COST OVERRUN IN INFRASTRUCTURE PROJECTS: CASE STUDY OF BANGLADESH ROADS & HIGHWAYS DEPARTMENT

By
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A thesis submitted to the Department of BIGD in partial fulfillment of the requirements for the degree of Master of Arts in Governance and Development

BRAC Institute of Governance & Development (BIGD)
BRAC University
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It is hereby declared that

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3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
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Executive Summary

Transportation infrastructure plays a vital role in every nation's Socio-Economic development and hence the size of the road network in a country is often used to assess the extent of its national development. In Bangladesh, Roads and Highways Department (RHD) is responsible for the construction and the maintenance of the major road and bridge networks. Since establishment of RHD the size of the major road network in Bangladesh has grown from 2500 kms to the present network of 22,476 kms. To keep up with the growth of the economy, roads and bridges built and maintained under RHD plays a vital role, which also includes safety and reliability of the road network. A proper development of the transportation road network will reduce the cost of transportation, both in terms of money and time; will also help in the integration of various regions within the country and may also create opportunity to create international road network.

Objective of the study includes collection of necessary information of road and bridge development projects ranges over previous 20 years, to analyse the data and corelate causes of cost overrun and key factors involved. In preliminary assessment for this study includes the key factors to be considered. The factors considered for this thesis are, type of projects; Key Personnel; source of Funding; requirement of changes in the original plan; project size in terms of value, utility relocation requirement may need to be considered.

Within the scope of this thesis, corelations between cost overrun was considered over the factors that is discussed above and it was found that cost overrun is positively related with time overrun, contract revisions, land acquisition and projects which includes bridges.

'Project duration' has been found to have the greatest effect on cost overrun. This is followed by 'project with bridge', which again is followed by variable - 'land acquisition'. This ranking may help decision makers employ limited resources to execute project management more prudently.

Further research and evaluation in this sector may also create further fundings and the appropriateness the outcome may be evaluated for the department. Impact of the prevention may play a vital role to cost saving and reduce the waste in form of potential national economic and financial losses. It could easily be understood that a minor improvement to the efficacy of the Roads development section may greatly impact improving the markets, production, jobs, health, education and other social services.

Dedication

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

Md. A. Alim Khan

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- Special thanks to management staff of the BRAC University of Dhaka for their academic support throughout my study.
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- Special thanks for the Officers of Roads and Highways Department (RHD) getting the information of case studies.
- Finally, I would like to give my special thanks for my family members whose patience and love enabled me to complete this work.

Md. A. Alim Khan

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List of Acronyms

ADP	Annual Development Program
ADB	Asian Development Bank
AFDB	African Development Bank
AUD	Australian Dollar
AVRII	Average Relative Importance Index
CBA	Cross Border Agreement
DCA	Department of civil aviation
DOTC	Department of Transportation and Communication
EA	Executing Agency
GDP	Gross Domestic Product
GOB	Government of Bangladesh
ICR	Implementation Completion Report
IRR	Internal Rate of Return
ICAO	International Civil Aviation Organization
IDA	International Development Association
ILS	Instrument Landing System
INR	Indian Rupees
JBRLP	Jamuna Bridge Railway Link Project
Km	Kilometre
LCCA	Life Cycle Cost Analysis
LGED	Local Government Engineering Department
MoHPW	Ministry of Housing & Public Works
NPV	Net Present Value

OECF	Overseas Economic Cooperation Fund
PCR	Project Completion Report
PIU	Project Implementation Unit
PV	Present Value
SAARC	South Asian Association for Regional Cooperation
RHD	Roads & Highways Department
RESA	Regional Environmental and Social Analysis
RII	Relative Importance Index
ROI	Return of Investment
ROR	Rate of Return
Rs	Indian Rupees
RSP	Rank of Studied Projects
SFD	Sinking Fund Deposit
SPCA	Single-Payment Compound Amount
SPPV	Single-Payment Present Value
SPSS	Statistical Package for Social Science
TA	Technical Assistance
TVM	Time Value of Money
UK	United Kingdom
UNECE	United Nations Economic Commission for Europe
USA	United States of America
USCA	Uniform Series Compound Amount
VOC	Vehicle Operating Cost
WB	World Bank

CHAPTER 1
INTRODUCTION

1.1 Background

Cost overruns in infrastructure development projects have significant implications on social, economic, political landscaping. Cost overruns impact competitiveness of an economy. Infrastructure developments serve as inputs for other sectors which enhance the economic purview. So, cost overruns in development projects lead to a rise in the capital-output-ratio for the whole economy. Literally cost overruns and its resulting delays diminish the efficiency of scare economic resources and limit the potential economic growth. Lack of appropriate identification efforts for understanding of the basic causes behind time and cost overruns, there is a risk that the insights will be altered and mislead the policy making process. For instance, the insight that the public sector is not capable of bringing public services in time and with stipulated cost, could lead to imbalanced corporatization related to infrastructure development and other public goods and services. Truly, lack of research on this topic is somewhat surprising and a gross inattention of vital public policy matters.

Roads & Highways Department (RHD) is the leading agency for Highways and Roads connectivity in Bangladesh, accountable for the acquiring and management of the major road network throughout the country. For RHD road network, fund is allocated from Development and Revenue Heads. Development budget is utilized for the construction, rehabilitation and improvement of roads and bridges, whereas the maintenance of the existing road network and assets is being done by revenue budget.

Annual Development Programme (ADP) is a number of development projects from various sectors and allocations for them during a financial year. ADP comprises of number of projects taken in all economic sectors and each ministry prepares priorities to instrument own projects. ADP is guided by the ongoing Five-Year Plan which depicts government's development policies, priorities and programs for that period. National Assembly approves ADP for the particular year. The main purpose for formulation and implementation of ADP are to accelerate economic growth, dropping poverty level and reducing unemployment rate. Time and cost overrun surge the ADP size, consequently increase social cost. In the case of Development Partner (DP)’s aided project, longer execution period invites higher interest rate cost and heaves more to amortization schedule.

1.2 Problem Statement

Almost all projects of RHD are being implemented with cost and schedule overrun. Each year, the government of Bangladesh takes numbers of projects for implementation under ADP, but the implementation status is poor, and many projects need revision resulting cost escalation with time overrun.

In 2022-2023 year, there are 44 ongoing projects considered to be wrapped up, out of which only three would end within their original deadlines and 41 projects missed their original target more than two years ago. Some projects are delayed by three to four years. 23 of the 44 projects have gone through cost revisions. An evaluation report of the Implementation Monitoring and Evaluation Division (IMED) on 49 projects, completed in fiscal 2016-17, shows 41 of them faced time extension and cost overrun. (Adhikary, 2022)

The RHD is implementing 185 ADP projects in 2022-2023, including 22 projects are funded by Development Partners (DP). The government allocated BDT 19,656 crore for these. Figure out the challenges of ADP implementation and suggest the strategic policy directives to overcome those are imperative. This study aims to way out the proper utilization of ADP especially in Road Transport sub-sector. (Adhikary, 2022)

1.3 Objectives

Considering the above issues, the main objective of the dissertation is;

'To identify the root causes of cost overrun in RHD projects in Bangladesh'

1.4 Research Questions:

a. What are the root causes behind such cost overrun?
b. How common and how severe are the cost overruns?

1.5 Rationale of the Study

Time and cost overruns in public sector bringing down the efficacy of scare resource input. Effective management of processes employed in creating these assets is to a large degree, determined by the sum of resources spent, time engaged and quality compared to other projects. Infrastructure includes the input required to produce goods and services from utilities (gas, electricity, internet, telecommunication, water etc.) and transport sector (highways, land ports, seaports, airports etc.) and is crucial to promote the economic activity.

Communication and transportation system are vital physical infrastructure which acts as a catalyst of a country's overall development and provide the mobility as well as accelerate the socio-economic development. Because of geographical location, Bangladesh could play a

pivotal role in providing transport linkage to SAARC countries sharing the access to Chattogram, Mongla and Payra Port as well as other land ports. As Bangladesh has the ultimate potentials of using the transport linkage for economic development, this could become an important source of foreign exchange earning with a win-win situation for all the countries concerned.

A sizeable around 25% of public sector resources is currently spent in development and maintenance of transport sector in Bangladesh. The allocation in Road Transport Sector is very high as of total ADP size, an enormous amount compared to other sectors' allocations. Cost overrun, especially for transport sector is considered as the most alarming issue for economic and social advancement for most of the countries. If we could identify the phenomena and the obstacles, how cost overrun decelerates the economic growth, then the formulation of proper development strategy would be the effective option in implementing projects. This study was conducted to investigate actual underlying hindrance as well as to propose the best fit strategy to overcome the situation for optimum growth of the economy.

A lot of study has been done regarding cost overrun in infrastructure project in different countries. Till improvement in measuring the acute issue is not satisfactory. Researchers are trying to get relieve form this chronic problem. In Bangladesh there are very few researchers have stepped on it.

1.6 Limitations of the study

The study has analyzed data in a limited scope and used information from RHD ADP projects only. To show the trend of cost overrun in road sector development project time series data is required. This was not possible within the scope of this study. There are some dissimilarities in mobilization of fund from different sources which was not differentiated whether the project is GoB funded or supported by Development Partner (DP). Moreover, in this study it is out of consideration whereas the project implemented by the existing Road Division or by separate Project Implementation Unit (PIU). Again, only Project Director (PD) has been considered as key personnel for the project implementation. Whereas Project Manager (PM) and Deputy Project Manager (DPM) also play important role in project implementation.

Moreover, the study has been affected by the following limitations:

Projects data for the study have been collected from both solely GoB funded and aided by development partners. There is some significant dissimilarities path in the project cycle from inception to completion of the project depending on the source of fund.

In the approval procedure of a project using public fund, Development Project Proposal (DPP) requires different time period in executing agency, in line ministry and in the planning commission. After the approval by the planning ministry or by the ECNEC, variable time requires for the particular contract approval by the approving authority. Time required for different approval stages of the project was not been considered.

Some projects have been implemented by the existing Road Division and some by independent Project Implementation Unit (PIU) which has not been segregated and classified in the study.

1.7 Methodology and Procedure:

Data was collected from different sources of published documents and various features of project execution, based on different research reports and government publications including the Perspective Plan, Five-year Plan, Road Master Plan, MTBF, RHD's Priority list, ADP Books of different financial years, Fund-release statistics etc. The paper also gone through different international and national issues regarding cost overrun in highway infrastructure projects. Specifically, data on roads and bridge development project across the national and regional highway network was collected from Planning & Programming Circle of RHD. 82 numbers of project completion reports (PCR) were reviewed. Data of few projects were excluded due to the fact that cost overrun was coupled with change in scope. The methodology will be discussed in details in chapter two.

1.8 Organization of the study

First Chapter of this paper provides a general outline of the situation in ADP implementation in Bangladesh Highway Projects especially for RHD with regards to time and cost overruns. This section illustrates the objectives and scope of the study, provides a brief overview of the approach used in clarifying the objective of the study. Chapter-2 presents and discusses the methodologies followed, and the statistical theories used to investigate the data. In Chapter-3 it discusses the overview of RHD provided with the moto and procedure of activities, especially for the implementation of the development projects. The literature review and concept in Chapter-4 presents previous experience and findings of earlier researchers in this area, root causes for cost overrun and their significance in global as well as Bangladesh perspective. Chapter-5 of the study represents data collection and description of those & discusses analysis of collected data and findings. Chapter-6 gives an overview of the magnitude of the cost overruns issues in RHD projects, using descriptive statistics. It is concluded with the findings, the encounters faced during the study, and areas for further

investigation, rooms for development and recommendations made to minimize cost overruns to improve proficiency of project administration and contract manage

CHAPTER 2

METHODOLOGY

Earlier studies on cost overrun of construction projects reveal that different statistical methods have been applied in analysing the causes and consequences of cost overrun. These methods include graphical and non-graphical descriptive statistics, hypothesis testing, simple and multiple linear regression models etc.

2.1 Exploratory Analysis

Once the data are processed for analysis, one of the first techniques the analyst applies is exploratory analysis that ranges from descriptive statistics to various types of data visualization. Such an exploratory analysis may corroborate existing body of knowledge and may shed light on possible new findings in the form of patterns, trends etc.

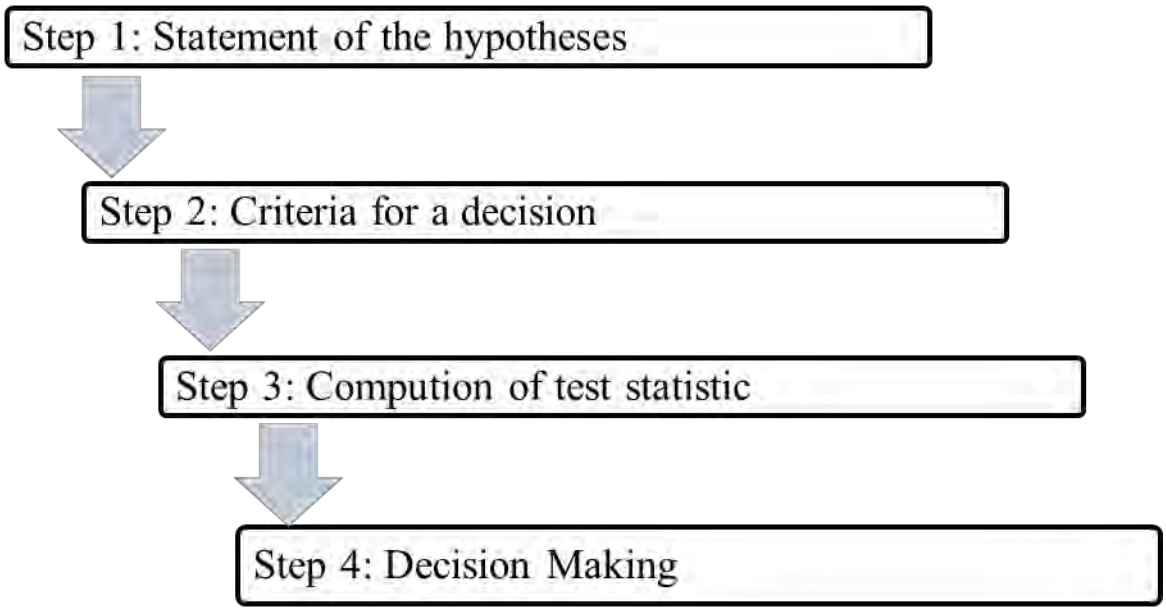
Descriptive statistics utilizes different measures of central tendency such as mean, median, and mode to summarize the data for quick observation. Besides, the measures of dispersion such as variance, standard deviation, and range etc. help the analyst assess the big picture with relative ease. In addition, different measure of measures of association such as covariance and correlation are also applied at this stage. A correlation matrix reveals possible association or, lack thereof upon which subsequent hypothesis testing and regression analysis could be conducted to further revalidate the preliminary findings.

Different data visualization techniques such as scatter plot, line graph, pie chart etc. also help the initial assessment of the data. For instance, the scatterplots reveal the presence of linear association or, lack thereof between two variables. It also, help to find the outliers that prompt the decision on whether to exclude those or, further analyse.

2.2 Hypothesis Testing

A statistical test introduces a mechanism for quantitative decisions about single a process or multiple processes. This method supports the decision over any hypothesis and provides enough support reject decisions. To come to such conjecture is named as a null hypothesis. A null hypothesis is characteristic arithmetic theory which indicates there is no statistical relationship and also significance exists, for a set of variables which is given, single or observed between two sets of data and measured incident. This method helps not to reject a good result and continue to act as if to "believe" the null hypothesis is to be true. Or result may be disappointing, indicating that we may not have had enough data to "prove" something to reject the null hypothesis.

The hypothesis testing aims at determining the likelihood of a population parameter, for example the mean, is how likely to be true. In the following discussion, we would describe the four steps for hypothesis testing.



The derivation of a test statistic is from the data, which is tested against upper and lower critical values that was pre-determined. If the outcome of the test statistics is less that the lower critical value or greater than the upper critical value the null hypothesis is considered as rejected.

Null and alternative hypotheses can be two or one tailed. For an example of one tailed test, light bulbs of some specific type are declared to have a mean lifetime of at least 500 hours, a testing program is implemented. The null hypothesis, in this case, is that the mean lifetime is greater than or equal to 500 hours. The complement or alternative hypothesis that is being guarded against is that the mean lifetime is less than 500 hours. The test statistic is compared with a lower critical value, and if it is less than this limit, the null hypothesis is rejected.

Thus, a statistical test requires a pair of hypotheses; namely,

H0: a null hypothesis

Ha: an alternative hypothesis.

The null hypothesis is a statement about a belief. We may doubt that the null hypothesis is true, which might be why we are "testing" it. The alternative hypothesis might, in fact, be what we believe to be true. The test procedure is constructed so that the risk of rejecting the null hypothesis, when it is in fact true, is small. This risk, α, is often referred to as the

significance level of the test. By having a test with a small value of α, we feel that we have actually "proved" something when we reject the null hypothesis.

Critical values for a test of hypothesis depend upon a test statistic, which is specific to the type of test, and the significance level, α, which defines the sensitivity of the test. A value of α = 0.05 implies that the null hypothesis is rejected 5 % of the time when it is in fact true. The choice of α is somewhat arbitrary, although in practice values of 0.1, 0.05, and 0.01 are common. Critical values are essentially cut-off values that define regions where the test statistic is unlikely to lie; for example, a region where the critical value is exceeded with probability α if the null hypothesis is true. The null hypothesis is rejected if the test statistic lies within this region which is often referred to as the rejection region(s).

Another quantitative measure for reporting the result of a test of hypothesis is the p-value. The p-value is the probability of the test statistic being at least as extreme as the one observed given that the null hypothesis is true. A small p-value is an indication that the null hypothesis is false.

2.3 Multiple linear Regression

Multiple linear regression attempts to model the relationship between two or more explanatory variables and a response variable by fitting a linear equation to observed data. Every value of the independent variable x is associated with a value of the dependent variable y. The population regression line for p explanatory variables x1, x2, ..., xp is defined to be $\mu y = \beta 0 + \beta 1x1 + \beta 2x2 + ... + \beta pxp$. This line describes how the mean response μy changes with the explanatory variables. The observed values for y vary about their means μy and are assumed to have the same standard deviation σ. The fitted values b0, b1, ..., bp estimate the parameters β0, β1, ..., βp of the population regression line.

Since the observed values for y vary about their means μy, the multiple regression model includes a term for this variation. In words, the model is expressed as DATA = FIT + RESIDUAL, where the "FIT" term represents the expression $\beta 0 + \beta 1x1 + \beta 2x2 + ... \beta pxp$. The "RESIDUAL" term represents the deviations of the observed values y from their means μy, which are normally distributed with mean 0 and variance σ. The notation for the model deviations is ε.

Formally, the model for multiple linear regressions, given n observations, is:

$yi = \beta 0 + \beta 1xi1 + \beta 2xi2 + ... \beta pxip + \varepsilon i$ for i = 1,2, ... n.

In the least-squares model, the best-fitting line for the observed data is calculated by minimizing the sum of the squares of the vertical deviations from each data point to the line (if a point lies on the fitted line exactly, then its vertical deviation is 0). Because the deviations are first squared, then summed, there are no cancellations between positive and negative values. The least-squares estimates b0, b1, ... bp are usually computed by statistical software.

The values fit by the equation b0 + b1xi1 + ... + bpxip are denoted i, and the residuals ei are equal to yi - i, the difference between the observed and fitted values. The sum of the residuals is equal to zero.

The variance ² may be estimated by s² =, also known as the mean-squared error (or MSE). The estimate of the standard error s is the square root of the MSE.

2.4 Summary of the Chapter 2

Here we have presented the theoretical aspects including exploratory analysis, hypothesis analysis and regression analysis of the data collected from Roads and Highways Department. In the next part we will know basic project implementation process by the RHD.

