CHAPTER 1

INTRODUCTION

1.1 GENERAL

In India, construction is the second largest economic activity after agriculture. The construction industry accounts for nearly 65 per cent of the total investment in infrastructure, and is expected to be the biggest beneficiary of the surge in infrastructure investment over the next five years. Investment in construction accounts for nearly 11 percent of India’s Gross Domestic Product (GDP). As opportunities in the sector continue to come to the fore, foreign direct investment has been moving upwards. The real estate and construction sectors received foreign direct investment (FDI) of €216.53 million in the first half of the financial year (2012-2013).

The construction sector, largely a project-based sector, thrives on delivering unique projects that fulfil the various needs of the society. The delivery of the project is often measured in terms of three parameters, schedule, cost, and quality achievement. Of these three parameters, schedule and cost are the widely used performance measures, that receive most attention from the construction industry stakeholders (Iyer and Jha 2006). Earlier studies in the construction field show that, while the upper limit of time extension for contracts in the United Kingdom is approximately 25 percent, 70 percent of the construction contracts in India exceed that limit,
often by large margins. Moreover, 40 percent of the contracts in India experience cost overruns of about 25 percent to 50 percent. This figure is very alarming and disheartening (Patil and Jugati 2011).

The analysis of the central sector projects by the Ministry of Statistics and Programme Implementation (MOSPI) shows that, many of the projects suffer from inadequacies in project formulation and implementation, resulting in large time and cost overruns, affecting the very viability of the projects, and acting as a drag on the economy. The analysis has also identified several factors responsible for time and cost overruns, some within the control of the enterprises and some beyond their control.

The analysis of time overrun in terms of the percentage of projects running behind their original schedule also shows a declining trend, which was 62 percent in 1993 to the lowest ever to 31.72 percent in March 2002, 34.13 percent in March 2007 which increased again to 52.10 percent. The increasing trend of the percentage of time overrun projects is also due to the same reasons as in the case of cost overruns. The projects in the highway, power, petroleum, shipping and ports, telecommunication, steel, fertilizers, and railway sectors suffered the most. The trend of the percentage of time overrun projects is depicted in Figure 1. The current status report published by the MOSPI highlighted, that out of the 951 projects 474 projects are behind schedule and 309 projects are cost overrun. MOSPI has reported that, “Of the total reported cost increase of USD 12.4 billion, USD 8.4 billion is on 466 delayed projects”. The reasons for these problems range from land acquisition, improper planning and budgeting, to poor coordination and monitoring of the projects.
The delays in project completion and cost overrun have always been the concern of project participants, and if it is a project of National importance, even the public interest is put at stake. The dispute resolution mechanism has also contributed to further delays, affecting the economics of the projects.

There is strong evidence of inconsistent performance of the Indian construction projects and the trend is growing rapidly, and projects are reportedly failing across all the key performance measures, including cost, time, and quality performances. With this growing volume, the schedule performance of the Indian construction sector is certainly a significant topic for investigation. Many studies have been reported on the causes and factors affecting the schedule and cost performance, but most of these studies are area specific (Odeh & Battaine 2002). The applicability of such research in the
Indian construction context still remains unexplored. So, there is a need to understand the factors that cause the time overrun and the impact of these factors on the successful completion of a project in the construction industry. In the Indian context, resources are the major barriers causing time and cost overruns of construction projects. Hence, in the present study, resource constraint factors causing time overrun of construction projects are considered.

Thus, the primary objectives of this research are to analyze the resource constraint factors influencing the time overrun of construction projects, to find the relationship between these factors by statistical methods and to predict the impact of these identified factors on time overrun of construction projects, using a time overrun model for the Indian construction sector.

1.2 ORGANIZATION OF THE THESIS

The thesis is organized into eight chapters. The first Chapter focuses on the introduction and motivation of the study. The second Chapter discusses the literature review. In Chapter 3, the research methodology is discussed. Chapter 4 gives details about the data collection. In Chapter 5, the different perspectives of the factors influencing time overrun in construction projects are discussed. The identification of critical factors using the factor analysis is presented. Chapter 6 discusses the development of a model for time overrun in construction projects whereas a different Scenario analysis is presented in Chapter 7. The findings and conclusions are presented in Chapter 8.
1.3 TIME OVERRUN (DELAY) IN CONSTRUCTION PROJECTS

In construction, time overrun is defined as “the time during which some part of the construction project has been extended or not performed due to an unanticipated circumstance”. Delay could be defined as the time overrun either beyond the completion date specified in a contract or beyond the date that the parties agreed upon for the delivery of a project (Assaf & Al-Hejji 2006).

Construction delay has been considered as a major risk as well as a source of disputes (Ogunlana 1996; Aibinu & Jagboro 2002); therefore, a knowledge and understanding of the sources of delay is important in order to identify and effectively manage the various risks of time overrun, dispute, arbitration, total abandonment, and litigation involved in achieving the project objectives (Aibinu & Jagboro 2002).

