IMPACT OF CHEMICAL ON CONSTRUCTION INDUSTIRES

[1]Bhavik Ramjiyani, [2]Harshil Patel, [3]Paras Patel, [4]Sachin Pawar
[1,2,3]Students, [4]Asst. Prof
[1]Department of civil engineering,
[1]Vidya vikas education trust Universal College of engineering, Vasai, India

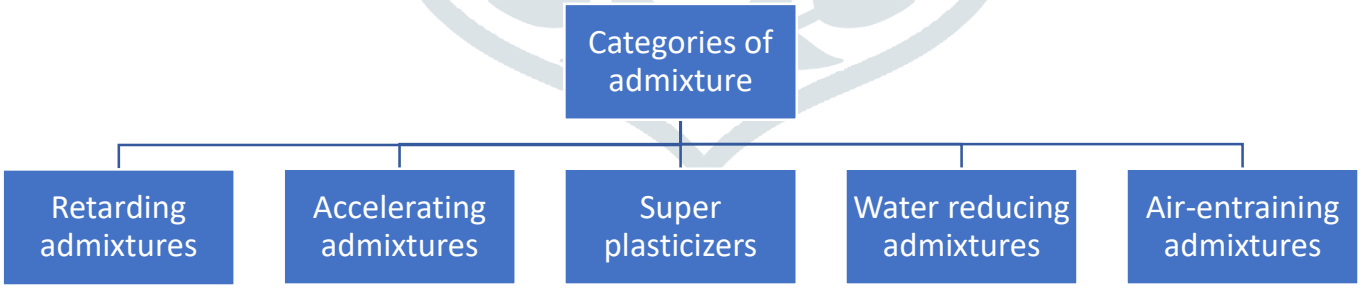
Abstract: There are many types of chemicals which are used in ***Construction industries*** apart from materials such as **(1)** ***Waterproofing chemicals***: On construction joints, bathroom drop slabs, terrace slab**. (2)*Grouting chemicals*:** For grouting of reinforcement and cracks**. (3)** ***Paints*:** To protect reinforcements (epoxy paints), walls (water or oil-based paints **(4)** ***Admixtures:*** Super plasticizers are very popular for enhancing the workability and creating flow able concrete. There are other admixtures too like accelerator, retarders which may be used according to requirement. **(5)*Surface Hardeners*:** Hardens the surface of a floor of concrete making it resistant to wear. It completely depends on type of construction is going on and what type of maintenance is required for repairs of any construction structure. This research paper will highlight the important of uses of chemical and methodology of repairs and maintenance of building structure. To study the characteristics of the admixture known as super-con 100, conducted several tests on concrete and mortar, with help of test results we will create compression graph which will show the actual need of admixture to increase the compressive strength

Keyword- Plasticizers, Workability, Maintenance, Repairs, Chemicals, Construction, Water Reducer, Admixtures.

Introduction

Maintenance is nothing but the work that is undertaken to improve facilities, services and surroundings and to sustain utility values of the building structure. Repairs are needed for the detoriation of building fabric which occurs due to climatic condition and wear and tear by building users

Objectives of this type of chemical is to limit detoriation, at regular interval inspection are carried out, in basis of effective maintenance action are taken for remedy problems, for the repairing of building or any place sustainable significance is carried out, it is important to keep the building in use for Repairs and maintenance the effective durability we require various chemicals that are mentions as



There are some of the admixtures which does not fit in these categories, which includes bonding, reduction of shrinkage and also includes coloring and damp proofing.

Super con -100 is pure melamine based super plasticizer which helps to improve compressive strength of concrete and it also effect water cement ratio by reducing water.

