Thailand

Regional Road Improvement Project (1) (2)

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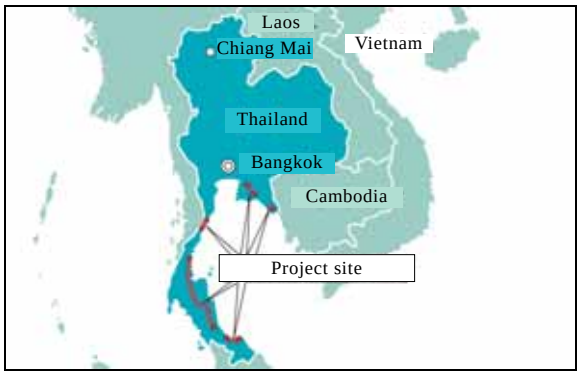
Field Survey: December 2004

1. Project Profile and Japan's ODA Loan



Central and South Thailand

Road widened in the project

1.1 Background:

Thailand's transportation system heavily relied on inland waterways until the mid-1950s. After the development of the 1st National Economic and Social Development Plan (1962-1966), improvement of the road network and motorization were accelerated by active investment in infrastructure including roads. By 1992, roads have come to play an extremely important role among major transportation modes (road, railway, marine transportation, inland waterway transportation, air transportation) occupying approx.90% in terms of both passenger traffic volume and freight traffic volume. The great importance given to road construction is also evidenced by the fact that the largest portion, or 84.1% of the government development budget for the transportation sector for 1992, was allocated to the investment in roads.

The national highways playing a vital role in the road network have a total length of 56,000km (total length of Japanese national highways: approx. 66,000km) and are maintained in good condition with a pavement rate of 78% as of 1993. Thus, expansion and improvement of the whole road network in Thailand was steadily implemented. However, as the traffic volume in both the Bangkok Metropolitan Area and the provinces increased sharply with the economic development of the country, a shortage of road traffic capacity created a bottleneck for physical distribution in Thailand.

1.2 Objective

The project's objective was to increase traffic capacity and to ease traffic congestion, by widening and improving trunk national highways in Central and South Thailand, and

thereby contributes to the development of the regional economy and the improvement of the living environment.

1.3 Borrower/Executing Agency

Government of the Kingdom of Thailand/Department of Highways (DOH), Ministry of Transport and Communications

1.4 Outline of Loan Agreement:

	Phase 1	Phase 2
Loan Amount / Loan Disbursed Amount	16,029 million yen 10,056 million yen	13,374 million yen 13,170 million yen
Exchange of Notes / Loan Agreement	September 1994 September 1994	September 1995 September 1995
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 3.0% 25 years (7 years) General untied	 2.7% 25 years (7 years) General untied
Final Disbursement Date	January 2001	May 2002
Contractors	Sumitomo Corporation (Japan) Maeda Corporation (Japan) JDC Corporation (Japan) etc.	Sumitomo Corporation (Japan) Nippon Road Co., Ltd (Japan)
Consultants	Parsons Polytech Inc. (Japan) Thai DCI Co., Ltd. (Thailand)	Parsons Polytech Inc. (Japan) Thai DCI Co., Ltd. (Thailand)
Feasibility Study (F/S) etc.	Department of Highways, Ministry of Transport and Communications	Department of Highways, Ministry of Transport and Communications

2. Results and Evaluation

2.1 Relevance

2.2.1 Relevance at the time of appraisal

At the time of the appraisal of this project, the 7th National Economic and Social Development Plan (1992-1996) called for further development and efficiency improvement of the transportation sector. Also, the 7th Road Development Plan (1992-1996) made by Department of Highways (DOH) of the Ministry of Transport and Communications in line with the above-mentioned plan set the target of widening the existing roads connecting Bangkok to major regional cities and newly developed economic areas. This project was to widen major national highways in Central and South Thailand and therefore was regarded as a project of high priority consistent with those

policies[1].

