Myanmar

Burma Railways Modernization Project (I)(II), Locomotives, Passenger Coaches and Freight Wagons Rehabilitation Project

Report Date: October 2002

Field Survey: August 2001

1. Project Profile and Japan's ODA Loan

Site Map : 3 Project site

Site Photo : New Locomotive in Mandalay

1.1 Background

Myanmar has four modes of transportation: railway; inland water; road and aviation. Shares of domestic passenger transportation (passenger-miles) by mode carried by national transportation companies in early 1980s were: railway (approx.60%), road (approx.20%); inland water (approx.10%) and aviation (less than 5%). Those of domestic freight transportation (ton-miles) are, railway (approx.50%); inland water (approx.30%); road (approx.20%) and aviation (less than 1%). Both statistics show that shares of railway are substantially larger than other modes. However, all type of rolling stock: locomotives, passenger coaches and freight wagons, had been deteriorated. With suffering from shortage of spare parts, operation ratio as well as efficiency of Myanmar Railways had been falling down.

In the 4th 4-year National Plan (1982/83-1985/86), reinforcement of transportation capacity to cope with increase of agricultural and industrial products was one of the high priory projects. Myanmar Railways (former Burma Railways) planned procurement of new diesel locomotives as well as rehabilitation, and procurement of new passenger coaches and freight wagons under the Plan, the investment amount of which accounted for 2.4% of total required investment amount for the Plan.

1.2 Objectives

The Railway Modernization Project[1] was divided into two phases and purpose of the Project was to reinforce the transportation capacity through procurement of 12 shunting diesel locomotives; 143 passenger coaches; and 240 freight wagons and rehabilitation of 5 shunting diesel locomotives stood in the shed. The Project also aimed to improve Myanmar Railways' engineering capability through learning of

[1] In this report, Burma Railways Modernization Project (I) and Burma Railways Modernization Project (II) are collectively referred to as Railway Modernization Project.

construction of rolling stocks from knockdown parts and save foreign currency for procurement.

Mutually complementing with the Railway Modernization Project, Locomotives, Passenger Coaches and Freight Wagons Rehabilitation Project aimed to maintain and increase operation capacities of Myanmar Railways. In other words, through supply of spare parts and rehabilitation of diesel locomotives, passenger coaches and freight wagons that were out of railway operation, the Project aimed to increase the rate of operation and its efficiency of Myanmar Railways to meet demand as well as to improve safety and comfort.

1.3 Project Scope

1.3.1 Railway Modernization Project

The Project consists of the following five components:

(i) Repair of Shunting Diesel Locomotives;
(ii) Procurement of fully erected and semi-knock down shunting diesel locomotives;
(iii) Procurement of fully erected and semi-knock down passenger coaches and freight wagons;
(iv) Procurement of machineries, equipment and tools for assembling semi-knockdown and knockdown rolling stock (ceiling crane, forklift, steel plate cutting machine, welder, hand drill);
(v) Training and technical assistance for Myanmar Railway staff provided by the supplier during rolling stock construction at site and acceptance of trainee at supplier.

The project were implemented by the following two phases.

Table 1: Procurement By Stage

(Unit: Number)

Items *Note	Stage I		Stage II	Total
	Phase I	Phase II	Phase III	
	Fully Erected	Semi-Knockdown	Heavy Knockdown	
Repair of Existing Shunting Locomotives	5			5
Shunting Diesel Locomotives (500HP)	2	5	5	12
Passenger Coaches	20 +(Bogie[2] 20)	51	72	143 +(Bogie 20)
Freight Wagons	25	75	140	240

Source: Myanmar Railways (MR)

Note)
Semi Knockdown: Half manufactured body structure of rolling stock, which can be assembled after some cutting and welding by MR
Heavy Knockdown: Material for body structure and frames to be procured. MR will construct rolling stocks in accordance with specification.

Assembling semi-knock down and heavy knock down locomotives was carried out at Insein

[2] Bogie: Component of rolling stock with 2 axes 4 wheelers. 1 rolling stock requires 2 bogies. On the other hand, in 4 wheeler rolling stock, wheel is originally equipped in the body. Compared with the 4 wheeler rolling stock, bogie-type rolling stock causes less vibration when in motion. In Japan, there is only bogie-type rolling stock. Myanmar Railways uses 4 wheelers mainly for freight wagons.

Workshop, and passenger coaches and freight wagons at Myitnge and repair of locomotives at Ywataung Workshop.

1.3.2 Locomotives, Passenger Coaches and Freight Wagon Rehabilitation Project

Scope of the project is as follows:

(i) Repair of 6 diesel locomotives (including technical assistance)
(ii) Heavy repair of 27 diesel locomotives
(iii) Repair of 10 upper class sleeping coaches
(iv) Heavy repair of 800 passenger coaches (including purchase of 20 spare bogies)
(v) Repair of 1,000 covered freight wagons (double axis equivalent)
(vi) Replacement of bearings for 50 covered freight wagons (bogie cars)
(vii) Heavy repair of 4,000 freight wagons (double axis equivalent)
(viii) Supply of machineries for repairing works and spare parts for daily maintenance (for two years' consumption)

1.4 Borrower/Executing Agency

The Executing Agency and the Borrower of the Projects is Myanmar Railways (formerly called Burma Railways Corporation). The guarantor on Loans is Union of Myanmar. Myanmar Railways is a national corporation under control of Ministry of Transportation that has exclusive right to operate railways in Myanmar.