CHAPTER 3

OVERVIEW OF ROADS AND HIGHWAYS DEPARTMENT

Roads and Highways Department (RHD) is established in 1962, the erstwhile British Colonial organisation 'Construction & Building (C&B)' was divided into two distinct bodies RHD and Public Works Department (PWD). RHD is answerable for the building and the maintenance of the major roads and bridges of Bangladesh. Since establishment of the department, the size of the RHD road network in Bangladesh has expanded from early 2500 kms to the presently 22,476 kms. (RHD, 2022)

The annual budget (2021-2022) for RHD of around BDT 25000 crore, of which about BDT 23500 Crore is from the Development head and BDT 1500 crore from the Revenue head. (RHD, 2022)

3.1 Departmental Objectives

The vision Roads and Highways Department (RHD);

> *to provide a safe, cost effective and well-maintained road network all through.*

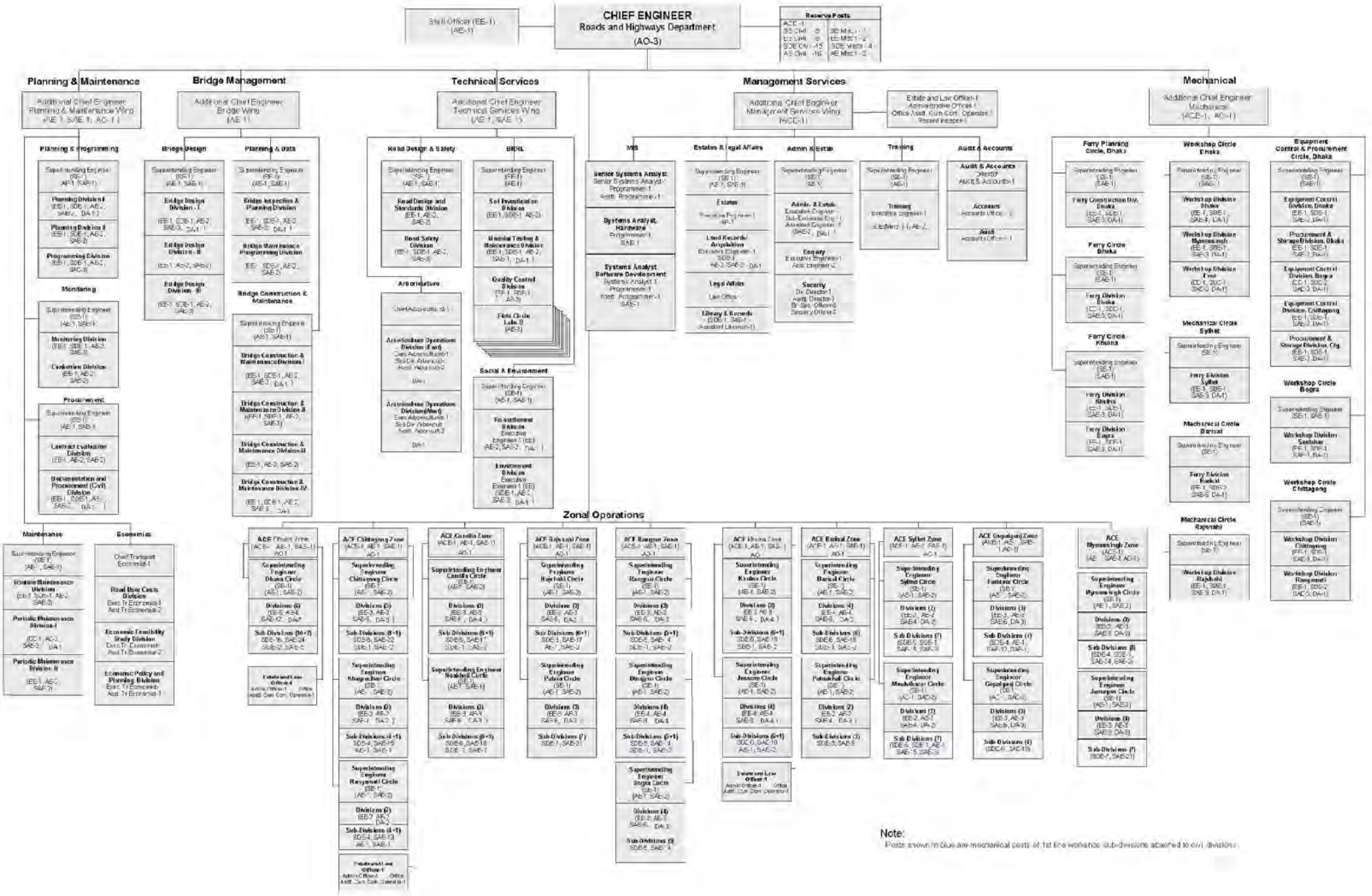
The RHD has the ability to plan, manage and serve its responsibilities over its jurisdiction. (RHD, 2004)

3.2 Personnel of RHD

RHD Strategy is prepared to satisfy the Road Transport and Highways Division (RTHD) Policy. To uphold this, they have formulated strategy for each of the RHD Wings (for headquarters) and RHD Zones (field offices). Strategy and policy documents along with any RHD General Procedures issued by the Chief Engineer are considered as a must for the RHD management system. (RHD, 2004)

RHD is steered by a Chief Engineer, associated by Additional Chief Engineers. The total posts in RHD are almost 20,000 out of which Class I (grade 9 and above) is of 625. The structure for RHD consists of five Wings in Headquarter and ten number of Field Zones, each of Wings and Zones are directed by Additional Chief Engineer under direct supervision by the Chief Engineer. More recently the government has approved revise organogram with large number of professionals.

ORGANOGRAM OF ROADS AND HIGHWAYS DEPARTMENT



As a professional organization RHD is mostly influenced by Civil Engineers, but also other professionals including Mechanical Engineers, Transport Economist, IT professionals have a vibrant role in the process. The organization is becoming more and more complex in its obliged duty and there is an urgent need for specialists in many areas of operation. Appropriate education and experience in certain cases that are specifically trained for a particular post as in HDM, road safety and project management should be introduced. Technology has evolved but a few has been developed for the support staffs to the effective operation of RHD. (RHD, 2004)

3.3 Assets

RHD secures a vast amount of assets in the form of land, road structures, bridges, culverts, ferries, equipment and others. The collective value would be at least BDT 37000 Crore. This all out value is the biggest of any other sole organization in Bangladesh and undoubtedly likely crossings the joined complete of all private sectors working in the country. These resources are a key qualification which is commanding to the economy and maintaining the value of these assets places a great responsibility on RHD. Maintaining the value of these assets places a crucial role on RHD. Neglecting periodic maintenance leads to both higher costs of RHD and higher road user costs and loss of consumer satisfaction. Without timely maintenance of these Assets will rapidly deteriorate and consequently burden additional 3 to 4 times cost that should have been spent on Routine and Periodic maintenance. (RHD, 2001)

3.4 Classified Roads under RHD

For roads and highways RHD uses two types of pavements, flexible pavement and rigid pavement. Flexible pavements are those which reflect the buckle of sub-grade, subbase, base and surfacing layers. In flexible pavement, asphalt (usually mix of bitumen and aggregates) is laid with no steel reinforcement that allows limited movement of the roadbed under-ground changes. Unlike the previous one, rigid pavement is associated with flexural strength; the load is distributed over a wide area of sub-grade level. Rigid pavement is just like other RCC slabs made with mainly steel reinforcement and cement concrete and laid on road embankment.

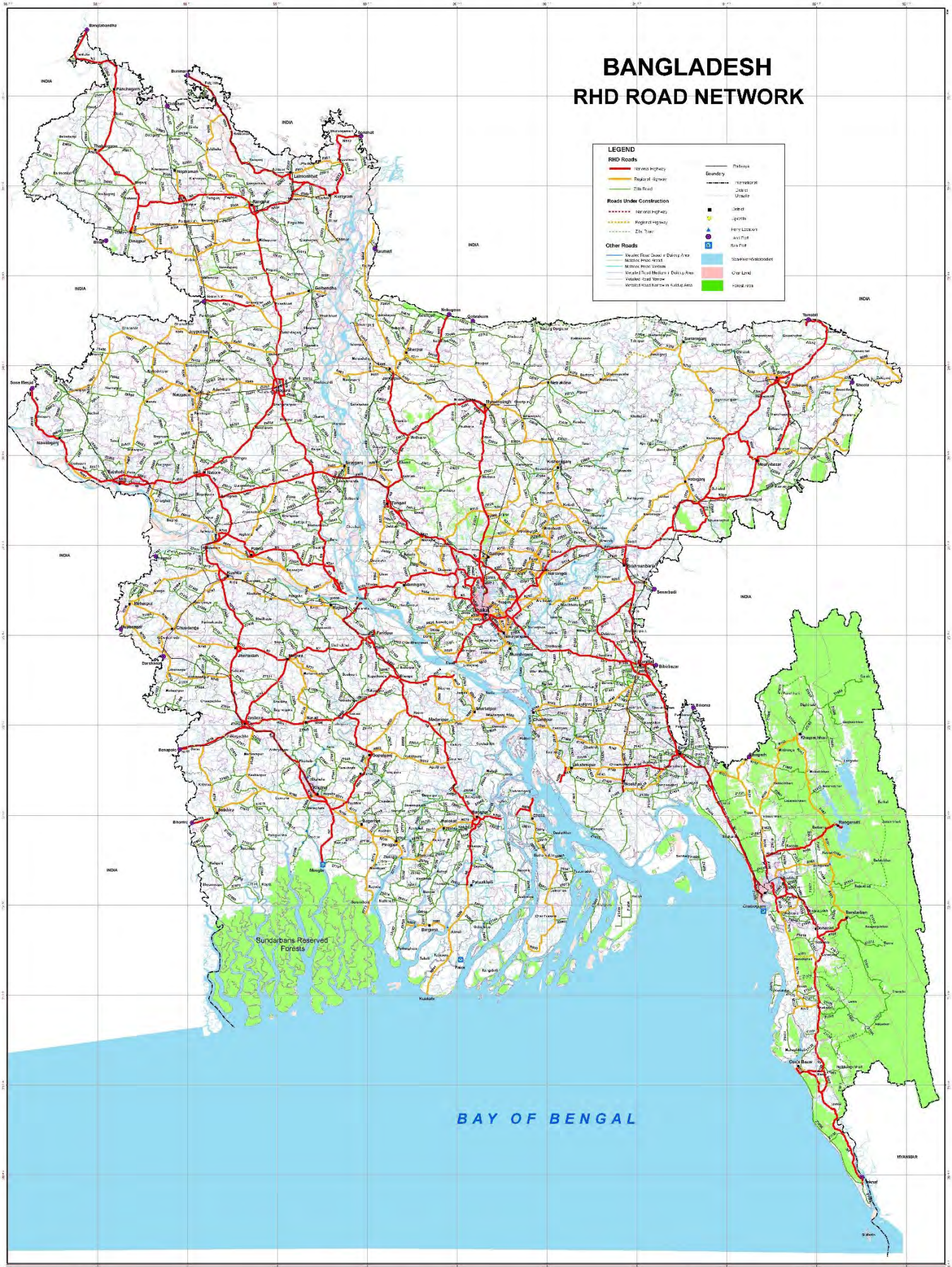
The RHD networks are mostly framed using flexible pavement, due to its favourable characteristics of smooth riding with easy maintenance and less traffic restrictions period. On the other hand, rigid pavement is usually used in bazar portion of the road sections where strong drainage facilities are not available. Most recently, RHD has introduced some section with rigid pavement in National Highways (NH), Regional Highways (RH), and Zilla

Highways (ZH). It has also a great responsibility to construct and maintenance of all culverts and bridges length up to 1500m over the NH, RH and ZH.

As of today, the number and length of the RHD highways are as follows (RHD, 2022):

National Highway (NH)	110 Nos	3991 Kms
Regional Highway (RH)	147 Nos	4898 Kms
Zilla Highway (ZH)	735 Nos	13587 Kms
Total Road Length	**992 Nos**	**22476 Kms**

RHD is custodian for almost 2500 items of construction equipment. The usual recurring cost for maintaining the equipment is about BDT 6 crore. The Mechanical Zones is responsible for taking care of the assets. Most mechanical equipment is allocated to field divisions and is under their day-to-day control. (RHD, 2022)



Government of the People's Republic of Bangladesh
Ministry of Road Transport and Bridges
Roads and Highways Department

HDM Circle, RHD
Sarak Bhaban, Tejgaon, Dhaka-1208
Bangladesh
URL: www.rhd.gov.bd

Printed and Published by HDM Circle, RHD

N.B: Grid Distance = 50 km

Datum : D_WGS_1984
Projection: Transverse_Mercator
Projected Coordinate System: BUTM2010

0 12.5 25 50 75 100 km
1 inch = 16 km

N
W E
S

Data Sources:
1. RHD Road-Centerline GPS Survey 2002-04, 2015 -2016, 2020; Road Information from RHD Field Divisions based on the latest Road Reclassification by the Planning Commission of Bangladesh.
2. Other Road Layer from SCB GIS data, 2016-17.
3. River Layer from SCB GIS data, 2016-17.
4. International Boundary Layer from BBS data, 2019
5. Road Questions Layer from LGED Thana Base Map, 1992
6. RHD Ferry Layer from RHD LRP Data, 2013.
7. Railway, Forests and Char Layer from SCB GIS data, 2016-17.

3.6 Revenue Earnings

RHD possess number of bridges, ferries and mechanical equipment. Government collects toll from 64 bridges, 3 roads and 54 ferries under RHD. The amount receives BDT 1021.14 crore from 2021-2022. (RHD, 2022)

3.7 Project Implementation Unit (PIU)

All RHD development project implemented under Annual Development Programme (ADP), funded mostly by GoB grant and some are co-financed by Development Partners (DP). In RHD large number of projects are implemented using the existing Road Zone, Road Circle or Road Division Engineers performing in parallel with their chartered duties including repair and maintenance of existing assets using revenue fund. For the large sized especially, foreign aided projects are formulated proposing separate PIU. Government has recently taken a remarkable policy not to transfer the PIU members until completion of the particular project.

3.8 Summary of the Chapter 3

RHD is a professional organization and custodian for almost 22500 Kms of backbone highways connecting all over Bangladesh. The field operation is divided into ten RHD Zone headed by Additional Chief Engineer who are answerable to the Department Chief. The RHD networks are mostly framed using flexible pavement. It earns a sizable revenue from its existing physical assets. Most of the ADP projects under this umbrella are implemented using the existing Road Zone, Road Circle or Road Division Engineers. In the next part of the study, we are going to explore the related studies on infrastructure projects in the developing and developed nations done by the different researcher.

CHAPTER 4
LITERATURE REVIEW

4.1 Project, Time and Cost Overrun

4.1.1 Project

> "A project is a temporary endeavour undertaken to create a unique product, service, or result. The temporary nature of projects indicates a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. Temporary does not necessarily mean short in duration. Temporary does not generally apply to the product, service, or result created by the project; most projects are undertaken to create a lasting outcome. For example, a project to build a national monument will create a result expected to last centuries. Projects can also have social, economic, and environmental impacts that far outlast the projects themselves". (Project Management Institute, 2008)

4.1.2 Time Overruns

Time overruns is defined as the increase of time compared with the planned implementation period. Time overruns or delays are incidences of a project that postpone the activities which impact project progress. Causes of delay include weather delays, scarcity of construction materials, preparation of shop drawing for constructions etc. Usually, project activities that have both external and internal cause and effect relationship for project delays. Internal causes of delay include causes that come from the clients or employers, designers or consultants, and construction firms. External causes of delays are created from outside of construction project jurisdictions such as from utility agencies, from government, from subcontractors, from suppliers, from labor unions, from natural events, etc. Thus, the time overrun is the difference between the actual completion period and the projected completion period. It is usually calculated in number of days. Time overruns may also be defined as the time increased to complete the project after planed date, which caused by internal and external factors surrounded the project. (Shibnai, 2015)

The five critical factors causing delay in construction projects, viz. minimal labours productivity, lack of communication and coordination among stakeholders, different forms of

corruption, delay in fund mobilization of the project, mishaps in priority of works during implementation of the project and unavailability of skilled manpower (Shibnai, 2015)

The most destructive top ranked issues causing delays in project implementation as (Shibnai, 2015),

1. Funding issues
2. Different forms of corruptions
3. Shortage of necessary construction equipment
4. Improper project planning and scheduling in work breakdown structures
5. Uncontrolled site management and improper supervision
6. Poor financial management on site,
7. Rework for faulty construction
8. Choosing unsuitable contractors
9. Incomplete planning

Delay occurs from contractors' side are fail to supply of construction materials to site in time, shortage of construction materials on site, defective work and construction mistakes, lack of skilled and experienced labor in projects' site, low productivity of labor, lack of coordination with other subcontractor's skills, poor site management, lack of construction equipment and tool on site etc. Consultant's issues with delay are absence of site staff from consultant's side, poor experience from the consultant part, poor experience site staff, slowness in making decisions, unfinished documents etc. From owners' side the factors are lack of working experience, delay in providing decisions, coordination gap with stakeholders, contract amendment (modifications of planned work and addition of new work, specifications change, and financial problems (Enshassi, et al., 2010)

4.1.3 Cost Overruns

Cost is the planned expenditure; the client approves to incur for obtaining the desired benefit. Cost overrun is the change between the actual cost of a project at ending and the budgeted amount. Cost overrun is also named 'cost increase', 'cost escalation' or 'budget overrun'. The cost overruns described as the difference between the original cost estimate of project and actual construction cost on completion of works. (Ahady , et al., 2017)

Cost Overrun=Actual Cost-Estimated Cost

This can be reviewed to a percentage value for comparison with original one.

Cost Overrun=(Final Contract Price–Original Contract Price)/(Original Contract Price) (Shibnai, 2015)

4.1.4 Causes of Cost Overruns

In Malaysia few researchers have examined the factors that cause delay in construction sectors. The most important factors causing delay were relevant with the contractors, followed by the factors relevant with the consultants, factors related to the client, and other external factors. Financial mobilization is the most prompting factor causing time overrun in Malaysia. Coordination difficulties are considered as the second important factor, followed by materials problems. (Enshassi, et al., 2010)

The contractor has been identified as being mainly responsible for factors that results in the delay of construction projects as financial problems, materials shortage, weak site management, construction errors and faulty works, and delay in the supply of materials to site. (Alaghbari , et al., 2007)

Consultant's responsibility which contributes to cause delay in construction sectors as supervision in late, slowness in decision making, sluggish to give instructions, lack of consultant's experience and incomplete drawings and specifications. (Alaghbari , et al., 2007)

The key factors on the clients' side responsible for delay in construction sectors is financial problems, slowness in decision making, unavailability of materials in the market. (Alaghbari , et al., 2007)

cost overruns occur mainly due to unfavorable climatic conditions, inappropriate planning and scheduling, cost escalation, poor site management, lack of necessary monitoring and controlling, mismanagement of resources in construction site, and inadequate financial control in site can invite to cost overrun. (Vaardini , et al., 2016)

One study in Nigeria found the causes for cost overrun (Oluyemi-Ayibiowu, et al., 2019);

1) Risk and uncertainty associated with projects
2) Poor financial capability of the client
3) Poor regulation and control in project management
4) Fraud and corruption practice in project management
5) Price escalation
6) Indiscriminate change in design and consequently change in scope of works
7) Unpredictable weather conditions
8) Lack of experience and proper training of Project Implementation Unit (PIU)
9) Fluctuation of currency/exchange rate
10) Less skilled manpower

11) Delay in payment of completed works
12) Unstable interest rate
13) Unstable government policies
14) Dispute on interpretation of specification and contract agreement
15) Use of inappropriate software for cost estimation
16) Non-performance of subcontractors and nominated suppliers
17) Dependency on imported materials
18) Inaccurate evaluation of projects implementation period
19) Complexity of works

The five most factors causing cost overrun are added works by the client, improper review of the plans as well as contract document, leading feasibility report, timely unavailability of required resources i.e., money, men. machine, management, and cost escalation during implementation period. (Shibnai, 2015)

Four factors that influence cost overruns are changes in working design, insufficient planning, unpredictable weather conditions, and fluctuations of cost of the building materials. (Enshassi, et al., 2010)

The major factors of cost overruns have been identified commonly as: erratic weather, inflation in material cost, mistaken materials estimates, complexity of work, contractor's lack of local experience, lack of contractor's project specific experience, and non-familiarity with localized legal aspects. (Sweis , et al., 2013)

In public sector projects, the influencing factors for cost overruns is price escalation, the estimates are prepared at low prices and the market prices do not match with, the change in scope, errors etc. In Indonesia, the influencing factors of cost overruns on high-rise building projects are increases in the material cost due to inflation, incorrect materials estimating and level of project complexity. (Odediran, et al., 2020)

The factors that can cause project overruns in government funded projects in developing nations are poor contract management, periodical payment difficulties from government side, material procurement issues, poor technical performances, escalation of material prices, bad weather and unfavorable natural events, and poor resource management. (Frimpong, et al., 2003)

4.2 Cost Overrun in Infrastructure Projects

Mega infrastructure projects are confronting budget overruns all over the world mostly. The Wembley Stadium that suffered cost overrun of 50%, the Scottish Parliament Building faced time overrun of three years and cost overrun over 900%. The Western Australian Perth Arena planned with a contract price of AUD 168 million but implemented with more than three of original price. Worldwide the average cost overrun for large-scale infrastructure projects varies from 20% to 45%; and 90% of total projects are facing cost overruns. There have been no organized improvements in cost overrun of construction projects. (A. Allahaim & Liu, n.d.)

In the US Department of Transportation which covering US railway projects with a value of USD 24.5 billion. The total cost overrun of eight projects under the department was discovered as 61% varying from -10 to 106%. It is revealed in the 15 road and railway projects under the Auditor General of Sweden, the cost overrun of 8 road projects found 86% in average. The range for highway projects were from -2 to +182%, while the average cost overrun for the seven railway projects was 17%, varying from -14 to +74%. One study carried out for the UK Transport and Road Research Laboratory (TRRL), 21 metro rail projects in developing countries which showed, 6 metro projects faced cost overruns more than 50%, two of these covered up to 500%, three surged cost overruns up to 100%, and the other four up to 50%. One study conducted in Denmark, which concluded with cost overrun of 50–100% is very random for big infrastructures. (A. Allahaim & Liu, n.d.)

Number of mega transport development projects incur huge cost overruns. One of the most notable examples in this regard is the English Channel Tunnel. This underwater rail tunnel linking the UK and France with the length of about 50 kms. Implementation costs extended from £2600 million finally to £4650 million, 80% higher than the planned costs. the Central Tunnel project in Boston, USA, suffered a cost overrun of USD 11 million which is 275% due to constant tunnel leaks. The Great Belt link project in Denmark faced 54%, the Humber bridge in UK 175% and the Paris Nord TGV in France 25% cost overrun. Their large cost overruns lead to a Pareto-inefficient allocation of resources and are the real threats to the EU economy. (Cantarelli, 2011)

4.3 Cost Overrun in Developing Nations

In India, The Ministry of Statistics and Program Implementation, evaluates 1,505 projects infrastructure projects of original cost Rs 21,21,793.23 crore cost of each Rs 150 crore or above. 386 number of projects reported cost overruns and 661 number projects were in time overrun. The anticipated completion cost of 1505 projects is likely to be Rs 25,92,537.79

crore, which indicates overall cost overruns of Rs 4,70,744.56 crore (22.19%). The average time overrun in these 661 delayed projects were 41.83 months. The delay in implementation of these projects and consequently the cost overrun was due to lengthy land acquisition process, delay in obtaining environmental clearances, lack of linkages in infrastructure support, fund mobilization, finalization of detailed working drawing, change in scope of works, lengthy tendering process, issuing order for equipment supply, law and order problems, state-wise lockdowns due to COVID-19. (India, 2022)

The main economic sectors of Jordan contain of real estate/construction field and tourism. The contribution of construction sector reported to 4.6 % of the total Gross Domestic Product (GDP) over the years 2002 –2011 and the average growth rate of the sector is 13.3%. During the period 2005–2011, 87% of the construction projects are of residential building. This is the main source of providing employment in Jordan. Like other developing nations of the world, public construction sector of Jordan is suffering from cost overruns. In this paper, number of public construction projects were analyzed and found that 65% of the projects were not completed on budget. Several factors inducing cost overruns in building projects are price escalation of construction materials including fuel cost, design modification, inaccurate cost estimates, lack of experience in project site positioning, lack of experience in project type selection, less experience in local regulations, unpredictable weather conditions, and shortage in construction equipment. The major factors for 73% of cost overrun were governmental delay, unpredictable weather events and changes in design. (Sweis , et al., 2013)

In Iran, one study conducted on Gas-Oil construction projects to identify and assess the relative position of the factors adding to cost overrun. Inaccurate cost estimations, poor planning, regular design revision, inadequate skilled labor availability, lack of qualified consultants, inflation of costs of equipment, labor, raw material and transportation costs. (Derakhshanalavijeh & Teixeira, 2017)

4.4 Cost Overrun in Bangladesh

The DPP processing is characterized by huge problems that need to be addressed. There is lack of dedicated human resources at the Executing Agency, Ministry, and Planning Commission level. The Government yet to start electronic processing of DPP. After initiation one DPP to get final approval, even takes three years of time, and by this time the road infrastructure deteriorates exponentially. There is no authority in ministry level for DPP approval and restriction on revision of DPP create problem in project implementation. The

Development Partners (DP) use their own guidelines for procurement of goods, works, and services.

