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A REVIEW RESEARCH PAPER ON SELF CONSOLIDATING CONCRETE

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A B S T R A C T

The Ordinary Concrete has difficulty in compaction due the complex shape of concrete structure and densely arranged bars. In Compaction process some problems are faced like noise of vibratory machine, harmful to health of workers and creates nuisance to neighboring peoples. Skilled worker who knows the compacting work are difficult to find in the Remote areas. So, we have an alternative of the Ordinary Concrete. An innovative type of concrete – "Self Compacting Concrete (SSC)" which does not require vibration to set and compact. It flows due to its own weight, Formwork is filled completely, and full compaction is achieved, even in the dense reinforcement.

Keywords:
Self Compacting Concrete; noise-free concrete, environmental-friendly, Fly ash, Aggregate.

1.1. Need of study:

The Ordinary Concrete has difficulty in compaction due the complex shape of concrete structure and densely arranged bars. In Compaction process some problems are faced like noise of vibratory machine, harmful to health of workers and creates nuisance to neighboring peoples. Skilled worker who knows the compacting work are difficult to find in the Remote areas. So, we have an alternative of the Ordinary Concrete. An innovative type of concrete – "Self Compacting Concrete (SSC)" which does not require vibration to set and compact. It flows due to its own weight, Formwork is filled completely, and full compaction is achieved, even in the dense reinforcement. It has the same engineering properties as the Ordinary concrete. As Industrial waste is used and noise-free concreting, SSC is environmental-friendly. As vibration is not required the cost of equipment is reduced. In SSC to measure the flow characteristics Slump flow test apparatus is used.

1.2. Objects:

An innovative type of concrete – "Self Compacting Concrete (SSC)" which does not require vibration to set and compact. It flows due to its own weight, Formwork is filled completely, and full compaction is achieved, even in the dense reinforcement. It has the same engineering properties as the Ordinary concrete. As Industrial waste is used and noise-free concreting, SSC is environmental-friendly. As vibration is not required the cost of equipment is reduced. In SSC to measure the flow characteristics Slump flow test apparatus is used. So, Self-compacting Concrete can be used instead of Ordinary Concrete.

1.3. Methodology:

From the review of the research paper, the mixing proportion of the samples are the given below are some mix designations followed: -

Mix-1: 15% fly ash and 85% cement
Mix-2: 25% fly ash and 75% cement
Mix-3: 35% fly ash and 65% cement
Mix-4: 45% fly ash and 75% cement
Mix-5: 55% fly ash and 65% cement

First of all, with sufficient water the fine and coarse aggregates are mixed in a pan-type mixer for 30 seconds. Then with 70% of mixing water the cement and fly ash were added together for 2 minutes. Finally, the super plasticizer is added with remaining water are mixed for 1 minute. For next 2 minutes the mixing is halted and for another 2 minutes the mixing is continued.

The moulds are being cleaned and oiled for easy demolding. The mould is of cubes, beams and cylinder. After conducting the experiment of flow characteristics for strength assessment the concrete mix was poured in the moulds. After pouring concrete in the moulds no compaction is given. Even finishing operation is also given. The casting specimen is demolded after 24 hours and transferred to the curing tank. The specimen is removed from the curing tank after its curing period of 7, 14 and 28 days and then all faces are screed off and then testing is done.

1.4. Tables Mixing Proportion

Mix designation	Mix-1	Mix-2	Mix-3	Mix-4	Mix-5
Cement (kg/m^3)	446.25	393.75	341.25	288.75	236.25
Fly ash(kg/m^3)	78.75	131.25	183.75	236.25	288.75
Fine Aggregate (kg/m^3)	850	850	850	850	850
Coarse Aggregate (kg/m^3)	850	850	850	850	850
Super plasticizer	1.30%	1.35%	1.40%	1.45%	1.50%
Water	199.50 (0.38)	210.00 (0.40)	220.50 (0.42)	236.25 (0.44)	288.75 (0.46)

Ref. N R Gayawala, Student of M.tech (research), Department of Applied Mechanics, S V National Institute of Technology, Surat-395007, Gujarat, India.

Harden Properties of SSC

Description	Tests to be performed				
	Comp. strength test	Split tensile test	Flexural test	Pullout test	Durability test
Specimen Size (cm)	Cube (15x15x15)	Cylinder (15 Dia.&30 Ht)	Beam (10x10x50)	Cube (15x15x15)	Cube (15x15x15)
No. of Specimen	3	3	3	3	3
Days of Testing	7, 14, 28	7, 14, 28	7, 14, 28	7, 14, 28	15, 30, 60, 100
Total nos. of Specimen	9	9	9	9	9
Volume (m^3)	0.003375	0.0053	0.005	0.003375	0.003375
Volume for all specimen (m^3)	0.0304	0.0477	0.0450	0.0304	0.0304
Total Volume of Concrete in Cum = 0.1809					

- Ref. of B Raijiwala, Associate Professor, Department of Applied Mechanics, S V National Institute of Technology, Surat-395007, Gujarat, India.

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1.5. Conclusion:

Without any external mean of compaction, SSC gives the good finishing as compared to ordinary concrete. The Maximum Compressive strength, Maximum Tensile strength, Maximum flexural strength and Maximum Pullout strength for SSC can be obtained by addition of 15% of fly ash in mix as compared to addition of 25%, 35%, 45% and 55% cement replacement by cement. Good durability property is given by SSC than ordinary concrete. So, M25 grade concrete are used in construction of heavily congested reinforcement structures and high-rise buildings, this mix proportion can be adopted.

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