ROAD MANAGEMENT PRACTICES
IN PROVINCIAL ROAD DEVELOPMENT
IN SRI LANKA

Meepe Attatage Indunil Kantha De Silva

(108487K)

University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk
Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa
Sri Lanka

October 2014
ROAD MANAGEMENT PRACTICES
IN PROVINCIAL ROAD DEVELOPMENT
IN SRI LANKA

Meepe Attatage Indunil Kantha De Silva

(108487K)

Dissertation submitted in partial fulfillment of the requirements for the
Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa
Sri Lanka

October 2014
DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or Institute of higher learning and to the best of my knowledge and belief if does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Also I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature : ............................................... Date : ............................

The above candidate has carried out research for the Masters dissertation under my supervision.

Signature of Supervisor: ............................................... Date : ............................
ABSTRACT

Road Management Practices in Provincial Road Development in Sri Lanka

Recently the development of infrastructure has been identified as a key aspect that should be considered in the development of third world countries like Sri Lanka. It affects the economy of the country as well as the social development of people. In considering infrastructure, roads and transportation can be considered as the most important sector to be developed in Sri Lanka.

As the substantial part of the population lives in rural areas and the occupations of most of them are based on agriculture, provincial roads are more useful to the rural communities than the main highways as these roads are required to transport their agricultural outputs to markets situated in urban areas. On the other hand, without physical access rural communities cannot get the social benefits such as education, medical treatments, and so on as they have no access to town centres.

Provincial Road Development Authority is responsible for the administration of provincial roads in each province. This research was entirely based on the road management practices of provincial roads in Sri Lanka. In this research first the issues and weaknesses in current road management practices have been identified. Thereafter the principal factors leading to these specific issues were analysed by doing case studies under the research objectives. The data was collected from four provincial road projects which were ongoing and completed rehabilitation projects. Data was mainly collected by doing direct observations, archival records, and so on. This data was investigated under a case study framework and finally conclusions were drawn up. As per conclusions, a set of guidelines have been recommended for the improvement of current management practices of the provincial roads. It is expected that these guidelines would be much helpful to overcome the difficulties encountered in current management practices in provincial road development.

Keywords: Road management practices, Provincial Road Development Authority, Rehabilitation projects, Development of infrastructure
DEDICATION

I dedicate this dissertation to my late beloved parents.
ACKNOWLEDGEMENT

First of all, I express my heartfelt gratitude to Dr. K.A.K Devapriya, Senior Lecturer, Department of Building Economics, University of Moratuwa who was my Project Supervisor for the valuable guidance given me while doing this research on Road Management Practices of Provincial Roads in Sri Lanka and preparing the dissertation.

Special appreciation is extended to Ch.QS. Indunil Senaviratne, Course Coordinator of M.Sc. in Project Management and all other lecturers who assisted me by sharing their knowledge throughout the period of achieving the Master Degree and non-academic staff who helped me in coordinating.

In this special occasion, I sincerely thank to Mr. Udeni Wickramaratne, Chief Resident Engineer, JICA funded Provincial Roads Development Project, Sabaragamuwa for the assistance given me throughout the whole period of doing the research and preparing the dissertation by giving valuable instructions. At the same time I am thankful to Mr. L.P. Perera, Structural Engineer, ADB funded North Central Provincial Roads Project and Mr. L.T. Kiringoda, former Director (Development and Planning), Urban Development Authority for the assistance given me in preparing the dissertation.

In addition to that I am grateful to Mr. V.B. Kumarasiri, Chief Engineer, PRDA, Anuradhapura, Mr. A.P Jayatissa, Assistant Resident Engineer, ADB funded North Central Provincial Roads Project, Anuradhapura, Mr. W.A.R. Pramila, Office Engineer, Project Management Unit, JICA funded Provincial Roads Development Project, Sabaragamuwa, Mr. R.A.B.H Rajapaksha, Assistant Resident Engineer, JICA funded Provincial Roads Development Project, Sabaragamuwa, Mr. JayanthaPelenage, Accountant, JICA funded Provincial Roads Development Project, Sabaragamuwa and Mr. W.S. Karunathilake, Programme Assistant, Southern Provincial Planning Secretariat, Galle for the fullest cooperation given me in
collecting relevant information. I hereby specially thank to Miss Nadeesha Weerasundara, draftsman in my office for the assistance given me in drafting work of the dissertation.

