

Country Name	Project on Capacity Building for Asset Management of Road and Bridges
Republic of Indonesia	

I. Project Outline

Background	The Indonesian government had developed and operated a management system for roads and bridges with assistance mainly from the World Bank and Australian Agency for International Development (AusAID). While basic technical skills for inspection of assets (roads and bridges) and system operation etc. were necessary to operate an asset management system ¹ efficiently, the Indonesian government was unable to implement them sufficiently. Enhancement of technical skills and establishment of organizational structure for effective operation of an asset management system were strongly required.												
Objectives of the Project	Through enhancing knowledge and capacity of project counterparts (C/Ps) and drafting guidelines, regulations and technical instructions, the project aimed at developing technical and organizational process of inspection, data collection, evaluation of conditions and maintaining assets and improving competency of asset analysis in pilot areas, thereby contributing to efficient and effective management of road and bridges, better services for road users and longer life of assets. The project objectives set forth are as follows: 1. Overall Goal: (1) Efficient and effective management of road and bridges through their life time by optimal budget allocation and proper preservation activities. (2) Better services for road users and longer life of an asset with relevant and precautionous maintenance and rehabilitation. 2. Project Purpose: (1) Technical and organizational process of inspection, data collection, evaluation of conditions and maintaining assets is developed systematically in pilot areas. (2) Competency of asset analysis based on the actual data collected in pilot areas is improved.												
Activities of the project	1. Project site: Jakarta, Bandung (where project offices were located) Pilot Project Sites: West Java, Banten, West Kalimantan and East Kalimantan Provinces (for pilot activities to cover various infrastructure conditions) 2. Main activities: (1) Review existing documents/data and identify main challenges; (2) Conduct training on improvement of inspection, data collection, maintenance and rehabilitation; (3) Draft technical documents, manuals and guidelines for survey/inspection, data collection, updating status, and collaboration works etc., introduce new technology for preventive maintenance, develop Supporting Map for Pavement Management (SMPM), Expert System ² and a more efficient and effective nationwide bridge inspection system to supplement the Integrated Road Management System (IRMS; the existing road asset management system in Indonesia), and conduct pilot activities; and (4) Provide guidance on basic principle of asset management and engineering principles including asset value assessment, and analyze the existing management systems based on the concept of proper asset management etc. 3. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Indonesian Side</td> </tr> <tr> <td>1) Experts: 7 persons</td> <td>1. Staff allocated: 9 persons</td> </tr> <tr> <td>2) Trainees received: 13 persons</td> <td>2. Office space for Japanese Expert, electricity</td> </tr> <tr> <td>3) Overseas activities cost</td> <td>3. Operational expenditure for pilot inspection and travel expenses for maintenance</td> </tr> </table>					Japanese Side	Indonesian Side	1) Experts: 7 persons	1. Staff allocated: 9 persons	2) Trainees received: 13 persons	2. Office space for Japanese Expert, electricity	3) Overseas activities cost	3. Operational expenditure for pilot inspection and travel expenses for maintenance
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Ex-Ante Evaluation	2009	Project Period	November 2009 – June 2012	Project Cost	(ex-ante) 198 million yen (actual) 246 million yen								
Implementing Agency	Ministry of Public Works, Directorate General of Highways (Bina Marga)												
Cooperation Agency in Japan	Oriental Consultants Co., Ltd.												

II. Result of the Evaluation

1 Relevance
<Consistency with the Development Policy of Indonesia at the time of ex-ante evaluation and project completion> The project has been consistent with Indonesia's development policy on 'maintaining the performance of already constructed roads' and 'reducing the backlog of the maintenance of transportation infrastructure and facility' etc. as set forth in <i>the National Medium-Term Development Plan (RPJMN) (2004-2009)</i> and <i>RPJMN (2010-2014)</i> . <Consistency with the Development Needs of Indonesia at the time of ex-ante evaluation and project completion> At the time of ex-ante evaluation, among approximately 35,000 km of national roads, approximately 14% was rated "Bad" (3%) or "Poor" (11%) on a four-point scale, and among approximately 88,000 bridges, it was expected that over 50% would need to be replaced or rehabilitated by 2026, and it was urgently required to manage assets such as roads and bridges and to rehabilitate them efficiently and

¹ An asset management system in this context refers to a system of budget planning for maintenance of roads/bridges based on the conditions of such infrastructures.

