Kingdom of Thailand

Procurement of Locomotives and Rolling Stock Project (2)

Report Date: March 2001
Field Survey: September 2000

1. Project Profile and Japan's ODA Loan

Site Map: Thai Eastern Seaboard Area

Lat Krabang Station Inland Container Terminal

(1) Background

The Thai government began developing its Eastern Seaboard Development Plan in the mid-1980s. The plan was to build new production centers for domestic industry (Map Ta Phut and Laem Chabang Industrial Complexes) together with new ports at Map Ta Phut and Laem Chabang and connections to road and rail networks for freight transport. The plan aimed to promote industrialization of the Thai economy and curb the excessive concentration of economic activity in Bangkok, which was nearing the limits of its infrastructure capacity.

Laem Chabang commercial port was fully opened in 1991 as a new foreign trade port for the Eastern Seaboard. It was expected to become a transit point for a large volume of freight, particularly containerized freight, and to support the development of North and Northeast Thailand, which are its hinterlands.

The Sri Racha - Laem Chabang railway was opened in July 1992 and, judging by the state of road traffic, which was nearing its limits, it was expected that demand for container freight shipping by rail between Laem Chabang and Bangkok would increase substantially. Therefore the Japan International Cooperation Agency (JICA) forecast in its survey report on the Laem Chabang Seaboard Development Plan that 50% of the containers freighted via Laem Chabang port would be carried by rail.

Thailand's cement manufacturers were continuously boosting their production in response to the the growing construction industry in the first half of the 1990s, and there were plans to build new cement factories in the industrial areas of the Eastern Seaboard, and ship the products by rail. The State Railway of Thailand (SRT) had held a share of around 15% of cement shipping in the past, and as the congestion of the roads meant that truck shipping of cement could not be increased easily, it was expected that increased production would lead to greater demand for rail shipping.

However, most of the SRT's locomotives were dilapidated and accidents were frequent, while declining profits made it difficult to maintain levels of service and efficiency. Therefore the rail freight capacity had to be expanded.

(2) Objectives

In order to expand rail freight capacity under Thailand's Seventh Five Year Plan (1992-96) to meet growing demand for shipping of containers and cement, this project was to rehabilitate or replace dilapidated rolling stock.

(3) Project Scope

This project was to procure 38 diesel locomotives (of which 14 were rehabilitated from dilapidated diesel locomotives and 24 were new purchases) and 99 container carriages.

(4) Borrower/Executing Agency

State Railway of Thailand (SRT)[Guarantor: Government of the Kingdom of Thailand]/ SRT

(5) Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	¥13,631 million / ¥7,845 million
Exchange of Notes/Loan Agreement	September 1993 / September 1993
Terms and Conditions	Interest rate: 3.0%, Repayment period: 25 years (grace period: 7 years), General Untied
Final Disbursement Date	January 1999

2. Results and Evaluation

(1) Relevance

This project was mainly to meet the demand for container freight arising with the completion of the Eastern Seaboard Development Plan, and to meet demand for cement shipping generated by cement factories and storage facilities built around the Eastern Seaboard Industrial Area. The plan was in line with the anticipated increase in shipping demand caused by the area's development, and as such it appears to have been a relevant plan.

However, the slump in the construction industry from 1996 and the impact of the currency and financial crisis of 1997 postponed plans to build cement factories and storage facilities in the area. Since 1998, the quantity of cement shipped to and fro the Eastern Seaboard Area has fallen below the plan. Nevertheless, the locomotives and the freight carriages procured under this project have been used effectively to carry freight in other areas. The shipment of cement and oil was reduced by the economic crisis, but the quantity of cargo transport through the Eastern Seaboard is expected to increase gradually as the Thai economy recovers.

(2) Efficiency

The project completion was delayed by the reasons including the bankruptcy of suppliers. The delivery of the locomotives was delayed by 17 months and that of the freight carriages by 13 months. The final

disbursement was originally scheduled in November 1996, but it was actually delayed by two years and two months to January 1999. Competition between potential suppliers pushed project costs far below estimates, and the total amount of ODA loan disbursement was approximately 58% of the commitment amount.

The SRT, which had had past experience of implementing many projects financed by the Japanese ODA loan, carried out this project within the planned project scope.

(3) Effectiveness

[1] State of usage (availability)

The availability of the locomotives and the freight carriages has largely been as planned, and the volume of freight shipped is increasing as the Thai economy recovers.