Taking up projects without accurate feasibility studies and estimation of costs, long delays in tender process, and dividing project work into smaller lot, poor performances by non-professional contractors are among the key reasons for delays. Delays in land acquisition process, utility relocation works, and frequent transfers of key project officials are also to blame in this regard. (Adhikary, 2022)

Inability to prioritize project needs is harming the road sector development of the country. The nation's significant roads framework advancement activity is being influenced as the public authority is yet to choose plans from the rundown, arranged by the RHD. Consideration of countless un-endorsed RHD projects in the ADP of 2012-2013 without assignment of funds. As indicated by Planning Commission, RHD has 144 on-going tasks at a total expense of BDT 17613 Crore in the ADP. Another Planning Commission official iterated RHD has embraced a few undertakings on political thought without proper study which has offered ascend to issues in the implementation interaction. (Kabir, 2012)

There are four main factors influencing time and cost overruns in transportation sector projects in Bangladesh as (Dutta & Dutta, 2015):

Technical and Natural Factors: during implementation stages of a project, it suddenly identified the poor quality of existing soil that may lead to significant changes in the work plan. Consequently, extra time and costs are involved in such changes. In other way, a good number of natural calamities for instances, flood, heavy rainfall hit every year which often cause delays as well as destroy the project inputs.

Project size: Project size is one of the most important issues causing delays, cost overruns. Seemingly, bigger projects involve more complex works, the resulting cost overruns. Since big sized projects are likely to have a long contract duration and vice versa, both initial cost (IC) and project duration (PD) should have impacts on cost and time overruns.

Organizational Failures: In Bangladesh, public funded projects are implemented by different government organizations. Usually, these departments are hierarchical organizations, disagreements between the individual and the organizational objectives often arise at every stage. Public

sector projects, therefore, encounter a series of consequences due to the organizational failures and delays in implementation and cost overruns occur.

Economic Factors: Bangladesh is not a huge economy and the number of mega cities is very few. Project located in a big city like Dhaka the capital city, enjoys more developments than other parts of the country, since it possesses an improved infrastructure for every important public sector and its economy is far better than that of other cities.

Ahsan & Gunawan (2010) identified the causes of delay and cost overrun of foreign aided projects in Bangladesh as-

- Lengthy process in tender document evaluation and award
- Delay in procurement processes
- Delay in land acquisition
- Natural calamities
- Regional politics and economic issues
- Delay in loan agreement and disbursement process
- Delay in hiring project staff
- Addition of new scope of work
- Frequent transfer of project key personnel

Specifically, the duos argued cost overrun in Bangladesh infrastructure projects funded by DP is for the following-

- Devaluation of local currency
- Lower estimated price for procurement of goods, works and services
- International competitive bidding
- Restrain in the use of contingency funds
- Reducing the project scope
- Changing in design
- Changes in taxes and interest rate policy

There are 79 factors as causes of delay in building construction projects originated by three parties: client, consultant, and contractor. Among those 79 factors, lack of experience from construction manager, selection of lowest bidder, funding shortage by client, constraints from access to project site, planning and scheduling issue, contractor's other workload, lack of proper management by client, poor site management by contractor, lack of skilled manpower, contractor's shortage in cash flow, price escalation, etc. are the most important causes of delay in implementation. These causes are mostly related with managerial and financial

management issues, like other developing countries, Pakistan, Vietnam, Egypt and Saudi Arabia. (Islam, et al., 2015)

4.5 Case Studies

4.5.1 Jamuna Bridge project

The main purpose of initiating the project was to connect the eastern and western parts of Bangladesh, disconnected by the Jamuna. This project was therefore to assist stimulate economic development by offering easy transportation of passengers and freight and the transmission of electricity, compact natural gas, and telecommunications amenities across the Jamuna efficiently and effectively. In addition to these, the project was to create rail network between the eastern and the western region in a cost-effective approach. The Project comprised of;

- Creation of a 4.8 kms long 4-lane bridge with meter gauge railway, electricity interconnector, gas pipeline, telecommunication infrastructures etc.
- Building of two guide embankments each of about 2.2 kms long, and a flood protection structure on the east side to control the river flow at the selected site.
- Construction of bridge approach roads, 16 kms to the east and 14 kms to the west side of the bridge.

The river training works contract package was awarded in delay, caused a chain consequence of delays in the completion of the other contract packages. Subsequently, it was six-month delay in completion of the civil works contract packages. Except this, delays were mainly caused by the following reasons:

- Cracks on the bridge deck and its precast units
- Underwater subsoil problems that led to slope failures in the river training works
- A need to redesign the east guide bund
- Delayed handover of the east bridge end area
- Slow progress in embankment construction
- Delay in holding decision by the donors

The estimated cost of the project considered as $696 million equivalent. Out of total cost $509 million (73%) was foreign exchange and $187 million (27%) was local currency cost. Asian Development Bank (ADB), Overseas Economic Cooperation Fund (OECF), and World Bank each provided a loan of about $200 million equivalent, he Government of Bangladesh

(GoB) financed the balance. The project implementation cost was $753.7 million which is around $57.7 million more (8.3%) than the estimated one. (ADB, 2000)

4.5.2 Jamuna Bridge Access Roads Project

The Jamuna Bridge Access Roads Project was initiated to facilitate to the goals of cutting transport costs in national transport networks, by focusing traffic volumes generated from the Jamuna Multipurpose Bridge Project and providing easy access to Jamuna Bridge from Dhaka and the from Chattogram area. The project offered reconstruction of 143 Kms of national highways (NH) between Jamuna Bridge and 20 Kms of Feni area on the Dhaka-Chattogram highway (NH-1), and accident-preventing improvements on low-cost on the selected national highways (NH) and regional highways (RH). The main objectives of the project were to;

- Optimum use of Jamuna Multipurpose Bridge by improving the access roads to the bridge
- Improve the livelihood standards by developing the road network that is strong enough to fight damages during natural events
- Support sustainable socioeconomic development by improving the transport connectivity between agricultural growth centres and industrial hubs

Implementation of civil works was delayed by about 14 months despite taking advance initiatives on contractor selection and other civil works procurement. The delay was, however, justified in view of the significant disruption of access to project site and the countrywide flood in 1998. In 1998, 68% area of the country flooded for 11 weeks. The level of embankment had to be elevated above the maximum flood level following the devastated flood, to ensure the sustainability of the project output against probable calamities. The time extension was required for the additional works on road embankment.

The cost of the completed project was $170.01 million where the estimated project cost was $196.30 million. The lower project cost was resulted from lower bid prices than estimated cost for civil works. It was also happened for deleting three permanent weighbridges and 18 portable weighbridges as well as for reducing the scope of civil works from road safety components. Delay in the progress following the 1998's flood influenced the increase in civil works (ADB, 2004)

4.5.3 Jamuna Bridge Railway Link Project

The Jamuna Bridge Railway Link Project (JBRLP) was taken to build well-coordinated and dependable infrastructure across the Jamuna River to link up at northwest of Bangladesh with the eastern part. Specifically, the objectives of the project were to:

- Create rail connectivity through the Jamuna River
- Effective use of Jamuna Bridge for multipurpose way i.e., both road and rail
- develop the railway network by integrating two sides of the railroad networks across Jamuna River
- Economic and physical connectivity with the less developed part with the more developed region of the Bangladesh

The planned implementation period of the project considered as 46 months, with the commencement of civil construction at the end of 1997 and finished by March 2001. The Project was finally completed in January 2004. Major delays in contract were caused by:

- delay in awarding the contract by Bangladesh Railway
- Contractor was not able to make proper use of the favorable season effectively at the first year of construction period
- Poor site activities planning by the contractor
- Rail procurement from the selected Canadian manufacturer was cancelled
- Spanish loan for the telecommunications component was delayed
- The French contractor was slow in the signalling equipment erection
- Contractor's organizational issues, as, delays in site facilitation, delays in submitting approval of materials and work methods requests to the authorities
- Interruption in the supply of prestressed concrete sleepers hindered the overall progress
- The recurrence of logistical issues with the supply of ballast to the site, lack of coordination among site activities which prevented track renewal works

The estimated cost of the project was $269 million out of which foreign exchange component was $93.5 million. The project encountered cost overrun and implemented by the cost of $365 million. The total cost overrun of the project was $96 million (35.7%). The cost overrun was due to:

- Contract price was more than estimated package cost
- In the feasibility study some part of the amount of works needed to be done were not considered in the change of the western zone tracks finally became double

- Additional ballast required for the rail associated with the poor state of the track materials in site
- Additional man-month of consulting services required for the extension of the implementation period
- Use of pre-stressed concrete sleepers as a substitute of wooden sleepers
- Delays in the inception of the project.
- Increased duties and taxes associated contracts
- The settlement of contractors' claims.
- Frequent & unexpected changes in the project scope. (ADB, 2005)

4.5.4 The Dhaka-Chattogram Four-lane Project

The Dhaka-Chattogram Highway is an economic lifeline, it connects Chattogram and other major destinations in the country with Dhaka. The 4-laning of Dhaka-Chattogram (198km) project was taken to reduce travel time, traffic congestion, ultimately to optimize the utilization of Chattogram Port. The DPP was approved by the ECNEC in January 2008, scheduled for completion in December 2013 with cost BDT 2165 Crore solely by GoB money. The funds are being allocated from the Japan debt cancellation fund (JDCF).

The Dhaka-Chittagong four-lane upgrade project cost is expected to increase by BDT 1335 crore, a 62 per cent rise compared to the original estimate. Despite the cost increase, the construction of the four-lane project was not finished by the revised deadline in December 2015.

National Engineering Service Pakistan Limited (NESPAK) was awarded a contract to provide engineering services for the project. The agreement unfortunately, was terminated by the government in May 2010 due to unsatisfactory services. Price increases in construction materials and inclusion of additional flyovers and other work have increased the total cost.

4.5.5 Joydebpur-Mymensingh 4-lane Project

Joydebpur-Mymensingh Four-lane Road Improvement Project consist of improvement of 87 km long highway from two lane to four-lane. The project was considered to create improved connectivity of Mymensingh region with Dhaka.

The infrastructure project started in July 2010 and was scheduled to be inaugurated in December 2015. Due to extension of the project implementation period twice, the cost was revised too. Conclusively, the cost is escalated up to BDT 1815.12 crore.

In the annual development programme (ADP) of 2014-15 fiscal year, the government assigned BDT 397.94 crore and fund released was only BDT 99.49 core for the project. Slow in utility relocation, political instability in that time, inadequate financial mobilization the contractor, non-existence of lead partner for long time, inadequate supply of required construction equipment and poor project management are the causes of overrun. (Mamun, 2014)

4.5.6 Khulna-Mongla Rail Project

The proposed railway route, along with the sea, to bring great changes in business and economic development especially for Bangladesh and India. This project has also taken to facilitate transporting Bangladeshi goods easily to Bhutan and Nepal. Ultimately, it would boost the regional rail connectivity. To improve communication and facilitate imports and exports through the Mongla port, the project was initiated at the cost of BDT 3801 Crore in November 2016 which was planned to be opened to traffic by 2020. But it has missed the deadlines number of times. The revised cost of the project stands at around BDT 4260 crore. (TribuneDesk, 2022)

The government of Bangladesh has taken number of initiatives to increase the capacity of the Mongla port that would reduce reliance on only the Chattogram port. The railway network connecting Mongla port is one of them. Mongla port will be directly connected with Dhaka after getting the project done. The project has been approved on 31 December 2010 in ECNEC funded by Indian Lines of Credit (LoC) with 69.18% of total cost. The Khulna-Mongla new rail line project was approved without any feasibility study. Finally, its actual work began six years after approval from ECNEC. The approved cost of the project was BDT 1721.39 Crore and increases to BDT 4260.88 crore. The deadline was extended to December 2022 following several amendments. The project authority on August 2022 sent a proposal to the BR headquarters seeking an extension of the project deadline up to July 2024. The issues regarding the cost overrun are addition of a long rail bridge on the river Rupsha and increase in 12 Km of track due to change in the alignment and increase in land acquisition amount. (Adhikary, 2022)

4.6 Summary of Literature Review including Case Studies

Delay in completion project and implementation of the project with more cost than budgeted are the main issues in public sector construction projects both in developed and developing economies. Different actors are responsible for delay and budget overrun in project implementation. Delays can be explained in two aspects: one is excusable which are beyond

the preview of stakeholders viz natural calamities and second one is non-excusable relevant with the project stakeholders viz clients, consultants, contractors.

Cost is the vital part for project implementation and cost overrun is the most frequently striking issues in project implementation worldwide especially in developing nations. Worldwide including Australia, UK, USA, 90% of the large-scale infrastructure projects face cost overrun values varies from 20% to 45%. In India out of 1505 infrastructure projects 386 number reported cost overruns. In a study of number of projects analyzed in Jordan and found 65% of them were not completed on budget.

In the papers as reviewed and the cases illustrated faced time and cost overrun due to some common and implicit causes.

- Excusable issues as natural calamities including flood
- Unforeseen sub-soil condition and other existing physical features
- Lengthy land acquisition process and increase in land prices led to delayed handing over the construction site
- Delayed process of approval and fund mobilization by the Development Partners (DP)
- Lack of expected actions by the employer, the contractors, consultants
- Contractor's inability in proper planning to make effective use of the construction season
- Lack of accumulation of necessary construction resources by the contractors
- Unappropriated cost estimate both in consultancy services and in investment packages by the employer
- Gap in proper feasibility study
- Change in project scope
- Unsatisfactory services by the consultants
- Increase in construction materials prices
- Issues of expected fund allocation and release
- Complexity in utility relocation work
- Proper mobilization of construction equipment

In the chapter of this paper, we are going to see the data analysis and the key findings from those data.

CHAPTER 5

DATA ANALYSIS & FINDINGS

In the backdrop of literature review, the data were collected and prepared for analysis in line with the possible methodology described in the earlier chapter. For the purpose of the study, all necessary data are collected and cleaned or, processed. Later, those were analysed before the findings are summarized.

5.1 Data collection

Data for highway projects in Bangladesh are difficult to collect due to the fact that these projects are executed under different agencies such as Roads and Highways Department (RHD), Local Government and Engineering Department LGED), different city corporations and similar local government bodies, Cantonment Boards, armed forces, utility agencies such as Bangladesh Water Development Board (BWDB), Bangladesh Power Development Board (BPDB) etc. Also, there is no central depository for collecting and preserving the data once the projects are completed. More importantly, the micro level data are not mostly available since most of the highway projects are implemented at district levels with limited skilled resources. Hence the only source of reliable data can be extracted from 'Project Completion Report (PCR)' prepared by RHD following instruction from Bangladesh Planning Commission. In addition to these PCRs, interviews with relevant project people were conducted to supplement the existing data.

As stated earlier, RHD is the sole public agency mandated with construction as well as operation and maintenance of highway network in Bangladesh and its record keeping is comparatively better with respect to other infrastructure agencies in the nation. Therefore, projects from RHD were selected for this study. A total number of 82 projects implemented by RHD were selected for the study, a detail list of which is presented in Annexure-A.

5.2 Data Description

The data collected from 82 projects were scrutinized for adequate accuracy and reliability. A number of the projects were cluster projects that comprised of different heterogenous projects across different districts as such those were excluded from the study. A number of PCR had incomplete data or, missing data and therefore those were excluded, too. Besides, a number of projects encountered cost overrun due to change in scope of the projects and those were excluded accordingly. After careful scrutiny based on the objective of the study a total of 56 projects were finally selected for the study.

Among these fifty-six projects, thirty-three were found to have cost overrun, while rest twenty-three projects were found to be not exceeding the estimated cost. The 'cost overrun' variable was constructed by dividing the actual cost with estimated cost and hence, a value greater than 1 indicates the project to have cost overrun phenomenon. Other variables were coded in similar fashion to fit the requirements of the study. Table 5-1 enlists the variables selected and prepared for the study.

Table 5-1 Descriptive Statistics of Different Variables

	Min	**Max**	**Mean**	**Standard Deviation**
Cost Overrun (=actual cost/estimated cost)	0.63	2.32	1.17	0.348
Duration of Project (in years)	1	14	6.02	2.982
Total time over run (=actual duration/estimated duration)	0.00	4.00	1.70	1.006
Key Person Transfer (total number)	1	25	8.93	6.229
Key Person/Year	0.30	8.00	1.66	1.304
No. of Revisions	0	2	0.89	0.366
Location 1 (1 if single RHD division,0 otherwise)	0	1	0.93	0.260
Location 2 (Number of Road Divisions)	1	34	1.84	4.483
Estimated Cost (in BDT10million)	52	1917	354.88	333.062
Location 4 (Number of administrative divisions)	1	6	1.14	0.773
Land Acquisition (LA) (1 if Yes; 0 if No)	0	1	0.59	0.496
Bridge Predominant Project (1 if Yes; 0 if No)	0	1	0.38	0.489
Road Predominant Project (1 if Yes; 0 if No)	0	1	0.59	0.496
Valid Number of observations, N	56			

Duration of the projects were expressed in years and initial descriptive statistics suggests that the lengthiest project in the sample was a14 year one while the shortest duration was 1 year. The project director was considered to be the 'key person' who, if allowed to continue the project till end, could contribute to smooth finish of the project. On the other hand, frequent transfer of key person is thought to disrupt the planned completion of the project. Two variables were setup to quantify the frequency of such transfer of key persons – 'Key Person Transfer' and 'Key Person/Year'. A number of dummy variables or, proxy variables were introduced, too namely – Location 1, Land Acquisition, Road Project, and Bridge Project etc. Table 5-1 enlists the variables along with a brief description for each.

5.3 Exploratory Analysis

Preliminary analysis comprises of different measures of central tendency, dispersion, and association that again is supplemented with different types of data visualization and data mining techniques. Here, a correlation matrix was developed using SPSS and results are presented in Table 5-2. The correlation values with 'asterisk' superscripts are considered to be more significant ones and those are extracted for further analysis such as scatterplots and hypothesis tests.

Table 5-2 Correlation Among the Different Variables

Variables	Cost Overrun	Duration	Total time overrun	Key Person Year	Number of Revisions	Estimated Cost
Cost Overrun	1	0.474**	0.365**	-0.226	0.352**	0.170
Duration	0.474**	1	0.580**	-0.274*	0.535**	0.085
Total time overrun	0.365**	0.580**	1	-0.218	0.500**	0.024
Key Person Year	-0.226	-0.274*	-0.218	1	-0.249	-0.023
Number of Revisions	0.352**	0.535**	0.500**	-0.249	1	0.194
Estimated Cost	0.170	0.085	0.024	-0.023	0.194	1
Land Acquisition (1 if Yes; 0 if No)	0.420**	0.423**	0.434**	-0.333*	0.354**	0.028
Bridge project (1 if Yes; 0 if No)	0.381**	0.257	0.232	-0.279*	0.229	0.013
Road Project (1 if Yes; 0 if No)	-0.275*	-0.265*	-0.241	0.283*	-0.247	0.024
Location 2(Number of RHD division)	0.246	0.200	0.232	-0.050	0.056	0.144
Location 4 (Number of Administrative division)	0.075	0.094	0.150	-0.113	0.055	0.228
Location 1 (1 if single RHD division)	0.123	-0.280*	-0.072	-0.012	-0.082	-0.323*

Figure 5-1 shows the scatterplot between two variables - cost overrun and duration of the sample projects. The plot suggests that there seems to be a moderately strong positive linear relationship between duration of project and its level of cost overrun. The correlation of 0.474 also supports such findings without presence of any other nonlinear pattern or significant outliers. Statistically it can be seen that the projects with longer duration seems to have higher cost overrun. Though, the reasons behind this cost overrun needs to be analysed further.

