Thailand

Highway Sector Project

Report Date: October, 2002

Field Survey: August, 2001

1. Project Profile and Japan's ODA loan

Site Map: Central & Southeast of Thailand

Site Photo: ROUTE 2313 (Udon Thani)

1.1. Background

Since the implementation of the First Seven-Year Highway Development Project of 1965, Thailand has engaged in numerous highway sector projects. As of 1987, the country had 16,000km of national highways and 32,000km of provincial highways, a total of 48,000km covering almost all of the country. The rate of pavement for the national highways reached 93.8%. An extreme increase in transportation demands due to a rapid economic growth accelerated the need for upgrading road standard, such as widening of roads. On the other hand, the rate of pavement for the provincial highways stayed as low as 59.5%. It was therefore expected that improvement of road conditions will contribute to the development of regional industries.

Feasibility study conducted by JICA in northeastern Thailand in 1985 recommended the improvement of 15 routes (total of 450km) and suggested repairs on 8 routes (total of 90km). JICA also conducted feasibility study in central Thailand in 1988, recommending improvement of 23 routes (total of 720km), route expansion of 8 routes (290km) and repairs of 8 routes (210km).

This project covers improvement, repair and expansion of 20 routes specified in JICA study, which were prioritized because of higher economic effectiveness.

1.2. Objectives

To improve the efficiency of the road network, reduce the transportation costs, and increase the productivity of local industries in Northeastern and Central Thailand by improving existing road conditions. These objectives were to be accomplished by paving laterite roads with asphalt, widening 2-lane roads to 4 lanes, and rehabilitating 20 national and provincial highways in Northeastern and Central Thailand.

1.3. Project Scope

Central and Northeastern Thailand were selected for the project. **Table 1-1** and **Table 1-2** show the original scope at the time of appraisal. These routes were selected from viewpoints of economic effectiveness (EIRR of more than 15%), road conditions, efficiency of roads network and contribution to the activation of rural economy based on the aforesaid JICA study.

Table 1-1: Profile of targeted highways in Central Thailand

Route	Origin - Destination	Main Construction Works	Distance (Km)
ML-2	Pattaya - Sattahip	Linear improvement	27
ML-7	Min Buri-Chachoengsao	Linear improvement, expansion of width, paving	41
IM-1	Bang Len-Bang Noi Nai	Asphalt paving	19
IM-2	Nong Pru-Lao Khwan	Asphalt paving	36
IM-13	Bang Pa-in - Ayutthaya	Asphalt paving	16
IM-14	Wang Noi - Thanyaburi	Linear improvement, paving, partial construction of new highway	24
IM-15	Klong Luang - Min Buri	Asphalt paving	24
IM-16	Lam Luk Ka -Khlong 16	Asphalt paving	21
IM-22	Rt.304-Bamg Nam Prieo	Asphalt paving, partial construction of new highway	17
IM-23	J.R.32 - J.R.3022	Expansion of width, paving for high standardization	27
RH-5	Chon Buri	Repair	30
RH-3	Samut Songkham	Repair	13
RH-2	Nakhon Sawan	Repair	34

Table 1-2: Profile of targeted highways in Northeastern Thailand

Route	Origin - Destination	Main Construction Works	Distance (Km)
IM-5	Nam Phong - Nong Tum	Asphalt paving	28
IM-8	Huai Koeng - Kumphawapi	Asphalt paving	14
IM-29	Prakhon Chai - Krasang	Asphalt paving	47
IM-19	Selaphum - Kham Phon Sung	Asphalt paving	46
IM-7	Lao - Tha Yom	Asphalt paving	41
IM-9	Nong Han - Kumphawapi	Asphalt paving	34
IM-25	Maha Chana Chai - Kho Wang	Asphalt paving	25

1.4. Borrower/Executing Agency

Kingdom of Thailand / Department of Highways, Ministry of Transport and Communications

1.5. Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	4,085 mil yen 3,580 mil yen
Date of Exchange of Notes Date of Loan Agreement	September, 1988 November, 1988
Terms and Conditions Interest Rate Repayment Period (Grace Period) Procurement	 2.9 % p.a. 30years (10 years) General Untied (Partially Untied for Consulting Service)
Final Disbursement Date	March 1997