Table 1 Usage of Locomotives and Freight Carriages Owned by SRT

	Initial planned level	1998 (on completion of the project)	1999	2000 [1)]
Locomotive availability [2)] (%)	86	84	83	85
Freight carriage availability[2)] (%)	90	97	96	95

Source: SRT material

Note

1) Estimated figures for 2000. The SRT fiscal year runs from October to September.
2) The proportion of all locomotives and freight carriages owned by SRT (on their books) which have not been scrapped and are not under repair.
3) Total numbers of locomotives and freight carriages owned by SRT
   SRT now owns 296 locomotives, but only 220 are operable (including 38 from this project). Furthermore, 36% of all SRT locomotives are 30 or more years old and in poor condition. Of its 8,016 freight carriages (of which 7,618 are operable), 64% are 30 or more years old.

[2] Volume of freight shipping

Procurement of the locomotives and carriages was completed in April 1998, but the SRT's total volume of freight shipping has declined overall, due to the impact of the economic crisis which began in mid-1997. Container traffic is moving in the direction of recovery, but petroleum-related and cement shipments are not recovering, and the composition of the freight being shipped differs from the initial plan (see Table 2).

In the Eastern Seaboard area, where the project effect is strongest, the planned cement-related investments have not been realized due to the economic crisis. Also, there had been a plan to unload petroleum-related products at Map Ta Phut Port, but after the economic crisis they were disembarked in Southern Thailand instead. These setbacks reduced the shipping volume in the Eastern Seaboard below the planned levels, but container shipping is growing as the economy recovers. The Eastern Seaboard Development Area is the origin of 90% of the container shipping, and container shipping, particularly through Laem Chabang Port, is considered to help realize the effectiveness of various other projects in the area.

Table 2 Changes in Shipment Volumes of Major Freight Types for SRT as a Whole

(unit: 1,000 tons/day)

	Petroleum-related	Cement (bulk)	Cement (bags)	Containers	Totals (including other items)
1992	1,793	1,278	762	626	7,681
(1995)	(1,653)	(4,898)	(2,306)	(2,830)	(15,298)
(1996)	(1,752)	(5,126)	(2,508)	(3,284)	(16,162)
1997	1,514	2,596	514	2,499	10,031
1998	1,196	2,012	280	2,717	8,671
1999	1,280	1,764	226	3,452	9,290

Source: SRT material

Note: Figures in ( ) are the predicted values in the Seventh National Development Plan (1992-1997).

[3] Financial Internal Rate of Return (FIRR)

The FIRR was recalculated using the same conditions applied at the time of the appraisal, to reflect the actual value following the completion. The table below states the conditions applied and the result of the recalculation. The recalculated result is slightly higher than that at the appraisal because container cargo kept on growing steadily even during the economic recession.

Table 3 Comparison of Forecast and Actual FIRR

	At the time of appraisal (1993)	Recalculation
Project life	30 years	Same as left
Cost	Investment + Maintenance cost	Same as left
Benefit	Increased fee income due to the implementation of this project (Year of benefit realization: 1997)	Same as left (Year of benefit realization: 1998)
FIRR	7.6%	8.6%

(4) Impact

[1] Promotion of distribution within Thailand and development of inter-city transport networks

According to the SRT, the share of container transport from Laem Chabang Port is approximately 50% for rail and 50% for trucks. The quantity of containers passing through Laem Chabang Port is growing, and therefore the volume shipped by rail will also grow as long as rail can retain its 50% share. In 1996 the Inland Container Depot (ICD) was completed at Lat Krabang near the New Bangkok International Airport, which is under construction. As a result, the rail share of container shipping between the ICD and Laem Chabang Port is expected to rise to 60% in the next five years. As the volume of container shipping increased, remaining single-line section on the railway route was upgraded to double-line using an ODA loan. The SRT is planning to add an additional line to keep pace with the anticipated further growth in container shipping.

[2] Assisting to realize the effects of other projects related to the Eastern Seaboard Development Area.

Container shipping connected to the Eastern Seaboard accounts for a 90% share of the SRT's total container transport. Enhancement of railway network including this project has contributed to logistics of the Eastern Seaboard Development Area and assisted the realization of effects from various related projects.

