

Road Safety Policy & Practice

Economic impact of 30km/h - Benefits and Costs of Speeds in an urban environment

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Key Findings

- Reducing urban speed limits will provide substantial cost savings and health benefits.
- Speed management is an inclusive solution for all road users globally.
- NGOs and advocacy groups play a significant role to facilitate these evolutions.

Introduction

Speed has fundamental economic costs which are hidden for many stakeholders. On the other hand, the economic benefits of speed are highly visible and strongly promoted by benefiting stakeholders and indeed carefully considered in cost-benefit assessments by road operating agencies. Thus, the main purpose of this paper is to explore and present the benefits and costs of low speed roads in urban environments.

Neglected Economic Costs of Speed

Most economic analyses of higher speeds consider only the reduction in travel time, omitting critical economic impacts through crash costs, emissions, fuel costs, and vehicle maintenance. The total costs of speed are often overlooked because lobbying by transport companies and other road users is focused on their travel time, while the main costs of crashes, Greenhouse Gases (GHGs), and health hazards from emissions are born by the society and government. Thus, those who speed reap the economic benefits and everyone (usually unknowingly) pays the costs.

Cost-benefit analyses employed by many government agencies that build and operate roads show the effectiveness of trucking, transport and logistics companies and motorised road users as advocates for the economic benefits of speed. However, most government agencies do not fully consider pedestrians as road users (Job, 2020). Direct evidence of biased economic analysis comes from the inclusion of driver waiting time in economic modelling for road policies combined with the absence of consideration of waiting time for pedestrians (Job, 2020). These biased analyses influence specific decisions such as signal phasing at intersections (strongly favoring

vehicles over pedestrians) and innumerable other decisions. Through such economic analyses, road policy in many countries is determined with the disturbing irrationality that the time of a person waiting in a car has economic value, but no economic value for the time of the very same person waiting to cross the road. Such analyses facilitate the maintenance of inappropriately high speeds where pedestrians are present, by ignoring the economic value of the latter.

One of the fundamentals of road traffic operations is that speed greatly influences not only traffic safety and operations but also climate impacts and air and noise pollution (Sakashita & Job, 2016). These climate change generating impacts of transport remain paramount as transport remains the weakest sector in delivering reductions in GHG emissions, with transport related emissions still growing while other sectors are achieving reductions (Gota, Huizenga, Peet, Medimorec, & Bakker, 2019). Generally, costs of higher speeds can include worsening of all the following:

- Loss of lives and debilitating injuries. Speed is the toxin in crashes (Job & Sakashita, 2016);
- Increases in GHG emissions and thus burdens the battle against climate change, as vehicles travel above optimal speeds or accelerate rapidly in stop-start traffic;
- Increases other air pollutants and noise which harm health (WHO Regional Office for Europe, 2013; Job, 1996);
- Higher transport costs, through vehicle maintenance costs and increasing fuel costs (Thomas, Hwang, West, & Huff, 2013);

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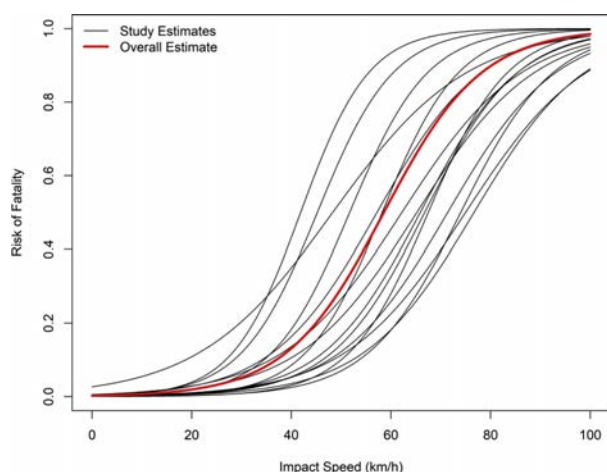


Figure 1. Risk of pedestrian crash fatality by speed of impact changes (Hussain, H., Feng, H., Grzebieta, R., Brijs, T., & Olivier, J., 2019)

- Reduction of equity of access by increasing the risk to pedestrians who must cross high speed roads in their commutes or journeys to school and other vulnerable road users such as cyclists and motorcyclists mixing with high speed traffic. This contributes to inequality and poverty; and
- Reduces opportunities for active transport which exacerbates many inactivity-related health problems such as obesity and cardio-vascular disease.

