Thailand

Track Rehabilitation Project (1)-(3)

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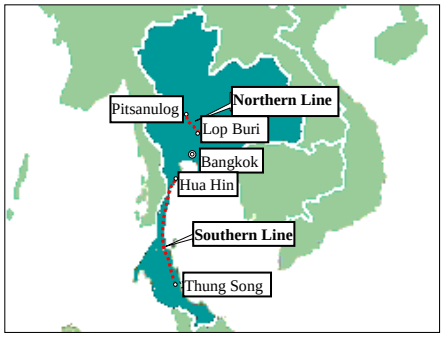
1. Project Outline and Japan's ODA Loan



Map of project area: Kingdom of Thailand

Hua Hin Station, State Railway of Thailand

1.1 Background

The State Railway of Thailand (SRT), Thailand's only railway company, was established in 1890 and currently consists of a railway network covering all of Thailand with a total extension of 4,044 kilometers. Centering on Bangkok, Thailand's capital, the SRT's railway lines radiate outwards to connect to nationwide destinations. However, apart from railway line covering Bangkok and its environs, the tracks on which the trains run are single, non-electrified tracks with a width of 1,000mm. Furthermore, decades have passed since the tracks were first laid and aging and deterioration are conspicuous. Frequent breakdowns of railway line have happened since 1984 and it had caused interruptions to services by which the railway fell into a serious situation.

SRT has responded to the situation by making temporary repairs to damaged areas. However, it was deemed that not only replacement of the rails but radical upgrading of the track structure including the sleepers, ballasts, and track bed was required for the segment from Bangkok to Chiang Mai on the Northern Line and the segment from Bangkok to the border of Malaysia on the Southern Line where aging and deterioration were significant. A decision was accordingly made to completely revamp

these sectors, which comprise a total extension of 791km based on the SRT's Seventh Five-Year Plan (1992-1996).

With regard to its Track Rehabilitation Project, the request to the government of Japan was made by the Kingdom of Thailand for an ODA loan, it was decided that the project would be carried out accordingly as high-priority basis.

1.2 Objective

This project was to promote the safety of the operation of the railway's trains and reduce its maintenance and management costs by revamping overall railway , totaling 791km in length, in the Northern line and the Southern line of SRT and thereby contribute to the development of the economy of Thailand by maintaining and strengthening the railway transport capacity in Thailand.

1.3 Project Outline

The project was divided into three phases as follows based on the schedule of rehabilitation on the railway segments under the Seventh Five-Year Plan:

Phase 1: Total extension of 289km on the Northern Line from Lop Buri to Chumsaeng (148km) and the Southern Line from Hua Hin to Ban Krut (141km)

Phase 2: Total extension of 258km on the Northern Line from Chumsaeng to Phitsanulog (108km) and the Southern Line from Chai Ya to Thung Song (150km)

Phase 3: Total extension of 244km on the Southern Line from Ban Krut to Chai Ya

Rehabilitation works were to include replacement of rails and sleepers, reinforcement of ballasts, improvement of the railway bed, purchasing machinery for the track rehabilitation, and repairing automatic signal facilities. The following ODA loan agreement was concluded to provide project funds for appropriation to engineering work expenses, funds to purchase materials, and consulting fees for each project segment.

1.4 Borrower/Executing Agency

Borrower/Executing Agency: State Railway of Thailand (SRT)