In addition to that I am thankful to Miss. L.A. Siriwardena (Technical Officer/ Programme Administrator) and Mr. A. Srinathyanandarajah (Technical Officer) in the Department of Building Economics, University of Moratuwa for the assistance given me in the preparation of this dissertation.

Finally I thank to all staff members in Resident Engineer’s Office, ADB funded North Central Provincial Roads Project, Anuradhapura and Provincial Road development Authority, North Central Province in giving me assistance in various ways to carry out my research successfully.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declaration of the candidate and supervisor</td>
<td>i</td>
</tr>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Dedication</td>
<td>iii</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>iv</td>
</tr>
<tr>
<td>Table of contents</td>
<td>vi</td>
</tr>
<tr>
<td>List of Figures</td>
<td>ix</td>
</tr>
<tr>
<td>List of Tables</td>
<td>x</td>
</tr>
<tr>
<td>List of abbreviations</td>
<td>xi</td>
</tr>
<tr>
<td>List of appendices</td>
<td>xii</td>
</tr>
</tbody>
</table>

## 1. Introduction

1.1 Background                                                          .... 1
1.2 Existing Condition of provincial roads                               .... 2
1.3 Problem statement                                                   .... 2
1.4 Aims and Objectives                                                  .... 3
1.5 Research method                                                      .... 3
1.6 Scope and limitations                                                .... 4
1.7 Chapter breakdown                                                    .... 4

## 2. Literature Review

2.1 Introduction                                                         .... 5
2.2 Activities of Project Management                                     .... 5
2.3 Project Management Practices in Road Construction                   .... 7
2.4 Road Management Practices in Provincial Roads                        .... 8
   2.4.1 Road                                                              .... 8
   2.4.2 Evolution of roads                                               .... 9
   2.4.3 History of roads in Sri Lanka                                    .... 10
   2.4.4 Current administration set up of roads in Sri Lanka             .... 12
3.1.8 Case study framework ................................................................. 50
3.2 Conclusion ..................................................................................... 50

4. Data Collection and Data Analysis ..................................................... 52
   4.1 Introduction .................................................................................. 52
   4.2 Project Management Practices on Road Development .................. 52
   4.3 Brief Introduction to Cases ............................................................ 54
   4.4 Data Analysis ............................................................................. 55
      4.4.1 Description of data analysis ..................................................... 55
      4.4.2 Data analysis ....................................................................... 59
   4.5 Cross-Case Analysis ................................................................... 88
   4.6 Synthesis of Evaluation of Provincial Roads ................................. 89
   4.7 Conclusion ............................................................................... 97

5. Conclusions and Recommendations ................................................ 98
   5.1 Introduction ............................................................................... 98
   5.2 Conclusions ............................................................................... 98
   5.3 Development of Best Management Practices and Guidelines for Provincial Roads ......................................................... 107
   5.4 Conclusion .............................................................................. 110

Reference List .................................................................................... 111

Appendix A ....................................................................................... 116
Appendix B ....................................................................................... 122
Appendix C ....................................................................................... 127
Appendix D ....................................................................................... 132
Appendix E ....................................................................................... 136
Appendix F ....................................................................................... 143
LIST OF FIGURES