2.2.2 Relevance at the time of evaluation

As of the time of this evaluation, the current 9th National Economic and Social Development Plan (2002-2006) emphasizes the importance of developing infrastructure that will contribute to regional development and improving efficiency of infrastructural services. Also, the 9th Road Development Plan (2002-2006) continues to focus on the improvement of roads connecting Bangkok to major regional cities. This project maintains high priority as a project consistent with these policies.[2]

2.2 Efficiency

2.2.1 Output

Table 1 indicates a comparison of the plan at the appraisal time and the actual result of the road widening work (from 2 lanes to 4 lanes) of major national highways in the project. As it shows, both Phase 1 and Phase 2 of the project were implemented mostly as planned at the time of appraisal (Fig.1)

Table 1. Comparison of Planned and Actual Output

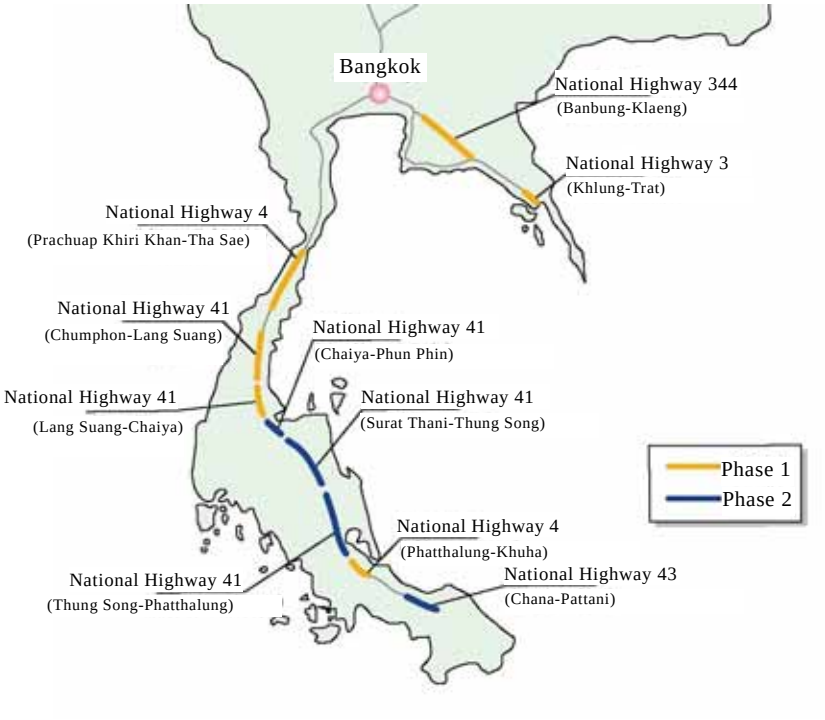
Plan (Appraisal)	Actual (Ex-post Evaluation)
＜Phase 1＞ Widening of major national highways in Central and South Thailand (Total length: approx. 330km) - National Highway 344 (Banbung-Klaeng): 79.2km - National Highway 3 (Khlung-Trat): 41.0km - National Highway 4 (Prachuap Khiri Khan-Tha Sae): 59.5km - National Highway 4 (Phatthalung-Khuha): 67.4km - National Highway 41 (Chumphon-Lang Suang): 67.0km - National Highway 41 (Lang Suang-Chaiya): 15.0km Construction supervision (246M/M)	As planned Construction supervision (236 M/M)
＜Phase 2＞ Widening and improvement of major national highways in South Thailand (Total length: approx. 300km) - National Highway 41 (Surat Thani-Thung Song): 117.6km - National Highway 41 (Thung Song-Phatthalung): 89.0km	As planned

[1] Almost concurrently with this project, a sector loan (Regional Roads Sector Project) was provided by Asian Development Bank (ADB) with the objective of widening regional trunk roads in the north and south regions. World Bank also provided a sector loan (Fifth Highway Sector Project) covering the northeast region.

[2] At present, Phase 3 of the project (signing of L/A: September 2000; loan amount: 19,544 million yen) is being implemented in the northeast and south regions.

- National Highway 41 (Chaiya-Phun Phin): 42.0km - National Highway 43(Chana-Pattani): 52.0km Construction supervision (207M/M)	Construction supervision (100 M/M)

Fig.1. Project Site Map (actual)



2.2.2 Project Period

Table 2 indicates a comparison of the implementation period planned at the time of appraisal and the actual period. As it shows, both Phase 1 and Phase 2 were delayed considerably. Main causes of the delay are ①decrease in cash position of contractors affected by the Asian economic crisis and ② the time taken for coordination in connection with land acquisition[3] (Khlung-Trat).