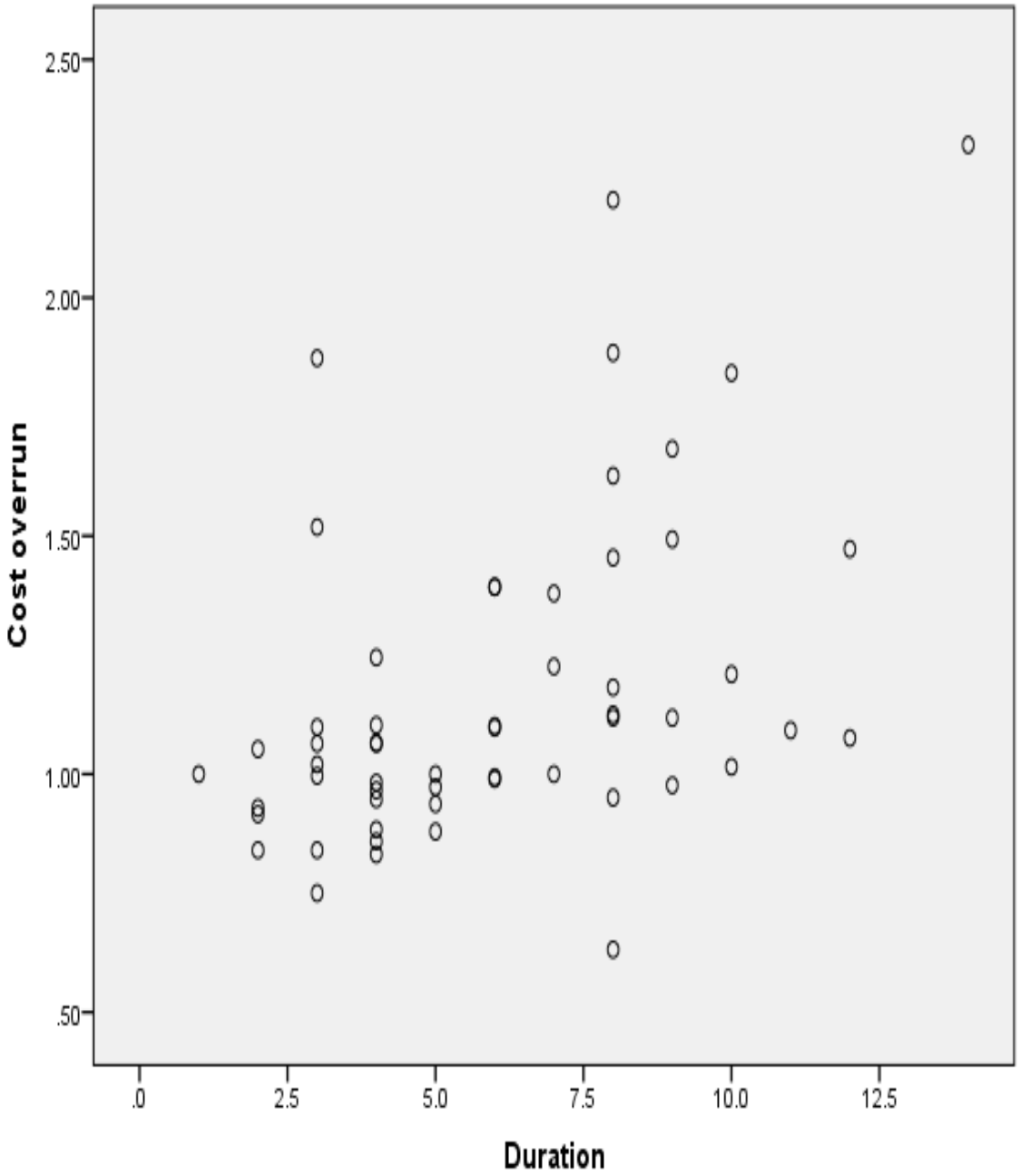


Figure 5-1 Scatterplot- Duration vs. Cost overrun

Figure 5-2 shows the scatterplot between two variables - cost overrun and total time overrun of the sample projects. This plot, too suggests that there may be a moderately strong positive linear relationship between level of time overrun of project and its level of cost overrun. Time overrun of the projects tends to have significant implications on cost overrun. This is due to the fact that the cost overrun is compared with the initial cost estimates prepared in the Development Project Proposal (DPP) where the time overrun is not usually considered.

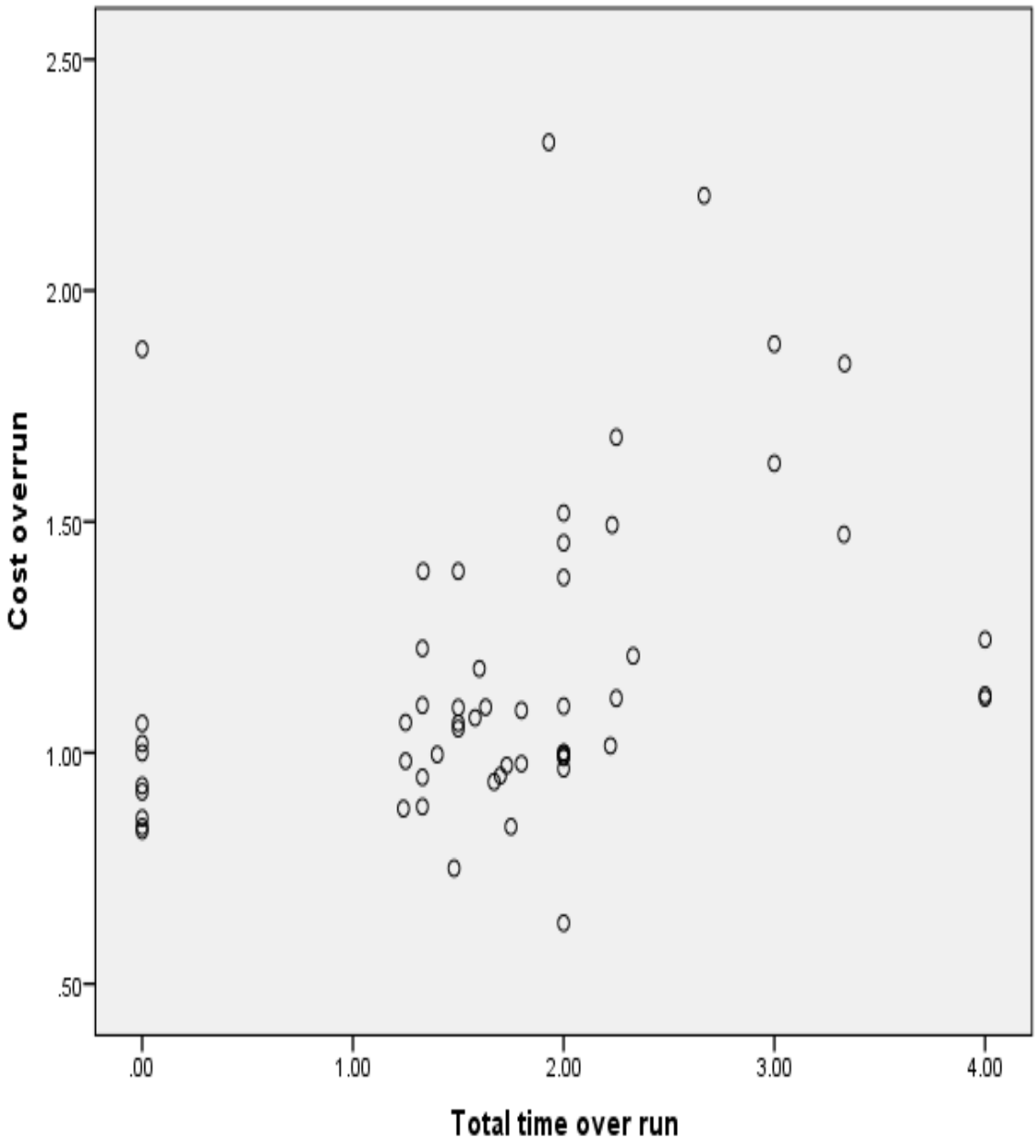


Figure 5-2 Scatterplot- Total time overrun vs. Cost overrun

Figure 5-3 shows the scatterplot between two variables - cost overrun and number of project revisions of the sample projects. This plot fails to convince one of the presences of any relationship between the two variables although generally the projects with more revisions tend to increase the cost. Further analysis may be conducted to test the assertion that in almost all cases the project proposals that need revision result in cost overrun.

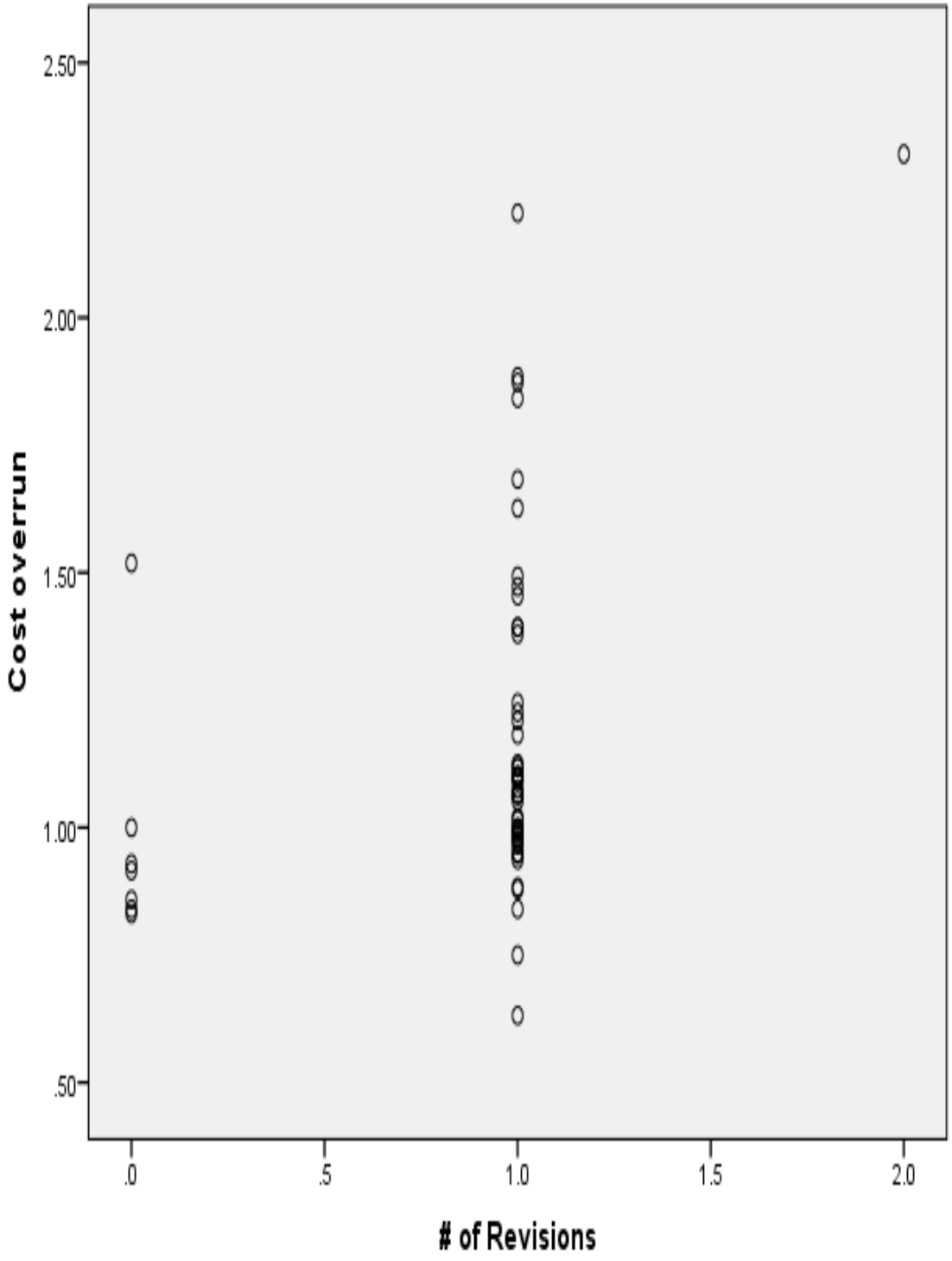


Figure 5-3 Scatterplot- No. of Revision vs. Cost overrun

One of the major factors contributing towards cost overrun of the projects is the requirement of land acquisition. Most of the projects involving land acquisition eventually result in cost overrun. Figure 5-4 shows the scatterplot between two variables - cost overrun and dummy variable – Land Acquisition (1 if LA is there, 0otherwise). There seems to be a positive relationship corroborating the intuition.

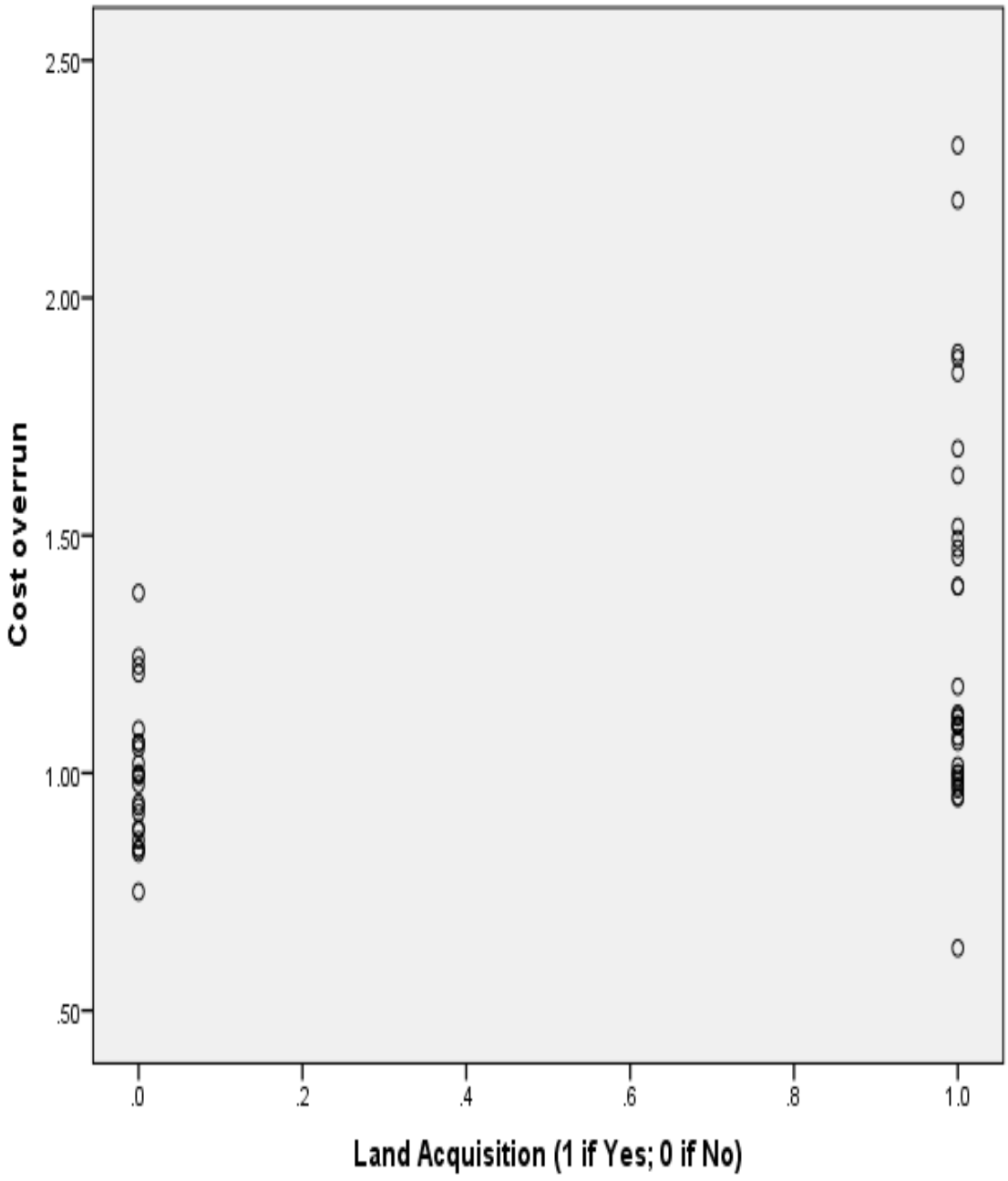


Figure 5-4 Scatterplot- Land acquisition (binary variable) vs. Cost overrun

The cost overrun in bridge projects is relatively higher in contrast to road projects. This is seemingly evident from Figure 5-5. On the other hand, the predominantly road projects do not show any convincing pattern in determining whether the projects will be exceeding the estimated cost or not. In other words, Figure 5-6 does not show any clear pattern of cost overrun.

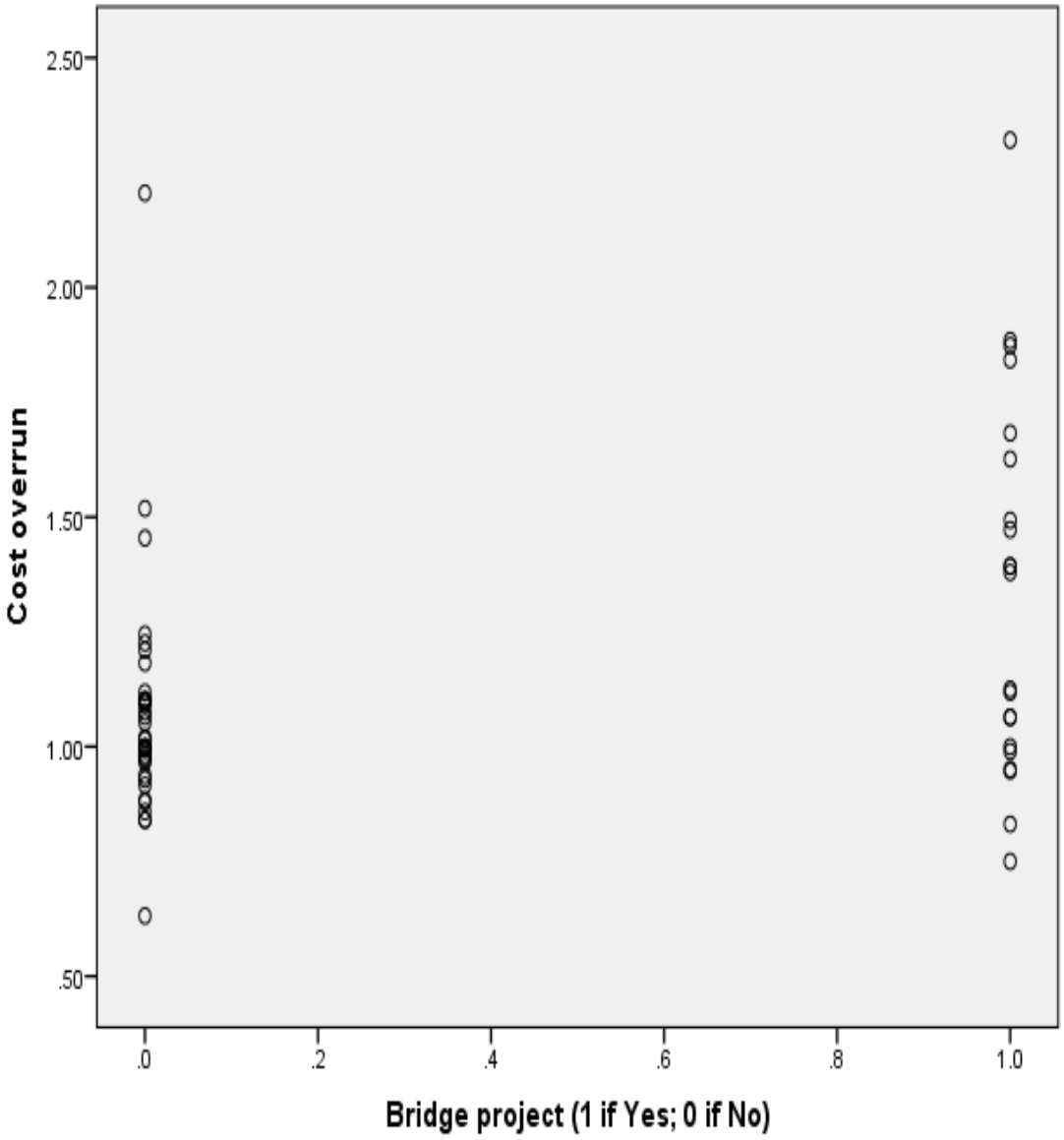


Figure 5-5 Scatterplot- Bridge project (binary variable) vs. Cost overrun

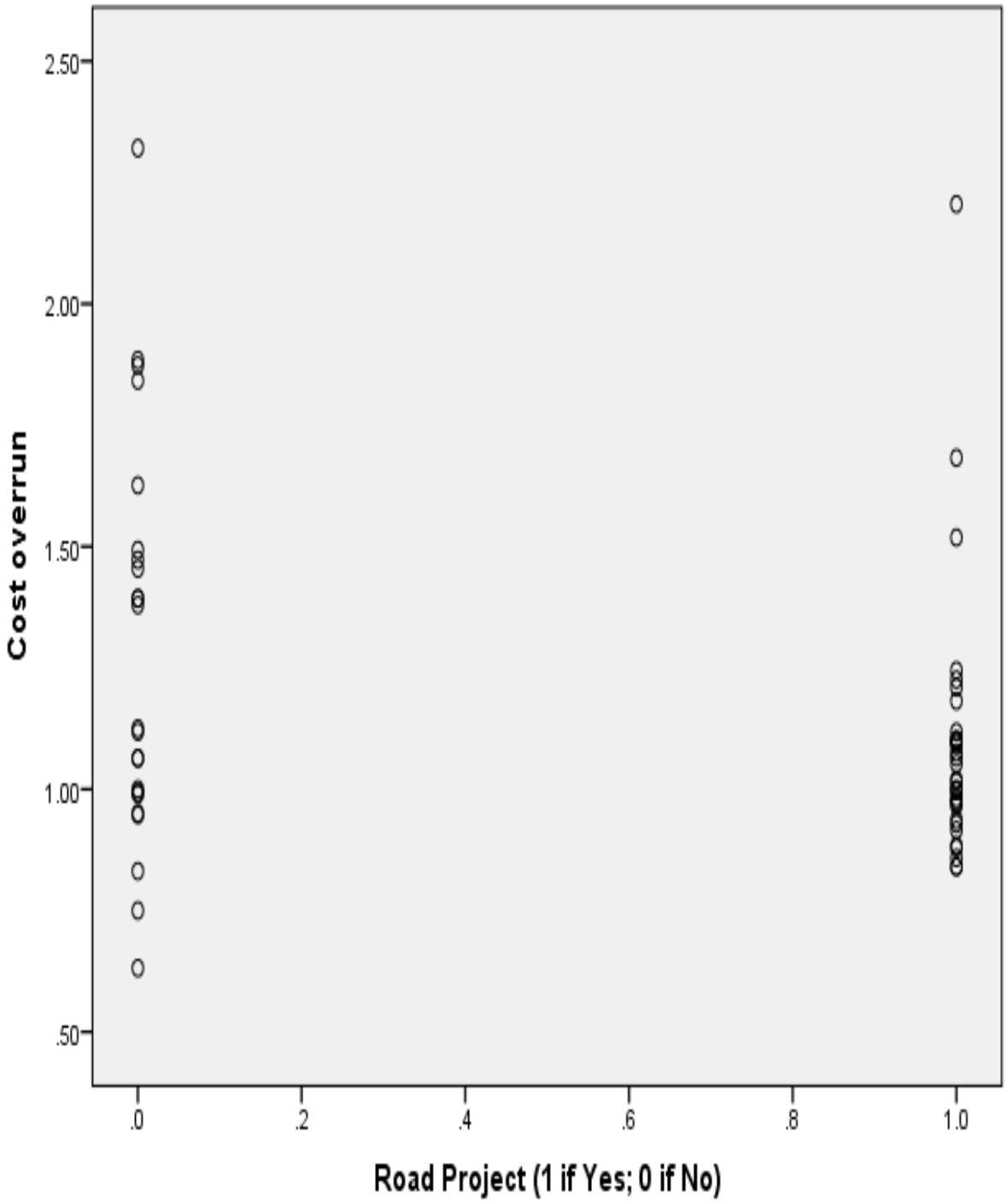


Figure 5-6 Scatterplot- Road project (binary variable) vs. Cost overrun

The exploratory analysis conducted using the correlation matrix and subsequent scatterplots reveal a number of possible patterns of relationships that needs to be scrutinized further employing hypothesis tests. On the basis of the exploratory analysis, the following sets of hypotheses are formulated to be tested in the following sections.