Guarantor: Kingdom of Thailand

1.5 Outline of Loan Agreement

	Phase 1	Phase 2	Phase 3	Additional Funding[1]
Loan Amount Disbursed Amount	10,331 million yen 10,174 million yen	7,651 million yen 6,905 million yen	7,973 million yen 6,792 million yen	2,979 million yen 2,428 million yen
Exchange of Notes Loan Agreement	January 1993 January 1993	September 1994 September 1994	September 1996 September 1996	July 1998 July 1998
Terms and Conditions - Interest Rate - Repayment Period - Grace Period - Procurement	 3.0% p.a., 25 years 7 years General Untied	 3.0% p.a. 25 years 7 years General Untied	 2.7% p.a. 25 years 7 years General Untied	 2.2% p.a. 25 years 7 years General Untied
Final Disbursement Date	November 2001	July 2003	January 2004	September 2001
Main Contractors	Mitsui & Co., Ltd.(Japan)/ John Holland Asia Ltd. (Hong Kong)・Namprasert Construction Co., Ltd.(Thailand)(JV)/ Sumitomo Corporation(Japan)/ Barclay Mowlem Construction Limited (Australia)			
Consulting Services	National Engineering Consultations Co., Ltd.(Thailand)・STS Engineering Consultations Co., Ltd.(Thailand)・Japan Transportation Consultants, Inc.(Japan)・Pacific Consultants International(Japan)(JV)			

2. Evaluation Result

2.1 Relevance

2.1.1 Relevance at the time of appraisal

At the time of the appraisal, strengthening the transport sector and making it more efficient had already been established as objectives under the Seventh Five-Year Plan for National Economic and Social Development, Thailand's national plan. Taking this plan into consideration, the SRT formulated its own Seventh Five-Year Plan (1992-1996) in which it stated details of its plans for investment in railway infrastructure. As part of this plan, it made a commitment to undertaking the Track Rehabilitation Project as a task of top priority.

[1] Since the government's investment budget was slashed during the Thai economic crisis of 1997, additional funding as an emergency measure was provided to promote the execution of existing projects which were being undertaken through ODA loans. The additional funding was provided for the local currency expense portion which was procured and paid in Thailand to ensure the effect of the project.

This project was to secure the safety of train operations by avoiding railway breakdown accidents which were occurring frequently on segments where aging and deterioration were conspicuous and to reduce repair, maintenance, and management costs. In addition, since the project was essential for improving the reliability of railway transportation in Thailand, the project was regarded as a high priority.

2.1.2 Relevance at the time of evaluation

At the time of the evaluation of the project, improving the SRT infrastructure, increasing the efficiency of infrastructure services, and improving the intercity transport network to contribute to regional development were promoted as chief measures for boosting Thailand's international economic competitiveness under the Ninth Five-Year National Economic and Social Development Plan (2002-2006) as well, which is currently underway. Taking this plan into consideration, the SRT formulated a transport development master plan (2004-2006) and is promoting various projects to strengthen transport capacity. In this regard, it intends to continue track rehabilitation works as top priority projects and plans to undertake fourth, fifth and sixth phase as the succeeding projects. Plans have already been completed for these phases of track rehabilitation (Phases 4 to 6) and they are now at a stage where they may be launched and the SRT is aiming for their early completion. Therefore, it can be said that the project continues to maintain a high degree of priority in terms of its relevance for addressing issues of the SRT.

2.2 Efficiency

2.2.1 Outputs

The plan at the time of the appraisal and the results of the track rehabilitation undertaken during the project are shown below in Table 1. The project works were undertaken on all segments (extension of 791km in total) in three phases during which rehabilitation of the tracks was carried out including the replacement of rails and sleepers, the reinforcement of ballasts, the improvement of the railway bed, the purchase of track maintenance machinery for the track rehabilitation, and the repair and restoration of the automatic signal equipment and it covered almost all of the initially planned.

Table 1. Comparison of Outputs Planned at the Appraisal and Actual Outputs

Planned (at appraisal)	Actual (at ex-post evaluation)
Phase 1 ・ Northern Line segment from Lop Buri to Chumsaeng (148km) ・ Southern Line segment from Hua Hin to Ban Krut (141km) Total of 289km	As planned
Phase 2 ・ Northern Line segment from Chumsaeng to Phitsanulog (108km) ・ Southern Line segment from Chai Ya to Thung Song (150km) Total of 258km	As planned
Phase 3 ・ Southern Line segment from Ban Krut to Chai Ya Total of 244km	As planned

