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"AN EXPERIMENTAL STUDY OF FLY ASH BASED PAVER BLOCK FOR CONSTRUCTION OF GREEN ROAD" -A REVIEW

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Abstract:- *Since last decade there is commendable growth in population and hence traffic through all means of viz. road, rail, air. Similarly the infrastructural growth, growth of urban and rural area is a prime consideration of the day. Urban and rural developing industries, main approach, street road, water supply and drainage supply other services depending on the growth rates and anticipated population growth.*

Due consideration need to be given for proper planning, selection and implementation of pavement types, which provide effective solution in terms of technically feasible, durably and pavement types, which provide of other services. P. C.C, R.C.C, and Block paver are population technique in present era.

A project on study of different types of pavements, their modality, adoptability and feasibility is taken as a part of UDP-2.

Project include study different permanent of R.C.C. and block pavers, their ments and dements & aim to provide efficient and effective solution for the benefits of society and community.

In our project we used 5 mixed design using different proportion of materials. The materials used in the mix design are cement sand grit fly ash silica fume polyester fiber water etc. from the results we conclude that the mix design made with different proposion (cement -16 kg, sand -48 kg, grit - 40 kg, fly ash -10%, silica fume - 0.25%,. polyster fiber recron 3s - 0.25% with (18 mm) which gave best results in the range between 43.84 N/mm^2 to 46.40 N/ mm^2 compare to other 4 mix design.

Introduction

Transportation

An act process, or instance of transporting or being transported, banishment to a penal colony, conveyance or travel from one place to another place. Public conveyance of passenger or goods especially as a commercial enterprise, etc. is known as transportation

Types of transportation

- Road transportation
- Air transportation
- Water transportation
- Pipe transportation

Road Transportation

That is used by vehicle that transport goods from one place to another and preindustrial is known road transportation

Requirements of a Pavement

The pavement should meet the following requirements:

- Sufficient thickness to distribute the wheel load stresses to a safe value on the sub-grade soil.
- Structurally strong to withstand all types of stresses imposed upon it.
- Adequate co – efficient of friction to prevent skidding of vehicles.
- Smooth surface to provide comfort to road users even at high speed.
- Produce least noise from moving vehicles.
- Dust proof surface so that traffic safety is not impaired by reducing visibility.
- Impervious surface, so that sub – grade soil is well protected.
- Long design life with low maintenance cost

Types of pavements

There are four types of pavement currently in use in the road construction present:

- **Flexible -** pavements with a bitumen bonded surfacing and road base, concrete paver block.
- **Flexible Composite -** The surfacing and upper road base are bituminous on a lower road base of cement bound material.
- **Rigid -** Pavements with a concrete surface slab which can be un-reinforced, joint reinforced or continuously reinforced.
- **Rigid Composite –** continuously reinforced concrete slab with a bituminous overlay.

- Although there has been considerable advance in the theoretical design of pavements, most of the current work is based on empirical methods and design charts.
- Normally a design is carried out for each of the alternatives and then the most economical chosen. However, if for environmental or technical reasons one is impractical then it may be omitted.
- The general form of the different types of pavement is shown below. It can be seen that common to all types of construction is the Sub-base and subgrade. It is this aspect of the design which is treated first. However, it is first necessary to decide on a failure criteria on which to base the design.

Definition of Paver Block Road

Above sub grade laying concrete Paver Block pavement is called Paver Block Road

Classification and Behavior of Paver Block Road

Concrete paving blocks form a 'flexible' surfacing because some degree of articulation can occur but the block still remains in contact. Friction between the vertical sides of the blocks provides interlock and load transfer to neighboring units. This ability to articulate without significant joint opening can only be achieved with small units. Although blocks do have considerable load-spreading ability, without an adequate foundation they will be dislodged vertically. Block may also be moved horizontally by forces from vehicle tyres; to prevent this, blocks are made of special plan shapes or, in the case of rectangular blocks, are laid in a herringbone pattern.
The blocks most commonly used for roads are 60 mm and 80 mm thick and are small enough, in width and weight, to allow them to be picked up in one hand. For heavy industrial applications, 80 mm /100 mm thick blocks are used and, in some instances, 120 mm. No scientific reason has been established for using thicker blocks, but one possibility is that thicker blocks are less liable to rotate about their horizontal axis in areas where there is a great deal of slewing or breaking of very heavy loaded wheels.

Objectives

The main objective is use paver block instead of normal concrete, its reduce cost as well as eco-friendly. Other advantage is that due to low maintance cost, good thermal insulator, required less plant area.

