Ex-post Monitoring of Completed ODA Loan Project

Thailand

"Track Rehabilitation Project (1)-(3)"

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1. Project Description



Map of the Project Area



Rehabilitated Section (Near Lop Buri Station, Northern Line)

1.1 Project Objective

The objective of this project is to promote the safety of operation of railway trains and reduce maintenance and management costs by refurbishing a total of 791km of railway tracks on both the Northern and Southern lines of State Railway of Thailand (SRT) and thereby contribute to the development of the economy of Thailand by strengthening and maintaining the railway transport capacity in Thailand.



Approved Amount/	(1)10,331 million yen / 10,174 million yen
Disbursed Amount	(2) 7,651 million yen / 6,905 million yen
	(3) 7,973 million yen / 6,792 million yen
	(Additional Funding) 2,979 million yen / 2,428 million yen
Loan Agreement Signing	(1) January 1993 / November 2001
Date / Final Disbursement	(2) September 1994 / July 2003
Date	(3) September 1996 / January 2004
	(Additional Funding) July 1998 / September 2001
Ex-Post Evaluation	Fiscal 2005
Executing Agency	State Railway of Thailand (SRT)
Main Contractor	Mitsui & Co., Ltd. (Japan), John Holland Asia Ltd. (Hong
	Kong)/ Namprasert Construction Co., Ltd.(Thailand) (JV),
	Sumitomo Corporation (Japan), Barclay Mowlem
	Construction Limited (Australia).
Main Consultant	National Engineering Consultations Co., Ltd.(Thailand),STS
	Engineering Consultations Co., Ltd. (Thailand), Japan
	Transportation Consultants, Inc. (Japan), Pacific Consultants
	International (Japan) (JV), Ocean Consultant Japan Co., Ltd.

1.2 Outline of the Loan Agreement

1.3 Background of Ex-post Monitoring

Centering on Bangkok, Thailand's capital, the SRT's railway lines radiate outwards to connect to nationwide destinations. However, apart from the railway line covering Bangkok and its surrounding areas, the tracks are single and non-electrified with a gauge width of 1,000mm. Furthermore, decades have passed since the tracks were first laid and aging and deterioration are conspicuous. Frequent breakdowns of rails have happened since 1984 and caused interruptions to services by which the railway fell into a serious situation.

This project refurbished a total of 791km of major rail lines on the Northern Line (Bangkok - Chiang Mai) and Southern Line (Bangkok - Malaysia Border) and was conducted in three phases from 1993 to 2004.

According to the ex-post evaluation conducted in Fiscal Year 2005, this project brought about both tangible and intangible benefits for the railway's operation, but the positive effects were limited to the refurbished segments of the railway only. In addition, the contribution to enhancing operational efficiency and to development of the SRT was limited.

In addition, the ex-post evaluation pointed out that SRT needed to promote an increase in fare revenue and enhance management by improving marketing and passenger service since SRT was chronically in debt both at the time of loan approval and ex-post evaluation. As such, the following recommendations were made upon ex-post evaluation in order to achieve better results considering cost versus effects and demand for railway travel:

- (1) Refurbishment of tracks of the remaining sections,
- (2) Improvement of related facilities such as signals and branch lines, and
- (3) Construction of double railway track, etc.

Therefore, this project was selected for ex-post monitoring and reviewed under each criterion with the findings from the field survey and other research activities with a final conclusion being drawn.

2. Outline of the Monitoring Study

2.1 Duration of the Monitoring Study

Duration of the Monitoring Study: April 2011 to February 2012 Duration of the Field Survey: July18 to August 6, 2011

2.2 Constraints of the Monitoring Survey

None

3. Monitoring Results

3.1 Effectiveness

- 3.1.1 Quantitative Effects
- 3.1.1.1 Effects of Track Rehabilitation
- (1) Number of Operation Delays due to Rail Breakdowns

Although the rails had broken down frequently before the project, the number of breakdowns greatly decreased with the completion of the project. There were no accidents attributed to rail breakdown on the refurbished sections (at the time of ex-post evaluation in 2006). Afterward, although no accident had been reported on the Northern Line, four accidents were confirmed at the 518km point on the Southern Line.