1.5 Outline of Loan Agreement

1.5.1 Myanmar Railways Modernization Project (I)

Loan Amount	8,454 million yen
Loan Disbursed Amount	3,942 million yen
Date of Exchange of Notes	November 1982
Date of Loan Agreement	December 1982
Teams and Conditions	
Interest Rate	2.25%
Repayment Period (Grace Period)	30(10) years
Procurement	Partial Untied
Final Disbursement Date	December 1988

1.5.2 Myanmar Railways Modernization Project (II)

Loan Amount	6,020 million yen
Loan Disbursed Amount	3,868 million yen
Date of Exchange of Notes	June 1984
Date of Loan Agreement	August 1984
Teams and Conditions	
Interest Rate	2.75%
Repayment Period (Grace Period)	30(10)
Procurement	Partial Untied
Final Disbursement Date	May 1994

1.5.3 Locomotives, Passenger Coaches and Freight Wagon Rehabilitation Project

Loan Amount	4,660 million yen
Loan Disbursed Amount	4,524 million yen
Date of Exchange of Notes	June 1984
Date of Loan Agreement	August 1984
Teams and Conditions	
Interest Rate	2.75%
Repayment Period (Grace Period)	30(10)
Procurement	Partial Untied
Final Disbursement Date	June 1994

2. Results and Evaluation

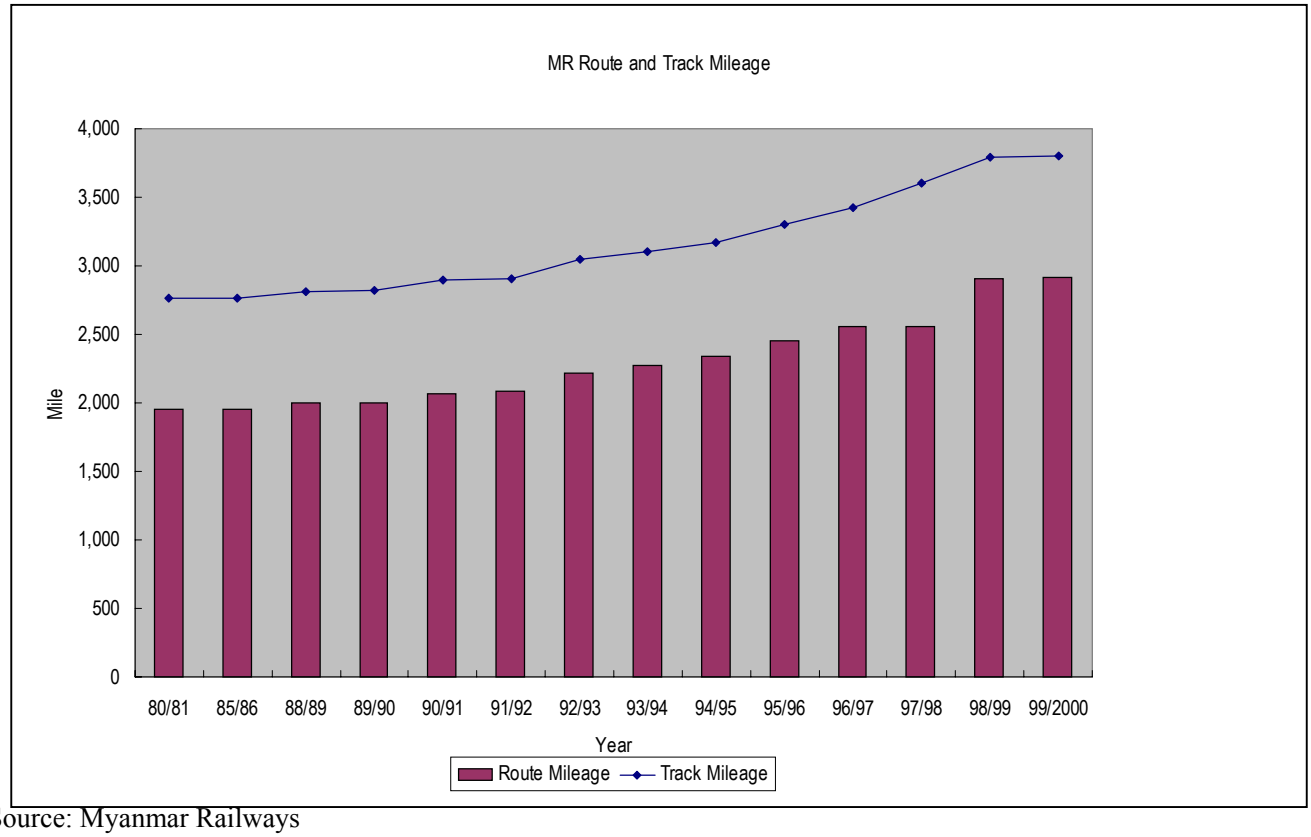
2.1 Relevance

At the time of appraisal, the Myanmar government tried to modernize the railway as stated in the 4th National Development Plan to cope with increased volume of transportation. The three Projects was a part of the National Plan to procure shunting locomotives, passenger coaches and freight wagons as well as to supply spare parts and repair diesel locomotives, passenger coaches and freight wagons that were out of railway operation. The projects were therefore relevant.