[3] Impact on road transport

At the time of the appraisal the SRT anticipated that the increase in rail freight capacity would encourage a modal shift in cargo transport from trucks to trains, thereby alleviating road congestion. However, after that the road network linking Bangkok to the Eastern Seaboard Area was developed rapidly, increasing the traffic capacity of the road network in the same period. Therefore traffic congestion did not become a severe problem, and at this stage it is not possible to judge whether this project alone had any impact on alleviation of traffic congestion. Similarly, the SRT took the view that this project would have an indirect impact on reduction of road accidents, but by now the road system has been upgraded with improved road safety, making it impossible to judge whether that effect is due from the project.

[4] Environmental impact

Since it is generally considered that a shift from truck freight to rail freight is accompanied by reductions in emissions of harmful substances such as nitrogen oxides (NOx), this project was expected to yield a positive environmental impact. However it is difficult to determine whether any such impact was generated, as the road network was developed at the same time..

(5) Sustainability

[1] The causes of low profitability and remedies

The road network in Thailand has been developed and automobiles have proliferated, while the air network has also been developed. Therefore numbers of rail passengers have not increased as much as had been anticipated, putting the SRT's business in a difficult position. The rolling stock is dilapidated. Since the tracks are not electrified, all the trains are operated with diesel locomotives or diesel cars.

Table 4 Business Revenue and Expenses for the SRT as a Whole

Unit: Million Baht

Year	Business earnings	Business expenses	Balance
1994	7,525	7,289	242
1995	7,338	8,112	-771
1996	7,897	8,713	-816
1997	8,466	9,163	-697
1998	7,219	8,772	-1,553

Source: SRT materials

Since the first oil shock in 1974, the SRT has recorded a deficit in its business balance almost every year. Its biggest problems are the weak financial position, the chronic operating losses and, as a result, lack of budgets for new investment and for operation and maintenance.

According to the SRT, the largest reason for its losses is that the fare is kept down by strong government control (both passenger fare and freight charge are up to a cabinet approval), leaving it unable to cover expenses. The fare for third-class passengers, who comprised 92% of the total passengers in 1997, is held at low levels as a measure to assist the lower-income class. Passenger fares had been frozen for 11 years between 1985 and 1996, and after that the fares for first and second class passengers were increased, while the third class fare have remained unchanged up until now. Therefore revenue from third class fare

contributes as low as 34% of the total passenger revenues.

Freight charge, on the other hand, is set by the freight type and distance, and has not been changed since 1July 1997.

The SRT's business revenue in FY 1998 broke down into 56% from passenger fares, 22% from freight charges and 22% from other revenues.

Table 5 Breakdown of Business Revenue

Year	Passenger revenue		Freight revenue		Other revenue		Total	
	Units (millions of Baht)	Shares (%)	Units (millions of Baht)	Shares (%)	Units (millions of Baht)	Shares (%)	Units (millions of Baht)	Shares (%)
1994	3,846	51.1	1,421	18.9	2,259	30.0	7,525	100.0
1995	3,848	52.5	1,526	20.8	1,964	26.8	7,338	100.0
1996	4,080	51.7	1,626	20.6	2,191	27.7	7,897	100.0
1997	4,154	49.1	1,713	20.2	2,598	30.7	8,466	100.0
1998	4,049	56.1	1,595	22.1	1,575	21.8	7,219	100.0

Source: SRT materials

In 1998 the breakdown of business expenditure was 49.2% for personnel costs, around 14.2% for equipment and materials costs, 11.7% for fuel costs, 12% for depreciation, and 12.8% for other fixed costs. The share for personnel costs has surpassed 50% for most of the past five years (see Table 6).

Table 6 Breakdown of SRT Business Expenses by Type

Units: Upper level: Millions of Baht, Lower level: % share of total business expenses

	Personnel costs	Equipment and materials costs	Fuel costs	Depreciation	Fixed costs	Totals
1994	4,080	1,541	912	756	747	8,037
	50.8	19.2	11.4	9.4	9,3	100.0
1995	4,747	1,599	909	858	769	8,881
	53.5	18.0	10.2	9.7	8.7	100.0
1996	4,983	1,655	1,034	1,041	673	9,387
	53.1	17.6	11.0	11.1	7.2	100.0
1997	5,215	1,641	1,139	1,168	942	10,105
	51.6	16.2	11.3	11.6	9.3	100.0
1998	4,953	1,429	1,182	1,209	1,288	10,060
	49.2	14.2	11.7	12.0	12.8	100.0

Source: SRT materials

[2] Deficit filling

Since FY 1997 Public Service Obligations (PSO) system has been introduced to improve the deficit generated by the policy of suppressing fares. The system guarantees income from the state to pay necessary expenses. Since the following year, the deficit has been covered by the government. However, payments are made a year in arrears, divided into four installments, which means that the SRT must cover costs from its own funds in the interim.