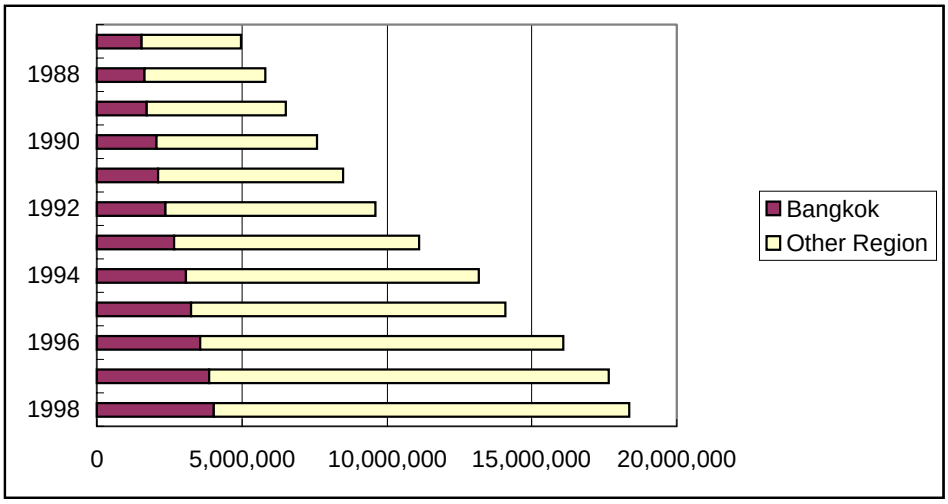
2. Results and Evaluation

2.1. Relevance

The implementation of the Highway Sector Project was consistent with the policy of Thailand originating from the First Seven-Year Highway Development Project of 1965 and, therefore, was relevant at the time of the appraisal. The Eighth National Economic and Social Development Plan (1997-2001), which was issued by the National Economic and Social Development Board, clearly emphasized the goal of "developing land transportation to improve connections with other transportation modes and to assist economic activity in various areas." The goals of the Eighth National Economic and Social Development Plan indicate that the objectives of the project still satisfy the development plan and policy of Thailand today, and therefore the project is still recognized as relevant.

Figure 2-1 indicates the number of automobile registrations in Bangkok and other regions. The number of automobiles has been increasing rapidly in the past decade, and this fact supports the claim that road construction is needed in Thailand.

Figure 2-1: The Number of Automobile Registration in Bangkok and Other Regions



Source: Statistics of Transportation, Planning Division, Transportation Department Ministry of Communication.

This project was also co-financed by two other lending agencies, IBRD and ADB. This implies that the project is considered relevant by other donor agencies as well.

2.2 Efficiency

(2.2.1) Scope of the project

The original and actual scope of the project are shown at the end of this report (Comparison of Original Plan and Actual).

Actual scope Routes IM-7 and IM-14 were constructed under another ODA Loan from Japan.

In addition, the Government of Thailand allocated funds to construct other routes, namely ML-2 (Pattaya - Sattahip), ML-7 (Min Buri - Chachoengsao), IM-1 (Bang Len - Bang Noi Nai), IM-2 (Nong Pru - Lao Khwan), IM-22 (Rt.304 – Bamg Nam Prieo), RH-5 (Chon Buri), RH-3 (Samut Songkham) and RH-2 (Nakhon Sawan). As the Public Works Department of the Ministry of Interior was responsible for the construction of route IM-15 (Klong Luang-Min Buri), the route was not covered by this Loan. As a result, nine routes of the originally planned twenty were constructed with funding from this Japanese ODA Loan.

(2.2.2) Implementation Schedule

The project was originally scheduled to be implemented during the period from June 1988 to October 1992, while the actual implementation was carried out during the period from February 1990 to September 1995 with three years behind the schedule. This delay was mainly attributed to the time taken to complete detail designs for the roads and tender preparation.

(2.2.3) Project Cost

The total project cost was estimated to be 8,100 million yen. The actual total project cost exceeded the estimated cost, mainly due to the increase in land acquisition cost.