The track rehabilitation works were carried out in an intensive manner on each segment earmarked for rehabilitation during the night when the trains ceased operating. The works proceeded by first removing the old rails and sleepers and then repairing the railway bed and reinforcing the ballasts. Upon completion of this work, the new sleepers and rails were laid. To carry out the work efficiently, newly developed machinery exclusively used for this track rehabilitation was introduced. Furthermore, all of the sleepers were upgraded to concrete sleepers and the rails were replaced with 100lb (50kg/m) rails which were 100mm in width and with a length longer than the previous rails[2]. As a result, the rail has become the heavy rail that withstand 20 tons of the load on train, the reinforcement of the ballasts and railway bed improvements enhanced the operating stability of the railway, making it possible to operate trains at higher speeds. The durability of the track also increased significantly, making it possible to reduce the frequency of routine inspections and improvements, thereby cutting the costs required for repairs and maintenance.

[2] Prior to the upgrades, the tracks had lighter rails 80mm in width and weighing 70lbs. (35kg/m). They were also of inferior quality, so they were not able to sufficiently withstand railway car loadings of annual maximum of 15 million tons. This was one of the reasons why rail breakdowns occurred frequently.

2.2.2 Project period

The Track Rehabilitation Project was undertaken in successive stages by project segment. Initially, the plan was to complete all upgrade works by September 2001 but delays for various reasons caused the completion to be postponed and it was finally completed in August 2002, about one year behind the initial projection.

Table 2. Comparison of Project Period Planned at the Appraisal, and Actual Performance

Planned (at the appraisal)	Actual (at ex-post evaluation)
Phase 1: October 1992 to December 1997 (Period: 63 months)	Phase 1: June 1993to October 2001 (Period: 100 months)
Phase 2: July 1994 to September 1999 (Period: 63 months)	Phase 2: January 1995 to June 2002 (Period: 89 months)
Phase 3: July 1996 to September 2001 (Period: 63 months)	Phase 3: September 1996to August 2002 (Period: 73 months)

The delays in the engineering works were caused by the selection procedures for consultants and construction companies, procurement of construction materials. However, the SRT made efforts to keep delays to a minimum by the introduction of newly developed machinery.

For the most part, the rehabilitation work was undertaken in an intensive manner during the night or by temporary interruptions in the operation of the trains in short period of no longer than five hours in each segment at maximum. Arrangements during the engineering works were put in place for alternative transportation, so there was almost no impact for the railway services due to the carrying out of track works or the delay in their completion.

2.2.3 Project cost

Funds required to cover all project costs from Phases 1 to 3 under the initial plan were estimated at 37,775 million yen (the ODA loan was planned to cover 25,955 million yen). However, actual expenditure for the entire project finished at 35,859 million yen, which is less than the initially estimated by about 1,916 million yen.

Table 3. Comparison of Project Costs Planned at the Time of Appraisal, and Actual Performance

Planned (at time of appraisal)	Actual (at time of ex post-ante evaluation) *
Phase 1 14,758 million yen (ODA loan amount: 10,331 million yen)	12,043 million yen (ODA loan amount:11,428 million yen)
Phase 2 11,490 million yen (ODA loan amount: 7,651 million yen)	11,033 million yen (ODA loan amount: 7,436 million yen)
Phase 3 11,527 million yen (ODA loan amount: 7,973 million yen)	12,783 million yen (ODA loan amount: 7,435 million yen)
Total for Phases 1 to 3 37,775 million yen (ODA loan amount: 25,955 million yen)	35,859 million yen (ODA loan amount 26,299 million yen)

* ODA loan amount includes the additional financing for local currency portion(Phase 1: 1,254 million yen, Phase 2: 531 million yen, and Phase 3: 643 million yen, totaling 2,428 million yen overall)

Despite an increase in project costs for the local currency portion due to the import of work machinery for improvement works and despite an increase in costs related to local engineering works due to the influences of domestic inflation in Thailand, a substantial devaluation in the Thai baht resulted in the total project costs in yen falling below the initial estimate.

2.3 Effectiveness

2.3.1 Decrease in the number of operation delays and derailment accidents due to rail breakdowns

The number of incidents of railway breakdowns, which had occurred frequently prior to execution of the project, decreased significantly as a result of the project. At least on the segments which had undertaken track rehabilitation, the number of operation delays due to rail breakdowns has been at zero level for the past three years. Furthermore, there have been no derailment accidents due to rail breakdowns for the past three years.

