

Fundamental Study on Improvement of Road and Bridge Management in Laos

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Laos is a landlocked developing country located in the heart of the Indochina Peninsular. It shares borders with five other countries (namely China, Myanmar, Thailand, Vietnam and Cambodia). Based on its strategic location, Laos has the potential to transform itself into a land-linked country developing connections with its neighbors through the road network and railways. Thus, development of the transportation infrastructure is one of the most important means of promoting the country's economic development. In the decades since independence in 1975, the Lao Government has invested significantly in infrastructure development, especially expanding and improving the road network. However, looking at the current situation in the developed countries such as the United States and Japan, it is not difficult to imagine that proper maintenance of infrastructure will be a major issues in the future of Laos. Furthermore, based on the experience in the developed countries, it is possible to make future maintenance easier by adopting the improved structure at the time of new construction. Thus, it is necessary for Laos to take actions with an eye on future maintenance from the stage where infrastructure development should be vigorously implemented.

In this dissertation, current situation of road and bridge management and causes of delays in road construction project in Laos are investigated with on-site hearings and collected materials. Then, the bridge management capability of governments across 42 countries receiving development assistance is comprehensively assessed based on reports collected from 102 participants of a training course on bridge maintenance and management prepared by JICA during 2016-2020. The dissertation consists of five chapters as follows:

Chapter 1 gives the background and objectives of the research. In addition, the layout is given.

Chapter 2 introduces the related administration sectors in Laos, summarizes statistics of data obtained from the Laos road (including bridges) sector, and shows the issues in the road and bridge maintenance and management. Such issues are obtained from inquiries from relevant staff, observations, and analysis of the actual issues carried out by: the Ministry of Public Works and Transport, the Department of Roads, and the Department of

Planning and Cooperation. The main objective of this chapter is to demonstrate and provide basic information about finding solutions.

In Chapter 3, causes of delays in road construction project in Laos are investigated with a questionnaire survey. To identify the causes of delays, a questionnaire is designed by modifying one used to measure causes of delays in road construction projects in the West Bank in Palestine and in consultation with engineering experts with more than 10 years of experience in Laos road construction projects. A total of 53 causes of delay are included in the questionnaire. For each cause, a question is asked about its degree of severity in terms of contributing to project delay as follows: level 0 = no influence; level 1 = very low; level 2 = low; level 3 = moderate; level 4 = high; and level 5 = very high. Questionnaire respondents include 35 contractors, 31 owners and 24 consultants in total. The suggested delay causes are ranked by severity index. The survey results indicate that the five top factors causing road construction delays are: Contractor cash flow; Delayed payment by the owner; Difficulties in financing projects by the contractor; Financial issues related to owner; and Insufficient equipment and vehicles for the work.

In Chapter 4, to identify existing issues, the current state of bridge maintenance and management in developing countries is analyzed based on reports collected from participants in training courses on bridge maintenance and management prepared by JICA during 2016-2020. There were 102 participants from 42 countries in the training course. The status of bridge management in these countries has been analyzed considering six major issues: budget-related issues, technical levels, issues of maintenance and management, issues related to bridge maintenance plans, issues related to BMS, and human resource issues. The maturity of the agencies in charge of bridge management in the participating countries is analyzed in each issue area via the introduction of a Transport Asset Management (TAM) maturity scale defined by the American Association of State Highway and Transportation Officials (AASHTO). This specifies and compares the maturity levels of the agencies for each TAM process of operating, maintaining, upgrading, and expanding physical assets effectively throughout their life cycle. The analysis revealed the total average maturity to be 2 to 3 on a scale of 1 to 5. Furthermore, on comparing the maturity level of each issue, the level in issues of the technical level of bridge inspection and level in issues in preparation and implementation of bridge maintenance plan are found to be the lowest, and most of the agencies analyzed were evaluated as 1 or 2.

In chapter 5, the conclusions of the dissertation are summarized, and some measures to be implemented for improving the road and bridge management in Laos are proposed.