As shown in Figure 1, track extension of Myanmar Railways was approximately 2,000 miles[3] in 1980. There was no prominent expansion of the railway network before 1990 and only 50 miles extension was made in 1980s. The Government of Myanmar expanded the network in 1990s and by year 2000 the track extension of 1,000 miles were achieved. The reinforcement of railway network, that is extension and double tracking, is still the important development policy in Myanmar. The railway has been a primary transportation means for Myanmar people and the projects have not lost their relevance as of now.

[3] 1 mile = approximately 1.6 km

Figure 1: Myanmar Railways Route and Track Mileage



Source: Myanmar Railways

2.2 Efficiency

2.2.1 Scope

All the scope of works of the three Projects were implemented as designed at the appraisal.

2.2.2 Schedule

Implementation Schedule of Modernization Project (I) was originally from September 1982 to March 1985. Actual implementation was delayed about three years to June 1988 from October 1985. The delay was caused by shortage of electricity at Myitnge Workshop for construction of passenger coaches and freight wagon.

Modernization Project (II) implementation was originally planed to be from January 1985 to December 1988 but it took from July 1986 to August 1993, namely the project was delayed for five and half years. The delay was mainly attributed to military coup in September 1998 and such political instability followed by suspension of disbursement from JBIC. (Disbursement restarted from April 1990.) Other reason of delay is tender preparation. At the time of appraisal, procurement was planned to be the direct appointment in order to maintain consistency of technical transfer from Phase I. However, as Myanmar side requested, procurement method was changed to competitive biddings, so that it took additional time for preparation to extend the implementation schedule.

Locomotives, Passenger Coaches and Freight Wagon Rehabilitation Project was planed to implement from May 1984 to October 1988 but it was completed in 1991. It took three more years than planned to complete the Project. Same as Modernization Project (II), suspension of disbursement and tender preparation were reasons of the delay.

2.2.3 Project Cost

As for Railway Modernization Project (I), the total cost of the Project was Japanese Yen 13,990 million (Foreign Portion: JPY 8,454 million and Local Portion: JPY 5,536 million); the Japanese ODA Loan should cover the foreign portion and Myanmar Railway would cover the local portion. The total amount of disbursement of the ODA Loan was JPY 3,942 million (but no exact record of the local portion was available from Myanmar Railway), which was substantially lower than the estimated required fund. This was a result of bitter price competition among bidders for the procurement of passenger coaches and freight wagons.

Total cost of the Railway Modernization Project (II) was JPY 9,905 million (Foreign Portion: JPY 6,020 million, Local Portion: JPY 3,885 million); the foreign portion was covered by the ODA Loan, and the local by Myanmar Railway. The total disbursement amount of the ODA Loan was JPY 3,868 million, which is also as a result of intensive competition in the bidding.

