

Country Name	The Project for Improvement of Road Construction and Maintenance Equipment in Rakhine State
Republic of the Union of Myanmar	

I. Project Outline

Background	<p>Situated on the north-south axis along the coast of the Bay of Bengal in western Myanmar, Rakhine State was battered by torrential rains and cyclones during the rainy season. Landslides were often caused by unstable soil all over the state, making it hard to gain access not only to areas inside the state but also to neighboring districts. Accordingly, even main roads, which were the prime arteries of physical distribution, faced appalling conditions and there was an urgent need to upgrade existing roads and bridges.</p> <p>The Public Works (PW) of Ministry of Construction (MOC) aimed to realize a road network made up of international trunk roads by the end of “The 30-year Road Development Plan (2001-2030)”. The road targeted for this development in Rakhine State (Toungup to Ann City) was regarded as an important route in formation of the main domestic road network. However, in order to implement the construction and maintenance of major roads, the PW of MOC faced with shortages and deterioration of road construction equipment.</p>			
Objectives of the Project	To promote the construction and maintenance of major roads in Rakhine State by procuring road construction and maintenance equipment and providing related technical assistance, thereby contributing to revitalizing the local economic activities and the improvement of life of the people in the area.			
Contents of the Project	<p>1. Project Site: Rakhine State</p> <p>2. Japanese side:</p> <p>(1) Provision of grant necessary for procurement of road construction equipment needed to construct and maintain approximately 140 kilometers (km) of the north-south road linking Toungup, Ma-ei and Ann. (20 items including construction and maintenance equipment for general civil engineering works, basic paving equipment, bridge inspection vehicle, mobile workshop for maintaining equipment on sites, trailers necessary for moving equipment around sites and other backup equipment.)</p> <p>(2) Technical assistance (soft component of Grant Aid) to utilize the performance of the project equipment in executing road construction and maintenance works, and place the project equipment under efficient operation and maintenance together with existing equipment and spare parts.</p> <p>3. Myanmar side:</p> <p>Road and bridge construction of the project site and storage area for construction and maintenance of equipment.</p>			
Project Period	E/N Date	February 20, 2014	Completion Date	March 6, 2016 (Completion of soft-component activities)
	G/A Date	February 20, 2014		
Project Cost	E/N Grant Limit / G/A Grant Limit: 738 million yen, Actual Grant Amount: 576 million yen			
Executing Agency	Public Works (PW), Ministry of Construction (MOC) (Department of Highways (DOH), Ministry of Construction (MOC) since April 1, 2015)			
Contracted Agencies	Main Contractors: Mitsubishi Corporation, Itochu Corporation Main Consultant: Yachiyo Engineering Co., Ltd.			

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-Post Evaluation >

As for the quantitative effect, the achievement status of indicator 2 is judged by the total length of road improvement on the target road alone as instructed in the ex-ante evaluation summary sheet. The progress of road widening work which was planned in combination with the subject road improvement is used as supplementary information.

1 Relevance

<Consistency with the Development Policy of Myanmar at the Time of Ex-Ante and Ex-Post Evaluation>

At the time of ex-ante evaluation, this project was consistent with development policy of Myanmar, such as “The 30-year Road Development Plan for 2001 to 2030” in which the Government of Myanmar prioritized the development of road construction. At the time of ex-post evaluation, the current national and regional development policies, such as “National Comprehensive Development Plan (2014-2030)” based on “National Transport Master Plan, 2014” formulated with assistance from JICA, prioritizes the improvement of road construction under the administration of both union government and local government.

<Consistency with the Development Needs of Myanmar at the Time of Ex-Ante and Ex-Post Evaluation >

This project was consistent with Myanmar’s development needs of road construction at the time of ex-ante evaluation as described in “Background” above. At the time of ex-post evaluation, there are continuing needs of equipment for road construction and maintenance not only for target roads but also for other roads in Rakhine State.

<Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation>

Japanese assistance at the time of ex-ante evaluation aimed to support reform efforts by Myanmar in a wide variety of fields geared to realizing democratization, national reconciliation and sustainable development. Priority areas were assistance for better living of people, including ethnic minorities, poverty groups and assistance to agricultural and local development.¹

<Evaluation Result>

In the light of the above, the relevance of the project is high.

¹ Source: ODA Databook in 2014

2 Effectiveness/Impact

<Effectiveness>

The project objective of promoting the construction and maintenance of major roads in Rakhine State by procuring road construction and maintenance equipment and providing related technical assistance was achieved.

