

RAPID TRANSIT SYSTEMS IN TAIWAN

by

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important factor contributing to the rapid economic growth, the so-called Taiwan Miracle, in the 80's. However, this freeway was overloaded soon after its completion. Although improvements are being made to add more lanes in segments in which traffic is heavy, the increase in capacity can not catch up with the increase in demand. The opening of the northern segment of the Second Freeway in 1997 did lessen the problem in the northern part of island to a certain extent. However, the junction of the two freeways has become a new bottleneck. The southern segment of the Second Freeway is scheduled to be completed by the end of this year and the central segment of the Second Freeway is scheduled to be completed in the year of 2001. By then, it is expected that situation will be much improved. The planning for the eastern link of the freeway network is to start in this year. It is expected to take more 20 years to close the round-the-island loop.

The railway system has been in operation since 1891 and was the most important mode of transpiration till the 70's. It now, refer to Fig. 2, has a total route length of 1,100 km. It was electrified in 1979 to upgrade the quality of its services. Works are now being carried out in major cities to relocate the rails underground to eliminate barriers, which seriously hinder urban developments, and to eliminate road crossings. This also increases the speeds of trains and shorten the travel time.

As economy keeps growing, the demand for a faster mode of transportation becomes apparent. The air traffic is already congested and lacks room for expansion. A high speed railway system appears to be a viable alternative. The government has entered an agreement with a concession company for the construction and operation of the Taiwan High Speed Rail. Tenders for civil works are expected to be called soon and the construction is expected to start in 1999. Although there are good reasons to be dubious, the construction is scheduled to be completed and the High Speed Rail open to revenue services in the year of 2003.

2. Rapid Transit Systems in Taiwan

The above-mentioned railway and highway systems, are expected to be able to satisfy the needs for long-distance travels for many decades to come, however, congestion still remains a daily nightmare for commuters in major cities. As one of the most populated areas in the world, Taiwan can not afford endless expansion of its road surfaces. Therefore, efforts are being made to construct rapid transit systems to solve the traffic problems in metropolitan areas.

Rapid transit systems, as depicted in Fig. 2 and Table. 1, have been planned for six metropolitan areas, ie. Taipei, Taoyuan, Hsinchu, Taichung, Tainan, and Kaohsiung. The Municipal Governments in Taipei and Kaohsiung have set up Rapid Transit