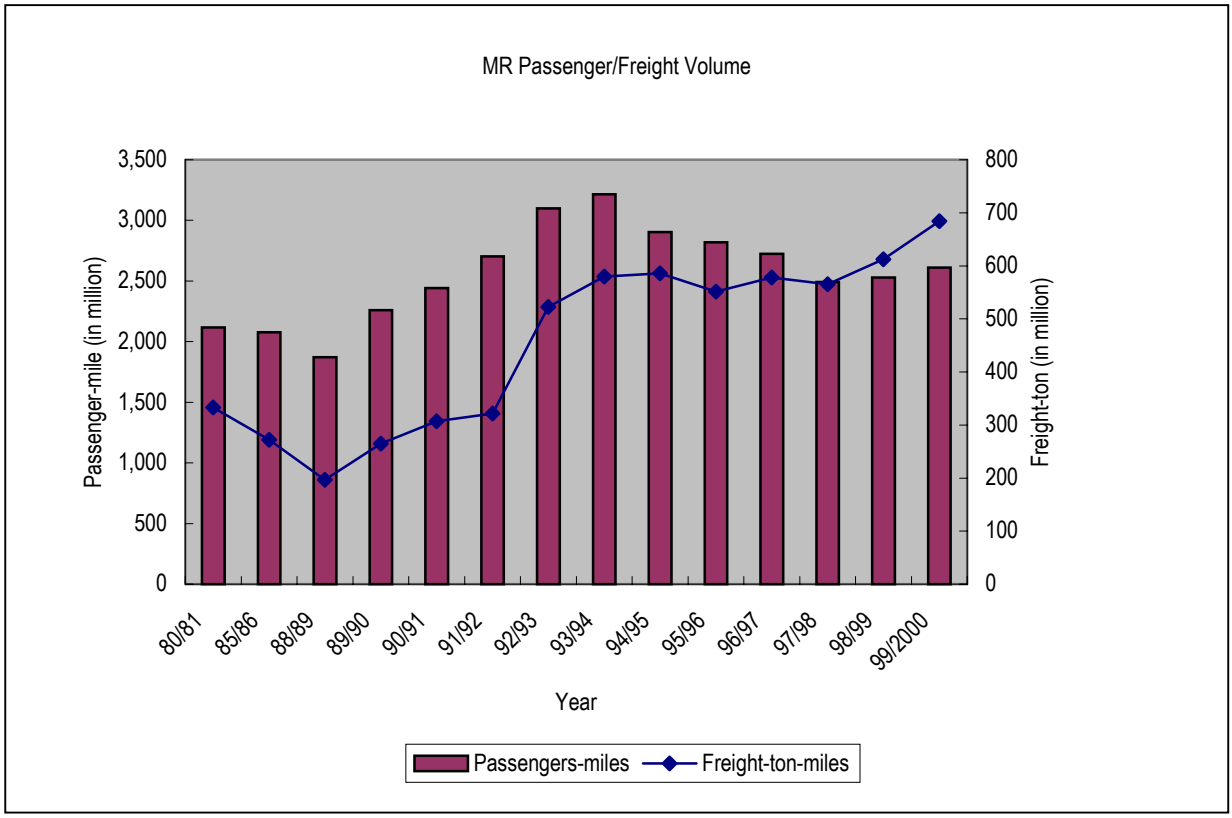
As for Locomotives, Passenger Coaches and Freight Wagon Rehabilitation Project , the total cost of the Project was JPY 7,528 million (Foreign Portion: JPY 4,660 million and Local Portion: JPY 2,868 million); the Japanese ODA Loan should cover the foreign portion and Myanmar Railway would cover the local cost portion. The total project cost was JPY 7,045 million (Foreign Portion JPY 4,660 million, Local Portion JPY 2,385 million),so that the Project was implemented within the planned cost.

2.3 Effectiveness

2.3.1 Transportation Volume by Railway

Due to political instability , passenger miles and freight-ton-miles dropped sharply in 1989 but recovered in the next year (Fig. 2). In 1990s, the government actively expanded the railway network, so that passengers and freight tons steadily increased. In recent years, however, the number of passengers has remained at the same level. On the contrary, freight volume maintains upward trend.

Figure 2: Myanmar Railways Transportation Volume



Source: Myanmar Railways

As shown in Table 2 and 3, the volume of passenger transportation carried by national transport companies was at the peak in 1995/96 and it is in downward trend in recent years. According to Myanmar Railway, as for the transportation on the land movement in Myanmar, railways and buses are the major means and motorization has not started yet in Myanmar . (Registered number of private vehicles is 172,000 out of the estimated total Myanmar population of 45.9 million in 1999. This accounts for 3 cars owned by each population of 1000.) Private bus companies have grown in early 90s but in recent years the transport volume for passengers has not been increased. As stated above, the volume of passenger transportation is in downward trend recently in the whole Myanmar. However, compared with other transportation means, the share of railway transportation is recorded as the highest in recent years. Especially in rural areas railway is the only means of public transportation and it plays a substantial role for the people's daily life.

Table 2: Number of Passengers by Mode (National Corporations)

(Unit: in thousand, %)

Year	80/81	85/86	90/91	95/96	96/97	97/98	98/99	99/2000
Passengers (in thousand)	205,428	158,785	178,468	194,723	186,595	164,192	146,103	131,435
Railways (%)	25.7	34.6	29.8	27.7	29.6	33.1	39.3	44.3
Airways (%)	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3
Inland Waterways (%)	6.9	12.8	15.4	12.8	12.5	12.9	16.1	17.2
Road (%)	67.1	52.3	54.6	59.2	57.5	53.7	44.4	38.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Myanmar Government Statistics Office, Statistical Year Book 2000

Table 3: Transport Volume by Mode

(Unit: in thousand mile, %)

Year	80/81	85/86	90/91	95/96	96/97	97/98	98/99	99/2000
Passengers-miles (in thousand)	3,145,178	3,151,678	3,984,640	5,114,648	4,867,641	4,286,605	4,152,588	4,100,334
Railways (%)	67.3	65.9	61.3	55.1	56.0	58.1	60.9	63.6
Airways (%)	4.4	4.2	2.8	3.6	3.6	3.0	2.9	3.2
Inland Waterways (%)	8.4	13.3	12.1	10.5	10.1	10.1	11.3	11.1
Road (%)	19.8	16.7	23.8	30.9	30.3	28.7	24.9	22.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Myanmar Government Statistics Office, Statistical Year Book 2000

While the volume of passenger transport is stagnant, freight transportation has been steadily growing. As shown in Table 4, freight cargo volume carried by the railways has accounted for more than 50% of the total volume for past 10 years. According to Myanmar Railways, major cargo items carried by Myanmar Railways are agricultural or agricultural related goods: rice, pulses, timber, fertilizes, and petroleum products and construction materials (ballast, aggregate and cement). Extension of the railways sustained the growth of freight cargo volume, especially agricultural products transported from the rural area to urban area.