Table 2. Comparison Planned and Actual Project Period

Plan (Appraisal)	Actual (Ex-post Evaluation)
＜Phase 1＞ September 1994 - July 1998 (47months)	September 1994 - May 2001 (81 months)
＜Phase 2＞ September 1995 - April 1999 (44 months)	September 1995 - December 2001 (76 months)

2.2.3 Project Cost

Table 3 indicates a comparison of the project costs planned at the time of appraisal and the actual costs. As it shows, the actual project costs of both Phase 1 and Phase 2 were

[3] According to the information by the Executing Agency

less than the planned amounts due to ①efficient contracting through competition and ② depreciation of the local currency at a rate greater than the inflation rate.

Table 3. Comparison of Planned and Actual Project Cost

Plan (Appraisal)	Actual (Ex-post Evaluation)
＜Phase 1＞ 33,676 million yen (ODA loan amount: 16,029 million yen)	20,386 million yen (ODA loan amount: 10,045 million yen)
＜Phase 2＞ 28,977 million yen (ODA loan amount: 13,374 million yen)	23,863 million yen (ODA loan amount: 13,155 million yen)

2.3 Effectiveness

2.3.1 Increase in traffic volume

After the major national highways were widened from 2 lanes to 4 lanes in the project, annual average daily traffic volumes on widened sections increased. As shown in Table 4, average annual daily traffic volumes on each section in 2003, the second year after completion, increased from 1994 by 69.2% on an average. Compared to those volumes planned at the time of appraisal (2000), the actual volumes exceed the planned on half of all sections, indicating that the project generated satisfactory effects.[4]

Fig. 2. National Highway 4: Phatthalung-Khuha

Table 4. Average Annual Daily Traffic Volume (vehicles/day)

Section	Actual (Appraisal) 1994	Plan (Appraisal) 2000 (second year after completion)	Actual (Ex-post Evaluation) 2003 (second year after completion)	Comparison against the Plan
＜Phase 1＞				
Banbung-Klaeng	9,619	27,287	15,528	56.9%
Khlung-Trat	9,849	19,109	10,265	53.7%
Prachuap Khiri Khan-Tha Sae	8,834	24,609	16,135	65.6%

[4] The sections that stopped short of achieving the planned volumes are affected by the following adverse factors:

- Banbung-Klaeng: shift of traffic to National Highway 3 accelerated by the construction of industrial complexes in the eastern coastal areas at a greater rate than expected
- Khlung-Trat: sluggish economy in Chanthaburi and Trat Provinces
- Chana-Pattani: slow trade in South Thailand due to deteriorated security conditions

Phatthalung-Khuha	8,555	11,858	17,635	148.7%
Chumphon-Lang Suang	N.A.	19,492	19,509	100.1%
Lang Suang-Chaiya	8,473	14,732	18,241	123.8%
＜Phase 2＞		2001		
Surat Thani-Thung Song	7,384	12,406	11,140	89.8%
Thung Song-Phatthalung	6,853	13,780	16,936	122.9%
Chaiya-Phun Phin	9,972	14,332	17,402	121.4%
Chana-Pattani	10,277	14,789	8,285	56.0%

Source: DOH

2.3.2 Reduction in vehicle operating cost

As a result of this project, the vehicle operating cost (VOC) has been reduced, although the degree varies by section. As Table 5 shows, the actual reduced amounts calculated at ex-post evaluation using the same unit costs as those used at appraisal range from 49.0% to 120.3% of the planned amounts[5].

Table 5. Reduction in Vehicle Operating Cost (million bahts/year)

Section	Plan (Appraisal) 2000: 2 years after completion	Actual (Ex-post Evaluation) 2003: 2 years after completion		＜Reference for Comparison＞＊ 2003: 2 years after completion	
＜Phase 1＞			(Comparison against the plan)		(Comparison against the plan)
Banbung-Klaeng	1,482.8	739.6	(49.9%)	373.8	(25.2%)
Khlung-Trat	338.42	224.4	(66.3%)	128.6	(38.0%)
Prachuap Khiri Khan-Tha Sae	716.11	679.1	(94.8%)	293.8	(41.0%)
Phatthalung-Khuha	656.41	755.6	(115.1%)	399.4	(60.8%)
Chumphon-Lang Suang	1,056.87	931.5	(88.1%)	403.1	(38.1%)
Lang Suang-Chaiya	N.A	207.9	－	84.7	－
＜Phase 2＞	2001				
Surat Thani-Thung Song	1,257.46	1,100.2	(87.5%)	475.5	(37.8%)
Thung Song-Phatthalung	759.7	659.7	(86.8%)	508.9	(67.0%)
Chaiya-Phun Phin	496.32	596.9	(120.3%)	233.7	(47.1%)
Chana-Pattani	404.86	267.2	(66.0%)	163.7	(40.4%)

