

LINE CAPACITY ANALYSIS FOR ADDING NEW CONNECTING TRAINS FOR INCREASING RIDERSHIP BETWEEN POLGAHAWELA AND KURUNEGALA

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ABSTRACT - Rail transport is a major public transport system in Sri Lanka. Polgahawela station is a junction - station. Although the Sri Lankan railway network does not cover majority of the country's districts, Railway network within Kurunegala district has a wider connectivity combining many cities in the country making the city a major transport hub. The main purpose of this research is to analyze the possibility of scheduling new connecting trains between Polgahawela and Kurunegala as the passengers can travel to Colombo in a minimum time. Selecting Polgahawela Station which is a junction station where passengers can use trains from both lines, as a case study. Other purpose is attracting more bus passengers to rail transport and reducing the private vehicles on the road. Therefore, moving bus passengers to the rail is a beneficial thing. Therefore, the proposal is based on diverting some trains that are running towards Rambukkana to Northern line. This research has been done to analyze the possibility of the above situation and find a possible time schedule and cost benefit analyzing has been done as a part of this research. Two trains were diverted to Upper and Lower direction with the objective of increasing the rail ridership between Kurunegala and Polgahawela railway station.

Keywords: Rail Transport; Ridership; Travel time; Diverting trains; Cost Benefit

1. INTRODUCTION

Kurunegala is a major city, which is in the Northwestern province of Sri Lanka. Because of its location it is like a transportation hub. It can be travelled to any direction of the country from this city. There is a railway station located in Kurunegala city and it is situated 2.1 km away from the main bus stand of the Kurunegala city. There are 93km from Kurunegala to Colombo and bus transport and rail transport available to travel to Colombo from Kurunegala. usually, buses take more than 3 hours to travel to Colombo while trains take maximum 2hours and 30 minutes. By using rail transport to travel to Colombo passenger may be able to save around 2 hours. The major problem that has been identified is unavailability of any connecting trains between Kurunegala railway station and Polgahawela railway station. Therefore, passengers at the Kurunegala cannot take the trains coming from the main line running through the Polgahawela station. To provide such kind of facility the line capacity analysis should be done. this research has been done for that scenario. "A railroad network is usually represented by an undirected graph $G = (V,E)$ where V is the set of nodes and E is the set of edges"(Lindner, 2000). The main objective of this research is to find out possibility for providing connecting trains to increase the rail ridership between Kurunegala and Polgahawela. As Kurunegala to Polgahawela there is a single track, "two trains travelling in opposite direction cannot occupy the same single track segment at the same time because collision would occur" [2].

2. MATERIALS AND METHODS

The Existing train timetable between Kurunegala and Polgahawela has been analyzed and have been identified the possible time slots to divert train to Main line. When diverting the existing time table should be analyzed because “Conflicts may arise between a fast train and a slow train that is travelling in the same direction”[2]. Also travel time should be considered as “A major cause of travel disutility in public transport systems is the time a passenger needs to Travel from origin to destination”[3].

2.1. New Schedule of the Diverted Trains

Table 1. (From Polgahawela to Kurunegala)

Railway station	Arrival time	Departure time
Polgahawela		09.25
Girambe	09.29	09.30
Thalawattegedara	09.35	09.36
Potuhera	09.39	09.40
Nailiya	09.45	9.46
Kurunegala	09.52	-

Table 2. (From Kurunegala to Polgahawela)

Railway station	Arrival time	Departure time
Kurunegala		12.25
Nailiya	12.31	12.32
Potuhera	12.37	12.38
Thalawattegedara	12.41	12.42
Girambe	12.47	12.48
Polgahawela	12.54	

3. RESULTS AND DISCUSSION

3.1. Cost Benefit Analysis

Each type of transport modes have different travel cost for the journey. Also types of the train will be affect for the cost directly. Following table represent the cost analysis of each transport mode.

Table 3. Cost Analysis

Location of the Passenger	Bus transport mode		Rail transport mode (3 rd class)		
	To Bus stand	To Colombo	Intercity (Rs.)	Express (Rs.)	Slow (Rs.)
Muttettugala	-	150	280	145	145
Saragama	-	150	285	150	150
Wehera	-	140	280	145	145
Mallawapitiya	20	140	265	130	130
Malkaduwwa	-	140	280	145	145

4. CONCLUSION

To increase the rail ridership between Kurunegala and Polgahawela it is better to divert a train (9.25am at Polgahawela and 12.25pm from Kurunegala) on the Main line into Northern line. Passengers can save nearly 1 hour by that decision. If there is a proper schedule passengers may attract to use trains.
[4]

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