

Chapter 1

Introduction

1.1 Problem Statement

Roadways are the important infrastructure of the country. The road networks are built for the transportation, economics, and defense of the country. Most of road pavement is flexible pavement or asphalt pavement that uses asphaltic concrete to be an adhesive material because it's cheaper than rigid pavement that uses Portland cement to be an adhesive material. When the road is used for many years, it will have some damages due to its service life. The major causes of roadways deterioration are high volume of traffic, overload trucks, and weather condition. Therefore, it needs some maintenance to keep the quality of road performance. Lack of maintenance in the right time causes the severe damages.

In 1997, Thailand confronted with the economic problems, which affected the pavement maintenance budgets of Department of Highways (DOH) and Department of Rural Roads (DOR). Decreasing in budgets for the agencies was the cause that many roadways can not take any periodic maintenance. For this reason, some roadways reached the severe damages level that can not be repaired by normal maintenance. These roadways needed some types of rehabilitation methods to strengthen the pavement structure. One of conventional methods is thick asphalt overlay by paving new asphalt over the existing pavement. Another method is reconstruction by remove surface, base, replace with new base and then overlay. These methods are high cost, waste of new materials, and harmful to the environment.

In the present, the technology for pavement rehabilitation is advance. There are developing into high-tech machines and researching into techniques. One of rehabilitation technique is now available for asphalt pavement is pavement in-place recycling. This technique has many benefits and advantages comparing with the conventional methods for example reduced costs of construction, conservation of aggregate and binders, preservation of existing pavement geometrics, preservation of the environment, less traffic disruption, and less user delay, etc.

DOH & DOR have already used pavement in-place recycling technique in many projects in Thailand for many years. These projects are operated by employing the contractors from competitive bidding. To calculate total costs for employing the contractor, DOH & DOR uses the standard estimation of road construction defined as direct costs of the contractor and the amount of money calculated from factor F defined as operation costs or indirect costs that are comprised of the administrative costs, interest costs, profit, and VAT. Generally in roadways construction, we can find the total costs from Bill of Quantity (BOQ). But in pavement in-place recycling, DOH & DOR use a formula that comes from many factors for estimating direct costs in unit cost. Therefore, it has one interesting problem that how difference between total costs estimation of DOH & DOR, and total costs estimation of the contractor is. Because the important issue having to consider for selecting pavement in-place recycling besides benefits and advantages is the costs. So, we should have research into costs of pavement in-place recycling.

1.2 Objectives

1. To analyze factors affecting total costs of pavement in-place recycling of DOH & DOR projects.
2. To analyze factors affecting total costs of pavement in-place recycling of the contractor.
3. To find some guidelines for improving total costs estimation in pavement in-place recycling.

1.3 Scope of Work

1. Consider only costs of pavement in-place recycling technique that uses cold recycler with Portland cement type I as a stabilizing agent.
2. Consider only significant factors affecting total costs of pavement in-place recycling work in pavement in-place recycling project.

1.4 Research Methodology

1. Steps in studying documents and literature reviews.

Studying into pavement in-place recycling technique, selecting pavement in-place recycling for pavement rehabilitation, and energy consumption and costs in pavement in-place recycling work from books, texts, journals, research papers, thesis, and data in internet, etc.

2. Steps in collecting data

2.1. Collecting data about total costs estimation of pavement in-place recycling of DOH & DOR projects from Bureau of Highways Maintenance Management Department of Highways and Bureau of Maintenance and Traffic Safety Department of Rural Roads.

2.2. Collecting data about total cost estimation of pavement in-place recycling work of the contractor by studying in the field and interview contractors.

2.3. Collecting material prices data from Bureau of Trade and Economic Indices Ministry of Commerce.

2.4. Collecting pavement in-place recycling machine prices and operating costs data from machine sale agencies.

3. Steps in factors analysis

3.1. Analysis of factors affecting total costs estimation of pavement in-place recycling of DOH & DOR in example projects.

3.2. Analysis of factors affecting total costs estimation of pavement in-place recycling of the contractor in example projects.

4. Steps in showing the results and comparison

4.1. Showing factors affecting total costs of pavement in-place recycling of DOH & DOR and factors affecting total costs & profit of the contractor.

4.2. Showing comparison between costs in total costs of DOH & DOR and costs in total costs of the contractor in pavement in-place recycling.

5. Steps in discussion

5.1. Discussion about factors that are cause of difference between total costs of DOH & DOR and total costs of the contractor in pavement in-place recycling.

5.2. Discussion about some guidelines for improving total costs estimation of pavement in-place recycling of DOH and DOR.

1.5 Benefits of this work

1. Able to understand factors affecting total costs of DOH & DOR and factors affecting total costs & profit of the contractor in pavement in-place recycling.

2. Able to understand total costs structure of DOH & DOR and total costs & profit structure of the contractor in pavement in-place recycling.

3. Able to find some guidelines for improving total costs estimation of pavement in-place recycling of DOH & DOR.