² SMPM and Expert System are tools for road and bridge management designed to be incorporated to the existing asset management system in Indonesia. SMPM is for planning of road pavement maintenance, and Expert System is for planning of bridge rehabilitation.

effectively. At the time of project completion, it is considered that needs of asset management are still high as condition of some national roads was still “Bad” (4.3%) or “Poor” (6.5%).

<Consistency with Japan’s ODA Policy at the time of ex-ante evaluation>

The project was consistent with Japan’s ODA policy, as *the Country Assistance Program for Indonesia* (2004) states that Japan will provide assistance to set up the public goods (water, sanitation, roads, electricity, etc.) necessary for local development as well as to improve the maintenance and management systems for these public services.

<Evaluation Result>

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

2 Effectiveness/Impact

<Status of Achievement for the Project Purpose at the time of Project Completion>

Project Purposes were achieved by the time of project completion. The rules on inspection, data collection, evaluation of conditions and maintenance were compiled in the *Guideline for Road Preservation Management* and *Diagnosis of Bridge Damage and Rehabilitation* drafted based on the situation analysis, and revised and finalized based on the pilot activities (Indicator 1-1 and Indicator 1-2). Many seminars and technical workshops were conducted and tools such as SMPM were developed, which were evaluated by the Japanese experts to have led to improvement of competency and maintenance capability at the field level (Indicator 2).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been partially maintained since project completion. The same rules are still applied under IRMS in the networking level, i.e., the Head Office of Bina Marga, especially Directorate of Road Preservation and Directorate of Bridge. The methods given in the *Guideline for Road Preservation Management* and *Diagnosis of Bridge Damage and Rehabilitation* are still utilized especially in Working Level (Balai, Satker³ in Pilot Project Area). Regarding various tools developed under the project, SMPM has not been utilized since project completion due to adjustment of guidelines, manuals, etc., that is ongoing within Bina Marga coupled with insufficient transfer of knowledge of SMPM utilization following the organizational restructuring⁴. On the other hand, the Expert System (bridge inspection system) which the project supported to develop under the project has been utilized by Bina Marga. There have also been some increases of awareness in Bina Marga to obtain precise data on road and bridge conditions and apply appropriate treatments according to their conditions.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

Overall Goals have been partially achieved by the time of ex-post evaluation. Effective and efficient management of inspection and maintenance works has been maintained by Bina Marga through the Long-Segment Maintenance Contract (LSMC) Program⁵ (Indicator 1-1). As for data collection and analysis, road condition data is collected based on International Roughness Index (IRI), utilizing the technology which has been constantly developed to minimize the required time for collecting such data and to obtain more efficient and accurate results (Indicator 1-2). Regarding budget allocation for maintenance, budgeting for road inspection, maintenance and rehabilitation has become more systematic and accurate through the direct outcomes of this project, since Bina Marga has become able to collect data on actual field conditions (Indicator 1-3). However, contribution of this project to those indicators is not clear except for the Expert System for bridges mentioned above. Road conditions are generally on improving trends in terms of percentage of “poor” or “bad” national roads. As for user’s satisfaction, while no data was available, it can be naturally inferred that the satisfaction might have been improved considering the current road conditions of some pilot projects (no disruption of traffic due to road conditions).

<Other Impacts at the time of Ex-post Evaluation>

No negative impact on natural environment has been observed and no land acquisition and resettlement has been occurred under the project.

<Evaluation Result>

In light of the above, through the project, targets set in indicators for Project Purposes were achieved by the time of project completion, the project effects have been partially maintained since project completion, and the degree of achievement of Overall Goals is partial at the time of ex-post evaluation. Therefore, the effectiveness/impact of the project is fair.

