of ingredients used for construction will affect the performance of prepared concrete. Coarse and fine aggregates are major constituents of cement concrete when composed for preparing concrete for construction. Similarly, the compressive strength of concrete is influenced by the characteristics of newly laid concrete. Several researchers concluded from their experimental works that type of material used significantly influence the strength and workability of concrete. In the present research, several studies performed by other researchers are reviewed in order to provide the information about effect of fresh concrete properties on the compressive strength of concrete.*

Keywords*:* Aggregate, flaky, workability, fresh concrete

1. INTRODUCTION

Since quite some time, concrete has been used in building. In the past, compressive strength and construction have been the main concerns in structural design of concrete buildings. However, recent field research has shown that concrete structures deteriorate with time due to a progressive loss of material features and attributes, which in turn affects a structure's performance and endurance. In order to optimize the performance of structures, maintenance of decaying concrete structures is necessary on a regular basis. There has been an increase in interest in the subject of damage assessment and maintenance of concrete buildings since building structures haven't performed well over the last several decades. Physical damage, such as that produced by fire, abrasion, or pressures from expansion and contraction, and chemical damage, such as that generated by a hostile environment, cause structures to degrade and deteriorate, which eventually results in a decline in performance.

Parameters effects fresh concrete

The angular aggregates are better to rounded aggregates in the two circumstances –

CEMENT TO AGGREGATE RATIO

Condition and performance of RC structures mainly influence by compressive strength of concrete structures. This depends over the cement to aggregate (fine and coarse aggregates) ratio.

WATER TO CEMENT RATIO (W/C)

Water to cement ratio of concrete mix influences the compressive strength and several characteristics of concrete which finally influences the condition of hard concrete

WORKABILITY OF CONCRETE

Fresh concrete is considered to have high workability if it can be compacted, finished, and moulded to the desired shape and texture with little effort and without the components being separated. Poorly workable concrete is challenging to compress and polish, does not adequately enclose embedded objects and reinforcing steel, and does not flow easily into shapes. The phrase is relative, however, since a blend that is suitable for one kind or size of element may be too stiff or harsh for another, depending on the application. Each mixture must be appropriate for the purpose for which it is being used, balancing the demands for fluidity, strength, and economy. Workability refers to the cohesiveness and consistency of the mixture and is influenced by the amount of cement, aggregates, water, and admixtures.

STRENGTH

In compression, concrete is robust, but in tension and bending, it is comparatively weak. Concrete must be crushed with considerable power, yet it only needs to be pulled apart or cracked little to do either. Compressive strength is largely governed by the quantity of cement used, but it is also influenced by the water to cement ratio, the appropriateness and extent of mixing and putting, as well as the amount of hydration and curing. In high-strength mixtures, tensile strength is often 7 or 8% of compressive strength; in low-strength mixes, it is 11 or 12%. The use of steel or fibre reinforcement may boost tensile strength as well as flexural bending strengthThe required compressive strength is established by analysing the applied loads and the site-specific soil properties at the project site. The true compressive strength of a material may be established by controlled laboratory testing utilising established protocols and equipment. Multiple samples of the concrete used in commercial building projects are tested to make sure it meets the required strength standards before the final pour. With the possible exception of big, high-end projects or those on challenging sites where particular foundation designs

make concrete strength a crucial factor, laboratory testing is not often needed in residential construction.

DURABILITY:

Durability may be defined as the ability to keep working properly for a long time. There is a link between usefulness and adequate performance in an application. Abrasion resistance is a must for any concrete that will be used for vehicular or foot traffic. Exposed concrete on a building's outside has to be weather resistant to avoid degradation caused by repeated cycles of freezing and thawing. Extremely increasing air entrainment may considerably improve the durability of concrete that has gone through several freeze-thaw cycles. Concrete with embedded steel reinforcement has to be resistant to excessive moisture absorption in order to avoid corrosion. Even while concrete may lose part of its aesthetic value and lustre as a result of weathering and normal wear, durability nevertheless implies that it will serve its intended purpose for a significant amount of time .

VOLUME STABILITY:

All materials expand and contract in response to temperature fluctuations, and porous materials like concrete also do the same in response to variations in moisture content. Cement-based goods, such as concrete, concrete masonry, and stucco, initially shrink when the cement hydrates and the additional mixing water evaporates. The first period of shrinkage is irreversible, but subsequent expansion and contraction due to changes in temperature or moisture are reversible. Concrete may fracture as a result of excessive shrinkage. The degradation cycle may start as a result of the fractures allowing moisture to enter. It is possible that steel or fibre reinforcement will aid to reduce the severity of shrinkage cracking, and control joints, which cut the concrete into smaller panels or sections, may help to control the location and durability of shrinkage cracks in wet climates. However, the mix design and constituent quantities also have an impact on the likelihood of shrinkage cracking.