5.4 Hypothesis Tests

Hypothesis 1*: Projects with cost overrun have longer duration than projects that do not have cost overrun.*

Hypothesis 2*: Projects with cost overrun have higher level of time overrun than projects that do not have cost overrun.*

Hypothesis 3*: Projects with cost overrun have a greater number of 'revisions' of project proposals than projects that do not have cost overrun.*

Hypothesis 4*: Projects with land acquisition have higher cost overrun values than projects that do not have land acquisition.*

Hypothesis 5*: Predominantly bridge projects have higher cost overrun values than predominantly road projects.*

Hypothesis 1: Projects with cost overrun have longer duration than projects that do not have cost overrun.

H_0: $\mu_{dur\_COR} <= \mu_{dur\_nonCOR}$

H_1: $\mu_{dur\_COR} > \mu_{dur\_nonCOR}$

Table 5-3 t-test for Equality of 'duration' Means: Projects With vs. Without Cost Overrun

Group Statistics										
		COR bin	N	Mean	Std. Deviation	Std. Error Mean				
Duration		1	33	7.060	3.092	0.538				
		0	23	4.520	2.086	0.435				
Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Duration	Equal variances assumed	4.785	0.033	3.427	54.000	0.001	2.539	0.741	1.054	4.024
	Equal variances not assumed			3.669	53.966	0.001	2.539	0.692	1.151	3.926

Since the p-value (i.e., 0.001) of the t-test is much less than α=0.05, the H_0 could be rejected in favour of H_1. Thus, the average duration of cost overrun projects is higher than average duration of projects without cost overrun.

Hypothesis 2: Projects with cost overrun have higher level of time overrun than projects that do not have cost overrun.

H_0: $\mu_{TOR\text{-}COR} <= \mu_{TOR\text{-}nonCOR}$

H_1: $\mu_{TOR\text{-}COR} > \mu_{TOR\text{-}nonCOR}$

Table 5-4 t-test for Equality of 'Time Overrun' Means: Projects With vs. Without Cost Overrun

Group Statistics					
	COR bin	N	Mean	Std. Deviation	Std. Error Mean
Total time overrun	1	33	2.012	1.027	0.179
	0	23	1.247	0.798	0.166

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total time overrun	Equal variances assumed	0.411	0.524	2.995	54.000	0.004	0.765	0.255	0.253	1.277
	Equal variances not assumed			3.133	53.292	0.003	0.765	0.244	0.275	1.255

Since the p-value (i.e., 0.004) of the t-test is much less than α=0.05, the H_0 could be rejected in favour of H_1. Thus, the average level of time overrun of cost overrun projects is higher than average level of time overrun of projects without cost overrun.

Hypothesis 3: Projects with cost overrun have a greater number of 'revisions' of project proposals than projects that do not have cost overrun.

H_0: $\mu_{ProejctRev\text{-}COR} <= \mu_{ProejctRev\text{-}nonCOR}$

H_1: $\mu_{ProejctRev\text{-}COR} > \mu_{ProejctRev\text{-}nonCOR}$

Table 5-5 t-test for Equality of 'no. of revision' Means: Projects With vs. Without Cost Overrun

Group Statistics					
	COR bin	N	Mean	Std. Deviation	Std. Error Mean
# of Revisions	1	33	1.000	0.250	0.044
	0	23	0.740	0.449	0.094

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
# of Revisions	Equal variances assumed	26.725	0.000	2.782	54.000	0.007	0.261	0.094	0.073	0.449
	Equal variances not assumed			2.527	31.523	0.017	0.261	0.103	0.050	0.471

Since the p-value (i.e., 0.017) of the t-test is much less than α=0.05, the H_0 could be rejected in favour of H_1. Thus, the average number of project revisions in cost overrun projects is higher than that of projects without cost overrun.

Hypothesis 4: Projects with land acquisition have higher cost overrun values than projects that do not have land acquisition.

H_0: $\mu_{COR\text{-}LA} <= \mu_{COR\text{-}nonLA}$

H_1: $\mu_{COR\text{-}LA} > \mu_{COR\text{-}nonLA}$

Table 5-6 t-test for Equality of 'LA' Means: Projects With vs. Without Cost Overrun

Group Statistics										
	LA	N	Mean	Std. Deviation	Std. Error Mean					
Cost overrun	1	33	1.294	0.395	0.069					
	0	23	0.999	0.155	0.032					
Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Cost overrun	Equal variances assumed	17.840	0.000	3.397	54.000	0.001	0.295	0.087	0.121	0.469
	Equal variances not assumed			3.884	44.506	0.000	0.295	0.076	0.142	0.448

Since the p-value (i.e., 0.000) of the t-test is much less than α=0.05, the H_0 could be rejected in favor of H_1. Thus, the average level of cost overrun in projects with land acquisition is higher than that in projects without land acquisition.

Hypothesis 5: Predominantly bridge projects have higher cost overrun values than predominantly road projects.

H_0: $\mu_{COR\text{-}Bridge} <= \mu_{COR\text{-}Roads}$

H_1: $\mu_{COR\text{-}Bridge} > \mu_{COR\text{-}Roads}$

Table 5-7 t-test for Equality of 'Bridge Project' Means: Projects With vs. Without Cost Overrun

Group Statistics					
	Bridge project	N	Mean	Std. Deviation	Std. Error Mean
Cost overrun	1	21	1.343	0.415	0.091
	0	35	1.071	0.258	0.044

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Cost overrun	Equal variances assumed	10.150	0.002	3.029	54.000	0.004	0.272	0.090	0.092	0.451
	Equal variances not assumed			2.706	29.459	0.011	0.272	0.100	0.067	0.477

Since the p-value (i.e., 0.011) of the t-test is much less than α=0.05, the H_0 could be rejected in favour of H_1. Thus, the average level of cost overrun in predominantly bridge projects is higher than that in predominantly road projects.

5.5 Regression Analysis

Once the hypothesis tests following the exploratory analysis was concluded, a Multiple Linear Regression (MLR) model was developed in order to forecasting potential extent of cost overrun of a project knowing the independent variables such as duration, number of revisions, presence of bridge and land acquisition components etc. Such a regression model not only assists in forecasting the extent of cost overrun of a road construction project, it also assists in finding significant variables and also, quantifies individual variable's contribution in causing a project's cost exceeding the estimates. The statistical package SPSS was used in developing the MLR model and model specification is presented in Table 5.8

Table 5.8 SPSS Model Summary of Regression Analysis

Model	**R**	**R Square**	**Adjusted R Square**	**Standard Error of the Estimate**
1	0.578[a]	0.335	0.296	0.292

a. Predictors: (Constant), Duration, Bridge project, LA

ANOVA[a]

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	2.235	3	0.745	8.714	.000[b]
Residual	4.447	52	0.086		
Total	6.682	55			

a. Dependent Variable: Cost overrun

b. Predictors: (Constant), Duration, Bridge project, LA

Coefficients

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	**0.793**	0.090		**8.800**	**0.000**
Land Acquisition (1 if Yes; 0 if No)	**0.154**	0.089	0.220	**1.729**	**0.090***
Bridge project (1 if Yes; 0 if No)	**0.171**	0.085	0.239	**2.008**	**0.050****
Duration of Project (Yr)	**0.037**	0.015	0.319	**2.523**	**0.015****

Dependent Variable: Cost overrun

The MLR model suggests that the variables - 'land acquisition', 'bridge project' and 'duration' have been found to be significant variable at high confidence level and the goodness of fit of the model was found to be 'moderate'. The 'land acquisition' variable was found have a t-stat value equal to 1.729 and p=0.090, which shows that the variable is significant at 91% confidence level. In other words, at a 91% confidence level it can be stated that presence of land acquisition significantly contributes a project's having cost overrun. To

be specific, the coefficient suggests that with all other variables constant, the inclusion of land acquisition component would increase the cost by 0.154 times the estimated cost. This finding seems quite intuitive and it supports earlier findings, too. Land acquisition, esp. in the context of Bangladesh that has scarcity of land, always involve high level of monetary compensation. In addition, if we consider the poor documentation and scope of corruption in land administration, the inclusion of land acquisition significantly contributes to time overrun and cost overrun of road construction projects.

The 'bridge project' variable was found have a t-stat value equal to 2.008 and p=0.050, which shows that the variable is significant at 95% confidence level. In other words, at a 95% confidence level it can be concluded that a project's being a 'bridge project' significantly contributes to its having cost overrun. To be specific, the coefficient suggests that with all other variables constant, the inclusion of a major bridge component would increase the cost by 0.171 times the estimated cost. This finding, too is intuitive and rational. Bangladesh being in a major delta is crisscrossed by hundreds of rivers most of which are wide and deep. Therefore, bridge projects involve construction challenges that pose difficulty in accurate estimation of cost and time during planning stage. This may be the reason why the bridge projects encounter major cost overrun.

The 'duration' variable was found have a high t-stat value equal to 2.523 and p=0.015, which shows that the variable is significant at 99% confidence level. In other words, at a 99% confidence level one can infer that a project's duration significantly contributes to its having cost overrun. To be specific, the coefficient suggests that with all other variables constant, a one-year increase in duration increases the cost by 0.037 times the estimated cost.

Goodness-of-fit of the model is measured by R-squared value that is 0.335 that indicates that 33.5% of the variability in dependent variable, 'cost overrun' can be explained by this MLR model. Although the R-squared value is not high, this model could be utilized as one of the tools to predict whether a project would experience cost overrun and if yes, what would be its extent. More data could be utilized to update the model in future.

In order to determine which explanatory variable has the greatest effect on the 'cost overrun' variable, standardized regression coefficients as reported in Table 5.8 could be referred to. Although standardized coefficients are a bit difficult to interpret, those prove quite helpful in comparing the effect that different explanatory variables such as 'land acquisition', 'bridge project', and 'duration' etc. have on the dependent variable - 'cost overrun'. Accordingly, 'duration' has been found to have the greatest effect on a project's cost overrun. This is followed by 'bridge project', which again is followed by variable - 'land acquisition' in

causing a project's chance of having cost overrun. Such a ranking may help decision makers employ limited resources to execute project management more prudently.

5.6 KEY FINDINGS

Cost, quality and time is considered to be the determining factors a projects' success. The scope of our study limits us to make necessary corelation with Cost and time parameter in Bangladesh Perspective.

Cost invades differs essentially as far as its scale from one undertaking to another. However, cost invade is exceptionally regular in infrastructure projects of Bangladesh. Understanding the reasons for cost overrun is vital for the success of infrastructure projects. Based on the analysis conducted in this paper, the followings are considered as key findings:

- Projects with cost overrun have longer duration than projects that do not have cost overrun.
- Projects with cost overrun have higher level of time overrun than projects that do not have cost overrun, it means cost & time are positively correlated.
- Projects with cost overrun have a greater number of 'revisions' of project proposals than projects that do not have cost overrun. Consequently, good planning can reduce cost Overrun.
- Projects with land acquisition have higher cost overrun in comparison to projects that do not have the same. So, land acquisition activities highly impact the Project's cost control.
- Predominantly bridge projects have higher cost overrun values than road projects, means critical engineering structure are more prone to cost overrun.

In this paper 'Project Implementation Period' has the greatest effect on cost overrun, followed by 'project with bridge' which again is followed by the variable - 'project which required land acquisition'. The overall ranking of variable causing cost overrun, may help managers planning and programming project management more effectively and efficiently. We want to conclude the paper in the next chapter.

CHAPTER 6
CONCLUDING REMARKS

6.1 INTRODUCTION

Delay in project implementation along with budget overrun are the main challenges in public funded avenue all over the global economies. In this context, the objective of this was to identify the root causes of cost overrun in Road and Highways Department projects in Bangladesh'. It was found that different actors are responsible for delay and cost overrun. Natural events and prominently non-excusable causes related with the project implementation unit and its environment viz clients, consultants, contractors are held responsible for the time overrun and consequently cost overrun. Moreover, not much of concentration on feasibility studies, lengthy process in project approval, resource mobilization, land acquisition, etc., have been identified as challenges commonly found as hindrances against smooth project management in the country. As a result, we would like to put forward the following recommendations.

6.2 RECOMMENDATIONS

Along with the economic growth large scale infrastructure development projects are keys to the overall economic development of a country. For a low-middle income developing country like Bangladesh, these development projects need to be implemented with utmost care, sincerity and minimum amount of cost or time overrun. To mitigate this wastage of resources, actual causes of time and cost overrun need to be identified perfectly and address accordingly during the formulation, implementation & review stages of the projects.

The predictions for such overrun needs to be calculated & visualized during the early stage of the project and work plan needs to be devised accordingly. Moreover, transfer & Changes of key personnel during the project implementation period are very critical to Project's success which needs to be kept to a minimum level for effective completion of the project. Having honest and philanthropic approach is a must in all walks to achieve our desired development at national level.

6.3 Scope for Further Research:

Further study may be conducted considering the following aspects:

Cost and time overrun study may be carried on for different phases of the project like: in project development phase, procurement phase, operation and maintenance phase. Secondly,

land acquisition process can be analysed in detail to make it more efficient and on-time so that it does not impede the implementation of project. Thirdly, single bridge project and multiple bridge projects can be examined separately. Finally, fund release procedures can be observed in detail to identify how it may impact the project duration.

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Annexure-A

Summary of Project Completion Reports

Table (Annex-A)0-1: Data Collected from Projects

SI No.	Project ID	Key Person Transfer	Funding	Start Year	End Year	# of Revisions	Estimated Cost (In Crore BDT)	Expenditure (In Crore BDT)	Cost Over Run (In Percentage)	Total time over run	Existing setup	LA	Utility relocation	Bridge project	Road Project	Comment
1	Rehabilitation of Meghna and Gumti Bridges	2	1	2012	2013	1	150	435.1	290.00%	0%	0	0	0	1	0	Executed by Bangladesh Army
2	5 Bridges in Netrokona	20	1	1998	2012	2	18.7	43.4	232.00%	193%	1	1	0	1	0	
3	Eliotganj-Muradnagar-Ramchandrapur-Sree… Road	8	1	2003	2011	1	33.6	74.1	221.00%	267%	1	1	0	0	1	
4	Bridge over Dhaleshori River at Elasin	21	1	2005	2013	1	48.4	91.2	188.00%	300%	1	1	0	1	0	
5	Mirpur Flyover	1	1	2010	2013	1	191.7	359.1	187.00%	0%	0	1	1	1	0	Executed by Bangladesh Army
6	Reconstruction of Narrow bridges at N R (Bridge Replacement Project)	15	0	1999	2009	1	56.3	103.7	184.00%	333%	0	1	0	1	0	
7	Tongi-Kaliganj-Ghorashal Road and Ghorashal Bridge	3	1	1999	2008	1	79.4	133.6	168.00%	225%	1	1	1	1	1	
8	Bridge over Bhogai River on Border Road, Sherpur	6	1	2002	2010	1	9.9	16.1	163.00%	300%	1	1	0	1	0	
9	Soidabad-Enayetpur Road, Sirajganj	0	1	2005	2008	0	13.5	20.5	152.00%	200%	1	1	0	0	1	
10	Bridge over Brahmaputra River in Jamalpur-Sherpur-Bongaon Road	5	1	2000	2009	1	28	41.8	149.00%	223%	1	1	0	1	0	

SI No.	Project ID	Key Person Transfer	Funding	Start Year	End Year	# of Revisions	Estimated Cost (In Crore BDT)	Expenditure (In Crore BDT)	Cost Over Run (In Percentage)	Total time over run	Existing setup	LA	Utility relocation	Bridge project	Road Project	Comment
11	Sanandabari Bridge, Jamalpur	0	1	1999	2011	1	9.1	13.4	147.00%	333%	1	1	0	1	0	
12	Araihazar-Bancharampur-Muradnagar Road and Bridge over Titash River	8	1	2000	2008	1	8.8	12.8	145.00%	200%	1	1	0	1	1	
13	Construction of Bridge over titash River, Cumilla	6	1	2002	2008	1	8.4	11.7	139.00%	133%	1	1	0	1	0	
14	Bridge over Titash River at Raghunatpur and Sreepur…	6	1	2002	2008	1	8.4	11.7	139.00%	150%	1	1	0	1	0	
15	Bridges and Culverts at Chattogram-Kaptai Road	19	1	2005	2012	1	8.7	12	138.00%	200%	1	0	0	1	0	
16	Sylhet-Tamabil-Jaflong Road	4	0	1993	2007	1	178.5	246.1	138.00%	107%	0	1	1	0	1	Increases scope of 14.5 KM road
17	Construction of Sylhet-Jakiganj	7	1	1999	2003	1	81.3	101.2	124.00%	400%	1	0	0	0	1	
18	Captain Leek Road, Feni	0	1	2004	2011	1	18.6	22.8	123.00%	133%	1	0	0	0	1	
19	Feni-Parshuram-Biloniya Road, Feni	3	1	2000	2010	1	18.6	22.5	121.00%	233%	1	0	0	0	1	
20	Lakshmipur-Char Alexander-Sonapur Road	4	1	2002	2010	1	39	46.1	118.00%	160%	1	1	0	0	1	
21	Bridge over Buri River and Titash River in Companyganj-Nabinagar-Radhika Road	8	1	2000	2008	1	8.8	9.9	113.00%	400%	1	1	0	1	0	
22	Badhaghat Bridge, Sylhet	4	1	2000	2008	1	21.1	23.6	112.00%	400%	1	1	0	1	0	
23	Cox's bazar-Teknaf Marine Drive Road (1st Phase)	8	1	1999	2008	1	83.9	93.8	112.00%	225%	0	1	0	0	1	
24	KB Haider Road, Feni	3	1	2006	2010	1	22.4	24.7	110.00%	133%	1	1	0	0	1	
25	Improvement of Kishoreganj-Nikli Road	0	1	2007	2013	1	20.5	22.6	110.00%	200%	1	1	0	0	1	0.5-hectare LA
26	Daulatdia Ferryghat approach Road	4	1	2010	2013	1	14.2	15.6	110.00%	163%	1	1	0	0	1	

SI No.	Project ID	Key Person Transfer	Funding	Start Year	End Year	# of Revisions	Estimated Cost (In Crore BDT)	Expenditure (In Crore BDT)	Cost Over Run (In Percentage)	Total time over run	Existing setup	LA	Utility relocation	Bridge project	Road Project	Comment
27	Itakhola-Motkhola-Kotiadi Road	0	1	2002	2008	1	32.8	36	110.00%	150%	1	1	0	0	1	
28	Banani-Tongi-Joydevpur Road	25	1	1998	2009	1	124.1	135.5	109.00%	180%	1	0	1	0	1	
29	Sarail-Nasirnagar-Lakhai Road	0	1	1999	2011	1	21.1	22.7	108.00%	158%	1	1	0	0	1	
30	Panchkitta-Nagerkandi Road, Cumilla	5	1	2007	2011	1	12.2	13	107.00%	125%	1	1	0	0	1	
31	6 nos Bridge in Goloria-Saturia Road, Manikganj	4	1	2010	2013	1	20.3	21.6	106.00%	150%	1	0	0	1	0	
32	10 bridges on Sylhet-Salutikor-Companyganj Road	4	1	2009	2013	1	36.2	38.5	106.00%	0%	1	0	0	1	0	
33	Improvement of Amberkhan-Tukerbazar Road	2	1	2006	2008	1	22.9	24.1	105.00%	150%	1	0	0	0	1	
34	Gofforgaon-Bormi Rd	7	1	1998	2006	0	29.5	30.3	103.00%	0%	1	0	0	0	1	Land Acquisition omitted
35	Widening the pav at Pabna Town rd	4	1	2010	2013	1	19.8	20.2	102.00%	0%	1	0	0	0	1	
36	Anwara-Banshkhali-Chakoria Road	22	1	2002	2012	1	52.4	53.2	102.00%	222%	1	1	0	0	1	
37	Sylhet Shahjalal Bridge over surma river, Sylhet	4	1	2001	2008	1	45.3	45.3	100.00%	200%	1	1	1	1	0	
38	Remaining works of Joydevpur-Mawna-Mymensingh rd	3	1	2007	2008	0	19.8	19.8	100.00%	0%	1	0	0	0	1	
39	Feni-Noakhali Road 4 lanning	8	1	2008	2013	1	24	24	100.00%	200%	1	1	1	0	1	Land acquisition was the bottleneck
40	Dhaka-Narayanganj link Road	17	1	2009	2012	1	55.9	55.7	100.00%	140%	1	0	0	0	1	
41	Construction of Ferries and Pontoons under RHD	3	1	2002	2008	1	87.5	86.9	99.00%	200%	1	0	0	0	0	
42	Bridge at Keshabpur near Bagherhat over vairab river	3	1	2002	2008	1	38.2	37.8	99.00%	200%	1	1	0	1	0	
43	Madhappur-Rajachapitala Road, Cumilla	5	1	2007	2011	1	16.8	16.5	98.00%	125%	1	1	0	0	1	

