

STORM WATER RUNOFF SOLUTION WITH PERMEABLE PAVEMENTS BY USING LATEX RUBBER LIQUID AS AN ADMIXTURE

E. Bhaskar Gowd ^[1], A. Siddiq ^[2], A. Mounica ^[3], D. Prabhuteja ^[4], Final B.Tech, Department of Civil Engineering, Gates Institute of Technology, Gooty ¹²³⁴

T. Sai Leela Assistant Professor, Department of Civil Engineering, Gates Institute of Technology, Gooty⁵

Abstract: *Road performance and traffic safety are highly influenced by improper water drainage system performance, particularly within intersection areas. So, the aim of the presented paper is the evaluation of pervious concrete made with two types and two aggregate fractions for potential utilization in intersection drainage areas. Although the studied pervious concrete mixtures achieved proper drainage but lower strength characteristics, this pervious concrete has a good potential for enhancing pavement drainage system if it is embedded on limited intersection areas.*

INTRODUCTION

Stormwater management is a key component of urban infrastructure design. If properly designed and constructed, porous pavements can help rainwater infiltrate soil, decrease urban heating, replenish groundwater, and reduce overall stormwater runoff. Today, the construction of permeable pavement systems that can accommodate surface water runoff is gaining increased attention through the Leadership in Energy and Environmental Design (LEED) program

Permeable pavement

Permeable pavement is the pavement which allows the water to flow through it. It is made up of pervious concrete. It is also called as “Thirsty Concrete” and it is ecofriendly. It is suitable for flood prevention and it increases storm water infiltration into the earth surface.

MATERIALS

1. **Ordinary Portland Cement (OPC) :** OPC is a special blended cement useful in general construction work and is especially suitable for applications in environmental conditions. 53 grade cement is used and it is used as a binding material.



2. **Coarse aggregate :**

The size of the aggregate is more than 4.75mm is called as a coarse aggregate. For this project, we are using 10mm size aggregate. It is used as a concrete material to increase the strength.



3. Potable water:

Water is the key ingredient, which is mixed with cement, forms a paste that binds the aggregate together. The water causes the hardening of concrete through a process called hydration.



4. Polythene Cover:

The main reason of polythene cover is for: To prevent moisture from the soil. To collect the storm water and it allows free flow into the drains



5. Latex Rubber Liquid:

Latex for repairs and sloping roofs of terrace, toilets, chajja, masonry walls, etc. Repairs to RCC members, Waterproofing of mortars/concretes, Feature & Benefits Styrene Butadiene co-polymer latex liquid that improves waterproofing Strengthens bonding of new and old concrete & plaster Enhances strength & water resistance of repair mix. It

improves the compressive strength



6. Interlocking Blocks:

Interlocking concrete blocks are solid concrete blocks that feature interlocking nipples akin to plastic lego pieces. They are perfect for projects that are temporary or require quick turnarounds because no groundwork or fixing is needed. They simply fit together like Lego bricks to create a strong structure. Curing and plastering is not needed in Interlocking block. Interlocking block is economical.



TESTS ON MATERIALS USED:

1. Impact test on concrete:

Aggregate Impact Value test determines the aggregate Impact Value (AIV) of aggregates which provides a relative measure of the resistance of an aggregate to sudden shock or impact. Resistance of the aggregates to impact is termed as toughness. Impact Value should not be less than 45% for aggregates used for concrete other than wearing surface and 30% for concrete used in wearing surface.

2. Crushing test on aggregates:

The aggregate crushing value provides a relative measure of resistance to crushing under a gradually applied compressive load. To achieve a high quality of pavement, aggregate possessing low aggregate crushing value should be preferred. The aggregate crushing value for cement concrete pavement shall not exceed 30%. The aggregate crushing value for wearing surfaces shall not exceed 45%.

3. Fineness test on cement:

The fineness of cement has an important bearing on the rate of hydration and hence on the rate of gain of strength and also on the rate of evolution of heat. Finer cement offers a greater surface area for hydration and hence faster the development of strength. According to the IS recommendations, the standard value of fineness of cement should have a fineness that is less than 10%, or the fineness of cement should not be higher than 10%.

4. Specific Gravity:

Specific gravity separates bad particles which are lighter than other particles, from good aggregates. Using specific gravity in cement mix design, we calculate the solid volume of aggregates in concrete mix. Gavel, water and cement are used for this test. The specific gravity of coarse aggregate of 10mm is 2.7.

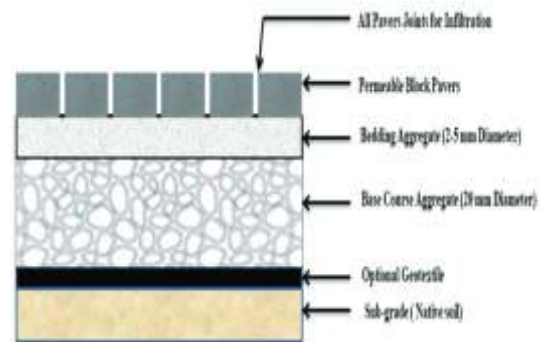
5. Elongation index test:

If elongated particles are used for pavement base course construction, they may break down easily under heavy loads which will cause damage to the pavement. So, it is necessary to know the elongation index of given aggregate mix. For pavements either bituminous or Non-bituminous, Elongation index of coarse aggregate should not be more than 15%.

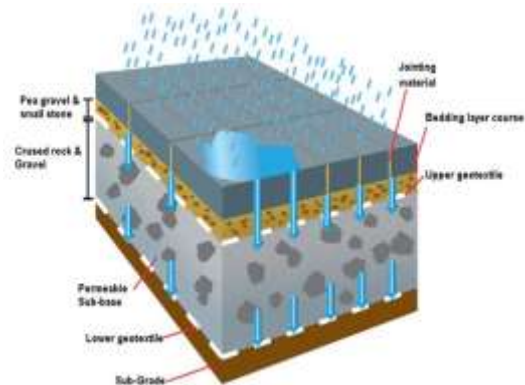
6. Flakiness index test:

A flakiness index test is conducted to determine the shape of the aggregates. The presence of flaky or flattened coarse aggregates is undesirable in cement concrete, in making bituminous roads, & in the construction of pavements. The flakiness index is defined as the percentage (by mass) of stones in an aggregate having an Average Least Dimension(ALD) of less than 0.6 times their average dimension.

PAVEMENT DESIGN



UNDERGROUND DRAINAGE



ADVANTAGES

- Increase the amount of storm water infiltration.
- It reduces the erosion.
- Provides effective management of water.
- Flood prevention.
- It absorbs noise.



- f. Proves to be better for people and environment.
- g. Less expensive.
- h. By using latex rubber liquid, strength of the concrete increases
- i. Curing and plastering is not required.

CONCLUSION

Pervious concrete is a cost-effective and environmental friendly solution to support sustainable construction. Its ability to capture storm water and recharge ground water while reducing storm water runoff enables pervious concrete play a significant role. Due to its potential to reduce the runoff, it is commonly used as pavement material. The smaller the size of coarse aggregate should be able to produce a higher compressive strength and at the same time produce a higher permeability rate. By using of latex rubber liquid the strength of the concrete increases.

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