



## Reuse of Treated Domestic Waste Water in Concrete

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### ABSTRACT

With the ebb and flow water emergencies in India there is a need as well as any open doors to search for elective wellsprings of water and its administration in development industry. In India squander water treated is released in water bodies. So all things being equal why not utilize the treated waste water in development industry. We utilized this treated waste water. The water tests utilized were Primary Treated Waste Water (PTWW), Secondary Treated squander Water (STWW), Gray Water (GW) and Tap Water (TW). The synthetic piece of waters like pH, Alkalinity, Hardness, Total Suspended Solids (TSS) and so forth were tried in research facility which were viewed as well inside the IS principles. Utilizing Treated Waste Water tests were led on concrete, new concrete and solidify concrete. The underlying and last setting times for PTWW and GW were viewed as deferred contrast with TW, yet for STWW it was close about same as TW. The compressive strength of cement was found by projecting shapes for 7 days, 14 days, 28 days and compressive strength of concrete mortar by projecting mortar 3D squares for 7 days and 28 days. The compressive strength got from STWW was at first a sluggish interaction for example for 7 days and 14 days however the outcome acquired toward the finish of 28 days were agreeable contrasted with PTWW, GW and TW. Consequently in the wake of leading test for a wide range of water for example PTWW, STWW, GW and TW, STWW was viewed as suitable and can be utilized in development industry with least natural effect..

Keywords: concrete, compressive strength, treated waste water

### 1. INTRODUCTION:

#### GENERAL:

Water in India is fundamentally a state subject. Water is the primary piece of our life. It's undeniably true that assuming water is utilized there will be squander. So the waste water age won't ever stop. In development industry concrete being the most generally development material utilized, utilizes the majority of the water. In development industry water is utilized for blending, total washing, relieving of cement and for washing concrete related mechanical machines. Additionally water is utilized for homegrown purposes. So as said above when we use water, squander water is created. What's more, because of this waste water there is an incredible natural effect.

#### Case Study: - "PUNE CITY"

Pune is the eighth biggest metropolitan city of India and one of the quickly developing urban areas in India. Populace of Pune city is roughly 3.4million in the year 2007, and the two adjoining urban communities Pune and Junner structure a metropolitan agglomeration with practically 5.0 million occupants. The yearly populace development has been 3.5-4.0 percent beginning around 1981 and the driver of relocation is the economy and particularly the Information Technology (IT) Sector

#### The board Scenario In PUNE CITY

Pune city has complete populace of around 35 lakhs and the all out water supply is 1050 MLD. Required per capita water supply according to standard Indian standards for A class urban communities is 135 lpcd though PMC gives 229 lpcd of water. (Considering around 20% misfortunes, which involve 16% misfortunes in dispersion and 4% misfortunes during treatment). About 80 % water provided to customers get changed over in sewage in Indian metropolitan urban communities. As per gauge Pune creates more than 567 million liter sewage each day. This is under an ordinary figure of 80% because of non-immoderate utilization of water which doesn't get reflected in sewage along with due to non-metered water supply, making the real water supply as well as wastewater age a suspect. (Diary of Environmental Research and Development Vol. 7 No. 1A, July-September 2012).

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## LITERATURES REVIEW

In this part, the writing survey is referenced till date 2012. As individuals from studies in regards to the subject were completed and papers were distributed. Here a portion of the papers distributed in a similar examination are depicted with their Abstracts which show the current turn of events and interest in the Subject.

### 2.1 Research paper by IBRAHIM AL - GHUSAIN(6) on "Utilization of treated wastewater for substantial blending in Kuwait"

The reasonableness of involving treated wastewater for it was tentatively assessed to blend concrete.

Substantial 3D shape examples were projected utilizing regular water (TW), fundamental treated wastewater (PTWW), optional treated wastewater (STWW), and tertiary treated wastewater (TTWW) acquired from the SEWAGE TREATMENT PLANT, JUNNER.