Table 4: Freight Transport Volume

(Unit: in thousand ton, ton-mile, %)

Year	80/81	85/86	90/91	95/96	96/97	97/98	98/99	99/2000
Freight-ton (in thousand)	4,725	5,666	5,337	7,642	7,979	7,860	8,305	8,359
Railways (%)	47.8	35.8	36.2	40.7	39.7	39.0	39.8	40.5
Airways (%)	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Inland Waterways (%)	29.9	41.0	46.7	41.6	44.0	43.3	44.9	43.7
Road (%)	22.2	23.1	17.1	17.7	16.3	17.7	15.3	15.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Freight-ton-miles (in thousand)	651,468	738,230	710,034	1,022,070	1,041,056	1,060,934	1,121,897	1,190,325
Railways (%)	51.2	36.8	43.2	54.0	55.5	53.3	54.6	57.5
Airways (%)	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.1
Inland Waterways (%)	29.5	41.7	45.9	31.6	31.4	31.6	31.2	28.6
Road (%)	19.2	21.4	10.8	14.4	13.0	15.0	14.1	13.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Myanmar Government Statistics Office, Statistical Year Book 2000

As it has been described above, although total volume of the railway passenger has been declining, the railways still plays an important role for transportation for people's daily life especially in rural area. The status of railway cargo transportation has been steadily substantial. As a whole, those three Projects financed by the Japanese ODA Loan contributed to the transportation sector in Myanmar to certain extent.

2.3.2 Improvement of Operation Ratio

Myanmar Railways reported rolling stock operation ratio as shown in Table 5. The record is available by 1994 but Myanmar Railways submitted no record after 1994, so that operation ratio after 1995 is unknown.

Table 5. Myanmar Railway Operation Ratio

Year	Passenger Coaches (%)	Freight Wagons (%)	Diesel Locomotives (%)
1982	68.2	72.4	74.9
1983	68.1	72.0	69.4
1984	60.9	72.7	67.7
1985	66.0	70.9	55.1
1986	62.6	76.2	61.7
1987	63.9	71.2	64.1
1988	73.1	77.4	66.9
1989	66.4	76.1	73.5
1990	68.2	79.6	77.1
1991	67.3	83.5	78.5
1992	71.8	89.4	78.9
1993	77.1	86.9	75.4
1994	74.6	86.1	78.4

Source: Myanmar Railways

Operation ratio of freight wagon and diesel locomotives has been kept around 70% and that of freight wagon 80% after 1990. Procurement of new rolling stock and rehabilitation including through the three Projects have contributed to improvement of Myanmar Railways' operation ratio to certain extent.

2.3.3 Myanmar Railways' Transportation Capacity

As seen in Table 6, in terms of transportation capacity of Myanmar Railways, the number of locomotives (the number of engines) decreased compared with that at the appraisal. Numerical decrease of engines meant replacement of steam locomotives to diesel ones. According to Myanmar Railways, diesel locomotives with small horsepower have been gradually replaced by the ones with larger horsepower to keep transport capacity.

As for passenger coaches and freight wagons, as shown in Table 6, though the number of rolling stocks were declined before 1994 if compared with early1980s, the numbers of rolling stocks had been stable. The number of vehicles procured under the Projects is not a large sum but most of the rolling stocks have been maintained well and it can be said the Projects contributed to maintain Myanmar Railway's transportation capacity. However, after 1995, the numbers of rolling stocks of passenger cargo and freight wagons were significantly declined. Myanmar Railways have tried hard to maintain its transport capacity by increasing the number of operations or by longer formation of the trains, but transportation capacity of the freight wagons were also declining. It is assumed that one of the main causes of the capacity decline is the shortage of spare parts, which had been mentioned at the time of appraisal or earlier, and that is still the unsolved problem as of now.

Table 6: Myanmar Railways Transportation Capacity

(Unit: Number, ton)

	80/81	85/86	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Locomotives												
Engines	360	358	393	363	355	318	311	311	304	312	320	330
Steam	141	131	123	88	80	48	43	43	42	41	39	39
Diesel	219	227	270	275	275	270	268	268	262	271	281	291
Passenger Cars												
Coaching Vehicle	1,343	1,333	1,096	1,070	1,084	1,130	1,034	689	682	710	760	827
Seating Capacity	53,082	52,472	44,187	43,015	40,611	43,919	41,613	36,792	27,228	28,346	32,346	34,728
Freight Wagons												
Wagons	9,028	8,930	6,392	6,280	6,353	6,676	6,923	3,896	3,329	3,292	3,657	3,519
4-Wheeled	4,424	4,286	4,286	4,178	4,093	4,347	4,561	1,991	1,525	1,482	1,454	1,339
Bogies	4,604	4,644	2,106	2,102	2,260	2,329	2,362	1,905	1,804	1,810	2,203	2,180
Carrying Capacity (ton)	201,908	197,593	135,934	134,228	107,228	127,578	132,633	83,795	77,825	77,274	60,385	82,057
4-Wheeled (ton)	72,996	72,205	72,815	71,099	69,617	74,635	64,013	32,081	25,692	24,967	21,761	21,712
Bogies	128,912	125,388	63,119	63,129	37,611	52,943	68,620	51,714	52,133	52,307	38,624	60,345