2.3. Effectiveness

(2.3.1) Average daily traffic

Tables 2-1 - 2-3 show figures for average daily traffic by type of vehicle (cars, buses and trucks). No data was available for IM-16. Table 2-1 shows that the actual volume of car traffic is greater than estimated, except for IM-9 and IM-29. Overall, it seems that the roads improved by the project are effectively accommodating the increasing volume of traffic after completion in 1995.

Table 2-1: Average daily traffic (CAR) (Unit: Number of Cars Per Day)

		1992	1993	1994	1995 (completion)	1996	1997	1998	1999
Route IM-25	Projection	-	-	66	73	77	85	89	95
	Actual	-	-	311	317	293	294	280	255
Route IM-9	Projection	-	-	-	253	279	300	312	332
	Actual	-	-	-	155	168	215	198	224
Route IM-19	Projection	-	-	191	208	220	244	256	272
	Actual	-	-	1,214	1,573	140	253	822	1,008
Route IM-29	Projection	-	-	-	219	239	246	268	285
	Actual	-	-	-	48	83	326	243	129
Route IM-8	Projection	-	-	-	-	360	392	418	444
	Actual	-	-	-	-	483	769	498	438
Route IM-5	Projection	-	-	-	-	179	198	209	222
	Actual	-	-	-	-	469	1,020	614	425
Route IM-13	Projection	-	-	1,354	1,465	1,586	1,716	1,831	1,946
	Actual	-	-	2,143	3,017	2,654	3,225	4,882	6,050
Route IM-16	Projection	-	-	642	693	762	823	869	924
	Actual	-	-	NA	NA	NA	NA	NA	NA
Route IM-23	Projection	-	906	977	1,068	1,154	1,247	1,326	1,410
	Actual	-	1,348	749	1,113	2,293	1,719	1,221	1,969

Source : DOH

According to the Executing Agency, the actual volume of traffic on IM-13 is larger than estimated because DOH did not take tourist traffic into consideration when estimating traffic volume. IM-13 connects Bangkok with Ayutaya, and both are famous tourist destinations. There was, in fact, much more tourist traffic than expected.

Table 2-2 shows that actual bus traffic volume on routes IM-25, IM-9, IM-5 and IM-23 is almost consistently larger than projected, while the ratio of actual volume of traffic to projected volume for all remaining routes fluctuates. As a whole, it may be said that the roads improved by the project are effectively accommodating the increasing volume of traffic.

Table 2-2: Average daily traffic (BUS) (Unit: Number of Buses Per Day)

		1992	1993	1994	1995 (completion)	1996	1997	1998	1999
Route	Projection	-	-	47	51	53	60	63	67
IM-25	Actual	-	-	104	123	74	58	81	109
Route	Projection	-	-	-	159	188	205	201	213
IM-9	Actual	-	-	-	248	219	285	233	237
Route	Projection	-	-	63	72	77	84	88	93
IM-19	Actual	-	-	350	263	112	88	81	76
Route	Projection	-	-	-	108	129	143	151	160
IM-29	Actual	-	-	-	32	64	341	223	98
Route	Projection	-	-	-	-	42	56	59	62
IM-8	Actual	-	-	-	-	28	37	73	56
Route	Projection	-	-	-	-	51	57	61	65
IM-5	Actual	-	-	-	-	249	179	173	184
Route	Projection	-	-	619	664	712	763	810	857
IM-13	Actual	-	-	399	857	1,695	943	1,274	732
Route	Projection	-	-	294	322	345	356	385	408
IM-16	Actual	-	-	NA	NA	NA	NA	NA	NA
Route	Projection	-	144	157	168	180	193	204	216
IM-23	Actual	-	267	176	222	241	210	207	222

Source : DOH

Table 2-3 shows a declining tendency in the ratio of actual traffic to projected volume for most roads. The volume of the truck traffic on most of these routes peaked between 1995 and 1997. This was possibly due to the collapse of the bubble economy, which occurred in Thailand in 1997.