SI No.	Project ID	Key Person Transfer	Funding	Start Year	End Year	# of Revisions	Estimated Cost (In Crore BDT)	Expenditure (In Crore BDT)	Cost Over Run (In Percentage)	Total time over run	Existing setup	LA	Utility relocation	Bridge project	Road Project	Comment
44	Khagrachhari – Rangamati Road	17	1	2000	2009	1	32	31.2	98.00%	180%	1	0	0	0	1	
45	Lalmai-Laksam-Maijdee Road	14	1	2007	2012	1	87.7	85.3	97.00%	173%	1	1	0	0	1	
46	Netrokona-Modan Road	9	1	2005	2009	1	23.4	22.6	97.00%	200%	1	1	0	0	1	
47	CPTFP	0	0	2004	2012	1	74.9	71.2	95.00%	170%	0	1	1	1	0	
48	Wazed Miah Bridge at Rangpur	9	1	2009	2013	1	22.6	21.4	95.00%	133%	1	1	0	1	0	
49	Pabna-Baderhat Road, Pabna	13	1	2006	2011	1	41.4	38.8	94.00%	167%	1	0	0	0	1	
50	Simrail-EPZ-Narayanganj Road	16	1	2007	2009	0	23.9	22.2	93.00%	0%	1	0	0	0	1	
51	Pabna-Paksey Nadibandar Road	7	1	2009	2011	0	7.1	6.5	92.00%	0%	1	0	0	0	1	
52	Remaining work of Mymensingh Town Bypass	8	1	2009	2013	1	33.5	30.5	91.00%	200%	1	0	0	0	1	
53	RNIMP-II	10	0	2004	2013	3	1092.9	980.3	90.00%	150%	0	1	1	0	1	Chattogram-Dohazari part has not completed
54	District Road, Rangpur Zone	12	1	2009	2013	1	155	137.2	89.00%	200%	1	0	0	0	1	Insufficient Allocation
55	Rangpur-Badargonj-Parbatipur Road	12	1	2009	2013	1	48.9	43.2	88.00%	133%	1	0	0	0	1	
56	Paglapir-Dalia-Tista Road	15	1	2006	2011	1	32.3	28.4	88.00%	124%	1	0	0	0	1	
57	Improvement of District Road, Sylhet	4	1	2009	2013	1	182.7	157.3	86.00%	200%	1	1	0	0	1	Project incompletely wrapped up due to fund shortage

SI No.	Project ID	Key Person Transfer	Funding	Start Year	End Year	# of Revisions	Estimated Cost (In Crore BDT)	Expenditure (In Crore BDT)	Cost Over Run (In Percentage)	Total time over run	Existing setup	LA	Utility relocation	Bridge project	Road Project	Comment
58	Kachua-Hajiganj Road	2	1	2004	2008	0	9.9	8.5	86.00%	0%	1	0	0	0	1	
59	Barisal-Bhola-Laxmipur road	0	1	1997	2009	1	18.8	15.9	85.00%	300%	1	1	0	0	1	Laxmipur portion
60	Road in Faridpur Town	6	1	2010	2013	1	49.4	41.5	84.00%	175%	1	0	1	0	1	
61	Construction of Nalcity-Ponabalia-Jhalakati Road	1	1	2006	2008	0	10	8.4	84.00%	0%	1	0	0	0	1	
62	Bridge over Halda river at Madunaghat, Chattogram	3	1	2004	2008	0	17.2	14.3	83.00%	0%	1	0	0	1	0	
63	Rahmatpur-Babuganj-Muladi-Hizla Road	0	1	2004	2008	0	13.9	11.5	83.00%	0%	1	0	0	0	1	
64	Palpara Bridge, Cumilla	1	1	2011	2013	1	15.5	12.5	81.00%	0%	1	0	0	1	0	Cost reduced due to change in design and avoided LA
65	Ataikula-Shujanagar Road	5	1	2011	2013	1	16.8	13.4	80.00%	167%	1	0	0	0	0	New pavement construction was not completed
66	Kashinathpur-Kazirhat Road, Pabna	7	1	2009	2011	0	17.7	13.9	79.00%	0%	1	0	0	0	1	Land Acquisition omitted
67	Bridge over Bangali River, Bogra	5	1	2010	2013	1	5.2	3.9	75.00%	148%	1	0	0	1	0	
68	Completion of remaining works Baiguni-Durgahata Road with Two Bridges, Bogra	15	1	2002	2010	1	20.9	13.2	63.00%	200%	1	1	0	1	1	
69	Dharmapassha-Madhyanagar Road (janaguruttapurna)	0	1	1994	2008	0	19.4	11	57.00%	0%	1	0	0	0	1	Scope and Land Acquisition sharply reduced

SI No.	Project ID	Key Person Transfer	Funding	Start Year	End Year	# of Revisions	Estimated Cost (In Crore BDT)	Expenditure (In Crore BDT)	Cost Over Run (In Percentage)	Total time over run	Existing setup	LA	Utility relocation	Bridge project	Road Project	Comment
70	Janaguruttapurna Zilla Road Improvement Project	4	1	2005	2008	0	38.1	21	55.00%	0%	1	0	0	0	1	Closed in incomplete condition
71	District Road, Chittagong Zone	13	1	2009	2013	1	250	131.6	53.00%	200%	1	0	0	0	1	Insufficient Allocation
72	Important Rd Rehabilitation in Patuakhali and Barguna Districts	1	0	2000	2007	1	210.7	107.1	51.00%	160%	0	1	0	0	1	
73	Shaistaganj-Puranbazar-Kalimnagaar Rd (Zilla road)	1	1	2000	2008	0	2.3	1.1	48.00%	0%	1	0	0	0	1	Closed in incomplete condition
74	Janaguruttapurna Zilla Road Imp Project (2nd Phase), Rajshahi	1	1	2005	2008	0	34.3	10.9	32.00%	0%	1	0	0	0	1	Closed in incomplete condition
75	Thana Connecting Road, Sylhet	4	1	1997	2008	1	26	8	31.00%	250%	1	0	0	0	1	Closed in incomplete condition
76	Improvement of Zilla Road Improvement Project (2nd Phase), Rajshahi	0	1	2005	2008	0	21.8	4.8	22.00%	0%	1	0	0	0	1	Closed in incomplete condition
77	Kulaura-Shamshernagar-Sreemongol Rd (Zilla rd)	0	1	2005	2008	0	6.9	1.5	22.00%	0%	1	0	0	0	1	Scope and Land Acquisition sharply reduced

SI No.	Project ID	Key Person Transfer	Funding	Start Year	End Year	# of Revisions	Estimated Cost (In Crore BDT)	Expenditure (In Crore BDT)	Cost Over Run (In Percentage)	Total time over run	Existing setup	LA	Utility relocation	Bridge project	Road Project	Comment
78	Construction of Feeder roads under Greater Sylhet District	5	1	2000	2008	1	617.9	127.5	21.00%	200%	1	1	0	0	1	Scope and Land Acquisition sharply reduced
79	Zilla rd under Sylhet zone	5	1	2005	2008	0	48.9	7	14.00%	0%	1	0	0	0	1	Closed in incomplete condition
80	16 Roads under Gopalganj Road Division	3	1	2011	2013	0	387.7	16.6	4.00%	0%	1	0	0	0	1	Scope Reduced
81	Emergency Disaster Damage Rehabilitation Project (EDDRP 2007)	60	0	2008	2010	1	423.8	422.8	100.00%	120%	1	0	0	1	1	
82	RNIMP-I	8	0	2004	2012	2	706.4	558.3	79.00%	225%	0	1	1	0	1	Scope reduced due to contractors' performance

Annexure-B

Sample of Project Completion Report

PROJECT COMPLETION REPORT

Name of the Project

Road Network Improvement and Maintenance Project-II (RNIMP-II)

ADB Loan: Ban 2021 (SF)

Administrative Ministry / Division

Ministry of Communication
Roads Division

Executing Agency

Roads and Highways Department

September 2013

প্রত্যয়নপত্র

প্রত্যয়ন করা যাচ্ছে যে, সড়ক নেটওয়ার্ক উন্নয়ন ও রক্ষণাবেক্ষণ প্রকল্প-২ প্রকল্পটি অনুমোদিত স্পেসিফিকেশন এবং গুণগতমান অনুসরণ করে নির্ধারিত সময়ে অর্থাৎ জুন ২০১২ (ডিফেক্ট লায়াবিলিটি পিরিয়ড জুন ২০১৩) -তে সমাপ্ত করা হয়েছে। অধিকন্তু ৩য় সংশোধিত অনুমোদিত ডিপিপি যথাযথভাবে অনুসরণ করে প্রকল্পটি শেষ করা হয়েছে। সংশোধিত ডিপিপি'র প্রকল্প ছকে বর্ণিত অংগভিত্তিক ব্যয় অতিক্রম করেনি এবং ডিপিপিতে নেই এমন কোন খাতে/অংগে জুন ২০১৩ পর্যন্ত প্রাপ্ত অর্থ ব্যয় করা হয়নি।

(দিলীপ কুমার গুহ)
পরিচিতি নং-০০১০২২
প্রকল্প পরিচালক (অতিঃ প্রধান প্রকৌশলী), সওজ
সাসেক সড়ক সংযোগ প্রকল্প।

Government of the People's Republic of Bangladesh
Ministry of Planning
Implementation Monitoring and Evaluation Division

PROJECT COMPLETION REPORT : IMED 04/2003 (Revised)

A. PROJECT DESCRIPTION :

01. Name of the Project : **Road Network Improvement and Maintenance project-II (RNIMP-II)**

02. Administrative Ministry/Division : **Ministry of Communication/ Roads Division**

03. Executing Agency : **Roads and Highways Department (RHD)**

04. Objective of the Project :

: The main objective of this project is to improve 145.175 km roads includign 58.3 km Zilla under Road Improvement Component (RIC) in Rangpur, Dhaka and Chittagong Zones to a higher standard.

Other objectives are:

(i) Periodic maintenance of 449 km of existing RHD roads under Periodic Road Maintenance Component (PRMC)

(ii) Routine maintenance of 105 km of existing RHD roads under Performance Based Routine Road Maintenance Component (PBRRMC).

(iii) Enhancement of road safety by improving selected accident-prone road sections of 195.0 km of RHD roads by civil works under Road Safety Component (RSC) and

(iv) Execution of Road Safety Audit on about 800 km of existing RHD roads under Supervision Consultancy Services of the Project.

The project also includes preparation of a Road Master Plan for next twenty years that will assist in taking future road projects under Roads and Highways Department.

5. Location of the Project.

(a) Road Improvement Component (RIC).

Division	District	Upazila
Dhaka, Rangpur and Chittagong	Mymensingh, Kishoregonj, Dinajpur, Panchagar, Nilphamari and Chittagong	Kishoregonj, Hossainpur, Nandail, Gaffargaon, Bhaluka, Patia, Chandannish/Anwara, Parbatipur, Fulbari, Nilphamari Domar, Boda/Debiganj, Panchagar and Tetulia.
(b) Periodic Road Maintenance Component (PRMC).		
Dhaka, Rangpur and Chittagong	Mymensingh, Jamalpur, Netrokona, Kishoregonj, Sherpur, Dinajpur, Panchagar, Nilpamari, Kurigram and Chittagong	Mymensingh Sadar, Fulbaria, Muktaghasa, Trisal, Nandail, Sribordi, Sherpur Sader, Bokshiganj, Dewanganj, Netrokona Sadar, Purbodhala, Dhobaura, Barhattra, Kendua, Kishoregonj, Nandail, Vairab, Kuliarchar, Bajitpur, Kotiadi, Pakundia, Tarail, Tarakandi, Sarishabari, Jamalpur Sadar, Chiribandar, Parbhamari, Rangpur Sador, Ulipur, Chilmari, Nilphamari Sador, Saidpur, Mithapukur, Pirganj, Palashbari and Gobindogonj.

(c) Performance Based Routine Road Maintenance Component (PBRRMC).

Dhaka and Rangpur	Mymensingh Netrokona, Dinajpur and Gaibandha.	Mymensingh Sadar, Gouripur, Netrokona Sadar, Fulbari, Birampur, Ghoraghat and Gobidhagonj.

(d) Road Safety Component (RSC).

Dhaka, Rangpur and Chittagong	Kishoregonj, Rangpur, Gaibandha, Comilla and Chandpur	Kishoregonj, Katiadi, Kuliarchar, Bhairab, Comilla Sador, Barura, Shaharasti, Hajigonj, Chandpur Sador, Rangpur Sadar, Mithapukur, Pirganj, Palashbari and Gobindagonj.

06. estment Cost :

(In lakh Taka)

	GOB	RPA	DPA	Total
(a) Original	35366.00	29854.00	44073.00	109293.00
(b) 1st Revised	42108.00	33437.00	33748.00	109293.00
(c) 2nd Revised	51817.52	34868.23	35707.06	122392.81
(d) 3rd Revised	43495.23	29827.86	24710.91	98034.00

07. Date of Approval : **DPP**

(a) Original : November 2004
(b) 1st Revised : June 2009
(c) 2nd Revised June 2011
(d) 3rd Revised December 2012

08. Implementation Period :

	Date of Commencement	Date of Comple
(a) Original	July 2004	June 2010
(b) 1st Revised	July 2004	December 2
(c) 2nd Revised	July 2004	June 201
(d) 3rd Revised	July 2004	June 2013

09. Financing Arrangement (Source-wise) Taka in Lakh (As per requirement according to 3rd Revised RDPP) : ADB Loan No. 2021-BAN (SF) = 54538.77
GOB Grant = 43495.23

9.1 Status of Loan/Grant : ADB Loan account effective upto 30 January 2013
GOB grant continued upto June 2013

a) Foreign F'

	y as per Agreement	Amount in US $ (Million)	Nature (Loan/Grant/ supplier's/ credit)	Date of Agreement	Date of Effective-ness	Date of Closing	
						Original	Revised
1	2	3	4	5	6	7	8
ADB	US$	SDR 46.13 million	Loan	25 June 2004	23 November 2004	31 December 2010	30 June 2013

b) GOB (as per requirement according to 3rd Revised RDPP)

(In lakh Taka)

Total amount in Lakh Taka	Loan	Grant in Lakh Taka	Cash Foreign Exchange
1	2	3	4
98034.00	-	43495.23	-

9.2 Utilization of Project Aid: (Source wise) upto 30 January 2013.

(In million)

Source (s)	Total Amount (after cancellation)		Actual Expenditure		Unutilized Amount	
	In US $	In Local Currency, RPA BDT (US$)	In US $	In Local Currency, RPA BDT (US$)	In US $	In Local Currency
1	2	3	4	5	6	7
ADB Loan No. 2021-BAN (SF)	78.81	2982.79 (43.10)	1745.60	28459.79 (412.57)	1345.60	28459.79 (412.57)

(1 US$= 69.20 BDT)

9.3 Re-imbursible Project Aid (RPA) :

(In lakh Taka)

RPA Amount		Amount Spent	Amount Claimed	Amount Re-Imbursed	Remarks
As per DPP (3rd Revised)	As per Agreement				
1	2	3	4	5	6
a) ADB: 29827.86	a) ADB: 29854.00	a) ADB: 50801.05	28549.79	28549.79	

B. IMPLEMENTATION POSITION

01. Implementation Period :

Implementation Period as per PP		Actual Implementation period	Time Over-run (% of original implementation period)	Remarks
Original	3rd Revised			
1	2	3	4	5
2004-2010	2004-2013	2004 to 2013	150.00%	Time over-run is due to delay in selection of Consultants for procedural reasons, delay in land acquisition-resettlement, utility shifting, inadequate & timely ADP & DPP allocation, delay in approval of RDPPs and also some civil works contractors' failure to perform was a reason for delay in completion of the civil works' contracts

02. Cost of the Project:

(In lakh Taka)

Description	Estimated Cost		Actual Expenditure upto 30 June 2013	Cost over-run (% of original cost)	Remarks
	Original	3rd revised			
1	2	3	4	5	6
Total	109293.00	98034.00	93115.44	-14.80%	Cost overrun of GoB fund was mainly due to increase in both the quantity and cost of Land. On the other hand,despite Land Acquisition was done fully for all the components but it took more time than anticipated. During the contract period it was not possible to complete all the civil work contracts. So, there was reduction of scope in RIC-1, RIC-3 and RIC-4. This is the main reason of negative cost overrun of DPA and RPA for this project.
GOB	35366.00	43495.23	42314.42	+19.64%	
RPA	29854.00	29827.86	28549.79	-4.40%	
DPA	44073.00	24710.91	22251.26	-49.51%	

03. Project Personnel:

Sanctioned strength as per PP	Manpower employed during execution	Status of the existing manpower			Manpower Employed	
		Manpower requirement for O&M as per DPP	Existing manpower for O & M	Others		
1	2	3	4	5	Male	Female
Officer (s) 17	19	-	-	-	19	0
Staffs) 30	41	-	-	-	41	0
Total : 47	60	-	-	-	60	0

04. Training of Project Personnel (Foreign/Local) :

Field of Training / Study tour/ workshop/ Seminer etc.	Provision as per PP		Actual		Remarks
	Number of person .	Man - months	Number of person	Mun - months	
a. -	-	-	-	-	
1	2	3	4	5	6
Foreign LS	LS	LS	24	10.50	10/15 days trip in Europe and Asia Region

05. Component-wise Progress (As per approved 3rd Revised DPP) :

(In lakh Taka)

Economic Code	Sl. No.	As Per 3rd RDPP				Cumulative Progress since start of Project			
		Component	Quantity/Unit		Rate	Financial		Physical	
						Quantity	Expenditure	Quantity	Rate
	1	2	3		4	5	6	7	8
		GOB Establishment Cost							
4500-4799	1	Salary & Allowances	LS	-	510.00		355.05		355.05
4800-4999	2	Others	LS	-	0.65				
7000		**Physical Construction Work**					123.57		123.57
7066	3	Construction of Office Building	2	nos	244.00				
7011	4	Construction of Residential Building	-	nos	-				
7016	5	Construction of Inspection Hut	14	nos	44.97		18.82		18.82
		Civil Construction work							
7021	6	**Road Improvement**	145.18	km	32635.25		32635.25		32,302.25
7021	7	Periodic Maintenance	449	km	9,764.06	430	9,613.90	430	9,613.90
7021	8	Routine Maintenance	105	km	632.85	105	632.85	105	632.85
7021	9	Road Safety Works	195	km	975.00	195	954.16	195	954.16
6807	11	**Transport Vehicle**	46	nos	1,337.33		1,183.31		1,183.31
6819/6821	12	**Office Furniture and Equipment**	94	nos	45.29		40.14		40.14
6901	13	Land Acquisition & Resettlement	598.54	Acre	19,319.43		19,307.51		19,307.51
7081	14	Utility Shifting	LS	-	1,105.06		1,105.06		1,105.06
7261	15	Railway Level Crossing	3	nos	150.76		150.76		150.76
		Consultancy							
	16	Supervision (Foreign)	262.58	Man-Month	2,738.03		2,670.16		2,670.16
	17	Supervision (Local)	1274.76	Man-Month	1,574.35	LS	1,535.80	LS	1,535.80
7981	18	NGO Services for LARAP Implementation	LS		295.00		281.11		281.11
	19	Road Master Plan	LS	-	450.00		450.00		450.00
	20	Follow-up Project Preparation	299	Man-Month	-		0.00		0.00
	21	External Audit	LS	-	95.00		95.00		95.00
7901	22	Tax-VAT for Consultancy Services	LS	-	1,450.00		1,152.80		1,152.80
		Contingency					0.00		0.00
7981	23	Physical	LS	-	23545.97	LS	21,143.19	LS	21,143.19
	24	Price	LS	-					
	25	Interest during Construction	LS	-	1,121.00		0.00		0.00
		Total			98034.00		93115.44		93115.44

06. Information regarding Project Director (s) :

Name & Designation with pay Scale	Full time	Part time	Responsible for more than one project	Date of Joining	Date of Transfer	Remarks
1	2	3	4	5	6	7
AKM Faizur Rahman	✓			22.01.2001	06.02.2005	
ARM Anwar Hussain	✓			06.02.2005	08.02.2006	
AKM Rezaul Haque	✓			08.02.2006	29.03.2009	
Md. Harun-Ur-Rashid	✓			29.03.2009	04.05.2009	
Md. Abdul Wadud	✓			04.05.2009	07.12.2009	
Muhammad Abu Taleb	✓			07.12.2009	30.12.2009	
Md. Faruk Ahmed	✓			30.12.2009	17.01.2010	
Md. Altaf Hossain	✓			17.01.2010	02.03.2010	
Md. Aminur Rahman Lasker				02.03.2010	11.01.2012	

07. Procurement of Transport (in Nos.) :

Type of transport	Number as per P.P.	Procured with date	Transferred to Transport Pool with date	Transferred to O & M with date	Condemned/dis maged with date	Remarks
1	2	3	4	5	6	7
Car	2	2	-	-	-	
Jeep	14	14				
Microbus	2	2				
Pickup	27	24				
Motor Cycle	6	4				
Jeep						
Dhaka Metro-Gha-13-1367		2008-09	12/09/2012			
Dhaka Metro-Gha-13-1368		2008-09	30/06/2013			
Dhaka Metro-Gha-13-1369		2008-09	12/09/2012			
Dhaka Metro-Gha-13-1370		2008-09	12/09/2012			
Dhaka Metro-Gha-13-1371		2008-09	30/06/2013			
Dhaka Metro-Gha-13-1372		2008-09	30/06/2013			
Dhaka Metro-Gha-13-1373		2008-09	12/09/2012			
Dhaka Metro-Gha-13-1374		2008-09	4/9/12			
Dhaka Metro-Gha-13-1489		2008-09		02/08/2012		
Dhaka Metro-Gha-13-0749		2008-09		01/01/2013		
Dhaka Metro-Gha-13-0750		2008-09		09/11/2011		
Dhaka Metro-Gha-13-0812		2008-09	28/09/2010			
Dhaka Metro-Gha-13-0822		2008-09		02/08/2012		
Dhaka Metro-Gha-13-0788			01/11/2012			
Car						
Dhaka Metro-Kha-12-6219		2008-09		29/07/2013		
Dhaka Metro Kha 12-6220		2008-09		29/07/2013		
Microbus						
Dhaka Metro-Cha-53-1145		2008-09	30/06/2013			
Dhaka Metro-Cha-53-1146		2008-09		02/08/2012		
Pickup						
Dhaka Metro-Tha-11-7833		2008-09	12/09/2012			
Dhaka Metro-Tha-11-7834		2008-09	18/09/2012			
Dhaka Metro-Tha-11-7981		2008-09	06/09/2012			
Dhaka Metro-Tha-11-7982		2008-09	12/09/2012			
Dhaka Metro-Tha-11-7983		2008-09	06/09/2012			
Dhaka Metro-Tha-11-7984		2008-09	12/09/2012			
Dhaka Metro-Tha-11-7985		2008-09	12/09/2012			
Dhaka Metro-Tha-11-8004		2008-09	23/09/2012			
Dhaka Metro-Tha-11-8005		2008-09	12/09/2012			
Dhaka Metro-Tha-11-7785		2008-09		06/09/2012		
Dhaka Metro-Tha-11-7855		2008-09	30/06/2013			