＊Using the same unit costs as those used at appraisal time

Source: DOH

[5] If using the unit costs as of ex-post evaluation provided by DOH, the reduced amounts would be 25.2% to 67.0% of the planned amounts.

2.3.2 Time saving

Since the traffic flow is smooth as a result of this project, the time required to drive on the target sections has been reduced. Although it was difficult to obtain quantitative data, the result of the beneficiary survey[6] shows that 78.8% of 240 respondents say that the driving time has been reduced.

2.3.4 Recalculation of Economic Internal Rate of Return (EIRR)

At the time of appraisal, Economic Internal Rate of Return (EIRR) was calculated for each section as shown in Table 6, based on the reduction in vehicle operating costs and time saving as benefit, and the project cost and operation and maintenance cost as cost. The results of recalculation for this evaluation based on the same assumptions as those at appraisal are shown in the same table. Although the values vary by section, they generally achieved the planned level on average, showing that the project fully achieved its objective set at appraisal[7].

Table 5. Comparison of Estimated and Actual EIRR

Section	Estimation (Appraisal)	Actual (Ex-post evaluation)
＜Phase 1＞		
Banbung-Klaeng	54%	51.6%
Khlung-Trat	37%	16.3%
Prachuap Khiri Khan-Tha Sae	41%	21.8%
Phatthalung-Khuha	31%	37.4%
Chumphon-Lang Suang-Chaiya	41%	42.7%
＜Phase 2＞		
Surat Thani-Thung Song	36%	31.0%
Thung Song-Phatthalung	28%	28.2%
Chaiya-Phun Phin	29%	60.5%
Chana-Pattani	28%	33.4%

[6] As part of this evaluation, a beneficiary survey was conducted in order to know whether the traffic conditions on the target sections improved after the completion of the project and whether such effect contributed to the development of the regional economy and the living environment. In the survey, we interviewed 30 road users and 30 residents along the road for 4 sections widened in the project (Phase 1: Banbung-Klaeng, Chumphon-Lang Suang; Phase 2: Surat Thani-Thung Song and Thung Song-Phatthalung) using a questionnaire with cooperation by DOH officials.

[7] Although the traffic volume on the Banbung-Klaeng section is only 56.9% of the planned volume, considering that the project cost per 1km is approximately 50% of that of the adjacent Khlung-Trat section, the planned level is almost achieved.

2.4 Impact

2.4.1 Development of regional economy

(1) Reduction in income disparity between the Metropolitan Area and provinces

Fig.3. Distribution base for rubber processed products

This project contributed to eliminating the bottleneck of physical distribution in the target regions by expanding traffic capacity through the improvement of trunk roads. According to the companies in the target regions that we visited for this evaluation, this project helped facilitate physical distribution and thereby contributed to the promotion of industries such as lumber processing, rubber processing, marine product processing, and tourism. Also, among the residents along the roads who responded to the beneficiary survey (120 persons), 57.5% said that the number of plants and stores along the improved roads increased, and 62.5% said that the project contributed to the promotion of the regional economy.

Actually, GRDP growth rate per capita from 2000 when most sections were completed to 2003 was 13.4% nationally on average and 1.4% for Bangkok, while those of 6 provinces where the project was implemented exceeded the national average, indicating that the difference in income in the Metropolitan area has been reduced[8](Table 7).