Table 4. No. of Rail Breakdown Incidents on the SRT Northern Line (Bangkok to Chiang Mai, total extension of 751km)

Year	1998	1999	2000	2001	2002	2003	2004
No. of Incidents	110	82	92	82	66	51	37

Source: SRT Data: No. of total incidents annually

Note: Of the entire 751km extension, rehabilitation works have been completed along a 256km stretch but there are still unimproved segments and rail breakdowns continue to occur along these segments. On the other hand, there have been no incidents of breakdown on segments where rehabilitation has been completed.

2.3.2 Operation speed and time required to reach destinations

Greater operating stability of the railway resulting from the rehabilitation of the railway tracks made it possible to increase the operating speed of the trains (accelerate the running speed). On segments where track rehabilitation took place, freight trains were able to travel at speeds of up to 120km/hour in contrast to a maximum speed of 100km/hour for both freight and passenger trains prior to track rehabilitation on the relevant railway segments; the operating speed for passenger cars, however, continued to remain at 100km/hour following the track rehabilitation.

In terms of the time required for transport, it was possible to reduce the traveling time by increasing the traveling speed on segments of the railway where track rehabilitation had been completed. According to the SRT's timetables, the average times required for travel on trains on segments where rehabilitation took place are shown in the table below.

Table 5. Average Time Required on Segments Where Track Rehabilitation was Completed

Unit: hours : minutes

	2001	2005	Increase/Decrease
Northern Line: 256km segment from Lop Buri to Phitsanulog Stations			
Passenger Trains	2:48	3:02	+0:14
Freight Trains	3:34	3:27	- 0:07
Southern Line: 535km segment from Hua Hin to Thung Song			
Passenger Trains	8:50	7:13	- 1:37

Freight Trains	10:38	8:50	- 1:48

Source: SRT Timetable

Travel time required on the Southern Line decreased considerably while travel time required on the Northern Line remained almost unchanged. According to an explanation given by the SRT, there are a large number of trains operating on the Northern Line and because they are operating on a single track, it is necessary to wait at stations along the way to allow for trains traveling from the opposite direction to pass.

2.3.3 Number of trains in operation and rate of operation

The number of trains in operation and the rate of operation of those trains on segments where track rehabilitation was carried out through the project are shown in Table 6.

Table 6. No. of Passenger Trains and The Rate of Operation on Segments Where Track Rehabilitation was Completed Unit: No. of passenger trains/days

	2001	2005	Increase/Decrease
Northern Line: 256km segment from Lop Buri to Phitsanulog Stations			
Passenger Trains	36	36	- -
Freight Trains	30	40	+10
Capacity (Maximum No. of Trains which can operate)	(92-101)	(92-101)	
Rate of Operation: Maximum No. of Trains in Operation/Capacity	65%	75%	+10%
Southern Line: 535km segment from Hua Hin to Thung Song			
Passenger Trains	22 – 28	28	+4 – 0
Freight Trains	12 – 14	14 – 20	+2 – +6
Capacity (Maximum No. of Trains which can operate)	(55-71)	(55-71)	
Rate of Operation: Total No. of Trains in Operation/Capacity	59%	67%	+8%

Source: SRT Data Since the number of trains in operation varies depending on the segment, the maximum value is shown for the rate of operation.

While there was an increase in the number of freight trains, the number of passenger trains remained unchanged on the whole. The SRT explains that the reason for this was the lack of locomotives and train carriages, since additional carriages had not been purchased in recent years. It also says that it is difficult to increase the number of trains because the railway operates on a single track where adequate arrangements (branch lines, etc.) for trains passing in the opposite direction along the way as well as signal facilities have not been put in place.