For quantitative effects, the average driving speed on the target roads at the target year (2018) achieved the 60 km per hour as planned (Indicator 1). The improvement of the total length of 135.4 km was completed, achieving the target of “the approximately 140 km” at the target year (Indicator 2). For the period from 2016 through 2017, the average driving speed gradually increased from 40km/h to 50km/h maintaining the same width of road as shown in the table below. It is likely that smoother flow of traffic in the process of improvement of road conditions by paving with as pen mac, slope improvement and reduction of blind spot area in mountainous roads, etc., has contributed to the gradual increase of driving speed. The improvement work was done separately in two sections. The construction of asphalt penetration macadam (as pen mac)² pavements on the section from Ann to Maei was completed for the planned length and up to 3.6m in width by the Road Construction Special Unit No.16 (RSCU-16) of DOH. The remaining work, which is widening of as pen mac pavements up to 7.2m in width, is expected to be completed by 2020. The widening was not completed as planned since there was the budget constraint partly attributable to the political unrest in Maungdaw District. The section from Taungup to Maei was completed by the Road Construction Special Unit 18 (RSCU-18) of DOH as planned. As for the bridge condition, ten (10) bridges on Yangon-Maei-Kyaukphyu road were inspected and repaired by the Department of Bridges (DOB) as per the maintenance plan. Operation and maintenance (O&M) of equipment procured under the project is managed by the DOH.

As for qualitative effects, the effects of the soft component were produced as planned. Majority of DOH staff in Rakhine State have knowledge and skills for O&M of equipment. They are also capable for routine O&M using data base management system for equipment ledger and operation manuals. The maintenance system developed under the project have still functioned to monitor the operative condition of equipment and inventories of spare parts. The operative condition of equipment during the operation hours is checked by the junior engineers once a week and the monthly report is prepared by the Staff Officer (Mechanical) to report to the Mechanical Equipment Compound in Yangon. The mobile workshops are often used especially for preventive measures, such as oil change, filter change and replacement of the consumables by the engineers as per the manufacturer’s instructions.

<Impact>

In terms of benefits to the people living along the target roads, the project contributed to advancing the mobility of local population and revitalizing the activities of communities. The population along the target road areas increased by 15.8% from 6,100 (2014-2015) to 7,064 (at the time of ex-post evaluation in 2019). During the same period, a government elementary school and a private school with estimated number of 100 students each were newly constructed. In 2015, Toungup college on the target road was upgraded to the university. In addition, the hospitals with 100 beds and some small clinics and rural health centers were newly established. Two passenger express bus lines were newly started and the number of small buses also increased to transport the local population, which also facilitated to export local products such as marine products and vegetables to other places. Furthermore, the blind spot areas and slopes were upgraded under the road improvement using the equipment provided by the project expecting to enhance the traffic flow and to reduce the accidents. The local people of Ann Township as well as Maei Township can now smoothly visit Ngapali Beach for their relaxation within weekends. Some of those provided equipment including vehicles have been used not only for the target road section but also for other road improvement projects in Rakhine State to rehabilitate the roads damaged by natural disasters.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

Quantitative Effects

Indicators	Baseline 2013 Baseline Year	Target 2018 2 Years after Completion	Actual 2016 Completion Year	Actual 2017 1 Year after Completion	Actual 2018 2 Years after Completion	Actual 2019 3 Years after Completion (As of April)
Indicator 1: Average driving speed on the target road	Approx. 25 km/h	Approx. 60 km/h	40 km/h	50 km/h	60 km/h	60 km/h
Indicator 2: Total length of road improvement on the target road	0 km	Approx. 140 km	135.4 km	135.4 km	135.4 km	135.4 km
Breakdown (1)	(i)Ann-Maei Section (by RCSU-16) (as pen mac)	66.6 km in length	66.6 km	66.6 km	66.6 km	66.6 km
		7.2 m in width	3.6 m	3.6 m	3.6 m	3.6 m
	(ii)Taungup-Maei Section (by RCSU-18) (as pen mac)	68.8 km in length	68.8 km	68.8 km	68.8 km	68.8 km
		5.4 m in width	3.6 m	3.6 m	5.4 m	5.4 m

Source: Ex-ante Evaluation Summary Sheet, Interviews with DOH officials of Rakhine State

Note: (1) Breakdown describes how the DOH Rakhine State proceeded to improve the road condition based on what was planned by the project.

3 Efficiency

While the project cost was within the plan, the project period exceeded the plan (ratio against plan: 78%, 124%). The longer project period is due to that massive floods hit to Rakhine State during July and August 2015 causing the delay on transportation of equipment which resulted in the slow response to the implementation of soft component assistance (training). The outputs of the project were produced as planned.

Therefore, efficiency of the project is fair.

² As pen mac: asphalt penetration macadam, the one of methods for the road pavement.