The sort of water utilized for blending didn't influence substantial downturn and thickness. Notwithstanding, setting times were found to increment with weakening water quality. PTWW and STWW were found to affect impeding setting time. Concrete made with PTWW and STWW showed lower qualities (i.e., more slow strength advancement) for a long time up to 1yr. At early substantial ages of 3 and 7 days, the strength of cement made with TTWW was higher than that of cement made with TW. The chance of steel consumption expanded with the utilization of STWW and PTWW, particularly when a more slender cover to the it was utilized to support steel. In outline, tertiary treated wastewater, of the kind created from wastewater plants in Kuwait, is viewed as reasonable for blending concrete in with no antagonistic impacts.

### 2.2 Research paper by K. S. AL-JABRI , on "Impact of utilizing Wastewater on the Properties of High Strength Concrete"

This paper examines the impact of utilizing wastewater on the properties of high strength concrete. Wastewater tests were gathered from three vehicle washing station in Muscat region. The gathered wastewater tests were combined as one and substance examination was done. Four water tests, including controlled consumable (regular) water were examined for pH, absolute disintegrated solids (TDS), chloride, hardness, alkalinity, and sulfates. Synthetic investigation results showed that albeit the compound syntheses of wastewater were a lot higher than those boundaries found in regular water, the water structure was inside the ASTM standard cutoff points for all substance demonstrating that the wastewater created can be involved Reuse of Treated Domestic Waste Water in Concrete JCEI'S Jaihind Polytechnic, Kuran 6 acceptably in substantial combinations. High strength substantial combinations were arranged utilizing various extents of wastewater and water-to-solidify proportion of 0.35. The level of wastewater supplanted went between 25-100 percent of regular water utilized in concrete. For each substantial blend, six

150mmx150mmx150mm solid shapes, three 300mmx150mm dia. chambers and three

100mmx100mmx500mm crystals were projected. Droop, compressive, ductile and flexural not set in stone at 28-day of restoring. 3D shape compressive strength not entirely set in stone at 7-

day of restoring. Additionally, beginning surface ingestion test was directed at 28-day of restoring to survey the sturdiness of cement. Results showed that the strength of cement of the blends arranged utilizing wastewater was equivalent with the strength of the control combination. Likewise, the water ingestion of cement isn't impacted when wastewater was utilized.

### 2.3 Research paper by Marcia Silva on "Maintainable Use of Resources - Recycling of Sewage Treatment Plant Water in Concrete"

Concrete is the most broadly involved development material on the planet. Creation of Portland concrete utilized in substantial produces over 2.5 billion tons of carbon dioxide and other ozone harming substances around the world. Also, concrete is one of the biggest water drinking ventures. Roughly 150 liters of water is required per cu. m. of substantial blend, disregarding different uses of water at the substantial business. Water is a basic natural issue and water supplies and water quality are turning out to be more restricted around the world. This paper presents an outline of the present status of information about the utilization of recycled water, particularly somewhat handled sewage treatment plant water in concrete. Based on distinguished information, an underlying research facility examination was led. A point by point research plan has likewise been created for extra information on this theme to comprehend and to decrease the natural effects of the substantial business. This primer examination observing proposed

that massive contrast don't exist between mortar 3D shapes made of consumable water Vs sewage treatment plant water.

#### 2.4 Research paper by MOHAMMAD SHEKARCHI on "Utilization of organically treated homegrown waste water in concrete"

The substantial business is polishing off every year one billion tones of blending water in with huge amounts of new water which are additionally utilized for washing total and restoring concrete Reuse of Treated Domestic Waste Water in Concrete JCEIS Jaihind Polytechnic, Kuran 7 by prepared blended substantial industry. An assortment of result materials have been effectively fused as unrefined substance substitutes, added substances, and admixtures in concrete and substantial innovation. A similar situation may be considered for homegrown waste water.