Bassioni & El-Razek (2008) stated that time overrun in construction project is considered one of the most common problems causing a multitude of negative effects on the project and its participating parties. Therefore, it is essential to identify the actual causes of time overrun in order to minimize and avoid the time overrun and their corresponding expenses.

Arditi & Pattanakitchamrnrom (2006) stated that the time overrun in construction can cause a number of changes in a project such as late completion, lost productivity, acceleration, increased costs, and contract termination.

In general, situations causing delay are complex in nature. A time overrun in one activity may not result in the same amount of project delay as in another. A time overrun caused by a party may or may not affect the project
completion date and may or may not cause damage to another party. A time overrun may occur concurrently with other time overrun and all of them may cause an impact on the project’s completion date.

Completing projects on time is an indicator of efficiency, but the construction process involves many unpredictable factors, which result from many sources. These sources include the performance of the project parties, resource availability, financial availability, environmental conditions and contractual relations. The time overrun definitely create negative impacts on the project performance. Therefore, time overrun is an important problem in the construction industry. The challenge is to measure the net impact of the construction time overrun accurately. Investigation into this problem area is needed, in order to manage time overrun situations in a better way, and to mitigate their consequences. Not many studies have been carried out to study the influence of resource constraint factors causing time overrun in the Indian construction industry. Assessing the frequency of time overrun, the extent to which time overrun may occur, and the factors influencing time overrun can provide insights for better planning of a construction project, to control these factors and improve the project performance.

1.4 EFFECTS OF TIME OVERRUN

Time overrun can lead to many negative effects such as cost overrun, disputes, arbitration, litigation and total abandonment (Aibinu & Jagboro 2002, Sambasivan & Soon 2007). These effects will retard the entire development of a construction industry. So, it is necessary to take steps to overcome time overrun in a construction project. The effects time overrun are shown in Figure 1.2.
1.5 RESOURCE CONSTRAINTS CAUSING TIME OVERRUN

One of the major issues in the Indian construction industry is resource constraints. These resource constraint problems occur in most of the construction projects. The major resources in construction projects are manpower, materials, equipments and finance. Shortage of labour, non-availability of equipments, non-availability of materials in the market, price fluctuation, and cash inflow and outflow, are the factors which cause the time overrun of a construction project during the construction stage. So, it is essential to conduct research to identify and evaluate the influence of the resource constraint factors, causing a time overrun and its importance. These findings can help the project managers, during the resource scheduling and resource allocation process in the construction projects.

1.6 NEED FOR THE STUDY

The construction industry is complex in its nature, because it contains a large number of parties, such as clients, contractors, consultants, stakeholders, shareholders, regulators and others. Construction projects involve a series of activities to accomplish their goals within a specific time. Each activity requires resources, such as manpower, materials, equipment and finance. Resource plays an important role in construction projects. Resource allocation in the schedule is necessary, to determine whether or not there is sufficient supply of resources on hand to perform the work as planned.
resources are handled, in some projects effectively and efficiently, while some
others are mismanaged. Hence, the projects incur time and cost overruns.
Construction delay is the main problem in the construction industry. It impairs
the feasibility of owners, with respect to and retards, the development of the
construction industry. Contractors are prone to see most of the delays as the
responsibility of the owner, while the owners usually want to put the blame on
the contractor or third parties. In order to improve this situation, the
identification, quantification and analysis of time overrun become essential.

Only a few studies so far have been carried out on the causes of
time overrun, considering the Indian scenario. Consequently, it is necessary to
analyze time overrun in construction projects, to avoid or minimize their
adverse impacts on a project, like cost overrun, disputes, litigation etc. This
thesis is very important as it helps to identify and evaluate the factors
influencing time overrun, which in turn, affect the performance of
construction projects. Suitable recommendations are given to reduce the time
overrun of the construction projects to improve their performance. The
findings of this research will enhance the performance of the construction
industry, to schedule the project activities properly, and to complete the
projects in time by avoiding delays in the construction activities.

1.7 OBJECTIVES

The aim of this research is to analyse the resource constraint factors
influencing the time overrun of construction projects. The aim of this research
is divided into the following objectives:

- To identify the factors causing time overrun of construction
  projects.
- To determine the owners’, consultants’ and contractors’
  perceptions of the relative importance of the factors causing
time overrun of construction projects.
• To identify the most significant factors causing time overrun of construction projects.

• To evaluate the degree of agreement/disagreement between owners, contractors and consultants regarding the ranking of the factors causing time overrun of construction projects.

• To test the hypothesis and verify the association between the ranking of factors from owners’’, contractors’ and consultants’ perceptions.

• To develop a model to depict the relationship between influential resource constraint factors and time overrun.

• To formulate the recommendations to reduce the time overrun of construction projects so as to improve the performance of the construction projects.

1.8 SCOPE

• Only construction projects in India are considered for this study.

• The factors causing time overrun are identified from the literature survey and experts’ opinions.