IRTE JOHANNESBURG CENTRE

IRTE IS A PROFESSIONAL SECTOR OF THE SOCIETY OF OPERATIONS ENGINEERS

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LETTER OF INTENT –

REDUCTION OF THE AXLE LIMIT FROM 9000 KILOGRAMMES TO 8000 KILOGRAMMES ON ALL SECONDARY ROADS

The Institute of Road Transport Engineers would like to highlight the technical difficulty of existing goods carrying vehicles adapting to a reduced axle mass, and how these difficulties would result in the need for up to 25% more vehicles on the road - not the simplistic 12.5%, that a 9 ton to 8 ton axle mass reduction would suggests at face value. In addition to the sheer economic cost of this, the emissions of greenhouse gases would increase proportionally.

Whilst it is noted that the proposal refers to 'secondary' roads, and rail be suggested as a replacement mode, we would suggest that rail coverage tends to complement 'Provincial', long distance roads, with little coverage of secondary roads; and further suggest that the majority of road transport would be affected since 'secondary' roads would be needed to access the 'Provincial' roads, thus resulting in that majority being only loaded to the 8 ton axle capacity.

The technical issue then is that the design of load carrying vehicles is based on them been loaded evenly (drivers would have to be highly skilled 'Load Masters' otherwise). This means that removing load from a 9 ton design axle also removes a proportion of the load from the axles that are not subject to the new proposal - generally steering axles and/or axles on a 3 axle trailer operating at, or at less than, 8 tons currently

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By example, a standard, common 2 axle truck with a GVM of 15.5 ton would carry 9 ton on the rear axle, and 6.5 ton on the front axle. Given a typical unladen weight (truck, body, fuel & crew etc.) of 8 ton, there remains a payload of 7.5 ton.

This payload being carried 5 ton on the rear axle, and 2.5 ton on the front axle. Reducing the rear axle payload by the 1 ton proposed would result in 0.5 ton also being removed from the front axle. The truck could then all only carry 6 ton, thus needing 5 trucks on the road to carry the 30 ton that 4 trucks carried previously.

It can be similarly shown that the commonest articulated truck on the road, the 3 axle truck tractor, with a 3 axle semi-trailer, would loose some 5.4 ton of payload.

The situation becomes a serious safety issue if the proposed axle lower axle limit is applied to single compartment road tankers. These are specifically designed so that their volume matches their load capacity, simply because if they are not fully loaded the liquid inside can move within the tank and seriously affect vehicle stability.

Thus if the tank is all only loaded to 80% of its capacity because of the proposed new axle legislation, the truck would become unstable under braking and cornering due to the unrestricted surge of the fluid within the vessel. *These tanks would have to be rebuilt to be accepted as safe vehicles.*

Whilst strictly outside our technical expertise we also draw attention to the following additional two points:-

On many secondary routes, the number of buses traversing that route exceed the number of goods vehicles, and where not greater in physical numbers, the accepted ‘axle load equivalency’ of mass (to factor 4, - see footnote), will make them responsible for the most road damage.

A ‘standard’ bus (rear axle load 10.2 ton) creates the damage done by 2.65 trucks with an 8 ton axle load. Projecting this to feeder services for the BRT system (with their 12 ton axle limit) suggests that only 5 buses, operating at this limit

will do the damage of 25 trucks with 8 ton axles. (Even empty, such a bus, with rear engine, will be over 8 tons on its rear axle.)

With a truck driver facing arrest under AARTO for more than 14% overload (1120 Kg above 8 ton), and a bus driver being allowed to go totally un-penalised whilst causing considerably more road damage at 'his' legal 10.2 ton (2200kg above 8 ton), are we not getting into a constitutional issue?

Equivalent single axle loads (ESALs). This approach converts wheel loads of various magnitudes and repetitions ("mixed traffic") to an equivalent number of "standard" or "equivalent" loads based on the amount of damage they do to the pavement. The commonly used standard load is the 18,000 lb. equivalent single axle load. Using the ESAL method, all loads (including multi-axle loads) are converted to an equivalent number of 18,000 lb. single axle loads, which is then used for design. A "load equivalency factor" represents the equivalent number of ESALs for the given weight-axle combination. As a rule-of-thumb, the load equivalency of a particular load (and also the pavement damage imparted by a particular load) is roughly related to the load by a power of four (for reasonably strong pavement surfaces). For example, a 36,000 lb. single axle load will cause about 16 times the damage as an 18,000 lb. single axle load

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On behalf of The Institute of Road Transport Engineers.

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