COHESIVENESS:

The component of workability known as cohesiveness reveals if a compound has abrasive, sticky, or plastic properties. It is preferable to have flexible concrete, which can be shaped into various shapes and then kept in that shape. A combination that is too rigid might cause the parts to split, so it's important to find the right balance. Too much or too little water used while mixing (high- or low-slump mixes), too little cement (lean mixes), or too few fine aggregate particles may all lead to a less than desirable end result. Aggregate particles that are too large, sharp, flat, or lengthy might also be problematic. Even if it's possible to soften a particularly harsh combination by including air, increasing the amount of fine aggregate, or boosting the cement content, in most cases the whole mix must be reworked to maintain the ideal ratio of all components. Extremely fine components, such as cement (fat mixtures) or rock dust, fine sand, or other analogous materials, may contribute significantly to the adhesive properties of a combination (over-sanded mixes). Because they need so much water to be even somewhat workable, sticky mixes are notoriously difficult to separate, and they also tend to exhibit considerable shrinkage cracking. Unless the concrete is treated poorly, a plastic mix's constituents do not readily separate and it is cohesive without being either sticky or abrasive.

2. LITERATURE REVIEW

The study has been performed by **Muhit et al. (2013)** for examining the properties of concrete due to dissimilar types of aggregates. Various shapes and projected totals have been joined and used to get ready different groups of concrete with variable water-cement (w/c).

Jakarsi (2013) considered the results of laboratory tests for finding the effects of flaky dimensioned aggregates on characteristics of concrete. Marshall Mix Design has been used for estimating all the mix designs.

An Observation has been made by **Ryza et al. (2013)**, for understanding the significance of the shape of aggregates. Different shapeIn concrete, the state of total particles has been connected with s and casted totals have been consolidated and used to get ready several properties such as reliability, slump or shear flow, resistance against shear, tensile and other behaviors. In recent years, Digital Image techniques have been conducted to find the particle shape characteristics of aggregate.

Uysal and Tanyildizi (2012) Compressive strength was modelled using an artificial neural network for self-compacting concrete that included mineral admixtures and polypropylene fibres and was then heated to high temperatures. Mineral admixtures such as fly ash, granulated blast furnace slag, zeolite, ground limestone, ground basalt, and ground marble were used instead. Fibre-reinforced polypropylene rates compared to those without. To anticipate the reduction in compressive strength of self-compacting concrete (SCC) mixes caused by exposure to high temperatures, an empirical model was developed using ANN, and it has been proved to be pretty excellent.

Bilgehan and Turgut (2010) An technique is provided that allows one to realistically identify concrete strengths in reinforced concrete structures that already exist but do not have or have no record of the concrete mixture ratios. As a result, researchers may quickly assess concrete sample' compressive strength using UPV measurements. The strategy may also be used in situations when there are too many constructions or tests to complete in the allotted

amount of time. The results comparison clearly demonstrates the effectiveness of the ANN technique in predicting the compressive strength of concrete using UPV data.

Vyawahare and Modani (2009) Research was conducted to determine the allowed percentages of aggregates in the concrete mixes to increase the workability and strength of the concrete with flaky and elongated particles.

Maslehuddin et al. [2003], When the elastic characteristics of crushed limestone aggregate concrete and steel-slag cement concrete were examined, it was discovered that the steel-slag cement concrete's elastic qualities were superior to those of the crushed limestone aggregate concrete. Some physical properties are superior to those of concrete made from ground limestone.

Westerholm et al. (2008) reported the findings of a laboratory examination into the rheological characteristics, including the yield stress and viscosity of the concrete. With the use of the appropriate tools, the effects of grading and sand particle form have been studied. The outcomes of the trials show how sand's amount and features affected the consistency and workability of mortar, among other properties. The amount of mortar is a key factor in determining how much the sand qualities affect.

3. CONCLUSION

The impact of novel concrete qualities on the compressive strength of concrete has been the subject of several investigations. The key findings of this research are stated in the list below:

Several varieties of material types are available for making concrete but selection of any method is not an easy task.

This paper provides basic information how fresh properties effects crushing strength of concrete.

Shape of aggregate particles has been related to several characteristics of concrete such as reliability, slump or shear flow, resistance against shear, tensile and other behaviors.

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