Mixed Aggregate effect in Local Compression of Concrete

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Abstract

The effect of mixed concrete was analyzed experimentally in this paper, the different size of aggregate size were mixed together i.e. 6mm+10mm and 10mm+20mm, the compression test is performed with these aggregate sizes and it is observed that mixed aggregate size of 10mm+20mm represents good agreement in compressive strength in all loading areas with constant loading rate in local compression.

Key Words – Concrete Block, Concrete, Compressive Strength, Local Compression, Aggregate size, mixed aggregate.

1.1 Introduction

Particle sizes of cement and sand have greater significance in strength of structures. Rough-textured, angular, and elongated particles require greater water in accordance with produce possible concrete than small particle, rounded close aggregate. Consequently, the cement content should also stand extended according to hold the water-cement ratio. Generally, flat yet elongated particles are prevented then are limited to about 15 percent with the aid of ounce about the volume aggregate. Unit-weight measures the aggregate to that amount graded amount then the voids within to them pleasure possess between concrete. The mixture content into particles influences the aggregate over cement paste required because the mix. Angular aggregates enlarge the unutilized content. Larger sizes on well-graded aggregate or accelerated grading reduce the unutilized content. Absorption on mixture wet regarding volume is measured when choosing volume due to the fact the intestinal structure on aggregate. Abrasion then skid is obstruction concerning the issue regarding abrasion resistance requires more friction resistible, thus material should have greater capability of resistance against abrasion, and hence material should have effective bonding characteristics to enhance resistance against abrasion. Different minerals among the

aggregate put on and level at unique rates. Harder aggregation be able be chosen among highly abrasive conditions to decrease wear.

1.2 METHODOLOGY

1.2.1 MATERIALS USED

The basic ingredients which were used in this investigation are:

- OPC (ultra tech cement)
- Natural Coarse aggregate
- Natural Fine aggregate
- Water (fresh drinkable water)
- Steel Bars

1.3 ORDINARY PORTLAND CEMENT

The ultra tech cement of 53grade manufactured by the ULTRATECH Cement Company was considered in this study, which is Indian standard code – IS 12269:1987 having strength for 28 days being a minimum of 58MPa or 530 kg/sq.cm.

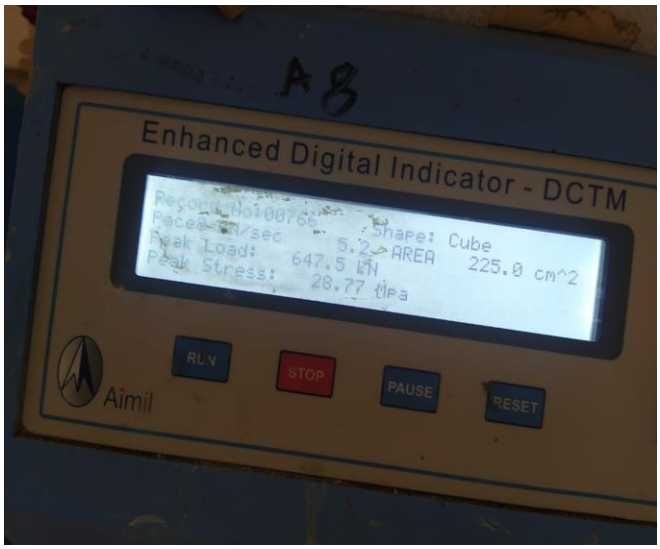


Figure 1.1: Compressive strength test of concrete block.



