

RESEARCH ON CONCRETE STRENGTH USING REMIXED CONCRETE MIXES

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Abstract- Remixed concrete is a combination of partially set old concrete and instantaneously prepared fresh concrete ultimately achieving appropriate strength. The improvement in strength by re-vibration was noted to be more pronounced at earlier ages and is expelled on re-vibration. It is possible also that some of the improvement in strength is due to the relief of plastic shrinkage stresses around the aggregate particles. Despite these advantages, re-vibration is not widely used as it involves an additional step in the production of concrete and hence increased cost. Also, if applied too late it may damage the concrete.

Keywords: Remixed concrete, Time lag, Bland ratio, Selfing concept, Crossing concept.

I. INTRODUCTION

Remix concrete mass obtained by laying one fresh concrete mass over relatively older preset mass of concrete it may be selfing or crossing concrete at a certain time lag of casting is often practiced at construction sites and may be termed as remixed or layered or spread concrete. In this remixed concrete the time lag t and blend ratio r play an important role. Preset concretes provide a reduction of strength as compared to the fresh concrete, in addition to that the other physical properties also harmfully affected. In order to utilize this preset concrete to achieve the requisite strength a fresh material is to be remixed.

II. LITERATURE REVIEW

Selfing & Crossing concepts provides to preventing the wastage of concrete materials which is partially set. By use of this technique it will observed that there is an increment in strength as compared to old one. It is seen that the strength of concrete prepared at $t = 15$ minute is less as compared to the same concrete at $t = 15$ minute selfed with a fresh concrete of same grade. strength of concrete due to intermittent curing < strength due to cumulative curing after 28 days of curing.

III. OBJECTIVES OF REMIX CONCRETE

The objectives of remix concrete is,

1. To study the behavior of concrete when subjected with time lag parameters and blend ratio,
2. To study effects of intermittent curing on strength of concrete by considering parameters like water cement ratio, mix type, different time lag,
3. To find out relation between strength of remix concrete mixes under intermittent curing by analytical results and experimental work results.
4. Formulating an optimization problem for selfing and crossing theory to achieve the overall optimum concrete mix design. Applying suitable method of solution to the optimization problem.
5. To prepare the model of the system to predict the effect of intermittent curing using time lag.

IV. SIGNIFICANCE OF THE RESEARCH

In field concreting work, due to unavoidable situations, mixed concrete masses undergo stiffening before being placed into the moulds at the construction sites. These pre-stiffened mixes theoretically serve no purpose if time lag t is well beyond the initial setting time. But the pre-stiffened mass, instead of being discharged altogether, it may be blended with a relatively fresh mix to increase the strength or processed by adding suitable admixture to retain the workability even at that time lag. For this purpose such mixes often blended with just water or cement slurry in arbitrary fashion. Neither any rational method which aims to estimate the strength of such blended mixes nor any admissibility of such limitation and validity of blending are available.

V. ADVANTAGES OF REMIXES

The concept can be efficiently utilized for predicting a particular strength of the resulting selfed or crossed mass in terms of the strengths of individual mixes in blending, but also can be advantageously applied for expressing the strength of the old preset mix completely in terms of that fresh one.

VI. CONCLUSIONS

1. After applying selfing technique to the existing partially set concrete at various time lags, it has been observed that there is an increment in strength of the above newly formed concrete as compared to old concrete.
2. The compressive strength of partially set concrete goes on reducing as the time lag exceeds towards final setting time.
3. Results show that the strength of concrete decreases with increase in blend ratio and time lag.
4. After adding a higher grade of fresh concrete to the old partially set concrete, strength increases as compared to addition of same grade of fresh concrete to the old partially set concrete.
5. Results of column specimen concreting for 50% first layer filling, followed by overlay of next 50 % delayed second layer filling gives better load carrying capacity as compared to column specimen concreting for 25% first layer filling, followed by overlay of next 75% delayed second layer filling.
6. It is observed that the strength of concrete which undergoes intermittent curing is less than that of strength due to cumulative curing after 28 days of curing. The flexural, tensile as well as shear strengths also benefit from remixing. Efficient uninterrupted curing is the key to quality concrete. Proper curing of concrete is crucial to obtain design strength.
7. Improvement in compressive strength of overlaying concrete is due to improvement in fresh properties of blended concrete i.e. workability and compaction.

REFERENCES:

1. A. A., & Emenike, A. J. (2013), "Effect of Curing Methods on Density and Compressive Strength of Concrete", *Cement and Concrete Composites*, 3(4), 55–64.
2. A. Ferhat Bingöllühan Tohumcu (2013), *Materials and Design*, 51, 12-18.
3. Ahmad, S., & Alghamdi, S. A. (2014), "A Statistical Approach to Optimizing Concrete Mixture Design", *The Scientific World Journal*, 1-8.
4. Alnaki, A. A., Wegian, F. M., Abdalghafar, M. A., & Alotaibi, F. A. (2014), "Assessment of the Strength of Remixed Concrete Structures", *Jordan Journal of Civil Engineering*, 8(2), 227–238.
5. Arthur R. Beck (1989), "Thin Bonded Concrete Overlay on a City Street", *Concrete International*, 11(5), 39-47.
6. Bairagi, N. K., and Kar, J. S. (1970), "Effect of Presetting of Cement on the Mortar Strength", *Cement and Concrete*.
7. Bairagi, N. K., Goyal, A. S., and Joshi, P. A. (1989). "Strength of Composite Mixes Using Selfing and Crossing Theory", *Indian Concretes Journal*, 63 (12), 600-604.
8. Bairagi, N.K. Goyal, A.S. and Abdul Lateef, P.K. (1989) "Study of Effect of Cumulative Curing on Strength of Concrete" *Indian Concrete Journal*, 63(1), 37-42.
9. Bairagi, N.K., and Jhaveri (1977), "Strength Variation of Composite Mixes by Pure Selfing Theory", *Indian Concrete Journal*, 51(3), 87-89.