

**Measurement of Efficiency and Effectiveness of PPR in terms
of time and cost overruns for Roads and Highways
Department and Identification of important factors for time
and cost overruns.**

Dissertation submitted in partial fulfillment of the
requirements for the Degree of
Masters in Procurement and Supply Management

Submitted by
Mohammed Yousuf
MPSM, Batch I
ID-12282009

Masters in Procurement and Supply Management 2012

December 2012



Institute of Governance Studies, BRAC University

Declaration

I hereby declare that this master's dissertation entitled "Measurement of Efficiency and Effectiveness of PPR in terms of time and cost overruns for Roads and Highways Department and identification of important factors for time and cost overruns" is the result of my own research except as cited in the references.

I also confirm that this report has not been accepted for any degree and is not currently submitted in candidature of any degree.

.....

MOHAMMED YOUSUF

Master's in Procurement and Supply Management

Cohort-I, ID No.-12282009

Dedication

To my loving parents who supported me all the way; to my family members whose constant dedication and love enlightened me; to my Supervisor whose guidance was a source of inspiration; to all of my friends and colleagues who stood beside me with great commitment; I dedicate my research, hoping that I made all of them proud.

Mohammed Yousuf

Acknowledgement

- I would like to express my gratitude to all those who gave me the possibility to complete this thesis. I am deeply indebted to my supervisor **Mujahid Mohiuddin Babu**, Lecturer, Institute of Business Administration (IBA), Dhaka University, Dhaka whose help, stimulating suggestions and encouragement helped me in all the time of research for and during writing of this thesis.
- Special thanks to management staff of the BRAC University of Dhaka for their academic support throughout my study.
- Special thanks to **Dr. Rizwan Khair**, Director, Institute of Governance Studies (IGS) who supported me very much.
- Special thanks for the respondent of Different Department such as Roads and Highways Department (RHD), Local Government and Engineering Department (LGED) and so on for their participation in filling up the questionnaire and getting the information of case studies.
- Finally I would like to give my special thanks for my Parents and family members whose patience and love enabled me to complete this work.

MOHAMMED YOUSUF

Executive Summary

Procurement is a specialized subject, which requires a high degree of knowledge and skill of those who are engaged in procurement of goods, works and services. Absence of adequate rules, procedures and other standard documents in Bangladesh has created serious problems in the implementation of procurement functions. The procurement practices followed until the issue of The Public Procurement Regulations, 2003 dated back to 1930s when the 'Manual of Office Procedure (Purchase)' was first issued and amended last in 1977. In 1992, ERD issued 'Guidelines for Procurement of Goods and Works Financed under Project Aid' and 'Guidelines for Employment of Consultants by the Government of Bangladesh'. Both these were based on World Bank documents, neither of which comprehensively deal with the diverse procurement issues nor have been updated in line with modern procurement practices. Prior to the introduction of the Public Procurement Regulations there were no nationally applicable uniform comprehensive procurement regulations or procedures. Consequently, procurement under local funding has been performed in a somewhat haphazard fashion leading to delays in decision-making and wastage of public resources. As a result public procurement reform in Bangladesh was very much essential as - (1) Guidance for the current procurement system was scattered among various outdated regulations and procedures; (2) Little action was taken to ensure that the procurement process complied with established regulations and procedures; (3) There were no clear lines of public accountability in the procurement process and little transparency; (4) There was little institutional coordination; (5) Operating through cash budgets and with inadequate financial planning, the government was an unreliable business partner and suppliers frequently suffered delays in receiving payment for goods and services supplied; consequently bidders sought to offset these risks by higher prices; (6) The system suffered from various forms of malpractice and unethical conduct, including a high incidence of vested interests, interference and insider dealings and occasional cases of retrospective approval of contract awards; and (7) There was a lack of professional knowledge and expertise in the purchasing and contracting function at all levels. So to overcome the above factors the Public Procurement Act 2006 was passed by Parliament, which was activated through issuing the Public Procurement Rules 2008 (PPR) outlines the principles to be followed by all the public sector procuring entities.

RHD is responsible for the construction and the maintenance of the major road and bridge network of Bangladesh. Since the Department was established the size of the major road network in Bangladesh has grown from 2500 kms to the present network of 21271 kms. Road sector is an important sector in the economy of any nation due to its impact on the welfare of its citizens and the investment involved. Good quality of road works is important for both safety and economic development reasons in any society. This importance is propounded by the fact

that the transport sector has a major role to play in the socio-economic development of a country as it provides access to markets, production, jobs, health, education and other social services. Construction and repair of roads utilizes a great part of government expenditure in Bangladesh. So the main question for this study is whether implementation of Public Procurement Rules 2008(PPR) is efficient and effective in road construction projects. For this assessment Roads and Highways Department was used. Project performance factors time and cost overruns were also studied.

The objectives, as mentioned in research objectives in sections 1.4.1 and 1.4.2, of the study were achieved through two approaches; the first one was a valid questionnaire that was obtained from different respondents from different departments such as Roads and Highways Department (RHD), Local Government and Engineering Department (LGED) and also from contractors. The second, by studying cases exposed to time and cost overruns in Roads and Highways Department (RHD).

The study clarified that “PPR does not support emergency situation and it is hard to follow at the emergency period” is the most critical factor that influence efficiency and effectiveness of PPR. The survey also indicated that "PPR takes time" occupied the second rank in importance according to the opinion of overall respondents. The survey also illustrate that "the extent of PPR in road sector projects is very much important" and this factor occupied the third rank from overall viewpoints of respondents.

The study indicates that “Cash problem during construction” is the most critical factor that influences project delay. The survey also indicated that “strikes and calamity; major disputes and negotiations” are among the most important factors affecting delay as per the overall opinion of respondents. The study illustrated that “Increment of materials prices” is one of the most important factors that may lead to cost overrun.

The study recommends that to make PPR effective and efficient, support from highest political levels is essential, this is seen as necessary for any organisational change to succeed, as it avoids any doubt about the government’s commitment to reform. The study also recommended the procuring entities to hold their responsibilities to avoid any delay or cost overrun that could be achieved by good management of the project and taking appropriate “Business contingency plan, Business continuity plan and Disaster management plan” for emergency situation such as strikes and calamity from the beginning of the project. The study also recommended the government to adopt laws through Bangladesh legislative council to prevent materials monopoly.

Table of Contents

Declaration	ii
Dedication	iii
Acknowledgement	iv
Executive Summary	v
Table of Contents.....	vii
List of Tables.....	xii
List of Figures.....	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the research:.....	1
1.1.1 Scope and Application of the Public Procurement Rules 2008:	2
1.1.2 The rules for Preparation of Procurement Related Documents and their Contents	3
1.1.3 Provisions Relating to Determination of Tender Price	6
1.1.4 Maintaining Records Relating to Issue of Procurement Related Documents	6
1.1.5 Methods of procurement	7
1.1.6 The Use of Other Methods for Procurement of Goods, Works, Etc.	8
1.1.7 Issuance of Variation or Extra Work Orders.....	8
1.1.8 Preparation of a Variation or an Extra Work Order.	8
1.1.9 Costing of Variation or Extra Work.	9
1.2 Justification of the research.....	10
1.3 Research problem.....	11
1.4 Research Objectives	11
1.4.1 Broad objectives	12
1.4.2 Specific objectives.....	12
1.5 Research methodology	13
1.6 Structure of the research paper.....	13
1.7 Conclusion.....	14
CHAPTER TWO: ORGANIZATIONAL ORIENTATION.....	15

2.1 Overview of the Roads and Highways Department (RHD).....	15
2.2 Departmental Objectives	15
2.3 Organization	15
2.4 Personnel	16
2.5 Asset	16
2.6 Road Length	16
2.6.1 Road Length by Classification in Roads and Highways Department:	16
2.6.2 Road Length by Surface Type according to latest survey	17
2.7 Number of Culverts	17
2.8 Number of Bridges	17
2.9 Major Bridges in Bangladesh	18
2.10 RHD Documentation Framework	19
2.11 Land Transport Policy	20
2.12 Strategy	20
CHAPTER THREE: RESEARCH METHODOLOGY	22
3.1 Introduction	22
3.2 Research strategy	22
3.3 Research design	22
3.4 Population	23
3.5 Sample Size Determination	23
3.6 Methodology of this thesis	23
3.6.1 Questionnaire approach	23
3.6.2 Case Studies	23
3.7 Questionnaire design	24
3.8 Questionnaire content	24
3.8.1 General information of the respondents	24
3.8.2 Factors influencing efficiency and effectiveness of PPR with respect to time and cost	24
3.8.3 Factors influencing time overruns at construction project	24

3.8.4 Factors influencing cost overruns	24
3.9 Pilot study.....	25
3.10 Data Measurement.....	25
3.11 Process of data and analysis	25
CHAPTER FOUR: LITERATURE REVIEW	26
4.1 Definition of time and cost overruns.....	26
4.1.1 Time overruns	26
4.1.2 Cost overruns.....	26
4.1.3 Efficiency	27
4.1.4 Effectiveness	27
4.2 Types of delay	27
4.2.1 Excusable delays	28
4.2.1.1 Changes	28
4.2.1.2 Differing Site Conditions	29
4.2.2 Concurrent delays.....	29
4.2.3 Compensable delays	29
4.2.4 Critical delays.....	30
4.3 Delay responsibility.....	30
4.4 Causes of time and cost overruns	30
4.4.1 Causes of time overruns (delay).....	31
4.4.2 Identifying factors that influence cost overruns	36
4.5 Delay mitigation in the construction industry	38
4.6 Time variance for building projects	39
4.6.1 Discussion on the major causes contributing to time variance	39
4.6.1.1 Policy-related Causes	40
4.6.1.2 Owner-related Causes	40
4.6.1.3 Design-related causes.....	40
4.6.1.4 Contractor-related Causes	41
4.6.1.5 Consultant-related Causes	41

4.7 Case Study:.....	43
CHAPTER FIVE: RESULTS AND DISCUSSION	47
5.1 Introduction	47
5.2 Characteristics of the respondents.....	47
5.3 Analysis of important factors	50
5.3.1 Mean scoring ranking:.....	50
5.4 Findings.....	50
5.4.1 Ranking for efficiency and effectiveness of PPR in RHD road projects	50
5.4.1.1 Ranking by RHD respondents.....	50
5.4.1.2 Ranking by LGED respondents for efficiency and effectiveness of PPR	52
5.4.1.3 Ranking by Contractors for efficiency and effectiveness of PPR in RHD road projects	54
5.4.2 Ranking for factors of time overruns in road sector projects	56
5.4.2.1 Ranking by RHD respondents.....	56
5.4.2.2 Ranking for time overruns by LGED respondents.....	57
5.4.2.3 Ranking for time overruns by Contractors.....	58
5.4.3 Ranking for factors of cost overruns in road sector projects.....	58
5.4.3.1 Ranking by RHD respondents for causes of cost overruns	58
5.4.3.2 Ranking by LGED respondents for causes of cost overruns.....	60
5.4.3.3 Ranking by contractors for causes of cost overruns.....	61
CHAPTER SIX: RECOMMENDATION AND CONCLUSION.....	67
6.2 Recommendations	67
6.2.1 Recommendations to increase efficiency and effectiveness of PPR	67
6.2.2 Recommendations to minimize time and cost overruns in Road sector projects	70
6.2.3 Contractors should give special attention to the following factors	70
6.2.4 Owners should consider the following factors	71
6.2.5 Consultants should look to the following points	72
6.2.6 Government and the high policies agencies of Bangladesh	72
6.3 Conclusion.....	72

6.4 Limitations on the Study	73
6.5 Recommendations for Further Research	73
Reference:.....	74
ANNEXURE-1 (QUESTIONNAIRE)	76
ANNEXURE -2 (TABLES FROM ANALYZED RESUSLT).....	83

List of Tables

No	Title	Page no
Table 4.1	Variables influencing time, and/or cost control in Indonesia (Kaming et al 1997)	31
Table 4.2	Factors that influencing cause time overruns (Alwi et al, 2002)	33
Table 5.1a	RHD respondents' view points for efficiency and effectiveness of PPR in RHD road projects:	83
Table 5.1b	LGED respondents' view points for efficiency and effectiveness of PPR in RHD road projects:	85
Table 5.1c	Contractor's view points for efficiency and effectiveness of PPR in RHD road projects:	87
Table 5.2a	RHD respondents' view points for time overruns in road projects	89
Table 5.2b	LGED respondents' view points for time overruns in road projects	90
Table 5.2c	Contractors' view points for time overruns in road projects	91
Table 5.3a	RHD respondents' view points for cost overruns in road projects	92
Table 5.3b	LGED respondents' view points for cost overruns in road projects	93
Table 5.3c	Contractors' view points for causes of cost overruns in road projects	94
Table 5.4	Rankings of efficiency and effectiveness of PPR for RHD road projects in Bangladesh from different perspectives	62
Table 5.5	Rankings of time overruns for RHD road projects in Bangladesh from different perspectives	64
Table 5.6	Rankings of cost overruns for road projects in Bangladesh from different perspectives	65

List of Figures

No	Title	Page no
Figure-1.1	Research framework diagram	13
Figure 4.1	Sequential relationships of various categories of delays (Vidalis et al, 2002)	27
Figure 5.1	Survey response by different groups of the respondents	48
Figure 5.2	Respondents illustration (Frequency and percentge) of Roads and Highways Department (RHD)	48
Figure 5.3	Respondents representation (Frequency and percentge) of Local Government and Engineering Department (LGED)	49
Figure 5.4	Graphical presentation of respondents for Contractors	49
Figure 5.5	RHD respondents' general perceptions regarding efficiency and effectiveness of PPR for road projects	51
Figure 5.6	Top significant factors from LGED respondents' view points for efficiency and effectiveness of PPR in road projects	53
Figure 5.7	Important factors from contractors' viewpoints for efficiency and effectiveness of PPR	55
Figure 5.8	Top significant factors for time overruns in road projects from RHD respondents' viewpoints	56
Figure 5.9	Important factors for time overruns in road projects according to the respondents' of LGED	57
Figure 5.10	Important factors of time overruns in road projects according to the contractor's	58
Figure 5.11	Important factors of cost overruns as per the respondents of RHD	59
Figure 5.12	LGED respondents' viewpoints for cost overruns in road projects	60
Figure 5.13	Top significant factors from contractors' viewpoints for cost overruns	61

CHAPTER ONE: INTRODUCTION

1.1 Background of the research:

Procurement is the sourcing and purchasing of goods, works, materials and services for business use. Individual businesses set procurement policies that govern their choice of suppliers, products and the methods and procedures that are going to be used to communicate with their suppliers. For example, businesses often have set procedures for calling for and evaluating proposals. Issues in procurement include:

- Identifying the needs of customers and suppliers;
- Choosing and preparing tools and processes to communicate with suppliers;
- Preparing requests for proposals and requests for quotations;
- Setting policies for evaluating proposals, quotes and suppliers.

There are also general trends in procurement. One of the most recent of these is green procurement, with an increasing number of businesses creating procurement policies that emphasize sourcing and purchasing of goods, works, materials and services that are less environmentally damaging than comparable alternatives and more efficient.

Procurement is a specialized subject that requires a high degree of knowledge and skill of those who are engaged in procurement of goods, works and services. Absence of adequate rules, procedures and other standard documents in Bangladesh has created serious problems in the implementation of procurement functions. The procurement practices followed until the issue of The Public Procurement Regulations, 2003 dated back to 1930s when the 'Manual of Office Procedure (Purchase)' was first issued and amended last in 1977. In 1992, ERD issued 'Guidelines for Procurement of Goods and Works Financed under Project Aid' and 'Guidelines for Employment of Consultants by the Government of Bangladesh'. Both these were based on World Bank documents, neither of which comprehensively deal with the diverse procurement issues nor have been updated in line with modern procurement practices. Prior to the introduction of the Public Procurement Regulations there were no nationally applicable uniform comprehensive procurement regulations or procedures. Consequently, procurement under local funding has been performed in a somewhat haphazard fashion leading to delays in decision-making and wastage of public resources. As a result public procurement reform in Bangladesh was very much essential as-

- (1) Guidance for the procurement system was scattered among various outdated regulations and procedures;
- (2) Little action was taken to ensure that the procurement process complied with established regulations and procedures;
- (3) There were no clear lines of public accountability in the procurement process and little transparency;
- (4) There

was little institutional coordination; (5) Operating through cash budgets and with inadequate financial planning, the government was an unreliable business partner and suppliers frequently suffered delays in receiving payment for goods and services supplied; consequently bidders sought to offset these risks by higher prices; (6) The system suffered from various forms of malpractice and unethical conduct, including a high incidence of vested interests, interference and insider dealings and occasional cases of retrospective approval of contract awards; and (7) There was a lack of professional knowledge and expertise in the purchasing and contracting function at all levels.

So With the assistance of IDA, the Government of Bangladesh embarked upon the task of reforming the procurement regime in the country in line with modern procurement practices. As a result, the Public Procurement Regulations 2003 were published in the official gazette on 1st October 2003 giving them immediate effect. In continuation of the process, The Public Procurement Act 2006 was passed by Parliament that was activated through issuing The Public Procurement Rules 2008 outlines the principles to be followed by all the public sector procuring entities. This is a great achievement for the Government of Bangladesh, introducing reform with a view to improving governance in the area of procurement. The new Rules and Act amended for quick processing of the procurement activities so that development activities can be geared up.

1.1.1 Scope and Application of the Public Procurement Rules 2008:

These Rules shall apply to the following areas namely –

- (a) Procurement of Goods, Works or Services by any procuring entity using public funds;
- (b) Procurement of Goods, Works or Services by any government, semi-government or any statutory body established under any law;
- (c) Procurement of Goods, Works or Services using public funds by -a company registered under the Companies Act, 1994 (Act No. 18 of 1994);
- (d) Procurement of Goods, Works or Services under a loan, credit or grant agreement or under any other agreement with a development partner or with a foreign state or an organisation, provided that if there is anything to the contrary in any such agreement entered into, the provision of that agreement shall prevail.

1.1.2 The rules for Preparation of Procurement Related Documents and their Contents

The rules for Preparation of Procurement Related Documents and their Contents are mentioned in Chapter two of Public Procurement Rules 2008, these are follows:

- (1) Documents needed for Pre-Qualifications, Tenders and Proposals shall be prepared by the Procuring Entity following the Standard Documents issued by the CPTU listed in Schedule I.
- (2) The Documents for Goods and related Services, Works and Physical Services shall, depending on the context, among others include—
 - (a) Instructions for the preparation and submission of an Application or a Tender;
 - (b) Information concerning the deadline and location(s) for receipt of Applications; or
 - (c) Information concerning the date, hour (local time) and location of the receipt and public opening of the Tender(s);
 - (d) A Tender Submission Sheet and sample formats for Tender Security; Performance Security and manufacturers' authorization, where applicable;
 - (e) The number of copies to be submitted with the original Application or Tender;
 - (f) Conditions of Contract, general and particular;
 - (g) Detailed specification of requirements of goods and works;
 - (h) Documentary evidence to be provided by the Tenderer to demonstrate its qualifications for purposes of post-qualification verifications to be conducted by the Tender Evaluation Committee;
 - (i) The period during which the Tender must remain valid;
 - (j) The qualifications and other criteria to be taken into account in the evaluation of Applications for Pre-Qualification or Tenders and the basis of its evaluation;
 - (k) A requirement that a Tenderer or an Applicant must, in the form specified in the Application or Tender Document, pledge not to engage in any corrupt, fraudulent, collusive or coercive practices as specified in Section 64 of the Act;
 - (l) A statement to the effect that the Procuring Entity may reject any or all Applications, Tenders or Quotations;
 - (m) A provision for holding a Pre-Tender meeting with potential Tenderers, where appropriate, in order to provide clarifications about the conditions of the Tender Documents;
 - (n) An indication in the Tender Data Sheet (TDS) or Application Data Sheet (ADS) as to whom a Tenderer or Applicant shall address any complaint under Rule 57;
 - (o) A provision to the effect that a Tenderer shall be permitted to modify, substitute or withdraw its Tender at any time prior to the deadline for the submission of Tenders.

(3) The Procuring Entity shall set out clearly the following information and conditions in the Tender or Proposal Documents

- (a) The description of the Works and Physical Services to be carried out;
- (b) The drawings and location of the Works;
- (c) The description of the Goods and related Services to be supplied;
- (d) The location of delivery or installation;
- (e) The schedule for delivery and completion;
- (f) The minimum performance requirements;
- (g) The warranty, defects liability and maintenance requirements;
- (h) The currency (ies) the tenderers shall quote in the tenders and the applicable and the applicable date of its exchange rate;
- (i) The amount(s) and currency (ies) of Tender security and performance security;
- (j) The terms and mode of payment of the Contract price;
- (k) The presence or absence of Advance Payment, in line with the government orders and agreements with development partners;
- (l) The minimum insurance coverage; and
- (m) Any other relevant terms and conditions.

(4) Tender Documents, where appropriate, shall define the tests, standards and methods that shall be used to determine the compliance of the Goods or equipment to be delivered or Works to be performed with technical specifications.

(5) Technical specifications shall be prepared in a non-restrictive manner so that a fair and open competition is possible and shall be consistent with drawings included in the Tender Documents.

(6) The Procuring Entity may, if necessary, seek the assistance of external specialists from outside the Procuring Entity at the time of for preparing the Tender Document.

(7) The Documents forming the Contract shall be in the following order of precedence, namely:-

- (a) The signed Contract Agreement;
- (b) The Notification of Award;
- (c) The Tender and the appendices to the Tender;
- (d) Particular Conditions of Contract;
- (e) General Conditions of Contract;
- (f) Technical specifications;
- (g) General specifications;
- (h) Drawings;
- (i) Price Schedule and schedule of requirements for Goods or Priced Bill of Quantities for works;

(j) Other Documents including correspondences.

(8) The Documentation needed for consultancy Services (i.e. Request for Proposal and Terms of Reference) shall be prepared following provisions in Chapter Six of these Rules.

(9) Where Tenders based upon alternative designs, materials, completion schedules, payment terms and other conditions are permitted, the conditions for their acceptability and the method for their evaluation shall be stated in the Tender Document.

(10) If Tenders for Goods will be invited on 'lot-by-lot' basis, each lot shall constitute a Tender and in such case the Tender Data Sheet (TDS) shall clearly indicate that, Lot not offering at least eighty percent (80%) of the total number of items required under that Lot, and representing at least 65% of the estimated lot value, shall be considered non-responsive; or if any item in a lot-Tender represents more than fifty percent (50%) of the estimated lot value, then the TDS shall specify that a lot-Tender not offering that particular item shall be considered nonresponsive, even if it complies with the requirement of minimum number of items based on percentage of the total number of items specified in the TDS.

(11) If Tenders for Goods will be invited for one or more items on 'item-by-item' basis, in such case the offer for each item shall correspond to full quantity under that particular item and each such item shall constitute a Tender and the Tender Submission Sheet shall be modified by inserting a Table to allow for offering the individual item in the sheet.

(12) Notwithstanding anything contained in Sub-Rule (1), Procuring Entities may, depending on the nature of a specific Procurement requirement, make necessary adjustments in the Application Data Sheet (ADS), Tender Data Sheet (TDS), or the Particular Conditions of Contract of the Documents mentioned in that Sub-Rule, provided that such adjustments, under no circumstances, shall contradict with any provisions of the Act and these Rules.

(13) The Central Procurement Technical Unit (CPTU) shall publish on their website the Standard Documents issued.