Table 2-3: Average daily traffic (TRUCK)

		1992	1993	1994	1995 (completion)	1996	1997	1998	1999
Route	Projection	-	-	352	374	411	444	468	496
IM-25	Actual	-	-	226	604	303	299	305	219
Route	Projection	-	-	-	1,704	1,840	1,966	2,067	2,192
IM-9	Actual	-	-	-	1,539	1,816	2,429	1,759	1,872
Route	Projection	-	-	917	993	1,072	1,148	1,216	1,288
IM-19	Actual	-	-	723	960	1,299	1,395	663	804
Route	Projection	-	-	-	602	645	703	746	791
IM-29	Actual	-	-	-	314	526	1,310	919	535
Route	Projection	-	-	-	-	1,498	1,624	1,717	1,814
IM-8	Actual	-	-	-	-	1,131	1,032	1,363	1,354
Route	Projection	-	-	-	-	707	720	801	849
IM-5	Actual	-	-	-	-	643	915	661	600
Route	Projection	-	-	1,397	1,500	1,610	1,729	1,835	1,941
IM-13	Actual	-	-	1,128	1,569	1,871	1,424	1,443	618
Route	Projection	-	-	2,380	2,554	2,759	2,952	3,133	3,313
IM-16	Actual	-	-	NA	NA	NA	NA	NA	NA
Route	Projection	-	3,042	3,276	3,518	3,753	4,035	4,289	4,536
IM-23	Actual	-	3,957	4,134	4,093	4,559	7,136	5,988	5,416

Source : DOH

(2.3.2) Reduction of travel time and vehicle operation costs

On eight out of nine routes road surfaces were improved with asphalt. The improvement on the remaining project (i.e. Route IM-23) consisted of expanding the road's width and paving for high standardization. By improving the surface of the road, travel time and the cost of vehicle operation were reduced.

Table 2-4 shows the expected and actual improvements (both Vehicle Operating Cost and Time Savings) for each project. The benefits realized on most routes were greater than projected.

Table 2-4: Expected and Actual Benefit of each project (1,000 Baht)

	1992		1993		1994		1995	
	Expected Benefit	Actual Benefit	Expected Benefit	Actual Benefit	Expected Benefit	Actual Benefit	Expected Benefit	Actual Benefit
Route IM-5	12,852.0	-	10,728.0	-	15,224.0	-	15,656.0	-
Route IM-8	3,946.0	-	4,674.0	-	5,471.0	-	5,610.0	-
Route IM-29	15,140.0	-	18,509.0	-	22,220.0	-	22,862.0	35,669.3
Route IM-19	12,015.0	-	14,278.0	-	16,768.0	32,098.5	17,225.0	59,615.5
Route IM-9	9,958.0	-	11,837.0	-	13,880.0	-	14,128.0	71,741.8
Route IM-25	5,944.0	-	7,108.0	-	8,435.0	8,441.9	8,553.0	12,077.5
Route IM-13	-	-	6,467.0	-	6,818.0	61,440.7	7,167.0	98,980.7
Route IM-16	-	-	34,918.0	-	36,804.0	66,963.9	38,689.0	95,654.5
Route IM-23	-	-	63,361.0	34,506.0	66,102.0	78,011.5	68,844.0	83,804.4

	1996		1997		1998		1999	
	Expected Benefit	Actual Benefit	Expected Benefit	Actual Benefit	Expected Benefit	Actual Benefit	Expected Benefit	Actual Benefit
Route IM-5	16,068.0	26,118.7	16,512.0	26,081.0	18,009.0	29,714.7	19,626.0	26,403.4
Route IM-8	5,746.0	25,612.1	5,877.0	27,964.5	6,482.0	29,583.6	7,139.0	25,195.2
Route IM-29	23,503.0	39,002.8	23,503.0	41,833.4	26,323.0	37,339.9	28,680.0	39,459.8
Route IM-19	17,676.0	64,099.8	18,120.0	57,721.1	19,842.0	60,822.9	21,705.0	64,430.5
Route IM-9	14,363.0	78,605.3	14,585.0	84,291.6	15,924.0	73,196.4	17,362.0	77,393.1
Route IM-25	8,667.0	13,060.4	8,779.0	11,907.0	9,526.0	12,515.9	10,325.0	13,251.0
Route IM-13	7,517.0	106,154.0	7,866.0	102,039.8	8,319.0	108,252.4	8,772.0	114,435.2
Route IM-16	40,575.0	102,293.4	42,460.0	81,530.8	45,559.0	86,593.7	48,658.0	91,929.3
Route IM-23	71,586.0	89,343.6	74,328.0	95,904.1	78,174.0	101,718.2	82,022.0	107,503.5

