Chapter 1

1.0 INTRODUCTION TO RESEARCH

1.1 Background

“Construction is one of the most dynamic, risky, challenging, and rewarding fields” (Kangari 1995, p.422). Construction projects are normally executed in uncertain and risky environments (Banaitiene, Banaitis, & Norkus, 2011). The risk and uncertainty can affect the proper delivery of the end product (Flanagan & Norman, 1993; Mills, 2001). The industry as a result is prone to poor performance (Tah & Carr, 2000). Risk management is now a highly discussed topic and an important aspect of project management is obtaining a better understanding of risk responsibilities and risk management abilities in the construction industry (Wood & Ellis, 2003). However, the engineering and construction industry has a poor reputation when it comes to coping with risk, with many major projects failing to meet deadlines, cost targets and specifications (Dey & Ogunlana, 2004). As construction projects become more complex and dynamic, they have resorted to the use of alternative procurement methods. This has added to the complex nature of the construction industry forcing organizations to rethink the manner in which they treat project risks (Tah & Carr, 2000; Dey & Ogunlana, 2004). Therefore, effective management of risk is critical to the success of any construction project (Banaitiene et al., 2011).

Edwards and Bowen (1998) identify risk management as a vital tool in coping with construction risks. The success of project management depends on the efficient and effective handling of the risks involved (Ren, as cited in S. M. Ahmed, Ahmad, & Saram, 1999). Hence, controlling the project risk has a positive effect on controlling project cost objectives, including on-time delivery and the quality of the completed project (Zou, Zhang, & Wang, 2007). In sum, controlling project risks means controlling the project itself.
Many studies identify risk identification and allocation as important factors in risk management (Raftery, 1994; Shuibo, Le & Yuan, 2006; Zou et al., 2007). According to Kerzner (2001), risk management is defined as, the act or practice of dealing with the risk. It includes planning for risk, assessing risk issues, developing risk handling option and monitoring risk to determine how the risk have changed. Buchan (as cited in Baker, Ponniah, & Smith, 1999b) offers a systematic illustration of the risk management cycle as identification, analysis, and response to risk. Risk identification covers identification of the source and type of risk, and the documentation of their characteristics (Flanagan & Norman, 1993). Risk analysis is the vital link between risk identification and risk handling (Al-Bahar & Crandall, 1990). Risk analysis is defined as the evaluation of the impact of the risk to the project (Wang, Dulaimi, & Aguria, 2004). While Fan, Lin, & Sheu (2008) identify risk handling/response as the choice of a proper strategy to reduce the likelihood of the occurrence of risk events and/or the magnitude of their negative impact, Akintoye and Macleod (1997) identify risk response as risk allocation. A risk shall be allocated to a particular party, which has the competence and expertise necessary to assess the risk fairly in order to control or minimize the same (Fisk, 1997).

Zou et al. (2007) has suggested that the life cycle of a construction project is normally divided into several stages, which include the conception, design, construction, and operation stages. They have further argued that more effective management of risks would be possible if the risks were identified and considered in a more comprehensive and systematic way in a project life cycle. Hence, it is important to identify the possible occurrence of risks at each stage and to make appropriate arrangements to cope with them.

According to Thompson and Perry (1992), risk involvement is high in road, reservoir maintenance and building refurbishment projects. Zayed, Amer, & Pan (2008) assert that highway projects entail higher risks than traditional projects as they involve high capital outlays and intricate site conditions. Kwak and Dewan (2001) identify locations in developing countries as one of the major factors to be considered in the planning and implementation of development projects. K.B.D.Perera (2006) supports
these findings by concluding in his study that 80% of road projects in Sri Lanka face time and cost overruns and that most projects face a high risk. The records of the Road Development Authority (RDA) (2006) indicate that there are nearly 11,600 km of both A and B class roads in Sri Lanka’s road network. Furthermore, several road projects have been implemented in the recent past such as the construction of new highways, the upgrading of existing national highways and the rehabilitation of roads in tsunami affected areas after taking into consideration the critical need for a good road network in a developing country (Central Bank Annual Report, 2006). Therefore, this research emphasizes the need to identify and analyse risk and risk handling/response, which are the main phases when it comes to the risk management process in road projects.