2.3.4 The effects for reducing operation and maintenance costs

According to SRT staff responsible for the onsite maintenance of the railway, maintenance and repair operations (replacement of rails and sleepers, etc.), which were carried out frequently prior to improvements, decreased significantly following the track rehabilitation works. In addition, routine inspection operations of the railway lines had become much more efficient, enabling a reduction in the number of maintenance personnel. Consequently, track operations and maintenance costs fell significantly to a level of approximately one-half to one-third of the costs prior to track rehabilitation work. According to test calculations by SRT headquarters, the annual average cost per kilometer for track operation and maintenance was 236,000 baht prior to improvement construction works. However, this annual average fell to 83,000 baht following the track rehabilitation works (In other words, the effects for reducing track operation and management costs was 153,000 baht per kilometer). Therefore, the effects for reducing annual operation and management costs on the segments which undertook track rehabilitation during the project amounted to 121 million baht.

(The effects for reducing operation and maintenance cost per kilometer: difference of 153,000 baht × total segment length of 791km which underwent rehabilitation = 121 Million baht)

In addition, as the increase in efficiency of routine inspections of the tracks enabled a reduction in personnel, the effects for reducing relevant personnel costs were also achieved.

2.4 Impact

2.4.1.1 Passenger transport volume and degree of dependence on railways

The number of passengers transported by the SRT is shown in Table 7, indicating a decreasing trend in the total number of passengers due to a decrease in the number of third-class passengers. Since the SRT’s policy of shifting the focus of sales from third-class passengers, where fares are kept low as a matter of policy under

government-regulated fares, to first- and second-class passengers, where higher fares can be obtained, the number of passengers for first and second classes remained roughly the same or increased. It is reflected in the figures shown in the table.

Bus transport holds the leading position in passenger transport volume by public transport in Thailand and it accounts for an overwhelming proportion of public transport volume (93.5%). However, there is a significant decrease in the number of passengers using buses as well as the number of passengers using railways in recent years due to the trend of private-car ownership.

Table 7. No. of SRT Railway Passengers

Annually: thousand passengers

	1993 (A)	1998	2003	2004 (B)	Increase /Decrease (B-A)
No. of Passengers First Class	18	119	129	124	688.9%
Second Class	4,532	4,681	4,633	4.391	-3.1%
Third Class	69,763	56,015	44,747	41,688	-40.2%
Total	75,053	60,815	49,509	46,203	-38.4%
Total transport volume for public means of transportation in Thailand	1,477,792	1,239,162	938,035	821,514	-44.4%
SRT share	5.0%	4.9%	5.3%	5.6%	+0.6%

Source: SRT data

Table 8. SRT Passenger Car Kilometers

Annually: thousand kilometers/passengers

	1993	1998	2003	2004	Average Car Kilometers per Person
No. of Passengers First Class	13,451	89,750	94,989	88,891	716.9
Second Class	2,926,622	2,862,351	2,952,111	2,732,556	622.3
Third Class	10,762,444	7,994,748	7,155,152	6,460,886	155.0
Total	14,020,975	10,946,849	10,202,252	9,282,333	200.9

Source: SRT data

One characteristic of passengers traveling on the SRT is the large number of passengers who travel more than 200km. Most of the first- and second-class passengers travel more than 700km. Since it is possible for SRT to impose special

fares on the passengers in these classes, the SRT is focusing on boosting services for these passengers.

2.4.1.2 Freight transport volume and the degree of dependence on railways

Domestic freight transport volume and transport volume based on the transport mode in Thailand are shown in Table 9. As the volume of domestic freight transport is increasing annually, the majority of the increase is contributed by the truck transport which accounts for an overwhelming share (88%) of the freight market. On the other hand, the volume of freight transported by the SRT and its share in terms of total domestic freight transport are increasing at a rate more than in domestic freight transport. The most notable factor contributing to this increase is the annual growth in container transport utilizing the Inland Container Depot. The SRT is concentrating its efforts on increasing the volume of container freight as one of its priority measures.

