

Bus Passenger Demand Analysis in Seven Major Corridors of Western Province

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1. Introduction

Buses have been a core mode of transport in Sri Lanka though their share is gradually falling. For instance, buses accounted for 65% of passengers crossing the Colombo Municipal Council (CMC) boundary in 1985, 57% in 1995, 55% in 2004 and 47% in 2013. The Sri Lanka Transport Board (SLTB) and private bus companies operate along roughly 680 and 400 inter-provincial bus routes in the Western Province, according to bus route information from the National Transport Commission (NTC). It is evident that most of the buses are operated in the seven major corridors in Western Province end in Pettah area where three bus terminals are located.

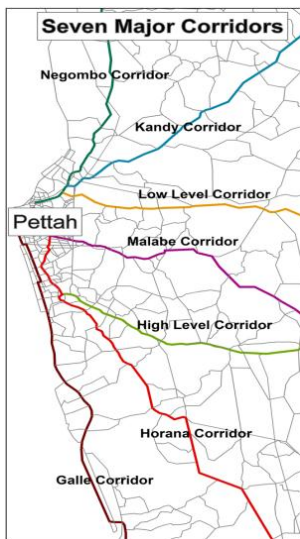


Figure 1 – Seven Major Corridors

Most of the inbound and outbound traffic of CMC use these seven major corridors of Galle, Negombo, Low Level, High Level, Horana, Malabe and Kandy (fig 1). Due to the traffic flow, these corridors are highly congested, especially during the peak hour. Another major impact on these corridors is that the average velocity of vehicles reduces significantly due to congestion and the lack of capacity of the roads. Especially, Horana and Low Level corridors as of recently experience high traffic flow but still have only 2 lanes capacity. These two corridors were developed recently due to the distribution of the traffic flow of the High Level corridor.

This research focuses on the bus passenger demand and supply of main seven corridors inside the Western Province and recommends catering to the demand during the peak hours. Moreover, this paper focuses on the oversupply during off peak hours and provides some alternatives to utilise the supplies. The analysis covers the

mode share on the corridors to evaluate the efficiency of bus operations and to propose rail based transportation to reduce the congestion on the road corridors.

2. The Objectives

The following are the main objectives of this research paper.

- To evaluate present bus passenger demand and supply during peak and off peak hours.
- To evaluate the impact of bus passenger demand and supply with other road transport modes along the seven corridors.
- To propose the possible solutions to cater the supply inadequacy during the peak hour and excess supply during the off peak hour for seven road corridors.

3. Methodology

Screen Line Survey (SLS) and Classified Vehicle Count (CVC) surveys were conducted to analyse the demand and supply of bus passengers along seven major corridors. Quantitative analysis was used to get the results. The main objective of the SLS is observing traffic volume at some of the previous survey locations. The CVC survey contains the number of vehicles by the hour, by mode and by direction. The survey locations were selected based on the major roads which cross the boundary of CMC, Kalutara-Colombo and Gampaha-Colombo. The bus demand was analysed from the SLS by using three separate buffer zones, namely

1. Colombo Municipal Council (CMC)
2. CMC+5km
3. CMC+10km

The SLS was conducted on one weekday either for 16 hours (6:00 AM to 10:00 PM) or 24 hours (6:00AM to 6:00AM of the following day) depending on the location. All surveys were conducted in 2013 and road settings are same as the 2013 road network.

4. Data Analysis and Results

Table 1 shows the peak hour bus passenger loading rate for Low Level is very high compare to other corridors except Horana. Off peak hour supply and demand and loading rate are at the optimum level at all the boundaries. The Horana corridor has supply deficiency along three buffer zones and much higher deficiency in the CMC+5km zone. This may due to the trip attraction and generation from CMC+5km is much higher than the other zones.

Table 1: Peak Hour and Off Peak Hour Bus Passenger Loading Rate (%)

Corridors	CMC		CMC+5 km		CMC+10 km	
	Peak	Off-Peak	Peak	Off-Peak	Peak	Off-Peak
Galle	95	75	81	83	98	76
Horana	120	80	140	86	121	83
Malabe	94	62	107	74	119	55
High Level	98	72	106	76	109	70
Low Level	120	85	102	71	107	89
Kandy	93	68	96	68	113	95
Negombo	105	68	105	83	110	85

Moreover, the capacity of the Horana corridor is much lower since it has only two lanes. Supply, demand and loading rate during off-peak period are at the optimum level at all boundaries of the Horana corridor.

According to the data analysis, it is evident that public transportation development is needed to reduce the traffic congestions along the corridors. The analysis also disclosed that poor performance of the public bus transport has become a major reason for the traffic congestion during the peak hours.

With the aim of mitigating these issues, new modes of public transport such as BRT and railway electrifications with traffic control and management should be focused on. Malabe Road, Horana Road and Low Level Road corridors need more attention than other road corridors. These corridors have now reached their maximum capacities and need development to avoid traffic congestions and bottle necks during the peak hour. Due to the higher share of the private vehicles the roads are congested and the road space to operate the buses is inadequate during the peak hour.

The analysis also shows the excess supply at off peak hour. In Malabe Road, Galle Road, Kandy Road, Negombo Road and High Level Road have the oversupply of buses during the off peak and it is to be well managed through the adequate scheduling and timing for these routes. The best solutions are re-routing and reduce the frequency of the buses during the off peak hour. Re-routing is one of the best solutions to serve congested areas and rural areas by shifting the bus fleet from over supplied area during the off peak hour. Private buses are owned by several individual organisations and managing the private bus fleet is also a difficult task as per the present experience of this industry. However, SLTB (Sri Lanka Transport Board) can focus on the re-routing of their buses during the off peak hour.

5. Conclusion

According to the results, it is evident that traffic congestion reduction along the corridors requires development of public transportation if the present situation continues, suburbs around the CMC boundary, where traffic demands on existing roads have almost reached or even exceeded capacity, and causing significant traffic congestion at each point. Malabe, Horana and Low Level corridors, already facing problems from traffic congestion, need strategies to alleviate traffic issues and bottlenecks during peak hours.

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