Figure 2.1 ... Cross section of the road according to Macadam’s construction ................................................................. 10
Figure 2.2 ... Cross section of a road pavement ........................................... 15
Figure 2.3 ... Cross section of a hill road ..................................................... 16
Figure 2.4 ... Warning signs ..................................................................... 20
Figure 2.5 ... Regulatory signs .................................................................. 21
Figure 2.6 ... Informatory signs .................................................................. 21
Figure 2.7 ... Pedestrian crossing ................................................................. 22
Figure 2.8 ... Countries with decentralised road maintenance have better roads ........................................................................... 24
Figure 2.9 ... Organizational structure of PRDA .......................................... 26
Figure 2.10 . Typical cross section of a blacktop road pavement ................. 28
Figure 2.11 . Effects of neglecting maintenance .......................................... 35
Figure 2.12 . Socio-economic and transport cost impacts ............................ 37
Figure 2.13 . Road investments - Socio-economic benefits ........................... 37
Figure 3.1 ... Research design ................................................................... 43
Figure 3.2 ... Case study framework for multiple-case studies .................... 51
Figure 4.1 Histogram presentation for Consultants’ responds ...................... 55
Figure 4.2 Histogram presentation for Client’s responds ............................ 56
Figure 4.3 Histogram presentation for Contractors’ responds ..................... 56
Figure 4.4 Fishbone Diagram .................................................................... 58
LIST OF TABLES

Table 2.1  Categorization of roads in Sri Lanka ..................................................... 13
Table 3.1  Relevant situation for different research methods ............................... 46
Table 4.1  Cost information for provincial road development ............................. 53
Table 4.2  Quality control tests ............................................................................ 78
Table 4.3  Evaluation of evidences of road management practices in provincial roads in Sri Lanka ...............................................................91
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>Aggregate Base course</td>
</tr>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AIV</td>
<td>Aggregate Impact Value</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Standard Testing Methods</td>
</tr>
<tr>
<td>BOQ</td>
<td>Bill of Quantities</td>
</tr>
<tr>
<td>CBR</td>
<td>California Bearing Ratio</td>
</tr>
<tr>
<td>CRS1</td>
<td>Cationic Rapid Setting 1</td>
</tr>
<tr>
<td>DBST</td>
<td>Double Bituminous Surface Treatment</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GNP</td>
<td>Gross National Product</td>
</tr>
<tr>
<td>GOSL</td>
<td>Government of Sri Lanka</td>
</tr>
<tr>
<td>ICB</td>
<td>International Competitive Bidding</td>
</tr>
<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>LAAV</td>
<td>Los Angeles Abrasion Value</td>
</tr>
<tr>
<td>LCB</td>
<td>Local Competitive Bidding</td>
</tr>
<tr>
<td>LGED</td>
<td>Local Government Engineering Department</td>
</tr>
<tr>
<td>NPA</td>
<td>National Procurement Agency</td>
</tr>
<tr>
<td>OPEC</td>
<td>Organization of Petroleum Exporting Countries</td>
</tr>
<tr>
<td>PRDA</td>
<td>Provincial Road Development Authority</td>
</tr>
<tr>
<td>PSDG</td>
<td>Provincial Specific Development Grant</td>
</tr>
<tr>
<td>PWD</td>
<td>Public Works Department</td>
</tr>
<tr>
<td>RDA</td>
<td>Road Development Authority</td>
</tr>
<tr>
<td>VOC</td>
<td>Vehicle Operating Cost</td>
</tr>
</tbody>
</table>
### LIST OF APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix A</td>
<td>Interviewed Transcript – Case i</td>
<td>116</td>
</tr>
<tr>
<td>Appendix B</td>
<td>Interviewed Transcript – Case ii</td>
<td>122</td>
</tr>
<tr>
<td>Appendix C</td>
<td>Interviewed Transcript – Case iii. (1)</td>
<td>127</td>
</tr>
<tr>
<td>Appendix D</td>
<td>Interviewed Transcript – Case iii. (2)</td>
<td>132</td>
</tr>
<tr>
<td>Appendix E</td>
<td>Interviewed Transcript – Case iv. (1)</td>
<td>136</td>
</tr>
<tr>
<td>Appendix F</td>
<td>Interviewed Transcript – Case iv. (2)</td>
<td>143</td>
</tr>
</tbody>
</table>