

Indonesia

Road Rehabilitation Project

Report Date: March 2001

Field Survey: September 2000

1. Project Profile and Japan's ODA Loan



Location Map of Project Area



Improved Road Section in Lampung Province, Sumatra Island

(1) Background

Since the 1970's Indonesia has been placing greater importance on improving and expanding its network of roads in order to further develop the nation's economy. As a result, the road sector now serves very important functions in terms of current socio-economic situations and medium- and long-term prospects of the nation. The main trunk lines (national and provincial roads) in particular have been comparatively well maintained and are serving as a key infrastructure supporting the nation's economic activities.

However, Indonesia has been forced to reconsider its road development strategy as the government's budget constraint cut into the development budget, and due to some prominent damage to already completed roads. This strategy has been switched to one that promotes road improvements based on the following three priorities.

Priority 1: Rehabilitate and maintain national, provincial and local roads

Priority 2: Complete projects currently underway

Priority 3: Construct new roads contributing to local development

(2) Objectives

This project aimed to rehabilitate selected national and provincial roads, with important roles in economic activities as part of trunk road networks, which were damaged by increasing traffic and other reasons.

(3) Project Scope

This project targeted (1) eight existing roads built by previous projects financed by Japanese ODA loans and (2) major trunk lines for nine provinces on Sumatra Island and East Java, in line with the first priority mentioned above. The project covered road expansion, bridge renovation, paving and street drain

rehabilitation based on the degree of damage to each road and traffic volumes.

Rehabilitation to trunk lines in areas other than the nine provinces mentioned in the above (2) (such as Central Java, East Java, Sulawesi) were to be financed by the Asian Development Bank.

Figure 1: Location Map of Roads to be Improved



(4) Borrower/Executing Agency

The Republic of Indonesia / Directorate General of Infrastructure Development, Ministry of Housing and Regional Development (Former Directorate General of Highways, Ministry of Public Works)

(5) Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	¥29,538 million / ¥28,688 million
Exchange of Notes/Loan Agreement	October 1988 / October 1988
Terms and Conditions	
Interest rate	2.7% p.a.
Repayment period	30 years (10 years for grace period)
Procurement	General Untied (Partially untied for consulting services)
Final Disbursement Date	November 1993

2. Results and Evaluation

(1) Relevance

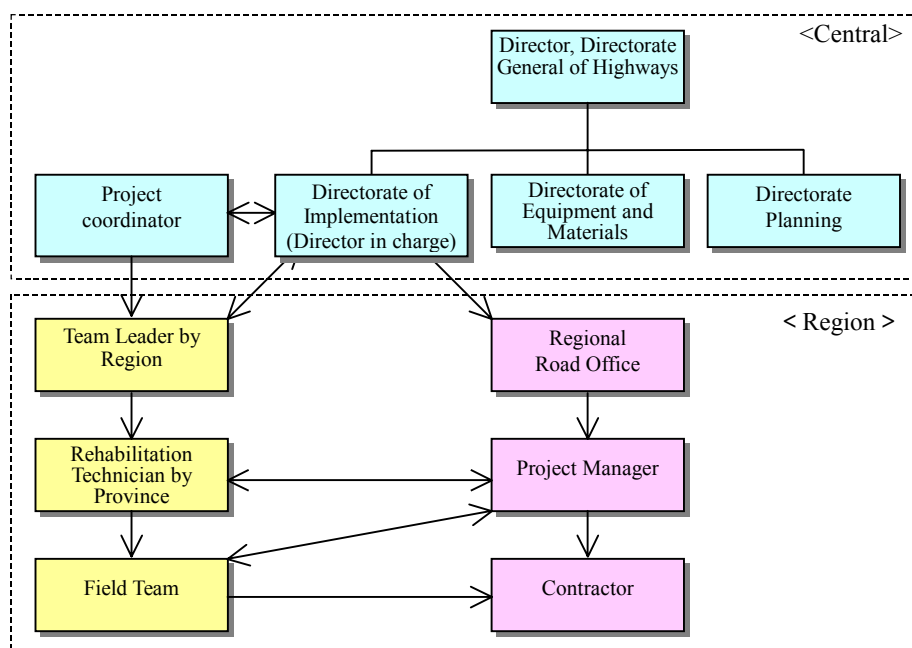
This project was to rehabilitate main trunk line networks, which have been given a very high priority in Indonesia's road development strategy focused on the maintenance of existing roads. Therefore, the relevance of the aim for this project continues to be maintained even now at the time of evaluation.

The scope of the project was scaled back in the following manner: (1) the total length of road to be rehabilitated using the ODA loan was decreased from 1,104km to 1,016km and (2) the length of trunk provincial roads in the nine provinces to be covered by the project was reduced from 3,013km to 2,046km. This was due to the fact that the amount of construction work required increased from the planning stage to the actual start of the civil works due to large damage and deterioration along the target roadways.