1.1.3 Provisions Relating to Determination of Tender Price

Provisions Relating to Determination of Tender Price are mentioned in Rule 5

(1) A Tender shall be invited on the basis of the delivered price of the Goods to the designated destination, or for the completion of Works or installation, inclusive of all associated and related Services thereof to be performed by the Tenderer

(2) Taxes, including VAT, and custom duties, payable by a Supplier if the Contract is awarded, shall be shown separately in the price schedule as provided for in the Tender Document.

(3) The Tender Document shall state that —

(a) The Tender price shall be fixed; or

(b) Price adjustments shall be made to reflect any changes, upwards or downwards, in major cost components such as labour, equipment, material and fuel, of the Contract,.

(4) Prices may be adjusted for contracts of more than eighteen (18) months following formula stated in the Tender Document.

(5) Price adjustment provisions shall not usually be necessary in simple Contracts of within eighteen (18) months or in cases where it is normal commercial practice to procure certain types of equipment at firm prices, regardless of e delivery time, provided that if considered necessary by the Procuring Entity it may, with the approval of the HOPE, use the price adjustment formula for contracts of within eighteen (18) months.

(6) The Bill of Quantities shall provide estimated quantities for the individual items of Day Works for pricing.

(7) The Procuring Entity may' at its discretion, include in the Bill of Quantities the Provisional Sums for payments to nominated Subcontractors and other purposes as detailed in the Tender Documents.

1.1.4 Maintaining Records Relating to Issue of Procurement Related Documents

Maintaining records relating to issue of procurement related documents are mentioned in rule 6. The Procuring Entity shall record the following information when issuing the Pre-Qualification, or Tender or RFP Documents to a Person, namely—

(a) Reference number relating to the issuance of procurement related document;

(b) Name and mailing address;

(c) Telephone and facsimile numbers and electronic mail address, if applicable;

(d) Any other information that is considered necessary by the Procuring Entity.

Rules 61 (4) of PPR 2008 states that the minimum time allowed for Tenderers to prepare and submit their Tenders for Goods, Works and Physical Services shall not be less than as specified

in Schedule II, provided that the Tender Documents are ready for sale and made available by the date of publication of the advertisement.

1.1.5 Methods of procurement

For goods and related services, works, physical services and their use are mentioned in part-1 of chapter four where Rule 61 is regarding the use of Open Tendering Method in the Procurement of Goods, Works, Etc. the related clauses of rules 61 are:

- (1) The open Tendering shall be the preferred method of Procurement for Goods and related Services, Works and Physical Services, unless the threshold or special circumstances relating to a specific requirement make it more appropriate for one of the other Procurement methods to be used.
- (2) Tenders shall be invited from all eligible Tenderers through public advertisement under Rule 90.
- (3) Government owned factories or enterprises may participate in the public Tenders if they establish that they are legally and financially autonomous.
- (4) The minimum time allowed for Tenderers to prepare and submit their Tenders for Goods, Works and Physical Services shall not be less than as specified in Schedule II, provided that the Tender Documents are ready for sale and made available by the date of publication of the advertisement.
- (5) In the case of an urgent national need of Procurement the Government may, if so recommended by the Cabinet Committee on Economic Affairs (CCEA), reduce the time for Procurement processing.
- (6) In cases where Pre-Qualification of Applicants has been carried out pursuant to Rules 91, 92 and 93 the Procuring Entity shall restrict the issue of Tender Documents to Pre-Qualified Applicants only.
- (7) In the case of Procurement of Goods and related Services and Works and physical Services under Open Tendering Method process and proceedings in flow-charts as given in Part B of Schedule III shall be followed.

1.1.6 The Use of Other Methods for Procurement of Goods, Works, Etc.

The use of other methods for procurement of goods, works etc is noted in rule 62

(1) A Procuring Entity may use a Procurement method other than Open Tendering Method for Procurement of Goods and related Services and Works and physical Services in accordance with the requirements set out in these Rules, namely, Limited Tendering Method, Direct Procurement Method, Two-stage Tendering Method and Request for Quotations Method, provided that the selection of any Procurement method other than open Tendering, should be recorded stating the reasons or justifications for the method selected in compliance with the conditions specified in these Rules.

(2) In the case of Procurement of Goods and related Services and Works and physical Services under Limited Tendering Method, Two-stage Tendering Method, Request for Quotations Method and Direct Procurement Method, process and proceedings as specified in Part C,D,E and F of Schedule III shall be followed.

1.1.7 Issuance of Variation or Extra Work Orders.

Rule 78 is related to the issuance of variation or extra work orders

(1) The Procuring Entity may issue a Variation Order for Procurement of Works, physical Services from the original Contractor to cover any increase or decrease in quantities, including the introduction of new work items that are either due to change of plans, design or alignment to suit actual field conditions, within the general scope and physical boundaries of the contract .

(2) The Procuring Entity may issue an Extra Work Order to cover the introduction of such new works necessary for the completion, improvement or protection of the original works which were not included in the original contract, on the grounds where there are subsurface or latent physical conditions at the site differing materially from those indicated in the contract, or where there are duly unknown physical conditions at the site of an unusual nature differing materially from those usually encountered and generally recognized as inherent in the work or character provided for in the Contract.

1.1.8 Preparation of a Variation or an Extra Work Order.

Rule 79 is regarding the preparation of a variation or an extra work order

(1) In claiming for any Variation or Extra Wok Order, the Contractor shall deliver a written notice within the period specified in Schedule II i.e. Time for claiming for Variation Order is Within seven (7) calendar days of being aware of the need for the Variation Order, giving full

and detailed particulars of any extra cost in order that it may be investigated at that time, and failure to provide such notice shall constitute a waiver by the Contractor for any claim.

(2) The preparation and submission of Variation or Extra Work Order shall be as follows -

(a) if the Project Manager deems it necessary that a Variation or Extra Work Order should be issued, he or she shall prepare the proposed order accompanied with the notices submitted by the Contractor, the necessary plans, his or her computations as to the quantities of the additional Works involved per item indicating the specific locations where such Works are needed, the date of his or her inspections and investigations thereon, and the log book thereof, and a detailed estimate of the unit cost of such items of work, together with his or her justifications for the need of such Variation or Extra Work Order, and shall submit the same to the Approving Authority.

(b) The Approving Authority, in accordance with DoFP, shall approve the Variation or Extra Work Order, after review and satisfaction with the justification, plans, quantities, and proposed unit cost of the new items of work involved if the Variation is within the threshold specified in Schedule II, or shall arrange to obtain approval from the authority next higher than the authority who approved the original contract in line with Rule 74(4).

(c) The time for the processing of Variation and Extra Work Orders from the preparation up to the approval by the Approving Authority concerned shall be within the period specified in Schedule II, which is, not exceeding thirty (30) days from its preparation to approval

1.1.9 Costing of Variation or Extra Work.

Rule 80 is for costing of variation or extra work

(1) The Contractor shall be paid for additional work items as follows –

(a) If items of additional works are exactly the same or similar to those in the original contract, the applicable unit price of work items in the original contract shall be used for payment of those additional work items;

(b) For new items of works that are not included in the original Contract, the unit prices of the new work items shall be based on -

(i) The direct unit costs used in the original Contract for other items (e.g. unit cost of cement, steel rebar, formwork, labour rate, equipment rental, etc) as indicated in the Contractor's price breakdown of the cost estimate, if available; or

(ii) Fixed prices acceptable to both, the Procuring Entity and the Contractor, based on market prices;

(iii) The direct cost of the new work item based on (i) and (ii) above shall then be combined with the mark-up factor (i.e. taxes, overheads and profit) used by the Contractor in his Tender to determine the unit price of the new work item.

(2) Request for payment by the Contractor for any extra work shall be accompanied by a statement, with the approved supporting forms, giving a detailed accounting and record of amount for which it claims payment and such request for payment shall be included with the Contractor's statement for a progress payment.

(3) Under no circumstances shall a Contractor proceed to commence work under any variation or extra work order unless the approving authority has approved it.

(4) The Head of the Procuring Entity may, in exceptions to the preceding Rule and subject to the availability of funds, authorize the immediate start of work under any Variation or Extra Work Order under any or all of the following conditions -

(a) In the event of an emergency where the carrying out of the work is required urgently to avoid causing damage to public services, or damage to life or property or to both; or

(b) When time is of the essence provided that,

(i) The cumulative increase in value of work on the project which has not yet been duly approved does not exceed the percentage specified in Schedule II i.e. Cumulative increase in value of Works on the project does not exceed ten percent (10%) of the adjusted original Contract price

(ii) Immediately after the start of work, the corresponding Variation Order or Extra Work Order shall be prepared and submitted for approval in accordance with Rule 36.

(5) Payments for Works satisfactorily accomplished on any Variation or Extra Work Order may be made only after approval of the same by the appropriate authority.

(6) For a Variation or Extra order involving a cumulative amount exceeding the percentage specified in Schedule II, no work thereon may be commenced unless said the appropriate authority has approved Variation or Extra Work Order.

1.2 Justification of the research

RHD is responsible for the construction and the maintenance of the major road and bridge network of Bangladesh. Since the Department was established the size of the major road network in Bangladesh has grown from 2500 kms to the present network of 21,271 kms. Road sector is an important sector in the economy of any nation due to its impact on the welfare of its citizens and the investment involved. Good quality of road works is important for both safety and economic development reasons in any society. This importance is propounded by the fact that the transport sector has a major role to play in the socio-economic development of a country as it provides access to markets, production, jobs, health, education and other social services. Construction and repair of roads utilizes a great part of government expenditure in Bangladesh. So the main question for this study is whether implementation of Public Procurement Rules 2008 is efficient and effective in road construction projects. For this assessment Roads and

Highways Department was used. Project performance factors time and cost overruns are also studied.

1.3 Research problem

Based on the discussion in the sections above, the comprehensive knowledge about the efficiency and effectiveness of PPR in terms of time and cost overruns for Roads and Highways Department and identification of important factors for time and cost overruns for road projects in Bangladesh need to be explored so that the public sector clients, private sector contractors or donors can use this research findings for the analysis of their own business requirements to achieve the core objectives of their own organisations. The knowledge gap in justification of efficiency and effectiveness associated with PPR in respect of time and cost overruns for road projects in Bangladesh has been identified as the research problem for this study. Within this premise the aim and objectives are formulated to address the research problem.

1.4 Research Objectives

Individuals, private firms or public entities are continually engaging in acquisition of physical assets in various forms such as, residential, commercial buildings, hospital, schools/institutions, and development infrastructure like water, roads, electricity and telecommunication. These assets represent major capital investment motivated by market demands or perceived needs (Hendrickson and Au, 1999). To remain competitive in profit or non-profit engagements, these entities focus on processes and procedures that offer value and competitive advantage. Understanding the customer needs and appropriately deploying the available resources in meeting customer expectations offer competitive edge over competitors in product and service provision. Thus, efficient and effective resource management through appropriate use of tools and techniques in asset acquisition and its implementation is critical. Customers are demanding for better quality product through efficient and timely deliveries at low price. It is therefore important, that time, cost, and quality of constructed facilities are efficiently managed in the entire project life cycle for effective service or product delivery

Delays and cost overruns in public sector investments can raise the capital-output ratio in the sector and elsewhere bringing down the efficacy of investments (Morris, 1990). Thus, successful management of processes employed in acquisition of these assets is to a large extent, determined by the amount of resources expended, time taken and quality when compared to similar projects. Infrastructure includes the capital required to produce economic services from utilities (like electricity, telecommunication, and water) and transport (roads, bridges, seaport, and airports) and is central to promoting economic activity (Chandra, 2002).

Road sector is an important sector in the economy of any nation due to its impact on the welfare of its citizens and the investment involved. Good quality of road works is important for both safety and economic development reasons in any society. This importance is propounded by the fact that the transport sector has a major role to play in the socio-economic development of a country as it provides access to markets, production, jobs, health, education and other social services. Construction and repair of roads utilizes a great part of government expenditure in Bangladesh. So considering the importance and impact of the above mentioned matters the objectives of the research are established.

1.4.1 Broad objectives

The broad objectives of this study are to measure efficiency and effectiveness of PPR in terms of time and cost overruns for Roads and Highways Department and identification of important factors for time and cost overruns.

1.4.2 Specific objectives

The road construction sector in Bangladesh is experienced mainly three kinds of extended problems.

One-problem concerns time management, i.e. road works are not completed within the agreed time and benefits of the works to the public are delayed.

Second problem concerns cost overrun, i.e. additional but avoidable costs to the decided budgets for varying reasons

And a third problem concerns the weaknesses in quality control system of the road works, which results into early wear and tear necessitating repair and Maintenance.

As a result the specific objectives of this study are:

1. Measuring the efficiency and effectiveness of PPR with respect to variation of time and costs overruns for road sector projects in Bangladesh
2. To identify variables influencing construction time and cost overruns for road works in Bangladesh
3. To investigate the perspectives on the relative significance of these factor from different respondents
4. To conduct several practical case studies in Roads and Highways Department.
5. To formulate recommendations in improving efficiency and effectiveness of PPR with respect to time and cost overruns and to recommend for solving the problem of delay and cost overruns at road construction projects in Bangladesh.

1.5 Research methodology

The methodology of the research contains review of comprehensive literatures to identify the significant factors associated with efficiency and effectiveness of PPR in respect of time and cost overruns for road projects. Through extensive review of literatures, all the factors associated with time and cost overruns for road projects have been identified and listed in tabular form through content analysis. Then, primary data have been collected through questionnaire survey to measure the efficiency and effectiveness of PPR offering some open-ended questions. The respondents were also asked to rate degree of importance of the time and cost overruns factors on 5-point ordinal scales. Ordinal scale is a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned to the agreement or degree of influence (1, 2, 3, 4, 5) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels. The respondents have been chosen from different groups such as Roads and Highways Department, Local Government and Engineering Department and so on who are directly involved in road sector project procurement, road project development or public procurement in Bangladesh. The sequential diagram of the research methodology is depicted in Figure-1.1.

Non-probabilistic convenient sampling technique has been used to collect the primary data. The data collected from questionnaire survey have been analysed to calculate the mean score each factor to determine the relative ranking in descending order of importance. Finally, analysis has been done to test for any agreement or disagreement in ranking of the individual factors between different groups of respondents.

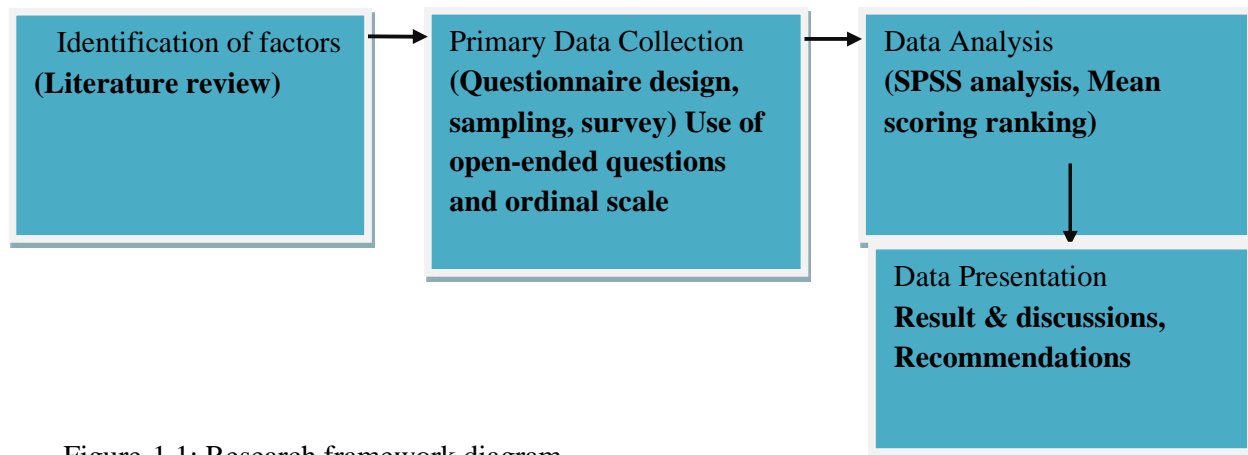


Figure-1.1: Research framework diagram

1.6 Structure of the research paper

This section introduces the structures of the research paper as follows:

- ✚ Chapter 1: Introduction
- ✚ Chapter 2: Organisational orientation

- ✚ Chapter 3: Research Methodology
- ✚ Chapter 4: Literature Review
- ✚ Chapter 5: Results and discussion
- ✚ Chapter 6: Recommendation and Conclusion

1.7 Conclusion

This chapter discussed a brief introduction of the research background, research problem, research objectives and methodology of the research report. In the next chapters, organisational orientation of RHD, literature review, methodology of the research, data analysis and discussion, recommendation and conclusion will be discussed.

CHAPTER TWO: ORGANIZATIONAL ORIENTATION

2.1 Overview of the Roads and Highways Department (RHD)

The Roads and Highways Department (RHD) was created in 1962 when the old 'Construction & Building (C&B) organisation was split into 2 separate bodies (the other being Public Works Department). RHD is responsible for the construction and the maintenance of the major road and bridge network of Bangladesh. Since the Department was established the size of the major road network in Bangladesh has grown from 2500 kms to the present network of 21,271 kms.

A Chief Engineer who is supported by a number of Additional Chief Engineers heads the RHD. It is responsible for an annual budget (2011-12) of Taka 2963.06 crore, of which about Taka 1824.26 Crore (822 Crore GoB, JDCF 228.13 Crore & 774.13 Crore Project part) is from the Annual Development Budget and Taka 1138.80 crore from the Revenue Budget. The total number of posts in the Department is almost 20,000.

2.2 Departmental Objectives

The departmental goal is that "The Roads and Highways Department is able to provide the People of Bangladesh with a safe, cost effective and well maintained road network". The purpose of the RHD is stated as: "The Roads and Highways Department has a sustainable capacity to plan, manage and deliver its full range of responsibilities in respect of the main road and bridge network and to be accountable for these duties".

The Assets of Roads and Highways Department have been conservatively estimated at Taka 46,000 crore (US\$8,000 million) of which by far the largest proportion is the value of the 21,271 kms of road and the 18,258 bridges. These assets are probably the greatest assets of any organisation in Bangladesh and maintaining their value is vital to its economy. This places a great responsibility on the Roads and Highways Department.

2.3 Organization

The recently proposed structure for RHD consists of five Headquarter Wings/Zones and seven Field Zones, each headed by an Additional Chief Engineer (ACE) who reports directly to the Chief Engineer. In addition two ACEs will be assigned to manage foreign aided projects one for World Bank Projects and one for Asian Development Bank Projects. This structure involves the formation of two new Head Quarter Wings, namely the "Bridge Management Wing" and the "Management Services Wing" and many more detailed changes to the existing organization.

2.4 Personnel

The current sanctioned staff of the Department totals 9,310 comprising 629 Class I, 875 Class II, 4,518 Class III and 3,288 Class IV post. Out of this total figure there are currently about 6238 vacant posts all of which except about 323, are from Class III and Class IV staff. These figures for sanctioned staff however mask the fact that there are currently about 8726 temporary (development & deputation, work charged, muster roll and casual staff) employed by the Department giving a total of about 18,036 posts. Because of the Government restrictions on recruitment of Class III and Class IV staff and the total ban on recruitment of temporary staff most staff are now over 40 years of age and there is an increasing rate of retirement, which should result in major changes in staff numbers during the next 5-10 years. (Source:www.rhd.gov.bd)

2.5 Asset

RHD has at it's disposal a huge amount of assets in the form of roads, bridges, land, ferries, equipment and buildings, the combined value of which has been conservatively estimated at Taka 46,000 Crore (approximately US\$8,000 million). Of this, by far the greatest proportion consists of the 21,271 kilometres of road and the 18,258 bridges. This total asset value is the largest of any individual organisation in Bangladesh and indeed probably exceeds the combined total of all private sector businesses operating in the country as a whole. Clearly, maintaining the value of these assets is a fundamental requirement which is vital to the economy of Bangladesh and which should be treated as one of the highest priorities of Government. This places a great responsibility on the Ministry of Communications (MoC) and the Roads and Highways Department (RHD).

2.6 Road Length

2.6.1 Road Length by Classification in Roads and Highways Department:

National Highway	3,537.91 Km
Regional Highway	4,278.07 Km
Zilla Road	13,454.63 Km
Total Road Length	21,270.61 Km

2.6.2 Road Length by Surface Type according to latest survey

Bituminous	16,649.11 Km
Earth	684.51 Km
HBB	638.40 Km
Cement Concrete (CC)	2.44 Km
Cement Blocks	0.37 Km
Total Paved Road Length	17,336.43 Km
Total Unpaved Road Length	638.40 Km
Total Surveyed Road Length	17,974.83 Km
Length of Road Not Surveyed	3,295.78 Km

2.7 Number of Culverts

Box Culvert	3852
Slab Culvert	2270
Total Number of Culverts	6122

2.8 Number of Bridges

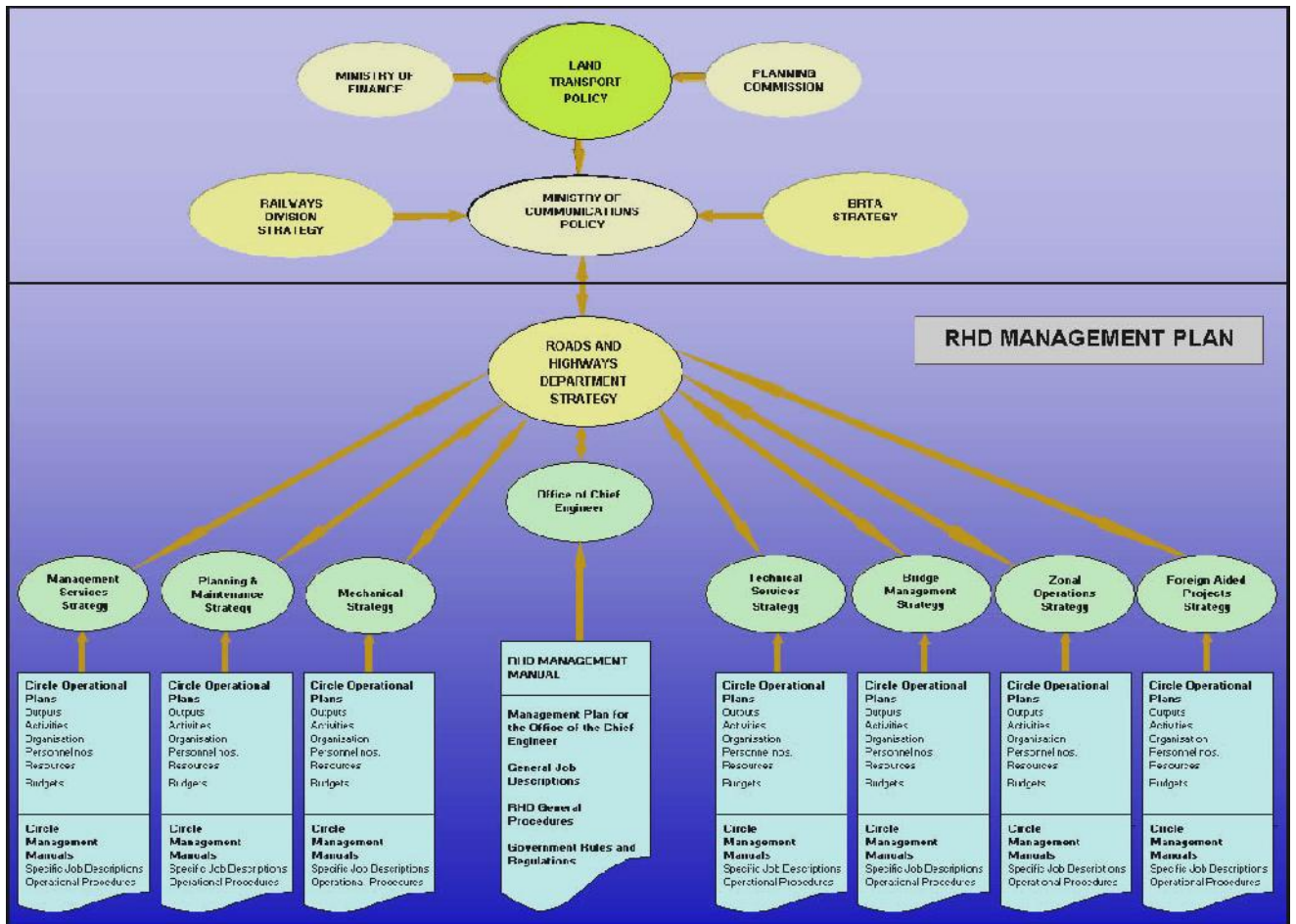
Unknown	3
Arch Masonry	378
RCC Bridge	1381
RCC Girder Bridge	1238
PC Girder Bridge	93
Steel Beam & RCC Slab	284
Truss with Steel Deck	153
Truss with RCC Slab	42
Bailey with Steel Deck	1005
Bailey with Timber Deck	82
Total Number of Bridges	4659
Total Number of Structures	10781

2.9 Major Bridges in Bangladesh

Name of Bridges	Name of Roads	Length(M)
Jamuna Bridge (Under Jamuna Bridge Authority)	Dhaka – Bogra	4800
Lalon shah (Paksey) Bridge	Ishwardi - Kustia Road	1786
Meghna - Gumti (Daud Kandi) Bridge	Dhaka – Chittagong	1408
Khan Jahan Ali (Rupsa) Bridge		1360
Bangladesh UK Friendship (Bhairab) Bridge	Dhaka – Sylhet	1194
2nd Buriganga Bridge		1016
Meghna Bridge	Dhaka – Chittagong	930
Gabkhan Bridge	Barisal – Patuakhali	918
Hajrath Sha Amanath Bridge	Chittagong - Cox's Bazar	914
Ist Bangladesh Chaina Friendship (Postagola) Bridge		848
Dharala Bridge		657
Kaliganga Bridge	Dhaka – Aricha	647
Gorai Bridge	Faridpur – Jessore	630
Karotoa Bridge	Boda – Debigonj	572
Bagabari Bridge	Pabna – Sirajgong	570
Daleswari Bridge	Dhaka – Aricha	492
Shambugonj Bridge	Mymensing - Haluaghat	464
Mohananda Bridge	Rajshahi – Nawabgonj	448
Brahmaputra Bridge	Dhaka – Sylhet	443

2.10 RHD Documentation Framework

The organisation of RHD is closely linked to the management policies, systems and procedures. The Figure 'RHD Documentation Framework' shows the hierarchy of management information required to define the organisation and the procedures, which are required for effective and efficient operations.



