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Research paper

A Study on Construction Risks Prioritization and its Management

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Abstract

Construction industry is an important industry and remains so with the continuation of the development process especially in the developing countries. On the other it is very risk and hazard. As industry when compared to other industries financial losses and bodily injury and death, and resulting human, social impacts are more in the case of construction. Mishaps also contain significant costs that are not insurable. Financial deliberations contains direct costs like medical reimbursement and hidden costs includes loss of competence by breaking up crew, cost to train fresh or changed employee, damage to equipment and tools, cost experienced by delays. Many researchers have been suggested risk management techniques to minimize the losses in the industry and very few companies may be implemented the suggestions. The goal of this study is to recognize and rank risks in construction projects. This study proposes the hierarchical dependencies between the criteria. The variations and factors have been investigated via questionnaire and is an element of an on-going research into the application of risk management in major projects. To know the performance and applicable of proposed model set of data collected from different industries by using the informal approaches such as intuition and experiences the study is conducted to prioritize and manage risks.

Keywords: *Risk, hazard, cost, tools, management, damage.*

1. Introduction

Risk Management is a way of dealing with the uncertainty. It is inevitable to control uncertainty which will need either formal or informal construction program management. It usually has four stages: risk recognition, risk analysis, selection of risk management technique and surveillance of risk consequences (Xiaohua et al.,2017). It is a positive and proactive task intended to reduce the probability of unsatisfactory outcomes to the project in its different stages. Risks are frequently existing and depending upon the uncertainties and their probable consequences; we regularly take up them and take measures to reduce risk (Aurelija et al., 2014). They are conducted at every phases of a project life cycle, from viability to end. Regardless of a growing element of major projects in being, however there is no standard to which reference may be made techniques, factors and approaches to risk analysis. It was this lack of information that led to the questionnaire survey explained in this paper.

Risk, risk assessment and the control of risk have become fundamental to the success of a major project. The results from this questionnaire are important as they might introduce new technique to approach risk (Zvonko and Mladen, 2014 and Olga et al., 2016). Also, the options for responding to risk might be increased and/or applied to different projects. The starting point of investigation was an examination of both published and unpublished information on the use of risk management used in different industries.

Using the informal approaches such as intuition and practical skills a survey is organized to prioritize and handle those risks. The target respondents who form the traditional organizational formation for construction management were illustrated as a flow chart,

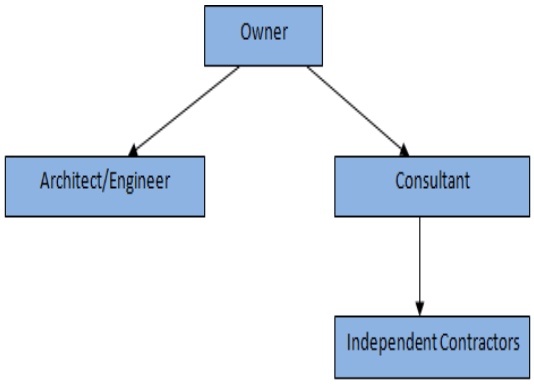

Fig. 1: Target Respondents (Traditional Organizational Structure)

This study is to plan and take management action to attain the goals of removing or reducing the probability and effects of risks before they occur and dealing with actual problems when they do. The results of this study are then used to prioritize risks to evidence a most-to-least-critical importance ranking.

2. Methodology

As explained above, it is obvious that the objective of this research is to prioritize and manage the risks so that risk-controlling activities may be scheduled and raised as they are

required throughout the lifecycle of the product or project to lessen disadvantageous impacts on attaining targets. Once the risks are recognized, the parameters for assessing, designating and prioritizing risks generally include likelihood (i.e. the chances of risk occurrence) and its consequences (i.e. the effect and extremity of risk occurrence). Risk restraints are used to contribute common and consistent benchmark for comparing the various risks to be managed.

One of the main objectives of the study was for it to be quick and easy to complete. This was crucial, as there were many questions, because the field of risk management is so broad (Jaffar et al., 2011). The answering techniques which were chosen here are defined and fully explained. The questionnaire utilized simple yes/no questions and many multiple choice questions. The questionnaire must be devised carefully to avoid any error and for precise results (Augustin et al, 2015).