Source: Myanmar Railways

2.3.4 Shunting Diesel Locomotives

12 shunting locomotives purchased by modernization project are active in each depot and the shed(except some under maintenance). Average annual running hours of the 12 shunting locomotives in 2000

is 3,691 hours. This illustrates each shunting locomotive on average works for 10 hours/day for shunting, and changing formation of passenger coaches and freight wagons.

Table 7: Shunting Locomotives Operation Hours

Unit: Year Hours

No.	1994	1995	1996	1997	1998	1999	2000
DD511	1,780	-	-	-	4,366	1,897	4,182
DD512	3,763	4,132	5,670	3,615	5,060	3,165	2,353
DD513	3,450	3,038	3,855	4,531	2,454	2,494	4,753
DD514	4,785	3,966	3,033	-	1,385	2,775	1,877
DD515	1,083	-	4,870	4,695	2,700	210	3,870
DD516	2,597	-	3,900	511	3,514	1,589	2,715
DD517	5,243	5,804	4,315	3,634	4,290	3,100	3,662
DD518	3,941	5,321	4,740	3,605	4,334	3,015	3,398
DD519	4,161	5,817	4,440	4,130	3,925	3,204	4,803
DD520	3,907	5,857	5,385	3,350	4,725	2,985	4,830
DD521	5,118	3,859	5,020	2,290	4,315	3,879	3,665
DD522	2,864	5,314	2,751	2,647	2,954	2,208	4,165

Source: Myanmar Railways

2.3.5 Quantitative Effect:

At the time of appraisal, based on the tariffs level then, the financial rate of return of the Modernization Project was estimated 3.5%. Assumptions of calculation are as follows :

Project Life: 30 years

Benefit: a) Passenger Fare; b) Freight Charges; c) Cost savings generated from abolishment of steam locomotives

Cost: a) Procurement of rolling stocks; b) Personnel and administration; c) Fuel and oils; d) Operation and Maintenance

At evaluation, since the same data and information as at appraisal were not available, re-calculation of FIRR for the three projects were not carried out.

2.4 Impact

2.4.1 Technology Transfer

Utilizing technology transferred from the project, in Insein Workshop, new construction, mid-life overhauling[4], and rehabilitation of the diesel electric locomotives (DEL) are carried out by Myanmar Railways staff. In Ywataung Workshop, maintenance and repairing diesel hydraulic locomotives (DHL) are being done. The Myitnge Workshop is responsible for construction of passenger coaches and freight wagons. With transferred technology, 186 passengers and 18 freight wagons were built from knockdown parts with financial assistances from China, Korea and OPEC Fund after the project was completed. Furthermore, with Myanmar Railways' own resources, and full utilization of local materials and parts, Myitnge Workshop constructed 110 passenger coaches and 7 freight wagons. Myanmar Railways maintains rolling stocks well, so that the Projects highly contributed to transferring technology.

2.4.2 Reduction of Causalities

4 To break up for inspection and repair

Passenger coaches procured by the Projects are made of steel and the transferred technology was how to construct the steel-made cars. Steel-made passenger coaches replaced wooden passenger coaches and it brought reduction of casualties caused by crashed woods in case of railway accidents. On the contrary, the number of accidents has been high. Derailment occurred 370 times the year 99/2000, which accounts at least one accident happens a day somewhere. Casualties by the several accidents are also recorded in every year. Myanmar Railways explained that derailment had often occurred during shunting, because maintenance of sidetrack was not sufficient compared with the main tracks. Maintenance for the main track at present cannot be recognized as sufficient, so that the operator of the locomotives is carefully operating trains especially at the area with poor maintenance. Notwithstanding the efforts, almost every year a serious accident occurs and people are involved. Track maintenance and maintenance for rolling stocks seems to be beyond Myanmar Railways' capacity.

2.5 Sustainability

2.5.1 Operation and Maintenance

2.5.1.1 Organization

Myanmar Railways has 26,403 staffs. Managing Director leads the organization as the head; under him there are six operation departments, two regional departments and two subordinate departments. The current structure was established in December 1994, and each department had more independent power than before. General Manager, as a head of department, has now more wide range of power and is able to make a quicker decision.

Under such organizational structure, rolling stock maintenance is carried out in three workshops. Insein Workshop is located in near Yangon and in charge of new construction of locomotives, heavy repair, overhauling and assembling knockdown parts. There is Ywataung Workshop in near Mandalay, the second largest city in Myanmar, which carries out periodic maintenance and heavy repair of diesel hydraulic locomotives. Myitnge Workshop is located in the bank of Ayeyarwaddy River where Mandalay is located in the opposite bank, is doing construction and maintenance for passenger coaches and freight wagons.