Table 7. GRDP per Capita (unit: bahts; in 1995 prices)

Province	2000	2003	Growth Rate
Chonburi	183,662	226,830	23.5%
Rayong	361,068	471,925	30.7%
Chanthaburi	38,124	39,197	2.8%
Trat	50,922	49,098	−3.6%
Prachuap Khiri Khan	55,532	63,367	14.1%
Phatthalung	25,862	31,458	21.6%
Chumphon	42,135	48,455	15.0%
Surat Thani	50,051	63,388	26.6%
Nakhon Si Thammarat	40,791	45,797	12.3%
Bangkok	174,580	180,466	1.4%
Entire Thailand	64,139	72,784	13.4%

Source: National Economic and Social Development Board (NESDB)

(2) Creation of employment opportunities

In connection with the promotion of the regional economy mentioned above, we asked

[8] The low growth rate of GRDP per capita of Chanthaburi Province and Trat Province (Khlung-Trat) are presumed to be attributable to the decline in the trade value in these regions.

the respondents of the beneficiary survey about this project and the creation of employment opportunities. According to the result, 39.2% of the respondents (120 residents along the roads) indicated that additional employment opportunities were created. Actually unemployment rates of 7 provinces where the project was implemented are below the national average, evidencing the improvement in the employment situation.

Table 8. Unemployment Rate

Province	2003
Chonburi	1.5%
Rayong	1.4%
Chanthaburi	0.6%
Trat	0.1%
Prachuap Khiri Khan	1.2%
Phatthalung	0.8%
Chumphon	0.8%
Surat Thani	1.1%
Nakhon Si Thammarat	2.3%
Entire Thailand	1.5%

Source: National Statistical Office (NSO)

2.4.2 Improvement of living environment

＜Impact on local residents＞

This project also had an impact on the lives of the residents along the improved roads. In the beneficiary survey, 54.2% of the respondents (120 residents along the improved roads) indicated improved access to public facilities such as educational and health care facilities.

According to the executing agency DOH, on the other hand, at some locations it became difficult for pedestrians to cross the road as a result of the road widening work in the project, and requests for the construction of U-turn roads or pedestrian overpasses are made by the residents.

＜Impact on the environment and society＞

Most parts of the roads improved in the project run through rural areas and only limited sections pass through densely populated areas. However, when asked about the impact of this project on the environment in the beneficiary survey, 26.7%, 37.5%, and 14.2% of the respondents (120 residents along the improved roads) respectively pointed out increases in air pollution, noise and vibration.

In this project, relocation of the residents and land acquisition were carried out[9], and compensations were provided without causing any problem in accordance with the compensation standards set by the relevant domestic law. According to the executing agency, no complaint has been made by residents so far.

2.5 Sustainability

2.5.1 Executing Agency

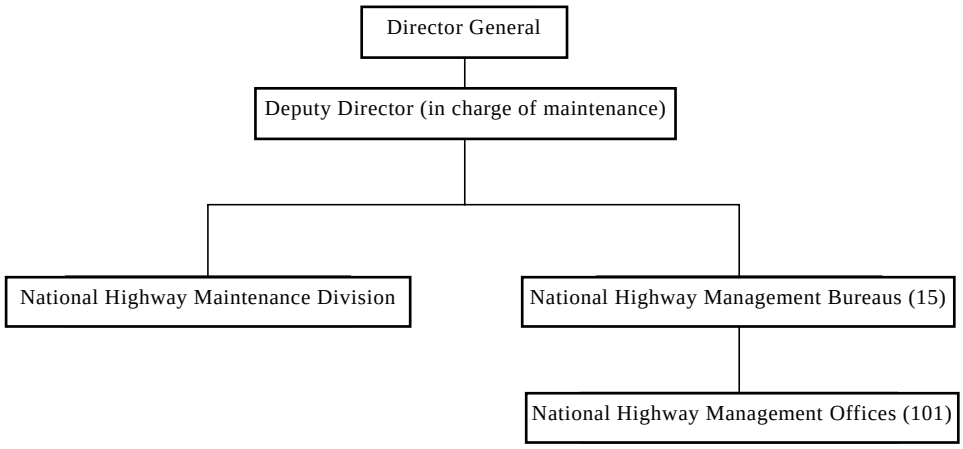
2.5.1.1 Technical Capacity

The executing agency DOH is equipped with the technical capacity required for the operation and maintenance of the project and has no problem. With the objective of enhancing the expertise and skills of the operation and maintenance staff, DOH provides training programs on administration, road engineering, and mechanical engineering.