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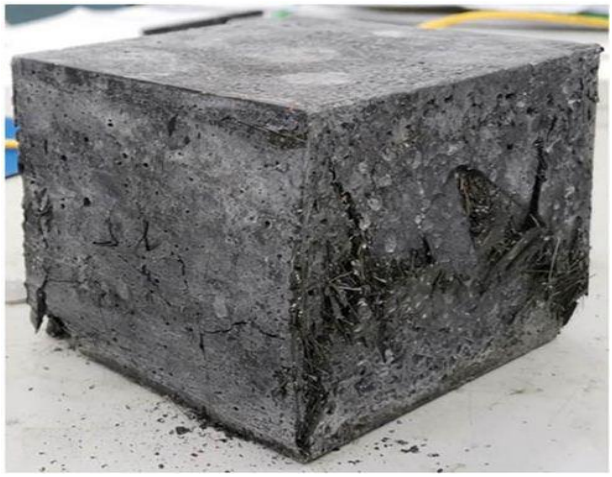


Figure 1.2: Compressive strength test of concrete block with shear crack.

1.4 RESULT

Table 1.1 - Results of compressive strength test for 100mm×100mm loading area with different size of aggregate.

Loading rate (1.0e-5/sec)		
Loading area	**Aggregate size (mm)**	**Stress (Mpa) (100×100 mm)**
100×100 mm	6mm+10mm	28.33
	10mm + 20mm	36.58

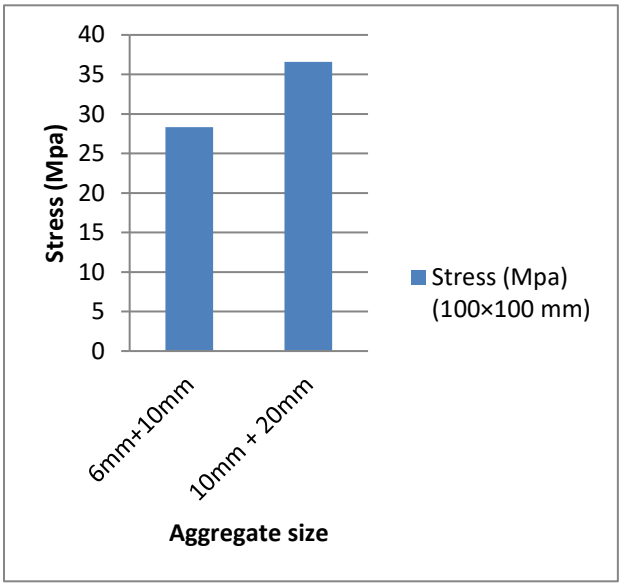


Figure 1.3 - Graph shows results of compressive strength test

Table 1.2 - Results of compressive strength test for 60mm×60mm loading area with different size of aggregate.

Loading rate (1.0e-5/sec)		
Loading area	**Aggregate size (mm)**	**Stress (Mpa) (60×60 mm)**
60×60 mm	6mm+10mm	40.96
	10mm + 20mm	47.85

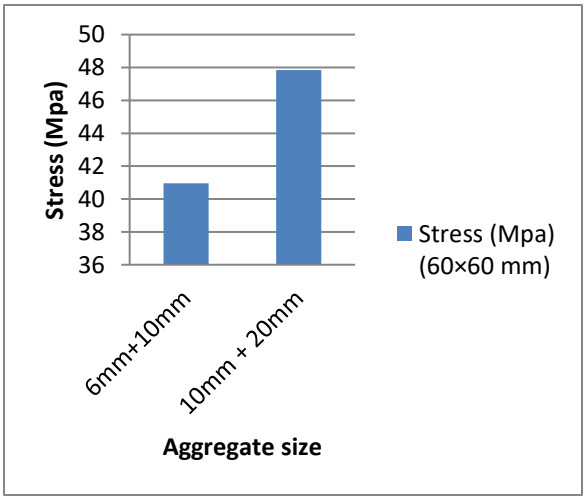


Figure 1.4 - Graph shows results of compressive strength test

Table 1.3 - Results of compressive strength test for 20mm×20mm loading area with different size of aggregate.

