

Summary and Issues of Road Management System in Laos

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1 Introduction

A large number of infrastructures have been constructing in the developing countries, but the corresponding maintenance and management have not been developed. Such as the similar situation of road system in Laos with the increasing of traffic volume, the government had spent huge amount of funds for the maintenance, rehabilitation, and replacement. Therefore, an efficiency way to improve the maintenance and management for road system has been waiting to be developed.

In this paper, it summarized two issues of road management system in Laos. Firstly, the budget allocation was revealed based on road classes. Secondly, a comparison of budget between repairing and replacement was conducted.

2 Road management in Laos

2.1 Overview of road management

The road network in Laos is classified into six classes: 1) National Road (NR); 2) Provincial Road (PR); 3) District Road (DR); 4) Urban Road (UR); 5) Rural Road (RR) and 6) Special Road (SR). In terms of road management, the Ministry of Public Works and Transport (MPWT) through its Department of Roads is responsible for the maintenance of the NR network (7,515.29km)^[1]. While the provinces, the Department of Public Work and Transport (DPWT's) is responsible for maintenance of local roads which includes PR (8,596.72 km), DR (7,166.37 km) and UR (3,541.85 km). RR (26,171.36 km) is managed by Urban Development Authority Agencies. SR (6,975.55 km) is not under the jurisdiction of MPWT or DPWT's, but it would typically fall under other ministries or private enterprises. The proportion of road network by road classes is shown in Fig. 1.

2.2 The system of road management

The program of Road Management System (RMS) is employed to manage allocation in road networks (exclude railway), the RMS was developed and adopted by MPWT. RMS is a tool assisting different divisions and planning levels within the Department of Roads in the strategic plan, program, contract and so on.

2.2.1 RMS objective

RMS provides a reliable tool to assist the road

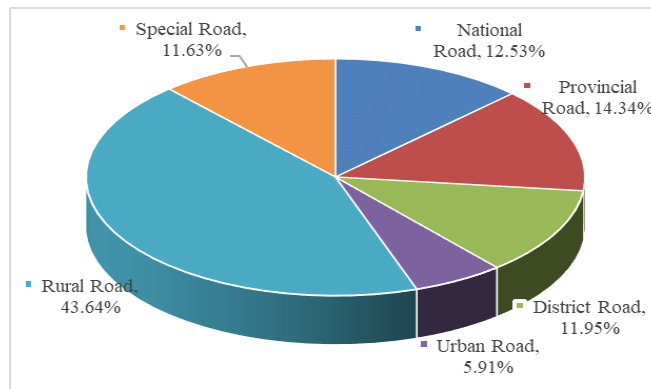


Fig. 1 Proportion of Laos's road network by road classes^[1]
management and prioritize the maintenance or rehabilitation work. To make available of financial resources (Funds) for keeping roads safe and functional. To make sure medium-term expenditure plan for maintenance and improvement of the road network, annual programming of road and bridge maintenance, storage for Laos road network and export data to dissemination on the web system.

2.2.2 Component of RMS

The monitoring of RMS components is consisting of the road data collection system, road databank, traffic monitoring system, pavement management system, routine maintenance management system, bridge management system, monitoring and evaluation system and geographical information system.

In maintenance and management work, the most difficult and important part of this major is the maintenance of bridge engineering since the construction cost is very high and the methods of restoration are very diverse depending on the deterioration of the material, the types of constructions.

2.2.3 Overview of Bridge Management System (BMS)

The BMS uses the data from annual survey of bridge condition to prepare bridge maintenance and repair program, condition survey, assigns priorities to bridge elements and maintenance/repair works, prioritizes operations under constrained budgets. It also produces bill of quantities for bidding documents for bridge maintenance contracts, and the cost will respond with maintenance activities cost.

2.2.4 Types of Bridge in Laos

Currently, there are 16 types of bridge in Laos, as

shown in **Table 1** [2], such as concrete slab, through steel truss (with top bracing), deck type steel truss (truss beneath deck), timber beam, log, arch, cable-stayed, box culvert, wet crossing, concrete T-beam (in situ), concrete T-beam (precast prestressed), concrete box girder, steel girders (concrete deck), steel truss(Bailey), half-through steel truss (no top bracing) and other(specify) as the following below:

Table. 1 Number of bridges by type [2]