(2) Number of Derailment Accidents due to Rail Breakdowns

No derailment accident was reported in the past three years at the time of ex-post evaluation in 2006, and no accidents were reported at the time of this monitoring. However, at some grade crossings on refurbished sections, six to twelve collisions with automobiles occurred annually.

(3) Travel Time on Refurbished Sections

Table 1 shows the travel time on refurbished sections based on the timetable. It indicates a slight decrease refurbished sections of the Northern Line, but increases in other sections. Especially, large increases were observed for freight trains. SRT explained that the increased time

due to the train diagram which prioritizes passenger trains rather than freight trains on single track sections.

					Unit: hour:minute
	Train Type	2001 Before	2006 Ex-post	2011 Ex-post	Change from 2006
Section		Project	Evaluation	Monitoring	10 2011
Northern Line : Lop Buri \sim	Passenger	2:48	3:02	3:00	-0:02
Pitsanulok 256 km	Freight	3:34	3:27	8:09	4:42
Southern Line: Hua Hin \sim	Passenger	8:50	7:13	7:36	0:23
Thung Song 535 km	Freight	10:38	8:50	15:20	6:30

Table 1: Average Travel Time on Refurbished Sections

Source: SRT data

3.1.1.2 Reduction of Operation and Maintenance Cost

The maintenance cost of rail tracks is shown in Table 2 according to SRT. Considering total refurbished length of 791km, the total savings in 2010 will be 127 million baht compared to the cost before the Project in 2001.

Table 2: Track Maintenance Co	ost
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Unit: Baht 10,000/km/year

Year	Before Rehabilitation	At Ex-post Evaluation	At Ex-post Monitoring
		(2006)	(2011)
Track Maintenance	23.6	8.3	7.49
Cost			

Source: SRT data

3.1.1.4 Internal Rate of Return (IRR)

Since IRR was not calculated at the time of ex-post evaluation, this monitoring survey does not cover this item.

3.1.2 Qualitative Effects

According to SRT, this Project increased users' confidence in punctuality and safety and enhanced comfort of railways.

The above facts reflecting some positive outcomes, such as a decreased number of railway accidents due to rail breakdowns and a short-term reduction in operation and maintenance costs, were mostly observed in 2011 just as they were at the time of ex-post evaluation in 2006. Meanwhile, travel time increased from that at the time of ex-post evaluation due to single track, grade crossing and train diagram issues.

3.2 Impact

3.2.1 Intended Impact

3.2.1.1 Passengers Transport Volume and Reliance on Railway

Impact indicators which were identified at the time of ex-post evaluation were reviewed to assess the current situation. These indicators, shown in Table 3 to 5, are not those of the Project target (791 km; 19.6% of total line distance), but all across Thailand (total operating distance of 4,043 km).

As Table 3 shows, the number of first-class passengers rapidly increased from 1993 to 2004 and remained almost unchanged, and slightly decreased from 2004 to 2009. On the other hand, the number of third-class passengers decreased from 1993 to 2004, but increased afterward up to 2009. Although the third-class fare is kept low due to government regulations, SRT shifted the focus on ticket sales to first and second class passengers, where additional fares can be applied.

In addition, first and second class passengers tend to travel much longer than third class passengers in terms of passenger-km (Table 4) and average travel distance per passenger (Table 5). A travel distance of 600~700km is close to the distance between Chiang Mai and Bangkok (751km) and which entails overnight sleeper service. This implies most first and second class passengers ride long distances between metropolitan areas. Thus, despite the competition with bus transport and civil aviation, long distance passenger transport on SRT is considered to maintain comparative advantages. Meanwhile, urban rail transport, which is not directly operated by SRT, has been developed in the Bangkok Metropolitan Area and the urban rail service was reevaluated in terms of mitigating traffic jams, punctuality and speed.

