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AN ASSESSMENT OF RISK INVOLVED IN PUNE METRO RAIL & SURROUNDING AREA OF PUNE METRO RAIL PROJECT

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ABSTRACT

The high rate of urbanization has heightened demand of good quality transport system for easy, quick and safe movement within pune region, so to overcome this issue government focus on different types of transportation mode like BRT, Metro Rails, etc. in pune region. This paper is focusing on Pune Metro Rail Project. Pune metro project is one type of major construction project. Complex characteristics of major construction projects, competitions and the tight economic situations have created the necessity for predicting the project risks and the need to improve management support, techniques, and tools for risk management. Risk in construction has been the object of attention because of time and cost over-runs associated with construction projects. Organizations from many industries have recognized the increasing importance of risk management and many companies have established risk management departments to control the risks they are, or might be, exposed to. This paper is to shed the risk may be available between the metro projects from Katraj to Agricultural College via Swargate and surrounding area through various parameters. We will focus on risk may be occurred for this area through questioner survey only.

Keywords— *Construction Project, Project Risk, Risk Assessment, Metro Project, Questioner Survey*

1. INTRODUCTION

The high rate of urbanization has heightened demand of good quality transport system for easy, quick and safe movement within pune region, so to overcome this issue government focus on different types of transportation mode like BRT, Metro Rails, etc. in pune region.. A big construction projects involve complex, time consuming design and construction processes characterized by unforeseen circumstances. Risk evaluation is an important part of risk management in major projects where lot of money, time & resources are involved. For an infrastructure project, risk evaluation can be carried out effectively by investigating and identifying the sources of risks associated with each activity of the project. These risks can be assessed or measured in terms of likelihood and impact.

A project like Metro rail, Monorail and Sky bus is today's requirement as the population is increasing faster than any other country. Metro rail project and other presents a great prospect as a fastest and cleanliest mode of urban transport. Some of these projects may be forming headlines due to the issues raised about their viability or private involvement but for citizen of that city it has proved boon thus government is frequently investing in such projects.

Pune is one of the fastest growing city in India both population wise and business wise and the cultural capital of Maharashtra. Pune metro rail project is one of the dream projects from which local citizen had lots of expectations. Experts claimed it as one of the milestone in urban transport history. But soon after the DPR is prepared and local citizen got to know about the alignment,

technology and other system that are considered for this project, they felt that there are many better options available that is not considered and even after finalizing the alignment and related documents local citizens and environmentalists views are not gathered and considered to check at least the end user perception. For this paper we select the metro project from Katraj to Shivaji nagar. There are two different methods of the construction of metro rail one is elevated metro i.e. above ground level at some height and second is underground metro. Now we will assess the risk associated with construction of underground metro rail as well as elevated metro rail. We have prepared a questionnaire for survey which include personal interview from the actual ground where the metro rail run. The questioner includes various factors which needed to introduce for identification on point of views of local residence and technical persons.

2. AIM AND OBJECTIVE

This paper focus the risk involved in this metro project and surrounding area through questioner survey and opinion of local person so that we can try to find the socio-economical-environmental risk and other technical risk only.

3. LITERATURE RIVEW

As per Altaher Mohamed Eida et Al, to identify the different risk factors that affect the performance of construction projects with the help of appropriate tools and technique for the development of desirable risk management framework to reduce the affect of risk. This study investigates, categorizes and evaluates the risk and develops a risk management policies and guidelines to the company contractor which can be adopted at the construction projects site for better and risk free construction work. The questionnaire prepared for the survey was formulated by seeing the relevant literatures in the area of construction management. The responses were analyzed by bar chart, standard variance & mean using the software of SPSS.

As per Walker and Dorofee, risk management could be put into practice. Their methods were based on software program along with risk reduction road map design for risk management. These could guide and help identify various risk management methods which could be easily put into practice Complex projects like the construction of an underground corridor for metro rail operations involve risks in all the phases of the project starting from the feasibility phase to the Operational phase. These risks have a direct impact on the project schedule, cost and performance.

As per Mulholland and Christian, a model in a systematic way to find out uncertainty in construction schedules. With the help of past project experiences the researcher describes a risk assessment process involving typical inputs and expected outputs. The model includes knowledge and experience acquired from many experts, project-specific information, decision analysis techniques, and a mathematical model to estimate the amount of risk in a construction schedule at the initiation of a project.