(2) Efficiency

The executing agency for this project was the Directorate General of Highways, Ministry of Public Works, which is currently the Directorate General of Infrastructure Development, Ministry of Housing and Regional Development. This Directorate General carried out the construction under the management of Regional Road Offices (Dinas Bina Marga, currently Road and Bridge Maintenance Offices [P3JJ: Proyek Perencanaan dan Pengawasan jaran dan Jimbatan]). As shown in Figure 2, the Director of Implementation is responsible for executing the project within the Directorate General of Highways. A project coordinator was established to monitor the progress of the project and coordinate all relevant parties. In this manner a close cooperation was maintained among the executing agency (central government), each regional government and the consultants. Further, the consultants assisted smooth implementation of the project from three standpoints: team leader for each region arranging with the central Directorate General of Highways, rehabilitation technician at the province-level, and field team directly involved with the implementation of the project.

Figure 2: Organization for Project Execution



As for implementation schedule, it was initially planned to take 39 months from January 1989 to March 1992. The project was actually completed roughly 6 months behind this schedule due to delays in the internal procedures for bidding and an extension of the construction period. In terms of project costs the local currency portion was slightly over budget, but this was set off by the foreign currency portion that was slightly under budget and thus overall there were no cost overruns for the project. The ODA loan amount stayed within the originally planned range.

Rehabilitation projects are generally requested to select suitable construction methods due to individual conditions of the existing structures. In some cases rehabilitation may need more workload than new construction, and it is assumed that this project could be the case. Taking this into consideration, there seem to have been no particular problems in terms of the efficiency of project implementation aside from the slight delay of the implementation schedule.

(3) Effectiveness

At the time of appraisal for this project, it was expected that a direct effect resulting from the completion of this road rehabilitation project would be a reduction in transportation costs.

In order to quantitatively measure reductions in transportation costs, data is needed on traffic volumes, traveling distances and times along the targeted roads for each departing point and destination. In order to accurately obtain such data it would be necessary to conduct census surveys such as road traffic census survey, person trip survey and other surveys like the ones performed in Japan. However, Indonesia has not conducted such type of surveys and the collection of the required data is difficult. The executing agency and the operation and maintenance (O&M) agencies for each province (P3JJ) were asked at this survey to present two actual data on traffic volumes and average traveling speeds for each route. This allowed for the collection of data on the average traveling speeds for South Sumatra Province and North Sumatra Province.

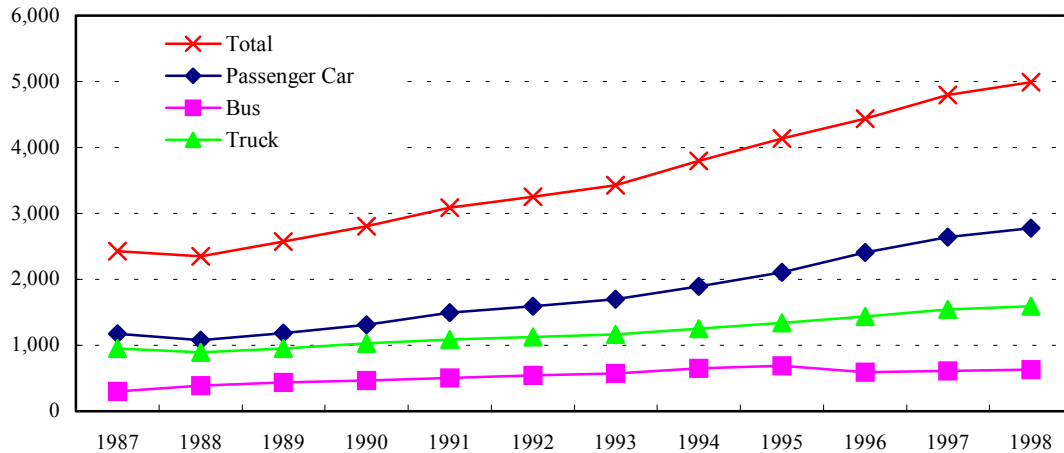
When looking at changes (improvements) in transportation efficiency based on the average traveling speeds for the target roads in these two provinces (see Table 1), average traveling speeds were increased upon completion of this project to 1993 and these speeds gradually decreased thereafter. However, the speeds have been maintained at 60km/hr since 1997. Traveling speeds are generally influenced by the traffic volume rather than the physical conditions of the roads (width, number of lanes, surface conditions). In other words, speeds decrease when the traffic volume increases and vice versa. There is no data on changes to traffic volumes before and after the implementation of this project, but the number of vehicles (passenger cars, busses, trucks) in Indonesia has been on the rise. Considering the sharp increase (at circa 10% annually, see Figure 3) in the number of vehicles from 1993, it can be assumed that these two provinces also saw similar increases in vehicles and traffic volumes. Average traveling speeds decreased from 1993 in line with this increase in traffic volume. However, even after this decrease, average traveling speeds were maintained at a rate higher than the level seen before the start of the project. Therefore, based on the data for these two provinces, an improvement in average traveling speeds was maintained for a set period following completion of this project, which suggests that the project successfully contributed to improved transportation efficiency.