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Year	1993	2004	2009	Increase/
	(Before Project)	(After Project)		Decrease (%)
				(2004-2009)
First Class	18	124	121	-2.4
Second Class	4,532	4,391	3,788	-13.7
Third Class	69,763	41,688	43,577	4.5
Total	75,053	46,203	47,486	2.8
Total Transportation	1,477,792	821,514	N/A	
Volume of Domestic				
Public Transportation				
Railway Share	5.0%	5.6%	N/A	

Table 3: Number of Passengers on SRT

Unit: 1.000 persons

Source: SRT data

Table 4: SRT Passenger Volume (Person per Kilometer)

			Annua	ally: 1,000 person/km
Year	1993	2004	2009	Increase/Decrease
	(Before Project)	(After Project)		(%)
				(2004-2009)
First Class	13,451	88,891	86,071	-3.2
Second Class	2,926,622	2,732,556	2,383,309	-12.8

Third Class	10,762,444	6,460,886	6,355,311	-1.6
Total	14,020,975	9,282,333	8,824,691	-4.9

Source: SRT data

	C	ľ	e	Unit: km/person
Year	1993	2004	2009	Increase/Decrease
	(Before Project)	(After Project)		(%)
				(2004-2009)
First Class	747	717	711	-0.8
Second Class	646	622	629	1.1
Third Class	154	155	146	-5.9
Total	187	201	186	-7.5

Source: SRT data

3.2.1.2 Freight Transport Volume and Reliance on Railway

Since the 1990s, truck transportation has dominated the domestic freight transportation market (ton base), and accounted for 88% of share in 2003 (Table 6), while, rail transportation accounted for only 2% of the total amount.

As for heavy freight transportation, from the political viewpoint of transport efficiency and environmental issues, the Ministry of Transportation (MOT) promoted a modal shift program from truck transportation to railway and shipping. However, the program did not result in a significant recovery of rail transportation.

Table 6: Freight Transportation Volume and SRT's Share

Unit: 1,000 ton

Year	1993 (Before Project)	2003 (After Project)	2009	Increase/ Decrease (%) (2003-2009)
Total Domestic Transportation	364,134	500,308		
Road Transportation	316,134	440,018		
Rail Transportation	7,477	11,456	11,505	0.40%
Railway Share	2.1%	2.3%		

Source: SRT data

3.2.2 Other Impacts

3.2.2.1 Impact on Natural Environment

According to SRT, this Project refurbished existing railway tracks completely, while reducing noise for passengers and neighborhoods along rail lines.

3.2.2.2 Resettlement and Land Acquisition

This project utilized existing right-of-way railroad land and there was no new resettlement or land acquisition during its construction.

These facts reveal that the track refurbishment done through this project has not resulted in a significant increase in total passenger or freight transportation volume on railways, this is partially due to the recent boom in Thailand of private ownership of automobiles. This situation is similar as at the time of ex-post evaluation.

3.3. Sustainability

3.3.1 Structural Aspect of Operation and Maintenance

Currently, the Ministry of Transport (MOT) has not been examining a privatization scheme for SRT and SRT continues to be operated as a state-owned enterprise. SRT clarifies responsibility for track maintenance for each local railway bureau and maintains track maintenance programs comprised of four levels, operation and maintenance structure is judged to have no problems.

3.3.2 Technical Aspect of Operation and Maintenance

Project Completion Report (PCR) and SRT state that operation and maintenance manuals have been prepared, which specify measure to be taken depending on level of wear damage. Railway maintenance workers are employed by SRT and trained regularly to maintain technical skills.

3.3.3 Financial Aspect of Operation and Maintenance

MOT budgets funds for SRT (Table 7) and provides annual maintenance costs (Baht 9.3 billion in fiscal year 2010 budget) to SRT (Table 8). Meanwhile, the Cabinet decides implementation of new projects (Table 9).

