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"Effect of Curing On Strenghth of Retempered Concrete"

Prof. P. G. Siddam
Mr. Waghmare Amar, Mr. Bansode Premkumar, Mr. Manjare Anup, Mr. Bhore Prajwal, Mr. Rathod Vinod, Mr. Shete Pritam, Mr. Birajdar Vishwaraj, Miss. Khandare Someshwari
Department of Civil Engineering, V.V.P. Institute of Engineering & Technology, Solapur.
PIN – 413002, Maharashtra ,India

Abstract—
Pervious For M20 concrete we can retemper the concrete up to 80 minutes. Adding water to a plastic mix to increase slump is an extremely common practice, even though it is not recommended because it increases the porosity of concrete. Concrete often arrives on site more than half an hour after initial mixing. Placement operations can take anywhere from 10 to 60 minutes, depending on the field conditions and the size of the load. When the slump decreases to an unacceptable level during the operations, water is added to the mix. Objective of this paper to study the effect of curing on strength of retempered concrete of M20 and Durability of retempered concrete. Usually the retempering process is used with normal concrete or with ready mixed concrete; an attempt is made to check the compressive of normal retempered concrete with an addition of retarder in 0.2 % at retempering time of 0 minutes to 80 minutes.

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I. INTRODUCTION

Retempering is defined as "Addition of water and remixing of concrete or mortar which has lost enough workability to become unplaceable". Retempering inevitably results in some loss of strength compared with the original concrete.

Concrete is like material obtained by mixing cement, fine aggregate , coarse aggregate and water in specific proportions .Water is added for chemical reaction and gives workability to fill in form of shape and dimension for structure. The chemical interaction between cement and water bonds the aggregate into solid mass.

In general at construction site the curing cannot be more than 5 days. This is because so many parallel works are being carried out at the same time, such as centering work, brick work and also the pressure of completing work within stipulated time. Consequently the compressive strength of concrete reduces considerably because of this inadequate curing, but the customers are under the impression that the curing is done for almost 28 days. In addition to that retempering is a general practice at almost all sites which further reduces the strength of the concrete.

Durability of Concrete

Durability defines the suitability of concrete to preserve its structural performances fixed by the designers, over specified span of time; hence it plays a fundamental role in determining the service life of the structure.

Durability of concrete is defined as its ability to resist weathering action, chemical attack, abrasion or any other process of deterioration. The concrete should be designed without deterioration. As a matter of fact porosity and permeability are the governing parameter which is held responsible for the performance of the concrete.

II. METHODOLOGY

Experimental Programme

The main aim of this experimentation work is to find the effect of addition of retarder admixtures on the properties of retempered concrete. Portland Pozzolona Cement and locally available aggregates and crushed sand were used in the experimentation. The specific gravity of fine and coarse aggregate was 2.74 and 2.84 respectively. The experiments were conducted on a mix proportion of 1: 1.81: 3.18 with water cement ratio (w/c) equal to 0.52 which corresponds to M 20 grade of concrete.

After thoroughly mixing all the ingredients in dry state, the required quantity of water was added in the mix and thoroughly mixed. At this stage the homogeneous concrete mix was obtained. This concrete mix was

covered with gunny bags for 15 minutes. The time was reckoned, Another set of retempered concrete specimens were cast by adding 0.2% retarder and the required extra amount of water to balance a w/c ratio of 0.52 for M20. Slump and compaction factor are shown in table no 1. All the specimens were demoulded and were transferred to curing tank to cure them for 3days, 5days, 7days, 14days and 28 days. We have made testing of the cube cure for 3days, 5day & 7days on Seventh day. After curing the specimens were tested for their compressive strength as per IS specifications. For compressive strength test, the cubes of dimensions 150 mm X 150 mm X 150 mm were cast and were tested under compression testing machine as per I S 516-1959. Compressive strength of retempered concrete are shown in table no 2.

When we add more than 0.2% retarder the demoulding time of the concrete increases, due to this scaffolding cost for construction increases. The optimum percentage of retarder is 0.2%. for M20.

THE RELATIONSHIP BETWEEN STRENGTH AND POROSITY

Porosity is one of the major components of microstructure of the cement system. It influences the strength and permeability of concrete. All aspect of strength is related to the total porosity. The pore structure development in the cement pastes tends to reduce the volume of large pores during the initial stage of hydration. The presence of entrapped air capillary porous and estimated air in concrete could influence the strength properties of concrete.

RESEARCH SIGNIFICANCE

Ready-mixed (RMC) concrete which is mixed at the plant, using a normal, well-designed concrete mix, should arrive at its destination with sufficient workability to enable it to be properly placed and fully compacted. In such circumstances, where there is a significant period of time between mixing and placing the concrete, there will be a noticeable reduction in the workability of the fresh concrete. If for any reason, the placement of the concrete is unduly delayed, then it may stiffen to an unacceptable degree and site staff would normally insist on the rejection of a batch or otherwise good concrete, on the grounds of insufficient workability. If not rejected, excessive vibration would be needed to attempt to fully compact the concrete, with the risk of incomplete compaction, expensive repair, or, at worst, removal of the hardened concrete.

TABLE 1. SLUMP AND COMPACTION FACTOR OF RETEMPERED CONCRETE

Retempering time	O.2 % retarder	
	Target Slump = 50 mm	Compaction factor =0.95
0 minutes	80	0.93
20 minutes	77	0.92
40 minutes	68	0.86
60 minutes	33	0.85
80 minutes	22	0.82

Table 2. COMPRESSIVE STRENGTH OF RETEMPERED CONCRETE

Retempering time	Compressive Strength in days in N/mm2				
	O.2 % retarder				
	3 days	5 days	7 days	14 days	28 days
0 minutes	20.45	22.50	26.80	27.70	28.20
20 minutes	20.31	22.35	26.66	27.61	28.09
40 minutes	19.06	21.33	23.31	25	27.65
60 minutes	17.06	19.51	22.37	24.09	26.84
80 minutes	14.38	15.52	16.93	20.26	22.29

III. CONCLUSIONS

The concrete with 0.2% retardar and 3 days of curing shows target strength up to 40 min.
The concrete with 0.2% retardar and 5 days of curing shows target strength up to 60 min.
The concrete with 0.2% retardar and 7 days of curing shows target strength up to 60 min.
Due to retempering target strength up to 80 min. reduces even for 7 days of curing.

With above all conclusions 1, 2, 3 and 4 we have to cure the retempered concrete for minimum 7 days.
From table no1 we can conclude that the compaction factor for 60 and 80 reduces with reference to the standard compaction factor which indicates the porosity of concrete.
Due to inadequate curing, rate of hydration changes which leads to increase in porosity of the concrete.
With the help of conclusion no. 6 and 7 we may conclude that due to retempering and inadequate curing strength and durability of concrete decreases.
From above all conclusions our observation proves that to get the required strength and durability of concrete a minimum curing period should be 7 days and maximum retempering time is 60 min.

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REFERENCES

[1]. M.S. Shetty, "Concrete Technology Books", S. Chand and company Ltd. 1st edition 1982
[2]. A.R. Pethkar, G.Deshmukh "Retempering of Concrete made by using Manufactured Sand" J. Inst. Eng. India Ser. A (April-June 2014) 95(2):105-108
[3]. A.R. Pethkar, G.K.Deshmukh " Comparison of strength between Retempered concrete of two different grades"The Indian Concrete Journal, September 2016, Vol. 90, Issue 9, pp.22-24