2.11 Land Transport Policy

The ‘Land Transport Policy’ is seen to be the guiding document for all issues concerning land transport. These activities come under the auspices of either the Ministry of Communications or the Ministry of Local Government Rural Development and Cooperatives. The Ministry of Communications Policy is a sub-set of the Land Transport Policy covering roads and highways (mainly through RHD), railways (through BR) and the management, regulation and operation of road transport (through BRTA and BRTC).

2.12 Strategy

The Roads and Highways Department Strategy is designed to satisfy the requirements of the Ministry of Communications Policy in respect of those activities, which are the remit of the RHD. To support the Roads and Highways Department Strategy, a separate strategy has been prepared for each of the Wings and zones within the Department.

Two types of documents have been defined to assist in the achievement of the activities within the Wing/Zone strategies. The two document types are Circle Operational Plans and Circle Management Manuals. The Circle Operational Plans contain details of the Objectives, Outputs and Activities of each Circle within the Wings/Zones together with details of the Personnel and other Resources required. An Operational Budget supports each Circle Operational Plan, which is essential for the successful implementation of the Plan. The Management Manuals contain operational procedures and regulations and job descriptions for the various grades of personnel and for specific posts. The sum total of these documents within RHD form the “Roads and Highways Department Management Plan”

The Roads and Highways Department Management Plan is not a static document, it must be changed as the Department changes and portions of the document, especially the Circle Operational Plans and the Management Manuals, will need regular updating.

The sections of this site include the Roads and Highways Department Strategy and the Wing/Zone Strategies together with relevant extracts from the Circle Operational Plans and Management Manuals. These documents indicate the extent and nature of the work to be undertaken by each Circle and provide justification behind the number of personnel, physical resources and budgets required if the reorganised RHD is to operate effectively.

Time and cost overruns on infrastructure development projects during implementation continue to pose great challenges to developing countries. Research has found that, there are many factors that impede on successful completion of projects on time, budget, and quality. This study sought to investigate on the factors that significantly contributed to time and cost overruns on efficiency

of procurement since Public Procurement Rules (PPR) in Roads and Highways department. Contractor inabilities, improper project preparation, resource planning, and interpretation of requirements, works definition, timeliness, government bureaucracy and risk allocation having been significant contributors to overruns. These factors should enable planners to take stock of past performance and incorporate lessons learned on future projects planning and implementation. The variables and underlying factors have potential of recurring in future projects, there is need to anticipate their occurrence, and to continually design appropriate strategies and mechanisms to overcome or minimize their potential impacts. Recommendations are given to assist the Government of Bangladesh on how project management could be improved on future projects planning and implementation. Projects owners, managers and agencies in developing their project management strategies, can use the findings of this study as a reference.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology of this thesis; the main topics included in this chapter are research strategy, research design and population, sample size determination, case study, questionnaire design, questionnaire content, pilot study and tests of reliability and validity of questionnaire and the last thing is the process of data analysis.

3.2 Research strategy

Naoum (1998) defined the research strategy as the way in which the research objectives can be questioned. Two types of research strategies are used at studies, quantitative and qualitative research. Quantitative approach is used to gather factual data and to study relationships between facts and how such facts and relationships accord with theories and the findings of any research executed previously, but the qualitative approach seek to gain insights and to understand people's perception of "the world" whether as individuals or groups (Fellows and Liu, 1997). In this thesis, a qualitative approach is used to understand the perception of respondents in Roads and Highways Department towards efficiency and effectiveness of PPR and identification of important factors influencing time and cost overruns at road construction projects in Bangladesh.

3.3 Research design

"Research design" refers to the plan or organization of scientific investigation, designing of a research study involves the development of a plan or strategy that will guide the collection and analyses of data (Poilt and Hungler, 1985). This research consists of seven phases; the first one is the proposal for identifying and defining the problems and establishment of the objectives of the study and development of research plan. The second phase of the research includes literature review. Literatures of time and cost overruns were reviewed. The third phase of the research included a survey which included the different procuring entities involved in road sector works, also some actual cases were collected from Roads and Highways Department. The fourth phase of the research includes the questionnaire design, through distributing the questionnaire to a sample of respondents. The purpose of the pilot study was to test and prove that the questionnaire questions are clear to be answered in a way that help to achieve the target of the study. The questionnaire was modified based on the results of the pilot study. The fifth phase of the research was questionnaire distribution. The questionnaire was used to collect the required data in order to achieve the research objectives. The sixth phase of the research focused data analysis and discussion. Statistical Package for the Social Sciences (SPSS) was used to perform

the required analysis. The last phase of the research includes the conclusions and recommendations.

3.4 Population

The population of this research included Procuring Entities and high officials of different sectors such as Additional Chief Engineer, Superintending Engineer, Executive Engineer, Sub-Divisional Engineer and Assistant Engineer of Roads and Highways Department, Local Government and Engineering Department. Contractors, working for Roads and Highways Department, are also considered as population for the research.

3.5 Sample Size Determination

Wood and Haber (1998) defined the sampling as the process of selecting representative units of a population for the study in research investigation. A sample is a small proportion of a population selected for observation and analysis. The samples were selected randomly from Procuring Entities and high officials of Roads and Highways Department, Local Government and Engineering Department and Contractors. The size of the sample for this study was 62.

3.6 Methodology of this thesis

After surveying the previous approaches of methodologies, the suitable one is to use questionnaire and case studies methods.

3.6.1 Questionnaire approach

A questionnaire was developed to assess the perceptions of respondents due to the importance index of effectiveness and efficiency of PPR and causes and effects of delay in road sector works. Factors influencing time and cost overruns in road construction projects in Bangladesh were first examined and identified through a relevant literature review and by conducting a pilot study that sought advice from experienced practitioners.

3.6.2 Case Studies

Four case studies were carefully selected and investigated. These cases discussed in depth information regarding the causes of time and cost overruns at road construction projects in Bangladesh, also to check the procedures and actions taken by procuring entities.. Each case will be analyzed separating of others; the case will illustrate the link between the data collected by questionnaire and data in case, recommendations will be documented for each case.

3.7 Questionnaire design

Considering the conditions and circumstances surrounding Bangladesh from economic level, the type of projects, geographical region and occupation factors which experienced the Bangladesh, factors, which affect efficiency and effectiveness of PPR and the time and cost overruns in engineering projects in Bangladesh, have been selected with the nature of construction projects and problems in Bangladesh.

3.8 Questionnaire content

The questionnaire included three parts that related to the factors of efficiency and effectiveness of PPR and time and cost overruns at road construction projects in Bangladesh. These parts are general information of the respondents, opinions regarding usefulness of PPR, factors influencing efficiency and effectiveness of PPR, factors influencing time overruns and factors influencing cost overruns.

3.8.1 General information of the respondents

Five items questions were prepared asking for information about respondents such as the educational background, name of organization, type of work, designation and experience. (The questionnaire is included in annex-1)

3.8.2 Factors influencing efficiency and effectiveness of PPR with respect to time and cost

This part of questionnaire consist of 3 groups related to efficiency and effectiveness of PPR, the groups included 28 factors that influencing to efficiency and effectiveness of PPR, these groups are general perception and attitude regarding PPR related factors, current environment and attitude toward implementing PPR related factors and opinion regarding usefulness of PPR related factors. (The questionnaire is included in annexure -1).

3.8.3 Factors influencing time overruns at construction project

This part of questionnaire consists of 13 factors; identified from the literature review, influencing time overruns in road sector projects in Bangladesh (The questionnaire is included in annexure -1).

3.8.4 Factors influencing cost overruns

This part illustrates the factors influencing cost overruns at road construction project; these factors are the harvest of previous studies, own experience and piloting study. 19 factors were included in this part. (The questionnaire is included in annexure- 1).

3.9 Pilot study

These structured questionnaires should be based on a carefully prepared set of questions piloted and refined until the researcher is convinced of their validity. Therefore the pre-testing is an important stage in the questionnaire design process, prior to finalizing the questionnaire. It involves administering the questionnaire to a limited number of potential respondents and other knowledgeable individuals in order to identify and correct design flaws.

For this research an English version of questionnaire was tested in order to make sure that the questions were easily understood. The test was made by distributing five drafts questionnaire. Among the drafts questionnaire three were distributed to high officials, such as, executive engineer, sub-divisional engineer and assistant engineer of RHD, one was distributed to high officials of LGED and one questionnaire was distributed to the contractors. The test enabled the researcher to remove any items that will not produce any usable data. Pilot investigation also helped to assess the adequacy of the research design and the instruments to be used for data collection. In general, the experts agreed that the questionnaire is suitable to achieve the goals of the study.

3.10 Data Measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is/are an appropriate method/s that can be applied and not others. In this research, ordinal scales were used. Ordinal scale is a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned to the agreement or degree of influence (1, 2, 3, 4, 5) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels.

ID	Item	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
----	------	--------------------	-----------	-------------	--------------	-----------------------

3.11 Process of data and analysis

After collecting the raw data of questionnaire, the data entered into computer spreadsheet, Statistical Package for the Social Sciences, (SPSS) program is used to perform the required analysis. The mean and standard deviations were used to get the result. The factors are ranked in descending order of mean value for time overruns and cost overruns separately.

CHAPTER FOUR: LITERATURE REVIEW

One of the most important problems in the construction industry is time and cost overruns. Time and cost overruns occur in every construction project and the magnitude of these delays and cost overruns varies considerably from project to project. So it is essential to define the actual causes of time and cost overruns in order to minimize and avoid the delays and increasing cost in any construction project. This chapter reviews literature concerning the major issues of time and cost overruns in order to recognize the related information regard those issues.

4.1 Definition of time and cost overruns

4.1.1 Time overruns

Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors (Kaming et al 1997). Delays are incidents that impact a project's progress and postpone project activities; delay causing incidents may include weather delays, unavailability of resources, design delays, etc. In general, project delays occur as a result of project activities that have both external and internal cause and effect relationship (Vidalis et al 2002).

Choudhry (2004) and Chan (2001) defined the time overruns as the difference between the actual completion time and the estimated completion time. It was measured in number of days. Project delays are those that cause the project completion date to be delayed (Al- Gahtani and Mohan 2007). From above, time overruns is defined as the time increased to complete the project after planed date, which caused by internal and external factors surrounded the project.

4.1.2 Cost overruns

Cost overrun is defined as excess of actual cost over budget. Cost overrun is also sometimes called "cost escalation," "cost increase," or "budget overrun." (Zhu et al 2004). Cost overrun is defined as the change in contract amount divided by the original contract award amount. This calculation can be converted to a percentage for ease of comparison (Jackson' 1990).

Cost overrun = (Final Contract Amount – Original Contract Amount) / (Original Contract Amount)

Choudhry (2004) defined the cost overruns as the difference between the original cost estimate of project and actual construction cost on completion of works of a commercial sector. Construction project.

4.1.3 Efficiency

Efficiency is measured in terms of how economically the organisation's resources are utilised in providing a given level of stakeholder's/customer's satisfaction. It is the relationship between inputs and outputs achieved. The fewer the inputs, both goods and services, used by an organisation to achieve a given output, the more efficient the is the organisation. It essentially means that one should complete tasks without waste of inputs. If product 'y' normally takes 2.0 units of item 'x', in its manufacture, and one can manage to provide it using only 1.8 units, then he has been efficient. If it takes 2.2 units of item 'x', he has been inefficient.

4.1.4 Effectiveness

Effectiveness is measured by the extent to which stakeholder's /customer's requirements are met over time. It is the degree to which objective or target is met. Effectiveness generally means that one can accomplish tasks that fit in with overall objectives. It is not effective to manufacture units of product 'y' if one is already overstocked with it, no matter how economically or efficiently one does it. Similarly, it is not effective if one has product 'y' in stock but cannot convey it promptly to the internal or external customers who need it.

4.2 Types of delay

The main types of delay have been stated by a number of researchers (Vidalis et al 2002), Ahmed et al (2003), Alaghabri et al (2007) and Al- Gahtani and Mohan (2007). These types are Excusable delay, Concurrent delay, Compensable delay, and Critical delay.

The types of delays above have internal or external impacts on project process. Internal causes of delay include causes that come from the owner, designers, contractors, and consultants. External causes of delays are originated from outside of construction projects such as utility companies, government, subcontractors, suppliers, labor unions, nature, etc. Figure 4.1 presents sequential relationships of various categories of delays (Vidalis et al 2002).

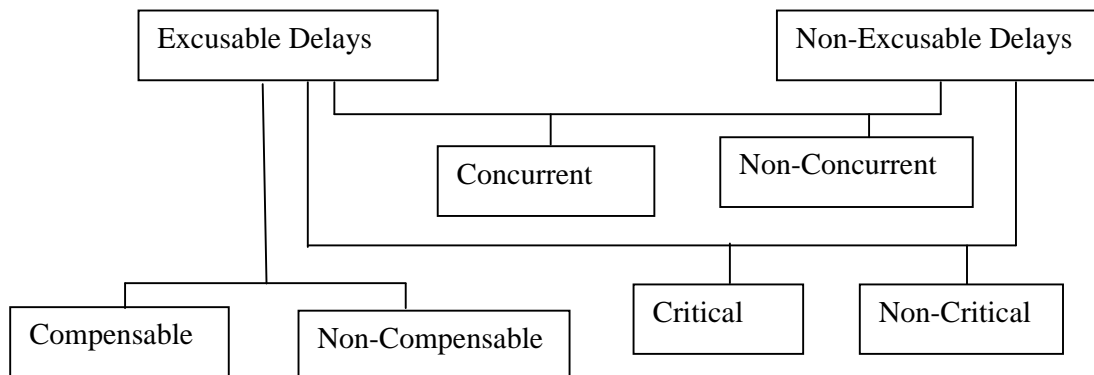


Figure 4.1: Sequential relationships of various categories of delays (Vidalis et al, 2002)

4.2.1 Excusable delays

Excusable delays are unforeseeable events beyond anyone's control. They are broken down further into compensable or non-compensable delays. If the delay is considered compensable, then the contractor is entitled to additional financial compensation as well as extra project time. Under certain circumstances where non-compensated excusable delays occur, the contractor receives extra time but not extra money for the additional completed work. Excusable delays, known as "force majeure" delays, and commonly called "acts of God" because they are not the responsibility or fault of any particular party. Most contracts allow for the contractor to obtain an extension of time for excusable delays, but not additional money (Alaghbari et al 2007).

Owner-issued contracts specifically address some potential compensable delays and provide equitable adjustments. The usual equitable adjustment clauses in owner issued contracts that apply to delay are: Changes, differing site conditions, and suspension. The changes clause in owner-issued contracts provides that equitable adjustments may be considered as follows:

4.2.1.1 Changes

With the help of a written change notice, the owner may, without any notice to the sureties (if any), unilaterally make any change, at any time in the work within the general scope of the contract, including but not limited to changes:

- In the drawings, designs or specifications.
- In the method, manner or sequence of contractor's work.
- In customer or owner furnished facilities, equipments, materials, services or site(s).
- Directing acceleration or de acceleration in the performance of the work.
- Modifying the contract schedule or the contract milestones.

If at any time contractor believes that acts or omissions of customer or owner constitute a change to the work not covered by a change notice, contractor shall within ten (10) calendar days of discovery of such act or omission, submit a written change notice request, explaining in detail the basis for the request. Owner may either issue a change notice or deny the request in writing. If any change under this clause causes directly or indirectly an increase or decrease in the cost, or the time required for the performance of any part of the work, whether or not changed by any order, an equitable adjustment shall be made and the contract will be modified accordingly (Ahmed et al 2003).

The clause recognizes that changes in the work or changes in the method or manner of performance may require changes in the schedule and schedule milestones and this could further necessitate revisions in activity durations, sequence of work items, or interrelationships of various tasks. These changes may have a direct impact on the schedule, as where a change in method requires a greater or lesser period of performance or its effects may be subtler, as where

the change merely rearranges priorities. In addition to a time extension, the contract's clause provides compensation for any delay resulting from a contract change by allowing an equitable adjustment for the increased cost of the performance of the work caused by the change (Ahmed et al 2003).

4.2.1.2 Differing Site Conditions

The portion of the clause addressing cost or time adjustments for 'differing site conditions' provide. If such conditions do differ in material and thus cause an increase/decrease in the Contractor's cost or time required for performance of the work, an equitable adjustment will be made pursuant to the General Condition titled "Changes". No claim of the contractor under this clause will be allowed unless the contractor has given the required notice. The main intention is to leave the contractor neither damaged nor enriched because of the resultant delay (Al-Gahtani and Mohan, 2007). The differing site conditions clause must not be confused with the site conditions clause in owner issued contracts - the so-called "Exculpatory" clause. Its intent is to disallow any claims for delays relating to conditions at the site, which the contractor should have anticipated. The exceptions are limited to those conditions defined in the differing site conditions clause (Ahmed et al 2003).

4.2.2 Concurrent delays

If only one factor is delaying construction, it is usually fairly easy to calculate both the time and money resulting from that single issue. A more complicated – but also more typical – situation is one in which more than one factor delays the project at the same time or in overlapping periods of time. These are called concurrent delays (Alaghbari et al 2007). Concurrent delays occur when both owner and the contractor are responsible for the delay. Generally, if the delays are inextricably intertwined, neither the contractor can be held responsible for the delay (forced to accelerate, or be liable for liquidated damages) nor can he recover the delay damages from the owner. Until the development of CPM schedule analysis, there was no reliable method to differentiate the impact of contractor caused delays from owner-caused delays. With the sophisticated computerized techniques now available, however, it has become possible to segregate the impacts of apparently concurrent owner and contractor delays (Alwi et al 2002). In analyzing a delay claim, an analysis based on a comparison of the contractor's approved CPM schedule with the as-built CPM schedule should be performed to apportion proper responsibility for delay. Because the critical path may shift as the job progresses, it is updated based upon contractually required input from the contractor.

4.2.3 Compensable delays

Compensable delays are those that are generally caused by the owner or its agents. The most common form of compensable delay is inadequate drawings and specifications, but compensable delays can also arise from the owner's failure to respond in a timely fashion to requests for information or shop drawings, owner's changes in design or materials, and owner's disruption and/or change in the sequence of the work. The contractor is entitled to both additional money and additional time resulting from compensable delays (Alaghbari et al 2007).

In addition to the compensable delays that result from contract changes by change notice, there are compensable delays that can arise in other ways. Such compensable delays are excusable delays, suspensions, or interruptions to all or part of the work caused by an act or failure to act by the owner resulting from owner's breach of an obligation, stated or implied, in the contract. If the delay is compensable, then the contractor is entitled not only to an extension of time but also to an adjustment for any increase in costs caused by the delay (Al-Gahtani and Mohan, 2007).

Al-Gahtani and Mohan (2007) added another type of delay that is pacing delay: Pacing delay is deceleration of the project work, by one of the parties to the contract. This is because of a delay to the end date of the project, caused by the other party. The goal is to maintain steady progress with the revised project schedule.

4.2.4 Critical delays

Critical delays are delay claims that affect the progress, time, and compensation. Noncritical delays do not affect the completion date of the project. They affect the succeeding activities that are not on the critical path of the schedule. This can set back activities if they do not have a float in the schedule (Abudul-Rahman et al 2006).

4.3 Delay responsibility

Ahmed et al (2003) claimed that the issue of responsibility for delay is related to whether the contractor is awarded or is liable for costs and additional time to complete the project. The categories of responsibilities are:

- Owner (or agent) responsible – contractor will be granted a time extension and additional costs (indirect), where warranted;
- Contractor (or subcontractor) responsible – contractor will not be granted time or costs and may have to pay damages/penalties;
- Neither party (e.g. “act of God”) responsible – contractor will receive additional time to complete the project but no costs will be granted and no damages/penalties assessed; and
- Both parties responsible – contractor will receive additional time to complete the project but no costs will be granted and no damages/penalties assessed.

4.4 Causes of time and cost overruns

4.4.1 Causes of time overruns (delay)

Time overruns (delays) can be divided into three categories:

1. Those over which neither party to the contract has any control;
2. Those over which the owner (or his/her representative) has control;
3. Those over which the contractor (or any subcontractor) has control.

The predominant factors influencing time overruns/delays are design changes, poor labour productivity, inadequate planning and resource shortages. Table 4.1 illustrates the variables of delay and cost controls, which studied by Kaming et al (1997) in Indonesia.

Table 4.1: Variables influencing time, and/or cost control in Indonesia (Kaming et al 1997)

Variables of delays and cost controls	Environment restriction
	Experience of project location
	Accurate prediction of equipment production rate
	Equipment availability
	Experience of local regulation
	Weather conditions
Variables of time controls	Build ability
	Labour productivity
	Level of planning
	Material availability
	Accuracy of materials estimate
	Accurate prediction of craftsmen production rate
	Skilled labour availability
	Locational restriction of the project
Variables of cost controls	Inflation of material cost
	Accurate quantity take-off
	Experience of project type

Ahmed et al (2003) studied two kinds of cause for delay in construction projects:

- (1) External causes; and
- (2) Internal causes.

