

ADVANCES IN CIVIL ENGINEERING

Volume - 1

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Chapter - 4

Evaluation of Adsorption Behaviour on Tracer Dye

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Chapter - 4

Evaluation of Adsorption Behaviour on Tracer Dye

B. Priyadharshini and M. Kavisri

Abstract

Tracer dye can be used to transported through geologic media laterally with water. Three different dyes were selected for the study i.e. Rhodamine B, Sulphorhodamine, and Fluorescein. A simple batch, column experiment and isotherm study were conducted to estimate the adsorption behaviour of the dyes with soil. The effects of the dye were studied for the photochemical decay, chemical decay, salinity, and by varying sediment concentration. The recovered concentration was analyzed using Spectrophotometer. In column study all three dyes were passed through the soil, and observed. The result shows that Rhodamine B shows good resistance to photochemical decay and significantly adsorbed to the soil, and the concentration recovery was less when compare to Sulphorhodamine B and Fluorescein. The adsorption of dye was more with respect to the time. The concentration recovery was more for fluorescein dye i.e. the dye was not adsorbed to soil easily. But the main problem encountered with this dye was background fluorescence which will present naturally in water. The adsorption data were fitted with Freundlich isotherm, the adsorption results show that the adsorption coefficient K value was minimum for Fluorescein when compare to the other dyes.

Keyword: Tracer, dyes, adsorption, freundlich isotherm, spectrophotometer

I. Introduction

A tracer is a material that could be carried by the subsurface water which will give the evidence about the groundwater movement and their corresponding direction, the velocity of the flow in groundwater and polluted contaminants which might be transported by the water. Similarly tracers dye support to identify the movement paths of water through a system. If enough information is collected about the geological media, then the dyes also help to determine the porosity, hydraulic conductivity, dispersivity, hydrogeological parameters and chemical distribution coefficients, (Davis S. N., 1985) (Sabir, 1999). The usage of tracers could improve our

Chapter - 5

Effect of Nano Rice Husk Ash on Pozzolanic Cement Concrete

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Chapter - 5

Effect of Nano Rice Husk Ash on Pozzolanic Cement Concrete

Praveenkumar TR, Manoj Kumaar C and Bose Christy Arun

Abstract

The increase in the greenhouse effect causes ecological imbalance contributing to global warming which is at alarming rate. Concrete usage around the globe is second only to water. An important ingredient in the conventional concrete is the Portland cement. The cement industry is responsible for 6% of all CO₂ emission, because the production of one tonne of Portland cement emits approximately one tonne of CO₂ into the atmosphere. In order to overcome the greenhouse effect caused by the manufacturing of the ordinary Portland cement an immediate need arise to find a suitable substitute for ordinary Portland cement.

Moreover, cement production is not only highly energy-intensive, next to steel and aluminium, but also consumes significant amount of natural resources. In order to meet infrastructure developments, the usage of concrete is on the increase. Supplementary cementitious materials (SCMs) like limestone, pozzolan (typically volcanic ash), fly ash and granulated blast furnace slag are used to replace some of the more expensive clinker. Chemical admixtures such as super plasticisers and air-entraining agents can also be added in small amounts to modify the properties of a concrete.

Another type of admixtures recently used are nanoparticles. The main objective of this work is to study the suitability of the Nano rice husk ash as a pozzolanic material for cement replacement in concrete.

In this investigation, the properties of concrete modified with Nano rice husk ash and fly ash in M35 grade is determined. Here two types of samples are prepared. In the first sample Nano rice husk ash replaces about 3% of cement and fly ash about 20% of cement. And in the second normal concrete sample fly ash replaces 20% of the cement. These samples are casted and cured for 7, 28 and 56 days. The tests conducted in this works are Compressive test, Split Tensile test, Flexural test, Carbonation test, Rapid

Chapter - 6

Safety Management in Construction Projects

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Chapter - 6

Safety Management in Construction Projects

C. Manoj Kumaar and T.R. Praveenkumar

Abstract

Construction sites are dynamic activities where workers engage in many activities that may expose them to a variety of safety hazards, such as falling objects, working from rooftops or scaffolding, exposure to heavy construction equipment, or the use of temporary electrical circuits while operating electrical equipment and machinery in damp locations. Construction activities comprise a wide range of activities including construction of new buildings, renovation of existing facilities, and major repair or alterations of building systems. Through implementation of safe work practices, training, and compliance with federal, state, and local regulatory requirements, the Workplace Safety program aims to identify, control, or eliminate construction-related hazards.

Keywords: Safety management, social and environmental factors, life cycle cost

Introduction

Construction projects can be a major disruption to your business and cause significant security concerns for tenants and visitors. There are a myriad of potential issues during all phases of construction that require a heightened level of security including break-ins, theft, access control challenges and property damage. It is important to minimize the likelihood of these incidents by engaging with your security team and addressing all safety issues with the project manager and your tenants prior to the commencement of construction ^[1].

From the planning stages to the finished product, everyone in the building and surrounding areas should be kept abreast of the latest safety and security updates. Develop strategies with your security team to ensure safety messages and procedures are clear and to the point. Additionally, alerting tenants to construction schedules can help keep them more alert for unknown individuals entering the facility during non-construction hours.

Chapter - 8

Strength Property of Paver Block by Partial Replacement of Cement as Sludge and Course Aggregate as Brick Bat

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Chapter - 8

Strength Property of Paver Block by Partial Replacement of Cement as Sludge and Course Aggregate as Brick Bat

Nirmala R., Shanmugapriya M. and Kausalya

Abstract

Now-a-days, the concrete paver block in road pavement is widely used. Concrete paver block is a better option in road construction when compared to the conventional bituminous road by keeping in view the economy and suitability. In the present experimental study, paver blocks were prepared using M30 mix using 12mm coarse aggregate, ordinary Portland cement and fine aggregate. The dimension of the paver block is 200 mm x 100 mm x 60 mm. The optimum content of sludge and brickbat were determined by partially replacing the cement and coarse aggregates in the percentages of 5, 10 and 15 respectively. Similarly, carbon fiber is also added in making the concrete paving block in 0.5%, 1% and 1.5% of weight of cement, so as to provide compressive strength to the same. After identifying the optimum percentage of all these, further experimental work is intended over the use of all these three in a single paving block. The strength tests were carried out for the optimum mix proportion to find the compressive strength, water absorption, flexural strength and split tensile strength. The main purpose of the study is to make the waste product like sludge useful and use of brickbat and carbon fiber to enhance the strength of paver block.

Keywords: Paver block, compressive strength, water absorption, flexural strength and split tensile strength

1. Introduction

Concrete paver blocks were first introduced in Holland in the fifties as replacement of paver bricks. It was probably World War II that led to the growth of concrete blocks as a paving material. The general worldwide trend towards beautification of city pavements, the rising cost of bitumen as a paving material and the rapid increase in construction and maintenance cost have encouraged designers to alternate paving material such as concrete paver block. These blocks were rectangular in shape and had more or less the