



A REVIEW PAPER ON MAGNETIC WATER USE IN CONSTRUCTION

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Abstract: - The most important challenge of the construction industry is to extend the life of the project work. This is possible by improving the quality of materials like steel bars, cement water quality etc. But in this review we focus specially on concrete, what are possible ways to increase the properties of concrete. Within the last decades new technology was invented in Russia and China called as magnetic water technology. This technology used in construction industry. Magnetic water was created using electromagnetic fields. In this magnetic water technology, a mechanism for magnetic water treatment was designed and its application on the ions contain in water has been passed through magnetic field to check the effect of magnetic water on concrete and change in the physical properties of the tendency.

Keywords: - Magnetic water, Magnetic technology, magnetic field, compressive strength, workability, water quality.

I. INTRODUCTION

As we know water is a very limited resource, it should be used efficiently. We also know that in construction industry use of water is done at higher level. We can optimize the water usage in construction industry by using magnetized water, so what is magnetized water, Magnetized water is a water which is passed through a magnetic field it is an inexpensive, ecofriendly water treatment and water charging method, it has very less installation charges and no energy requirement. The most important challenge for concrete technology is to improve the properties of concrete, to increase the compressive strength of concrete and to get more workable concrete at less water. Contents are the aims, so, with use of magnetized water usage of water will minimized with increasing concrete properties. The cost of these methods cannot be compared with their advantages. Therefore, it is necessary to focus on making economical concrete with high strength.

II. MATERIALS

Materials used in concrete are specified as per grade of concrete. The grade of concrete varies as per the changing proportion of its materials. The proportion and ratio for materials that should be mixed to obtain the grade of concrete are specified by IS 456:2000. Ordinary Portland cement of 53 grade is used as per IS 12269. Natural river sand, crush sand, M sand is used as fine aggregate. Fine aggregate passing through 4.75mm sieve as per IS:383, coarse aggregate which is locally available is used with a nominal size of 20mm.

Mix Proportion

Proportion of concrete should be selected to make the most economical use of available materials to produce concrete of required quality. the concrete mix design will be prepared by laboratory design using IS 10262:2009.

III. PROPERTIES OF MAGNETIC WATER

Mechanical properties

The experimental study shows that the mechanical properties of MW has comparatively better effect on concrete than NW. The compressive split tensile and flexural strength of MWC enhances the maturity of the concrete increases by continuous hydration mechanism which reduces the porosity of concrete. The use of magnetic water reduces greenhouse gas emissions^[5]

With reference to another experimental study, it is said that magnetic water mixed concrete will have high compressive strength, splitting tensile strength, flexural strength and a lower mass/compressive strength loss under acid attack and water absorption than control mix specimens due to their greater density and more efficient degree of cement hydration^[6].

The scope of the study is to improve water quality standards and reduce the water-cement ratio thereby reducing the use of cement materials and porosity of concrete.^[4]

2.workability Test-

The workability of fresh concrete prepared by MFTW (Magnetic Field Treated Water) and normal water was resulted as using normal water in concrete, medium slump(75mm) was achieved 0.5w/c ratio but magnetic water medium slump value is achieved for 0.45w/c ratio, hence cement ratio is reduced about 11% while using MW.^[3]

3. Water Properties-

From the current study, use of magnetic field for water treatment changes physical and chemical properties of water. Where the surface tension, viscosity and electrical conductivity were decreased and pH value was increased as compared to normal water.^[1]

IV. MIX AND CURING-

The strength properties show that magnetic water concrete producing high strength than normal water at the earlier curing age. The concrete samples cast and cured with magnetic water gives 20% efficient than the normal water^[4]

V. MAGNETIC WATER

Magnetically treated water is the water obtained after passing through a specific magnetic field, or placing that magnet in or near this water for a period, thereby changing many of its properties due to exposure to the effect of those magnetic fields. Scientific research has shown that more than 14 properties change in water after passing through the magnetic field, including electrical conductivity, increase dissolved oxy-gen in water, increase the ability to dissolve salts and acids, crystallization, surface tension, change in the speed of reactions by, increasing permeability, etc., and the water retains its magnetic strength for 8-12 hours and then starts in slow gradual decline, although some properties of water do not change even if this water passes for a long time in this field.^[1]

The activation of water treatment using magnetic field depends on three conditions

- I. Magnetic flux density
- II. Duration of exposing water to magnetized field
- III. The amount of exposing water to the field

VI. MECHANISM OF MAGNETIC WATER

Magnetized water is water that has travelled through a magnetic flux. the magnetic properties of water are governed by its purity and the kind of magnetization. After magnetism, the structure of water is coupled in a single channel, and the size of the molecule varies with the angle of bond changes, resulting in increased fluidity and contact area with the help magnetism so that the hydration rate will rise^[5]. After the magnetization, strong hydrogen bonds were established, which leads to improved viscosity, and the static magnetic field has also been studied. the alignment of water molecules at normal temperature.

VII. ADVANTAGES:

- I. No chemical or admixture are required for concrete mix.
- II. Magnetic device can be easily installed and requires less maintenance.
- III. Concrete prepares with using MW will be cost effective, environmental Accepted.
- IV. Use of magnetic water increased the workability of concrete.
- V. Magnetic water mixes concrete shows higher compressive, split tensile and elastic strength than normal compacting concrete.
- VI. Magnetic water helps in using of concrete at early age.

VIII. APPLICATION:

- I. Magnetized water can be used for agriculture purpose.
- II. Use in fish farming worldwide.
- III. magnetized water helps in curing of concrete early age.
- IV. Magnetized water can be used in construction.

CONCLUSION:

1. The results of various literature survey have concluded that the concrete prepared by magnetic water shows significant increase in compressive strength of concrete around 10-20% as compare to the concrete prepared by normal ordinary water.
2. The results of surveys also concluded the increase in workability of concrete prepared by magnetic water. This is a good phenomenon, since the increase in workability by adding water leads to decrease in strength of concrete.
3. We have studied that the cause of this increase in compressive strength and workability is due to because the magnetized water causes less hardness as compare to normal water.
4. The hardness is reduced by such treatment because of change in CaCO₃ particles state from calcite to aragonite.
5. A literature survey also concluded that the increase in compressive strength by using magnetic water is more significant when certain percentage of cement is substituted by GBFS (Granulated Blast Furnace Slag).
6. The extent of increase in compressive strength depends upon the amount of cement substitution and the magnetic field strength used in treatment of water.

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