4 Sustainability

<Institutional Aspect>

Mechanical Department of DOH located in Yangon has an overall responsibility for O&M of equipment procured under the project. The routine maintenance and periodical reporting are done by RSCU No.16 and No.18 of DOH, in Rakhine State. As for the construction and maintenance of roads and bridges, RCSU No. 16 and No. 18 as well as the Bridge Construction Special Unit 7 & 8 are responsible respectively. The total number of staffs assigned for O&M of equipment in Yangon including Mechanical Section, Mechanical Equipment Compound, Base Workshop and Mechanical Training Center slightly increased from 836 at the time of ex-ante evaluation (2014) to 882 at the time of ex-post evaluation (2019). On the other hand, the total number of staffs of RSCU No.16 & No.18 and the Bridge Construction Special Unit 7&8 decreased by 26% during the same period. According to the interviews with DOH, the current staff number is sufficient enough to manage the routine O&M as the total number of equipment also decreased by 36% due to that some of equipment were discarded after the end of life span as they are not economically viable to repair. The maintenance system developed under the project have functioned well as described above in “Effectiveness”.

<Technical Aspect>

As described above in the qualitative effect, the majority of DOH staff in Rakhine State have knowledge and skills for O&M of equipment. As for the bridge inspection taken care by each bridge inspection unit in States and Regions, DOB has enough technical knowledge as they acquired the technology through JICA’s technical cooperation project, “The Project for Capacity Development of Road and Bridge Technology (2016-2019)”. Intensive technical training for DOH staff in charge of mechanical equipment maintenance in Rakhine State had been conducted by JICA experts as soft component. Four training courses on the Basic Training of Database System were conducted by DOH in which four engineers from Rakhine state participated and they contributed to the internal transfer of the O&M by ledger related techniques to others. Currently, the Basic Training on Database System is conducted on annual basis. Manuals and inventory books for spare parts have been shared during training courses as well as to the field engineers.

<Financial Aspect>

Though there are some fluctuation of DOH budget for Rakhine State, it was confirmed through the study that more than estimated annual O&M cost were allocated up to 2018 and the approximately 2% of total budget has been constantly allocated to the O&M for the procured equipment since 2016. According to the interview with DOH officials, the budget amount is sufficient enough to conduct O&M of the procured equipment.

Budget of DOH, Rakhine State

(Unit: Myanmar Kyats in Million)

Items	2016	2017	2018	2019 (as of March)
(1) Total budget	3,663.9	2,781.1	2,909.4	1,823.8
(2) Total budget for O&M of the procured equipment (Ratio of total budget: %)	65.9 (1.8%)	51.8 (1.9%)	56.9 (2.0%)	33.6 (1.8%)
(3) Total expenditures for O&M of the procured equipment (Actual)	23.3	25.0	23.0	9.0

Source: DOH

<Current Status of Operation and Maintenance>

The maintenance of procured equipment has been properly conducted according to the database management system by equipment ledger as described on the above. In case of equipment failure at job sites, a group of mechanical engineers is sent by the mobile workshop for urgent repairs. The necessary spare parts and consumables are procured and managed appropriately.

<Evaluation Result>

Therefore, the sustainability of the project effect is high.

5 Summary of the Evaluation

The project achieved its objectives, “to promote the construction and maintenance of major roads in Rakhine State of Myanmar by procuring road construction and maintenance equipment and providing related technical assistance” as it was observed that the road improvement on target roads were completed as planned by the provided equipment. It is expected to complete the road widening work for some remaining parts. Effects of soft components were produced and some positive impacts were observed. As for sustainability, there is no problem in institutional, technical and financial aspects. Regarding efficiency, project period exceeded the plan. Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations to the Executing Agency:

In order to enhance and sustain the project impact, it is recommended that the DOH should complete widening of asphalt pavements between Ann – Maei as soon as possible by the end of 2020.

Lessons Learned for JICA:

The data base management system for equipment ledger introduced by the project was very new to the DOH. This technology has helped the DOH to effectively and efficiently manage all the procured equipment by reminding the engineers to make regular maintenance in timely manner and to make the stock control much easier, etc. The DOH has now been developing a centralized data base system for equipment ledger in Headquarters, based on data base management system of this project, to control all the equipment across the country. It is preferable, therefore, that JICA will consider the system of this kind as one of the components for operation and maintenance of equipment in the future projects.

Moreover, in case the system is introduced, it should come together with the special trainings as soft component since engineers and machine operators who acquired the technology have now played an important role to sustain the project effects in the road and bridge construction sector in Myanmar.



Procured Equipment are being utilized and maintained properly



Improved road condition contributes to the better transportation for local people