In this concentrate on three sorts of water got from a nearby plant of treatment of homegrown waste were performed on concrete glue, mortar and substantial examples. Some toughness qualities of cement have been additionally examined. The outcomes affirm the plausibility of involving organically treated squander water in substantial industry when it is contrasted and the consequences of reference examples made up with faucet water

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## Methodology

A test examination was completed to assess the plausibility of treated squander water in concrete. To accomplish previously mentioned goals we performed different trials on concrete and cement with the assistance of PTWW, STWW, and GW and contrasted the outcomes and TW.

- Compound boundaries like pH, Alkalinity, Hardness and TSS were tried for PTWW, STWW, GW and TW and contrasted the outcomes and IS guidelines.
- The test like consistency of concrete, beginning setting season of concrete, last setting season of concrete, compressive strength of concrete were done on solidify.
- Tests on concrete were usefulness, compressive strength of concrete, elasticity of cement and flexural strength of cement.
- To get compressive strength of concrete we projected the mortar 3D square examples for 7 days and 28 days by blending PTWW, STWW, GW and TW.
- For compressive strength of concrete, substantial shapes were casted for 3 days, 7 days, 28 days and 60 days by blending PTWW, STWW, GW and TW.

### 3.3.1 Method of blending

The substantial is blending by gauging technique.

1. First the blender was cleaned.
2. The coarse totals, fine totals, fly debris and concrete were filled the blender and dry blending was completed for 2 min.
3. The water was included 2 spans and the substantial was ready inside 5 min.

3.3.2 Method of restoring - Curing of cement done by ponding technique, in which all substantial shape place for various time of relieving, as 7days, 14days, and 28 days.

### 3.3 MATERIAL USED AND TESTING:-

In this section we are managing properties and meaning of all materials which we utilized in our venture. All the test on materials like concrete, fly debris , coarse total , fine total , water , were completed in KALOKHE RMC, JUNNER.

- 1) Cement

- 2) Fly debris
- 3) Fine Aggregate
- 4) Coarse Aggregate
- 5) Normal Water
- 6) Primary Treated Waste Water
- 7) Secondary Treated Waste Water
- 8) Grey Waste Water

### SAMPLE IMAGE



**Fig.1 - Concrete Cube**



**Fig.2- Testing of concrete cube**

### CONCLUSION.

From this exploratory examination we reason that

1. STWW is most appropriate water test as utilization of elements of cement. STWW contain less pollutions and fits in standards of Indian Standard.
2. Reaction of Bogue's part and STWW is typical as occurring while utilization of versatile water.
3. Use of STWW conveys no progressions on properties of cement for example Consistency, Initial Setting Time, Final Setting Time and Workability. All above properties are inside limit. The pollutions which are dispensable may diminish the strength however the STWW likewise contains a few debasements which are not expendable and can be utilized as strength gainer.
4. Compressive strength of mortar 3D square ready with STWW shows improvement in the strength by 7.76% when contrasted with TW for 28 days.
5. The pace of compressive strength of cement acquiring is at first delayed while it acquires strength at 28 days and 60 days than typical water utilized. Because of a few suspended solids which are available in the water which might help for acquiring the strength at the later stage as at first they are wet they may not help for acquiring strength yet as it dries it comes into represent acquiring the strength.
6. STWW is Techno Economical fixing on the grounds that STWW is coming about 2.37% more strength than ordinary water utilized at 60 days and STWW is prudent than typical water. So as the outcome shows not just it tends to be substituted for the strength gain as consumable water yet additionally it builds the strength than the consumable water so it is an option for typical water.
7. There is no any massive contrast in elasticity and flexural strength is improved by utilizing STWW.

From this conceivable result and commitments of this examination are : to limit the requirement for the utilization of consumable water, take out the need to grow consumable water, supply for use in substantial industry, limit the need to build more water treatment plausibility, save the consumable

water for drinking reason, make sewage treatment plant become all the more monetarily alluring by reusing water before its last treatment and other comparable objectives towards supportable turn of events.

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