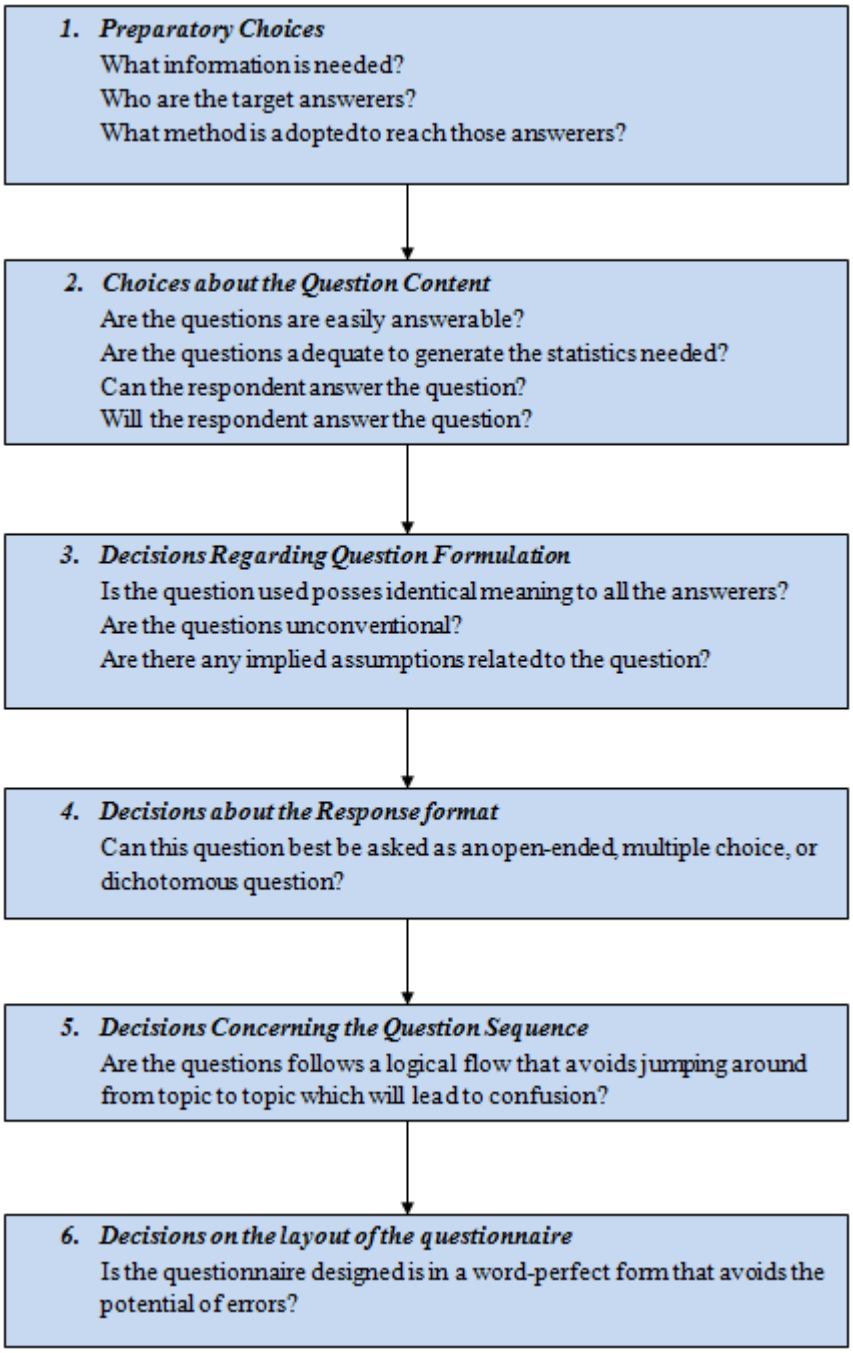

Fig. 2: Questionnaire Construction Decision

Once the questionnaire is revised and finalized, number of questionnaires required for the survey is produced. The final version of questionnaire is posted to the relevant people and their responses are awaited (Agnieszka et al.,2015). The participants who requested the results then have been informed of the summary. The five scale ranking technique was adopted for this study which is being adopted extensively (e.g. 1= very low, 2= low, 3= moderate, 4= high, 5= very high)(Edmundas et al, 2013 and . Nikhi et al., 2016).