Internal causes of delay include the causes arising from four parties involved in the project. These parties include the owner, designers, contractors, and consultants. Other delays, which do not arise from these four parties, are based on external causes for example from the government, materials suppliers, or the weather.

Chan et al (1996), Ogunlana et al (1996), Kaming et al (1997), Alwi et al (1999), Ahmed et al (2003) and Alaghbari et al (2007) mentioned the possible following factors causing delays in construction projects: A number of researcher have categorized the factors that causing delays in the four categories, those are:

(1) Contractor's responsibility

The factors that related to contractor's responsibility are; delay in delivery of materials to site; shortage of materials on site; construction mistakes and defective work; poor skills and experience of labour; shortage of site labour; low productivity of labour; financial problems; coordination problems with others; lack of subcontractor's skills; lack of site contractor's staff; poor site management; and equipments and tool shortage on site.

(2) Consultant's responsibility

The factors that related to consultant's responsibility are; absence of consultant's site staff; lack of experience on the part of the consultant; lack of experience on the part of the consultant's site staff; (managerial and supervisory personnel); delayed and slow supervision in making decisions; incomplete documents; and slowness in giving instructions.

(3) Owner's responsibility

The factors that related to owner's responsibility are; lack of working knowledge; slowness in making decisions; lack of coordination with contractors; contract modifications (replacement and addition of new work to the project and change in specifications); and financial problems (delayed payments, financial difficulties, and economic problems).

(4) External factors:

The factors that related to external factors are; lack of materials on the market; lack of equipment and tools on the market; poor weather conditions; poor site conditions (location, ground, etc.); poor economic conditions (currency, inflation rate, etc.); changes in laws and regulations; transportation delays; and external work due to public agencies (roads, utilities and public services) (Alghbari et al 2007).

Chan et al (2002), Alwi et al (2002), Assaf (2006), Odeh and Battaineh (2002) and Alghbari et al (2007) Classified factors that cause time overrun into eight groups (owner, contractor, consultant, material, labour and equipment, contract, contractual relationships and external factors). Table 4.2 illustrated the factors that cause time overruns.

Table 4.2: Factors that influencing causes of time overruns (Alwi et al, 2002)

Category	Factor
Owner	Finance and payments of completed work.
	Owner interference.
	Slow decision-making by owners.
	Unrealistic imposed contract duration.
Contractor	Subcontractors.
	Site management.
	Construction methods.
	Improper planning.
	Mistakes during construction.
	Inadequate contractor experience
Consultant	Contract management.
	Preparation and approval of drawings.
	Quality assurance/control.
	Waiting time for approval of tests and inspections
Material	Quality of material.
	Shortage in material
Labor and equipment	Labor supply.
	Labor productivity.
	Equipment availability and failure
Contract	Change orders.
	Mistakes and discrepancies in contract documents

Contractual relationships	Major disputes and negotiations.
	Inappropriate overall organizational structure linking
	Lack of communication between the parties.
External factors	Weather condition
	Regulatory changes and building Code
	Problems with neighbors.
	Unforeseen ground conditions

Ogunlana et al (1996) examined construction delays in a fast- growing economy: comparing Thailand with other economies. A study of the causes of delays in 12 high rise building construction projects in Bangkok, Thailand has been made. Resource supply problems were by far the most acute problems of the construction industry in the boom years. Projects suffered delays because materials, especially cement, were in short supply, technical personnel were overstretched, having to do so much so soon in their careers.

Demands from construction owners for frequent changes also created design and coordination problems for field staff. The result was that many projects were poorly managed and exceeded time forecasts. The results of the survey have also been compared with studies from other developing economies. Contractors working in developing economies work under special constraints, which are not as serious in developed countries. This class of problem requires focused strategy by a national agency working in concert with participants in the construction industry towards their solution.

Al- Khalil and Al-Ghafly (1999) assess the frequency of project delay in water and sewage projects, the extent of the delay, and the party responsible for the delay. They found that a large number of projects experience delay, especially in medium- and largesize projects.

Owners and consultants assigned the major responsibility for delay to the contractor but the contractor placed it mostly on the owner. On average, the contractor is assigned most responsibility, but when considering that part of the responsibility of the consultant and others may be transferable to the owner, the owner may carry the prime responsibility for delay. It may also be argued that the contractor is not primarily responsible because of the high rate of approval for contractors' requests for time extension.

Aibinu and Jagboro (2002), in their study of the growing problem of construction delay in Nigeria, examined the effects of delays on the delivery of construction projects in the country.

Utilizing a questionnaire survey of 61 construction projects, the authors identified, and assessed the impact of delays on the delivery of construction projects. Time and cost overruns were found to be frequent effects of delay. Acceleration' of site activities coupled with improved owners' project management procedures and the inclusion of an appropriate contingency allowance in the pre contract estimate were recommended as a means of minimizing the adverse effect of construction delays in Nigeria.

Odeh and Battaineh (2002) studied the causes of construction delay at traditional contracts in Jordan, they used questionnaire procedure in this study; the questionnaire was distributed to a random sample of 100 contractors and 50 consultants. The study illustrated that; according to contractors, labor productivity was the most important delay factor. Inadequate contractor experience, however, was the most important delay factor to consultants. All parties generally agreed on the ranking of the individual delay factors. They agreed that inadequate contractor experience, owner interference, and financing of work were among the top five most important factors. Moreover, delays caused by subcontractors, slow decision-making by owners, improper planning, and labor productivity were among the top ten most important factors for both parties. Operational factors such as labor productivity, construction methods, site management, and equipment availability and failure were important to contractors than to consultants.

Ahmed et al (2003) found that the most common type of delay is excusable compensable at 48%, followed by non-excusable delays with 44% and 8% for excusable noncompensable delays. In most of the cases, it is found that when the contractor has the responsibility, the type of delay respectively is non-excusable; when the responsibility is the owner's or the consultant's it is an excusable compensable delay; and when the government is responsible, the delay is considered an excusable compensable.

The consultants play a very important role in design-related delays because as they are in charge of the design process in conjunction with the owner of the project. On the other hand, the government plays the most important role in code-related delays. The contractor has the major responsibility for delays in construction-related delays. Delays due to financial / economical causes as well as management / administrative causes share an intermediate position of importance, just presenting one key delay – delayed payments. These categories do not have the same negative impact on project completion times as other factors considered in this study such as code, design and construction related issues (Kessing; 2003).

Alghbari et al (2007) examined the factors that cause delay in construction projects in Malaysia. The results of the analysis show that from a total of 31 variables examined, separated into four categories by responsibility, the major factors causing delay in construction projects are factors due to the contractor, followed by factors due to the consultant, factors due to the owner, and

finally external factors. The main finding of the study is that the financial factor is the most influencing factor in causing delay in construction projects in Malaysia. Coordination problems are considered the second important factor causing delay in construction projects, followed by materials problems. Further examination of factors causing delay in construction projects in Malaysia based on four categories – contractor, consultant, owner, and external factors – the study shows that on the contractor’s side, financial problems are the major factor in delaying construction projects. Poor site management and, as a consequence, construction Mistakes, delay in the delivery of materials to the site, and coordination problem were the subsequent factors causing delay in construction projects in Malaysia. The study also shows that the main factor on the owner’s side causing delay in construction projects is financial problems. From the consultant’s side, the first component that seems to be the cause of delay in construction projects is ineffective or lack of supervision, followed by “slowness in giving instructions” and “lack of consultant’s experience” (Chan et al 2002).

4.4.2 Identifying factors that influence cost overruns

Previous research has attempted discover reasons for the disparity between the tender sum and the final account. This section identifies the factors that influence cost overruns. Four factors were identified from the existing research findings Morris et al (1990), Kaming et al (1997) and Chimwaso (2001). These are; design changes, inadequate planning, unpredictable weather conditions; and fluctuations in the cost of building materials.

To broaden the investigation it was decided to complement the above list of factors with other factors gleaned from the final account reports. These were compared with the factors from the existing research findings, and a final list of 18 factors was prepared. Those were then divided into two groups of seven critical factors and nine other factors, which are usually ignored, but perceived to be of equal significance (Chimwaso; 2001).

List of critical factors

1. Incomplete design at the time of tender.
2. Additional work at owner's request.
3. Changes in owner's brief.
4. Lack of cost planning/monitoring during pre-and-post contract stages.
5. Site/poor soil conditions.
6. Adjustment of prime cost and provisional sums.
7. Remeasurement of provisional works.
8. Logistics due to site location.
9. Lack of cost reports during construction stage.

List of other factors, which are usually ignored

1. Delays in issuing information to the contractor during construction in delays.
2. Technical omissions at design stage.
3. Contractual claims, such as, extension of time with cost claims.
4. Improvements to standard drawings during construction stage.
5. Indecision by the supervising team in dealing with the contractor's queries in delays.
6. Delays in costing variations and additional works.
7. Omissions and errors in the bills of quantities.
8. Ignoring items with abnormal rates during tender evaluation, especially items with provisional quantities.
9. Some tendering maneuvers by contractors, such as front-loading of rates.

The prime variables of cost overruns have been commonly identified as: unpredictable weather, inflationary material cost, inaccurate materials estimates, complexity of project, contractor's lack of geographical experience, contractor's lack of project type experience, and non-familiarity with local regulations (Kaming et al 1997).

Morris (1990) studied the factors influencing cost overruns in public sector projects, he found that Escalation in costs is attributable partly to the fact that the original estimates were prepared at the then current prices, and partly to delays which enhance the effect of inflation and to direct escalation in costs arising out of change in scope, errors etc. Based on certain assumptions with regard to the pace of expenditure on projects Morris have roughly computed that for the 133 projects which were studied only about 25 to 30% of the cost increase can be attributed to inflation. The remaining 70 to 75% has to be explained in terms of delays, inefficiencies, scope changes, changes in statutory levies, variations in exchange rates and to the combined effect of these factors with inflation.

Morris (1990) was mentioned ten factors that influencing cost overruns of construction projects. These factors are: inadequate project preparation, planning and implementation, delay in construction as the first cause of cost overruns. The second factor was supply of raw materials and equipment by contractors. The third one was change in the scope of the project. The fourth factor of cost overruns was resources constraint: funds, foreign exchange, power; associated auxiliaries not ready. The delays in decisions making by government, failure of specific coordinating bodies was the fifth factor. The sixth cause was wrong /inappropriate choice of site. The seventh one was technical incompetence and poor organizational structure. The labor unrest was the eighth one. The ninth factor cause cost overruns were natural calamities, Indo-Pakistan war and the last one was the lack of experience of technical consultants, inadequacy of foreign collaboration agreements, monopoly of technology.

Kaming et al (1997) examine the factors influencing construction cost overruns on highrise projects in Indonesia, They found that cost overruns occur more frequently and are thus a more severe problem than time overruns on high-rise construction in Indonesia. The predominant factors influencing cost overruns are material cost increases due to inflation, inaccurate materials estimating and degree of project complexity.

Chimwaso (2001) evaluated ten projects to assess their cost performance. The results have shown that seven out of ten projects had reported cost overruns. The factors that influence cost overruns have been identified and ranked in order of significance. These factors have further been classified under categories according to the format of final account reports. By classifying them into categories, helps to deal with them effectively. The four categories arrived at are: variations, measurement of provisional works, contractual claims and fluctuations in the cost of labour and materials, with variations being the most significant.

Frimpongs et al (2002) studied 26 factors that cause cost overruns in construction of ground water projects in Ghana, they sent to 55 questionnaire to owners, 40 to contractors and 30 to consultant. According to the contractors and consultants, monthly payments difficulties from agencies was the most important cost overruns factor, while owners ranked poor contractor management as the most important factor. Despite some difference in viewpoint held by the three groups surveyed, there is a high degree of agreement among them with respect to their ranking of the factors. The overall ranking results indicates that the three groups felt that the major factors that can cause excessive groundwater project overruns in developing countries are poor contractor management, monthly payment difficulties from agencies, material procurement, poor technical performances, escalation of material prices according to their degree of influence. The amount of cost- increase (overruns), increased with an increase in the total cost of a residential project. However, private residence owners who spent more time on the preplanning phase spent more money on the design phase; issued less change orders; selected more experienced contracting companies; and hired a supervising engineer to independently supervise the progress of work and ensure the delivery of materials –experienced less and cost – increases during the implementation phase of their residential projects. A major factor contributing to the sample projects' and cost- increase was the insufficiency of money and time allocated to its design phase (Koushki et al 2005).

4.5 Delay mitigation in the construction industry

An analysis is needed to identify the impact of delay on time and cost followed by taking the appropriate action to mitigate delay and minimize the cost required. It is important to improve the estimated activity duration according to the actual skill levels, unexpected events, efficiency of work time, and mistakes and misunderstandings. Mitigation efforts are necessary to minimize

losses and this can be achieved by many procedures such as protection of uncompleted work, timely and reasonable re-procurement, and timely changing or cancellation of purchase orders. It is important to predict and identify the problems in the early stages of construction and diagnose the cause to find and implement the most appropriate and economical solutions (Abdul-Rahman et al 2006).

It was indicated from the survey findings derived from different levels of management that the major causes of delay are due to financial problems followed by manpower shortage and changes in the project requirements. All parties involved in the project also agreed that delay occurs mostly during the construction phase. Therefore, in resolving those problems, the units of analysis suggested to increase the construction productivity, followed by increase the expertise and skill of human resources, and conducted site meetings more frequently. A strategic view of solving delay problems should consider the importance of the management aspects, the effects of knowledge and information flow between the organization levels, and the importance of top management contribution in solving the problems.

4.6 Time variance for building projects

Time variance (T_v) is the time between the scheduled contract time and the completion time in undertaking building projects.

4.6.1 Discussion on the major causes contributing to time variance

The consequences of construction time delay when undertaking a public sector building project affects all project parties, with issues such as extra cost. Although various methods for mitigating the problem have been developed in the previous studies, the limitation of using these methods raises the concern that probably the causes contributing to the time variance has not been adequately addressed. To investigate the causes, five interview workshops were arranged with relevant personnel in the public sectors. These discussions led to the identification of the following major categories of causes of time overruns (Wang et al 2003).

4.6.1.1 Policy-related Causes

Essentially, public sector projects are sponsored or endorsed by the government. The implementation of this type of project must be in line with governmental policy. On the other hand, governmental policy has to incorporate multiple dimensional interests, in particular, the public interests. These interests are multiple, dynamic and complicated, and in order to satisfy these interests, changes in policy are unavoidable. A typical example is the existence of many prolonged office-building projects in a number of cities in China, mainly due to the change of governmental financing policy in late 1990.

The government either postponed or reduced the financial commitments to many building projects in an attempt to depress the 'over-heated' construction market. As a result, many projects were delayed. New policies are often introduced in the middle of a project's construction process, for example, additional safety measures, or new quality monitoring systems. The implementation of new policies will normally involve investment from the project parties. The process of identifying that should take what responsibility in order to implement these policies can substantially delay project progress (Moungrous et al 2003).

4.6.1.2 Owner-related Causes

A public sector project generally involves more changes, thus inducing delays in the process of implementing the project. The public sector owner in general, is less active in pushing project progress when compared with a private sector owner. There is a lack of skill in controlling construction programming.

The bureaucracy exists in all procedures that a public sector project has to go through, which further induces progress delay. A public sector owner has to work with many governmental departments when changes to a project occur. He has to spend a substantial amount of time communicating with many other governmental departments, which again induces project delays (Wang et al 2003).

4.6.1.3 Design-related causes

The discussion shows that insufficient or incorrect design data is a major reason contributing to project delays. The problem happens because of the owner's poor briefing, insufficient time allowed for design, the architect's poor skill and the owner's quests for changes during the construction process (Vidalis et al 2002).

4.6.1.4 Contractor-related Causes

There are many ways in which a contractor's performance can delay a construction project. For typical examples, main contractors often have various disputes with subcontractors and materials suppliers, which can cause major delays. In fact, such disputes are considered a major cause for project delay. Other factors, such as the contractor's insufficient financial resources, mistakes in making decisions on progress control and the overall inability when performing management functions, are also possible reasons for causing project delays.

It is interesting to note that, a main contractor will sometimes deliberately demand an unreasonably short contract period although the contractor understands that the completion on contract time is impossible. In this situation, the contractor only wants to secure a contract and thus agrees with an unrealistic contract period imposed by a project owner. Consequently, project delay cannot be avoided (Takim et al 2004).

4.6.1.5 Consultant-related Causes

The consultant engaged in a building project can affect the progress of construction programming through various monitoring measures such as issuing certificates, and endorsing the satisfaction of certain activities in the construction process. Progress delay can happen if these monitoring measures are not implemented properly. This appears a typical problem in the mainland of China where a professional called the 'supervision engineer' is adopted for supervising construction performance, particularly in committing public sector projects. Supervision engineers are given the authority to endorse the satisfaction of certain procedures such as piling, steel fixing, the quality of key materials, before the construction programming can proceed forward. It has been found that supervision engineers often cannot endorse these procedures in time, thus construction delays are caused (Wang et al 2003).

Enshassi et al 2003 found that the financing group of delay factors was ranked the highest and the environment group was ranked the lowest. In order to improve the situation, there is a need to pay more attention to the financial issues in the local construction industry, and there is a need for better communication and coordination with international funding agencies. The construction industry in Bangladesh should also adopt innovative management techniques, team building and value engineering in order to be more efficient and effective. A constructive team building approach between owners, consultants and contractors will reduce delays and improve the quality of the work.

Kaming *et al.* (1997) exploited questionnaire survey in Indonesian high-rise construction projects. They identified 11 variables of delays and 7 variables of cost overruns. Out of which, materials cost increased by inflation, inaccurate quantity take-off and labor cost increased due to

environment restriction are the first three causes of cost overruns; while design changes, poor labor productivity, inadequate planning, materials shortage and inaccuracy of materials estimate are first five causes of delays.

With person-interview survey of 450 randomly selected private residential project owners and developers in Kuwait, Koushki *et al.* (2005) identified estimates of time delays and cost increases and their causes. The three main causes of delays are changing orders, owners' financial constraints, and owners' lack of experience. And three first causes of cost overruns are contractor- related problems, material-related problems and owners' financial constraints. They recommended that to minimize time delays and cost overruns, project owners should require the availability of adequate funds, allocation of sufficient time and money at the design phase, and selection of a competent consultants and reliable contractor to carry out the work.

Frimpong *et al.* (2003) carried out a questionnaire survey in Ghana groundwater construction projects. They listed and ranked 26 factors responsible for project delays and cost overruns. The Kendall's coefficient of concordance was used to test the degree of agreement between owners, contractors and consultant and concluded that there was insignificant degree of disagreement.

Chang (2002) identified through 4 case project documents the reasons for cost and schedule increase and further quantified their contributions to this problem for engineering design projects. These reasons were grouped into three headings: mainly within the owner's control, mainly within the consultant's control, and beyond either the owner's or consultant's control.

Around the world, many other researchers have been attracted on project delay problems. Many of them have paid attention to Asian and African countries. In Southeast Asia, these researchers are: Ogunlana *et al.* (1996) in Thailand, Kaming *et al.* (1997) in Indonesia, Sambasivan and Soon (2007) in Malaysia. Chan and Kumaraswamy (1996), Kumaraswamy and Chan (1998), Lo *et al.* (2006) have studied about Hong Kong, and Acharya *et al.* (2006) have studied about Korean perspective. Middle East countries, where petroleum and natural gas exports have played an important role in the economy, construction boom has consumed many research efforts. Assaf and Al-Hejji (2006) in Saudi Arabia, Koushki *et al.* (2005) in Kuwait, Faridi and El-Sayegh (2006) in UAE, and Odeh and Battaineh (2002), Sweis *et al.* (2007) in Jordanian construction industry are prominent. In other continents, Chang (2002) surveyed in US. And Frimpong *et al.* (2003) in Ghana, Mansfield *et al.* (1994), and Aibinu and Odeyinka (2006) in Nigeria are the other African researchers.

In Vietnam, large construction projects were studied by Long *et al.* (2004a) to identify project success factors, and by Long *et al.* (2004b) to identify common and general problems.

Roads and Highways Department, Bangladesh, also facing the construction delays and cost overruns problems as the big headache now, especially with government-related funded projects. For this efficiency and effectiveness of Public Procurement Rules 2008 in Roads and Highways Department extensively reviewed.

4.7 Case Study:

Four case studies collected from actual work implemented in RHD for the era before and after the PPR. The data was collected from reviewing work documents recorded in files and maintained by division's office of RHD, Interviews with the work's contractors, consultants and owners. Summarized data of the collected information was presented by concentrating on the factors influencing time and cost overruns of these works.

Case Study -1:

This case illustrates one of works in fiscal year 2009-2010, which experienced time overruns in RHD. The work was for periodic maintenance of DBST and Overlay works at Mawna – Fulbaria-Kaliakoir-Dhamrai-Nabinagar road R-315 under Manikgonj Division. The work includes maintenance works of about 32.070 km.

The characteristics of the work are as follows:

Name of work: periodic maintenance of DBST and Overlay works at at Mawna –Fulbaria-Kaliakoir-Dhamrai-Nabinagar road R-315 under Manikgonj Division

Work Location: Mawna –Fulbaria-Kaliakoir-Dhamrai-Nabinagar road R-315.

Tender no: 01/2009-2010

Tender invitation date: 06/10/2009

Tender receiving date: 5/11/2009

Date of approval: 5/04/2010

Time required from invitation to approval = 180 days

Actual work value =Tk. 84973565.62

Revised work value =Tk. 84920846.24

Approved time for work = 150 days

First revised time = 118 days, it is 78.67% of actual duration it is

Second revised time = 60 days

Comments: From the data mentioned above it is observed that the work was procured as per PPR. The work was delayed and time over runs occurred though it was not experienced cost overruns. Another point is noted that the time from advertisement to approval of work is almost 06 months which was not efficient procurement. So it can be commented that though PPR was followed but procurement efficiency was not obtained for this work.

Case Study -2:

This case illustrates one of works in fiscal year 2001-2002, which experienced cost overruns in RHD. The work was for Construction of flexible pavement at Ch. 14+580 to 16+ 000=1420m of Sonapur-Char alexander Road during the year 2001-2002 under Noakhali Road Division.

The characteristics of the work are as follows:

Tender invitation date: 16-02-11

Last date of receiving tender: 14-03-02

No of tender received: 327

Date of approval: 04-06-2002

Time required from invitation to approval = 108 days

Actual work value =Tk. 52, 89,517.00

Revised work value =Tk. 62, 38,411.60 it is 17.94% more than the actual value.

Approved time for work = 90 days

Revised time = Data not found

Comments: The work was done before following the PPR. Cost overruns occurred for this work. The data for time overruns was not found in record. The work required 17.94% more money than the actual. From the record and interviews it is noted that the causes of cost variation was, the demand of public representative of project area, Cheokhali Bazar has to be widened to 5.50m. So variation has to be done as per proper rules & regulation. So it can be commented that though PPR was not followed but procurement was efficient for this work.

Case Study -3:

This case illustrates one of works in fiscal year 2008-2009 which experienced both cost and time overruns in RHD. The work was for periodic maintenance of DBST and Overlay works at Dhaka (Jatrabari)-Mawna-Bhanga-Barishal-Potuakhali road (N8) under Munshigonj Division. The work includes maintenance works of about 32.11 km.

