

Criteria for Setting Speed Limits for Sri Lankan Road Ways

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Abstract

The available knowledge and studies which have been carried out on setting speed limits for Sri Lankan road ways are very limited. Speed limit, on a given roadway, is a much important factor for road users, because that decides the travel time. This research attempts to evaluate the applicability of speed limits for Sri Lankan road network and develop a methodology for setting up speed limit for selected road section.

In the selection of road sections for this research, the scope was limited to straight road sections in flat terrains in sub-urban areas and other characteristics such as shoulder conditions, roadside development and etc pretty much equal. Then, the sample speed data was collected on selected road sections according to the vehicle category. The collected data was processed and compared with existing speed limits. Besides, a questionnaire survey was carried out in order to find out drivers' knowledge and attitude about speed limits on those selected road sections.

According to the obtained results, only three-wheelers and buses exceeded the speed limits which were to be adopted on the road sections by drivers. Then, the speed limit for motor cycles, car/van/jeep, light goods vehicles can be increased while Speed limit for heavy vehicles is kept as of for these road sections. After considering the results of the questionnaire survey it can be suggested that the speed limits for three-wheelers and buses can be increased by 10 kmph with respect to their prevailing speed limit values.

1. Introduction¹

Speed limits are used to regulate the speed of road vehicles for safety reasons. There is no blanket speed limit for many roads in other developed countries. The speed limits are decided by considering many road characteristics such as road class, road width, shoulder condition, road markings, etc. Although, Sri Lankan road network is prevailed only with

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blanket speed limits, there are roads where users can not adopt to the current blanket speed limit, because factors like road surface condition and topography of the road are subjected to change abruptly along the road sections. Thus, this research is expected to evaluate whether the current blanket speed limit is the best approach to be used in Sri Lanka or if not, to propose necessary guidelines for setting speed limits for different types of roadways.

2. Literature Review

In this section, the important theoretical aspects and your methodology must be described. Write this section to give enough information to the reader to be able to replicate your results. Therefore, do not provide a chronological description of your work, if the information is not necessary to understand the paper or replicate the results. Authors were unable to find any studies or researches on criteria for setting speed limit for road ways in Sri Lanka. However, other countries have been carried out many studies and researches in this area. Many of such researches propose 85th percentile speed to set speed limit for selected roadways. [Parker (1992), Juan and Janice] Generally a speed limit is given as, a blanket speed limit, a speed zone or a specific speed limit for a particular roadway with certain features.

Some adjustment factors such as access density, road class, lane width and etc. were applied by Dissanayake

and Jian (2003) to an ideal speed which limit based on actual conditions at the selected site. It was found that the model developed in the study predicted speed limits more realistic than using 85th percentile speed solely.

Dissanayake and Liu (2009) stated that speed zones can be suggested for potentially hazardous location on gravel roads and the 85th percentile model can be applied establishing speed zones on gravel roads.

3. Methodology

3.1 Materials and Methods

According to scope of this research several steps were identified which had to be performed in order to complete the project. Those steps were; (1) select at least two roads with similar characteristics (2) collect road geometric data, speed data and traffic data (3) analyze data to find 85th percentile speed and find current speed of vehicles. Finally based on analysis results to decide whether the current blanket speed limit is suitable or otherwise propose guidelines for setting the speed limits.

3.2 Site Selection

Three road sections were selected to check whether they are with similar characteristics. Those are; (1) Kandy – Jaffna A9 Road (from 67 to 70 km) at Dambulla (2) Katugastota – Kurunagala A10 Road (from 17 to 20 km) at Weuda area (3) Kurunagala – Puttlam A10 Road (from 59 to 62 km) between Wariyapola and Padeniya. Site information was also collected.

Table 1: Road geometric data and AADT data

Factors	Road name		
	A9 Road (From 67 to 70 km)	A10 Road (From 59 to 62 km)	A10 Road (From 17 to 20 km)
Single lane width / (m)	3.10	3.55	3.65
Number of Pedestrian crossing(s)	1	1	5
Number of defected area(s)	3	no	no
AADT data (RDA)	5926 (2007)	9527 (2008)	8528 (2007)
Shoulder condition	Poor	Well Paved	Well Paved

3.3 Collection of Data

Field speed data were collected using radar guns at several road sections on weekdays. In obtaining the speeds of vehicles, it was ensured to collect only the speeds of free flow vehicles with the standard headway.

Besides a questionnaire survey was conducted in order to find out attitude of drivers who use those road sections frequently.

4. Data Processing and Analyzing

The collected speed data was divided into speed ranges and frequency was listed which suits to the particular speed range. These frequency values for each speed ranges were plotted

against the mean of the speed range in order to check the normality of collected speed data. Then cumulative percentage values were calculated. Then, the cumulative percentage values were plotted against the mean of the speed range in order to find the 85th percentile speed value for the relevant vehicle type.

5. Results

The obtained results of 85th percentile speed value of each vehicle category were tabled in the following for both road sections and also the statutory speed limit values for relevant vehicle category were shown in the following table.

Table 2: 85th percentile speeds

Vehicle Type	85 th Percentile Speed / (kmph)		
	Weuda - Mawathagama section	Padeniya - Wariyapola section	Statutory Speed Limit / (kmph)
<i>Motor cycle</i>	65	63	70
<i>Three wheeler</i>	52	49	40
<i>Car / Van / Jeep</i>	72	67	70
<i>Bus</i>	69	67	60
<i>Heavy Vehicles</i>	62	58	60

The results obtained from the questionnaire survey were tabled as following for both the road sections

considering the vehicle types. The responses of the interviewed drivers of all the vehicle types are shown in table 3.

Table 3: Questionnaire Survey Results

Vehicle Type	Weuda - Mawathagama section (From 17 to 20 km)			Padeniya – Wariyapola section (From 59 to 62 km)		
	Suitable	Should be increased	Not aware	Suitable	Should be increased	Not aware
Response about current speed limit						
Motorcycle	27%	67%	6%	26%	70%	4%
Three wheeler	4%	96%	0%	3%	97%	0%
Car / Van / Jeep	14%	86%	0%	26%	74%	0%
Bus	13%	87%	0%	27%	73%	0%
Light goods Vehicles	16%	84%	0%	22%	78%	0%
Heavy Vehicles	83%	17%	0%	86%	14%	0%

6. Conclusions and Suggestions

- According to the obtained results, although only three wheeler and buses exceeded the speed limit, the majority of drivers (except heavy vehicle) convey that the speed limit should be increased. It seems that speed limit law enforcement at these road sections influence drivers to slow down their speed.
- Speed limit for three wheelers and buses can be increased by 10 kmph.
- Speed limit for Motor cycles, Car/van/jeep, Light goods vehicles can be increased.

- Speed limit for heavy vehicles is suitable for these road sections.

6.1 Continuation of the project

- Our scope of this research was limited to straight road sections with flat terrain.
- But it is required to carry out this research at road sections which have different road characteristics such as horizontal curves, vertical curves, different road conditions and geographical terrains.
- Various road sections should be considered in order to develop a generalized criterion for setting speed limits for Sri Lankan road ways.

References

- [1] Lu, J. J., Park, J., & Dissanayake, S. (2003). Criteria for Setting Speed Limits in Urban and Suburban Areas in Florida.
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- [3] Sri Lanka Road Development Authority ADT Data Report