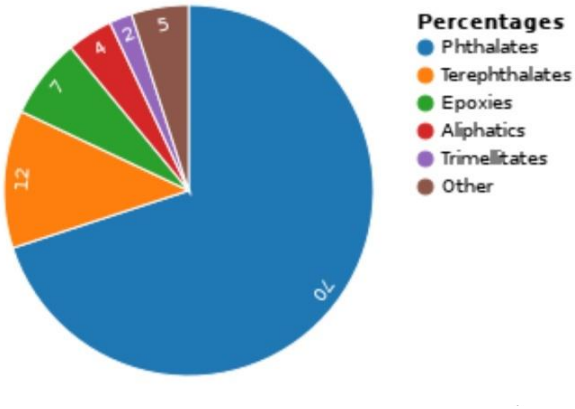


Figure 1 Shares of global plasticizer consumption in 2014

Chemicals which is used known as super-con 100 which is super plasticizer which is used in our methodology for checking compressive strength of concrete

Super plasticizers

It is the plasticizer which includes water reducing admixtures, commonly reoffered to water reducer, they are high range water reducers which allows large water reduction or greater flow ability without substantially slowing set time or increasing air entrainment. Each type of super plasticizer has defined ranges for the required quantities of concrete mix ingredients along the effects, along with the effects. They maintained a specific consistency and workability at a greatly reduced amount of water. They produce a high strength concrete. Most type admixtures, super plasticizer affect other concrete properties as well. The special effects however should be found from manufacturer or concrete supplier.

Super con-100 is an admixture known as Super plasticizers, also known as plasticizers, include water-reducing admixtures. Compared to what is commonly referred to as a “water reducer” or “mid-range water reducer”, super plasticizers are “high-range water reducers”. High range water reducers are admixtures that allow large water reduction or greater flow ability (as defined by the manufacturers, concrete suppliers and industry standards) without substantially slowing set time or increasing air entrainment. Each type of super plasticizer has defined ranges for the required quantities of concrete mix ingredients, along with the corresponding effects. They can maintain a specific consistency and workability at a greatly reduced amount of water. Dosages needed vary by the particular concrete mix and type of super plasticizer used. They can also produce a high strength concrete. As with most types of admixtures, super plasticizers can affect other concrete properties as well. The specific effects, however, should be found from the manufacturer or concrete supplier. Super-con admixture is a chemical admixture that can be added to concrete mixtures to improve workability. Unless the mixed is starved of water, the strength of concrete is inversely proportionally to amount of water added or water cement ratio. In order to produce strong concrete, less water is added which makes the concrete mix less workable and difficult to mix, necessitating the use of plasticizer, water reducers, super plasticizer or dispersants.

Objective:-

1. To study the characteristics of the admixture known as super-con100
2. To Conduct several tests on concrete and mortar mixed with super-con 100
3. To study the impact of admixture (supercon 100) on the concrete properties

Methodology

We have conducted the several test based on the added admixtures and compare those with the without using any admixture and study the results based on the test, those test are compressive test of concrete and other test is permeability also called as water penetration test as shown in following,

1. Preparation of concrete blocks.

1. We measured accurately 87.5kg of coarse aggregate and spread it on a dry clean metallic mixing trough.

2.40Kg of fine aggregate already measured was spread on the coarse aggregate in the mixing trough.

3.22Kg of cement already measured was also spread on the ingredients already present in the mixing trough.

4. The ingredients in the trough were thoroughly mixed using the standard procedure for hand-mixing until a uniform colour mixture attained.

5.9.9Kg of Water already measured was added gradually while mixing was continued until uniform coloured mixture was achieved.

6. Using trowels the steel moulds were filled with the concrete mix in layers tamping 25times before another layer was added. The surfaces were levelled using a trowel and the top surface of the specimen marked for identification.

7. The moulds were left in the laboratory for 3days.After which the demoulding was done and the block placed inside a temperature-controlled water bath for curing.