Strengthening of passenger business, which supplies a majority of business revenue, could reduce the deficit with serious efforts by raising third class fare by even a small amount, or to increase the numbers of first and second class passengers. To that end, service standards will have to be raised.

[3] Operation, repair and maintenance

(a) Operation and maintenance scheme

The operation and maintenance of rolling stock is the responsibility of the Mechanical Engineering Department under the Deputy General Manager – Operation 1. Maintenance and inspection of rolling stock now takes place at four workshops in the country (Makkasan, Bang Sue, Nakhon Rachasima and Thung Song), which carry out overhauls and major repairs, and thirteen depots around the country, which handle regular inspections and minor repairs.

For maintenance, locomotives and carriages are dismantled for inspection at intervals of five years, with an average depreciation period of 25 years. However, many carriages require repairs or suffer accidents, and some repair workshops are inefficient due to shortages of equipment. Therefore repair and maintenance work at the Makkasan workshop has been privatized, and outsourcing is being considered. Locomotive repairs at Bang Sue are already outsourced. The Makkasan workshop is situated in a busy urban area, and the decision has been taken to sell it within a few years and relocate to a suburban site.

Table 7 Maintenance and Repair Methods and Intervals for Locomotives and Carriages

Diesel Locomotives	Freight Carriages
Trip inspection: Inspected in the engine shed after a service.	Daily or trip inspection: Carriage inspectors inspect carriages at stations during services.
Regular inspection: Major components are inspected at depots without disassembly at intervals of 1, 2, 3, 6 and 12 months.	Periodic inspections: Carriages are inspected at intervals of 8, 16, 32 and 40 months.
Partial inspection: Major components of locomotives are disassembled and inspected in depots. Intervals are two years for diesel–electric locomotives and 2.5 years for hydraulic coupling diesel locomotives.	Two-year inspection and repair: Carriages are inspected and repaired in a carriage shed or a repair factory every two years.
Heavy repair: Locomotives are completely disassembled and inspected in repair factories. Intervals are four years for diesel–electric locomotives and five years for hydraulic coupling diesel locomotives.	Heavy repair and general overhaul: Repairs are made at a repair factory every 4~6 years.

Source: SRT materials

[4] Maintenance budgets

The total maintenance budget for the SRT was 332.9 million Baht in 1998 and 427 million Baht in 1999. A large depreciation of the Baht against US$ since 1997 (from 24 to 50 Baht per US$) has raised prices of parts and fuel. Also, personnel costs have been rising in recent years due to increased numbers of days worked on holidays, even though the number of train staff has not increased. The SRT is promoting the use of an early retirement and restricting the number of staff in preparation for future privatization.

The SRT have been unable to make adequate new investments due to the lack of funds, which has had an impact in the form of declining availability and inefficient operation. As a result, the SRT is in a vicious circle of low fare revenues and deficits . While there is no problem with the repair skills and the systems inside the repair factories, obtaining adequate budgets remains a serious problem.