Achievement of project purpose and overall goal

Aim	Indicators	Results
(Project Purpose) 1. Technical and organizational process of inspection, data collection, evaluation of conditions and maintaining assets is developed systematically in pilot areas.	1-1. Systematic rules on inspection, data collection, evaluation of conditions and maintenance is testified through pilot activities.	Status of the achievement: achieved (partially continued) (Project Completion) <i>Guideline for Road Preservation Management</i> and <i>Diagnosis of Bridge Damage and Rehabilitation</i> were drafted based on the situation analysis. (Ex-post Evaluation) Under the IRMS, each Satker has collected data on road and bridge conditions utilizing the same method used in the pilot activities to decide the necessity of road and bridge maintenance.
	1-2. The finalized draft of guidelines, manuals, regulations and technical instruction	Status of the achievement: achieved (partially continued) (Project Completion) <i>Guideline for Road Preservation Management</i> and <i>Diagnosis of Bridge Damage and Rehabilitation</i> were revised and finalized. These guidelines/manuals were to be translated into Indonesian by Bina Marga and to be shared on its website. (Ex-post Evaluation) Above guidelines/manuals have been translated into Indonesian. While the guidelines/manuals are not available on website, the methods given in them are still utilized especially in Working Level.

³ Both Balai and Satker are regional working units of Bina Marga. Under Balai in each region, Satker is responsible for each section. In Balai, asset management is conducted by Satker P2JN (Planning and Supervising of National Road).

⁴ In the process of the adjustment, SMPM was replaced by an updated version of similar software in excel file called RAMS (Road Asset Management System) adapting the approach of SMPM by assistance from Australian Government.

⁵ LSMC is an approach to replace direct labor with contracting out for routine and major road maintenance.

2. Competency of asset analysis based on the actual data collected in pilot areas is improved.	2. Direction of improvement of asset management system <i>(Note: This indicator was interpreted as status (i.e., improvement and utilization) of the asset management system.)</i>	Status of the achievement: achieved (partially continued) (Project Completion) Many seminars and technical workshops were conducted, which were evaluated by the Japanese experts to have led to enhancement of competency of staffs. Moreover, tools such as SMPM were developed, which contributed to improvement of maintenance capability at the field level. (Ex-post Evaluation) While SMPM is no longer utilized, the Expert System for bridges has been utilized by Bina Marga. There have been some increases of awareness in Bina Marga to obtain precise data on road and bridge conditions and apply appropriate treatments according to their conditions.
(Overall goal) 1. Efficient and effective management of road and bridges through their life time by optimal budget allocation and proper preservation activities.	1-1. Systematic inspection and maintenance works is implemented based on the experience of the project.	(Ex-post Evaluation) partially achieved, i.e., the indicator was achieved, but the contribution of this project is not clear enough especially regarding road maintenance. Bina Marga is now conducting LSMC Program for inspection and maintenance works for road. Under this program (Contract), periodic inspection for road is conducted in order to have a concrete idea to select inspection and maintenance work method. After this project, bridge inspection has become more systematic by combining the previous techniques utilized since 1992 with identification and interpretation techniques for damaged bridge structure and element introduced by this project.
	1-2. Efficient data is collected and analyzed.	(Ex-post Evaluation) partially achieved Road condition data is collected based on IRI, utilizing the technology to minimize the required time for collecting such data and to obtain more efficient and accurate results.
	1-3. Efficient budget allocation for maintenance	(Ex-post Evaluation) partially achieved Through the outcomes of this project, budgeting for road inspection, maintenance and rehabilitation has become more systematic and accurate, since data collected is based on actual field conditions. The planned budget is actually allocated.
2. Better services for road users and longer life of an asset with relevant and pre-cautious maintenance and rehabilitation.	2. Road conditions and user's satisfaction is improved.	(Ex-post Evaluation) partially achieved Ratio(%) of national roads classified as Poor or Bad Before the project: 14% of total 35,000km 2013: 7% of total 38,570km 2014: 6% of total 38,570km 2015: 11% of total 47,017km 2016: 14% of total 47,017km (Classification is based on IRI. Note: some roads were re-categorized to "national road" in 2015 and it might have made the result after 2015 worse than before 2014.) Longer life: no data available. Bridge condition: no data available User's satisfaction: no data available

Source: JICA internal document, Questionnaire survey and interview with Bina Marga, road condition data provided by Bina Marga

3 Efficiency

Both the project cost and the project period exceeded the plan (ratio against the plan: 123% and 108%, respectively), mainly due to the extension of the period for dispatching experts in the third year in response to the increase in the number of sites for pilot activities and covering some administration related matters. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

To be in line with *RPJMN 2015-2019* that aims to maintain balance between national transportation oriented and local/regional transportation oriented, Bina Marga is applying the LSMC (2016-). By applying this policy, Bina Marga emphasizes road and bridge asset management activity as very important in order to determine the needs for detail road maintenance/rehabilitation.