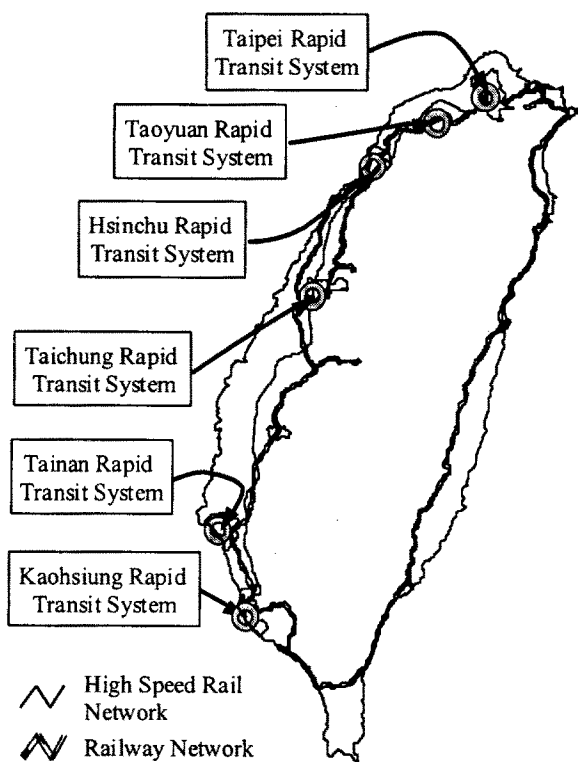


Fig. 2 Rail and Rapid Transit Systems in Taiwan

Table 1 Status of Rapid Transit Systems in Taiwan as of January, 1999

	Capacity	Elevated km	At-grade km	Underground km	Total Length km	Number of Stations	Number of Depot	Status/ Opening Date
Taipei MRT Initial Network								
INITIAL NETWORK								
Mucha Line	Medium	10.9			10.9	12	1	Open
Neihu Extension	Undecided				12.9	11	1	Studying
Tamshui Line	Heavy	10.5	9.5	2.8	22.8	20	1	Open
Hsintien Line	Heavy			10.3	10.3	11	1	1999
Nankang Line	Heavy			11.5	11.5	12	1	2000
Eastern Extension				2.5	2.5	2		Studying
Panchiao Line	Heavy			7.0	7.0	5	1	2000
Tuchen Extension				5.5	5.5	4		2006
Chungho Line	Heavy			5.4	5.4	4	1	Open
Maintenance Track				1.6	1.6	1		1999
Taipei MRT Long-Term Network								
Hsinchung Line	Heavy			19.7	19.7	15	1	designing
Luchou Line	Heavy			6.4	6.4	5	1	designing
Hsinyi Line	Heavy			6.2	6.2	6		planned
Sungshan Line	Heavy			8.5	8.5	7		planned
Orbital Line	Medium	29.4			29.4	25		planned
Airport Link	Medium				34.7	15	1	planning
Taoyuan MRT								
Red Line	Light	7.7		9.9	17.6	15	1	planned
Blue Line	Light	15.8		6.5	22.3	14	1	planned
Green Line	Light	2.8		5.9	8.7	7		planned
Hsinchu MRT								
Red Line	Light	9.8	2.7		12.5	14	1	planned
Blue Line	Light	3.4	9.1		12.5	12		planned
Maintenance Track		1.0			1.0			planned
Taichung MRT Initial Network								
Red	Light	17.5		15.9	33.4	23	1	planned
Blue	Light	5.5		11.2	16.7	14	1	planned
Green Line	Light		0.8	18.4	19.2	17	1	planned
Tainan MRT								
Red Line	Light	13.6		10.1	23.7	16	2	planned
Blue Line	Light	20.4			20.4	15	1	planned
Green Line	Light			16.6	16.6	13	2	planned
Science Park Extension	Light	11.6			11.6	3		planned
Kaohsiung MRT								
Orange Line	Heavy			14.4	14.4	14	1	approved
Red Line	Heavy	8.5		19.8	28.3	23	2	approved
					454.2	355	24	

Departments to be in charge of the constructions of their own rapid transit systems. The constructions of the rest of rapid transit systems are to be managed by Department of Housing and Urban Development of Taiwan Provincial Government.

briefly discussed hereinafter. It should be noted, however, most of the networks are still pending on approval by the Ministry of Transportation. And Communications (MOTC) Therefore, the information given shall be deemed as preliminary and is subject to revisions from time to time.