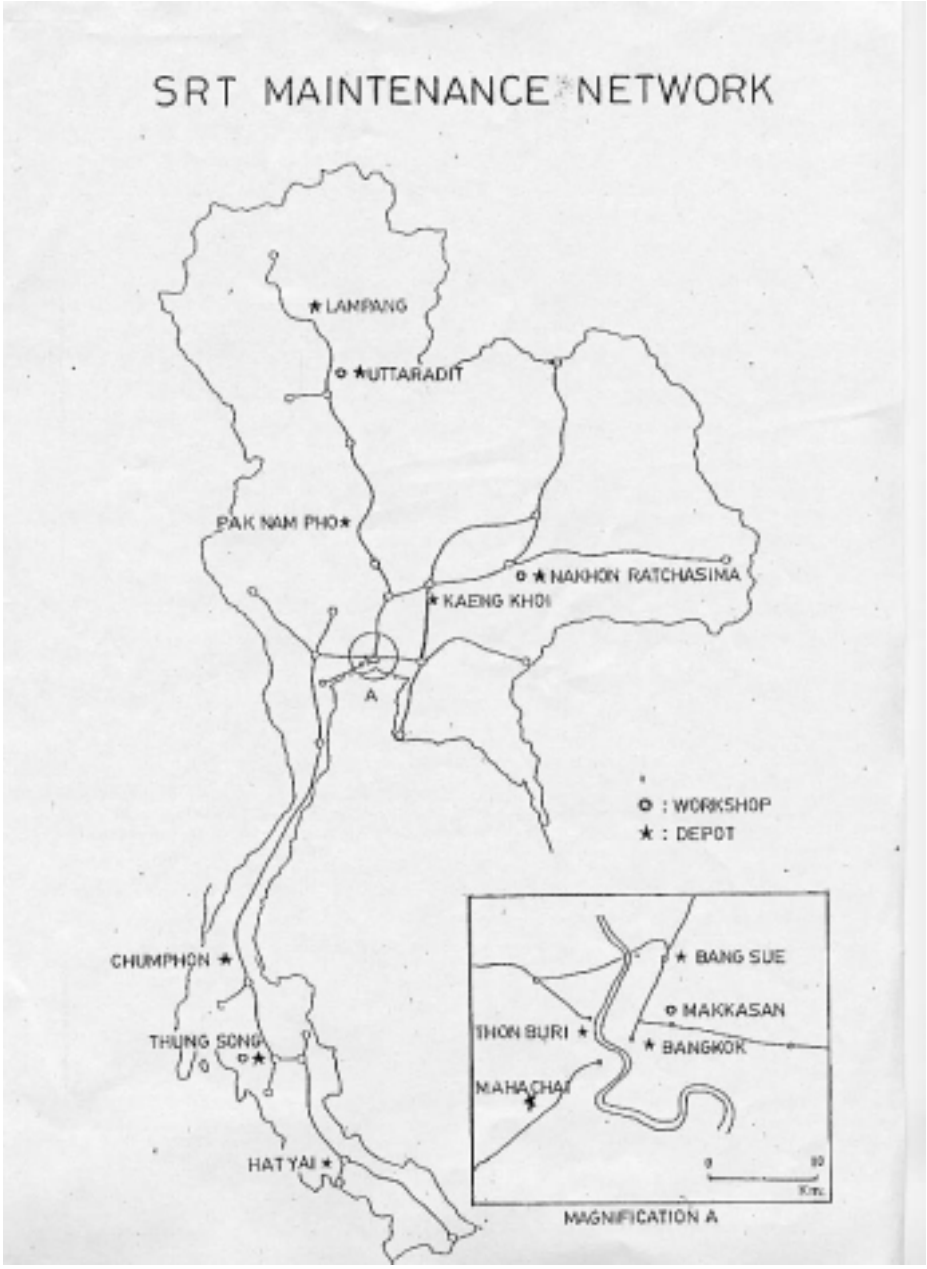
[5] Direction on structural reform and privatization for the SRT

The Thai government is now considering the privatization of the SRT, with assistance from the World Bank. Specifically, the current SRT organization would be split into the head office, the infrastructure division, railway operations (passengers, freight), and an asset management division. All but the head office will be privatized. These reforms are expected to make the SRT's operations more efficient and improve its financial strength in order to enhance its transport capacity.

In 1998 the SRT had a total workforce of approximately 24,000 people, but drastic job cuts are now being made in preparation for privatization, and outsourcing is introduced wherever possible.

Comparison of Original and Actual Scope

Item	Plan	Actual
①Project Scope		
-Procurement of diesel locomotives	38 locomotives (Of which 14 were renovated from dilapidated locomotives and 24 were newly purchased)	Same as left
-Inspection equipment (for locomotives)	1 set	Same as left
-Purchase of container freight carriages	99 locomotives	Same as left
-Inspection equipment (for freight carriages)	1 set	Same as left
②Implementation Schedule Completion of procurement	Nov. 1996	Locomotives: Apr. 1998 Freight carriages: Dec. 1997
③Project Cost		
Foreign currency	¥13,631 million	¥7,845 million
(ODA Loan portion)	(¥13,631 million)	(¥7,845 million)
Local currency	436 million Baht	669 million Baht
(ODA Loan portion)	(-)	(-)
Total	¥15,558 million	¥10,802 million
(ODA Loan portion)	(¥13,631 million)	(¥7,845 million)
Exchange rate	1Baht＝¥4.42 (June 1993)	1Baht＝¥4.42 (Rate at the time of the appraisal)


SRT MAINTENANCE NETWORK
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