Source: DOH

(2.3.3) EIRR

EIRR has been recalculated using figures that were obtained from questionnaires answered by DOH. Table 2-5 shows the result of the recalculation and the previous EIRR calculated at the time of appraisal. In order to recalculate the EIRR, the following assumptions were used:

＊(Preconditions) Project Cycle : 14 years
Benefit : VOC (Vehicle Operational Cost) Savings
TCS (Time Cost Savings)
Cost : Construction Cost
Maintenance Cost

Table 2-5: Current recalculated EIRR and previously calculated EIRR

Route	Current EIRR	Previous EIRR	Current/Previous
Route IM-5	19 %	22 %	0.87
Route IM-8	30 %	22 %	1.41
Route IM-29	21 %	21 %	0.97
Route IM-19	29 %	16 %	1.76
Route IM-9	31 %	16 %	1.98
Route IM-25	17 %	16 %	1.08
Route IM-13	103 %	42 %	2.45
Route IM-16	44 %	39 %	1.13
Route IM-23	48 %	53 %	0.91

Source: DOH

There are some differences between the recalculated EIRR and the projected EIRR at the time of the appraisal. The route with the widest gap is Route IM-13, which has much more car traffic than projected. On the other hand, the recalculated EIRR of some routes are slightly lower than the projected figure. Route IM-5 has much less traffic than expected. Actual car traffic in 1999 was less than half the projected volume.

Despite the fact that projected EIRRs for the routes were quite high, the recalculated EIRRs surpassed those figures for most of the routes. These discrepancies are caused by two factors: the difference in VOC/TCS, as mentioned previously, and the difference in operation and maintenance costs.

Table 2-6 shows the projected and actual costs for the operation and maintenance of each route. For most routes, actual maintenance costs are lower than projected. Routes IM-13 and IM-16 are exceptions. Route IM-13 had much more car traffic than expected, which may be the reason for the higher operation and maintenance cost.

Table 2-6: Projected and Actual Operation and Maintenance Cost

Route		*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Route IM-25	Projected	670	704	739	776	814	855	898	943	990	1,039
	Actual	-	-	-	444	512	519	396	456	486	506
	Projected/Actual	-	-	-	0.57	0.63	0.61	0.44	0.48	0.49	0.49
Route IM-9	Projected	938	985	1,034	4,086	1,142	1,197	1,257	1,320	1,386	1,455
	Actual	-	-	-	-	605	605	683	847	921	997
	Projected/Actual	-	-	-	-	0.53	0.51	0.54	0.64	0.66	0.69
Route IM-19	Projected	1,266	1,330	1,396	1,466	1,539	1,616	1,697	1,782	1,871	1,964
	Actual	-	-	-	946	1076	1077	953	1024	1118	1304
	Projected/Actual	-	-	-	0.65	0.70	0.67	0.56	0.57	0.60	0.66
Route IM-29	Projected	1,288	1,353	1,420	1,491	1,566	1,644	1,726	1,813	1,903	1,998
	Actual	-	-	-	-	803	816	819	1015	1092	1171
	Projected/Actual	-	-	-	-	0.51	0.50	0.47	0.56	0.57	0.59
Route IM-8	Projected	388	408	428	450	472	496	520	546	574	602
	Actual	-	-	-	-	-	363	329	371	389	422
	Projected/Actual	-	-	-	-	-	0.73	0.63	0.68	0.68	0.70
Route IM-5	Projected	766	804	844	886	931	977	1,026	1,078	1,131	1,188
	Actual	-	-	-	-	-	846	775	880	925	987
	Projected/Actual	-	-	-	-	-	0.87	0.76	0.82	0.82	0.83
Route IM-13	Projected	-	488	513	539	565	594	623	655	687	722
	Actual	-	-	-	498	759	823	846	927	1073	1127
	Projected/Actual	-	-	-	0.92	1.34	1.39	1.36	1.42	1.56	1.56
Route IM-16	Projected	-	627	659	691	726	762	800	840	882	927
	Actual	-	-	-	1321	1693	1829	1477	1635	1751	1839
	Projected/Actual	-	-	-	1.91	2.33	2.40	1.85	1.95	1.99	1.98
Route IM-23	Projected	-	799	839	881	925	971	1,020	1,071	1,124	1,181
	Actual	-	-	400	453	615	762	822	948	1038	1090
	Projected/Actual	-	-	-	0.51	0.66	0.78	0.81	0.89	0.92	0.92