The status of all the rapid transit systems is

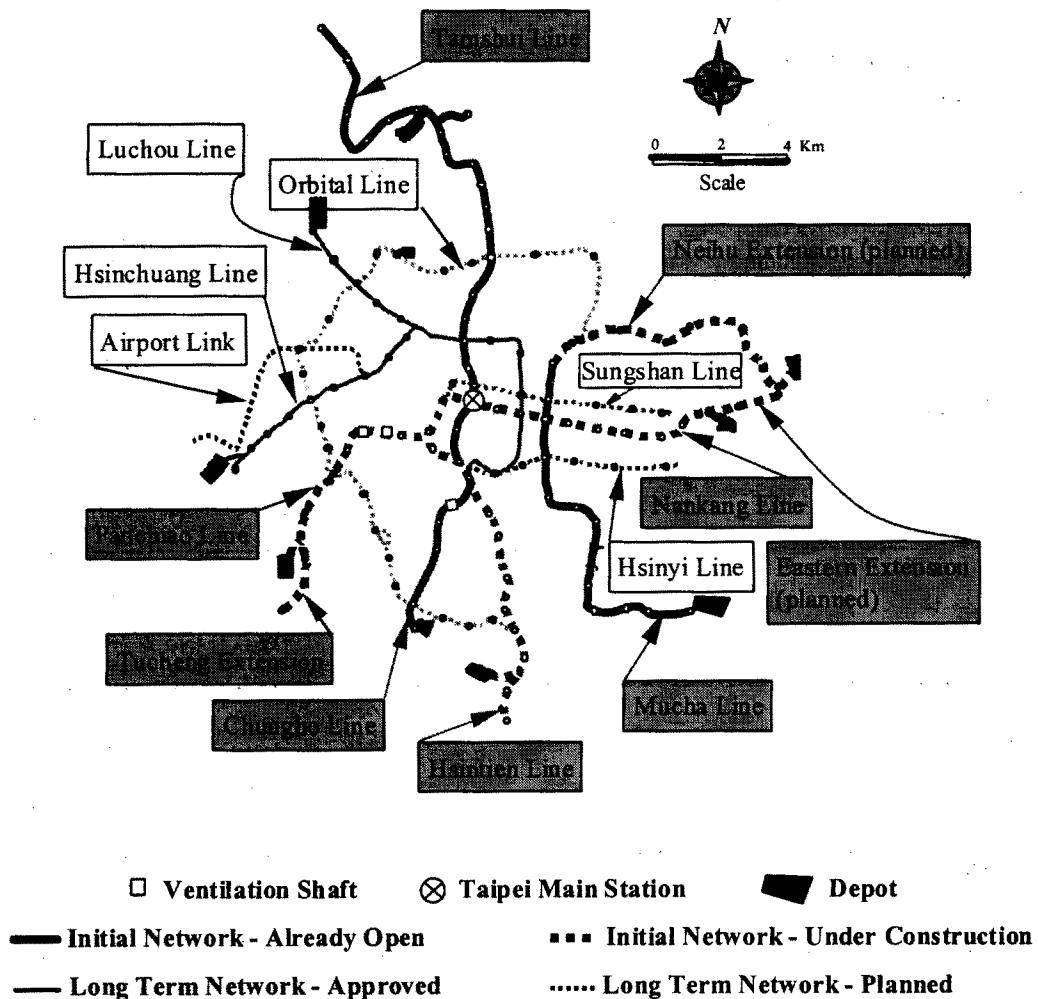


Fig. 3 Status of Taipei Rapid Transit System, January, 1999

2.1 Taipei

As depicted in Fig. 3, the Initial Network of the Taipei Rapid Transit System comprise 6 lines, with a total of 79 stations, plus a short maintenance track. Of the total route length of 86.8 kilometers in the Initial Network, 31.6 kilometers is elevated, 9.5 kilometers at-graded and 45.7 kilometers underground. The so-called Long-Term Network comprises 6 more lines and is 83.5 kilometers in length. There are 67 stations in the Long-Term Network.

As of this date, Mucha Line, Tamshuei Line and Chungho Line in the Initial Network are already open to revenue services. Mucha Line is carrying an average of 40,000 passengers and Tamshuei/Chungho Lines together are carrying an average of 200,000 passengers on each weekday. Hsintien Line, Nankang Line (excluding the Eastern Extension) and Panchiao Line are still under construction and will be completed in the year of 2000. Neihu Extension was originally elevated, however, the City Council strongly requested it be relocated underground. At this moment, final decision is yet to be made.

Regarding the Long-term Network, the design for the Hsinchuang Line is ongoing and the design of the Luchou Line is to start in 1999. The rest of lines are still pending on approval from the MOTC. A medium capacity line has been planned to connect the Taipei Rapid Transit Systems to Chiang Kai Sek Airport, which is about 30 km to the west of Taipei City. This so-called Airport Link is now studied by a concession company.

2.2 Taoyuan

The Taoyuan Metropolitan Area Rapid Transit System, as shown in Fig. 4, includes the Red, Blue and Green Lines, with a total of 36 stations and a total length of 48.6 km. The planning of this rapid transit system was completed in 1993 and the report was

submitted to the MOTC for review in 1994. The review comments by the MOTC were incorporated and the report was re-submitted to the Ministry for approval in 1998. Preliminary works, such as ground investigation, digitization of maps, utility survey, GIS establishment and area-wide traffic integration, have been completed.

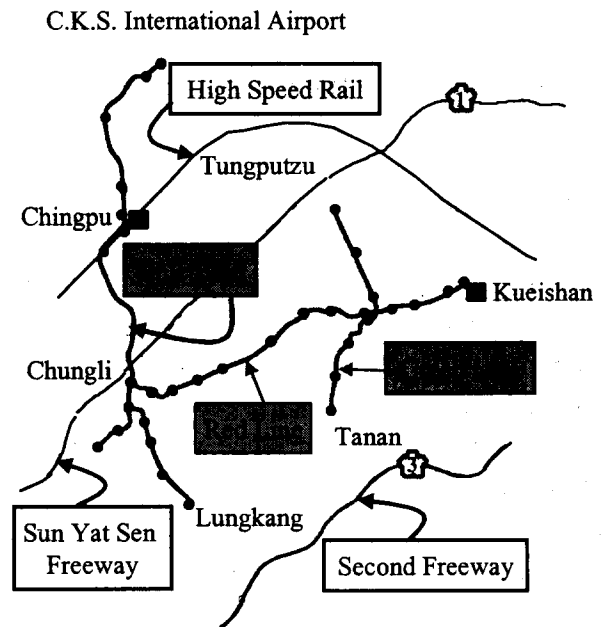


Fig. 4 Taoyuan Rapid Transit System

2.3 Hsinchu

The Hsinchu Rapid Transit System, as shown in Fig. 5, includes the Red and the Blue Lines, with a total of 26 stations and a total length of 26 km. The planning of this rapid transit system was completed in 1997 and the report was approved by the Taiwan Provincial Government in 1998. The report is to be submitted to the MOTC for review soon.