As the major concern of this experiment was more of compressive strength than mix proportion the following values were used for quantity evaluation are as follows for mortar and concrete:

Design Specifications

MORTAR

For cube size of	70.6mmx70.6mmx70.6MM
Vol of 1 cube	0.000351 cum
Bulking and wastages	35%
1 cube vol	0.000479 cum
Total no of cubes	30NOS
30 CUBE VOL (18 control & 12 for test)	30x0.000479 = 0.0142 cum
NOW,	
Quantity of cement	0.0142/5 x 1=0.00284 cum
No of bags	0.00284/0.035 =0.08 NOS
In kgs	4.05-5KG
Quantity of sand	0.0142/5 x 4=0.011 cum
In kgs	28-30KG

1:1:2 (m25) concrete (nominal mix)

For cube size of	150mmx150mmx150mm
Vol of 1 cube	0.00337 cum
Dry volume	52%
1 cube vol	0.00513 cum
12 NO OF CUBES (6 control & 6 for test)	12NOS
Total quantity	12x0.00513=0.0615 cum

Now,

Quantity of cement	00.0615/4 x 1=0.015 cum
No of bags	0.015/0.035 =0.439 NOS
In kgs	21.96-22KG
Quantity of sand	0.015/4 x 1=0.01539 cum
In kgs (sp wt 2600)	40KG
Quantity of aggregate	0.015/4 x2=0.03078 cum
In kgs (sp wt 2850)	87.5KG

Volume of a bag of cement: 0.035M3.

2. Compressive strength test.

1. All required apparatus/equipment were confirmed.

2.4 Specimens i.e. 1cube were removed from the curing bath.

3. Wore hand gloves, Excess water were wiped out and the specimen left to dry out for approximately 5mins.

4. The mass of the 2 specimens was each measured using a weighing balance and recorded.

5. The cube specimens were centred in the universal testing machine after wiping the upper and lower plates of the UTM however for the cylindrical specimen steel plates were place above the specimen which lay in a horizontal position each at a time.

6. The UTM was then set to compression, the value for the load rating and the operation of machine were done through assistance by the laboratory technician on duty.

7. The load was continuously applied at a constant rate without no shock.

8. Immediately the specimen start to break the UTM automatically switched off.

10. The machine was cleaned by cleaning the creaked concrete from the machine.

11. The recorded value was then matched by the display once more and then the machine was switched off.

12. The procedure was repeated for all the specimens for all the days we carried the compressive strength i.e. 28 days as directed by the laboratory technician.

Permeability of concrete:

The property which shows the rate of flow of a fluid into porous solid is defines permeability. In other words, Permeability can be defined as the ability to resist weathering action, chemical attack, abrasion, or any process of deterioration.

It occurs in hardened concrete in two ways

1. From the trapped air pockets when the compaction is incomplete.
2. By evaporation from the empty space due to losses of mixing water.

3. Permeability test:

1. Concrete cubes are place in the permeability apparatus as shown in Fig no 2.
2. There is six slots in that apparatus we have placed both casted cubes the non-chemical mixed are the top side and the chemical added cubes are at bottom sides
3. Water are used for penetrating in the concrete cubes for 3 days of continuous water pressure
4. After completion of test period blocks are removed and going for UTM Lab
5. In laboratory we have noted the cubes weight and then placed in UTM
6. The point load compression test is conducted on the cubes
7. The cubes were breaks in the middle parts as shown in fig no 3.

Figure 2 Permeability test Apparatus

Figure 3 Cubes after point load

Results and analysis:

Load against time generated by UTM during crushing of concrete.

Table 1: Controlled cube results without use of any admixtures

Without supercon 100									
ID	L (mm)	B(mm)	H(mm)	Weight (Kg)	DOC	DOT	Load (mpa)	Compressive strength	Avg KN
2L	149	152	149	8.51	6-02-19	6-03-19	557700	24.62	25.75
3L	151	150	150	8.35	6-02-19	6-03-19	577700	25.51	
7L	148	152	150	8.38	6-02-19	6-03-19	578600	25.72	
1L	150	149	150	8.33	6-02-19	6-03-19	572600	25.62	
5L	149	150	149	8.47	6-02-19	6-03-19	609700	27.78	

Table 2: Admixture added cube test results

With supercon 100									
ID	L (mm)	B(mm)	H(mm)	Weight (Kg)	DOC	DOT	Load (mpa)	Compressive strength	Avg KN
1	150	150	150	8.34	4-02-19	4-03-19	527600	23.45	27.832
2	150	149	148	8.57	4-02-19	4-03-19	743800	33.28	
3	148	150	150	8.30	4-02-19	4-03-19	628000	28.29	
4	149	148	149	8.41	4-02-19	4-03-19	567800	25.75	
5	150	149	149	8.53	4-02-19	4-03-19	634500	28.39	

