# Tolls for Freight Vehicles

Associate Professor Russell G. Thompson, PhD
VREF Centre of Excellence for Sustainable Urban Freight Systems
The University of Melbourne

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Currently, there seems to be little basis for determining toll levels apart from maximising revenue. This is leading to a large number of freight vehicles avoiding toll facilities that is creating significant social and environmental problems for communities in urban areas.

The Volvo Centre of Excellence in Sustainable Urban Freight Systems (CoE-SUFS) based at the University of Melbourne has conducted a number of studies that have investigated how to improve the rationality for toll levels for freight vehicles. This submission outlines some of the main findings and suggests areas where improved methods are required.

There is an increasing number of toll roads being operated within Australia. Rising toll levels is leading to avoidance of toll roads by freight vehicles that is causing substantial social problems (eg. noise and safety) as well as environmental impacts (eg. emissions). There is a need to understand more about the balance of power between shippers, receivers & carriers. Presently there is little knowledge of impacts of types of tolls (eg. flat, time-of-day & responsive) for freight vehicles. The transport industry considers that it "already pays" recovery costs. Tolls are considered an extra tax, adding costs to carriers, can increase price of goods.

There seems to be a wide range of attitudes towards tolls by carriers since the freight transport industry not homogeneous (Hire & Reward, Owner operator; fleet size & type of goods). Current toll rates are largely determined by distance (not travel time) and there is little discrimination on the type of freight vehicle and the utilisation of weight and volume capacity of vehicles. Incorporating these factors would make a link between tolls charged, road maintenance costs and efficiency. There is also a reluctance to explore discounts for off-hours that would encourage more large trucks to use urban tolled freeways at night.

Studies have identified that truck drivers have an extremely *low willingness to pay* even a token toll for time savings. Toll levels are often considered too expensive by freight carriers. In many cases the travel time benefits of toll roads cannot be *monetized* (especially for small owner operators) and are not well perceived. Owner operators often do not value travel time savings and cannot use them productively. Many carriers are not reimbursed (eg. For-hire, FTL). For many small owner operators, toll costs cannot be passed onto shippers or 3rd party brokers. For private carriers, toll costs are often absorbed as part of operating cost within company's overall transport costs. Many carriers have a limited ability to absorb costs, so they pass the toll costs onto receivers. This adds to the price of goods and effects the competitiveness of our exports.

Research conducted by CoE-SUFS has compared the direct costs and externalities of freight vehicles using EastLink versus a highway route in Melbourne. The analysis showed how freight vehicle operators make their decision based on direct cost, which is affected by toll charges and most favour the highway route. Such decisions are purely based on direct costs with no externalities are considered. This analysis highlighted that when more and more trips are diverted to highways, how significant the external costs are with developing congestion.

Therefore, charging higher toll charges to maximise benefit for the service provider may cause huge social costs to be incurred by society unknowingly.

The analyses of different toll charging mechanisms on Melbourne tollways with respect to freight vehicles was investigated in order to identify trade-offs. Firstly, a disparity between the two toll charging schemes was found and secondly disparities were found within the same facility which may not be able to be justified based on the cost of infrastructure provision.

For both tollways in Melbourne it should be noted that the toll structures are not efficient given that ETC system in option and thus create a lot of inequalities for road users. Fundamental factors such as time of the day are not considered in EastLink where factors such as pavement damage are not even considered.

When determining toll charges externalities seem to have not have been considered which produces a significant costs to the society. Furthermore, the ETC in operation, the present toll structures were found to be inefficient by not treating fairly different types of road users.

Government should aim to minimise the overall cost of freight transportation, not individual costs, and thus the analysis can be extended to model the pavement damage caused by freight vehicles to determine more appropriate toll charge and more emphasis should be given to externalities produced by freight vehicles when using different road types.