Table 1 Average Traveling Speeds (km/h)

Region / Target Speed	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
South Sumatra Province	60	40	60	80	80	70	70	60	60	60
North Sumatra Province	60	30	70	70	70	65	65	60	60	60

Source: Data provided by the P3JJ for each province

Figure 3: Number of Vehicles in Indonesia (thousand vehicles)



Source: Data from the Central Statistics Bureau (BPS)

(4) Impact

1) Impact on Regional Economy

Quantitative analysis of impacts on the regional economy generally needs to build a certain economic impact model in which upgraded infrastructure is an input. However, constructing such a model depends on availability and validity of data. Therefore, it was difficult to create such a model for this survey due to limits on the available data and assumptions have had to be made based on qualitative analysis.

According to the reply from P3JJ in South Sumatra Province and North Sumatra Province, the completion of this project produced the following indirect effects.

- i) Vitalized commercial activity (trade) in the regions
- ii) Increased production incomes in the agricultural sector
- iii) Promoted the creation of industrial sites for factories and businesses

For example, bananas that have just been harvested are picked up that afternoon and delivered to major cities in that region by the following morning. If the conditions of the roads are poor, it becomes much harder to maintain such distribution efficiency and delivery regularity. Farmers have said that such regularity has given them more free time to devote to other pursuits (maintenance of the farmland, crafts) and this has helped to raise incomes. Furthermore, when the road access is improved, it raises the value of the land along the roads and in turn invites the establishment of new industrial sites. It is assumed that in this manner the project has contributed to the development of the local economies.

2) Impact on Environment

There is no quantitative data according to the P3JJ in the North Sumatra Province and South Sumatra

Province. However, one negative impact on the environment has been air pollution brought about by vehicle exhaust gases, and both organizations have launched forestation programs along the roadsides in order to relieve this impact on the environment.

Soil erosion was seen along some of the roadside slopes, and grass was planted in relevant areas as a counter measure.

3) Impact on Society

This project was to rehabilitate the existing trunk roads, and there was no need for large-scale land acquisitions, unlike construction of new roads. While it included minor additional land acquisition to widen the roads, this did not result in involuntary resettlement of residents or other social problems.

(5) Sustainability

1) Operation and Maintenance

During hearings with the executing agency it was learned that the maintenance of road facilities, including those provided by this project, is handled based on the following three road types.

- i) National roads: P3JJ under the central government (national budget and human resources)
- ii) Local roads 1 (provincial): Road offices (P3T) under the provincial government (provincial budget and human resources)
- iii) Local roads 2 (prefectural): Road offices (PBPJK) under the prefecture government (prefectural budget and human resources)

However, even local roads such as provincial and prefectural roads there will be some cases of constructions being directly implemented or managed by the central government when those constructions are deemed as being very important for national development plans. In such cases the budget and personnel are provided by the national government.

The central government has used Integrated Road Management System (IRMS) to prepare a database on the conditions of facilities in terms of the road sections (national and local roads) including those rehabilitated by the ODA loan project. This system lists the indicators shown in Table 2 for each road link. Every year the relevant authorities within the central government update this data. Based on the indicators, the necessity for road repairs is determined and priorities are set for all of the road sections, are then reflected in the nation's road plans. In this manner the Integrated Road Management System helps the authorities to monitor the physical conditions of national and local roads and it functions effectively when considering necessary improvement and rehabilitation activities.

Table 2 Monitoring Indicators in the Integrated Road Management System (IRMS)

Indicator	Explanation
Management Classification	Nation, province, local government smaller than province
Road Function	Trunk line, auxiliary road
Sub-link No.	Number attached to the sub-link of each road link
Start Point	Milepost at the point where the sub-link starts
End Point	Milepost at the point where the sub-link ends
Section Length	Length of the sub-link section (km)
Average Traffic Volume	vehicles / day
Road Surface Types	There are 17 different road classifications, but the following are the five main classifications ranked in order of best road quality 9: Asphalt / concrete 11: Hot road sheets (HRS) 6: Macadamized roads 2: Gravel roads 1: Unpaved roads
Road Width	m
International Road Surface Standards	Scale from 0 (very good) to 12 (very poor)

Note: This data was provided by the Directorate General of Regional Infrastructure Development.