The characteristics of the work are as follows

Name of work: periodic maintenance of DBST and Overlay works at Dhaka (Jatrabari)-Mawna–Bhanga-Barishal-Potuakhali road (N8) under Munshigonj Division.

Work Location: Dhaka (Jatrabari)-Mawna–Bhanga-Barishal-Potuakhali road (N8)

Tender no: 21/2008-2009

Tender invitation date: 12/11/2008

Tender receiving date: 15/12/2008

Date of approval: 11/03/2009

Time required from invitation to approval = 120 days

Actual work value =Tk. 84470601.30

Revised work value =Tk. 84877322.97

Approved time for work = 300 days

Revised time = (300+124) days, it is 41% more than actual duration

Comments: From the data mentioned above it is observed that the work was procured as per PPR. The work was experienced by both time and cost over runs though procurement system was efficient.

Case Study -4:

This case illustrates one of works in fiscal year 2008-2009 which experienced time overruns in RHD. The work was for Consultancy Services for Feasibility Study of 3rd Shitalakha Bridge at Bandar Upazila, Narayangonj.

The characteristics of the work are as follows

Invitation of Request for Proposal: 14/08/2008

Submission of evaluation report for approval= 17/12/2008

Time required from invitation to final evaluation = 123 days

Actual work value =Tk. 18300000.00

Revised work value =Value was not revised

Approved time for work = 06 months i.e. July 2008 to December 2008

Revised time = 1st revision: up to December 2008 i.e. 06 months more than the actual

2nd revision up to 30th June 2009 i.e. total 12 months more than the actual

3rd revision up to 30th June 2010 i.e. total 24 months more than the actual

Comments: From the data mentioned above it is observed that the work was procured as per PPR. The work was experienced by time over runs extensively though there was no cost over runs. From the record and interviews it is noted that the causes of time over runs was objection from one of proposers regarding the scanned signature put on financial proposal and the dilemma was whether the scanned signature can be treated as electronic signature or not? So to meet up the objection the project takes more time and several revisions were required.

CHAPTER FIVE: RESULTS AND DISCUSSION

5.1 Introduction

This chapter includes the analyzed result and discussions on the findings for efficiency and effectiveness of PPR, and discussions on the findings of time and cost overruns for the road sector projects in Bangladesh.

5.2 Characteristics of the respondents

To conduct the survey, the questionnaires were distributed among 90 respondents, 30 in each of three groups of respondents (Roads and Highways Department, Local Government and Engineering Department and Contractors). Out of 90, a total of 65 questionnaires were returned from the respondents in which 3 were left blank or partially filled up, which were screened out for analysis. Finally, a total of 62 completely filled-up questionnaires have been considered for further analysis. The overall response rate is 68.88%, which is quite satisfactory. As the sampling was chosen through convenient sampling method and the researcher through self-administered process did the survey, the response rate is quite satisfactory. Figure 5.1 shows that the response rate for Roads and Highways Department is 80%, for Local Government and Engineering Department is 60% and for the Contractors group is 53.33%. As respondents from Roads and Highways Department have direct communication with the researcher and they also have much interest in efficiency and effectiveness of PPR, the response rate from RHD group is higher compared to the other two groups. The respondents from contractors are also very much interested. However, because of their current work load, most of them did not have enough time to fill the questionnaire at that time, which has resulted in lower response rate (53.33%) for the study. Figure 5.1 gives a picture of the survey response of different groups of respondents and Figure 5.2, 5.3 and 5.4 illustrates organisation and sector wise representation of the respondents.

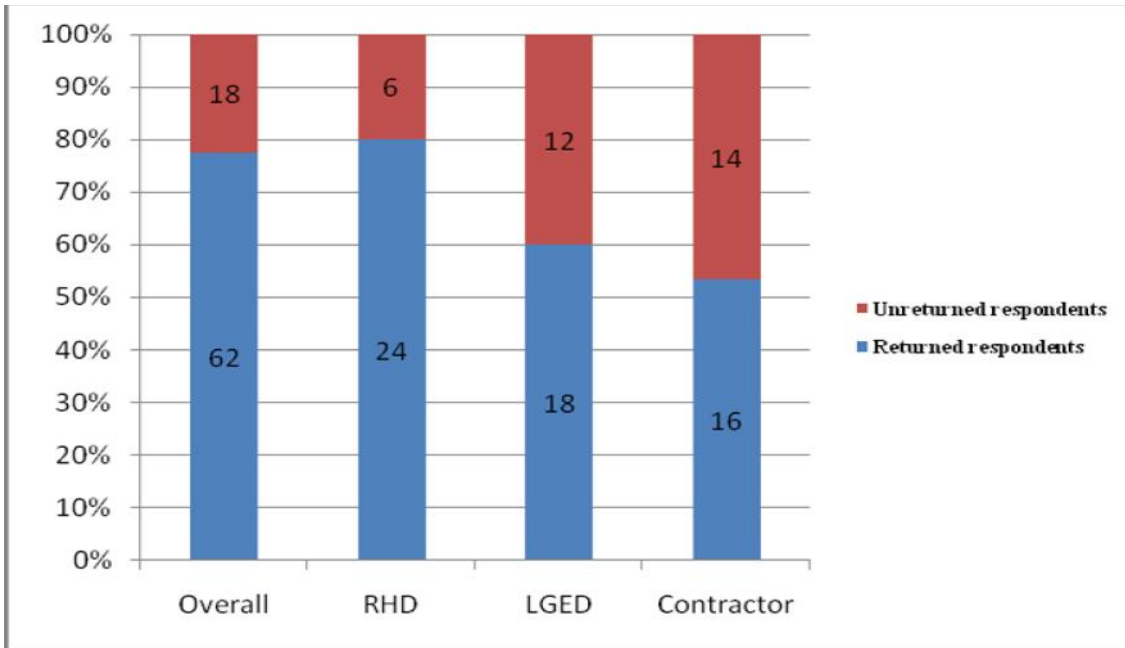


Figure 5.1: Survey response of different groups of respondents

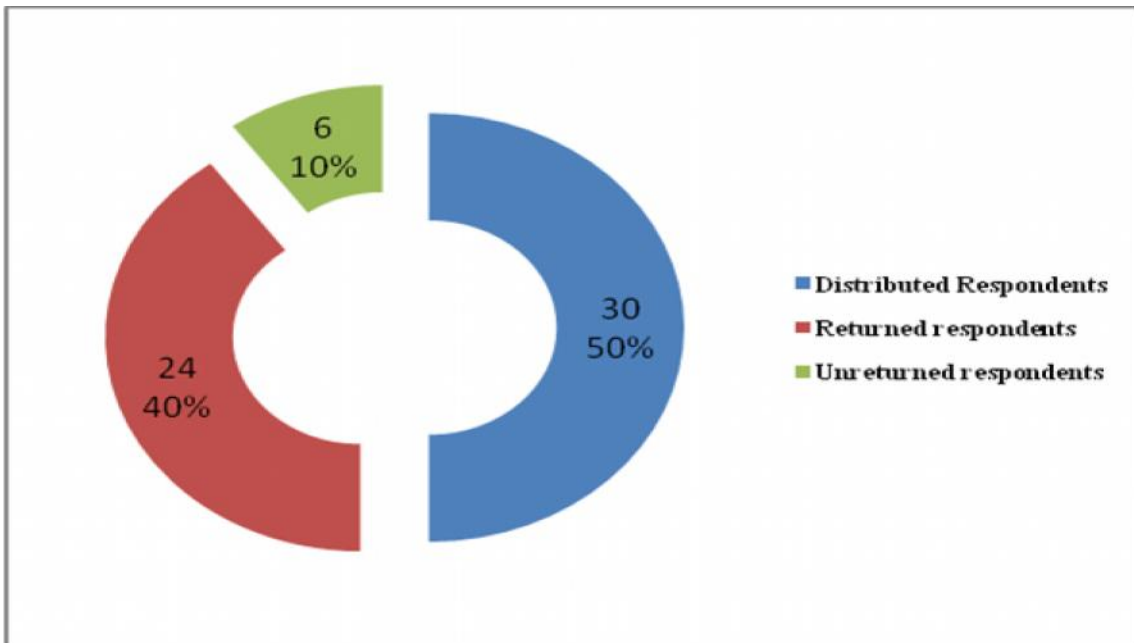


Figure 5.2: Respondents illustration (Frequency and percentage) of Roads and Highways Department (RHD)

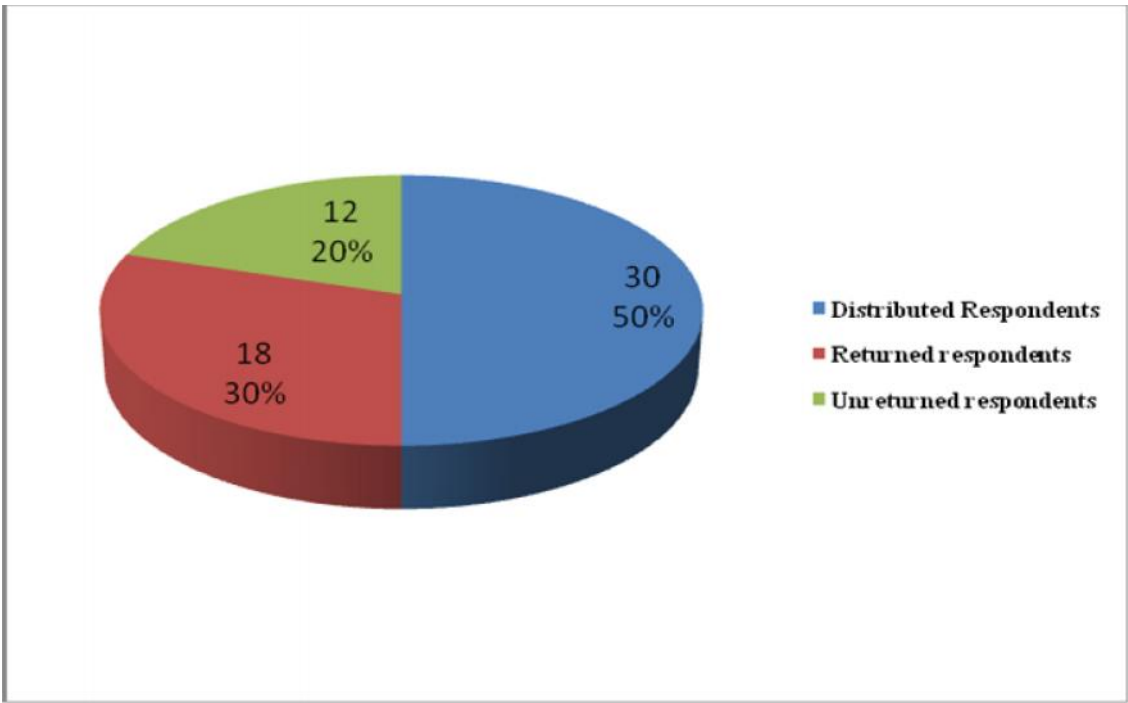


Figure 5.3: Respondents representation (Frequency and percentge) of Local Government and Engineering Department (LGED)

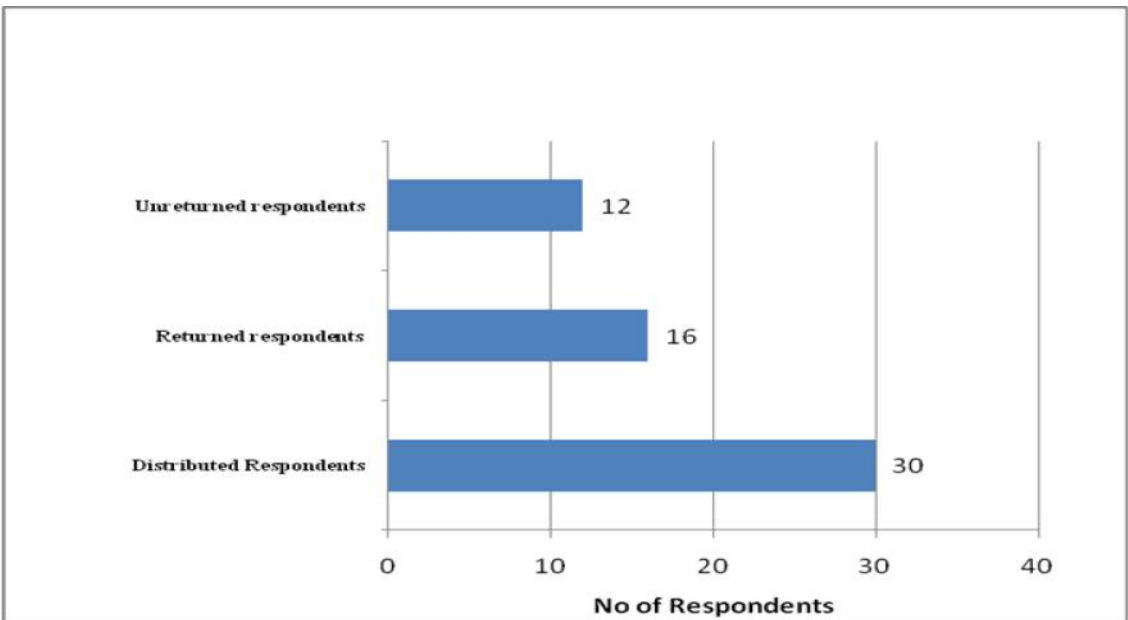


Figure 5.4: Graphical presentation of respondents for Contractors

5.3 Analysis of important factors

For the analysis of important factors of efficiency & effectiveness of PPR, time and cost overruns for road projects, mean scoring ranking method using Statistical Package for the Social Sciences, (SPSS) program were used to get the relative significance of the important factors.

5.3.1 Mean scoring ranking:

After collecting the responses from the respondents on the perceptions towards the significance of factors for efficiency & effectiveness of PPR, time and cost overruns in road projects in the context of Bangladesh, the mean score is calculated for relative ranking of those factors in descending order. Mean score ranking technique is widely used in construction management researches (Xu, *et. al.*, 2010; Ibrahim *et al.*, 2006) to determine the relative importance of variables.

The mean score (MS) for each factor for 5-point ordinal scale can be calculated the following equation (Chan and Kumaraswamy, 1996):

$$MS = \frac{\sum_{1}^{5} (f \cdot s)}{N} \dots\dots\dots (Eq. 5.1)$$

Where,

f = frequency of each rating for each factor;

s = score given to each factor by the respondents (ranging from 1 to 5); and

N= total number of responses concerning a particular factor.

5.4 Findings

5.4.1 Ranking for efficiency and effectiveness of PPR in RHD road projects

5.4.1.1 Ranking by RHD respondents

The ranking of the factors for efficiency and effectiveness of PPR in RHD road projects based on the rating given by RHD respondents is presented in Table 5.1a (ANNEXURE-2). The top ten significant factors from RHD respondents' view points are: Contractors sometime submit unrealistic low rate for the work (MS = 4.60), The extent of importance of PPR for development of road sector in Bangladesh (MS = 4.47), PPR Takes more time (MS = 4.33), not possible to ensure quality as experience is not required for taka 2 crore (MS = 4.27), PPR is Good (MS = 4.20) , PPR is fair and transparent system (MS = 4.07), it is required to increase tender validity

period for many projects & It is hard to follow at the emergency period (MS = 4.00), PPR is useful, transparent and unique procurement system to procure goods/works/ services (MS = 3.93), working Environment is improving due to PPR (MS = 3.87), It is hard to follow all rules that require more time and cost (MS = 3.80).

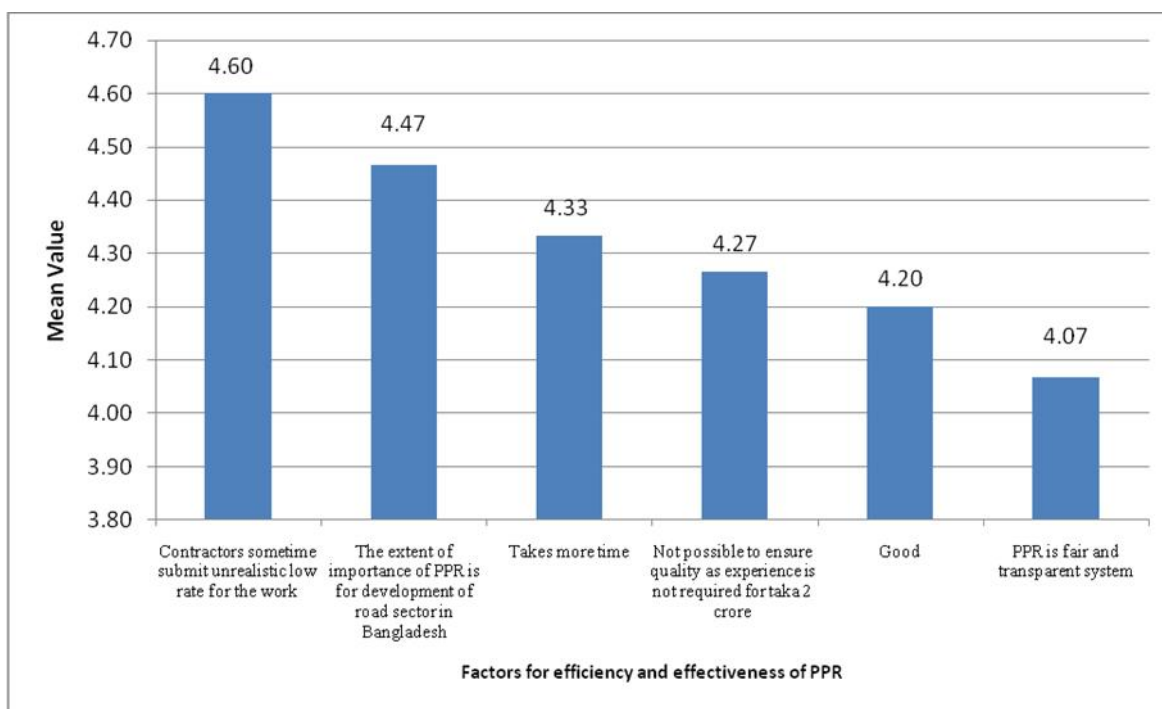


Figure 5.5: Depicts the top significant factors from RHD respondents’ general perceptions regarding efficiency and effectiveness of PPR for road projects

The analysis of table 5.1a from ANNEXURE-2 shows that contractors sometime submit unrealistic low rate for the work, the extent of importance of PPR for development of road sector in Bangladesh, PPR takes more time, it is not possible to ensure quality as experience is not required for taka 2 crore, PPR is good, PPR is fair and transparent system are “**strongly agreed**” by the respondents as mean score for these factors greater than 4.00.

On the other hand it is required to increase tender validity period for many projects, It is hard to follow at the emergency period i.e. PPR does not support emergency situation, PPR is useful, transparent and unique procurement system to procure goods/works/ services, working Environment is improving due to PPR, it is very much bureaucratic, now tender procedures are going timely than previous, procurement system has been slowed down, advertisement time with respect to invitation for tender is more, PPR accelerated contract approval time than previous, attitudes of some contractors towards PPR are still negative, some contractors get opportunity while they have good relation with the representative of procuring entities, contractors are able to do work with quality for following PPR, easy to get licence and work in previous system but

it is not possible in present system, time for evaluation is insufficient, efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR, attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good, PPR introduce single tender dropping point instead of several which makes procurement easy are “**agreed**” by the respondents as mean score for these factors greater than 3.00 and less or equal 4.00.

Regarding the factors, in earlier system, pressure and request comes very frequently from upper level but now it has decreased, contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money, most of the respondents are “**neutral**” as mean score for these factors greater than 2.00 and less or equal 3.00.

The factor “PPR is not needed at all” is “**disagreed**” by the respondents as mean score of this factor greater than 1.00 and less or equal 2.00.

5.4.1.2 Ranking by LGED respondents for efficiency and effectiveness of PPR

Table 5.1b shown in ANNEXURE-2 reveals ranking of the factors for efficiency and effectiveness of PPR by LGED respondents. From the view point of LGED respondents, the highest ranked 10 significant factors are: It is hard to follow at the emergency period i.e. PPR does not support emergency situation (MS = 4.76), Time for evaluation is insufficient (MS = 4.53), the extent of importance of PPR for development of road sector in Bangladesh (MS = 4.41), Some contractors get opportunity while they have good relation with the representative of procuring entities and contractors sometime submit unrealistic low rate for the work (MS = 4.35), it is required to increase tender validity period for many projects & it is hard to follow all rules that require more time and cost (MS = 4.24), PPR Takes more time (MS = 4.18), PPR accelerated contract approval time than previous, attitudes of some contractors towards PPR are still negative, PPR is very much bureaucratic (MS = 4.00), not possible to ensure quality as experience is not required for taka 2 crore, advertisement time with respect to invitation for tender is more (MS = 3.65), PPR is Good (MS = 3.41) , introduce single tender dropping point instead of several which makes procurement easy (MS = 3.35).

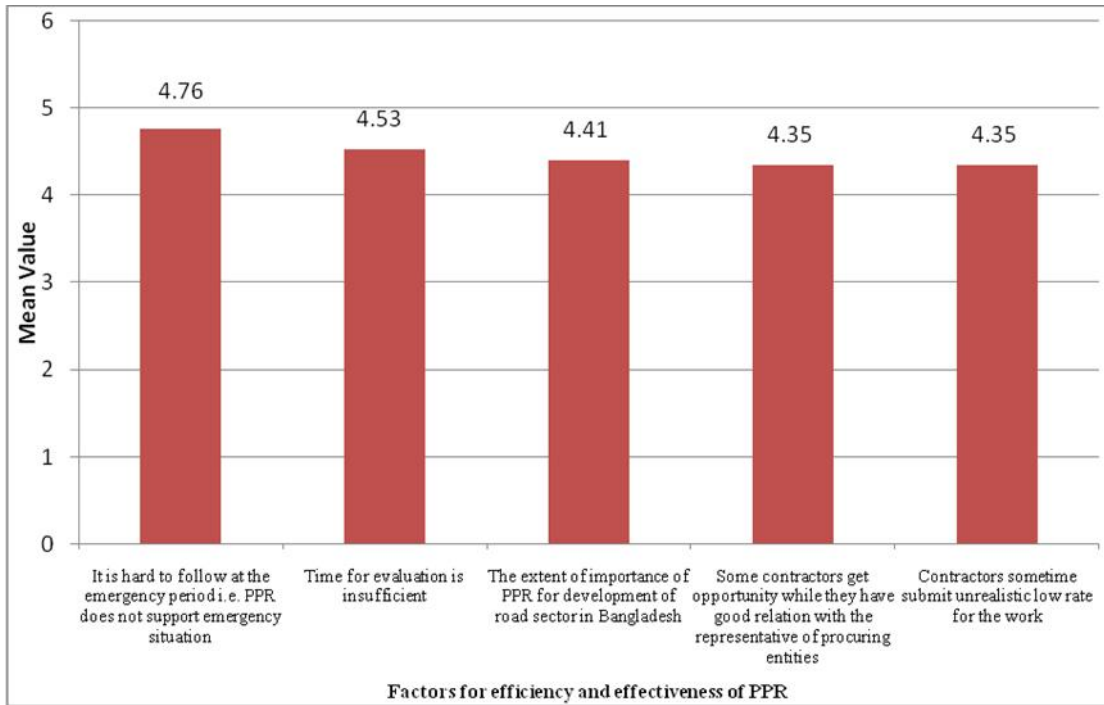


Figure 5.6: Depicts the top significant factors from LGED respondents' view points for efficiency and effectiveness of PPR in road projects.