Source: DOH

2.4. Impact

(2.4.1) Economic Impact

This project seems to have enhanced quality of life. People living near the highways now have better access to various facilities, including hospitals, even in rainy weather, since the roads are now paved.

(2.4.2) Social Impact

The increase of traffic has created some problems. Most significantly, some nearby residents interviewed for this report said there has been an increase in traffic accidents. According to DOH, there were no problems reported regarding the resettlement of local residents or land acquisition.

(2.4.3) Environmental Impact

There seems to be no serious concern regarding the environmental impact of this project. This is because traffic volume on the routes has not been large enough to cause serious environmental impacts such as air pollution.

2.5. Sustainability

(2.5.1) Operation and Maintenance

The regional sub-district maintenance division of DOH (Highway District Offices as referred to in Figure 2-5) maintains all of the roads. The agency directly responsible for the operation and maintenance of this project is the Maintenance Division of the Department of Highways. Figure 2-5 shows overall structure the Maintenance Division. Each regional Highway District Office has approximately one engineer and 25 workers.

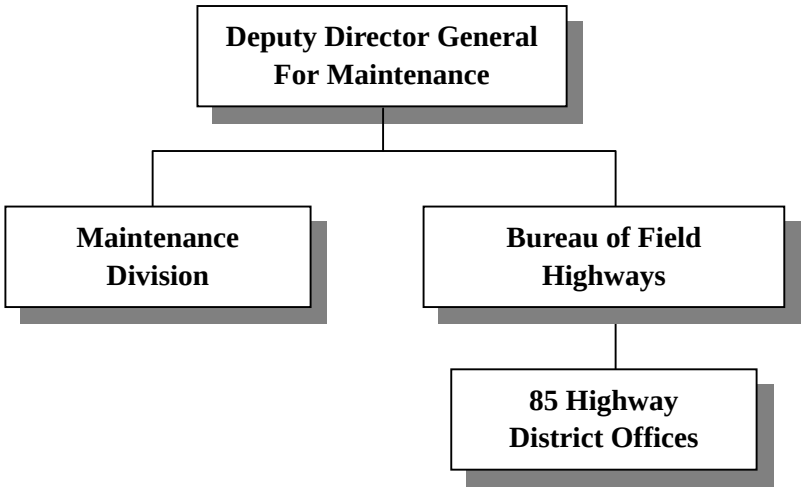
In general, each regional Highway District Office handles 120 km of the road. According to DOH staff size is sufficient for conducting operational and maintenance services. All roads in the country have the same maintenance code. DOH is required to follow this code. If there is a lack of personnel, work has to be out-sourced.

The responsibilities of the maintenance division of DOH are as follows:

- To develop highway maintenance standards
- To coordinate, follow up and evaluate highway maintenance and rehabilitation
- To organize and control a highway toll collection system
- To develop a motor weight checkpoint operation plan in accordance with the law
- To support other divisions and coordinate work with them

One of the problems faced in executing road maintenance is the illegal use of overweight trucks. There is a legal limit on the amount of freight a truck can carry; however, this restriction has not been observed strictly. There are sugar cane fields along some of the project roads and many trucks carry loads of sugar cane over the legal limit. This activity is damaging road surfaces faster than expected, thus in general increasing the cost of road maintenance.

