Tushar Saxena, et. al. International Journal of Engineering Research and Applications
www.ijera.com
ISSN: 2248-9622, Vol. 10, Issue 6, (Series-II) June 2020, pp. 46-47

RESEARCH ARTICLE OPEN ACCESS

A study on distress and cause of distress in Rigid Pavements

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ABSTRACT
Regardless of quality of pavement material and design, increase in the vehicular traffic and changing environmental conditions will reduce the service life of pavement which ultimately results in its failure. As a result, failure of road surface causes traffic jam and accident. At the same time vehicle operating cost is increased. It makes discomfort to the passengers.
Keywords **-** Rigid Pavement, Failure, Distress. Environmental Conditions, Traffic

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Date of Submission: 18-05-2020 Date of Acceptance: 03-06-2020

I. INTRODUCTION

Rigid pavements are built on the top of sub grade and base course. The pavement distributes the loads over a wide area with one or two structural layers due to relative rigidity Surface course is the top layer which consist of PCC slab and base course is the layer laid below the PCC slab consist of crushed aggregates and well compacted soil. It is observed that after the opening of newly constructed road or well-maintained or newly widened road which is very good in the terms level of service, but it is after some time with the use of traffic volume and constantly changing weather, especially after monsoon or in monsoon the road quality is decorate at every use of traffic and after some time it gets completely decorated with uneven crack, pot holes, ruts, crack etc. This problem is very much common in every road. Hence the quality and level of service is dropped down drastically as the road user increase but maintenance is overlooked. Pavements fail prematurely because of many factors.

Few primary reasons pavements fail prematurely, like failure in design, failure in construction, failure in materials, failures in maintenance. Here for case study I will pick the rigid pavement for evaluation of failures, and its remedies. If the pavement remain failure one and doesn't maintained as per need than VOC (vehicle operation cost), travel time, traffic congestion, traffic volume, traffic density and lots of precious man hours / time is wasted. So the pavement should be well maintained and good for smooth riding to road user which overcomes the VOC, traffic congestion, traffic volume, traffic density and precious man hours.

II. OBJECTIVES

This study leads to identification of different Causes, locations, Frequency of pavement distress e.g. scaling of cement concrete, shrinkage cracks, joint spalling, warping cracks, pumping. due constantly changing weather conditions and traffic volume.

III. TYPES OF FAILURE

1. Spalling at a joint: Cracking, breaking or chipping of joint/crack edges. Usually Occurs within about 0.6 m of joint edge. Excessive stresses at the joint caused by infiltration of incompressible materials and subsequent expansion can also cause blowups.

2. Faulting: A diffrence in elevation across a joint or crack usually associated with undoweled slab. It is noticeable when the average faulting in the pavement section reaches 2.5 mm, when it reaches 4mm diamond grinding or other rehabilitation measures should be considered.

3. Longitudinal Cracking: Longitudinal Cracks not associated with corner breaks or blowups that extend across the entire slab. These cracks divide slab into two or more pieces also called panel cracking.

4. Corner Cracking: A crack that intersects the Pcc Slab joint near the corner (within 2m). A corner break extends through the entire slab and is caused by high corner stresses.

Some other types of failures such as pumping, Polished aggregate, Pumpout are major types of defects

IV. CAUSE OF FAILURE

Rigid pavement fails due to defects in the quality of material used, construction method and quality control during construction. Pavement also fails due to Inadequate surface drainage or subsurface drainage in the locality, Increase in the magnitude of wheel loads and the number of load repetitions due to the increase in traffic volume, Settlement of foundation of the embankment due to improper compaction or low bearing capacity of soil. Environment factors including heavy rainfall, soil erosion, high water table, snowfall, frost action etc.

V. CONCLUSION

On the basis of various data collected from different roads construction and maintenance authority, the following conclusions drawn: Most of the road maintenance works are done by on emergency basis. As a result proper quality control is not always possible. Due to lack of quality control, highway and road needs early and repeated maintenance.

Study of data about equipment for highway maintenance owned by different authorities indicates that equipment's are neither sufficient nor well distributed.

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