The analysis of table 5.1b (ANNEXURE-2) shows that PPR is hard to follow at the emergency period i.e. PPR does not support emergency situation, time for evaluation is insufficient, the extent of importance of PPR for development of road sector in Bangladesh, some contractors get opportunity while they have good relation with the representative of procuring entities and contractors sometime submit unrealistic low rate for the work, it is required to increase tender validity period for many projects & it is hard to follow all rules that require more time and cost, PPR takes more time are “**strongly agreed**” by the respondents as mean score for these factors greater than 4.00.

On the other hand PPR accelerated contract approval time than previous, attitudes of some contractors towards PPR are still negative, PPR is very much bureaucratic, not possible to ensure quality as experience is not required for taka 2 crore, advertisement time with respect to invitation for tender is more, PPR is good, introduce single tender dropping point instead of several which makes procurement easy, easy to get licence and work in previous system but it is not possible in present system are “**agreed**” by the respondents as mean score for these factors greater than 3.00 and less or equal 4.00.

Regarding the factors, easy to get licence and work in previous system but it is not possible in present system, procurement system has been slowed down, attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good, now tender procedures are going timely than previous, PPR is fair and transparent system, environment is improving,

contractors are able to do work with quality but previously they got job through lottery, efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR, most of the respondents are “**neutral**” as mean score for these factors greater than 2.00 and less or equal 3.00.

The factors, contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money, PPR is useful, transparent and unique procurement system to procure goods/works/ services, in earlier system, pressure and request comes very frequently from upper level but now it has decreased, it is not needed at all are “**disagreed**” by the respondents as mean score of this factor greater than 1.00 and less or equal 2.00.

5.4.1.3 Ranking by Contractors for efficiency and effectiveness of PPR in RHD road projects

Table 5.1c (ANNEXURE-2) depicts the ranking of the factors based on the surveyed data given by the contractors. The contractors have ranked the top ten significant factors associated with efficiency and effectiveness of PPR for road projects in Bangladesh are: It is hard to follow at the emergency period i.e. PPR does not support emergency situation (MS = 4.94), PPR is very much bureaucratic (MS = 4.56), it is hard to follow all rules that require more time and cost (MS = 4.55), Some contractors get opportunity while they have good relation with the representative of procuring entities (MS = 4.38), Contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money, it is required to increase tender validity period for many projects, PPR takes more time (MS = 4.31), contractors are able to do work with quality but previously they got job through lottery (MS = 4.18), attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good (MS = 3.93), the extent of importance of PPR for development of road sector in Bangladesh (MS = 3.81), contractors sometime submit unrealistic low rate for the work, easy to get license and work in previous system but it is not possible in present system (MS = 3.56), procurement system has been slowed down (MS = 3.50).

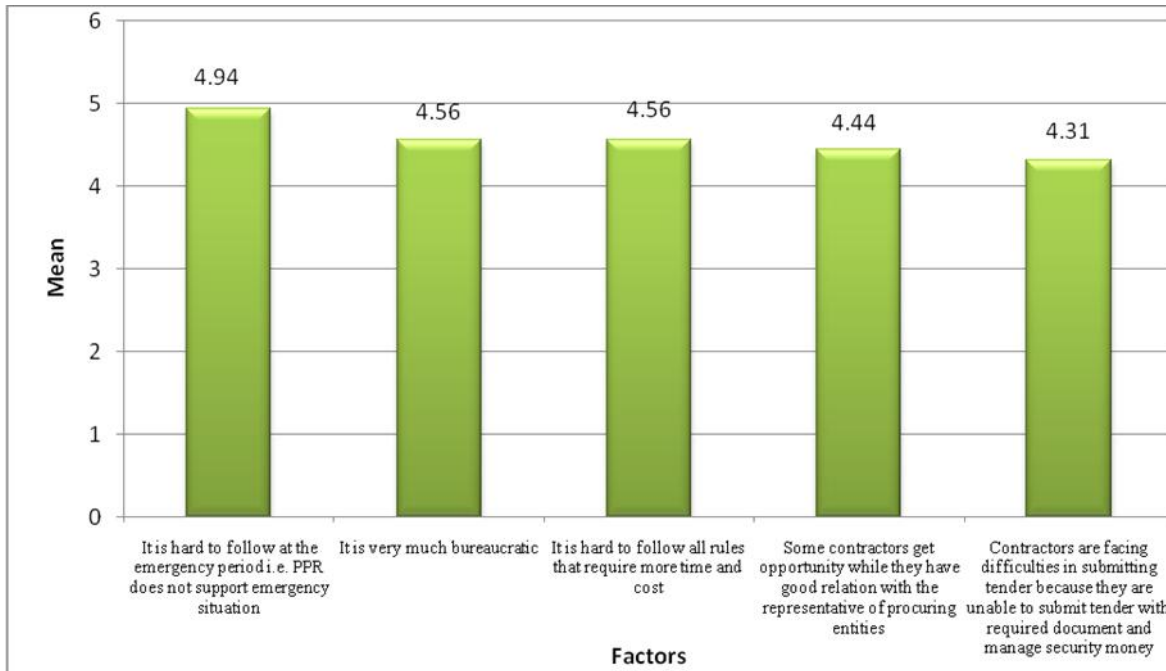


Figure 5.7: Depicts the most important factors from contractors' view points for efficiency and effectiveness of PPR in road projects.

The analysis of table 5.1c (ANNEXURE-2) shows that PPR is hard to follow at the emergency period i.e. PPR does not support emergency situation, time for evaluation is insufficient, PPR is very much bureaucratic, it is hard to follow all rules that require more time and cost, some contractors get opportunity while they have good relation with the representative of procuring entities, contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money, it is required to increase tender validity period for many projects, PPR takes more time, contractors are able to do work with quality but previously they got job through lottery are “**strongly agreed**” by the contractors as mean score for these factors greater than 4.00.

On the other hand, attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good, the extent of importance of PPR for development of road sector in Bangladesh, contractors sometime submit unrealistic low rate for the work, easy to get license and work in previous system but it is not possible in present system, procurement system has been slowed down, PPR accelerated contract approval time than previous, attitudes of some contractors towards PPR are still negative, environment is improving, time for evaluation is insufficient, PPR is good are “**agreed**” by the contractors as mean score for these factors greater than 3.00 and less or equal 4.00.

Regarding the factors, advertisement time with respect to invitation for tender is more, not possible to ensure quality as experience is not required for taka 2 crore, now tender procedures are going timely than previous, introduce single tender dropping point instead of several which

makes procurement easy, PPR is fair and transparent system, efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR most of the contractors are “**neutral**” as mean score for these factors greater than 2.00 and less or equal 3.00.

The factors, PPR is useful, transparent and unique procurement system to procure goods/works/ services, in earlier system, pressure and request comes very frequently from upper level but now it has decreased, it is not needed at all are “**disagreed**” by the contractors as mean score of this factor greater than 1.00 and less or equal 2.00.

5.4.2 Ranking for factors of time overruns in road sector projects

5.4.2.1 Ranking by RHD respondents

The ranking of the factors for time overruns in road sector projects based on the rating given by RHD respondents is presented in Table 5.2a (ANNEXURE-2). The top five significant factors from RHD respondents’ view points are: Shortage of equipment at site (MS = 4.25), Poor site management, Major disputes and negotiations, cash problem during construction (MS = 4.12), strikes and calamity, inadequate contractor experience (MS = 4.06), insufficient number of staffs (contractor) (MS = 4.00), delay of material delivery to site, shortage of construction materials (MS = 3.75)

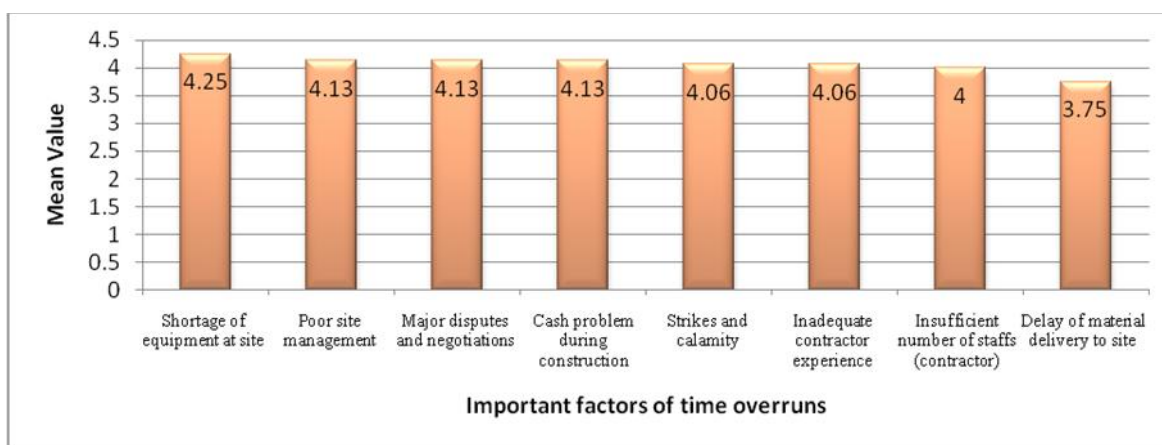


Figure 5.8: Depicts the top significant factors for time overruns in road projects from RHD respondents’ viewpoints

From the table 5.2a (ANNEXURE-2) it is found that the factors, Shortage of equipment at site, Poor site management, Major disputes and negotiations, Cash problem during construction, Strikes and calamity, Inadequate contractor experience, are “**strongly agreed**” by the RHD respondents for time overruns in road sector works of Bangladesh as mean score for these factors greater than 4.00.

The factors, insufficient number of contractor’s staffs, Delay of material delivery to site, shortage of construction materials, suspension of work by owner or project poor economic conditions (currency, inflation rate, etc.), lack of materials in markets and failure in testing, are “**agreed**” by the respondent for time overruns in road sector works of Bangladesh as mean score for these factors greater than 3.00 and less or equal 4.00.

5.4.2.2 Ranking for time overruns by LGED respondents

Table 5.2b (ANNEXURE-2) shows ranking of the factors for time overruns in road sector projects by LGED respondents. From the view point of LGED respondents, the highest ranked 5 significant factors are: Cash problem during construction (MS = 4.12), strikes and calamity (MS = 4.06), inadequate contractor experience, inadequate contractor experience, insufficient number of staffs (contractor) (MS = 4.00), Shortage of equipment at site (MS = 3.93), suspension of work by owner or Project Poor economic conditions (currency, inflation rate, etc.) External factors (MS = 3.87).

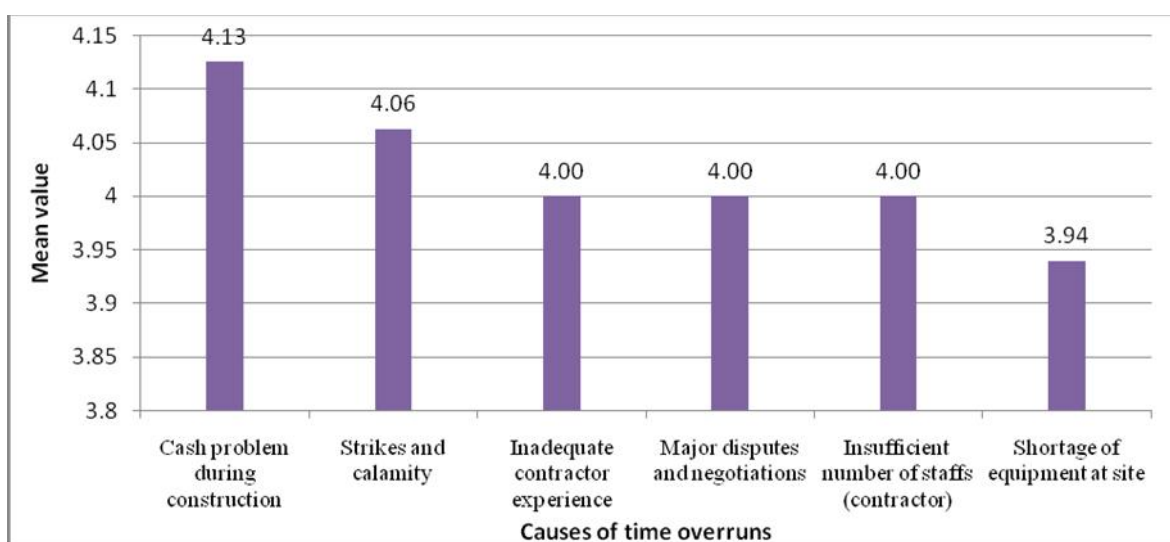


Figure 5.9: Depicts the most important factors for time overruns in road projects according to the respondents’ of LGED

From the analysis of table 5.2b (ANNEXURE-2) it is found that the factors, Cash problem during construction, Strikes and calamity are “**strongly agreed**” by the LGED respondents for time overruns in road sector works as mean score for these factors greater than 4.00.

The factors, inadequate contractor experience, Major disputes and negotiations, insufficient number of contractor’s staffs, suspension of work by owner or project poor economic conditions (currency, inflation rate, etc.), poor site management, delay of material delivery to site, shortage of construction materials, lack of materials in markets and failure in testing, are “**agreed**” by the respondent for time overruns in road sector works of Bangladesh as mean score for these factors greater than 3.00 and less or equal 4.00.

5.4.2.3 Ranking for time overruns by Contractors

Table 5.2c (ANNEXURE-2) shows ranking of the factors for time overruns in road sector projects by contractors. From the view point of contractors, the highest ranked 5 significant factors are: Cash problem during construction (MS = 4.44), strikes and calamity, lack of materials in markets (MS = 4.18), suspension of work by owner or Project Poor economic conditions (currency, inflation rate, etc.) External factors (MS = 4.00), shortage of construction materials (MS = 3.87), major disputes and negotiations (MS = 3.68).

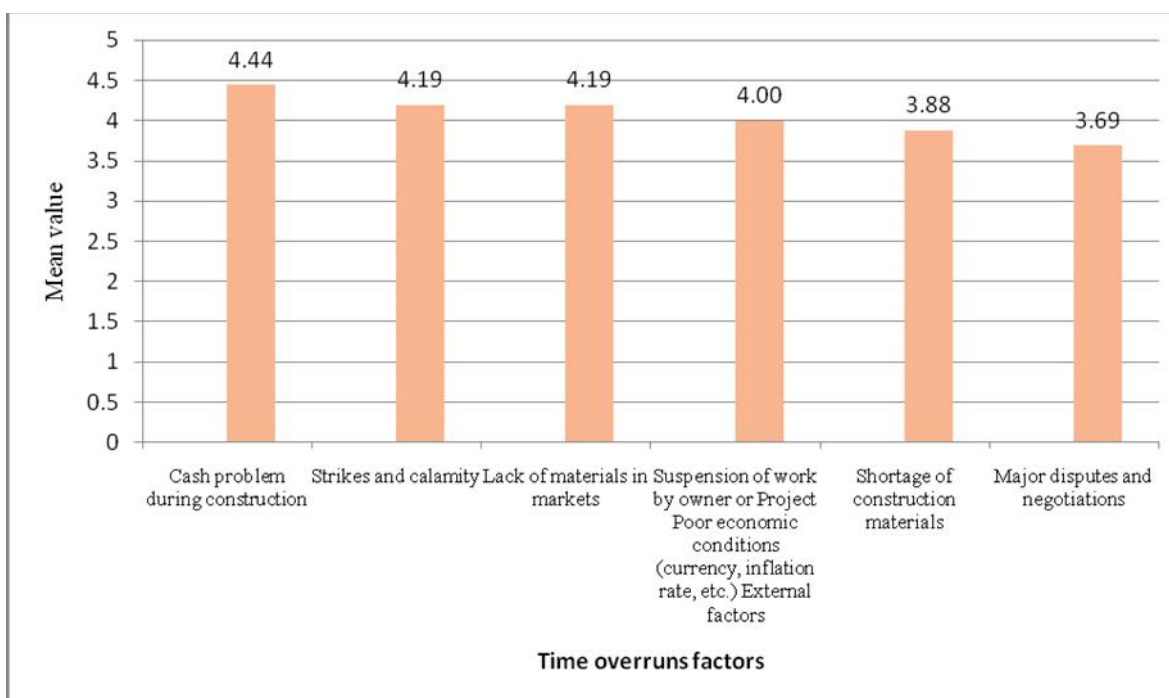


Figure 5.10: Important factors of time overruns in road projects according to the contractor's

From the analysis of table 5.2c (ANNEXURE-2) it is found that the factors, Cash problem during construction, Strikes and calamity, lack of materials in markets are “**strongly agreed**” by the contractors for time overruns in road sector works as mean score for these factors greater than 4.00.

The factors, suspension of work by owner or project poor economic conditions (currency, inflation rate, etc.), shortage of construction materials, major disputes and negotiations, shortage of equipment at site, failure in testing, poor site management, delay of material delivery to site, insufficient number of contractor's staffs, inadequate contractor experience are “**agreed**” by the contractors for time overruns in road sector works of Bangladesh as mean score for these factors greater than 3.00 and less or equal 4.00.

5.4.3 Ranking for factors of cost overruns in road sector projects

5.4.3.1 Ranking by RHD respondents for causes of cost overruns

The ranking of the factors for cost overruns in road sector projects based on the rating given by RHD respondents is presented in Table 5.3a (ANNEXURE-2). The top five significant factors from RHD respondents' view points are: Increment of materials prices (MS = 4.44), delay in construction, supply of raw Materials & equipment by contractors (MS = 4.37), resources constraint: funds and associated auxiliaries not ready (MS = 4.25), Design changes (MS = 4.19), Delays in decisions making by Government, failure of specific coordinating (MS = 4.18)

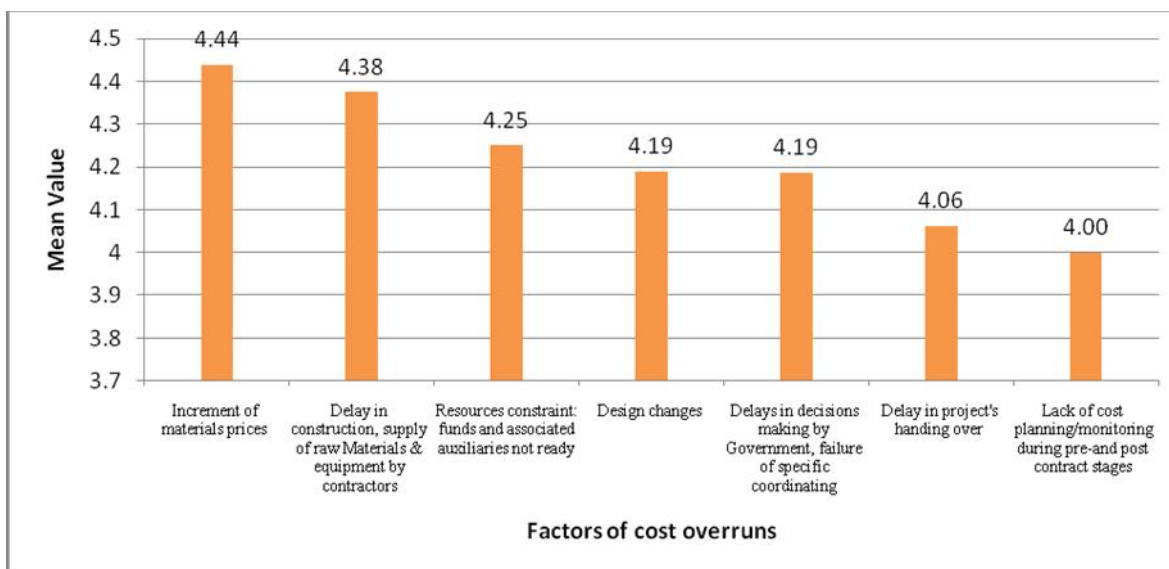


Figure 5.11: Important factors of cost overruns as per the respondents of RHD

It is observed in table 5.3a (ANNEXURE-2) that the factors, increment of materials prices, Delay in construction, supply of raw Materials & equipment by contractors, Resources constraint i.e. funds and associated auxiliaries not ready, Design changes, Delays in decisions making by Government, failure of specific coordinating, Delay in project's handing over, are “**strongly agreed**” by the respondents for cost overruns in construction of road sector for Bangladesh and mean score for these factors greater than 4.00.

The other factors in table 5.3a are “**agreed**” by the respondents for cost overruns in construction of road sector for Bangladesh as mean score for these factors greater than 3.00 and less or equal 4.00.

5.4.3.2 Ranking by LGED respondents for causes of cost overruns

The ranking of the factors for cost overruns in road sector projects based on the rating given by LGED respondents is presented in Table 5.3b (ANNEXURE-2). The top five significant factors from LGED respondents' view points are: delay in construction, supply of raw materials & equipment by contractors, increment of materials prices (MS = 4.44), delays in decisions making by Government, failure of specific coordinating (MS = 4.31), unpredictable weather conditions (MS = 4.25), lack of experience of technical consultants, inadequacy of foreign collaboration agreements, monopoly of technology, design changes, resources constraint: funds and associated auxiliaries not ready (MS = 4.06), change in the scope of the project, in Government policies, delay in project's handing over (MS = 4.00).

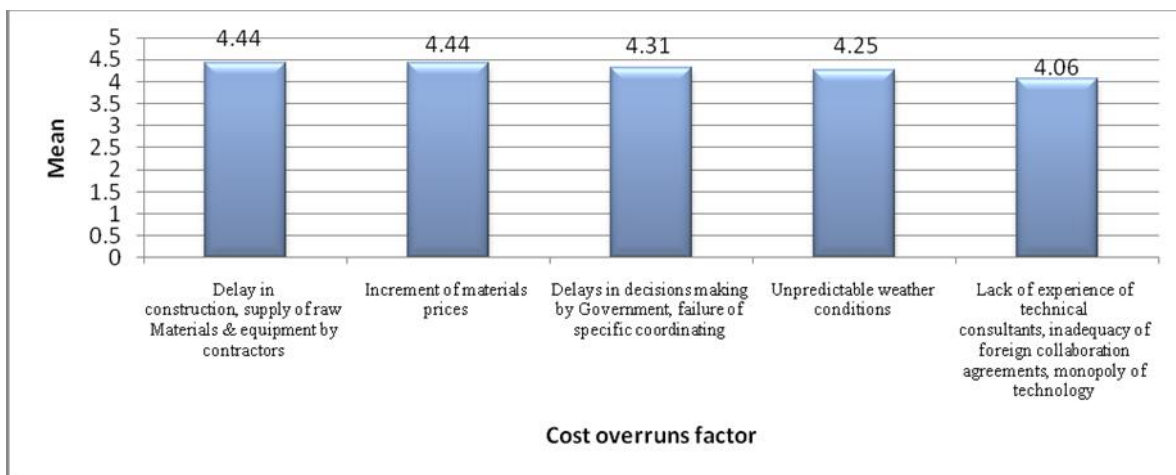


Figure 5.12: The top significant factors from LGED respondents' view points for cost overruns

It is observed in table 5.3b (ANNEXURE-2) that the factors, delay in construction, supply of raw materials & equipment by contractors, increment of materials prices, delays in decisions making by Government, failure of specific coordinating, unpredictable weather conditions, lack of experience of technical consultants, inadequacy of foreign collaboration agreements, monopoly of technology, design changes, resources constraint: funds and associated auxiliaries not ready are “strongly agreed” by the respondents for cost overruns in construction of road sector for Bangladesh and mean score for these factors greater than 4.00.

Regarding the factors, technical incompetence, poor organizational structure, and failures of the enterprise, wrong/inappropriate choice of site, respondents are “neutral” as mean score for these factors greater than 2.00 and less or equal 3.00.