Dhaka Metro-Tha-11-7855		2008-09	30/06/2013			
Dhaka Metro-Tha-11-7857		2008-09	30/06/2013			
Dhaka Metro-Tha-11-7858		2008-09		02/08/2012		
Dhaka Metro - 11-7765		2008-09	01/11/2012			
Dhaka Metro - 11-7766		2008-09	26/07/2012			
Dhaka Metro - 11-7767		2008-09	18/09/2012			
Dhaka Metro - 11-7776		2008-09	11/11/2012			
Dhaka Metro - 11-7777		2008-09	18/09/2012			
Dhaka Metro-Tha-11-7910		2008-09	03/04/2013			
Dhaka Metro-Tha-11-7911		2008-09		02/08/2012		
Dhaka Metro-Tha-11-7912		2008-09	06/09/2012			
Dhaka Metro-Tha-11-7922		2008-09		30/06/2013		
Dhaka Metro-Tha-11-7925		2008-09		19/11/2012		
Motorcycle						
Dhaka Metro-ha-31-0839		2008-09	1/11/2012			
Dhaka Metro-ha-31-0840		2008-09	30/06/2013			
Dhaka Metro-ha-29-8742		2008-09	18/09/2012			
Dhaka Metro-ha-29-8745		2008-09	18/09/2012			

08. Procurement of Goods, Works and Consultancy Services:

08.1 Goods & Works of the Project costing above Tk. 200.00 lakh. and Consultancy above Tk. 100.00 lakh :

Description of procurement (goods/works /consultancy) as per bid document	Tender/Bid/Proposal Cost (in crore Taka)		Tender/Bid/Proposal		Date of completion of works/services and supply of goods	
	As per DPP	Contracted value	Invitation date	Contract signing/ L/C opening date	As per contract/ Extended date	Actual
1	2	3	4	5	6	7
Construction Supervision Consultancy	4030.90 (excluding taxes and VAT)	4030.90 (excluding taxes and VAT)	18 June 2005	17 Aug. 2006	--	30 June 2013
NGO Services	--	134.20	04 July 2006	31 May 2007	30 June 2013	30 June 2013
Road master Plan Consulting Services	575.50	450.00	18 June 2005	23 July 2006	--	--
Financial & Performance Audit Services	146.50	146.50	07 March 2007	04 Oct. 2007	--	--
Consulting Services of Detailed Design of Trasport Corridor Project	1607.51	1607.51	June 2009	Sept. 2011	--	--
• *RIC-1*	28162.00	18473.14	26 July 2007	20 May 2008	25 June 2011	24 June 2012
• *RIC-2*	17712.37	13223.69	26 July 2007	20 May 2008	25 June 2011	24 June 2012
• *RIC-3*	25009.38	19971.51	26 July 2007	20 May 2008	25 June 2011	24 June 2012
• *RIC-4*	13537.55	9942.83	26 July 2007	20 May 2008	25 June 2011	24 June 2012
• *PRMC DZ-1*	1149.36	1149.36	11 June 2007	09 January 2001	15 April 2009	31 Dec. 2010

• PRMC DZ-2	1018.31	1018.31	11 June 2007	07 January 2001	15 April 2009	31 Dec. 2010
• PRMC DZ-3	846.53	846.53	11 June 2007	09 January 2001	15 April 2009	31 Dec. 2010
• PRMC DZ-4	826.38	826.38	11 June 2007	09 January 2001	15 April 2009	31 Dec. 2010
• PRMC DZ-5	633.92	633.92	11 June 2007	22 January 2001	28 April 2009	31 May 2010
• PRMC DZ-6	677.39	677.39	11 June 2007	09 January 2001	15 April 2009	17 Dec 2-10
• PRMC DZ-7	990.96	990.96	11 June 2007	09 January 2001	15 April 2009	31 Dec 2009
• PRMC RZ-1	643.49	643.49	11 June 2007	22 January 2001	28 April 2009	–
• PRMC RZ-2	992.21	992.21	11 June 2007	09 January 2001	15 April 2009	31 Dec 2009
• PRMC RZ-3	1039.92	1039.92	11 June 2007	09 January 2001	15 April 2009	31 Dec 2009
• PRMC RZ-4	710.44	710.44	11 June 2007	22 January 2001	28 April 2009	
• PRMC RZ-5	1044.64	1044.64	11 June 2007	22 January 2001	28 April 2009	
• PRMC RZ-6	885.14	885.14	11 June 2007	22 January 2001	28 April 2009	
• PRMC RZ-7	583.68	583.68	11 June 2007	22 January 2001	28 April 2009	31 Dec 2009
• PBRRMC DZ	378.20	378.20	--	21 June 2007		
• PBRRMC RZ	389.61	389.61	--	21 June 2007		
• RSC CW-DZ	345.00	345.00	--	25 February 2008		15 August 2010
• RSC CW-CZ	420.30	420.30	--	25 February 2008		
• RSC CW-RZ	389.60	389.60	–	25 February 2008		31 Dec. 2010

8.2 Use of Project Consultant (s) (Foreign/Local):

Name of the Field	Approved man month		Actual man month utilised	Remarks
	As per PP	As per contract		
1	2	3	4	5
a) Foreign : Construction Supervision of Civil Works of Road Network Improvement &Maintenance Project-II (RNIMP-II)	262.58	----	262.58	
b) Local : Construction Supervision of Civil Works of Road Network Improvement &Maintenance Project-I (RNIMP-II)	1274.76	----	1274.76	

09. Construction/Erection/Installation Tools & Equipment: N/A

Description of items	Quantity (as per PP)	Quantity procured with date	Transferred to O & M with date	Disposed off as per rule with date	Balance	Remarks
1	2	3	4	5	6	7

C. FINANCIAL AND PHYSICAL PROGRAMME :

01. (a) Original and revised schedule as per PP :

(In lakh Taka)

Financial Year	Financial provision & physical target as per original PP				Financial provision & physical target as per latest revised DPP			
	Total	Taka	P.A.	Physical %	Total	Taka	P.A.	Physical %
1	2	3	4	5	6	7	8	9
2004-2005	15292.150	4457.070	10840.08	-	1.730	1.730	0	-
2005-2006	24821.200	10367.760	14453.44	-	31.000	31.000	0	-
2006-2007	19418.520	5754.340	13664.18	-	1235.030	176.080	1058.95	-
2007-08	19260.440	5723.930	13536.51	-	10912.170	5258.960	5653.21	-
2008-09	19260.440	5723.930	13536.51	-	15730.70	8442.300	7288.4	-
2009-10	11235.250	338.970	10896.28	-	23542.44	14990.96	8551.48	-
2010-2011	0.00	0.00	0	-	17484.15	6967.98	10516.17	-
2011-2012	0.00	0.00	0	-	18816.09	4488.39	14327.7	-
2012-2013	0.00	0.00	0	-	10280.67	3137.81	7142.86	-

01. (b) **Revised ADP allocation and progress** :

(In lakh Taka)

Financial Year	Revised Allocation & target				Taka release	Expenditure & physical progress			
	Total	Taka	P.A.	Physical %		Total	Taka	P.A.	Physical %
1	2	3	4		6	7	8	9	10
2004-2005									
2005-2006									
2006-2007									
2007-2008	15200.00	6600.00	8600.00	11.14%	12232.00	10912.17	5258.96	5653.21	11.14%
2008-2009	21975.00	5475.00	13500.00	25.54%	18186.00	15730.70	8442.30	7288.40	25.54%
2009-2010	30181.00	15261.00	14900.00	47.28%	30181.00	23542.44	14990.96	8551.48	47.28%
2010-2011	20195.00	6975.00	13220.00	49.16%	19385.00	17484.18	6967.98	10516.17	49.16%
2011-2012	19400.00	4500.00	14900.00	79.86%	18980.00	18816.09	4488.39	14327.70	79.86%
2012-2013	5363.00	1975.00	3406.00	98.30%	5362.34	5362.13	1957.00	3405.14	98.30%
Total									

D. ACHIEVEMENT OF OBJECTIVES OF THE PROJECT:

Objectives as per PP	Actual achievement	Reasons for shortfall, if any
(a) To help the Government achieve poverty reduction through economic growth by improving transport efficiency and strengthening integrated road network (b) To Improve national-regional and zilla roads to provide rural farmers with better access to markets, social services and employment opportunities (c) To provide better access to the border point in and to complete some missing links in the main road network. (d) To promote private sector participation in road maintenance (e) To ensure road safety improvement by providing road safety measures	As envisaged, the achievement of the project is now satisfactory. The zonal roads and regional road connectivity has improved in the regions of Rangpur and partly in Mymensingh. As a result activities in the regions have increased much. Road Maintenance done through Periodic Road Maintenance contracts has also contributed to the living condition and increased the economic conditions of the people. The roads which were suffering	There are few shortfalls in the Project. Contract RIC-4 (Chittagong -Dohazari) Road was not complete due to contractor's inefficiency and shortage of cash flow. People in these regions were not benefitted. Further Due to

The following components of the project have been undertaken in order to fulfill the objectives: (i) Road Improvement Component (RIC): Reconstruction of 53.1 km National highway namely Panchagarh-Banglabandha including Tetulia bypass (53.1 km), Nandail-Kishorgonj Road (15.8 km), Kishorgonj-Hossainpur Road (14.775 km), parbatipur-Fulbari Madhyapara Road (27.5 km), Boda-Debigonj-Nilphamari Road (28.8 km was done under the project. (ii) Periodic Road Maintenance Component (PRMC): Periodic road maintenance of about 449 km of RHD's roads. (iii) Performance Based Routine Road Maintenance Component (PBRRMC): Routine road maintenance of about 105 km of Project roads through performance based contract. (iv) Road Safety Component (RSC): Civil works at selected accident-prone areas or black spots of some 195.0 kms of Road (v) Consulting services for Development of Road Master Plan for 20 years.	from lot of potholes and difficulties were improved cent percent and helped in increasing activities of the people. A new concept of road maintenance through private participation was introduced in the project ie. Gobindaganj-Gharaghat-Birampur-Fulbari-Dinajpur Road (55.00 km), Mymensingh-Raghurampur-Netrokona-Mohongonj-Jamargonj-Sunamgonj Road (39.00 km), Mymensingh-Fulpur-Nokla-Sherpur Road (7.00 km) and Mymensingh-Fulbaria Road (4.00 km) where the performance is found satisfactory. The roads were maintained timely and no slowing down of traffic movement reported. Traffic safety features were improved in the projevt roads and have helped in reducing accidents. In brief, the objective of the project has achieved its goal.	delay/difficulties in Land acquisition and utility shifting some length of Project road was omitted from the project scope. On the other hand, despite some contracts were completed, it took additional time due to some unavoidable reasons.

E. BENEFIT ANALYSIS: To be worked out by RHD during Operational Period

01. Annual Out-put:

Items of out-put	Unit	Estimated quantity expected at full capacity	Actual quantity of out-put during the 1st year of operation at full capacity (or during, real production for newly completed project)

02. Cost / Benefit : To be taken up by RHD during period of operations

Item	Estimated	Actual
(1) Benefit cost ratio of the project (i) Financial		1.62
(ii) Economic		
(2) Internal Rate of Return (i) Financial		
(ii) Economic (Overall)		17.43%
Panchagarh-Tetulia-Banglabandha Road		25.14%
Bhaluka-Gaforgaon (Including Gaforgaon bypass)		0.00%
Gaforgaon-Kishoregonj Road		31.00%
Nandail-Kishoregonj Road		24.6%
Fulbari-Madhyapara Road		34.40%
Parbatipur-Fulbari Road		24.70%
Debigonj-Nilphamari Road		0.00%
Boda-Debigonj Road		13.80%
Chittagong-Dohazari Road (Including Patya Bypass)		0.00%

03. Please give reasons for shortfall, if any, between the estimated and actual benefit:

F. MONITORING AND AUDITING

0.1 Monitoring: To be filled in by RHD

Name & designation of the inspecting official	Date of Inspection	Identified Problems	Recommendations
1	2	3	4

(a) Ministry / Agency:
(b) IMED :

(c) Others: (Please specify)

0.2. Auditing during and after Implementation:

2.1. Internal Audit: N/A

Period of Audit	Date of submission of Audit Report	Major findings/ objections	Whether objections resolved or not.
1	2	3	4

2.2. External Audit:

Audit period	Date of submission of Audit Report	Major findings/ objections	Whether objections resolved or not
1	2	3	4
2011-12	Nil	Nil	
2010-11	22 December 2011	(PRMC DZ-1 & 2) Penalty for incomplete works imposed from the contracts. Tk. 135.60 Lakh.	6 settled and 3 outstanding
		(PRMC DZ-1 & 2): Outstanding Mobilization Advance was not realized after termination of contract from the encashment of performance security Taka 1,22,22,700.00	
		(PRMC DZ-5) Loss due to making excess payment through wrong calculation in the IPC measurement sheet Tk. 63177.66	
2009-10	Nil	Nil	Nil
2008-09	31 March 2010	PRMC (DZ-3) irrelavant item of work against Periodic Road Maintenance work Tk.13,16,460.00	
		(RIC) Conducting Performance Audit engagement of Chatared Accountant Firm is questionable Tk. 7094108.00	
		PRMC (DZ-5 & 7) liquidated damage was charged for failure to completion of work as per approved works program Tk. 32637322.00	7 settled and 4 outstanding
		(RIC-4) PAid for shifting of Utilities has yet to be adjusted Tk. 29997550.00. Accountant Firm is questionable Tk. 7094108.00	
2007-08	31 March 2009	Tk. 7.00 Crore was paid to DC for LA but the land was not handed over by the DC, Chittagong.	5 settled and 1 outstanding
2006-07	Nil	Nil	Nil
2005-06	Nil	Nil	Nil
2004-05	Nil	Nil	Nil

G. DESCRIPTIVE REPORT

1. General Observations/Remarks of the Project on:

1.1 Background

(i) The project titled "Road Network Improvement and Maintenance Project-II (RNIMP-II) has been jointly financed by ADB and the Government of Bangladesh. The objectives of the Project were to response the infrastructure development focus of GOB to support the maintenance of the RHD road network, upgrade the strategic regional highways and district (zilla) roads in poor areas in the Northwest and central North regions of Bangladesh, provide better access to the border point in Banglabandh and to complete some missing links in the main road network. Aside from the sectoral strategy for the roads sub-sector as set out in the Fifth Five Year Plan (1997- 2002), the Project is consistent with the Bangladesh Integrated Transport System Study (June 1998) and the Road Master Plan (1994). The latter is financed by UNDP and implemented by ADB. The project has been developed in accordance with the Country Operational Strategy for Bangladesh, which emphasises the importance of the road network for regional cooperation.

The RNIMP-II is comprised of seven components. The four main components which comes under the Consultant Services Contract is as follows:

A) Road Improvement Component (RIC) consisting of four contracts determined by geographical location.
B) Periodic Road Maintenance Component (PRMC) consisting of fourteen small contracts.
C) Performance Based Routine Road Maintenance Component (PBRRMC) consisting of two contracts. .
D) Road safety Component (RSC) consisting of three contracts.

I. Road Improvement Component: (RIC)
This includes improvement works over 225.8km of National, Regional and Zilla Roads in the Rangpur, Mymensingh, and Chittagong Regions. Major works include reconstruction and improvement of roads and drainage structures and the construction of new structures and bypass road sections.

Contract RIC-1
The original contract is in two sections, both of which are located within the Mymensingh - Kishoreganj district areas of the RHD Dhaka Zone. The 15.8km section from Nandail to Kishoreganj is a Regional Highway. The 46.4km section from Bhaluka via Goffargaon and Hossainpur to Kishoreganj is a Zilla Road with additional construction of the Goffargaon Bypass (11.05 Km) and Hossainpur Bypass (2.15 Km).

Contract RIC-2
This contract is for 53.10km of the National Highway (N5) from Panchagarh to Banglabandh and includes construction of the Tetulia Bypass, all within the RHD Rangpur zone.

Contract RIC-3
The original contract is in 3 sections, all located in the RHD Rangpur Zone.
The 12.40 Km section from Madhyapara to Fulbari, the 19.65 Km section from Parbatipur to Fulbari and the 51.5km section traverse from Boda to Nilphamari via Debiganj and Domar and all the roads section are under Zilla roads category.

Contract RIC-4
The original contract is for 26.60 km of the National Highway (N1) from Chittagong to Dohazari and also includes construction of the Patiya Bypass, all within the RHD Chittagong Zone.

II. Periodic Road Maintenance Component (PRMC)
Major works which include DBST and Bituminous Wearing Course to be executed over a total length of 390.80 km of Regional and Zilla roads which were incorporated in the Project as selected by the HDM circle of RHD.

III.Performance Based Routine Road Maintenance Component (PBRRMC)
This component applies to work on approximately 105 km of selected Regional and Zilla Roads and located in both the RHD Dhaka and Rangpur Zones.

IV. Road Safety Component (RSC)
Three contracts for road safety inhancement improvements at identified black spot areas of RHD Dhaka, Comilla and Rangpur Zones as identified by the Road Safety Circle of RHD.

The project work was executed under ADB's Standard Bidding Documents (Procuement of Civil Works. August 1997), based on the Federation Internationale des Ingenieurs-Cnseils (FIDIC) Conditions of Contract, Fourth Edition. The Contractors for the civil works under the Road Improvement Component were selected through International Competitive Bidding (ICB) procedures. As defined in these conditions, the Employer was RHD, the Enigneer was the Employer's Representative, and the Engineer's Representative was the Consultant. The consultant nominated a Team Leader (TL) to act as the Engineer's Representative on site. The construction periods for the individual contracts was initially 36 months which was later extended by one year.

Road Master plan has been prepared under this project in response to the direction provided by the National Land Transport Policy[1], which guided the Government to 'develop a long term (20 year) Road Master Plan.The Road Master Plan for Bangladesh is intended to be the steering document for investment in the road sector over the next twenty years. It has been compiled following a thorough diagnosis of the existing problems of the RHD road network, and the future challenges to be faced. These can be summarised as:

1.2 Justification/Adequacy

In April 2000, ADB and the Government concluded a Partnership Agreement on Poverty Reduction (PAPR) to guide ADB support to Bangladesh over the medium term in accordance with the o' ng objective of proverty reduction. The PAPR set long-term and medium-term goals bas e Government's vision and plans for poverty reduction. The long-term goals focus on improv. m human development to be achieved by 2010, while the medium-term goals aim to reduce income properly and human poverty by 2005.

The Government's strategy for achieving its medium and long-term goals is to accelerate economic growth and ensure an adequate supply of basic needs. Through he propoor economic growth strategy, the Government will seek to (i) raise added value in agriculture by enabling farmers to diversify their production, and (ii) expand non-farm employment, especially in less-developed rural areas. This will be accomplished by providing improved roads and other infrastructure and communications to facilitate enterprise, and provide better access to markets.

The PAPR requires ADB to redirect its support for the road sector in Bangladesh. Roads are identified as one of the leading agents of poverty reduction. The road sub-sector strategy will foucs on (i) accelerating pro-poor economic growth, including by providing farmers with access to markets and inputs, (ii) reducing the obstracles to social services delivery and providing access to vulnerable groups, (iii) facilitating popular participation by facilitating travel; and (iv) conducting road sector operations with greater public scrutiny and introducing more objective and transparent approaches to resource allocation, especially regarding road maintenance.

[1] Approved by Cabinet in April 2004

1.3 Objectives

The objective of the Project is to help the improve transport efficiency and strengthen integrated road network through balanced development of national, regional and zilla roads. To this end, the Project will (i) improve sub-standard roads to provide rural farmers with better access to markets, social services and employment opportunitities; (ii) secure Government resources through periodic road maintenance; (iii) promote private sector participation in road maintenance; and (iv) improve road safety.

1.4 Project revision with reasons

Out of a total contract length of 225.8 km , 139.7 km (62%) was completed. This is due mainly to the delay by the RHD in giving to the Contractor "right if access to and possession of site" which was caused by the lack of progress in land acquisition, resettlement, relocation of utilities and removal of trees.Thus caused delays in the major widening and improvement works. The Completion Period of 36 months had to be extended by 12 months from to 48 months and the scope of work had to be reduced in 3 of the 4 contracts (RIC-1, 3 & 4), to enable sectional completion.

In RIC-1, two road sections have been deleted (i)- Bhaluka-Gaffargoan Section (18.3 km) and (ii) Gaffargoan By-pass (13.30 km). However with 3 bridges along the Bhaluka-Gaffargoan Section have been constructed. This is to enable sectional completion. The reduced scope has been completed

In RIC-2, there was no deletion. And the original scope has been completed.

In RIC-3, two stretches had to be deleted (i) a 22.7-km stretch along the Boda-Debiganj-Domar-Nilphamari Road and (ii) a 5-km stretch along Pabartipur-Fulbari Road. This was to enable sectional completion. However 8 culverts along a 5-km stretch in the deleted Parbatipur – Fulbari Section have been constructed. The reduced scope of work was completed.

In RIC-4, 21.6 km of the original 26.8 km has been deleted retaining only the new 5.2-km Patiya By-pass together with 3 bridges and 2 culverts were retained. This is to enable sectional completion of the new Patiya By-pass section. The revised scope of work was not completed due to the unpreparedness of the Contractor.
The revised scope and physical progress is shown in Table 1 below.