Figure 2-5: Structure of Maintenance Division



Source: DOH

(2.5.2) Technical Capacity

In each Highway District Office there is one engineer and 25 workers. DOH considers this number sufficient for executing standard operation and maintenance.

In order to maintain service level standards, DOH has been providing training to its staff. There are two courses, primary level maintenance training and intermediate level maintenance training. The intermediate level maintenance training program is held once every two years.

No problems regarding staff skills have been reported.

(2.5.3) Financial Status

In terms of the sustainability of operations and maintenance, it should be pointed out that the budget for maintenance is running short. DOH did not receive the allocation it requested, and the lack of funds has forced DOH to postpone maintenance on some roads.

In spite of the budgetary concerns, however, prospects for the sustainability and future growth of this project are not bad. Development along these routes means the regional Highway District Office may be able to acquire financial backup from municipal governments.

The operation and maintenance system adopted for this project can be considered appropriate. Although the budget is short, people along the route are more or less content with the current status of O&M.

Comparison of Original and Actual Scope

Item	Plan	Actual
1. Project Scope		
Central Region		
(a) Route ML-2 (Pattaya - Sattahip)	27.3km	Constructed under government budget
(b) Route ML-7 (Min Buri - Chachoengsao)	41km	Constructed under government budget
(c) Route IM-1 (Bang Len - Bang Noi Nai)	18.8km	Constructed under government budget
(d) Route IM-2 (Nong Pru - Lao Khwan)	36.0km	Constructed under government budget
(e) Route IM-13 (Bang Pa-in - Ayutthaya)	16.2km	19.1km
(f) Route IM-14 (Wang Noi - Thanyaburi)	24.4km	Constructed under another ODA loan
(g) Route IM-15 (Klong Luang - Min Buri	24.3km	Constructed under government budget
(h) Route IM-16 (Lam Luk Ka - Khlong 16)	20.8km	20.6km
(i) Route IM-22 (Rt.304 - Bamg Nam Prieo)	16.5km	Constructed under government budget
(j) Route IM-23 (J.R.32 - J.R.3022)	26.5 km	26.9km
(k) Route RH-5 (Chonburi)	30.0km	Constructed under government budget
(l) Route RH-3 (Samut Songkham)	13.0km	Constructed under government budget
(m) Route RH-2 (Nakhon Sawan)	34.0km	Constructed under government budget
Sub Total	328.8km	66.6km
Northeast Region		
(a) Route IM-5 (Nam Phong～Nong Tum)	28.0km	28.0km
(b) Route IM-8 (Huai Koeng～Kumphawapi)	14.2km	14.2km
(c) Route IM-29 (Prakhon Chai～Krasang)	47.1km	41.8km
(d) Route IM-19 (Selaphum～Kham Phon Sung)	46.3 km	46.1km
(e) Route IM-7 (Lao～Tha Yom)	40.7km	Constructed under another ODA loan
(f) Route IM-9 (Nong Han～Kumphawapi)	34.3km	35.1km
(g) Route IM-25 (Maha Chana Chai～Kho Wang)	24.5km	24.5km
Sub Total	235.1km	189.7km
Grand Total	563.9km	256.3km
2. Implementation Plan		
1. North Eastern Region D/D Preparation	Jun. 1988 ~ Oct. 1988	Jan.1991~Dec.1992

Preparation of Tender	Jul. 1988 ~ Oct. 1988	Feb.1991~Jan.1992
Tender Evaluation	Nov. 1988 ~ May. 1989	Mar.1992~Feb.1993
Construction	Jun. 1989 ~ Jun. 1991	Feb.1993~Mar.1996
2. Central Region		
D/D Preparation	Jun. 1989 ~ Oct. 1989	Feb.1990~Mar.1991
Preparation of Tender	Jul. 1989 ~ Oct. 1989	Mar.1990~Arp.1991
Tender Evaluation	Nov. 1989 ~ Jun 1990	Apr.1990~May 1991
Construction	Jul. 1989 ~ Oct. 1992	Apr.1991~Mar.1993
(b) Consultant Services	May. 1989 ~ Nov. 1992	Apr. 1991-May 1996
(c) Completion	Oct 1992	Sep.1995 (Completion of civil work)
3. Project Cost		
Foreign Currency	4,085 million yen	4,085 million yen
Local Currency	803 million Baht	1,470 million Baht
Total	8,100 million yen	8,788 million yen
ODA Loan Portion	4,085 million yen	3,580 million yen
Exchange Rate	1Baht =5yen	1Baht = 3.2 yen