No;	Bridge type	No of bridges	%
1	Concrete slab	140	4.97
2	Through steel truss (with top bracing)	1	0.04
3	Deck type steel truss (truss beneath deck)	24	0.85
4	Timber beam	608	21.60
5	Log	5	0.18
6	Arch	50	1.78
7	Cable stay	1	0.04
8	Box culvert	837	29.73
9	Wet crossing	16	0.57
10	Concrete T-beam, in situ	210	7.46
11	Concrete T-beam, precast prestressed	386	13.71
12	Concrete box girder	22	0.78
13	Steel girders, concrete desk	51	1.81
14	Steel Truss, bailey	328	11.65
15	Half-through steel truss (no top bracing)	10	0.36
16	Other (specify)	126	4.48
	Grand total	2,815	100

3 The budget for road management

3.1 Proportion of the budget

For the road maintenance and management budget each year, the budget allocation is determined based on the road grade and purpose, as shown in **Fig. 2** [3]. It shows the national and provincial roads have the maximum share in the budget, especially the national road has the share of 80%.

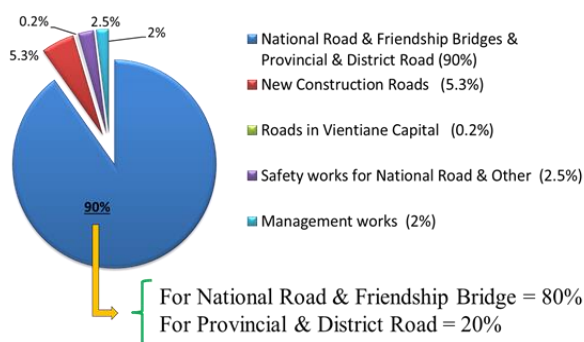


Fig. 2 Proportion of the budget for road management [3]

3.2 The budget for replacement/upgrade and repair

Fig. 3 shows a statistic of Laos's Investment on road management from 2004 to 2018 [4], which includes the data compilation indicating the budget used in repair work and replacement/upgrade work. It indicates that the budges for replacement/upgrade work are generally more than that for repair work. It can be thought that the road structures with

the weak carrying capacity were unable to satisfy the current traffic demand since the existing imperfect way for the maintenance and management.

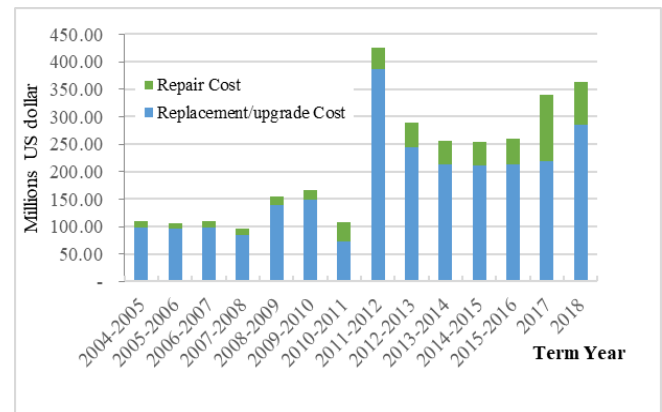


Fig. 3 Statistic of Laos's investment on road network 2004 to 2018 [4]

4 Issues of road management

According to the proportion of Laos road network by road classes in **Fig. 1** and the proportion of the budget for road maintenance and management in **Fig. 2**, it can be seen the budget for allocation is unbalanced, because of national road is the main road, so it needs to prioritize at first, there is a lot of traffic volume, heavy truck and it is a path to the commercial economy of Laos. Therefore, the government of Laos had spent a large number of funds for the national road.

In addition, **Fig. 3** shows the budget in each year between replacement/upgrade cost and repair cost, for replacement/upgrade cost is large invest more than repair cost, due to several reasons as the routes are not the standards require replacement, repair technical are not yet high enough, owner's/engineers/surveyors have not enough experience and roads maintenance contractors are still lack of equipment and insufficient of maintenance experience.

5 Conclusion

From above-mentioned two issues for upgrading maintenance management work, it needs to find a higher maintenance technical/methodologies for upgrades, and develop the maintenance and management systems with more efficient, administration to maximize the efficiency of the budget, which can make it more safe and can be used in long-term as much as possible.

References

- [1] Statistic of Laos road network 2017 source by Department of Roads, Ministry of Public Works and Transport.
- [2] Annual Road Asset Report 2016, Public Works and Transport Institute, Division of Infrastructure and Transport: pp.13, March 2017.
- [3] Degree on Road budget, No.130/Gov Date 01/06/2016, on article 5. pp.2-3.
- [4] Source by Department of Planning and Cooperation, Ministry of Public Works and Transport.