Mode	FY2009	FY2010	Portion to
Department	(Actual)	(Budget)	total budget
	THB mil.	THB mil.	(%)
Road Transport			
Department of Highways (DOH)	40, 511	26,672	35.9
Department of Regional Roads (DRR) 22,369	16,895	22.7
Department of Land Transport (DL	T) 2,333	2,238	3
Express Authority of Thailand (EX	AT) 9,419	7,036	9.5
Bangkok Metropolitan Transit		.,	
Authority		35	0
Railway Transportation			
SRT	9,843	9,335	12.6
Mass Rapid Transit Authority(MRTA) 7,919	6,526	8.8
Water Transportation			
Maritime Department	3,732	3, 557	4.8
Civil Aviation			
Department of Aviation	923	909	1.2
Civil Aviation Training center	126	197	0.3
Policy and Planning			
Others	336	341	0.5
Office of Transport Policy and			
Planning	489	576	0.8
Total	98,000	74, 317	100

Table 7: Budget of MOT

Source : MOT.

Note: Thai fiscal years start in October and end in September.

As for management reform of SRT as a whole, no drastic improvement to increase the operating revenue from railways has been made and SRT annually posts ordinary loss even after government subsidies (Table 8). On the other hand, SRT accelerated reforming of its structure and Airport – Rail Link is operated by its subsidiary. In addition, SRT reformed itself by increasing non-operating revenue from alternate sources such as real estate and installation of optical fiber cable. SRT also established a Marketing Department in an effort promote its services and increase the number of passengers and freight volume.

The Thai Cabinet approved new projects in April 2010 (Table 9).

-Track Rehabilitation Project Phase 5-6, Bridge Improvement Project (2010-2014)

-Telecommunications Network Project, Crossing Safety Project, Colored signal lights Project, and Rail Line Protective Fencing Project (2010-2014)

-Track Doubling Project (767km; there is no implementation plan on Northern and Southern Lines except Bangkok and its suburbs.)

The above Track Rehabilitation Projects followed Project Phases 1-3. Phase 4 was conducted to refurbish a 227km section of Northern and Southern Lines using Thai government funding. Phase 5 and 6 are to be implemented on 308km (North-eastern Line, 2010-2013) and 278km (North-eastern Line, 2010-2013) respectively.

Phase 4-6 correspond to ex-post evaluation Recommendation (1) Refurbishment of tracks of the remaining sections, Recommendation (2) improvement of related facilities such as signals and branch lines, and Recommendation (3) construction of double railway track are being implemented as part of he above new projects.

These facts indicate SRT is receiving continual government revenue support for current expenses and investment costs. Although SRT is trying to increase non-operational revenue from sources other than railways, it has not improved management drastically, resulting in a final deficit. In addition, the final loss is increasing recently. However, as long as government support continues, there will be little financial problem for operation and maintenance.

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Unit: Million Bal							Aillion Baht			
						Fiscal Year	r			
Item	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Revenues										
Traffic revenues	5,558	5,668	5,816	6,080	6,108	5,976	6,305	6,370	6,591	6,398
Property revenues	553	615	692	977	885	952	1,086	1,042		
Fibre optic cable transmission system	870	895	921	943	955	746	689	759		
Concession fares from the government	80	68	57	60	59	57	52	50	2,058	2,055
Compensation from the government	-	-	6	-	-	63	115	69		
Other revenues	474	590	571	594	641	696	720	750		
Total operating revenues	7,535	7,835	8,064	8,653	8,647	8,489	8,967	9,040	8,649	8,453
Expenses										
Maintenance of way & signalling and communication	1,736	1,730	1,802	1,337	1,139	1,163	1,294	1,332		
Maintenance of locomotive and rollingstock	1,838	1,993	1,961	1,978	1,941	2,110	2,016	2,267		
Traffic and transportation	4,186	4,539	4,577	4,744	4,938	5,449	6,571	6,399	N/A	N/A
General expenses	506	494	540	574	544	690	615	562		
Others	-	-	-	-	-	-	47	10		
Total operating expenses	8,266	8,756	8,879	8,633	8,562	9,412	10,542	10,571	11,649	10,956
Profit(Loss) from operating	-731	-921	-815	20	85	-923	-1,575	-1,531	-3,000	-2,503
Other income										
Land deed compensation	278	526	124	194	-	5	-	-	-	-
Profit from sales of property	0	-4	22	11	10	32	-	-	-	-
Total income	278	523	145	206	10	37	1,995	1,088	0	0
Other Expenses										
Pension expenses	1,499	1,688	1,759	1,842	1,924	2,076	2,399	2,525	3,220	3,683
Pension reserves	-	-	-	271	1,364	387	404	739	-	-
Depreciation	1,217	1,324	1,373	1,366	1,867	1,708	1,830	1,701	1,639	1,980
Financial expense	1,634	1,863	1,987	2,039	1,959	1,779	1,855	2,168	2,504	2,495
Devaluation of investment	22	-	-	-	-	-	-	-	-	-
Loss (Profit) on writing off assets	4	0	-1	0	1	4	60	9	-	-
Loss (Profit) from foreign exchange	525	-500	-421	304	795	-454	-0	3	-158	-425
Loss on writing off materials and supplies	0	0	4	30	-1	2	274	276	-	-
Total expenses	4,901	4,376	4,700	5,852	7,909	5,502	6,822	7,422	7,205	7,733
Net Profit (Loss) for the year	-5,354	-4,773	-5,370	-5,627	-7,814	-6,388	-6,403	-7,864	-10,205	-10,236

