CHAPTER 1

Introduction:

1 Title of thesis

Role of Inherently Safer Concept in Hazard Identification and Risk Assessments in Viaduct work: Design based approach

1.1 Statement of proposal

1.1.1 Problem Statement

Construction industry is backbone of Indian economy. Viaduct construction works plays an important role and it supports the Indian economy as well as infrastructure takes its shape to the global level. Same time safety standard and its implementation have been an issue for construction industry in India. Numerous accidents are reported in construction since beginning of the project which has significant impacts on individual and nation. Infrastructural development and time frame associated with it along with cost factor makes the execution process most challenging. Competent Supervision and its placement with respect to competency lack in construction industry which impacts and encounters majority of accidents.

In construction Industry, visually progress is main or prime concern and safety concerns are not coming upfront although legislative requirements understands the importance of safety concerns. Accidents are driven since design stage of construction and focused done on assessment of risk is not updated or not quantified properly to mitigate the hazard and risk associated in it.
Therefore, approach to understanding the safer approach and concept of quantification of risk, reassessment of activity since design stage to implementation stage could be recognized in mitigating inherent hazard and risk involved in viaduct work.

1.1.2 Background

Construction is third most accident prone industry and ill organized industry due to involvement of illiterate and untrained workers. There are various types of dependency involved in roles and responsibility assigned by management which supervision always carried by the engineers/supervisor in available time and resources.

Viaduct work consists of most vulnerable work activity where availability of inherent risk remains consistent. Although in recent years accidents frequency rate in construction industry has decreases involving the technological approach. In recent few years it has been found that the majority of accidents coming from construction work activity is “work at height” which consist up to 56% of total accidents coming out from construction work and it is majorly involved in viaduct construction work where it has been noticed approx. 60%. Rather from work at height, material handling, excavation, hot work etc. are main concern where incident rate are majorly recognized.

Based on initial design, planning of executing the work comes first where safety issued and its regulatory requirements discussed. Management concern towards hazard and risk involved in the planning stage remain theoretical and they remain eager to accept the challenges. Although while during its execution, time frame restriction, resources limitations and cost effectiveness bring the instability to the real approach towards implementation of safety at work place which lack the concentration of assessing the inherent risk which indirectly involved in the process.
Therefore, to minimizing the accident frequency it will be favorable to assess all vital part of a project by applying the concept of implementation of inherent safer way to identification of hazard and risk assessment involve since design stage to execution of work till its completion.

1.1.3 Role of viaduct in sustainable development

As reasonable improvement turns into a more imperative target in common base arranging and approach making, Quality of Life is an inexorably vital measure to comprehend, describe and apply viably in the inquiry and advancement of suitable framework answers for practical improvement.

The illustrations exhibit how foundation can be deliberately created or re-created to enhance local personal satisfaction and financial intensity while saving or upgrading the common habitat.

The most well-known and generally utilized meaning of manageable advancement originates from the United Nations' Brundtland Commission's report: "addressing the necessities (and desires) of the present era without trading off the capacity of future eras to address their own issues and yearnings" (WCED 1987).

As a rule, it is additionally comprehended that reasonable improvement has three angles: natural, monetary, and social. While meanings of and ways to deal with supportable advancement and assessment change, the applied premise of practical improvement is in a general sense the same: to give a worthy or enhancing personal satisfaction for groups while safeguarding that normal resources that empower such arrangement to proceed. Viaducts are scaffolds made out of a few little traverses for intersection a valley or a crevasse.

Alongside improvement and enhancing network, viaducts ought to be practical. This could be accomplished through powerful arranging and planning. Millau Viaduct is an impeccable case of a maintainable development artful culmination.
1.1.4 Motivation/ Need of research

In India construction has accounted for around 40 per cent of the development investment over the past 50 years. Around 16 per cent of the nation's working population depends on construction for its livelihood. The Indian construction industry employs over 30 million people and creates assets worth over Rupees 4000 billion (approx.).

Major accidents of construction particularly bridges or viaduct structures which has been happened recently in India who motivates to look some alternative or research which could able to minimize the impact or accidents ratios. Investigation and analyzing the past accidents, it reveals the root causes of accidents which has been happened in viaduct work (Metro rail work or other bridges work) and various aspects has come to work in. Commonly human error and technical assessment of work by team leader or concern engineer has played important role in leading to the accidents. Site Engineer/ team leaders’ job is to identification of hazard and risk assessment carrying during and at the time of construction activities plays an important role. The risk quantification barrier which indicates to change its methodology or planning is the vital part or concern which an engineer or team leader or designer may take in priority before executing the work.

During my research, it will be focused to use all inherent safer approach to identify hazard and its risk quantification including re assessment in all levels of activities by which we will be able to justify the risk rating by which there will be a way to change the methodology or design and probably frequency of accidents can be reduced.

1.1.5 Scope

In recent scenario various technique and methods are available worldwide for hazard identification and risk assessment although every technique has its own limitation and scope. Taking it further, we have been thought to reconstruct the
technique and conceptualize in a way we can take it forward to assessing risk in construction more significantly. In this way, we have been taken consideration of safety in design, analysis of inherent risk available since inception, coordination between designer and engineers.

1.2 Objective

- Study of method statements, design proposals and all safety management system

- Study of various techniques used for identification of hazard and risk assessment for construction projects (mainly in design and execution of bridges/ metro rail viaduct works)

- To introduce the framework for risk assessment in construction of viaduct work and to provide a palette of techniques facilitating the various steps of risk assessments including utilization of inherent safer concept from design stage to completion stage of a project.

- To assess the effectiveness in eliminating and minimizing accidents rates by validating the model.