<Institutional Aspect>

Under the new President Joko Widodo Administration, Ministry of Public Works has recently been restructured to Ministry of Public Works and Housing. Bina Marga also has several changes in its organization, and at the time of ex-post evaluation, it consists of Director General, Secretary of Director General, Directorate of Road Network Development (Planning Section), Directorate of Road Development, Directorate of Road Preservation, Directorate of Bridge, and Directorate of Toll Road, City and Regional Facility. Among them, Directorate of Road Preservation is responsible for road asset management, and Directorate of Bridge is responsible for bridge asset management. Under Bina Marga, the number of Balai was increased from 11 at the time of project completion to 18 at the time of ex-post evaluation. As mentioned above, such changes were followed by the adjustment of existing guidelines, etc., which led to non-utilization of SMPM developed under this project. According to interview to Bina Marga, nevertheless, there is sufficient number of staff in Bina Marga including regional offices such as Balai and Satker etc. for effective asset management of roads and bridges.

<Technical Aspect>

At the time of ex-post evaluation, most C/Ps still work on road and bridge asset management in Bina Marga, however, some have retired and some have been transferred to other positions which are not related to asset management of roads and bridges. While many C/Ps have sustained their skills and knowledge acquired under the project, skill level of most staff in regional offices such as Balai and Satker is not sufficient to conduct effective and comprehensive road and bridge asset management. Moreover, some standard operation procedure (SOP) and equipment to determine appropriate methods for road and bridge maintenance are not available in these regional offices. To improve the situation, Bina Marga has been providing some training related to road and bridge asset management with its staffs every year in several provinces, while it is not clear such training is enough for improving/retaining staff's skills.

<Financial Aspect>

After project completion, central government budget of approximately 1,500 to 1,800 million Rupiah has been allocated annually to Bina Marga for routine road maintenance works, approximately 2,200 to 3,000 million Rupiah has been allocated annually for periodic road rehabilitation works, and approximately 9,000 to 11,000 million Rupiah has been allocated annually for road structure improvement. The amount of budget allocated for road and bridge preservation and maintenance has been increasing every year, however, the amount is not sufficient to conduct effective asset management of roads and bridges. Moreover, the budget for Bina Marga including for road preservation has been reduced recently due to the government's revenue shortfall.

<Evaluation Result>

In light of the above, some problems have been observed in terms of the institutional, technical and financial aspects of the implementing agency. Therefore, the sustainability of the effectiveness through the project is fair.

5 Summary of the Evaluation

Through the project, targets set in indicators for Project Purposes were achieved by the time of project completion, the project effects have been partially maintained since project completion, and the degree of achievement of the Overall Goal is partial at the time of ex-post evaluation. As for sustainability, some problems have been observed in terms of the institutional, technical and financial aspects. As for efficiency, both the project cost and the project period exceeded the plan. Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- Bina Marga is advised to continue and improve the asset management for road and bridge not only in Head Office level and pilot project but also in all Balai and Satker P2JN under Bina Marga. Since 2015 Bina Marga has been under restructuring and a new Directorate (i.e Road Preservation and Directorate of Bridge) could focus more with asset management, we advise that the guideline and software produced under this project could be utilized in the new directorate as a basis by updating or formulating a similar software which can help Bina Marga to overcome problems especially in budgeting the allocation for road and bridge rehabilitation.

Lessons learned for JICA:

- Some of the tools developed under this project was not used after project completion due to organizational changes, while the same approach was used with a new software developed with assistance from other development partners. For sustainability of project effects, JICA should have kept longer cooperation to Bina Marga to perfectly ingrain the method into the institution free of influence from the change of institution structure. When planning a technical cooperation project to develop a system, the project period should be set carefully taking into consideration that it may take time for such a system to take root in the organization. For example, a longer cooperation period than the period required for developing the system, or phasing of the project into the pilot phase and the embedding (dissemination) phase, can be considered.
- The guidelines were translated into Indonesian language only after project completion, which may have affected transfer of knowledge and thus continuing utilization of the methods and tools developed under the project. JICA should have prepared all the guideline in dual language (English and Indonesian) from the beginning in order for staffs and operators in Balai can understand better and continue to utilize the obtained method and software efficiently.



Discussion on road maintenance in Balai office



Pilot Project Site for bridge maintenance