Source: SRT data

3.3.4 Current Status of Operation and Maintenance

According to on-site inspection and SRT, the tracks have been operated and maintained properly without any specific problem.

The above facts show that there is no major concern on sustainability of the Project, because the government decided to provide financial support to SRT for current expenses and investment costs going forward. The local railway bureaus of SRT have maintained necessary technical skill levels for operation and maintenance of rail tracks.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This Track Rehabilitation Project achieved initial targets of reduction of train accidents and reduction of operation and maintenance costs. However, due to the single track and stagnant railway passenger demand, the long term impact on the railway business of SRT is limited and any ripple effect on the Thai economy is unclear.

SRT's chronic deficit, pointed out by the ex-post evaluation, remains unchanged and SRT needs to continuously strive for management improvement to recover from chronic deficit.

Recommendations (1) to (3) made by ex-post evaluation have been completed or are still in progress as described above.

4.2 Recommendation

4.2.1 Recommendation to SRT

The Project led to a reduction in the number of accidents due to rail breakdown, and a reduction in operation and maintenance costs. In order to sustain the effects, it is desired that the operational lifetime of rail be prolonged by establishing a more detailed maintenance system. For example, they are recommended to check tracks more frequently using an automatic testing train in order to operate trains more smoothly and to improve on points such as avoidance of sudden speed reduction or acceleration. Although the frequency of checks depends on how much tonnage has passed on a track, four times a year is considered ideal.

4.2.2 Recommendation to MOT and Thai Government

It is recommended that budget for SRT's current expenses and investment cost continue to be secured.

4.3 Lessons Learned None

Table 9 Cabinet Approved Investment Budget for SRT (2010-2014)

State Railway of Thailand - Budget Plan for Infrastructure - Urgent Period 2010-2014 (According to Cabinet Resolution Dated 27 April 2010)

