

Concomitant of Dissimilar Zones of Sand on the Workability

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Abstract - The term workability elucidates the capacity to work with concrete. In the words of a lay man, workability is defined as the positioning of concrete to be compacted sans segregation. Centum percent compaction of concrete is significant feature for furnishing the maximal strength. An expert of concrete requires requisite and myriad experiences to design a mix. A full command on the aspects of workability needed by the concrete expert with full comprehension of the sort of work, loss of slump, method of placing. Number of academicians tried to state the appellation of workability. This paper analysis the corollaries of disparate zones of sand on the fresh characteristics of concrete. Several journals have been assessed to examine the characteristics of fresh concrete. In this research various proportions of such aggregate mixed in preparing M 30 grade and M 40 grade of Concrete mix and the effect is studied on workability of concrete. Several research papers have been assessed to analyze the workability of concrete and the effect of different zones of sand on workability are discussed in this paper.

Key Words: Sand, Gradation, Coarse aggregate, Workability, Slump cone.

1. INTRODUCTION

Grading and large aggregate sizes are bumptious parameters in any concrete mix. See affects the relative dimensions of mixing, performance, economy, durability and cracking of concrete etc. Fine aggregate material is comprehensively used in making concrete for use in edifice as well other infrastructure amelioration. The acquiescence of concrete as a decidedly flexible product construction depends on the availability of appropriate nutrients, durability and the corresponding simplicity of its composition to the required shapes. Concrete makes cement, it is smooth and coarse aggregates and water. Aggregates make up 75% of concrete by volume their properties significantly affected the durability and performance of the concrete structure. Beautiful and tough the combined dimensions vary depending on the design combination required for construction. Globally, mineral resources annually range from 47-59 billion tons, with a good amount. Sand and solid aggregate (gravel) account for the largest percentage (approximately 68- 85%), thus as a rapid increase in its level of exploitation. The sand of the river has been the preferred choice for fines amount due to its availability, accessibility and minimal or non-existent processing requirements. Beauty Modulus is a word used as an indicator of refinement or corruption of integration. This is reduction of the accumulated percentage of standard filtered storage items divided by 100 it is well known that integration plays an important role in achieving desirable structures concrete.

1.1 Sand

Fine aggregate (sand) is an important ingredient in concrete that contains natural or crushed sand stone. The caliber and density of the aggregate greatly influence the strong structures of concrete. A mixture of concrete or mud can be made stronger, stronger and cheaper if you make good mixing choices on the basis of grading, particle structure and surface texture, abrasion and resistance to skiing and absorption as well as excess moisture. Good aggregates are a structural compound that takes most of the volume of mixed concrete formulas. Depending on shape, texture, size and other aspects of good integration can have a profound effect on them output. The role of positive aggregate can be explained by a few points.

- Positive aggregates provide dimensional stability in the mixture.
- The elastic modulus and resistance to concrete abrasion can be positively affected to combine
- Good quality also contributes to the balance of the mixture and the stabilizing properties.

- The structures of the final aggregates also have a significant impact on the reduction of concrete.

Sieve size	Zone-1	Zone-2	Zone-3	Zone-4
10mm	100	100	100	100
4.75mm	90-100	90-100	90-100	95-100
2.36mm	60-95	75-100	85-100	95-100
1.18mm	30-70	55-90	75-100	90-100
0.6mm	15-34	35-59	60-79	80-100
0.3mm	5-20	8-30	12-40	15-50
0.15mm	0-10	0-10	0-10	0-15
Fineness modulus	4.0-2.71	3.37-2.1	2.78-1.71	2.25-1.35



Fine aggregate

1.2 Coarse aggregate

Coarse combination is stone that are broken into small sizes and irregular in shape. In production work the aggregate are used including limestone and granite or river combination. Concrete blend is produced by using many substances or additives however is generally made from a material known as Coarse Aggregates and they are one of the vital components of concrete and occupy massive volumes in the concrete blend. aggregate which has a size bigger than four seventy five mm or which retrained on four seventy five mm IS Sieve are known as Coarse mixture. In our studies paper we used coarse mixture of 10mm – 20 mm.

