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Investigation of Truck Overload and their Effects on Rutting Performance for Flexible Pavements on Oman Roads

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Abstract

Road infrastructure is one of the basic facilities needed for the growth and advancement of any modern economy. The growth of every country's economy is measured by the growth of its transport infrastructure. Overloaded vehicles have a significant impact on pavement life and distress. This study has been conducted to investigate the effect of truck overloads on pavement rutting performance using the new Mechanistic Empirical Pavement Design Guide (M-E PDG) and distress models.

Four projects were selected by MOTC on which the truck traffic is heavy. These are (AL-Batinah Expressway Package-2, AL- Sharqiyah Expressway Package- 1, Barka- Nakhal Road and Upgrading of Sallan Roundabout). Soil and aggregate material collection and laboratory testing have been conducted. MOTC, Department of Land Transport has provided information of axle and gross truck weights of Al Saih Al Ahmar region. M-E PDG distress models have been used to analysis the rutting in the pavement layers.

The cross section of AL- Batinah Expressway Package-2 has been selected to conduct the load analysis and study the economic impact of truck overloads through life cycle cost analysis (LCC).

The research used Everseries Pavement Analysis Program and pavement materials conditions to estimate the compressive strains occurring under the asphalt concrete (AC) layer. These computed strains are incorporated in rutting models to estimate the pavement life for different axle weights. Due to the large amount of data, the research focuses only on six axle truck. Results show that as the temperature decreases the strain dramatically decreases and when the truck axle load increases the strain increases causing increase in rutting depth. As a result, the time needed to rehabilitate the project is shortened. The analyses of pavement rut data show that single axle trucks cause more rutting damage than tandem and tridem axle trucks.