STUDY ON THE EFFECT OF OVERLOADING ON SRI LANKAN ROADS

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ABSTRACT

With the increasing demand for transport means, new technological vehicles and heavy loads carrying vehicles are used by people, in order to take the financial advantage. Consequently most of the commercial vehicles plying on Sri Lankan National Highways are overloaded. Previous studies show that overloaded vehicles are carrying as much as double weights than its maximum permissible load. Limits for standard legal axel loads and gross vehicle weight have been already imposed by Minister of transport as a part of Motor Traffic Act. But, they are violated oppressively by the transporters but not enforced stringently by road agencies or Motor Traffic Department.

Designing of flexible road pavements is mostly based on the cumulative number of equivalent standard axles(CNESA) which is significantly subscribed by the heavy vehicular traffic including overloaded vehicles. Construction cost of road pavement is hence directly incurred by CNESA and it results in extensive, costly pavement designs. Furthermore the damage by overloaded vehicles to the pavement is exponential. Continuous overloading of vehicles reduces the design life of pavement resulting premature failures and induces additional cost to road agencies for maintaining them. On the other hand, limiting the carrying loads may result in multiplied number of trips and thereby cost for the user is increased.

In this study, actual axle load survey data at selected locations to cover the national road network were analyzed and assayed in different aspects. Case study was done for the axle load data in 22^{nd} km of A004 road & 196^{th} km of A006 road in such a way that transport cost for user & pavement construction cost could be evaluated at different loading scenarios, such as, at legal limit, 10%, 20%, 30% & 40% than legal limit.

Results of preliminary assessment include percentage of overloading vehicles, extent of overloading, overloading growth trend over a decade, often overloaded commodity types & significant vehicle types. Results of case study include, transport cost for the user & pavement construction cost in each loading scenario, optimum level of overloading that result in minimum pavement construction cost while user cost shall be satisfied. Further it has been evaluated simple alterations that can be practice to reduce CNESA extensively.

It was concluded that, 1.2 axle type has a significant contribution to ESA due to overloading. Further, sand, fertilizer, cement, rice & paddy are identified as often overloaded commodity types. From the case study, it was concluded that, transport cost for the user is getting reduced when more overloading occurred. But, the increased user cost lie in a large range than decreased pavement cost.

It can be recommended that, overloading up to 20% from GVW shall be an optimum level where the both parties will be satisfied. Further it could be controlled overloading extensively & reduce pavement cost by rules against 1.2 & 1.22 type vehicles which are overloaded more than 30% from GVW. Simple methods to enforce the rules are also discussed in recommendations.

Keywords: Vehicle overloading, standard legal axel loads limits, effective enforcement

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LIST OF ABBREVIATIONS

Abbreviation	Description
AASHTO	American Association of State Highways and Transportation Officials
ADT	Average Daily Traffic
BBD	Benkelman Beam Deflection Test
BC	Bituminous Surfacing
BOT	Build Operate and Transfer
CBR	California Bearing Ratio
CNSA	Cumulative Number of Standard Axles
DCP	Dynamic Cone Penetration
DF	Damage Factor
DFC	Damage Factor Cost
DLL	Deficit Design Life
ESA	Equivalent Standard Axel Load
FWD	Falling Weight Deflectometer Test
GVW	Gross Vehicle Weights
LL	Liquid Limit
MAL	Maximal Axle Load
MCC	Manual Classified Count
MDD	Maximum Density
M-E	Mechanistic –Empirical
PI	Plasticity Index
RDA	Road Development Authority
SAR	Standard Axle Repetitions
TRL	Transport research Laboratory
VDF	Vehicle Damage Factor

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