As for the shunting locomotive procured by the Modernization Project, maintenance work is done at Ywataung Workshop. Maintenance is carried out in accordance with the operation manual provided by the manufacturers. Myanmar Railways owns several types of locomotives made in Germany, France, Japan, China and India, which have different operation and maintenance program. For example, maintenance program of 500HP diesel shunting locomotives repaired by the Project and those of 500HP shunting locomotives constructed by the Project have 6 routines: daily maintenance (W-1), every 250 hours (W-2), every 500 hours (W-3), every 1000 hours (W-4), every 12000 hours (W-5) and every 24000 hours (W-6). Maintenance of W-1 to W-4 should be carried out in the depot or the shed ("Shed Maintenance") and W-5 and W-6 should be done in Ywataung Workshop ("Shop Maintenance"). W-6 is overhauling where all the parts are dismantled, and necessary repair and replacement with spare parts should be done.

Passenger coaches are provided maintenance works in daily, monthly, and semi-annually and overhauling is done once every 2 years. Maintenance program of freight wagons is almost same as passenger coaches but overhauling of freight wagon is done once every four years.

2.5.1.2 Operation and Maintenance Capacity

Training for mechanical and electrical engineers is provided in the training center in Ywataung Workshop. The center was built and training tools were supplied by German grant aid in 1979. At beginning stage, German lecturers provided lessons to the workers but now Myanmar Railways staff replaced all the

German lecturers. In the center, training for electrical works, mechanical works, welding and lathe operation are provided.

Myanmar Railways is well aware of importance of maintenance and understand that lack of maintenance will cost as many times as much for repairing. Therefore maintenance works have been carried out as described above. However, due to shortage of foreign currency at present, supply of spare parts cannot be done in proper and timely manner. In addition, lack of skilled engineers and job hopping of engineers due to low salary causes restless overworking conditions to maintenance staff. Unfortunately Myanmar Railways has not been able to solve this problem. Facilities and tools in Training Center also have been deteriorated, for it has been more than twenty years since its establishment. In some cases, the engineers learned in the center left Myanmar Railway and engaged in new jobs at private companies soon after engineering skills were obtained, which also suffers Myanmar Railway.

2.5.2 Financial Situation

2.5.2.1 Operating Profit

Last 20 years, operating profit of Myanmar Railway have kept increasing. However, the real operating profit adjusted by Consumer Price Index shows that the profit goes up whenever the tariff is revised but it is declined very soon. In real term, the operating profit has been at the same level. (See Table 9, Figure 3.)

According to Myanmar Railways, revenue from passenger transportation was accounted for more than 70% in early 1980s but it went down to 60% in year 99/2000. On the other hand, revenue from freight cargo had been 20% of the total revenue in mid-90s and has been gradually increasing in late years and compensating decrease of the revenue from passengers. As for operating cost, fuel cost increased substantially by 50% at present, which used to account for 20% in early 90s. Salary, which used to predominate O&M cost and sometimes became over 60%, went down to about 20% recently.

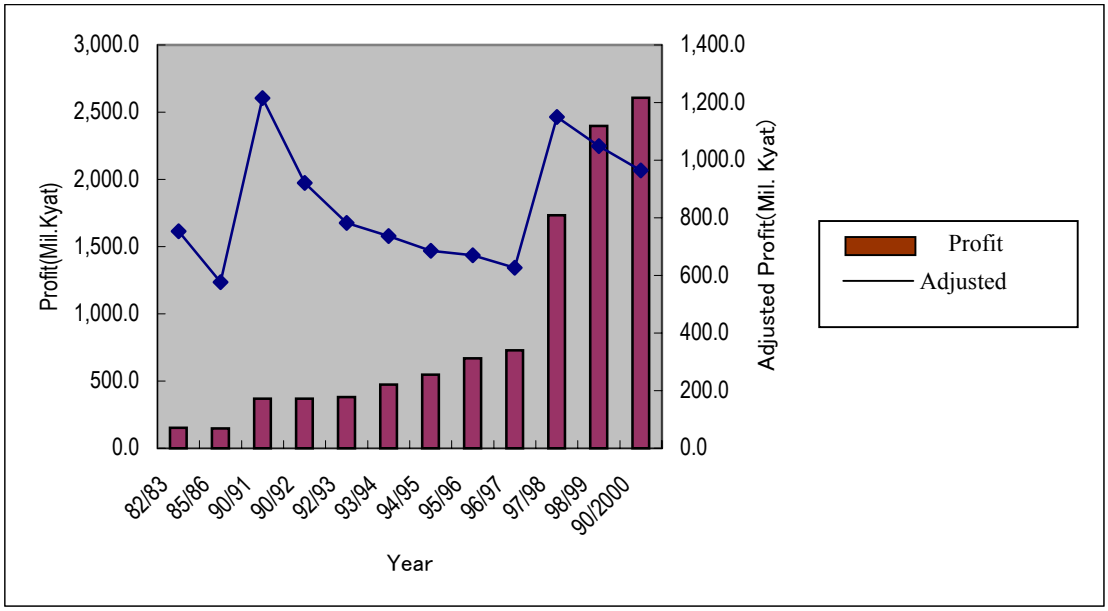
Table 8: Operation Profit

Unit: Million Kyat

Operation Profit	152.1	148.1	368.3	547.9	669.5	728.9	1,734.3	2,396.8	2,607.3
Adjusted Profit	753.0	576.2	1,215.5	685.8	669.5	626.7	1,150.1	1,048.9	963.9