Table 9. Volume of Freight Transported by SRT and its Share in Thailand's Freight Transport Unit: Thousand tons annually

	1993 (A)	1998	2003 (B)	Increase /Decrease (B – A)
Freight transported by SRT	7,477	8,545	11,456	+53.2%
Freight transported by truck	316,720	412,075	440,018	+38.9%
Freight transported by water	39,905	43,451	48,780	+22.2%
Freight transported by air	32	46	54	+68.7%
All freight transported by domestic public transport means	364,134	464,117	500,308	+37.4%
SRT share of freight transport	2.1%	1.8%	2.3%	+0.2

Source: SRT data

2.4.2 Burden on the environment

This project undertook the overall rehabilitation of existing railway tracks without the acquisition of new land, and since work was undertaken mainly at night in an intensive manner for brief periods by segment at the site, it is deemed that the projects have been carried out placing very little burden on the environment and having almost no impact on residents living environment along the railway.

2.5 Sustainability

2.5.1 Executing Agency

2.5.1.1 Structure

The SRT is managed as an independent public enterprise which receives capital from the government of Thailand. In addition to the company's president being appointed by the Thai government, the Ministry of Transport is also deeply involved in its management.

Since its establishment in 1890, it has a long history and extensive experience more than 110 years. It is one of Thailand's most influential enterprises which owns railway network extending 4,044km throughout Thailand and more than 19,000 staff.

Although the SRT Construction Department was in charge of the Track Rehabilitation Project, the Civil Engineering Department is responsible for the operation and maintenance of the tracks. The Civil Engineering Department has 20 regional railway operation and maintenance offices throughout the country. The appointed persons responsible for inspecting each respective segment of the railway are dealing with routine inspections of the railroad tracks and railroad bed as well as the periodic maintenance and repair of the tracks together with technical personnel who are subordinates of them. There are approximately 2,100 personnel (11.2% of all of the employees of the SRT) who are involved in the maintenance of the railroad tracks. Since the government has a policy of controlling the total number of employees, local engineering works are outsourced to local companies with significant experience in engineering works (about 30 companies) and SRT staff manage and oversee the work accordingly.

As a characteristic of the railway work, the routine inspection and maintenance of the tracks are undertaken mainly at night or during intervals in the operation of the trains. The SRT has a system whereby technical personnel with extensive experience are assigned to regional track operation and maintenance offices and they are able to manage ordinary maintenance and deal with problems of great urgency.

2.5.1.2 Technical capacity

There is 1,900 technical staff holding technical qualifications certified by the SRT assigned to its regional track operation and maintenance offices under the Civil Engineering Department. The SRT has secured staff's technical expertise in their work areas with an adequate level. Based on the extensive experience, procedures for routine inspections and maintenance as well as dealing with emergency situations have all been set out in work manuals. Training for staff is also conducted once to twice a year, the SRT is making good efforts to maintain and improve the level of technical expertise.

From the viewpoint of labor saving and promoting efficiency in track maintenance,

newly developed heavy machinery has also been introduced, such as tamping machines for stabilizing the agitation of the railroad bed ballasts.

2.5.1.3 Financial status

While the SRT's income from fares, which is the mainstay of the SRT's revenue, is fixed at a low level since fares are regulated by the government and there has been little growth in the number of passengers, there are operating costs and railway car maintenance costs. As a result, operating income and expenditure have been in deficit. In addition, the SRT has been continually posting substantial losses for net profit and loss due to expenditure for employee pension funds, depreciation, and interest on loans. Thanks to its long history, the SRT is endowed with significant assets in the form of railway operations-related assets which include real estate in various regions across Thailand. The SRT's losses are being covered in part by sales of these assets and by subsidies from the government.

In the SRT's expenditure, track maintenance costs fell significantly from 2003 onwards when the track rehabilitation project was nearly completed and the cost saving effects are clearly noticeable in track maintenance and management, which was one of the objectives of the project. From the viewpoint of safe train operations, the SRT intends to make efforts to secure the necessary budget for operation and maintenance of the tracks and at the same time to improve their management in order to continue their track improvement works in the future by their own budget.

The government of Thailand has positioned the SRT as a part of Thailand's transport infrastructure that is essential for the citizens of the country and is committed to continue to provide assistance for the SRT.

