A STUDY ON THE CIRCULAR RAILWAY IMPROVEMENT IN YANGON*

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1.   INTRODUCTION

This paper introduces the current status of the circular railway system in Yangon city and analysis on the possibility to improve the system.

2.   THE CIRCULAR RAILWAY IN YANGON

Due to the expansion of the Yangon area and the rapid growth of population, the circular railway service was introduced for urban transport on 1st May 1959. The Myanmar Railway operated up to eight diesel locomotive with 160 average daily trips and carried 57,578 commuters daily. Although the population growth of Yangon increased, transportation services were not so changed from the last decade. Due to this phenomenon the commuters who enter the CBD daily from suburban area create a lot of problems for the transportation of Yangon.

In the circular railway sector, nine additional diesel locomotives were augmented in 1964, to meet the needs of commuters. Even though suburban railway the daily services increased 190 trips in 1965 and 200 in 1971 and more passengers were carried, the train was not a major mode of public transportation. The urban rail services decrease to 146 trips in 2000 but the population is gradually increased. Even though the population of the Yangon is about 4.3 million, the services of the suburban   rail service makes 162 trips in 2005 but still fewer than in 1971 when the   population was about two million. Few percentages of daily commuters are using the rail service because of frequent delay of trains caused by engine troubles and other failures of locomotives. While public transport users in the road transport are rapidly increasing, rail service users are decreasing. 4,707 buses carried about 4 million passengers per day and the rail service carried about 72000 passengers per day (Country Paper for the 4th ASEAN-JAPAN, "Workshop-Cum- Seminar on Urban Transportation", 1998).

The above mention rail service is not adequate for Yangon CBD area because it could hardly meet the demand of increasing commuters generated from satellite townships built during the expansion of the city. Also as the inhabitants in Yangon mainly rely on the Bus to commute to their work, school and market to deal, the number of the vehicles could hardly meet the demand. The railway service is the mass transportation mode and is managed by Myanmar Railways.

There are 13 routes of rail services in Yangon. All these railway lines links the CBD area and suburban area of Yangon (Division (7), February, 2008). Although the passengers using in rail services are increased, the rate is not very much. Trains are running poor quality as the old coaches and often breakdown of locomotives. Although carrying the goods is being banned during rush hour by regulation, passengers have to ride with goods in the same coach at the normal time. Goods are kept in front of door and block the way of the passengers. The speed of the train is very slow (about 20 km / hour) and railway tracks are not maintained well. Low income people use the railway, and mostly used by those who collect green grocery from suburb and sell them in downtown area. It is very time-consuming and has unreliable schedules. Some passengers are not properly seated and sit on the door step and also sit between two coaches, which are dangerous behaviors.

It is very noisy due to the hawkers and snack sellers on the trains. The level of the coach's door step and that of platform are not the same height that makes it many difficult to get on and off the train. There is no shunting line at the station on the way of railway so that the passengers have to wait until the repairing process is completed if the train is breaking down. The coaches are needed to be clean and tidy.

The train halts a minute at the small station; passengers try to get on and off quickly while reducing the speed to halt. Whistles are used to signal for train leaving and sounding the alarm when someone is on the railway track but at the banned area for whistling, railway man let the passengers know that the train is about to leave by blowing a hand held whistle three times, it is more chance to happen the accidents because of human error. Most of the stations are not only far from the bus stop but also no access road. Although the amount of fares is very affordable for the public, there are no significant amounts of passengers in Yangon city. Figure 4 describes the time-space diagram of the circular railway which the authors originally made from the original time-table.
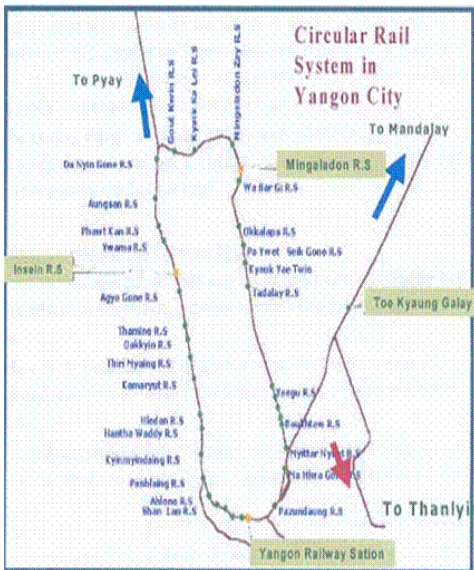