Literature view

Chintan patel and other conclude that Recron-3s polymer fiber for mixing concrete and mortar for improving certain properties of the concrete and mortar. Fiber has special triangular shape for better anchoring with other ingredient of the mix. Recron-3s fiber is available in 6mm and 12mm length. From the analysis of present project it is found that the using of Recron-3s in Pavement quality concrete will increase the compressive Strength and flexural strength. It is also found that the minimum crack is occurring under heavy load. And this will decrease the water permeability. Recron-3S is environmental friendly material. Usage of Recron-3s fibers will reduce the cost of maintenance by reducing the micro cracks and permeability and hence the durability will increase. It is found that use of Recron-3s fiber reduces the segregation. It is found that addition of Recron-3s fibers have beneficial effects on the mechanical properties of concrete.

Karasawa a. and other conclude that The concrete paving blocks with the FA replacement ratio of 25% satisfied the production target value of the plastic deformation (at most 1 mm), at the unit water content which is used as the basis of water control at the factory, where the unit water content ranges from "the unit water content at the moulding limit" through "the unit water content at the moulding limit minus 10 kg/m3." Also, this mix satisfied the target production value of the 7-day flexural strength (at least 6.00 MPa).
For the mix with the FA replacement ratio of 25%, the dry cast concrete blocks for pavement satisfied the production target value of the plastic deformation (at most 1 mm) for the unit water content which is used as the basis of water control at the factory. The unit water content ranges from "the unit water content at the moulding limit" through "the unit water content at the moulding limit minus 10 kg/m3." From this observation, it is considered that fly ash (25% content) can be used as a substitute for fine aggregate in concrete. For the mix with FA replacement ratio of 40%, the dry cast concrete blocks for pavement exceeded the production target value of the plastic deformation at the unit water content used as a basis of water control at the factory. In addition, this mix did not satisfy the production target value of the 7-day flexural strength. From this finding, fly ash (40% content) is considered inappropriate as a substitute for fine aggregate in concrete.

Muhammad Nawazish Husain conclude that Recron 3S fibre helps in improving soil subgrade strength of silty soil. It is evident from the CBR test results that CBR value of untreated soil increases from 3.50% to 20.2% with addition of 0.15% Recron 3S fibre. From the results it is also observed that addition of further Recron 3S fibre to the soil in the quantity of 0.30%, 0.45% and 0.60% of dry weight of soil has very little further increase in the CBR value. In case of unconfined compressive strength testing Recron 3S fibre is showing an increasing trend in UCS value of treated soil. It is evident from the UCS test results that UCS value of untreated soil increases from 2.8132% to 4.2622% (more than 50%) with addition of 0.15% Recron 3S fibre. From the results it is also observed that further increase in the quantity of Recron 3S fibre (0.30%, 0.45% and 0.60% of dry soil) increases the UCS value but to a lesser extent.

That with increase in workability the compressive strength decreases.

- The optimum replacement of cement with silica fume 5% to 15% leads to increase in compressive strength whereas the percentage replacement of 20% leads to decrease in compressive strength
- Variation of w/c ratio has an impact on compressive strength of concrete. With the increase in w/c ratio the compressive strength decreases and vice versa.
- Addition of silica fume in proper proportion improves durability attack by acidic waters and improving concrete conditions.
- Silica fume having high fineness leads to high normal consistency.
- Silica fume gives a higher strength of compressive strength as compared to any other material such as fly ash, GGBS.

Conclution

We are use for the paver block road in the parking area, foot path way, society approach road, petrol pump area etc. and we prepare the reinforced cement concrete road as above area so we suggest to prepare the paver block road is very comfortable, economic, low cost, make easily.
In our project we used 5 mixed design using different proportion of materials. The materials used in the mix design are cement sand grit fly ash silica fume polyester fiber water etc. from the results we conclude that the mix design made with different proposion (cement -16 kg, sand -48 kg, grit - 40 kg, fly ash -10%, silica fume - 0.25%,. polyester fiber recron 3s - 0.25% with (18 mm) which gave best results in the range between 43.84 N/mm^2 to 46.40 N/ mm^2 compare to other 4 mix design.

- Mass production under factory conditions ensures availability of blocks having consistent quality and high dimensional accuracy.
- Good quality of blocks ensures durability of pavements, when constructed to specifications.
- Paver block does not require curing, and so can be opened for traffic immediately after construction.
- Construction of paver block is labor intensive and requires less sophisticated equipment.
- The system provides ready access to underground utilities without damage to pavement.
- Maintenance of paver block is easy and simple and it is not affected by fuel and oil spillage.
- Use of colored blocks facilitates permanent traffic markings.
- Paver block is resistant to punching loads and horizontal shear forces caused by maneuvering of heavy vehicles
- Low maintenance cost and a high salvage value ensures low life cycle cost.

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