Modification of Revolutionary Product Concrete Cloth

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Abstract - *This article features a trial and error method adopted for modification of Concrete Cloth. Various locally available material were collected and tested to make modified Concrete Cloth cost effective and to the same result as Concrete cloth. First Trial was done with OPC 53 grade cement, M sand, polypropylene fibre, gunny bag, wire mesh, fibre glass weaving thread. Wire mesh used in first trial was not giving the smooth flexibility as needed so in second trial it was replace by a glass fibre mesh with rest of the material being the same. It also has issues with the spilling out of cement through gunny bag. Therefore in the third trial gunny bag was replaced by cotton canvas rest of the material being same as second trial. All concrete cloth formed from these three trial were tested. Transverse strength test, abrasion test, water absorption test, durability test, surface roughness test etc. were conducted on samples.*

Key Words: modified concrete cloth, wire mesh, concrete mix, Polypropylene fibre, gunny bag, M sand

1.INTRODUCTION

Worldwide there is increasing demand for construction and construction materials, for that concrete is the most extensively used material in construction. Since a very long time, construction has followed conventional methods. And there are no provisions for very rapid and emergency workable concrete installation methods.

Concrete cloth is an upcoming revolution in civil world, which in turn have a wide range of application in rapid construction, in state of emergency etc. Due to its own physical property namely flexible and easy to use. Concrete cloth is a cement impregnated fabric that hardens when hydrated to form a thin, durable, water and fire proof concrete layer. This evolution may lead to a new way of construction without the use of the mixing equipment. Thus it makes construction much easier in just two steps; placing the concrete cloth and spraying water over it.

Concrete Cloth is a ceramic material because of which it is fire and water proof. Concrete Cloth has a number of applications in the civil and construction sectors. Other applications for CC include Roofing, Water Tanks, Flood defences, tunnel lining, retaining walls, erosion control, building cladding etc.

1.1 OBJECTIVE

- The main aim of the project is to modify concrete cloth by using locally available materials.
- To find the properties of modified concrete cloth.

1.2 METHODOLOGY

The process starts from selection of material and collection, laboratory testing, data analysis, preparation of concrete cloth, tests on concrete cloth and finally analysing the results.

Locally available materials : Gunny bag, OPC (53 grade), wire mesh (1.5mmx1.5mm size), polypropylene fibre, M sand, fibre glass weaving thread, Glass fiber mesh, cotton canvas were collected. The collected materials were tested and compared with the standard one. Three trials were conducted. After curing various test were conducted.

2. PROCEDURE

1st Trial:

Materials Used: Gunny bag, OPC (53 grade), wire mesh (1.5mmx1.5mm size), polypropylene fibre, M sand and fibre glass weaving thread.

Comment about preparation:

In this trial wire mesh was used as reinforcement for the preparation of modified concrete cloth. but the final product was not much flexible in nature. It was foldable but the flexibility was less. So in the next trial instead of steel mesh; fibre mesh was used.

2nd Trial:

Materials used :

Gunny bag, OPC (53 grade) ,polypropylene fibre, M sand, fibre mesh and fibre glass weaving thread.

Comment about preparation:

This trial gives primary requirement of the product such as good flexibility. The main difficulty in this trial is that the pore size of the gunny bag is larger than what we required. So during folding some amount of cement was escaping through these pours. It will affect the various properties of modified Concrete Cloth. So in the next trial replaced the gunny bag with a cotton cloth.

3rd Trial:

Materials used:

Gunny bag, OPC 53 grade, fibre mesh, polypropylene fibre, M sand, fibre glass weaving thread.

Comment about preparation:

The pore size of cotton cloth is very small so cement retained in the product. And also it gave good flexibility.

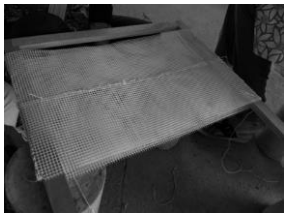

Fig-1: Fixing

Fig-2: Mixing

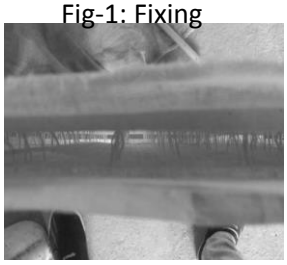

Fig-3: Weaving

Fig-4: Modified Concrete cloth

3. TESTS ON MODIFIED CONCRETE CLOTH

Table -1: water absorption test

WATER ABSOTPTION TEST		
SL NO	TYPE	% WATER ABSOPTION
1	Gunny bag with steel wire mesh	8.43
2	Gunny bag with polypropylene fibre	8.55
3	Cloth with fibre mesh	6.54

Table -2: Transverse strength test

TRANSVERSE STRENGTH TEST		
WET TEST		
SL NO	TYPE	BREAKING LOAD(N)
1	Gunny bag with steel wire mesh	1311.76
2	Gunny bag with fibre mesh	1432.12
3	Cloth with fibre mesh	1335.68
DRY TEST		
SL NO	TYPE	BREAKING LOAD(N)
1	Gunny bag with steel wire mesh	1415.74
2	Gunny bag with fibre mesh	1514.12
3	Cloth with fibre mesh	1430.88

Table -3: Abrasion test

ABRASION TEST		
WITH GUNNY BAG		
SL NO	TYPE	LOSS IN THICKNESS
1	Gunny bag with steel wire mesh	1.67
2	Gunny bag with fibre mesh	1.0
WITH OUT GUNNY BAG		
SL NO	TYPE	LOSS IN THICKNESS
1	Gunny bag with steel wire mesh	0.61
2	Gunny bag with fibre mesh	0.65

ABRATION TEST		
WITH CLOTH		
SL NO	TYPE	LOSS IN THICKNESS
1	Cloth with wire mesh	0.84
2	Cloth with fibre mesh	0.86
WITH OUT CLOTH		
SL NO	TYPE	LOSS IN THICKNESS
1	Cloth with wire mesh	1.0
2	Cloth with fibre mesh	0.65

Table -4: Surface hardness test

SURFACE HARDNESS				
SL NO	TYPE	REBOUND VALUE	COMPRESSIVE STRENGTH. (N/mm2)	AVERAGE COMPRESSIVE STREGTH(N/mm2)
1	Gunny bag with steelwire mesh	21	16	21.75
		25	21.5	
		26	22	
		20	14	
2	Gunny bag with polypropylene fibre	25	21.5	25.25
		27	24	
		21	16	
		28	26.5	
3	Cloth with fibre mesh	20	14	14
		21	16	
		23	18.3	
		20	14	

It is clear from the above test results that the value of gunny bag with fibre mesh as reinforcement is a better suited composition for this product. It gives good results in transverse strength test (1432.12N and 1541.12N) and surface hardness test (25.25). Hence it is safe to conclude from the three trials that gunny bag with fibre mesh as reinforcement is better composition than the other two.

3. CONCLUSIONS

Modified Concrete cloth is the latest and extremely useful innovation in field of construction. It is time and material saving technique. It is durable, flexible, economical and time saving. It allows concrete construction without the need of plant and mixing equipment. Simply position the modified concrete cloth and add water. It is less expensive to install compared to the conventional concrete.

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