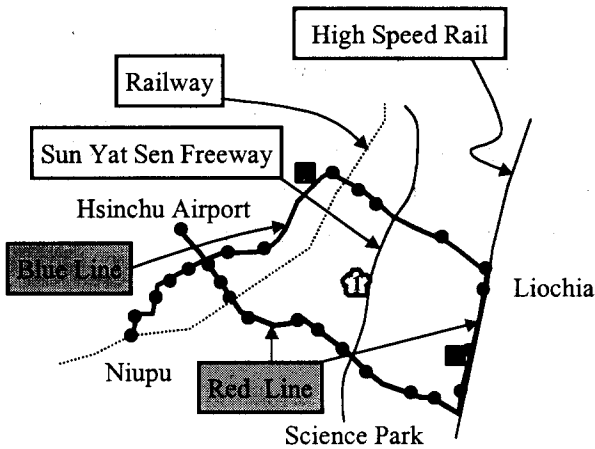


Fig. 5 Hsinchu Rapid Transit System

2.4 Taichung

The Proposed Network of Taichung Metropolitan Area Rapid Transit System, as shown in Fig. 6, includes the Red, Blue and Green Lines, with a total of 54 stations and a total length of 69.3 km. The planning of this rapid system was completed in 1992 and the report was submitted to the MOTC for review

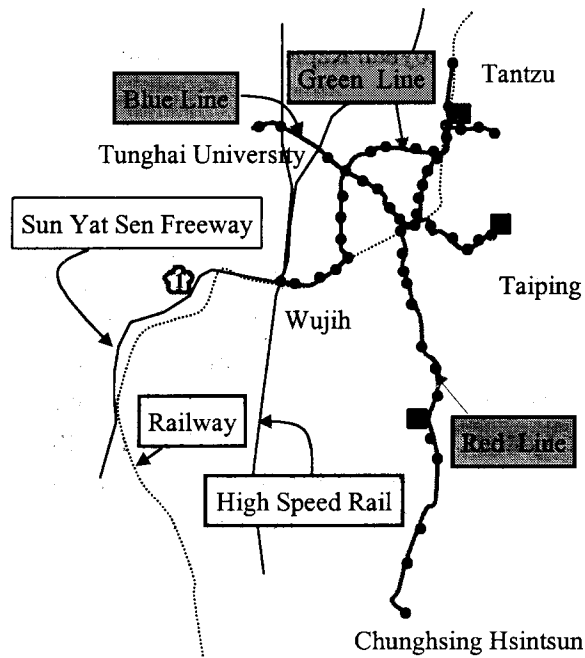


Fig. 6 Taichung Rapid Transit System

in 1994. The comments from the MOTC were incorporated and the report was revised and re-submitted to the Ministry for approval in 1998. Preliminary works, such as ground investigation, GPS survey, utility survey, GIS establishment and area-wide traffic integration, have been completed. The Long-Term Network mainly calls for extension of the above-mentioned lines.

2.5 Tainan

The Tainan Metropolitan Area Rapid Transit System, as shown in Fig. 7, include the Red, Blue and Green Lines, with a total of 47 stations and a total length of 72.3 km. The planning of this rapid transit system was completed in 1992 and the report was submitted to the MOTC for review in 1993. The comments from the MOTC were incorporated and the report was revised and re-submitted to the MOTC for approval in 1998. Preliminary works, such as ground investigation, utility survey, GIS establishment and area-wide traffic integration, have been completed.

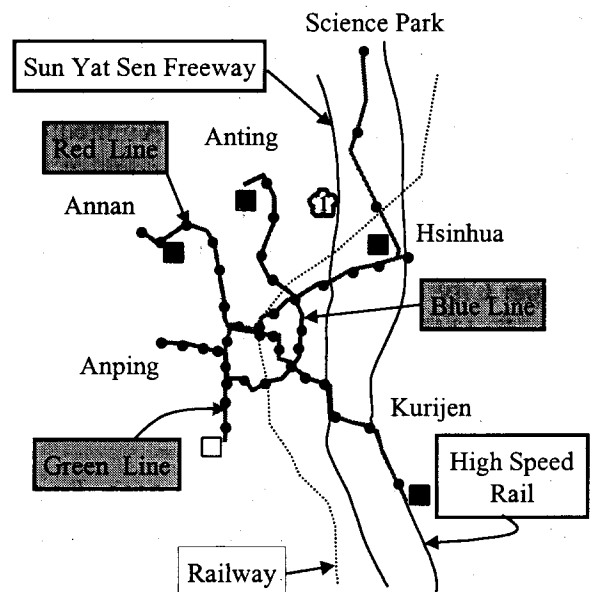


Fig. 7 Tainan Rapid Transit System

2.6 Kaohsiung

The Initial Network of the Kaohsiung Rapid Transit System, as shown in Fig. 8, consists of the Orange and the Red Lines with a total of 37 stations and a total length of 42.7 km. Design for the Orange Line started in 1994 and was suspended in 1995. It is expected to resume within a year or so.