2.5.1.2 Operation and Maintenance System

Operation and maintenance of national highways improved in the project are carried out by National Highway Management Bureaus (15 bureaus in charge of detailed planning and supervision) at the regional level and National Highway Management Office (101 offices in charge of maintenance) at the provincial level based on the maintenance plan drawn up by National Highway Maintenance Division of DOH headquarters (Fig.4). There is no problem with the allocation or the staff of these offices.

Fig.4. Organization Chart for Maintenance System



[9] The nubmer of relocated residents confirmed in this evaluation is Banbung-Klaeng (1,178), Chumphon-Lang Suang (22), and Surat Thani-Thung Song (0).

2.5.1.3 Financial Status

The maintenance budget of the roads in the jurisdiction of DOH including the target sections of this project is classified into the ordinary maintenance budget and the periodic maintenance budget. According to DOH, a sufficient amount is allocated to the ordinary maintenance budgets and there is no problem with the operation and maintenance of the project in terms of the financial status. As for the periodic maintenance budget mainly used for overlaying, about 75% of the requested amount is allocated and there has been no problem with the sustainability of the project's effects so far.

2.5.2 Operation and Maintenance Status

When we drove on national highways improved in the project for this evaluation, no situation was found that may obstruct driving such as ruts, cracks, or pot holes, and there seemed to be no specific problem with the operation and maintenance status.

3. Feedback

3.1 Lessons Learned

As a result of the road widening in the project, it became difficult for pedestrians to cross the road at some locations. In implementing similar projects in the future, it is advisable to hold workshops at the planning and implementation stages and to give consideration to the situation of the region and the needs of local residents.

3.2 Recommendations

(To the executing agency)

In order to minimize the negative impact of the project on the areas along the roads, it is advisable to ensure convenience for local residents by constructing U-turn roads and pedestrian overpasses where necessary and also to make efforts to enhance the safety of local residents and improve the environment by setting speed limits and posting signs while taking noise control measures in the sections passing through residential areas. For more frequent use of pedestrian overpasses, it is desirable to educate pedestrians in cooperation with relevant agencies.

Comparison of Planned and Actual Scope

Item	Plan	Actual
①Output Phase 1	･Widening and improvement of major national highways in Central and South Thailand (from 2 lanes to 4 lanes)(total length: approx. 330km) - National Highway 344(Banbung-Klaeng) - National Highway 3 (Khlung-Trat) - National Highway 4 (Prachuap Khiri Khan-Tha Sae) - National Highway 4 (Phatthalung-Khuha) - National Highway 41 (Chumphon-Lang Suang) - National Highway 41 (Lang Suang-Chaiya) ･Construction supervision (246M/M)	･As planned ･Construction supervision (236M/M)
Phase 2	･Widening and improvement of major national highways in South Thailand (from 2 lanes to 4 lanes)(total length: approx. 300km) - National Highway 41 (Surat Thani-Thung Song) - National Highway 41 (Thung Song-Phatthalung) - National Highway 41 (Chaiya-Phun Phin) - National Highway 43 (Chana-Pattani) ･Construction supervision (207M/M)	･As planned ･Construction supervision (100M/M)
②Project Period Phase 1	Sep. 1994 - Jul. 1998 (47 months)	Sept. 1994 - May 2001 (81 months)
Phase 2	Sept. 1995 - Apr. 1999 (44 months)	Sept. 1995 - Dec. 2001 (76 months)
③Project Cost Phase 1 Foreign l Currency Local Currency Total ODA Loan Portion	 16,029 million yen 17,647 million yen (4,326 million bahts) 33,676 million yen 16,029 million yen	 10,045 million yen 10,192 million yen (2,997 million bahts) 20,237 million yen 10,056 million yen

Exchange Rate	1 baht＝4.08 yen (as of Sep.1994)	1 baht＝3.4 yen (1994-2001 average)
Phase 2		
Foreign Currency	13,374 million yen	13,155 million yen
Local Currency	15,603 million yen (4,310 million bahts)	10,693 million yen (3,240 million bahts)
Total	28,977 million yen	23,848 million yen
ODA Loan Portion	13,374 million yen	13,170 million yen
Exchange Rate	1 baht＝3.62 yen (as of Aug.1995)	1 baht＝3.3 yen (1995-2001 average)