The other factors except in table 5.3b are “agreed” by the respondents for cost overruns in construction of road sector for Bangladesh as mean score for these factors greater than 3.00 and less or equal 4.00.

5.4.3.3 Ranking by contractors for causes of cost overruns

The ranking of the factors for cost overruns in road sector projects based on the rating given by contractors is presented in Table 5.3c (ANNEXURE-2). The top five significant factors from contractors' view points are: increment of materials prices (MS = 5.00), unpredictable weather conditions, delays in decisions making by Government, failure of specific coordinating (MS = 4.44), change in the scope of the project, in Government policies, resources constraint: funds and associated auxiliaries not ready (MS = 4.37), design changes (MS = 4.31), delay in project's handing over (MS = 3.93)

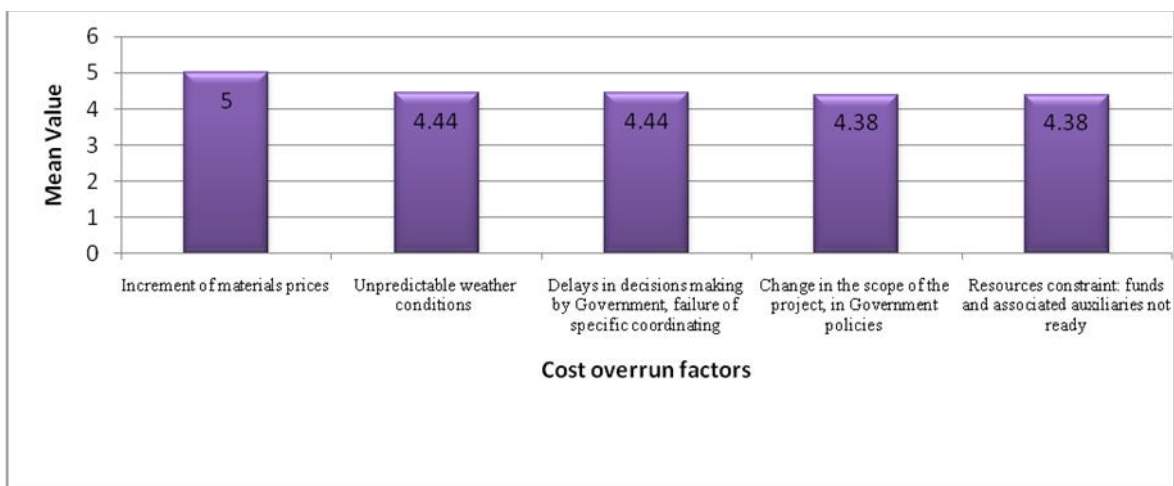


Figure 5.13: Depicts the top significant factors from contractors' viewpoints for cost overruns.

In table 5.3c (ANNEXURE-2) it is observed that the factors, increment of materials prices, unpredictable weather conditions, delays in decisions making by Government, failure of specific coordinating, change in the scope of the project, in Government policies, resources constraint: funds and associated auxiliaries not ready, design changes are “**strongly agreed**” by the contractors for cost overruns in construction of road sector for Bangladesh as mean score for these factors greater than 4.00.

For the factors, lack of coordination at design phase, wrong / inappropriate choice of site, bad allocation of labour inside the site, contractors are “**neutral**” as mean score for these factors greater than 2.00 and less or equal 3.00.

The other factors in table 5.3c are “**agreed**” by the contractors for cost overruns in construction of road sector for Bangladesh as mean score for these factors greater than 3.00 and less or equal 4.00.

Table 5.4: Rankings of efficiency and effectiveness of PPR for RHD road projects in Bangladesh from different perspectives

Efficiency and effectiveness measurement factors	Overall			RHD		LGED		Contractors	
	R	MS	SD	R	MS	R	MS	R	MS
It is hard to follow at the emergency period i.e. PPR does not support emergency situation	1	4.57	.74	7	4.00	1	4.76	1	4.94
PPR Takes more time	2	4.26	0.64	3	4.33	6	4.18	5	4.31
To what extent do you think PPR is important for development of road sector in Bangladesh	3	4.23	0.63	2	4.47	3	4.41	8	3.81
It is hard to follow all rules that require more time and cost	4	4.21	0.81	10	3.80	5	4.23	3	4.55
It is required to increase tender validity period for many projects	5	4.17	0.67	7	4.0	5	4.23	5	4.31
Contractors sometime submit unrealistic low rate for the work	5	4.17	0.67	1	4.60	4	4.35	9	3.56
Some contractors get opportunity while they have good relation with the representative of procuring entities	6	4.12	.87	14	3.53	4	4.35	4	4.44
It is very much bureaucratic	7	4.10	0.91	11	3.73	7	4.0	2	4.56
Time for evaluation is insufficient	8	3.68	0.88	16	3.40	2	4.53	13	3.13
Not possible to ensure quality as experience is not required for taka 2 crore	9	3.67	0.86	4	4.27	8	3.64	16	2.75
PPR accelerated contract approval time than previous	10	3.65	0.81	14	3.53	7	4.00	11	3.44
Attitudes of some contractors towards PPR are still negative	10	3.65	0.78	14	3.53	7	4.00	11	3.44
PPR is Good	11	3.55	0.61	5	4.20	9	3.41	14	3.06
Easy to get license and work in previous system but it is not possible in present system	12	3.44	0.65	15	3.46	11	3.29	9	3.56
Contractors are able to do work with quality for following PPR	12	3.44	0.92	15	3.46	15	2.65	6	4.18
Procurement system has been slowed down	13	3.40	0.82	12	3.67	12	3.00	10	3.50
Attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good.	13	3.40	0.61	17	3.26	12	3.00	7	3.93
Advertisement time with respect to invitation for tender is more	14	3.36	0.76	13	3.60	8	3.65	15	2.87

Efficiency and effectiveness measurement factors	Overall			RHD		LGED		Contractors	
	R	MS	SD	R	MS	R	MS	R	MS
Environment is improving	15	3.27	0.74	9	3.87	15	2.65	12	3.37
Now tender procedures are going timely than previous	16	3.11	0.86	11	3.73	13	2.82	16	2.75
PPR is fair and transparent system	17	3.09	0.88	6	4.07	14	2.76	18	2.50
Introduce single tender dropping point instead of several which makes procurement easy	18	3.06	1.01	18	3.20	10	3.35	17	2.62
Contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money	19	2.96	1.30	20	2.8	17	1.71	5	4.31
Efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR	20	2.53	1.01	16	3.40	16	2.24	19	2.00
PPR is useful, transparent and unique procurement system to procure goods/works/ services.	21	2.43	1.25	8	3.93	18	1.65	20	1.75
In earlier system, pressure and request comes very frequently from upper level but now it has decreased	22	1.98	1.11	19	2.87	19	1.53	21	1.56
It is not needed at all	23	1.38	0.61	21	1.87	20	1.23	22	1.06

*R = Ranking, MS = Mean score, SD = Standard deviation

Table 5.4 depicts the overall ranking for efficiency and effectiveness of PPR calculated from the response given by all the three groups of respondents. The mean scores of all the factors ranges from 4.57 to 1.38. It is hard to follow at the emergency period i.e. PPR does not support emergency situation (MS = 4.57), PPR takes time (MS = 4.26), the extent of importance of PPR for development of road sector in Bangladesh (MS = 4.23), it is hard to follow all rules that require more time and cost (MS = 4.21), it is required to increase tender validity period for many projects, contractors sometime submit unrealistic low rate for the work (MS = 4.17), some contractors get opportunity while they have good relation with the representative of procuring entities (MS = 4.12), PPR is very much bureaucratic (MS = 4.10) are some of the top ranked factors rated by the respondents in the context of Bangladesh.

Table 5.5: Rankings of time overruns for RHD road projects in Bangladesh from different perspectives

Time overrun factors	Overall			RHD		LGED		Contractors	
	R	MS	SD	R	MS	R	MS	R	MS
Cash problem during construction	1	4.22	0.62	2	4.12	1	4.12	1	4.43
Strikes and calamity	2	4.10	0.77	3	4.06	2	4.06	2	4.18
Major disputes and negotiations	3	3.93	0.59	2	4.12	3	4.00	5	3.68
Suspension of work by owner or Project Poor economic conditions (currency, inflation rate, etc.) External factors	4	3.85	0.71	6	3.68	5	3.87	3	4.00
Shortage of equipment at site	5	3.84	0.69	1	4.25	4	3.93	6	3.28
Lack of materials in markets	6	3.81	0.67	6	3.68	7	3.56	2	4.18
Shortage of construction materials	7	3.68	0.80	5	3.75	9	3.43	4	3.87
Poor site management	8	3.60	0.84	2	4.12	6	3.68	8	3.00
Insufficient number of staffs (contractor)	9	3.47	0.96	4	4.00	3	4.00	10	2.43
Failure in testing	10	3.43	0.76	7	3.62	8	3.50	7	3.18
Inadequate contractor experience	11	3.37	1.14	3	4.06	3	4.00	11	2.06
Delay of material delivery to site	12	3.33	0.88	5	3.75	7	3.56	9	2.68

*R = Ranking, MS = Mean score, SD = Standard deviation

Table 5.5 depicts the overall ranking for time overruns calculated from the response given by all the three groups of respondents. The mean scores of all the factors ranges from 4.22 to 3.33. Cash problem during construction (MS = 4.22), strikes and calamity (MS = 4.10) are the top ranked factors for time overruns, rated by the respondents in the context of Bangladesh.

Table 5.6: Rankings of cost overruns for road projects in Bangladesh from different perspectives

Cost overrun factors	Overall			RHD		LGED		Contractors	
	R	MS	SD	R	MS	R	MS	R	MS
Increment of materials prices	1	4.63	0.49	1	4.44	1	4.44	1	5.00
Delays in decisions making by Government, failure of specific coordinating	2	4.31	0.55	5	4.18	2	4.31	2	4.44
Resources constraint: funds and associated auxiliaries not ready	3	4.23	0.59	3	4.25	4	4.06	3	4.38
Unpredictable weather conditions	4	4.21	0.68	9	3.93	3	4.25	2	4.44
Design changes	5	4.19	0.61	4	4.19	4	4.06	4	4.31
Change in the scope of the project, in Government policies	6	4.10	0.77	9	3.93	5	4.00	3	4.38
Delay in construction, supply of raw Materials & equipment by contractors	7	4.06	0.69	2	4.37	1	4.44	10	3.38
Delay in project's handing over	8	4.00	0.62	6	4.06*	5	4.00	5	3.94
Lack of experience of technical consultants, inadequacy of foreign collaboration agreements, monopoly of technology	9	3.94	0.73	8	3.94	4	4.06	7	3.81
Lack of experience of project type, Inadequate project preparation, planning and implementation	10	3.71	0.77	10	3.87	8	3.56	8	3.68
Unsettlement of the local currency in relation to dollar value	11	3.70	0.59	12	3.62	7	3.63	6	3.91
Lack of cost planning/monitoring during pre-and post contract stages	12	3.52	0.79	7	4.00	9	3.50	12	3.06
Omissions and errors in the bills of quantities	13	3.50	0.74	13	3.56	10	3.38	9	3.56
Technical incompetence, poor organizational structure, and failures of the enterprise	14	3.47	0.85	9	3.93	13	2.94	9	3.56
Delays in issuing information to the contractor during construction stage	15	3.44	0.82	15	3.31	11	3.31	8	3.68
Lack of coordination at design phase	16	3.39	0.76	11	3.68	6	3.75	13	2.75

Cost overrun factors	Overall			RHD		LGED		Contractors	
	R	MS	SD	R	MS	R	MS	R	MS
Inadequate review for drawings and contract documents	17	3.35	0.73	12	3.62	11	3.31	11	3.12
Bad allocation of labour inside the site	18	3.04	0.89	14	3.50	12	3.25	15	2.37
Wrong / inappropriate choice of site	19	2.77	0.83	16	3.06	14	2.81	14	2.43

*R = Ranking, MS = Mean score, SD = Standard deviation

Table 5.6 depicts the overall ranking for cost overruns calculated from the response given by all the three groups of respondents. The mean scores of all the factors ranges from 4.63 to 2.77. Increment of materials prices (MS = 4.63), Delays in decisions making by Government, failure of specific coordinating (MS = 4.31), resources constraint: funds and associated auxiliaries not ready (MS = 4.23), unpredictable weather conditions (MS = 4.21), Design changes (MS = 4.19), Change in the scope of the project, in Government policies (MS = 4.10), delay in construction, supply of raw materials & equipment by contractors (MS = 4.06), delay in project's handing over (MS = 4.00) are some of the top ranked factors for cost overruns, rated by the respondents in the context of Bangladesh.

CHAPTER SIX: RECOMMENDATION AND CONCLUSION

This chapter includes the conclusions and recommendations that would help in improving the efficiency and effectiveness of PPR for road sector works and solving the problem of delay and cost overruns at road construction projects in Bangladesh.

The first objective of this study was to Measure the efficiency and effectiveness of PPR with respect to time and costs overruns in road sector projects in Bangladesh. The second objective was identifying variables influencing construction time and cost overruns for road works. Investigate the perspectives on the relative significance of these factor from respondents was the third objective. The fourth one was to evaluate the degree of agreement /disagreement regarding the ranking of these factors. The fifth objective was to conduct several practical case studies, and the last one was to formulate recommendations to improve efficiency and effectiveness of PPR with respect to time and cost overruns and to recommend for solving the problem of delay and cost overruns at road construction projects in Bangladesh.

6.2 Recommendations

This part of the thesis concludes the recommendations on main findings as following:

6.2.1 Recommendations to increase efficiency and effectiveness of PPR

This part of thesis included 27 variables for measuring the efficiency and effectiveness of PPR in respect of time and cost overruns

- ✚ From the overall analysis it is found that the factors “PPR is hard to follow at the emergency period i.e. PPR does not support emergency situation” ranked first by different respondents. So it is required to include appropriate “Business contingency plan, Business continuity plan and Disaster management plan” from the beginning of every project for efficient and effective procurement.
- ✚ Results indicated that the variable “Contractors sometime submit unrealistic low rate for the work” has been strongly agreed by the respondents. This result indicates the high importance of efficient and effective procurement work to complete the road project within stipulated time and cost. So to prevent the submission of unrealistic low rate by the contractors the researcher recommends imposing nonrefundable security money on contractors during signing of contracts both for unrealistic low rate and high rate. Up to certain limit low rate or high rate may be allowed say for example 2 to 5 percentages. But above this limit nonrefundable security money should be imposed which may reduce the tendency of quoting unrealistic low/high rate and at the same time government revenue will also be increased.

- ✚ Results have shown that the factor of “PPR takes more time” has also been strongly agreed by the respondents. So to reduce the procuring time it is recommended that the time bar at different stages may be reduced say for example, for small and national tendering advertisement time may be reduced to some extent. Specially in case of emergency no time bar/ limitation should be imposed
- ✚ “PPR is very much bureaucratic” has been strongly agreed by the respondents. To remove this difficulty it is required to increase the procuring entity’s/ project director’s financial power for large, complex and international projects.
- ✚ For the effectiveness of PPR tenderer’s right to lodge complain should be decreased by imposing an amount of fee against every complaint.
- ✚ Structured training and awareness program is very much essential for increasing efficiency and effectiveness of PPR. For this PPR related course may be included in university curriculum, as it is needed both for public and private sectors.
- ✚ Bangladesh government may be started professional degree regarding PPR likewise MCIPS or others for making expert scholars in this field.
- ✚ There should be a professional cadre of staff that implements and manages the procurement function.
- ✚ A competitive and transparent procurement process with strong self-reinforcing mechanisms should be provided for
 - Wide advertising of procurement opportunities,
 - Public opening of bids,
 - Pre-disclosure of all relevant information,
 - Clear accountabilities for decision making, and
 - An enforceable right of review for bidders.
- ✚ Establishment of a central public procurement office for overall policy making and supervision of public procurement in the country.
- ✚ To make PPR effective and efficient support from highest political levels is essential, this is seen as necessary for any organisational change to succeed, as it avoids any doubt about the government’s commitment to reform.
- ✚ Political leadership is needed not only in support of the passage of legislation through Parliament but in demonstrating that all the forces of government will be used to make the procurement reforms a success and to punish those who commit malpractices.
- ✚ Once malpractices have been identified, they must be corrected and mechanisms put in place to prevent recurrence. For this the government may declare “zero tolerance of

corruption” and to implement it figures in government who commit procurement-related malpractices should be sanctioned. Corruption and malpractices in procurement are facilitated by the general expectation among all participants and among the public at large that this kind of behaviour is the norm and consequently that bribery is a necessary means to obtain government contracts. Leading by example and educating the public about the true costs of corruption can be a powerful means of changing such expectations and of building resistance to corrupt practices.

- ✚ Cooperation between the public and private sector leading to better understanding of each others’ problems and needs are also important for efficient and effective PPR.
- ✚ A favourable working environment, including good salary levels, strong professionalism and high morale is essential for efficient and effective PPR
- ✚ Use of E-Procurement, Greater use of electronic procurement and More advanced applications of electronic commerce including its use in tendering should be implemented
- ✚ Procurement audits and the investigation of complaints, integration of finance, administration, human resources and information technology is needed for effective PPR
- ✚ Developing an integrated set of tools and good practices to improve procurement systems and the outcomes they produce and to assist in the periodical assessments of the domestic legislation. Various benchmarks should be established whether the elements of a well-functioning public procurement system are in place. The benchmarks will be based on four pillars, each of which contains a number of indicators:

Pillar I: Legislative and regulatory framework

- Procurement legislative and regulatory framework in compliance with applicable obligations derived from national and international requirements
- Availability of implementing regulations, documentation and tools to support implementation

Pillar II: Institutional framework and management capacity

- Degree of mainstreaming and integration into Public Financial Management System
- Existence of a functional management/regulatory body
- Existence of institutional development capacity

Pillar III: Procurement operations and market practices

- Efficiency of procurement operations and practices,
- Functionality of the public procurement market, and

- Existence of contract administration and dispute resolution provisions.

Pillar IV: The integrity of the public procurement system

- Existence of effective control and audit systems,
- Existence and efficiency of the appeals mechanism,
- Degree of access to information, and
- Existence of ethics and anti-corruption measures.

Each of these indicators is defined against a desirable “good practice standard” that can be used to determine the degree of achievement of an effective and efficient procurement system.

6.2.2 Recommendations to minimize time and cost overruns in Road sector projects

The following points can be recommended in order to minimize and control time and cost overruns in Road sector projects.

6.2.3 Contractors should give special attention to the following factors

- ✚ Contractors are recommended to be aware about construction materials, so they are advised to purchase the construction materials at the beginning of work. It is also better for them to have time schedule for material delivery process to the site in order to avoid shortage or lack of materials.
- ✚ Contractors are recommended to monitor the quality of activities continuously and to set the required quality system in the different activities of the project so as to avoid any mistakes that may lead to rework of activities, and finally time and cost overruns.
- ✚ Contractors are advised to set up stores for required construction materials, and especially those are scarce or that are in limited quantity in the markets to avoid time and cost overruns.
- ✚ Contractors are recommended to have qualified and quantified technical staff with appropriate experience of the project in order to be able to follow the different technical and managerial aspects of the project. The staff will be more effective if it is consisted of enough numbers of engineers, technicians, and foremen, so the responsibilities would be shared between all of them.
- ✚ Contractors are recommended to set up a computerized system to perform documentation process for all the activities in the site, so they would be able to detect performance in the work and to follow the time schedule continuously.
- ✚ Contractors are recommended to have a time schedule that clarifies their needs for equipments in the site, so it would be ready where needed without delay.

- ✚ Contractors are recommended to have the ability for controlling most project activities, used approved materials, and mechanisms of work to avoid the failure of tests.
- ✚ Contractors are advised to prepare a method of statement and the schedule for the project that take into consideration both reality and project type. Also it would be advised to follow such a plan and update. It from time to other and to compare it with available resources.
- ✚ Contractors are recommended to have enough cash before beginning in any project to avoid the financial problems. Also it is advised to monitor financial spending of the project and payments because any problem in financial aspect will lead to time and cost overruns.
- ✚ Planning and scheduling: they are continuing processes during construction and match with the resources and time to develop the work to avoid cost overrun and disputes.
- ✚ Site management and supervision: administrative and technical staff should be assigned as soon as project is awarded to make arrangements to achieve completion within specified time with the required quality, and estimated cost.

6.2.4 Owners should consider the following factors

- ✚ Owners are recommended to revise the bid documents such as technical specifications, drawings, bill of quantities and the design of the project in a good way. This is because any discrepancy in bid documents will lead to disputes between projects parts and so delay may occur. Pay progress payment to the contractor on time because it impairs the contractor's ability to finance the work.
- ✚ Owners are recommended to detect the available materials that present with contractor and to assess his financial ability to implement the project.
- ✚ Owners are advised to directly interview in case of any disputes between contractor and consultant to prevent the effect of such problems on the project accomplishment and the quality used in the project.
- ✚ Owner should determine the required duration of project and impose realistic duration to avoid time and cost overruns.
- ✚ Owners are recommended to have technical staff who is able to manage the different stages of any project and to follow the performance percentages, and also able to compare the actual performance with the planned one.
- ✚ Owners are recommended to facilitate the emergence of licenses needed to begin project work. And also to minimize change orders as possible as he can in order to avoid any time and cost overruns.

- ✚ Improvements the communication and coordination between the local construction agencies and the international funding agencies to solve the materials of financial issues.

6.2.5 Consultants should look to the following points

- ✚ Reviewing and approving design documents, drawings, and the payments of contractor to avoid any delay or cost overruns at the project. Consultants are advised to hire a qualified technical staff to manage the project in a good way, so he would be able to overcome any technical or management problems that happen.
- ✚ It is also advised for consultant to have high qualification to give suitable instruction in a suitable time and to be able to answer any question stated by contractor to avoid time and cost overruns.
- ✚ Consultants are recommended to avoid centralization of decisions especially those related to consultant work because this may lead to project delay. This may lead to marginalization of site engineer and then to the occurrence of many problems inside the site.
- ✚ Inflexibility: Consultants should be flexible in evaluating contractor works. Compromising between the cost and high quality should be considered.

6.2.6 Government and the high policies agencies of Bangladesh

- ✚ Government is recommended to construct new storehouses to store the required construction materials such as; the cement, base course, aggregates, steel and bitumen.
- ✚ Government is advised to state an official law through legislative council to prevent materials monopoly and prices manipulation, so to avoid time and cost overruns of projects.
- ✚ Government is advised to put a condition on the donor in the memorandum of understanding that obligate donor to compensate the contractor for any loss that result from hard political situation and unpredictable weather condition. This is very effective for continuity of construction works in Bangladesh, and to avoid time and cost overruns.

6.3 Conclusion

Procurement reform is a protracted process and there are many obstacles along the way. Establishing the legal framework and the regulatory institution are the first and possibly the easiest steps in the reform process. Enforcing compliance with the law and eradicating institutionalized corruption from public procurement are the more difficult steps that may take longer to achieve. However, while acknowledging the shortcomings, we should also recognize the progress that has been made in Bangladesh, where public procurement is conducted

according to higher standards of integrity, transparency and value for money than those which obtained in the past.

6.4 Limitations on the Study

One of the main limitations on the study was the secondary data; the difficulty in splitting into discrete time and cost impacts for each factor due to the close interrelationship between variables. Literature on similar studies in Bangladesh to collate with that from other countries was scarce. Another limitation was, for the study, only Roads and Highways Department was considered. It would have been better if comparison can be made with other public and private departments.