The author Oleg Kaplinski describes the method of defining the utility function as the decision maker is faced with a choice between certitude of a given result and a lottery was to extreme results. The two contrasting cases of function of utility, that is characteristic of a decision maker with an aversion to risk, and decision maker with a predilection to risk, are then analyzed in detail. The suggested procedure of analyzing and identifying attitudes towards risk is based on the new criterion of maximization, namely the criterion of maximization of the expected result which has been replaced by the criterion of maximization of expected utility. It significantly changes the approach to analyzing risk, especially in construction industry.

The researcher **SS. Asadi and Vallabhaneni Eswara Rao,** first identifying the risk types based on that condition of to collect the data from different case study and conduct the questionnaire survey related to risk and previews date from the projects completions of past years. The survey will be directly conducted through project managers, site engineers and contracts, this paper mainly

focused on 5 phases; Risk identification, risk assessment, risk responses, risk monitoring and analysis and finally risk control. To identifying the risk factors mainly focus financial, technical, legal, management, material, environment, political and social risks. In that case to conduct the questionnaire survey in that total questions 50 and 47 questions related to risk and three questions personal details and risk facing in site work and also to collect the date related to risk management in construction projects. And to analysis the date and questionnaire survey by using the rating system to mention the high rating risk factor and low risk factors must be identifying to the end of report.

4. RESEARCH METHODOLOGY& DATA COLLECTION

Following flowchart shows the methodology for this Project and data collection process,

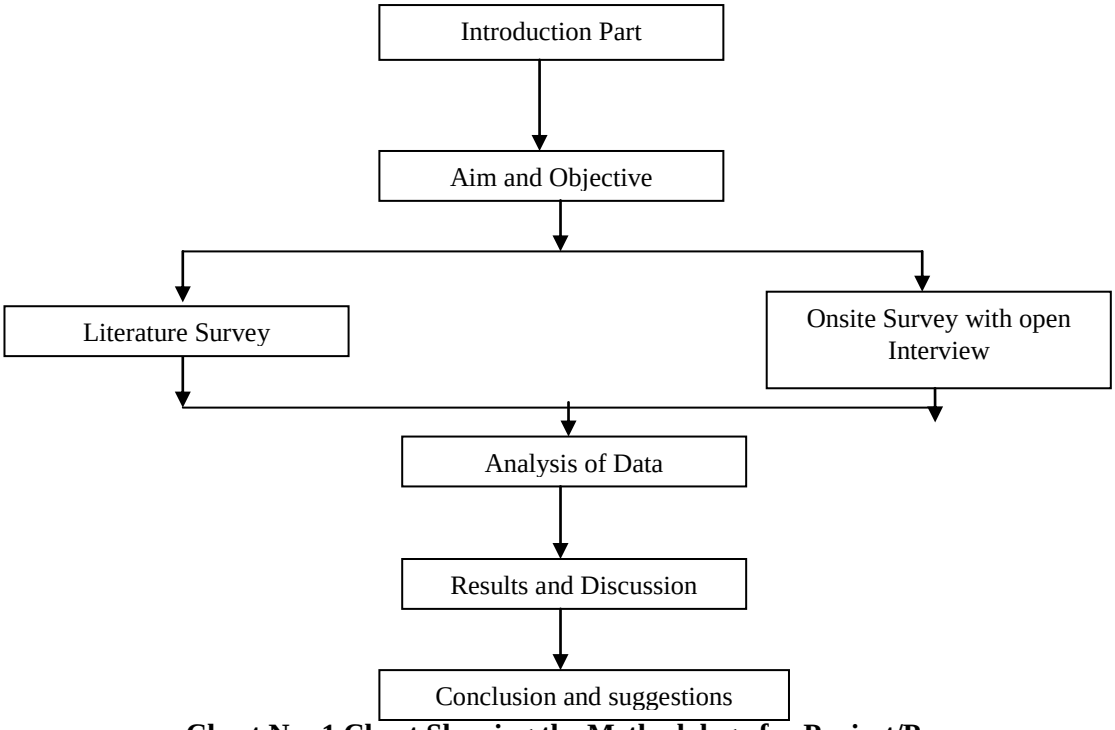

Chart No.-1 Chart Showing the Methodology for Project/Paper

5. PROPOSED ROUTES AND PHASES OF PUNE METRO PROJECT

The proposed routes of Pune Metro rail project are given below,

Table No. 1 Proposed Metro Corridors

Sr.No.	Details(Alignment)	Length In Km		
		Elevated	Under Ground	Total
1	Agricultural college to Nigidi via Pune Mumbai road	16	0	16
2	Agricultural college to Warje via JM and Karve road	8.7	0	8.7
3	Agricultural college to Hadapsar via Mhatre bridge	16	0	16
4	Agricultural college to Vagholi via Bund garden road	16	0	16
5	Agricultural college to Hinjewadi	17.5	0	17.5

	via Aundh			
6	Agricultural college to Swargate and Katraj via Shivaji road	7	5	12