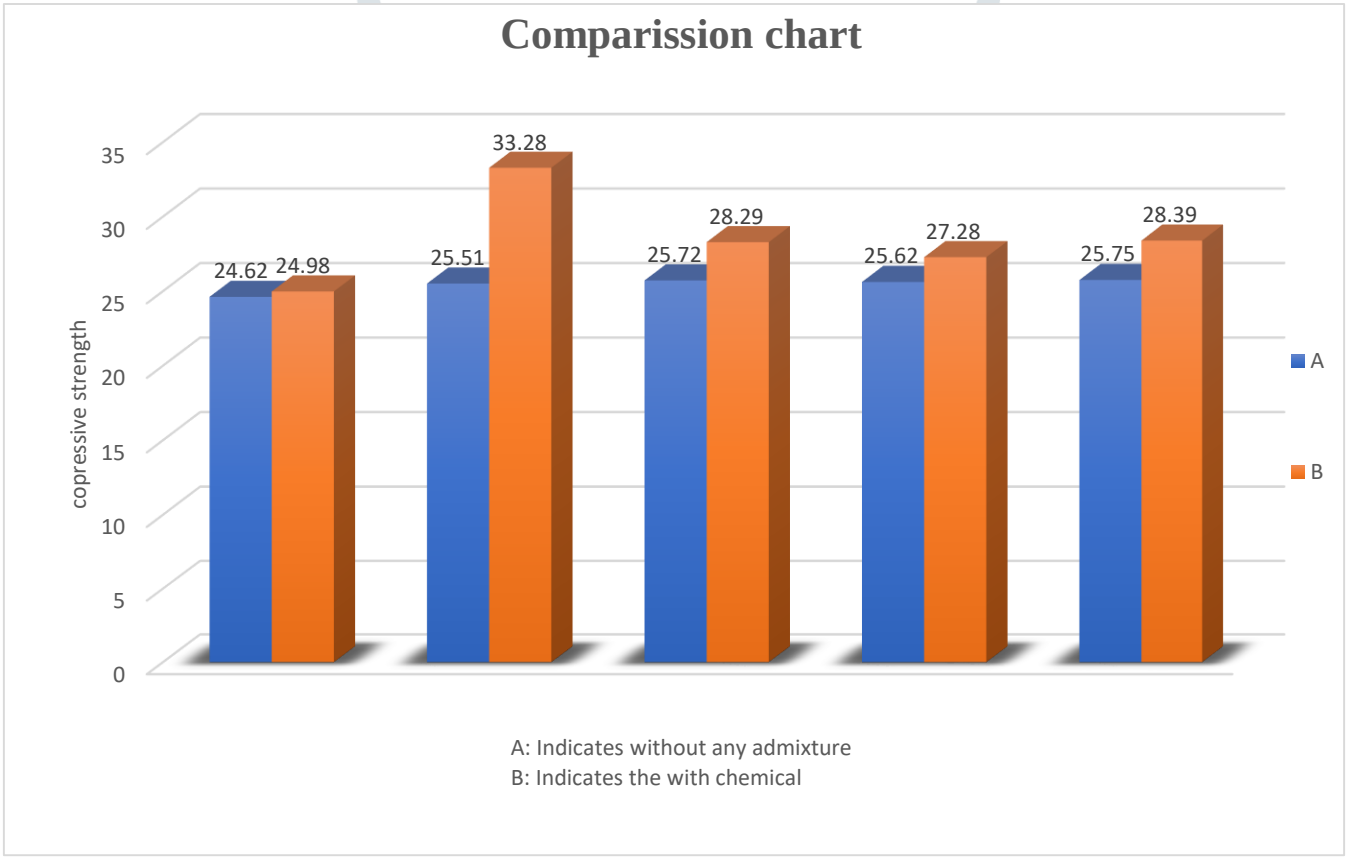


Figure 4 Compressive test Compression Bar chart

Remark:

We have observed that there is a drastic increase in the compressive strength of about 8.08% by adding of chemical of about 1% of cement weight.

