

Analysis of Failure Bituminous Pavement

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ABSTRACT:

The purpose of this study was to evaluate the possible causes of pavement failures, and to recommend remedies to minimize failures of the pavement. The paper describes lessons learnt from pavement failures and problems experienced during the last few years on a number of projects in India. Based on the past experiences various pavement preservation techniques and measures are also discussed which will be helpful in increasing the serviceable life of pavement.

The revolution in the automobile industry and liberalized economy has led to tremendous increase in the vehicle ownership levels. This has resulted in changing traffic characteristics on road network. In this paper an attempt has been made to analyze the changing traffic composition trends, speed characteristics and travel patterns by taking few case studies. Further, the impact of changing traffic composition trends and emerging issues thereof are discussed.

Keywords: speed characteristics travel patterns, the changing traffic composition trend, tests and test results.

INTRODUCTION

Road maintenance is one of the important of the entire road system. The maintenance operations involve the assessment of road condition, diagnosis of the problem and adopting the most appropriate maintenance steps. Even if the highways are well designed and constructed, they may require maintenance; the extent of which will depend on several factors including the pavement type. Various types of failures in pavement ranging from minor and localised failure to major and general failure do take place on roads. The failures may be due to one or a combination of several causes.

LITERATURE REVIEW

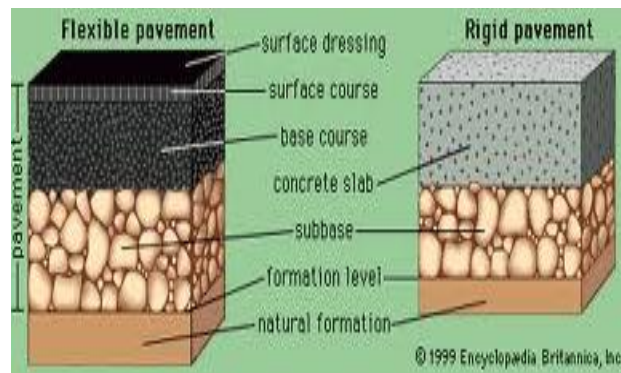
- Pavement failure:

Pavement failure is defined in terms of decreasing serviceability caused by the development of cracks and ruts. Before going into the maintenance strategies we must look into the causes of failure of bituminous pavements. Failures of bituminous pavements are caused due to many reasons or combination of reasons.

- Types of Pavement

There are two types of pavements a are:-

- Flexible pavement
- Rigid pavement



I. Flexible pavement :

The major flexible pavement failures are fatigue cracking, rutting, and thermal cracking.

The fatigue cracking of flexible pavement is due to horizontal tensile strain at the bottom of the asphaltic concrete. The failure criterion relates allowable number of load repetitions to tensile strain and this relation can be determined in the laboratory fatigue test on asphaltic concrete specimens.

Rutting occurs only on flexible pavements as indicated by permanent deformation or rut depth along wheel load path. Two design methods have been used to control rutting: one to limit the vertical compressive strain on the top of sub grade and other to limit to tolerable amount (12 mm normally).

Thermal cracking includes both low-temperature cracking and thermal fatigue cracking.

Layers in Flexible Pavement

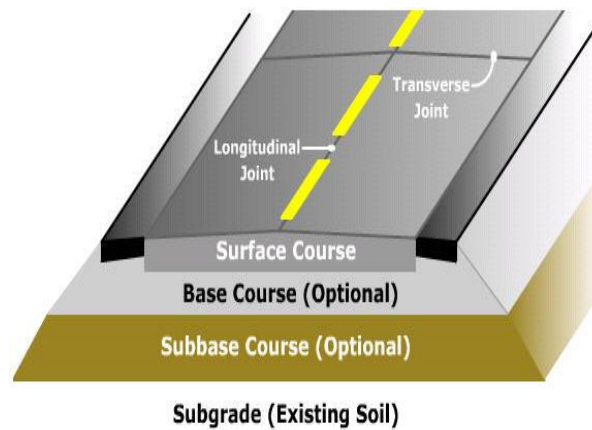


fig.1

II. Rigid pavement :

Traditionally fatigue cracking has been considered as the major, or only criterion for rigid pavement design the allowable number of loads reputation to cause fatigue cracking depends on the stress ratio between flexural tensile stress and concrete modulus of rupture. Of late pumping is indentified as an important failure creation.

Pumping is the ejection of soil slurry throws the joints and cracks of cement concrete pavement, caused during the downward movement of slab under the heavy wheel loads. Other major type of distress in rigid pavement include faulting spelling and deterioration .The wheel load acting on the pavement will be distributed to a wider area, as the stress decreases with the depth. Taking advantages of the stress distribution characteristics, flexible pavement normally has many layers. Hence, the design of flexible pavement uses the concept of layered system based on this, flexible pavement may be cons trusted in a number of layer and the top layer has to be of best quality to sustain maximum compressive stress, in addition to wear and tear.



TEST ON PAVEMENT

1. Penetration test
2. Softening point test
3. Ductility test
4. Viscosity test
5. Elastic recovery test
6. Direct tensile test
7. Indirect tensile test
8. Creep test
9. Marshal stability test

CONCLUSION

From our case study we conclude that their various pavement failure in the NH-58 road which is stretching from KIET to SRM extending to a distance of 8.7 KMs. There are various pavement failure defects like Pot holes, alligator cracks, polished cracks etc.

During our study we conclude that the Muradnagar Bus Station is prone to accidents as no traffic signal is provided. No proper maintenance of road is going on. There is no proper Auto Rickshaw stand which is the main reason of road blockage and failure of pavement We are going to forward a copy of our project report to the Muncipal Head Department to draw some special attention towards the NH-58 Highway for the betterment of Highways.

NAME OF TEST	Sample Temperature	RESULT
1.Penetration test	25°C	62mm
2.Softening point	5°C	47°C
3.Ductility test	27°C	82mm
4.Viscocity test	135 °C	325cp

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