Journal of Civil Engineering and Environmental Technology
p-ISSN: 2349-8404; e-ISSN: 2349-879X; Volume 5, Issue 4; April-June, 2018, pp. 229-230

http://www.krishisanskriti.org/Publication.html

Comparative Study on Concrete Paver Blocks and Bituminous Pavement on the Basis of Cost Estimate

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Since road pavements are an important part of any residential campus, costing about 50% of the investment, a careful evaluation of the alternatives is necessary to make the right choice on a rational basis, which may be comparatively more beneficial to the campus.

Now-a-days, solid unreinforced pre-cast cement blocks concrete paver is also used on the road pavement as this is versatile, aesthetically attractive, functional and cost effective and requires little or no maintenance if correctly manufactured and placed. Paver blocks can be used for different traffic categories i.e. Non-traffic, Light-traffic, Medium-traffic, Heavy-traffic and Very heavy traffic.

The selection criteria of type of pavement, flexible or rigid or paver block should be based not on the initial cost of construction but life cycle cost, which includes the discounted maintenance and pavement strengthening costs that are incurred during the design life of the pavement.

Road connectivity is a key component of development by promoting access to economic and social services and thereby generating increased agricultural incomes and productive employment opportunities. It is also a key ingredient in ensuring poverty reduction.

It was against this background of improving connectivity that the Prime Minister announced in 2000, a massive rural roads program. The Prime Minister's Rural Road Program (Pradhan Mantri Gram Sadak Yojana, PMGSY) set a target of:

- Achieving all-weather road access to every village/habitation with a population greater than 1000 by 2003
- Providing all-weather road access to all villages/habitations of population greater than 500 people [250 in case of hill States (North-Eastern states, Sikkim, Himachal Pradesh, Jammu & Kashmir and Uttaranchal), the desert areas and tribal areas] by the end of the Tenth Five Year Plan, i.e., 2007.

An all-weather road can be defined as a road, which is negotiable during all weathers, except at major river crossings, but the road bed needed to be drained effectively & efficiently by adequate cross-drainage structures, such as, culverts, minor bridges & causeways etc. The pavement should be negotiable during all weathers, which does not necessarily mean that it should be paved or surfaced or black-topped. An earthen road with gravely soil or an earthen road with a gravel or WBM layer on top also permits all-weather use, depending upon rainfall & soil type.

The road network required for providing the 'basic Access' to all villages/ habitations is termed as the Core Network. Basic access is defined as one all-weather road access from each village/ habitation to the nearby Market Centre or Rural Business Hub (RBH) and essential social and economic services.

A Core Network comprises of Through Routes and Link Routes. Through routes are the ones which collect traffic from several link roads or a long chain of habitations and lead it to a market Centre or a higher category road, i.e. the District Roads or the State or National Highways. Link Routes are the roads connecting a single habitation or a group of habitations to Through Roads or District Roads leading to Market Centers. Link Routes generally have dead ends terminating on habitations, while Through Routes arise from the confluence of two or more Link Routes and emerge on to a major road or to a Market Centre.

The Core Network may not represent the most convenient or economic route for all purposes. However, the Core Network is likely to be a cost-effective conceptual frame work for investment and management purposes, particularly in the context of scarce resources.

Highway and pavement design plays an important role in the DPR projects. The satisfactory performance of the pavement will result in higher savings in terms of vehicle operating costs and travel time, which has a bearing on the overall economic feasibility of the project.

Flexible pavement are preferred over cement concrete roads as they have a great advantage that these can be strengthened and improved in stages with the growth of traffic and also their surfaces can be milled and recycled for rehabilitation. The flexible pavements are less expensive also with regard to initial investment and maintenance. Although Rigid pavement is expensive but have less maintenance and having good design period. The economic part are carried out for the design pavement of a section by using the result obtained by design method and their corresponding component layer thickness. It can be done by drawing comparisons with the standard way and practical way.

Concrete blocks laid in an interlocking system are becoming a common type of pavement in now-a-days for pedestrian areas, cycle paths and open spaces. In these areas concrete blocks have almost ousted traditional flagstones and to some extent asphalt pavements. This is due to (a) simple laying, (b) great resistance to overloading,(c) little maintenance, and (d) simple re-laying after excavations. As regards roads proper, concrete blocks are used only to a limited extent for residential streets, roads with a maximum speed of 30 km/hand for bus bays. But now-a-days, the paver blocks are used in primary roads also.

The concrete blocks were hand placed according to the following procedure:

i) The sand was spread and compressed by a roller

ii) The sand surface was levelled with a beam drawn on levelled sectional irons

iii) The concrete blocks were laid in an interlocking system

iv) The joints between the blocks were filled with sand

v) The sand on the outside of the border blocks was removed

vi) The blocks were vibrated by a vibrating plate and a small tandem wheel roller

Investigators of block pavements have almost universally agreed that block pavements behave as flexible pavements rather than rigid pavements. In flexible pavements, the load applied to the pavement surface is distributed by a relatively thin wearing surface, such as asphaltic concrete, and the underlying base and sub base layers to the natural soil sub grade. When the stresses on the sub grade from the traffic loads are sufficiently large, the sub grade will shear and displace causing rutting in the sub grade which appears as a surface rut. Classic failure of flexible pavement is rutting due to shear deformations in the sub grade, and all flexible design procedures consider this failure mode. It has long been known that, both during construction and under traffic, pavers progressively wedge together and develop interlock.

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