However, before that, decision has to be made whether the project is to be awarded in the traditional mode or as a BOT project. The Long-Term Network calls for two more lines, however, details are unavailable.

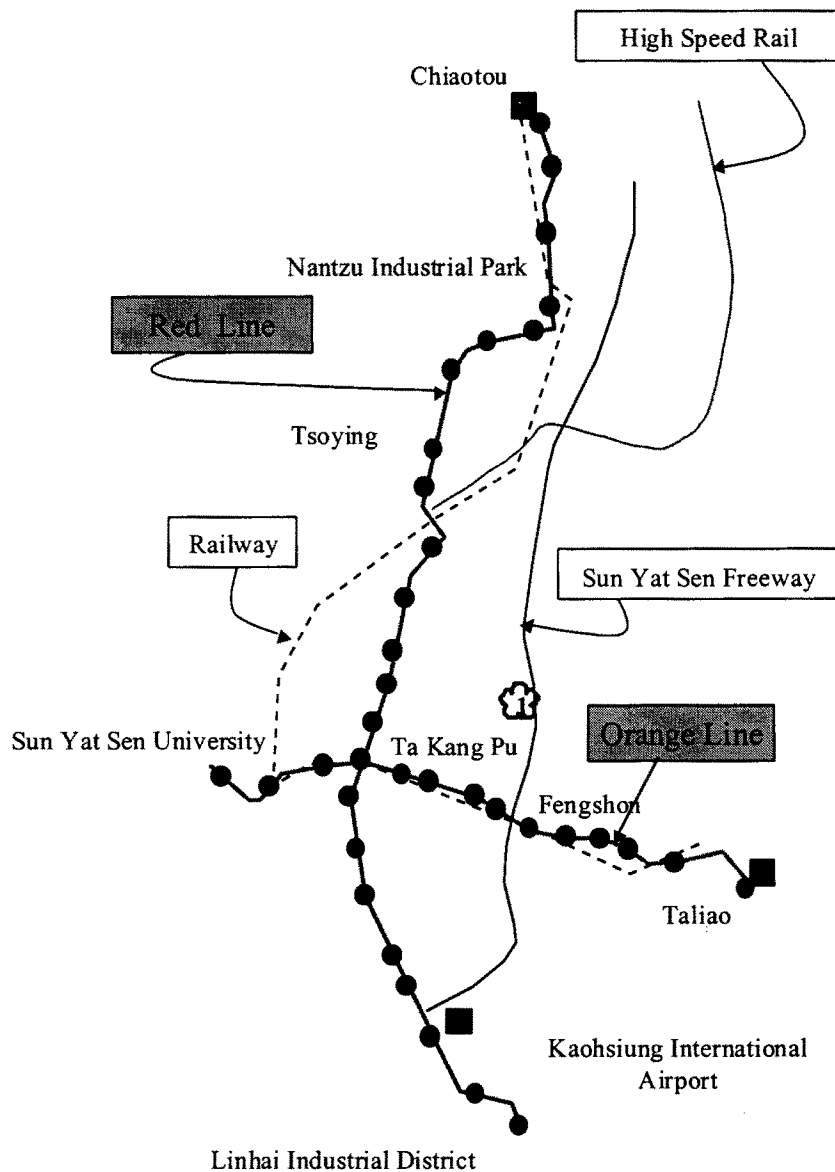


Fig. 8 Kaohsiung Rapid Transit System

3. SUMMARY

The rapid transit systems mentioned above supplement the highway and railway networks and form an integrated transportation system of the entire island. Locally, they are to be integrated with the bus systems to become backbones for regional transportation.

The Initial Network of the Taipei Transit System is implemented in the traditional way. That means, the project owner engages

consultants to perform preliminary and detailed designs. Stimulated by the successful tender of the High Speed Rail, the sentiment is shifting toward the build-operate-transfer (BOT) mode of tender. The Airport Link in the Long-Term Network of the Taipei Rapid Transit System is likely to be awarded in such a manner. It is anticipated that more and more construction projects, not limited to rapid transit systems, will be implemented as BOT projects.