1.2 Research Problem
What are the severe risk factors in road construction projects and how these severe risk factors should be managed at each stage of the project life cycle?

1.3 Research Questions
The key research questions that this study generates are as follows:
1. What are the severe risk factors prevalent in each phase of the project life cycle?
2. How are these severe risk factors managed in the existing context?
3. How these severe factors allocated to contracting parties?
4. What are the drawbacks with regard to the current handling strategies?
5. What are the upgraded solutions to the current handling strategies?

1.4 Aim and Objectives
1.4.1 Aim
The aim of this study is to identify the critical risks and the strategies for handling them at each stage of the project life cycle in road construction projects.
1.4.2 Objectives

Fulfilling above research aim was done by achieving five research objectives. These objectives are;

1. To identify the severe risks associated with each phase of the project life cycle of a road project;
2. To identify how these severe risks are handled at each phase of the project;
3. To evaluate the allocation of critical risk factors among contracting parties each phase of a road project;
4. To determine bottlenecks and to introduce alternatives to the present risk handling methods;
5. To develop a risk management model to manage the severe risks throughout the project life-cycle of a road project.

1.5 Scope and Limitations

The research is limited to grade A and B class road rehabilitation projects, which use remeasurement contracts in Sri Lanka and assumes that the identified risk factors are mutually exclusive.

1.6 Methodology

The methodological approaches adopted for this study are as follows:

1. A comprehensive literature survey on risk, risk management, construction risk management and research methods.
2. Preliminary interviews and project document review targeted at identifying the applicability of various types of risk factors and their handling strategies taken from the literature on road construction projects in Sri Lanka.
3. A structured questionnaire survey using the Delphi method to identify critical risks and the handling strategies for such risks at each stage of the project life cycle for road construction projects and to develop a risk management model.
4. Case studies to test the applicability and effectiveness of the Model.
1.7 Research Output/ Dissemination

Risk management is a topic receiving much attention in construction management literature. However, the practicability of risk management techniques in construction has received relatively little attention, which is compounded by the lack of knowledge with regard to risk management. The present research aims to fill the lacunae that exist in relation to this subject. Simultaneously, the research intends to provide the following outputs:

1. To raise awareness and understanding of severe risk factors affecting road construction projects at each phase of a project life cycle;
2. To raise awareness of risk management strategies available and their application to road projects and to provide solutions to the drawbacks in existing risk management strategies;
3. To develop a risk management model in order to manage the critical risk factors at different phases of a project life cycle;
4. To disseminate knowledge on risk management through publications.

1.8 Structure of the Thesis

The main purpose of Chapter 1 is to provide the background for the research. Chapter 1 discusses the aims, objectives and research problems, and the scope of the research, its limitations and research outputs/dissemination.

Chapter 2 gives an overview of risk management practice in the construction industry. It introduces the concepts of risk, risk management and the current status of risk management in road construction in Sri Lanka.

Chapter 3 sets out the research framework used to guide this research in order to achieve its aims and objectives. The chapter outlines the research philosophy, methodology and methods adopted and the modes of data analysis used for the study.

Chapter 4 provides the findings of the Delphi study in relation to each phase of the project life-cycle by identifying the severe factors at each level and their handling...
strategies. The findings are further elaborated using some of the results of the interviews. The chapter also contains the analysis of the results with the use of statistical methods and development of the model.

Chapter 5 summarises the research process and presents the key research findings. It presents the conclusions derived from the research findings and recommendations to improve risk management in road construction projects in Sri Lanka. It also provides limitations and suggestions for further development.