Figure.1 Route map of Circular Railway
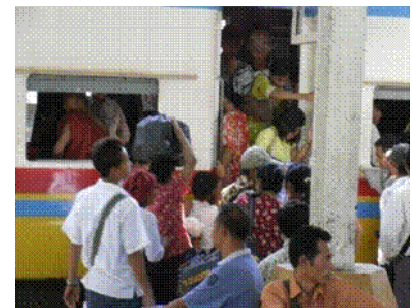

Figure.2 Dual-double track of Circular Railwav
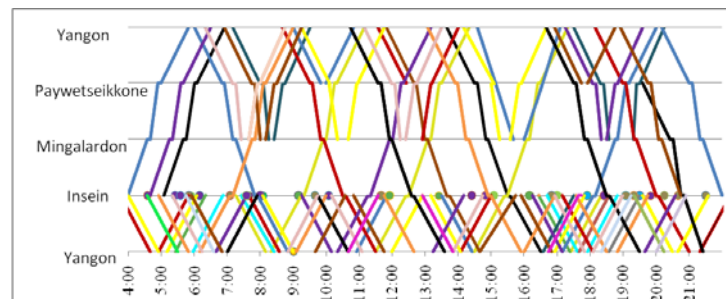

Figure.3 Congested Scene of the train

Figure.4 Circular Railway Time-Space Diagram at present

3. POSSIBILITY OF IMPROVEMENT

3.1. Setting of Alternatives

The transportation system is strongly related with other socioeconomic and environmental systems of Yangon. Changes to the transportation system have both direct and indirect impacts on the social and economic activities in Yangon. The circular railway service has high potential to be an efficient transportation system .The implementation of this service will give the effectiveness on the socioeconomic and environmental system of Yangon. The circular railway service will be analyzed by the cost - benefit ratio on the three alternatives comparing with the existing bus service and the circular railway service (hereafter Alternative (0)). The three proposed alternatives are shown in Table 1

The existing circular railway service is very low due to the poor facilities of the services with low speed (20km/ h) according to the author's riding experience. The proposed three alternatives are operated at 60km/h. The operation route of existing circular railways has five routes (Division (7), February, 2008). The route of Insein –Yangon is the one with the highest frequency. It means that the circular railway service is more reliable for people who stay around the Insein area than the other routes. For the new proposed alternatives (1, 2 and 3), it tries to seek the balance opportunity for the people from all area which are nearby the circular line.

3.2. Generalized cost assumption

The generalized cost is estimated based on the time in the train, stopping time, average waiting time, other delay time and the fare. All of the times are converted into a monetary value. It is done by multiplying the total travel time by the value of minutes by $.In this converting, 1$ is equal to 1200 Kyats (Myanmar currency) due to the people's daily average income 3$ of 8 hours working time. The generalized cost of bus, Alt (0), Alt (1), Alt (2) and Alt (3) are shown by Table 4.2.In this table, BGC is bus generalized cost and TCG is the train generalized cost. This table shows that although the generalized of

bus is the lower than Alt (0), most of the stations of the proposed alternatives of train generalized cost are lower than the generalized cost of bus.

The bus stop is located near the residents' area and easy to change the bus line to reach the CBD area but the train station is not close to the resident area and not easy to change the mode to reach the CBD area and it takes time. The furthest distance from the bus stop and the station is 1.77km and the nearest is 0.1 km (Advance& Style Co., 2007-08 first edition). Most of the passengers do not want to change from the train to the bus even though the fare of the train is very low. And also if the passenger misses the train, they have to wait until the train comes again but the circular railway service is not punctual. The passenger cannot predict the train arrival time. The frequent delays of the trains are caused by the failure of locomotives especially.. If the passengers miss the bus; they can change easily to the other bus line to go to the CBD area. Therefore, there are many points to be the high generalized cost of train.

3.3 Passenger volume estimation.

The authors assume that the passenger volume would be estimated by binary-logit aggregate modeling with the generalized cost of the buses and the railway counting on the population of each zone (surrounding area of the station) in Yangon.

The population of the surrounding area of each station is shared by the population of the relevant township's population. The train passengers are calculated by multiplying of the total labor force, Probability of train passengers and the percentage of the passengers coming to the Yangon. Most of the low- income people use the circular railway service. The fare of the proposed alternatives is affordable for the passengers.

According to the generalized cost of bus and proposed alternatives, the passenger is increased from 130,000 to over 230,000.It means that the 76% of train passengers increased. Alternatives (1, 2, and 3) are the same fare but the different frequency causes the different investment of rolling stock.