We consider Agricultural College to Swargate and Katraj via Shivaji road for this Project work which having high density of traffic throughout the day. This route having old memory of pune like Shanivar wada, Tulsi baug, Mandai etc, so the risk on this route is very high than other route. This route having both elevated and underground metro of 12 Km length.

6. RISKS INVOLVED IN METRO RAIL PROJECTS

Types of Risks

Risks are classified into many types and on many basis, these are as follows:

a) On the basis its identification and prevention:

Known-known: the things that have ceased to be risks, because they have happened and it is not possible to prevent Those known unknowns: the risks that have been identified and it may be possible to mitigate its effect if it does arise.

Unknown unknowns: these are the risks that have not been identified and its adverse effects are not foreseeable by even the most experienced professional.

b) On the basis on surety of type of impact:

Pure risks: if the occurrence of an event results in no change in the situation or a loss with no possibility of gain, this risks is termed as pure risks.

Speculative risks: when the outcome may be loss or profit, the risks is called speculative risks.

c) On the basis of risks associated with particular project:

- Financial Risks
- Legal Risks
- Technology Risks
- Political Risks
- Commercial Risks
- Market Risks
- Cost And Time Over Run
- Environment Risks
- Construction Risks
- Operation And Maintenance Risks
- Surrounding Risks

The survey questionnaire was designed to get the ranking of above risks by suitable technique. The survey questionnaire is made up of abstract of 4 basic and theoretical risk factors as studied in various research papers and by observation which is combination of Technical and Socio-political- Environmental-Surrounding risk.

Respondents have to give ranking under the category for Less Important (1), Relevant (2), Essential (3), Important (4), Most Important (5). Detailed questionnaire was distributed to many on site and off site technical persons firms who are working for metro project and local residences surrounding the metro project. Total 60 questionnaires were distributed out of which 52 replies received. Following is the questioner which we prepared,

Nature of Participant-
Name of Company--

Name & Address of Project --						
Name of Participant with Designation & Contact No.—						
Factors	**Category**	**RESPONCE**				
		1	**2**	**3**	**4**	**5**
Technical Risks	Incomplete Design					
	Inadequate specification					
	Inadequate site investigation					
	Change in scope Construction procedures due to site condition					
	Insufficient Resource availability on site					
Construction Risks	Labour disputes on site					
	Site condition changes					
	Equipment failures on site					
	Design changes due to site condition or as per requirement					
Socio-Political-Environmental-Surrounding Risks	Changes in laws and regulations for environmental protection or any other condition					
	Language/Cultural barrier					
	Requirement for permits and their approval					
	Political Pressure					
	Acquisition of Land					
	Water Logging Problem in Rainy Season					
	Vibration occurred below the structure due to work					
	Insurance for all project and surrounding area					
	Relocation risk of Project Surrounding People					
	Natural Disasters Fighting system					
	Traffic Diversion Problem during and after completion of project					
	Historical Building Preservation problem during and after project.					
Financial Risks	Increased material cost due to delay					
	Payment delays by government					

	Improper estimation of project					
	Taxes increase					
Total =						

- This questioner survey was conducted in Mandai, Budhwar Peth, ABC and Ravivar peth with Local Peoples in proposed Metro Surrounding area.
- Survey conducted with 34 Local Peoples.

6. CONCLUSION

The success of a project management exercise depends very much on the efficient management of risk in big project. There are two different methods of the construction of metro rail one is elevated metro i.e. above ground level at some height and second is underground metro. The processes of risk management are Risk Identification, Risk Classification, Risk Analysis, and Risk Response. In Metro project this paper is only focus on Financial, technical, construction and socio-technological-environmental-surrounding risk for finding the factors with likart's scale only. For this project onsite survey and open interview was conducted to finalize the risk.

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