Myannmar Railway

Figure 3: Operation Profit



Comparison of Original and Actual Scope

Myanmar Railways Modernization Project (I)

Item	Plan	Actual
1. Project Scope		
1.1 Repowering Existing Locomotives	5 Nos.	As planned
1.2 Procurement of Shunting Diesel Locomotive	Fully Erected: 2 Semi Knockdown: 5	As planned
1.3 Procurement of Passenger Coach	Fully Erected: 20 Semi Knockdown: 51 Fully Erected (Bogie): 20	As planned
1.4 Procurement of Freight Wagon	Fully Erected: 25 Semi Knockdown: 75	As planned
2. Implementation Schedule		(Completion)
2.1 Repowering Existing Locomotives	Sep. 1982-Oct. 1983	Oct. 1985
2.2 Procurement of Shunting Diesel Locomotive	Sep. 1982-Mar 1985	Feb. 1987
2.3 Procurement of Passenger Coach	Sep.1982-Jan. 1985	Jun. 1988
2.4 Procurement of Freight Wagon	Sep. 1982-Nov. 1984	Feb 1988
3. Project Cost		
Foreign Currency	8,454 million yen	3,942 million yen
Local Currency	5,536 million yen	N.A.
Total	13,990 million yen	N.A.
Out of which, ODA Loan portion	8,454 million yen	3,942 million yen
Exchange Rate	1 Kyat=30 yen (September 1982)	1 Kyat = 25円 (as of 1986)

Myanmar Railways Modernization Project (II)

Item	Plan	Actual
1. Project Scope		
1.1 Spare Parts for Repowered Existing Locomotives	For 2 years	As planned
1.2 Procurement of Shunting Diesel Locomotive	Heavy knockdown: 5 nos.	Fully Erected: 2 Heavy knockdown: 3 nos.
1.3 Procurement of Passenger Coach	Heavy knockdown: 60 Heavy knockdown (Bogie): 2 Heavy knockdown (2-axes): 10	Fully Erected: 5 Heavy knockdown: 55 Heavy knockdown (Departmental): 2 Heavy knockdown (Departmental): 10
1.4 Procurement of Freight Wagon	Heavy knockdown Covered: 70 Heavy knockdown High-side open: 70	Fully Erected Covered: 5 Heavy knockdown Covered: 65 Fully Erected High-side: 5

		Heavy knockdown High-side open: 65
2. Implementation Schedule 2.1 Procurement of Shunting Diesel Locomotive 2.2 Procurement of Passenger Coach 2.3 Procurement of Freight Wagon	 Jan. 1985-Aug.1987 Apr. 1986-Dec. 1988 Dec. 1985-Jul. 1988	 July 1986-Nov. 1989 Aug. 1986-Mar. 1993 Aug. 1986-Mar. 1993
3. Project Cost Foreign Currency Local Currency Total Out of which, ODA Loan portion Exchange Rate	 6,020 million yen 3,885 million yen 9,905 million yen 6,020 million yen 1 Kyat=30 yen (Mar.1984)	 3,868 million yen 1,380 million yen 5,248 million yen 3,868 million yen 1 Kyat=20 yen (1988)

Locomotives, Passenger Coaches and Freight Wagon Rehabilitation Project

Item	Plan	Actual
1. Project Scope 1.1 Repair of Diesel Locomotives 1.2 Repair of Passenger Coaches 1.3 Repair of Freight Wagon 1.4 Machineries for Depot	 a) 6 DLs to be repaired; b) 27 DLs to be provided with spare parts a) 10 upper class sleeping cars; b) Spare parts for 800 passenger cars; c) Electronic appliances for 20 upper class sleeping cars a) 1,000 covered freight wagons; b) Replacement of bearing for 50 bogie wagons; c) 4,000 units of wagons (double axis equivalent) One set	 a) 5 DLs repaired; b) As planned a) As planned; b) As planned; c) As planned; a) As planned; b) As planned; c) As planned As planned
2. Implementation Schedule 2.1 Repair of Diesel Loco 2.2 Repair of Passenger coach/Freight wagon 2.3 Machineries for Depot	 May 1987-Oct 1988 May 1984-Oct. 1988 By 1985	 1987-1991 March 1984-1990 1988
3. Project Cost Foreign currency Local currency Total Out of which, ODA Loan portion Exchange Rate	 4,660 million yen 2,868 million yen 7,528 million yen 4,660 million yen 1 Kyat = 30 yen (March 1984)	 4,660 million yen 2,385 million yen 7,045 million yen 4,524 million yen 1 Kyat = 20 yen

		(Year 1988)