TABLE 1 - REVISED SCOPE AND PHYSICAL PROGRESS (RIC Contracts)

Contract No.	Contractor	Original Contract Length (km)	Length Deleted (km)	Length in Revised Scope (km)	Length Completed (km)	Length Completed (%-age of original contract length	Remarks
RIC-1	CGC-RC JV	62.2	31.6	30.6*	30.6*	49%	* including 3 bridges in deleted Bhaluka-Gaffargoan Section
RIC-2	Monico Ltd	53.1	0	53.1	53.1	100%	
RIC-3	AMI-GITEC JV	83.7	27.7	56.0*	56.0**	67%	**including 8 culverts in a 5 km stretch of the deleted Parbatipur – Fulbari Section
RIC-4	Islam Trading Consortium	26.8	21.6	5.2*** (Patiya By-pass)	0	0%	***including 3 bridges & 2 culverts *Contract terminated in May 2012.*
Total		225.8 km	80.9 km	144.9 km	139.7 km	62%	Completion Period extended from 36 to 48 months

Road Network Improvement and Maintenance Project-II (RNIMP-I) was framed for improving transportation facilities in Central North (Mainly Mymensing and Kishorgonj) and North-Western Districts (Rangpur, Dinajpur,Panchagarh, Nilphamari, Kurigaram, Lalmonirhat, Nilphamary) of the country. Main Components of the Project were Road Improvement, Periodic Road Maintenance, Performance Based Routine Road Maintenance and Road Safety. Also, project scope includes formulation of Road Master Plan for 20 years. ADB is the development partner for the project. The original PP was approved in the ECNEC on 24 October 2004. The Project was initially scheduled to complete in January 2010. But due to delays in engaging design and supervision consultants and for some other reasons project completion time was extended up to December 2011 through 1st Revision of the DPP. The 1st revised DPP was approved by the ECNEC in the meeting held on 04 August 2009. The 1st approved RDPP was required to be further revised due to the following main reasons. In the second revision of the DPP, the Project Completion time was proposed to be June 2013 including Defect Liability Period (DLP) Initially the progress on the Contracts had been slow mainly due to delay in land acquisition and resettlement in certain stretches of the Project roads Due to delay in land acquisition and resettlement mainly resulting from inadequate DPP/ADP allocation; inadequate and inappropriate ADP funding and for some other reasons Project Completion time was extended up to June 2013. ADB also extended the Loan period from 31 December 2010 to 30 June 2012. The 2nd RDPP was approved on 21 June 2011. The 3rd revised DPP was prepared due to reasons mentioned in the following sections. The 3rd RDPP was approved on 18 December 2013

a) There were 18 civil work contracts under the RIC and PRMC of the Project; 04 (four) under RIC and 14 (fourteen) under PRMC. The RIC Contracts were commenced on 25 June 2008 with time of completion of 36 months. The PRMC Contracts were commenced on January 2008 The PRMC Contracts had a time of completion of 15 months. The price escalation is applicable for all these contracts as per the Contract Agreements signed between the Government of Bangladesh and the Contractors.

b) There was a delay in award of RIC and PRMC Contracts. The RIC bids were invited on June 2007 and Notice for Commencement of work was issued on 25 June 2008.

c) There was also a delay in completion of some of these contracts. One year extension was given for all the RIC Contracts. One of the reasons being late handing over of the site, as Land Acquisition and Resettlement took more time due to inadequate DPP provision against this item and for inappropriate/inadequate GOB funding in the Annual Development Programmes (ADPs).

d) Keeping in consideration of ADB's loan closing cut off date i.e. 30 June 2012, contractors' preparedness and access to the working sites, it was advised in Aide Memoire of ADB Review Mission (9-15 December 2011) to reduce/ revise/ delete the scope of works under RIC Contract-1 and RIC Contract- 3.

e) In view of above, in RIC Contract- 1 scope of works of Bhaluka-Gaforgaon (Including Bhaluka Bypass) revised, and in RIC Contract- 3 scope of works of Parbatipur-Fulbari and Boda-Debigonj-Domar-Nilphamari Road has been reduced and scope of works of some reoad length has been deleted for civil works. Thus, the revised scope of works for different RIC contracts as proposed in the 3rd revised DPP has been reduced to 139.0 km from 243.0 km.

The Price Contingency (Price Escalation) applicable to various civil work contracts has exceeded the provision kept in the 2nd revision of DPP. There had been unforeseen abnormal steep increase in the indices of certain construction materials, which has resulted in increased escalation. the Price Contingency available in the 2nd Revised DPP is only BDT 19039.66 . So, 21936.68 lakh. Provision for Price contingency has been kept in 3rd RDPP. The excess Price Contingency (Price Escalation) has been proposed to be partly compensated by the savings in Civil work contracts, Utility Relocation and Physical Contingency. However, The cumulative Price Escalation till completion of the Project is estimated at BDT 21016.38.

On the other hand, Deductible amount of Income Tax (IT) and Value Added Tax (VAT) have been increased by the Government for Civil works, Consultancy and NGO services after signing of the respective contracts. The amount of taxes (IT & VAT) in excess of the contract provision which are being deducted fro the Contractors'/Consultants/ NGOs Payment Certificate (Bills) are to be refunded. In the 3rd Revised DPP the provision for refund of these excess IT & VAT for Civil works has been kept in the Physical Contingency (Code: 7981).

2. Rationale of the project in respect of Concept, Design, Location and Timing.

Concept: The rationale of concept can be visualized from the following:

Road network system is considered an important element of physical infrastructure and plays the most vital role in the growth and advancement of trade, industry, education, agriculture and other social and economic activities.

The road network in Bangladesh expanded rapidly in early eighties and the pace of this development gradually accelerated in later period which continued till date; starting with only 4,000 km of primary and secondary highway network in 1971, Bangladesh has now an extensive road network of nearly 223,000 km. Investment in road sector development particularly with foreign assistance has been also increased manifold since late 80's. Although there is overall resource constraints in the country, GOB has also been making substantial investments in building social and physical infrastructure including road network because of its paramount need as a pre-requisite for socio-economic development of the country.

Roads and Highways Department Bangladesh (RHD) under the Ministry of communications, is one of the two administrative departments responsible for construction and maintenance of roads, bridges and ferries in Bangladesh. The RHD is responsible for constructing and maintaining the country's arterial road communication network consisting of national highways, regional highways and zilla roads. The second administrative department responsible for construction and maintenance of roads bridges and ferries, Local Goverfnment Engineering Departmtnrt (LGED) under the Ministry of Local Government, Rural Development and Cooperatives, is responsible for construction and maintenance of Feeder Roads Type 'B' (FRB) and Rural Roads R1, R2 and R3.

Based on a study carried out by Bangladesh Integrated Transport System Study (BITSS), the role of road transport in carriage of both passenger and freight traffic over the years has been increasing consistently and the share of road transport is about 73% and 66% respectively in carriage of passenger and freight traffic. The demand for road transport has increased at an average annual rate of 8.4 percent for passengers and 8.2 percent for freight during the 1990s, which are almost double the average Gross domestic Product (GDP) growth of 4.7% for the same period. The road has become principal mode of transporation of Traffic in Bnagladesh. The condition of roads, as well as, capacity and reach of the road network, has also substantially improved. The primary roads classified as in a good or fair condition has increased from 73 percent to 96 percent over the last five years. The RHD with a road network of over 20,000 km and 18,000 bridges and culverts has an estimated asset value of Taka 68,000 crores, which is the largest of any individual organization in Bangladesh (other than Army) and indeed exceeds the combined total of all private sector business operating in the country as whole. But the sustainability of these achievements could be jeopardized by insufficient resources allocated to road maintenance. The allocation for routine and periodic maintenance per kilometer of RHD roads ahss decreased by 3 percent per annum over the last five years. Therefore, it is not only the developement but also maintaining the existing assets is a fundamental requirement of RHD which is also vital to the economy of Bangladesh. Bangladesh is also set for rapid economic development that will rely heavily on road network. Expectations from this network are growing and there is a need to prevent further deterioration of the asset, improve traffic speed, reduce vehicle operating costs, imrpvoe safety and do all this with due consideration of the environment. This places a great responsibility on the Ministry of Communicaitons and the RHD. Therefore, critical issue of the road sector today is to maintain and improve the network and address the poor efficiency and safety of road oeraitons. The focus thus has been shifted from road development to road maintenance. There is also need to establish additional domestic resources of

road maintenance financing capable of ensuring the RHD's Annual Road Maintenance Plan (ARMP) on a sustainable basis.

The Road Network Improvement and Maintenance Project-II ((the Project) has been conceived in the above perspective and is in response to the infrastructure development focues of GOB on improving regional roads and feeder roads in the Districts of (i) Panchagarh, Nilphamari, Dinajpur, Rangpur, Lalmonirhat, Kurigram and Gaibandha in North-west with Rangpur as a regional centre, and (ii) Kishoregonj, Mymensingh as a regional centre. Aside from the sectoral strategy for the roads sub-sector set out in the Fifth Five Year Plan (1997-2002), the Project is consistent with the Bangladesh Integrated Transprot System Study (June 1998) and the Road Master Plan (1994), the latter financed by UNDP and implemented by the Asian development Bank (the Bank). The Project has been developed in accordance with the Country Operaitonal Srategy for Bangladesh, which emphasizes the importance of the road network for regional cooperation.

The Project is also consistent with the previous Asian development Bank's (ADB's) Project namely Jamuna Bridge Access Roads Project, Road Network Improvement and Maintenance Project-I, financed by the ADB. Though these previous projects ADB also financed; weigh bridges to monitor axle-load; consultancy services on safety measures in road design; training in road safety enforcement and eduction; to formulate a policy and guidelines wih establishment of legal and regulatory framework for private sector investment in highway projects; and establishment of an independent Road Design and safety circle to monitor safety aspects throughout RHD etc.

Traffic counts were taken during the feasibility study, and projections were developed for the 20-year project evaluation period. The projections were used to determine physical capacity requirements, in terms of number and width of lanes for motorized and non-motorized traffic, intersection layouts, and so forth. A design speed of 80 km per hour for national and regional roads and 65 km for zilla roads were adopted and the horizontal and vertical alignments were designed accordingly.

The pavements were designed in accordance with accepted international standards and procedures for a 20 year life, with provision for overlays during or at the end of 10 years to cater the serviceability loss and extend the life to 20 years maintaining international roughness index at recommended level. The designs were based on traffic counts and traffic projections (for capacity), and axle load surveys and projections (for structural opacity). The pavement structure will consist typically of an improved subgrade, a granular sub-base of brick aggregate, a base of stone aggregate, asphaltic concrete surfacing (base course and wearing course) or double bituminous surface dressing. Roughness values for completed pavements, expressed in international roughness index terms, are to be 2.0-2.5.

Bridges and Drainage Structures

The structures were designed in accordance with AASHTO standards. AASHTO HS20 live loading was adopted and the return period of 20 years was considered for drainage structures. Improvement of structures includes (i) rehabilitation of bridge/culvert decks, and widening of the structures according to road section and RHD guidelines; (ii) reconstruction of structures requiring replacement because of structural and hydrological inadequacy; and (iii) new construction of structures on realigned sections.

Location

Rationale of Location of the Project can be understood from the followings:

The feasibility study for the Project under ADB TA No-3508-BAN assessed 27 roads selected from northwest and central north regions covering Dinajpur, Gaibandha, Kurigram, Lalmonirhat, Nilphamari, Panchagarh, Rangpur, Jamalpur, Kishoreganj, Mymemsingh, Netrokona, and Sherpur. The 27 candidate roads were identified by a set of selection criteria established through extensive consultative meetings with various stakeholders including Government officials, road engineers,

Non-Governmental Organizations (NGOs), transport operators, public representatives, and common road users in the project areas.

The feasibility study identified 17 roads (12 in northwest region and 15 in center north region) totaling 516 km (3 national highways of 165 km, 1 regional highway of 62 km, and 13 Type-A feeder roads of 289 km.) as viable for investment. The technical, social and economic studies performed under this feasibility study includes- (i) social aspects such as population density, roof material of houses, and literacy level; (ii) economic aspects such as unemployment level, non-agricultural employment, and non-farm income sources; (iii) road condition and traffic such as road roughness level, general road conditions, traffic level, and level of non-motorized vehicle; (iv) level of completion of road network loop; and (v) level of stakeholders' recommendation. Out of identified 17 roads, 6 roads were selected under RNIMP-I as the project roads based on their economic rate of return as its main criteria, and some other aspects such as likely poverty impact, adverse environmental impact, or social and resettlement implications.Four of thee remaining roads were selected under RNIMP-II.

Timing

The timing of project though late in implementation but was needed badly early which eventually was completed within a time frame of the road improvement planning.

3. Brief description on planning and financing of the project and its applicability

- Project Identification

  The Project was identified by MoC through RHD and forwarded to ADB for Loan in implemention. A feasibility study was carried out for some selected roads and finally roads were selected under various componets as described hemnceforth.

  - Appraisal

    An ADB Mission visited Bangladesh from 26 May to 2 June 2003 to carry out appraisal for the proposed Project. The Misison's principal objectives were to (i) discuss with the Government the issues raised during the Management Review Meeting held in ADB on 20 May 2003; (ii) refine and firm up the proposed Project's scope, estimated cost and financing arrangements, implementation arrangements, and loan processing and Project implementation schedules. An Aide memorie summarizing discussions and agreements were reached with the Government at a final meeting on 02 June 2003 which was then issued by the ADB.

  - Credit Agreement

    Loan Agreement with ADB was signed on 25 June 2004. Total Credit are as follows:

    Terms of Loan:-

    - Interest Rate during Grace Period 1%
    - Interest rate after Grace Period 1.5%

    ADB Loan Details:

Original Loan Amount	SDR 88,125,000 (US$ 65,000,000.00)
Net Revised Loan Amount	SDR 46,130,721.43

Allocation details:

Category	Original Allocation in SDR	Revised Allocation in SDR
Civil Works- Road Improvement	65,061,000	36,259,028
Civil Works- Periodic Road maintenance	5,204,000	2,920,900
Civil Works- Routine Road maintenance	1,007,000	504,833
Road Master Plan	559,000	479,422
Road Safety- Black Spot Improvement	1,119,000	706,215
Privatization of Vehicle Inspection Center	350,000	3891
Improvement of Public Awareness for HIV/AIDS and woman trafficking	140,000	127,878
Consulting Services- Supervision	4,832,000	4,242,842
Consulting Services- Design	699,000	0
External Audit	280,000	85,643
Interest Charge	1,303,000	847,643
Unallocated	7,571,000	0
Total Category Allocation	88,125,000	46,130,721

- Loan Conditionalities

  The ADB agreed to lend from Bank's Special Fund with an interest charge of 1% per annum during the grace period and 1.5% per annum thereafter on the amount of loan withdrawn from the loan account and outstanding from time to time.

Revised Ammortization Schedule

Date Payment Due		Payment of Principal (expressed in SDR)	
15 December	2011	1,401,503.00	PAID
15 June	2012	1,099,029.00	PAID
15 December	2012	1,099,029.00	PAID
15 June	2013	945,137.00	
15 December	2013	945,137.00	
15 June	2014	945,137.00	
15 December	2014	945,137.00	
15 June	2015	945,137.00	
15 December	2015	945,137.00	
15 June	2016	945,137.00	
15 December	2016	945,137.00	
15 June	2017	945,137.00	
15 December	2017	945,137.00	
15 June	2018	945,137.00	
15 December	2018	945,137.00	
15 June	2019	945,137.00	

Date Payment Due		Payment of Principal (expressed in SDR)
15 December	2019	945,137.00
15 June	2020	945,137.00
15 December	2020	945,137.00
15 June	2021	945,137.00
15 December	2021	945,137.00
15 June	2022	945,137.00
15 December	2022	945,137.00
15 June	2023	945,137.00
15 December	2023	945,137.00
15 June	2024	945,137.00
15 December	2024	945,137.00
15 June	2025	945,137.00
15 December	2025	945,137.00
15 June	2026	945,137.00
15 December	2026	945,137.00
15 June	2027	945,137.00
15 December	2027	945,137.00
15 June	2028	945,137.00
15 December	2028	945,137.00
15 June	2029	945,137.00
15 December	2029	945,137.00
15 June	2030	945,137.00
15 December	2030	945,137.00
15 June	2031	945,137.00
15 December	2031	945,137.00
15 June	2032	945,137.00
15 December	2032	945,137.00
15 June	2033	945,137.00
15 December	2033	945,137.00
15 June	2034	945,137.00
15 December	2034	945,137.00
15 June	2035	945,137.00
		46,130,721.43

4. Analysis of the Post-Implementation situation and result of the project:

4.1 Whether the beneficiaries of the project have clear knowledge about the Target/ Objectives of the project:

The direct beneficiariaries of the project are mainly the local people of the region and indirect beneficiary goes to the GDP growth of the country. Beneficiaries are also RHD and District Administration. Asset of RHD has increased and so its liability to maintain. Private participation for road maintenance was introduced in the Project which will help RHD taking decison in future about further deployment of such private partricipation for road maintenance.

4.2 Programme for use of created-facilities of the project

Maintenance program for the craeted assets and facilities are to be implemented through local RHD divisions who will chalk out appropriate programmes.

4.3 O & M programme of the project

Being implemented

4.4 Impact of the project

4.4.1 Direct

Activities in the regions where implemented were noticed positive. Foodgrains are now being markcted easiliy by the farmers. Cost of land has increased. Business activities even small scale industry growth noticed.

4.4.2 Indirect

Expected that the GDP growth will be significant but can only be assessed after four to five years.

4.5 Transfer of Technology and Institutional Building through the project

Project preparation, international procurement and Construction technology with international standards were implemented in this project by the foreign and local experts of the Consultants which were closely monitored, participated and collaborated by all the RHD staff. Transfer of technology was effected through practical supervision and quality control in the field participated by RHD personnel effectively. International Training was also given to RHD officers and other Government Officers. Further, these training has helped in building up institutional capacity within the RHD.

4.6 Employment generation through the project

Due to implemenation of the project, the road network has improved a lot in the region and as a result activities in the agriculture as well as in commercial fields have increased significantly.

4.7 Possibility of Self employment

There is ample possibility of self employment as more peopole will be taking part in the activities of marketing agricultural products and in setting up of many small scale industries like brick fields, vehicle repair shops, markets, rice mills, fuel station etc.

4.8 Possibility of women-employment opportunity

Possibility of women-employment opportunity will significantly increase in the fields of agriculture and in various types of cottage industry.

4.9 Women's participation in development

During construction women labours were engaged in large numbers by the contractors including women engineers.

4.10 Probable Impact on Socio-Economic activity

Impact on socio-economic activities is will be significant. Cash rich people will be buying land by the side of the project road, NGO's activity in the region for upliftment will increase, more number of children will be going to school, markets will coming up and so also marketing of local agricultural produce.

4.11 Impact on environment

There will not be adverse effect on the environment except that the plying of vehicles will increase.

4.12 Sustainability of the project

The project is sustainable considering the economic return and financial analysis as projected in the Feasibility Report.

4.13 Contribution to poverty alleviation/reduction

The projects aim was to reduce povery alleviation which will succeed satisfactorily. A study on Poverty Reduction may be carried out by RHD for regions of completed contracts for assessment of the poverty reduction scenario.

4.14 Opinion of the public representatives, local elite, local administration, teachers, religious leaders, women's representatives etc.

All - positive response received except for the incomplete stretch of RIC-1 and RIC-3. The incomplete stretches of the roads if taken up by the RHD may be completed soon under different project head.

4.15 Contribution of Micro-credit programmes and Comments on overlapping with any NGO activities

RHD may take up a survey for assessment of the contributions of Micro-credit programmes and on overlapping with any NGO activities in the region of completed contracts of the project.

5. Problems encountered during Implementation (with duration and steps taken to remove those)

5.1	Project Management : no problem	5.11	Design formulation/approval: no problem
5.2	Project Director: Frequent tranfers affected efficient and prompt disposal of matters by the Engineer	5.12	Project aid disbursement and re-imbursment : no problem
5.3	Land Acquisition: It was a serious problem till one year after award of the contract of all 4 RIC contracts. After one year these were mostly resolved except for Bhaluka to Gafargaon Section, Gafforgaon Bypass and Debigonj to Nilphamari (RIC-3) whose LA was solved in January 2011 mainly due to inadequate & timely DPP approval and ADP allocation	5.13	Mission of the development partner: no problems
5.4	Procurement: All procurements got dealyed due to procedural requirements but project got completed within extended Loan Closing period except RIC 4 which could not be done at all due to Contractor's resource constraints and reluctance to do work	5.14	Time & Cost Over-run: completion period of RIC-1, 2, 3 and few PRMC contracts had to be extended for unavoidable reasons for which there was cost overrun and time over run
5.5	Constultancy: no problem	5.15	Project Supervision/Inspection: no problem
5.6	Contractor: Except for RIC-4 no problem from other contractors. Due to cash flow and negative attitude of the Contractor of RIC-4 (ITCL) could not be completed by the contracts.	5.16	Delay in Decision: nil
5.7	Manpower: no problem	5.17	Transport: no problem
5.8	Law & Order: no problem	5.18	Training: no problem
5.9	Natural clamity: nil	5.19	Approval: no problem
5.10	Project financing, allocation release: The Project suffered due to insufficient GoB matching fund allocation at different financial year	5.20	Others: nothing

6. Remarks & Recommendations of the Project Director:

Due to some unavoidable circumstances like insufficient provision of DPP allocation, procedural delays and litigation, there had been some delay in acquisition of land in some stretch of Road like Debigonj to Nilphamari (Including Domar bypass), Bhaluka to Gafargaon (Including Gafargaon Bypass). Land for Patya bypass was fully acquired. But due to contractor's insufficient resources and non performance, this proposed bypass could not be developed and acquired land is remained unutilized. These portions were omitted from the scope of RNIMP-II. But, as land has been fully acquired in these sections during the project period, the omitted road sections can be included for development in future GoB /fdnded/ Foreign aided Project.

(Deleep Kumar Guha)
ID No.001022
Project Director (Addl. Chief Engineer), RH-
BASEC Road Connectivity Project
132/4 New Bailey Road, Dhaka

Date : .....

Signature and seal of the Project Director/Manager

7. **Remarks/Comments of Agency Head**

Date : .....

Signature and Seal

8. **Remarks/Comments of the officer in- charge of the Ministry/Division**

Date :

Signature and Seal