Social and environmental costs (externalities in terms of crashes, congestion, emission, noise, infrastructure cost) that are generated by motor vehicles, especially heavy vehicles (HVs) are becoming more of a concern for societies today. When the feasibility of projects are evaluated these externalities are now incorporated by way of calculating Social Cost Benefit Analysis (SCBA) beyond economic BC ratio. From a societal perspective, it is desirable for all transportation users to pay their full costs including private and social. Therefore, it is fair to charge the total cost from heavy vehicle users where equity is maximised. Social and environmental costs are not direct costs, but are borne by society. We have studied the social and environmental costs generated by HV using different types of roads and highlighted its significance. This discussion clearly proves that how sensitive the toll decisions are in terms of total cost and stakeholder objectives.

Only a few schemes have considered emission classes when deciding tolls, namely, German, Swiss and UK schemes. But more parameters need to be incorporated in order to capture the real effect of externalities. Therefore, a more comprehensive model is required to determine toll levels and how to minimise impacts while providing an efficient service.

Furthermore, it was found that toll charges are determined without any acceptable basis and methodology is not transparent to users. As mentioned earlier there's a trend in the world to charge HVs profoundly. CityLink in Melbourne is one of the most recent examples of that. CityLink toll charges are significantly higher and leads to more externalities being produced due to toll avoiding nature of HVs. Ignoring this fact, CityLink increased toll charges for HVs during the year 2016, which makes the conditions difficult for many freight operators. Recently they have increased the toll charges by 125% from 1st of April 2017 to support new infrastructure development. This has led to a noteworthy social dialog being initiated among the truck community and other stakeholders recently in Australia.

Another example supporting the same idea, again from Australia, is the latest toll increase publicized for HV in Brisbane on the Clem7, Legacy Way, Go Between Bridge toll roads. A comparison was made with car tolls, which was now 2.65 times for HV and will reach 3 with the new hike. All these examples highlight the fact that there seems to be no scientific basis or model available for governments to negotiate with toll companies in PPPs or to determine optimal toll for trucks looking at system optimisation, which leads to very inefficient HV transportation system.

It has been observed that toll avoidance behaviour is a common issue in Melbourne and excessive toll charges aggravate such avoidance. With logistics sprawl, demand for faster routes will grow in future. As a result, the number of heavy vehicles avoiding toll roads in future will be higher in the absence of proper toll charges. Toll avoidance leads to severe equity issues and cross-subsidisation of road users. The condition found to be truly unfair for people who are not using the un-priced road network and substantial advantage for HVs using the road heavily every day for zero charge. Therefore, it can be proven that direct road user charges are more appropriate and essential to be applied to all roads before differentiating any freeways or infrastructure that has been developed under private investment schemes. This is well understood by the countries like Switzerland, UK and New Zealand where the entire road network has been tolled. Toll avoidance is not limited to an equity issue or cross-subsidisation. It also produces more externalities, high maintenance costs on alternative roads and results in less sustainable transportation systems.

Considering the above issues, there needs to be methods developed for determining the optimal level of road user charges for freight vehicles in urban areas that considers the objectives of key stakeholders as well as the social, environmental and economic impacts.

New mechanisms should be capable of charging users directly for what they have consumed and this model promotes more sustainable transportation system. However, the future of freight transportation should look at more proactive manner shaping the freight transport to its maximum possible way. In other words, the pricing structure should encourage users to move goods at its lowest possible cost, including externalities.

Charging users based on direct usage (including externalities) is not sufficient enough to create sustainable transportation system where users behave independently. We suggest a pro-active method where road user charges (RUC) are uses as a tool to optimise the total cost of transportation. System optimised traffic assignment can be achieved if RUC are used as a tool to push users to such optimum state. This will enable to minimise total travel costs while minimising externalities.

Therefore, this will be a multi-objective optimisation task considering multiple classes of heavy vehicles as well as economic, social and environmental costs and benefits. Since these multi-objectives are related each other, conflicting sometimes, it is not an easy to find a solution for such condition.

More rational methods of calculating road user charges are being hindered by technological, political and social acceptability in the phases of data collection method, implementation procedure followed by non-availability of models to calculate damage caused to environment and society in the past. Moreover, complexity of the solution holds the implementation of an ideal system on one end, and political and social acceptability on the other end.

Our work suggests a more transparent, yet efficient, method for determining road user charges which incorporates the objectives of key stakeholders and the triple bottom line can be used to improve the sustainability of urban freight transport in the future.