The passengers of Alternatives (1, 2and 3) are not very different despite the different investment because the value of the generalized cost of each alternative is not so different. The passengers of Alternatives (0, 1, 2 and 3) are shown in Table 2

Table.2 Estimated Passenger Volume

Alt.0	Alt.1	Alt.2	Alt.3
133,236	232,519	237,986	235950

3.4 Evaluation of alternatives

The authors calculate the total cost and revenue in terms of each alternative, which is summarized in Table 3.

Alternative (0) has deficit because the cost is lower than the revenue .Although service is running with the 18 locomotives and 83 coaches with properly time schedule, the peak hour congestion are very high. For the proposed alternatives, the value of revenue of Alternative (1) is almost the same as the value of cost .And also the peak hour congestion ratio is acceptable with the 14 locomotives and 104 locomotives. Although the peak hour ratio of Alternative (2) with the 22 locomotives and 168 coaches is acceptable, the value of revenue is very low than the value of cost. The Alternative (3) is with 38 locomotives and 296 coaches and very low peak hour congestion ratio. The deficit is very high.

Table.3 Comparison of Alternatives

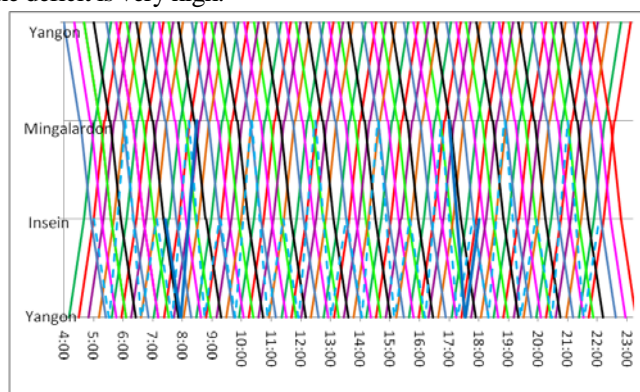|		Alt (0)	Alt (1)	Alt (2)	Alt (3)
Revenue(000)		2,664	28,979	29,668	29,408
Cost(000)		7,976	28,115	46,282	65,585
B/C		0.33	1.03	0.64	0.45
Load	West Route	210%	115%	113%	50%
Factor	East Route	341%	129%	106%	55%
Locomotive used		18	14	22	38
Coach used		83	104	168	296

Figure.5. Time-space diagram in the proposed alternative 1

The railway passengers probability, the generalized of the difference between the bus and railway service regarding to the

distance from the Yangon and the generalized cost of the difference between the existing and the proposed railway service are not much different in effectiveness, even the different investment .The B/C ratio of the all Alternatives are less than 1 except Alternative (1).

From the result of the analysis in among the three alternatives, Alternative (1) is the suitable project for the improving of the circular railway service. The time-space diagram in the proposed and recommended alternative (1) is described in Figure 5

4.   CONCLUSION

In this paper, the existing public transportation services of the Yangon meet hardly the demand of the public. The problems of Public Transportation in Yangon are traffic congestion at CBD area, uncomfortable and unsafe services of the all modes .The traffic deaths of Myanmar are the highest among the neighborhood country as in 1999; it is the fact of the public transportation service decreasing and the car ownership increasing. The lack of the cooperation of the each relevant institution and the poor management of the operation system are the major issue of the Public Transportation of Yangon. The experiences of Public Transportation improvement in Southeast Asia countries are the applicable to improve the Public Transportation network in Yangon. The experience of the improvement of rail system in Jakarta metropolitan area which is developed based on the existing infrastructure is the good example for the improvement of the existing Circular Railway service in Yangon. The result of the analysis shows that the suitable solution of the improving of the railway service in order to the increasing of the frequency and the affordable fare with high speed of   punctual railway services is the (Alternative (1)) for   alleviating of the traffic congestion at peak hour and the   achieving the more convenience condition of urban transportation. Possibilities to improve the level of service of circular railway system in order to alleviate the traffic congestion in CBD area of Yangon are maintenance of existing facilities, replacement of Rolling Stock , installing of the modern signaling equipment and advanced information system, upgrade the station facilities and promotion of vicinities around station, improvement of fare system and increase of frequency. Although the circular railway service is high potential to lead the Public Transportation, the improvement of the circular railway service only is not enough to achieve the effective Public Transportation service.

As the traffic problem in CBD area of Yangon is become worsening, the feasible solutions of the urban transportation in Yangon are the major task for the attractive and effective Public Transportation System.

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