3. Results and Analysis

The obtained statistics is examined with the Statistical Package for the Social and Science (SPSS). It is a statistical analysis package and so allows any organization or individual that need to hold and analyze large amounts of data. It is most simple and convenient and is very useful for determining interrelationships between different variables. There is a need to take more number of questionnaires for precise results.

Having contacted each of 77 construction companies, 50 expressed an immediate interest. The remaining 27 were either:

- Too busy to participate
- Do not participate in surveys-company policy
- Not relevant to their business
- No response at all

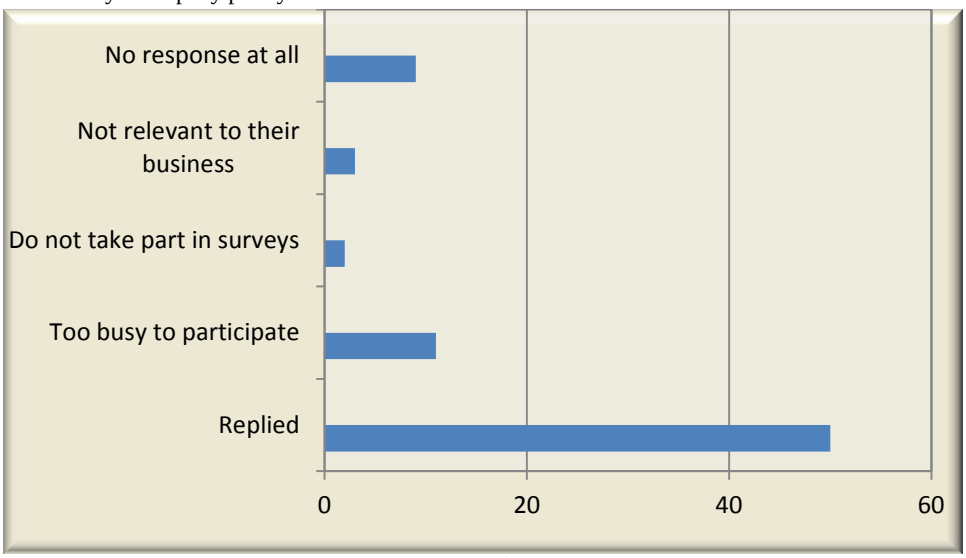

Fig. 3: Number of Responses

This particular concept worked as all the respondents that did reply, completed it as best as they could. The replies given by the answerers are the input or data that has to be analyzed further. SPSS is a statistical methodology that takes a hypothesis-testing point of view to the statistical analysis of large quantitative data. This software permits the investigation of various factors affecting the project success. After analysis, the outcome obtained from the software is distinguished and various reduction and control techniques are concluded. The survey results of this study were used to quantify two factors: probability and impact.

The Table1 shows the analysis of results, and the analysis was done using SPSS software in which the probability and impact ranks of various risks were obtained. From the results it can be interpreted that more number of respondents have agreed that material, labour and equipment resourcing will have more probability of risk factors and inadequate construction quality will impose heavy impact to the construction project. Therefore while managing the risk, the technical factors should be given more priority like site factors, environmental factors, political factors, commercial factors and socio-economic factors.