1.3 Concrete

Concrete is a creative cloth product of cement, best aggregates (sand) and coarse substances. Aggregates combined with solid water over the years. Portland Cement is the most usually used type concrete for cement manufacturing. Concrete making is about searching after the homes of concrete and functional programs. Concrete has an excessive compression energy (you do no longer have it crack beneath weight), but the sturdy pressure decreases considerably (it cracks whilst being pulled). The compressive force is normally controlled through the amount of water in the cement in the course of production concrete, and strong energy are advanced the use of additives, commonly metal, to build sturdiness concrete. In other words we are able to say that concrete is manufactured from sand (that is the first section set), ballast. (that is a strong mixture), cement (may be known as bond) and water (this is additive). Concrete structures are regenerated with many elements mainly because of the attention of possibilities cement, sand, aggregates and water. As a manner to effectively use concrete in manufacturing work, we ought to hide of their houses. On this paper, we use two grades of concrete; M30 and M40.

a) For M30 grade

Zones of sand	Design Mix Ratio
Zone I	1 : 1.74 : 2.67
Zone II	1 : 1.66 : 2.76
Zone III	1 : 1.57 : 2.85

b) For M40 grade

Zones of sand	Design Mix Ratio
Zone I	1 : 1.53 : 2.32
Zone II	1 : 1.46 : 2.15
Zone III	1 : 1.37 : 2.47

Maximum size of aggregate is 20 mm.

2. Workability

Work is the property of an uncooked or pure concrete mix. In simple words, how to work easy placement and controllable concrete means concrete that can be laid and be compiled without problems without separation. Performance is an important concrete and consistent material overcrowding. The performance you want does not always standardize all types of concrete. Additional performance is required on the less accessible part or the more reinforced section instead there is a large concrete body. The performance of the newly repaired concrete can be determined many tests, but in this paper we have determined it in the form of a hunch cone.

2.1 Slump test

Concrete slump test is one of the easiest tests and is widely used in construction sites as well Laboratories. It's important to do this best test in the first collection as soon as it combines work begins. This is necessary for proper water installation to complete the required supply performance. When after this test is performed whenever the mixture appears to be wrong again water repair is desirable. A deterioration test is required for all concrete samples cube testing so that in the event of a failure of the cube can be made some conclusions as to whether the mixture was present more efficiency or in other words had a greater amount of water cement equivalent to the recommended mixture .

Principle of Slump Test

The slump test artifact is a measure of the demeanor of a compacted inverted cone of concrete concealed by the action of gravity. It measures the bendability or the wetness of concrete which anon gives an interpretation about the workability plight of concrete mix.

Pattern of slump

True slump: If the concrete slumps fluently, it is christened as true slump.

Shear slump: If one half of the cone glides down, it is labeled as shear slump.

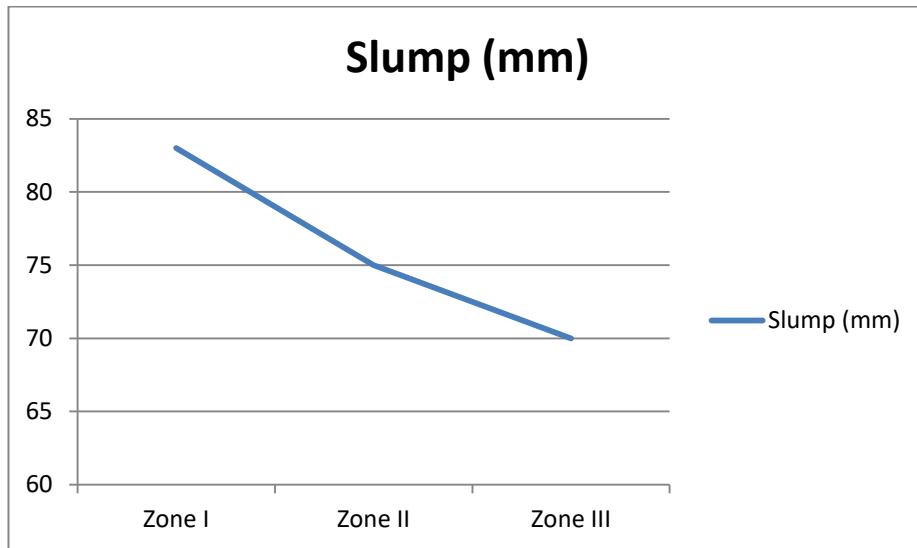
Collapse slump: If the crisp concrete collapses altogether, it is termed as collapse slump .