Loading rate (1.0e-5/sec)		
Loading area	**Aggregate size (mm)**	**Stress (Mpa) (20×20 mm)**
20×20 mm	6mm+10mm	102.85
	10mm + 20mm	112.36

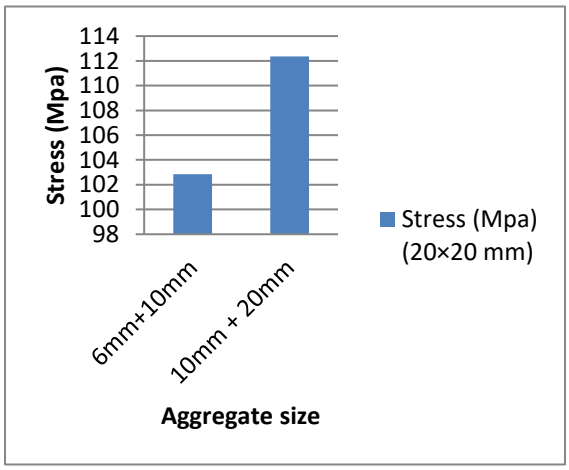


Figure 1.5 - Graph shows results of compressive strength test

Table 1.4 - Results of compressive strength test for 15mm×15mm loading area with different size of aggregate.

Loading rate (1.0e-5/sec)		
Loading area	**Aggregate size (mm)**	**Stress (Mpa) (15×15 mm)**
15×15 mm	6mm+10mm	134.96
	10mm + 20mm	143.66

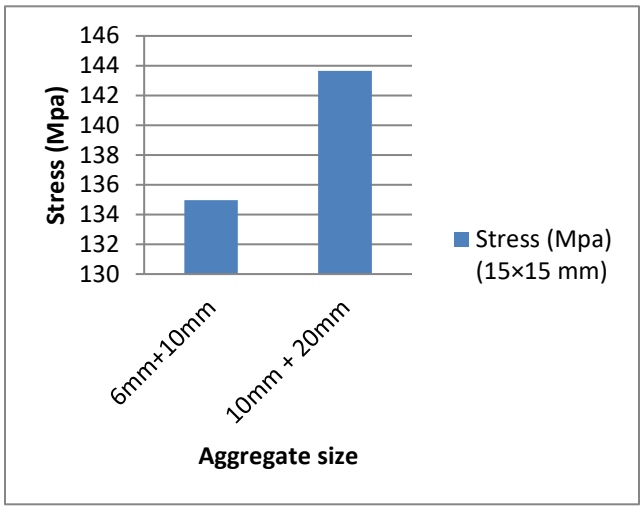


Figure 1.6- Graph shows results of compressive strength test

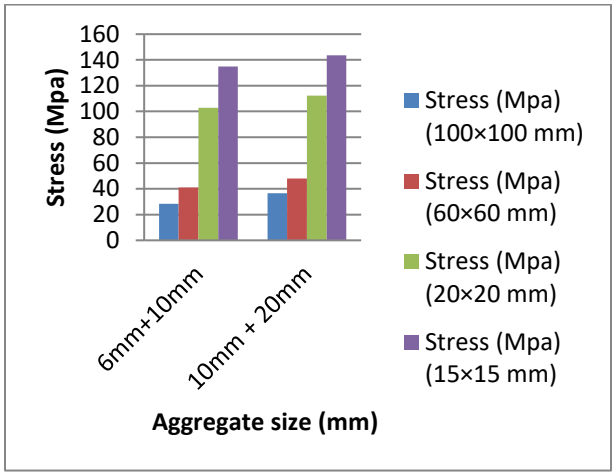


Figure 1.7: Overall comparison of result for compressive strength of different size mixed aggregate and constant loading rate.

Conclusion

1. The compressive strength of the concrete block increases in different local compressive loads due to effect of loading area.

2. The mixed aggregate of size 10mm+20mm represents higher stability as compared to other aggregate size and mixed aggregate.

3. It is observed that the mixed aggregate provides higher stability in local compression under constant loading rate with different loading area.

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