Table 3: Water penetration Test Results

Type	CUBE ID	WEIGHT OF SPECIMEN	WATER PENETRATION (mm)						MAXIMUM DEPTH (mm)
			1	2	3	4	5	6	
Without Supercon 100	1791	8.454	58	58	40	48	51	56	58
	1792	8.495	9	8	29	19	14	8	29
	1793	8.267	22	27	26	21	28	24	28
With Supercon 100	1794	8.070	22	26	26	21	26	24	26
	1795	8.383	10	20	18	20	16	16	20
	A-163	8.083	10	20	18	24	16	16	24

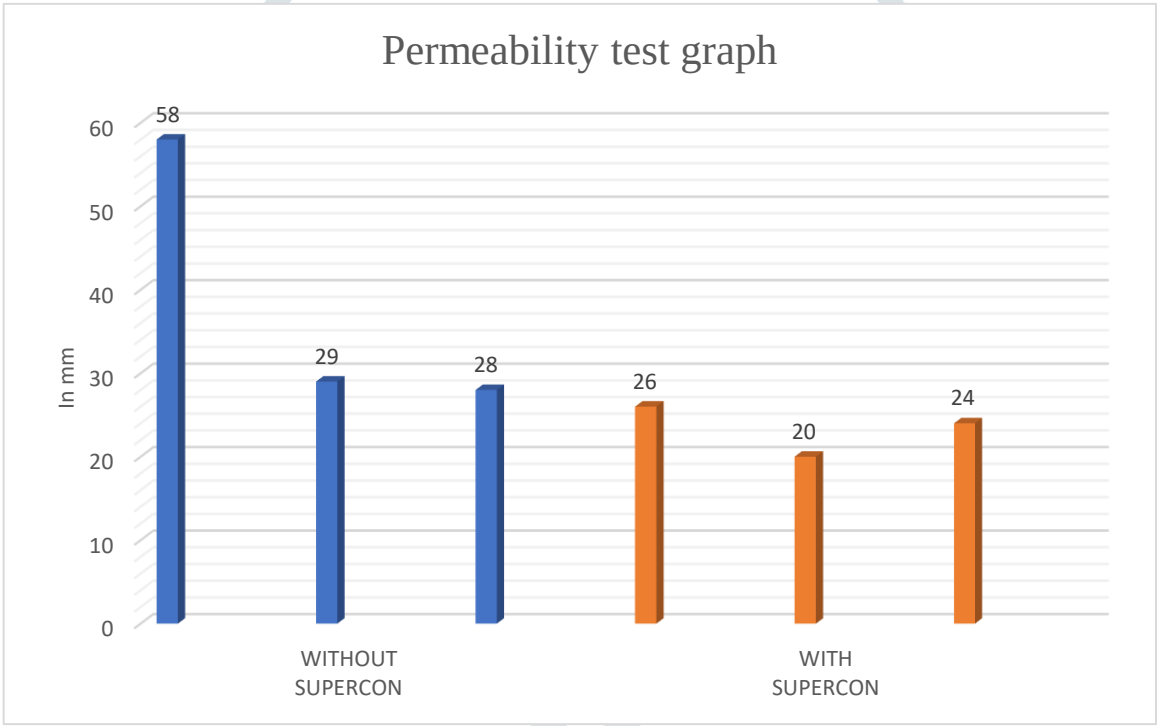


Figure 5 Permeability test Compression Bar chart

Remark:

The above results shows the less permeability in aided admixture whereas without use of chemicals with greater permeability

Conclusion: -

The results shows that the mixed admixtures in concrete have impacted the compressive strength of concrete in much effective manner and increased the compressive strength, also there was less penetration observed in cubes which were having chemicals than the normal concrete cubes that indicates the be lesser seepage which will increase the life and strength of concrete.

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