The Balikpapan - Samarinda section in East Kalimantan Province (112km) and the Telukbetung - Bakauhuni section in Lamupung Province (105km) rehabilitated by this project were visited and inspected. The conditions of these sections are as explained below.

The former section suffered repeated damage from landslides. Temporary measures were taken by P3JJ, but they were awaiting urgent full-scale restoration works before the next rainy season. The relevant section is a trunk line road linking major cities in the Eastern Kalimantan Province and thus an interruption in traffic service here gives rise to a major negative impact on the local economy.

The later section serves as a main trunk road connecting major cities in Lamupung Province in the southern tip of Sumatra Island. This road communicates with Bakauhuni Port, which has regular runs to Jakarta, and a higher percentage of overloaded trucks and other heavy vehicles use this road. This has resulted in greater damage and wear on the road surface. Despite the frequent use by heavy vehicles, the relevant road section only has a grade 3 pressure-resistance structure (8 tons) and is waiting for an upgrade to a grade 2 (10 ton) structure or higher.

Details on the budget allotted for the maintenance of these road sections is not clear, but the involved P3JJs can just barely cover daily and small-scale maintenance activities (cleaning, joint, repairing cracks and others) with the current budget, but separate budget requests need to be submitted to the central government for large-scale repairing and rehabilitation.

2) Sustainability

The sections of road rehabilitated by this project play an important role as the base for regional economic activities. Expansion of road width, repaving and other such operations (not for all sections) are expected to increase traveling speeds and raise transportation efficiency.

However, it is assumed that every section visited and inspected by this survey are in need of repairs, as in the case of the two sections. In addition to the financial assistance from Japan, the World Bank and others have also provided support and this has made it possible for such repairs to be conducted on a fairly frequent basis. Despite that, it has become apparent that the cause for the heavy damage and wear to the roads is due to the fact that the standards of the nation's road maintenance system (budget, technologies,

personnel) has not kept pace with the increasing traffic volumes. Therefore, raising the level of this maintenance system has become necessary.

When considering the sustainability for the effects of the road improvement, the hardware capable of meeting the needs (traffic demand) must be available, but it is also important to have a comprehensive traffic strategy in place to control these needs. Specifically, traffic laws and regulations, for instance against speeding and overloading, need to be strictly enforced.

Comparison of Original and Actual Scope

Item	Plan	Actual
Project Scope		
A. Existing ODA loan roads	Total section: 1,104km	Total section: 1,016km
1. Sipang - Medang ~ Kebanjahe (North Sumatra)	Section length: 69km Expansion of road width (7.0m) and repaving	Section length: 179km
2. Jambi - Muarabungo (Jambi)	Section length: 244km Expansion of road width (5.5m) and repaving	Section length: 243km
3. Muarabungo - Lubuklinggau (Jambi and South Sumatra)	Section length: 289km Road surface rehabilitation, paving	Section length: 212km
4. Cilacap - Jogjakarta (Central Java)	Section length: 154km Repaving, rehabilitation of shoulders	Section length: 0km
5. Balikpapan - Samarinda (East Kalimantan)	Section length: 115km Reconstruction and repaving of sections hurt by landslides, sinking foundations and other such problems	Section length: 112km
6. Telukbetung - Bakauhuni (Lampung)	Section length: 89km Repaving and road surface rehabilitation	Section length: 105km
7. Panjang - Sribawono (Lampung)	Section length: 60km Repaving and rehabilitation of road surface and shoulders	Section length: 58km
8. Amurang ~ Kotamubagu (North Sumatra)	Section length: 104km Expansion of road width and repaving	Section length: 107km
B. National and provincial roads in 9 provinces	Effective distance: 3,013km	Effective distance: 2,046km
Implementation Schedule		
1. Consulting Service	Jan. 1989 ~ Mar. 1992 (39 months)	1991 ~ 1993 (46 months)
2. Construction		
(1) Temporary road repairing	Apr. 1989 ~ Mar. 1990 (12 months)	N.A.
(2) Civil works	Apr. 1990 ~ Mar. 1992 (24 months)	May 1990 ~ Nov. 1992 (31 months)
Project Cost		
Foreign currency	¥20,677 million	¥18,987 million
Local currency	¥11,552 million	¥12,051 million*
Total	¥32,229 million	¥31,038 million
ODA Loan portion	¥29,538 million	¥ 28,688 million*
Exchange rate	Rp 1 = ¥0.088 (Jul.1987)	Rp 1 = ¥0.054 *

(3) Project costs: The equivalent yen amount for the local currency portion (actual) as well as the exchange rate were calculated by the executing agency. (The "ODA loan portion" refers to the disbursed amount of the ODA loan.)