											Unit: Millon Ba	IUI
Project	Budget	Foreign			Disbursem	ent Plan (Fis	cal Year)			Distance	Period	Deadline
		Content	2010	2011	2012	2013	2014	2015	Total	(Km)	(Month)	
Available plan / budget that can be implemented immediately - 11 items												
 Railway rehabilitation project phase 5 	8,508	50		2,369	3,725	2,173			8,266	308	36	2013
Railway rehabilitation project phase 6	6,779	50		1,926	3,028	1,766			6,720	278	36	2013
3. Construction of Double-track railway - Chacherngsao - Klong 19 - Kangkoy	11,348	40			2,940	3,363	3,363	1,682	11,348	106	48	2015
4. Provision of 13 diesel-electric locomotives (20 tons/shaft)	2,145	6		195	e	1,947			2,145		36	2013
5. Improvement of unsafe railway	23,671	41		4,737	14,693	4,241			23,671		36	2013
6. Improvement of bridges	12,167	35		1,599	3,463	3,139	3,966		12,167		48	2014
7. Colored signal lights	11,358	45		433	2,167	5,466	3,292		11,358		48	2014
Installation and improvement of road blocks	5,456			877	1,434	1,782	1,363		5,456			
8.1 Installation of road blocks	4,446	12		808	1,189	1,085	1,363		4,446		48	2014
8.2 Provision and improvement of road blocks	1,010	Local		68	245	697			4,010		36	2013
9. Installation of fences along railway	4,737	Local		1,005	3,732				4,737	1,649	24	2012
10. Construction of locomotive garage at Kangkoy	1,000	Local		18		583	400		1,000		36	2014
11. Construction of locomotive garage at Sriracha and Unit 10 Ladkrabang	360	Local		60	300				360		24	2012
TOTAL	87,529			13,219	35,484	24,459	12,384	1,682	87,228			
Projects that require feasibility study - 10 items												
1. Double-track railway Lopburi-Paknampo	7,860	40		6	10	2,586	2,586	2,588	7,860	118	48	2015
2. Double-track railway Mabkabao - Nakorn Rachasima (Jira Junction)	11,640	40		135	10	3,831	3,831	3,833	11,640	132	48	2015
3. Double-track railway Jira Junction - Khonkaen	13,010	40		120	10	4,293	4,293	4,294	13,010	185	48	2015
4. Double-track railway Nakorn Pathom - Nongpladuk - Hua Hin	16,600	40		130	10	5,486	5,486	5,624	16,600	165	48	2015
5. Double-track railway Prajuabkirikan - Chumporn	17,000	40		120	10	5,623	5,623	591	17,000	167	48	2015
6. Provision of 50 diesel-electric locomotives GE	6,563	6			592	863	4,518		6,563		48	2015
7. Refurbishment of 56 locomotives	3,360	68		13	216	2,580	551		3,360		48	2014
8. Provision of 115 new passenger cars for commercial services	4,981	06			451	4,081	448		4,981		48	2014
Construction of inland container depot (ICD) station 2	6,066	Local			2,000	2,000	2,066		6,066		36	2014
10. Installation of telecom network	2,200	Local		56	876	1,268			2,200		36	2013
TOTAL	89,280			664	4,185	32,611	29,402	22,418	89,280			
GRAND TOTAL	176,808			13,883	39,669	57,070	41,786	24,099	176,307			

Notes: 2010 budget plan for provision and improvement of road blocks worth 5 million Baht transferred to 2011 budget of 63 million Baht as DPL loan for 2011, total 68 million Baht

Item	Plan	Actual
1. Output	Phase 1	As planned
	-Northern Line from Lop Buri to Chumsaeng	
	(148km)	
	-Southern Line from Hua Hin to Ban Krut	
	(141km)	
	Total 289km	
	Phase 2	As planned
	-Northern Line from Chumsaeng to	
	Phitsanulog (108km)	
	-Southern Line from Chai Ya to Thung Song	
	(150km)	
	Total 258km	
	Phase 3	As planned
	Southern Line from Ban Krut to Chai Ya	
	(244km)	
2. Project	Phase 1 October 1992toDecember 1997	June 1993toOctober 2001
Period	(63 months)	(100 months)
	Phase 2 July 1994toSeptember 1999	January 1995toJune 2002
	(63 months)	(89 months)
	Phase 3 July 1996toSeptember 2001	September 1996toAugust 2002
	(63 months)	(73 months)
3. Project	Phase 1 14,758 million yen	12,043 million yen
Cost	Phase 2 11,490 million yen	11,033 million yen
	Phase 3 11,527 million yen	12,783 million yen
	Total 37,775 million yen	35,859 million yen
ODA Loan	Phase 1 10,331 million yen	11,428 million yen
Portion	Phase 2 7,651 million yen	7,436 million yen
	Phase 3 7,973 million yen	7,435 million yen
	Total 25,955 million yen	26,299 million yen
		(Inclusive of additional
		financing in local currency of
		2,428 million yen)

Comparison of Original and Actual Scope