2.5.2 Operation and maintenance

The SRT's track operation and maintenance works have been organized into the four programs shown below and are undertaken appropriately at regular basis.

Table 10. Track Operation and Maintenance Programs

Program	Period	Details
(1) Major periodic maintenance work	Every 3 or 4 years (targeting class 1A, 1B and 2A tracks)	Overall inspection and maintenance of tracks including replacement of sleepers, reinforcement of ballasts, repairs of railway shoulder, repairs of drainage system and related facilities, etc.
(2) Medium-level periodic maintenance work	Every 2 years (targeting class 2B and 3 tracks)	Overall inspection and maintenance of tracks including repair and replacement of places in need of repair, reinforcement of ballasts, etc.

(3) Light maintenance work	As needed	Repair of faults discovered during routine inspections
(4) Emergency maintenance work	As needed	Emergency procedures when an accident or natural disaster, etc. occurs

Source: SRT data

3. Feedback

3.1 Lessons Learned

None in particular

3.2 Recommendations

(1) Although the SRT had tended to fall into chronic deficit at the time of the loan approval, it remains unchanged even at present. Therefore, there is a need to promote management improvement that will help for enabling the SRT to overcome its deficit operations. In view of the trend of declining passenger numbers in the railroad transport sector, it is necessary for the Thai government to clarify its position regarding the railway sector in the medium to long term. In terms of relevance to the project in particular, there is a need to make efforts to raise fare income and improve the SRT's financial conditions by boosting measures in the areas of marketing and passenger services.

(2) Although the track rehabilitation project brought about both tangible and intangible advantages in the railway's operations, the positive effects are limited only to those segments of the railway where improvement works were undertaken. The contribution to enhancing operations and to developing the SRT remains limited.

As the SRT reviews costs versus effects and the cost that should be consumed in the railway, it is hoped that the following measures will be undertaken to enable the Track Rehabilitation Project to demonstrate greater results:

(1) Undertake track rehabilitation works on the remaining railway segments
(2) Improve relevant facilities such as signals and branch lines
(3) Make the railway double-track

Comparison of Original and Actual Scope

Project Details: Thai Railways Track Rehabilitation Project

Item	Plan	Actual
(1) Project Scope Phase 1 Northern Line from Lop Buri to Chumsaeng Southern Line from Hua Hin to Ban Krut Phase 2 Northern Line from Chumsaeng to Phitsanulog Southern Line from Chai Ya to Thung Song Phase 3 Southern Line from Ban Krut to Chai Ya (Total)	 148km 141km 108km 150km 244km (791km)	As planned
(2) Project Period Phase 1 Phase 2 Phase 3	October 1992 to December 1997 (Period: 63 months) July 1994 to September 1999 (Period: 63 months) July 1996 – September 2001 (Period: 63 months)	June 1993 to October 2001 (Period: 100 months) January 1995 to June 2002 (Period: 89 months) September 1996 to August 2002 (Period: 73 months)
(3) Project Cost Phase 1 Foreign currency Local currency Total ODA Loan Portion Exchange rate Phase 2 Foreign currency Local currency Total ODA Loan Portion Exchange rate Phase 3 Foreign currency Local currency Total ODA Loan Portion Exchange rate	 9,682 million yen 996 million baht 14,758 million yen 10,331 million yen 1 baht＝5.1yen 7,651 million yen 996 million baht 11,490 million yen 7,651 million yen 1baht ＝4.08 yen 7,973 million yen 846 million baht 11,527 million yen 7,973 million yen 1baht＝4.2 yen	 10,117 million yen 653 million baht 12,042 million yen 11,428 million yen* 1 baht＝2.95 yen 6,905 million yen 1,440 million baht 11,032 million yen 7,436 million yen* 1baht＝2.90 yen 6,860 million yen 2,095million baht 12,783 million yen 7,435 million yen* 1baht＝2.85 yen

* ODA loan amount includes additional financing in local currency (Phase 1: 1,254 million yen, Phase 2: 531 million yen, Phase 3: 643 million yen, Total: 2,428 million yen）