Independent Evaluator's Opinion on "Highway Sector Project"

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1. Relevance and General Impact

The Highway Sector Project was being implemented during the period of February 1990 to September 1995, three years behind the original schedule. The Project was practically carried out in the 7th National Economic and Social Development Plan which placed emphasis on sustaining economic growth, distributing wealth to the rural areas and environmental protection. As for the role of land transport, the subcommittee for the Seventh Plan Transport defined land transport policy as to provide support and catalyst for growth of economic sectors specifically those contributing to development of the rural areas.

The implementation of the Highway Sector Project comprised a number of small projects of road improvement, repair, and expansion. These projects spanning over 20 national and provincial highways and linking a number of districts for instance Sattahip, Chachoengsoa and Pattaya in the Central Thailand and Nam Phong, Kumphawapi and Huai Koeng in the Northeastern Thailand. The Project must, by its scope, have distributive impacts on economic and social development in the rural areas. Consequently, the Project was considered to be in line with the National Economic and Social Development Plan. Moreover saving in fuel consumption and vehicle operating cost such as wear and tear due to asphalt paving of 133 kms. (Route: IM-1, IM-2, IM-13, IM-15, IM-16, and IM-22) and 235 kms. (Route: IM-5, IM-7, IM-8, IM-9, IM-19, IM-25, and IM-29) in the Central and the Northeastern Thailand, respectively, can be viewed as contributing to improvement in quality of life in the rural areas in terms of efficiency and environment. In addition, the repair, linear improvement, and expansion of road width, a total of 196 kms (Route ML-2, ML-7, IM-14, IM-23, RH-2, 3, and 5), in the Central Thailand were improvement in safety of road usage. All these aspects are part of the emphasis of the 9th National Economic and Social Development Plan.

2. Efficiency and Effectiveness

The Project cost exceeded the estimation by 688 million yen mainly because of the increase in land acquisition cost. This, however, did not alter the results of benefit-cost analysis. The recalculated EIRR of each particular route comprised the Project are ranging from a minimum of 17% up to a very high value of 103% compared to those previously calculated EIRR value ranging from 16% to 53%. It follws that the effectiveness of Project is well aligned with plan.

The estimated traffic included average daily traffic in terms of car, bus and truck were considerably close to the actual. Exceptions were the over-estimation of car traffic on Routes IM-9 and IM-29. However, the actual number of buses and trucks using the two routes are more than their projection. As a result, the overall benefits exceed costs for both routes. It should be noted that for low volume rural roads, the estimation of traffic is practically difficult. Much of the movement is non-vehicular, benefits derived from non-motorized transport (NMT) are inevitably ignored.

3. Impact and Sustainability

Based on the traffic volumes of each particular route in the Project, the economic, environmental and social impact of the Project should not be significant. However, in terms of distributive efficiency rendered by the Project, this should be materialised as the Project improved accessibility to marketplaces as well as to other necessary facilities. The Project has, as a consequence, enhanced the quality of life in the rural areas. Sustainability of the positive impact rendered by the Project depends on the enforcement issue regarding overweight trucks. This is quite critical for prolonging benefits derived from the Project within its economic time frame at a reasonable maintenance program.

4. Lessons Learned and Recommendation

The role of transport in the development process is manifold. Provision of transport services involves costs that need to be reflected in the prices charged at least to cover the operation and maintenance costs. In this respect, Lending Agency should set as a condition for Executing Agency to maintain a good road condition so that the stream of net benefits derived from the road is, to a certain extent, in line with the NPV analysis of the project. To alleviate maintenance budget shortage, one possible source of funding is by enforcing a more stringent overweight charge on trucks reflecting their detrimental effect on pavement.