Table 1: Probability Test and Impact Test Ranks

Code	Mean value	Rank	Code	Mean Value	Rank	Code	Mean Value	Rank	Code	Mean value	Rank
TF1	8.47	25	SF16	8.57	24	TF1	10.91	22	SF16	11.53	20
TF2	24.77	5	SF17	26.49	**3**	TF2	25.38	**3**	SF17	24.87	4
TF3	28.34	**1**	SF18	23.29	8	TF3	21.22	9	SF18	23.42	6
TF4	24.78	6	SF19	27.32	**2**	TF4	22.60	8	SF19	29.12	**1**
TF5	13.99	18	CF20	24.99	4	TF5	11.12	21	CF20	27.19	**2**
TF6	15.93	15	CF21	11.85	20	TF6	12.43	19	CF21	13.70	17
TF7	12.67	19	CF22	10.67	21	TF7	13.20	18	CF22	14.36	15
TF8	18.25	10	CF23	24.40	7	TF8	23.57	5	CF23	23.33	7
TF9	14.70	17	PF24	19.99	9	TF9	8.58	26	PF24	16.71	11
TF10	8.59	23	PF25	15.52	16	TF0	8.77	25	PF25	15.09	13
TF11	6.14	30	EF26	16.04	14	TF11	6.26	30	EF26	18.35	10
SF12	8.05	26	EF27	6.33	29	SF12	14.93	14	EF27	7.63	27
SF13	6.98	28	EF28	16.15	13	SF13	7.38	28	EF28	13.98	16
SF14	7.42	27	SEF29	16.40	11	SF14	9.81	24	SEF29	6.56	29
SF15	9.83	22	SEF30	16.28	12	SF15	15.52	12	SEF30	10.61	23

(TF1-TF11=Technical factors, SF12-SF19=Site factors, CF20-CF23=Commercial factors, PF24, 25=Political factors, EF26-EF28=Environmental factors, SEF29, 30=Socio-Economic factors)

4. Conclusion

The success of any project mostly is determined by the ability of construction team to minimize the risk factors and implementation of the project should be proper. Material labour and equipment resourcing is a major risk often occurs in a project. Basically effective use of resources weighs more in success of project and saves time and cost to a great extent. To minimize the adverse effects of risks, precautions should be taken to reduce those risks before they occur, otherwise their impacts will be severe. For a project to be successful, the following recommendations should be followed:

- Determine the risk that has more probability of occurrence and take measures to minimize or eliminate them before they occur.
- Adopt Safety, rules and regulations in the construction site from initial to final stage of the construction project.
- The material, labour and equipment resourcing being the most probable risk that might arise, effective planning is needed to mitigate the risk before it occurs.
- Durable and sound materials should be used for the construction to avoid defect in the construction and to raise the quality of construction.
- Well trained and experienced workmen should be employed where necessary.

References

[1] XiaohuaJina, GuominZhangb, JunxiaoLiuc, YingbinFenga, JianZuod, "Major Participants in the Construction Industry and Their Approaches to Risks: a Theoretical Framework"-Procedia – Engineering, 182, 2017, pg.314 – 320.

[2] AurelijaPeckienea, AndzelikaKomarovskab, LeonasUstinoviciusc, "Overview of Risk Allocation between Construction Parties"-Procedia- Engineering, 57, 2014, pg.889 – 894.

[3] Alfredo, Larissa Rubio, Sergio Arauzo, "Evaluating risk management practices in construction organizations" –Procedia-Social and Behavioural Sciences, 2014, pg.201-210.

[4] ZvonkoSigmunda, MladenRadujkovi, "Risk Breakdown Structure for construction projects on existing buildings"-Procedia - Social and Behavioral Sciences, 119, 2014, pg.894 – 901.

[5] Olga V. Didkovskayaa, Olga A. Mamayevaa, Marina V. Ilyinaa"Development of cost engineering system in construction"-Procedia – Engineering, 153,2016, pg.131-135.

[6] Jaffar. N, Abdul-Tharim, A. H, Mohd-Kamar, I. F, Lop, N. S." A Literature Review of Ergonomics Risk Factors in Construction Industry" Procedia Engineering 20, 2011, pg.89-97.

[7] AugustinPurnu, Constan, NicoletaBodea," Educational simulation in construction project financial risks Management", Procedia Engineering 123, 2015, pg.449 – 461.

[8] Agnieszka, Dziadosz, MariuszRejment" Risk analysis in construction project - chosen methods", Procedia Engineering 122, 2015.pg. 258 – 265.

[9] EdmundasKazimieras, Zavadskas, ZenonasTurskis," Multi-criteria risk assessment of a construction project", Procedia Computer Science 17, 2013, pg.129 – 133.

[10] Nikhil Bhoir, SomnathMunde, Prasad Birajdar, SagarBharane, GaurangSangle,"Risk management in construction industry-Materials", International journal of research in advent technology(E-ISSN: 2321-9637),2016.