Determination of an Effective Laying Pattern and Best Block Shape for Concrete Block Pavement Based on Field Performance

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Significance of problem

There has been an intensive process of urbanization which has brought about need for rapid construction of roads and related infrastructure during the end of the last century. Therefore development of economical road construction methods is a high priority for a developing country like Sri Lanka. Concrete block paving is one of the predominant road construction method used in most of the developing counties due to economic adaptability and this has emerged as a cost effective road construction method suitable for certain local conditions. But in Sri Lanka this technique is yet to be developed to a fully fledge road construction method. This can be attributed to a dearth of the technical expertise and knowledge. As a result, there is a great need to develop knowledge and establish proper methods of block paving.

The performance of concrete block pavements vary with block shape, thickness, size of the block, compressive strength ,laying pattern, bedding sand and sub grade conditions. Therefore, considerable amount of research has been done recently with Concrete Block Pavement models in order to analysis their performance with respect to various factors. But most of the researches on CBP have been done in laboratory models and very low traffic roads and these tests may not simulate real situation. This research will cover the real ground situation and the behavior and the effects of blocks due to traffic weights.

Objective

1 determine most suitable individual block shape for CBP roads

2 determine effective laying pattern for CBP roads

Method/design

This research was covered the real ground situation and the behavior and the effects of blocks due to traffic weights with high percentage of heavy truck and buses.. Under this study, concrete blocks were cast according to the specifications in predetermined shapes and paving was done with different block shapes and patterns in a road which contains vehicular traffic.

Selected 100m road length was divided to 10 equal parts and blocks were paved according to selected pattern and block shapes in each different section.

Deflection was measured by using Benkelman instrument and block displacement were measured by using venire caliper. The most effective block shape and pattern were selected comparing deflection and block displacement in each combination of block shape and patterns.

Findings

The analysis of results show that the following results

Most effective block shape is Uni style

Most effective block paving patterns are Stretcher and Herring. Both show similarly good results.

The effective laying angles are 0 and 90 degrees. Here again both angles show good results.

Conclusions

Under this study, concrete block paving road was constructed. Concrete blocks were cast according to the specifications in predetermined shapes and paving was done with different block shapes and patterns. Then the performances of the block paving were observed after allowing traffic. The data were collected to determine the most effective block shape and pattern.

The most effective combination of variables for cement concrete block laying are Uni style block shape, Stretcher and Herring block pattern and zero or 90 degree block angle can be recommended for new CBP roads.