Pedestrian fatalities are the highest proportion of deaths from crashes in many low- and middle- income countries and globally the most severe type of crash. The graph below shows the risk of fatalities for each speed for a pedestrian crash (Hussain, H., Feng, H., Grzebieta, R., Brijs, T., & Olivier, J., 2019).

Figure 1 shows that speed has a large impact on the road safety. Speed is a risk factor for all crashes ranging from fender-bender to fatal injuries. A more recent systematic review study by Hussain et al. (2019) has identified the relationship between impact speed and the probability of a pedestrian fatality during a vehicle-pedestrian crash, where it is shown that an impact speed of 30km/h has on average a risk of a fatality of around 5%. The results strongly mandate a system of safe-speed limits for different road environments.

The Value of 30km/h in Pedestrianised Areas

With compliance of speeds at or below 30 km/h where pedestrians are present, the reduction in serious injuries to pedestrians can be powerful (in excess of 70 percent (Woolley, Stokes, Turner & Jurewicz, 2018; FHWA, 2020) as well as delivering substantial safety benefits for all other road users in these environments. For example, two TRL (Webster & Layfield, 1996; Webster & Mackie, 2013) studies in the UK compared before and after

implementation of 30 km/h (20 mph for the study) zones with physical traffic crash calming measures. The result from the first study for a total of 72 schemes showed that average annual crashes fell by 60 percent, while child pedestrian and cyclist crashes fell by 70 percent and 48 percent, respectively.

The World Bank's recently published Guide for Road Safety Opportunities and Challenges shows that no low-income countries, and only 3 percent of middle-income countries, have 30 km/h or less speed limit policies for urban roads (World Bank, 2020). Research on the full economic impacts of speed are rare, in itself reflecting neglect of the breadth of impacts of travel speed and leading to travel time becoming the dominant factor in current analysis which then (mis)guide vital transport policy decisions. Research on economically ideal speeds are only available for non-urban roads. However, studies show that economically optimal travel speeds are from 76 km/h to 85 km/h on high speed roads, highlighting that economically ideal speeds are significantly lower than the often higher posted speed limits (Hosseinlou, Kheyraadi, & Zolfaghari, 2015; Cameron, 2003, 2012). In addition, these studies did not consider GHG emissions, the inclusion of which would drive the economically optimum speeds even lower. With the other broad costs of speed (saving lives, GHGs, efficiency, health benefits from reduction in obesity, etc.) noted above considered, the economically optimal speed is significantly lower than the speed limits based on travel time costs, and misinformed or self-interested promotion of higher speeds. With stop-start traffic, more vulnerable road users creating higher risks of serious injuries, costs, and health hazards from emissions, economically optimal speeds in urban environments are much lower, though not well researched.

Conclusions

The recommended reduction of speed limits to 30 km/h has a potential to save lives and debilitating injuries. The strong relationship between speed and the risk of injury and of death applies to all road users involved in crashes. Legislative, enforcement, and road engineering actions to reduce urban speed limits will not only reduce crash injuries and deaths, but will also provide significant cost savings and health benefits delivered by transport noise and air pollution reduction, and increased pedestrian and cyclist active mobility. Finally, lower urban speeds combined with sound urban street policies also facilitate public transport, reduced space for motorised vehicles in favour of non-motorised active transport, freeing up more space for urban recreation and commerce, delivering more liveable vibrant cities (Global Designing Cities Initiative, 2016). Speed management is thus an inclusive solution for all road users globally. These evolutions should be and are being facilitated by advocacy by a wide range of NGOs and advocacy groups along with provision of information from researchers, with promotion from organisations such as the World Bank and Global Road Safety Facility (GRSF).

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