6.5 Recommendations for Further Research

A lot of research has been done and documented on efficiency and effectiveness of public procurement and time and cost overruns in developing countries in Asia on many areas of infrastructure and commercial (e.g. road sector projects) development. However, this was lacking in Bangladesh. Further research in similar road sector infrastructure developments was therefore recommended.

Reference:

1. Aibinu, A.A. and Odeyinka, A. (2006). "Construction delays and their causative factors in Nigeria." *J. Constr. Eng. Management*, ASCE, Vol. 132, No. 7, pp. 667-677.
2. Abudul-Rahman H., Berawi A., Mohamed O., Othman M. and Yahya I., 2006. Delay mitigation in the Malaysian construction industry. *Journal of Construction Engineering and Management*, Vol. 132, No. 2, pp.125 -133.
3. Assaf, S.A. and Al Hejji, S. (2006). "Causes of delay in large construction projects." *Int. J. Project Management*, Vol. 24, pp. 349-357.
4. Chang A. Shing-Tao (2002). "Reasons for cost and schedule increase for engineering design projects." *J. Management Eng.*, ASCE, Vol. 18, No. 1, pp. 29-36.
5. Chang A. Shing-Tao (2002). "Reasons for cost and schedule increase for engineering design projects." *J. Management Eng.*, ASCE, Vol.18, No. 1, pp. 29-36.
6. Chandra, P. (2002) *Projects Planning, Financing, Implementation and Review*. (5th edition) Publisher, Tata McGraw-Hill Publishing Company.
7. Chris, H. and Au (1999) *Project Management for Construction Fundamental Concepts for Owners, Engineer, Architects and Builders*. Prentice-Hall, Inc.
8. Chan, D.W.M. and Kumaraswamy, M.M. (1996), "An evaluation of construction time performance in the building industry." *Building and Environment*, Vol. 31, No. 6, pp. 569-578.
9. Daylong Training on Public Procurement Management on Friday, 18 June 2010, Venue: Prothom Alo Seminar Room, CA Bhaban (4th Floor), 100 Kazi Nazrul Islam Avenue, Karwan Bazar, Dhaka
10. Faridi, A.S. and El-Sayegh, S.M. (2006). "Significant factors causing delay in the UAE construction industry." *Construction Management and Economics*, Vol. 24, No. 11, pp. 1167-1176.
11. Frimpong, Y., Oluwoye, J., and Crawford, L. (2003). "Causes of delay and cost overruns in construction of groundwater projects in a developing countries; Ghana as a case study." *Int. J. Project Management*, Vol. 21, pp. 321-326.
12. Frimpong, Y., Oluwoye, J., and Crawford, L. (2003). "Causes of delay and cost overruns in construction of groundwater projects in a developing countries; Ghana as a case study." *Int. J. Project Management*, Vol. 21, pp. 321-326.
13. Koushki, P.A., Al-Rashid, K., and Kartam, N. (2005). "Delays and cost increases in the construction of private residential projects in Kuwait." *Construction Management and Economics*, Vol. 23, No. 3, pp. 285-294.

14. Koushki, P.A., Al-Rashid, K., and Kartam, N. (2005). "Delays and cost increases in the construction of private residential projects in Kuwait." *Construction Management and Economics*, Vol. 23, No. 3, pp. 285-294.
15. Kumaraswamy, M.M. and Chan, D.W.M. (1998). "Contributors to construction delays." *Construction Management and Economics*, Vol. 16, No. 1, pp 17-29.
16. Kaming, P.F., Olomolaiye, P.O., Holt, G.D., and Harris, F.C. (1997). "Factors influencing construction time and cost overruns on highrise projects in Indonesia." *Construction Management and Economics*, Vol. 15, No. 1, pp. 83-94.
17. Long, N.D., Ogunlana, S.O., and Lan, D.T.X. (2004a). "A study on project success factors in large construction projects in Vietnam." *Journal of Engineering, Construction and Architectural*, Vol. 11, No. 6, pp. 404-413.
18. Long, N.D., Ogunlana, S., Quang, T., and Lam, K.C. (2004b). "Large construction projects in developing countries: a case study Vietnam." *Int. J. Project Management*, Vol. 22, pp. 553-561.
19. Mansfield, N.R., Ugwu, O.O., and Doran, T. (1994). "Causes of delay and cost overruns in Nigeria construction projects." *Int. J. Project Management*, Vol. 12, No. 4, pp. 254-260.
20. Morris, S. (1990) 'Cost and Time Overruns in Public Sector Projects', *Economic and Political Weekly*, Nov. 24, Vol. XXV, No. 47, pp. M154 -168.
21. Odeh, A.M. and Battaineh, H.T. (2002). "Causes of construction delay: Traditional contracts." *Int. J. Project Management*, Vol. 20, pp. 67-73.
22. Ogunlana, S.O, Promkuntong, K., and Jearkijrm, V. (1996). "Construction delays in a fast-growing economy: comparing Thailand with other countries." *Int. J. Project Management*, Vol. 14, No. 1, pp. 37-45.
23. Sambasivan, M. and Soon, Y.W. (2007). "Causes and effects of delays in Malaysian construction industry." *Int. J. Project Management*, Vol. 25, pp. 517-526.
24. Sweis, G., Sweis, R., Hammad, A.A., and Shboul, A. (2007). "Delays in construction projects: The case of Jordan." *Int. J. Project Management*, Article in Press

ANNEXURE-1 (QUESTIONNAIRE)

(Questionnaire Survey on (i) efficiency and effectiveness of PPR with respect to variation of time and costs overruns in road sector projects (ii) Identification of important factors for time and cost overrun of Roads and Highways Department in Bangladesh)

This questionnaire survey will be used as a part of the researcher's MA in Procurement and Supply Management Programme in the BRAC University, Bangladesh. You will be highly praised and appreciated for spending your valuable time and effort to fulfil this questionnaire. The survey data collected through this questionnaire will be used only for the purpose of this study and will be considered as strictly confidential.

Instructions to the respondents:

1. The questions mentioned in this questionnaire have retained no right or wrong answer. On the basis of your perception, views and experience you are requested to select the most appropriate answer for each question.
2. You may find out irrelevancy or impertinency of some questions. However, researcher would like to request to answer all the questions, because every question contains a specific objective. In the case of your unwillingness to answer any question you are requested to continue to answer the remaining questions.

Some Key Words

Procurement is the sourcing and purchasing of goods, works, materials and services for business use. Individual businesses set procurement policies that govern their choice of suppliers, products and the methods and procedures that are going to be used to communicate with their suppliers

Effectiveness is measured by the extent to which stakeholder's /customer's requirements are met over time.

Efficiency is measured in terms of how economically the organisation's resources are utilised in providing a given level of stakeholder's/customer's satisfaction.

Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors (Kaming et al 1997).

Cost overrun is defined as excess of actual cost over budget. Cost overrun is also sometimes called "cost escalation," "cost increase," or "budget overrun." (Zhu et al 2004).

SECTION 1: GENERAL INFORMATION

1.1. Educational Background of the respondents

Masters Degree	Bachelor’s Degree	Diploma	H.S.C	S.S.C	Other (Specify)

1.2. Name of organization:

BWDB DPDC LGED PWD REB RHD others (Specify)

1.3. Major type of work involved:

Buildings Roads Water and Sewage Electro mechanics others (Specify)

1.4. Respondents designation:

Chief Engineer/Additional Chief Engineer/ Superintending Engineer/Executive Engineer/Sub-Divisional

Engineer/Assistant Engineer/ Sub-Assistant Engineer/ Consultant/ Contractor/ others (Specify) -

1.5. Relevant working experience (Years):

1-3 Yrs 3-5 Yrs 5-10 Yrs >10Yrs

(End of section 1)

SECTION 2: Usefulness of PPR for Road sector in Bangladesh

2.1 To what extent do you think PPR is important for development of road sector in Bangladesh? [Please, put ‘tick’ () mark in appropriate box]

Very important	Important	Moderately Important	Less Important	Unimportant

2.2 Efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR.

Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)

(End of section 2)

SECTION 3: (i) Efficiency and effectiveness of PPR with respect to variation of time and cost overruns in road sector projects (ii) Identification of important factors for time and cost overrun of Roads and Highways Department in Bangladesh

3.1: Questions regarding efficiency and effectiveness of PPR with respect to variation of time and cost

ID	Item	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
A	General Perception and attitude regarding PPR					
1	Good					
2	Takes more time					
3	It is not needed at all					
4	It is very much bureaucratic					
5	It is hard to follow all rules that require more time and cost					
6	It is hard to follow at the emergency period i.e. PPR does not support emergency situation					
7	PPR is useful, transparent and unique procurement system to procure goods/works/ services.					
8	Introduce single tender dropping point instead of several which makes procurement easy					
9	Contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money					
10	Contractors sometime submit unrealistic low rate for the work					
B	Current environment and attitude toward implementing PPR					
11	Environment is improving					
12	Attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good.					
13	Attitudes of some contractors					

	towards PPR are still negative					
C	Opinion regarding usefulness of PPR					
	PPR is useful because					
14	PPR is fair and transparent system					
15	Now tender procedures are going timely than previous					
16	PPR accelerated contract approval time than previous					
17	Contractors are able to do work with quality but previously they got job through lottery					
18	Easy to get licence and work in previous system but it is not possible in present system					
19	In earlier system, pressure and request comes very frequently from upper level but now it has decreased					
	PPR is not effective because					
20	Procurement system has been slowed down					
21	Advertisement time with respect to invitation for tender is more					
22	Time for evaluation is insufficient					
23	It is required to increase tender validity period for many projects					
24	Not possible to ensure quality as experience is not required for taka 2 crore					
25	Some contractors get opportunity while they have good relation with the representative of procuring entities					
26	Others (Specify)					

3.2: Questions regarding identification of important factors that significantly contributed to time and costs overruns in road sector projects in Bangladesh

ID	Item		Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
A	Important factors of time overruns						
1	Cash problem during construction	Factors relating to Contractor's responsibilities					
2	Lack of materials in markets	factors relating to Materials					
3	Shortage of construction materials	factors relating to Materials					
4	Delay of material delivery to site	factors relating to Materials					
5	Major disputes and negotiations	factors relating to Contractual relationship					
6	Poor site management	factors relating to contractor's responsibilities					
7	Insufficient number of staffs (contractor)	factors relating to contractor's responsibilities					
8	Inadequate contractor experience	factors relating to Contractual relationship					
9	Failure in testing	factors relating to Contractual relationship					
10	Suspension of work by owner or Project Poor economic conditions (currency, inflation rate, etc.) External factors	External factors					
11	Shortage of equipment at site	factors relating to Labor and equipment					

ID	Item		Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
12	Strikes and calamity	External factors					
13	Others (Specify)						
B	Important factors of cost overruns						
1	Increment of materials prices						
2	Delay in construction, supply of raw Materials & equipment by contractors						
3	Unsettlement of the local currency in relation to dollar value						
4	Resources constraint: funds and associated auxiliaries not ready						
5	Lack of cost planning/monitoring during pre-and post contract stages						
6	Design changes						
7	Inadequate review for drawings and contract documents						
8	Technical incompetence, poor organizational structure, and failures of the enterprise						
9	Lack of experience of project type, Inadequate project preparation, planning and implementation						
10	Bad allocation of labour inside the site						
11	Omissions and errors in the bills of quantities						
12	Lack of coordination at design phase						
13	Delays in issuing information to the contractor during construction stage						

ID	Item	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
14	Change in the scope of the project, in Government policies					
15	Delay in project's handing over					
16	Delays in decisions making by Government, failure of specific coordinating					
17	Wrong / inappropriate choice of site					
18	Unpredictable weather conditions					
19	Lack of experience of technical consultants, inadequacy of foreign collaboration agreements, monopoly of technology					

(If you think there are more factors contributing to time and costs overruns in road sector projects in Bangladesh, Please mention the name of factors and their importance below)

ID	Item	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)

Any other comments, please

(Thanks for sharing your expert opinion and valuable time.)

ANNEXURE -2 (TABLES FROM ANALYZED RESULT)

Table 5.1a: RHD respondents' view points for efficiency and effectiveness of PPR in RHD road projects:

	Mean	Std. Deviation
Contractors sometime submit unrealistic low rate for the work	4.6000	.50709
To what extent do you think PPR is important for development of road sector in Bangladesh	4.4667	.63994
Takes more time	4.3333	.72375
Not possible to ensure quality as experience is not required for taka 2 crore	4.2667	.59362
Good	4.2000	.41404
PPR is fair and transparent system	4.0667	.59362
It is required to increase tender validity period for many projects	4.0000	1.00000
It is hard to follow at the emergency period i.e. PPR does not support emergency situation	4.0000	1.00000
PPR is useful, transparent and unique procurement system to procure goods/works/ services.	3.9333	.79881
Environment is improving	3.8667	.63994
It is hard to follow all rules that require more time and cost	3.8000	1.14642
It is very much bureaucratic	3.7333	1.09978
Now tender procedures are going timely than previous	3.7333	.79881
Procurement system has been slowed down	3.6667	.89974
Advertisement time with respect to invitation for tender is more	3.6000	.98561
PPR accelerated contract approval time than previous	3.5333	1.06010
Attitudes of some contractors towards PPR are still negative	3.5333	.91548

	Mean	Std. Deviation
Some contractors get opportunity while they have good relation with the representative of procuring entities	3.5333	1.12546
Contractors are able to do work with quality for following PPR	3.4667	.83381
Easy to get licence and work in previous system but it is not possible in present system	3.4667	.83381
Time for evaluation is insufficient	3.4000	1.24212
Efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR.	3.4000	.82808
Attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good.	3.2667	.79881
Introduce single tender dropping point instead of several which makes procurement easy	3.2000	1.20712
In earlier system, pressure and request comes very frequently from upper level but now it has decreased	2.8667	1.45733
Contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money	2.8000	1.08233
It is not needed at all	1.8667	.74322

Table 5.1b: LGED respondents' view points for efficiency and effectiveness of PPR in RHD road projects:

	Mean	Std. Deviation
It is hard to follow at the emergency period i.e. PPR does not support emergency situation	4.7647	.43724
Time for evaluation is insufficient	4.5294	.51450
To what extent do you think PPR is important for development of road sector in Bangladesh	4.4118	.50730
Some contractors get opportunity while they have good relation with the representative of procuring entities	4.3529	.60634
Contractors sometime submit unrealistic low rate for the work	4.3529	.49259
It is required to increase tender validity period for many projects	4.2353	.43724
It is hard to follow all rules that require more time and cost	4.2353	.43724
Takes more time	4.1765	.72761
PPR accelerated contract approval time than previous	4.0000	.70711
Attitudes of some contractors towards PPR are still negative	4.0000	.79057
It is very much bureaucratic	4.0000	.86603
Not possible to ensure quality as experience is not required for taka 2 crore	3.6471	.86177
Advertisement time with respect to invitation for tender is more	3.6471	.60634
Good	3.4118	.50730
Introduce single tender dropping point instead of several which makes procurement easy	3.3529	1.05719
Easy to get licence and work in previous system but it is not possible in present system	3.2941	.58787

	Mean	Std. Deviation
Procurement system has been slowed down	3.0000	.93541
Attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good.	3.0000	.00000
Now tender procedures are going timely than previous	2.8235	.95101
PPR is fair and transparent system	2.7647	.56230
Environment is improving	2.6471	.49259
Contractors are able to do work with quality but previously they got job through lottery	2.6471	.78591
Efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR.	2.2353	.75245
Contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money	1.7059	.58787
PPR is useful, transparent and unique procurement system to procure goods/works/ services.	1.6471	.78591
In earlier system, pressure and request comes very frequently from upper level but now it has decreased	1.5294	.62426
It is not needed at all	1.2353	.43724

Table 5.1c: Contractors' view points for efficiency and effectiveness of PPR in RHD road projects:

	Mean	Std. Deviation
It is hard to follow at the emergency period i.e. PPR does not support emergency situation	4.9375	.25000
It is very much bureaucratic	4.5625	.51235
It is hard to follow all rules that require more time and cost	4.5525	.51235
Some contractors get opportunity while they have good relation with the representative of procuring entities	4.4375	.51235
Contractors are facing difficulties in submitting tender because they are unable to submit tender with required document and manage security money	4.3125	.47871
It is required to increase tender validity period for many projects	4.3125	.47871
Takes more time	4.3125	.47871
Contractors are able to do work with quality but previously they got job through lottery	4.1875	.40311
Attitude of majority procuring entity towards PPR is positive but very few still feel that lottery system is good.	3.9375	.25000
To what extent do you think PPR is important for development of road sector in Bangladesh	3.8125	.54391
Contractors sometime submit unrealistic low rate for the work	3.5625	.51235
Easy to get license and work in previous system but it is not possible in present system	3.5625	.51235
Procurement system has been slowed down	3.5000	.51640
PPR accelerated contract approval time than previous	3.4375	.51235
Attitudes of some contractors towards PPR are still negative	3.4375	.51235
	Mean	Std. Deviation

Environment is improving	3.3750	.50000
Time for evaluation is insufficient	3.1250	.88506
Good	3.0625	.25000
Advertisement time with respect to invitation for tender is more	2.8750	.34157
Not possible to ensure quality as experience is not required for taka 2 crore	2.7500	.46291
Now tender procedures are going timely than previous	2.7500	.44721
Introduce single tender dropping point instead of several which makes procurement easy	2.6250	.50000
PPR is fair and transparent system	2.5000	.51640
Efficiency and effectiveness of road sector works in Bangladesh is increased for adopting PPR.	2.0000	.89443
PPR is useful, transparent and unique procurement system to procure goods/works/ services.	1.7500	.44721
In earlier system, pressure and request comes very frequently from upper level but now it has decreased	1.5625	.51235
It is not needed at all	1.0625	.25000

Table 5.2a: RHD respondents' view points for time overruns in road projects

	Mean	Std. Deviation
Shortage of equipment at site	4.2500	.44721
Poor site management	4.1250	.80623
Major disputes and negotiations	4.1250	.71880
Cash problem during construction	4.1250	.71880
Strikes and calamity	4.0625	.77190
Inadequate contractor experience	4.0625	.77190
Insufficient number of staffs (contractor)	4.0000	.73030
Delay of material delivery to site	3.7500	.85635
Shortage of construction materials	3.7500	.93095
Suspension of work by owner or Project Poor economic conditions (currency, inflation rate, etc.) External factors	3.6875	.79320
Lack of materials in markets	3.6875	.87321
Failure in testing	3.6250	.71880

Table 5.2b: LGED respondents' view points for time overruns in road projects		
	Mean	Std. Deviation
Cash problem during construction	4.1250	.61914
Strikes and calamity	4.0625	.77190
Inadequate contractor experience	4.0000	.51640
Major disputes and negotiations	4.0000	.51640
Insufficient number of staffs (contractor)	4.0000	.63246
Shortage of equipment at site	3.9375	.57373
Suspension of work by owner or Project Poor economic conditions (currency, inflation rate, etc.) External factors	3.8750	.71880
Poor site management	3.6875	.60208
Delay of material delivery to site	3.5625	.72744
Lack of materials in markets	3.5625	.51235
Failure in testing	3.5000	.73030
Shortage of construction materials	3.4375	.81394

Table 5.2c: contractors' view points for time overruns in road projects		
	Mean	Std. Deviation
Cash problem during construction	4.4375	.51235
Strikes and calamity	4.1875	.83417
Lack of materials in markets	4.1875	.40311
Suspension of work by owner or Project Poor economic conditions (currency, inflation rate, etc.) External factors	4.0000	.63246
Shortage of construction materials	3.8750	.61914
Major disputes and negotiations	3.6875	.47871
Shortage of equipment at site	3.2857	.72627
Failure in testing	3.1875	.83417
Poor site management	3.0000	.73030
Delay of material delivery to site	2.6875	.70415
Insufficient number of staffs (contractor)	2.4375	.51235
Inadequate contractor experience	2.0625	.68007

Table 5.3a: RHD respondents' view points for cost overruns in road projects		
	Mean	Std.
Increment of materials prices	4.4375	.51235
Delay in construction, supply of raw Materials & equipment by	4.3750	.50000
Resources constraint: funds and associated auxiliaries not ready	4.2500	.57735
Design changes	4.1900	.54391
Delays in decisions making by Government, failure of specific	4.1875	.65511
Delay in project's handing over	4.0625	.68007
Lack of cost planning/monitoring during pre-and post contract stages	4.0000	.51640
Lack of experience of technical consultants, inadequacy of foreign	3.9375	.99791
Unpredictable weather conditions	3.9375	.85391
Change in the scope of the project, in Government policies	3.9375	.85391
Technical incompetence, poor organizational structure, and failures of	3.9375	.77190
Lack of experience of project type, Inadequate project preparation,	3.8750	.80623
Lack of coordination at design phase	3.6875	.60208
Unsettlement of the local currency in relation to dollar value	3.6250	.71880
Inadequate review for drawings and contract documents	3.6250	.71880
Omissions and errors in the bills of quantities	3.5625	.62915
Bad allocation of labour inside the site	3.5000	.81650
Delays in issuing information to the contractor during construction stage	3.3125	.79320
Wrong / inappropriate choice of site	3.0625	1.06262

Table 5.3b: LGED respondents' view points for cost overruns in road projects		
	Mean	Std.
Delay in construction, supply of raw Materials & equipment by	4.4375	.51235
Increment of materials prices	4.4375	.51235
Delays in decisions making by Government, failure of specific	4.3125	.47871
Unpredictable weather conditions	4.2500	.57735
Lack of experience of technical consultants, inadequacy of foreign	4.0625	.68007
Design changes	4.0625	.77190
Resources constraint: funds and associated auxiliaries not ready	4.0625	.68007
Change in the scope of the project, in Government policies	4.0000	.89443
Delay in project's handing over	4.0000	.63246
Lack of coordination at design phase	3.7500	.68313
Unsettlement of the local currency in relation to dollar value	3.6250	.61914
Lack of experience of project type, Inadequate project preparation,	3.5625	.81394
Lack of cost planning/monitoring during pre-and post contract stages	3.5000	.81650
Omissions and errors in the bills of quantities	3.3750	.88506
Inadequate review for drawings and contract documents	3.3125	.70415
Delays in issuing information to the contractor during construction stage	3.3125	1.01448
Bad allocation of labour inside the site	3.2500	.93095
Technical incompetence, poor organizational structure, and failures of	2.9375	.85391
Wrong / inappropriate choice of site	2.8125	.75000

Table 5.3c: Contractors' view points for causes of cost overruns in road projects		
	Mean	Std.
Increment of materials prices	5.0000	.00000
Unpredictable weather conditions	4.4375	.51235
Delays in decisions making by Government, failure of specific	4.4375	.51235
Change in the scope of the project, in Government policies	4.3750	.50000
Resources constraint: funds and associated auxiliaries not ready	4.3750	.50000
Design changes	4.3125	.47871
Delay in project's handing over	3.9375	.57373
Unsettlement of the local currency in relation to dollar value	3.9167	.28868
Lack of experience of technical consultants, inadequacy of foreign	3.8125	.40311
Lack of experience of project type, Inadequate project preparation,	3.6875	.70415
Delays in issuing information to the contractor during construction stage	3.6875	.60208
Omissions and errors in the bills of quantities	3.5625	.72744
Technical incompetence, poor organizational structure, and failures of	3.5625	.62915
Delay in construction, supply of raw Materials & equipment by	3.3750	.50000
Inadequate review for drawings and contract documents	3.1250	.71880
Lack of cost planning/monitoring during pre-and post contract stages	3.0625	.77190
Lack of coordination at design phase	2.7500	.57735
Wrong / inappropriate choice of site	2.4375	.51235
Bad allocation of labour inside the site	2.3750	.50000