

Harden Properties of Concrete using Untreated Wash Water

Er. Mukesh Kumar¹, Er. Sandeep Pannu²

¹M. Tech (Structure Engineering & Construction), MRIEM, Rohtak, India

²Assistant Professor, Civil Engineering, MRIEM, Rohtak, India

ABSTRACT

Concrete is a widely used construction material that provides a durable and strong foundation for structures. However, the production process of concrete involves the generation of large quantities of waste, including untreated wash water, which can negatively impact the environment. This has led to the exploration of ways to recycle and reuse this waste material, including using it in the production of concrete.

The use of untreated wash water in concrete production has been shown to affect the harden properties of concrete. The harden properties of concrete, such as compressive strength, tensile strength, and durability, are critical in determining the performance and longevity of a structure. The presence of contaminants and impurities in untreated wash water can affect these properties by reducing the strength of the concrete and making it more susceptible to degradation.

Studies have shown that the use of untreated wash water in concrete production can result in a decrease in compressive strength, which is a measure of the ability of concrete to withstand loads. The presence of contaminants and impurities can also affect the durability of concrete by increasing the rate of corrosion of steel reinforcement and reducing its ability to resist cracking.

However, several techniques have been developed to mitigate the negative effects of untreated wash water on the harden properties of concrete. These techniques include the use of chemical additives, such as superplasticizers and pozzolanic materials, to improve the strength and durability of concrete. Additionally, the use of pre-treatment processes, such as filtration and sedimentation, can help remove contaminants and impurities from untreated wash water before it is used in concrete production.

KEYWORDS: Concrete, Untreated wash water, Recycling, Hardened properties, Compressive strength, Tensile strength, Durability, Contaminants, Impurities, Steel reinforcement, Corrosion, Cracking, Chemical additives, Superplasticizers, Pozzolanic materials, Pre-treatment processes, Filtration, Sedimentation, Environmentally-friendly, Construction industry.

OBJECTIVES:

The main objective is to cast & study the harden properties of concrete using Untreated wash water.

The specific objectives are:

1. Property & tests on untreated wash water
2. Study of strength properties of the concrete casted with untreated wash water.

➤ PROPERTIES OF UNTREATED WASH WATER:

Untreated wash water is generated during the process of cleaning equipment, trucks, and mixer drums that are used in the production of concrete. The properties of untreated wash water can vary depending on the source and type of equipment being cleaned. Some of the common properties of untreated wash water include:

1. **High pH:** Untreated wash water typically has a high pH, ranging from 10 to 12, due to the presence of dissolved calcium hydroxide and other alkaline compounds.
2. **Suspended solids:** Untreated wash water can contain high levels of suspended solids, such as cement particles, sand, and gravel, which can affect its quality and ability to be reused.
3. **High turbidity:** The presence of suspended solids in untreated wash water can also result in high turbidity, which can reduce the clarity of the water.
4. **High total dissolved solids (TDS):** Untreated wash water can contain high levels of total dissolved solids (TDS), such as salts, minerals, and other dissolved organic and inorganic compounds.
5. **Chemical contaminants:** Untreated wash water may contain chemical contaminants, such as admixtures, oils, and grease, which can have negative impacts on the environment and human health.
6. **Biological contaminants:** Untreated wash water can also contain microorganisms, such as bacteria, viruses, and fungi, which can cause health risks and environmental concerns if not properly treated.

Overall, untreated wash water has the potential to be a valuable resource for the concrete industry if its properties can be effectively managed and controlled. Proper treatment and disposal of untreated wash water are critical to ensure the safety of the environment and public health.

REPORTS OF CUBE TEST

1. Identification mark
2. Date of test
3. Age of specimen
4. Curing conditions, including date of manufacture of specimen
5. Appearance of fractured faces of concrete and the type of fracture if they are unusual



RESULTS:

The use of untreated wash water in concrete production can have both positive and negative effects on the harden properties of concrete. The results of studies on the harden properties of concrete using untreated wash water are summarized below:

Compressive strength: The use of untreated wash water in concrete production can result in a decrease in compressive strength compared to concrete produced with clean water. This decrease in strength is due to the presence of impurities and contaminants in untreated wash water, which can affect the hydration of cement and reduce the bond strength between cement and aggregates. However, the magnitude of the decrease in compressive strength depends on the quality of the untreated wash water and the amount of contaminants present.

Tensile strength: Studies have shown that the use of untreated wash water can also affect the tensile strength of concrete. The presence of contaminants and impurities in untreated wash water can reduce the bond strength between concrete and steel reinforcement, leading to a decrease in tensile strength.

Durability: The durability of concrete can be affected by the use of untreated wash water due to the presence of contaminants that can increase the rate of corrosion of steel reinforcement and reduce its ability to resist cracking. This can result in reduced service life and increased maintenance costs for structures.

Chemical additives: The use of chemical additives, such as superplasticizers and pozzolanic materials, can help mitigate the negative effects of untreated wash water on the harden properties of concrete. These additives can improve the workability, strength, and durability of concrete, allowing for the safe and environmentally-friendly reuse of untreated wash water in concrete production.

CONCLUSION:

Overall, the use of untreated wash water in concrete production can have negative effects on the harden properties of concrete. However, with the use of appropriate techniques and additives, these effects can be mitigated, allowing for the safe and environmentally-friendly reuse of this waste material in the construction industry.

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