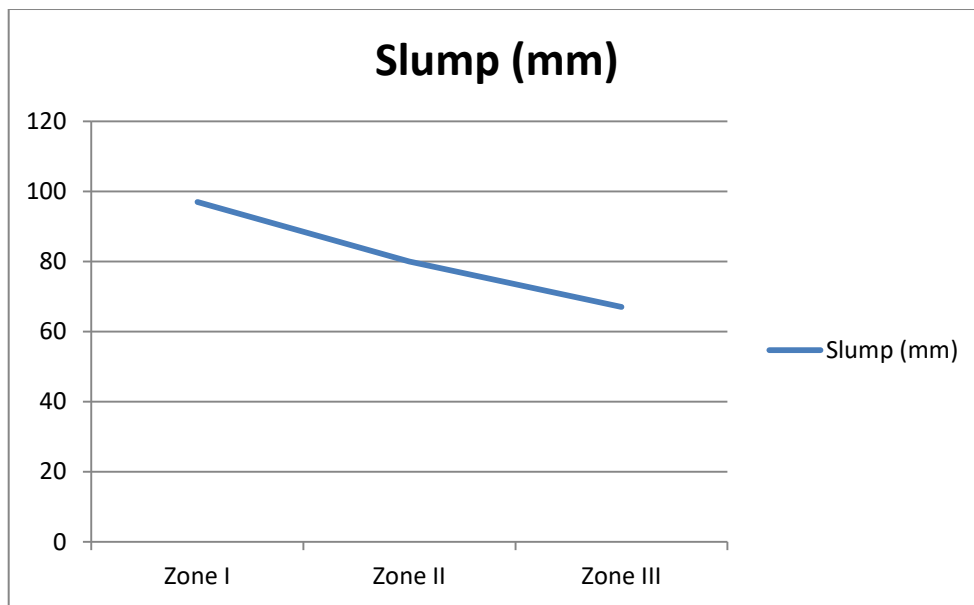
True Slump

Result : After the completion of this test , following results were observed;

Slump for M30	Slump for M40
a) Zone I = 83mm.	a) Zone I = 97mm
b) Zone II = 75mm.	b) Zone II = 80mm
c) Zone III = 70mm.	c) Zone III = 67mm



Graphical representation for M30 grade of concrete



Graphical Representation for M40 grade of concrete

3. CONCLUSIONS

Fragmentation of fine aggregates affects concrete mix in addition to coarse aggregates. The following results can be summed up in this study :

Well graded aggregates are preferred as voids present due to larger size aggregates are called by smaller size aggregates thus, reducing cement content and hence improving workability. As particle size of the mix decreases (increase in specific surface), workability gets reduced progressively. For particles passing through 600 μ , the workability increases with increase in its content despite increase in its specific surface, which can be explained by surface index. Particles smaller than 600 μ act as ball bearings for larger particles, thus reducing the need of lubricant and hence increasing the workability of the mix. This holds true for particle retained on 150 μ sieve, but for particle passing through 150 μ sieve, high proportions of these particles may lead to decrease in workability by reducing the amount available for hydration reactions and its cohesiveness

- a) The presence of high concentrations of fusion fines stored in the filter effects of 600 microns loss of functionality.
- b) Combining a size between 300 microns and a size of 150 microns causes an increase workability.
- c) Concrete performance can be measured by a standard grading curve by detection the area where the grading curve of aggregate lies.
- d) Well organized aggregates work best
- e) Particles in excess of 75 microns can vanguard to abatement in the workability of the concoction.

The fine aggregate gradation has more detrimental effect

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