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Risk Management: A Bottom-up Approach to Ascertain Responsibility

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ABSTRACT

Construction is generally aimed at meeting developmental objectives. Improper allocation of risks in construction projects result in poor performance and inefficient resource usage that would undermine the planned development. Allocating risks to a party best able to manage them has been a time-honored “mantra”, based on an assumption that the party best able to manage a specific risk is the party best able to manage that risk throughout all stages of a risk management cycle. However, in practice, different parties may be better equipped to handle specific stages, while some stages may be better managed jointly, especially in the case of complex risks. A survey was conducted to ascertain the perceptions of practitioners in the industry to identify who is better able to manage each stage of the risk management cycle with respect to some specified risks. This paper discusses the conceptual framework involved, the preliminary survey results obtained and their implications and applications.

Keywords: Joint Risk Management, Construction

1. BACKGROUND

The construction industry is known to operate in an adversarial environment which gives rise to problems such as conflicting agendas, wasted resources, poor performance, disputes and disrupted relationships between the stakeholders. To a certain extent, this has resulted from the way the risks were handled traditionally in construction projects. Risks are inherent to construction projects due to the large number of uncertainties; and the contracts which are seen as tools for managing risks (Godfrey, 1996), have traditionally inclined towards managing risks through transferring them. However, this strategy often fails, creating an adversarial

climate leading to disputes, time and cost overruns and poor overall performance (Chan and Kumaraswamy, 1997; McGowal *et. al.*, 1992).

As professed by Latham (1994) risks can be transferred, accepted, managed, minimized or shared but cannot be ignored. In this context, Rahman and Kumaraswamy (2001, 2002) suggest that the main contracting parties should jointly manage unforeseen risks in the post contract stage. However, absence of acceptable risk sharing mechanisms that form a part of the contract is an obstacle in effective joint risk management. Shared risk pricing leading to a target cost that can be adjusted in the course of the contract to accommodate unforeseen risks accompanied by a pain share/gain share arrangement has been the popular sharing mechanism in projects where risks are jointly managed. However, price adjustments for risks unforeseen at the time of the contract may not be mutually acceptable in some situations and a linear painshare / gainshare arrangement assumes the responsibility of different stakeholders to be equal which may not be the case and hence, unfair.

Moreover, allocating risk to a party best able to manage them as compared to joint risk management is still the preferred way in the industry especially with the consultants (Rahman, 2003). It is convenient to assume that a party traditionally seen as best able to manage a certain risk overall is indeed the party, which is best able to manage it through all stages of risk management cycle. This paper hypothesizes that the previous statement is not true and presents a survey instrument which was developed to test the same and to identify the party best able to manage different stages of the risk management cycle with respect to a specified number of risks. The instrument is also designed to quantify the contribution of each stage towards the effective performance of overall risk management cycle for the purpose of developing a risk sharing mechanism in which each stake holder's share is proportional to his responsibility. The preliminary results of a pilot survey are also presented.

2. INTRODUCTION TO RISKS AND RISK MANAGEMENT

This section defines risk management for the purpose of this paper, identifies various stages involved in risk management and structures them so as to form comprehensive and mutually exhaustive processes in a complete risk management cycle. Emphasis is laid on defining and developing the different stages of a risk management cycle because of the necessity to identify the responsible stakeholder for each stage of a risk management cycle and to quantify the contribution of each stage of the cycle, towards achieving a controlled risk environment as it is imperative to define the stages involved in risk management such that they are comprehensive and mutually exhaustive of the processes and steps involved.

According to the Oxford English Dictionary (1989), risk is exposure to mischance or peril whereas the Project Management Body of Knowledge (2000) treats it as an uncertain event or condition that, if it occurs, has a

positive or negative effect on a projects objective. The definition of risk management varies in conjunction with the definition of risk.

According to Lewis *et al*. (1992), risk management involves the identification and assessment of the particular, significant risks which may impair the performance of a specific project and the establishment of policies for dealing with them, whereas PMBOK (2000) defines risk management as the systematic process of identifying, analyzing, and responding to project risk and it includes maximizing the probability and consequences of positive events and minimizing the probability and consequences of adverse events to project objectives.

For the purpose of this paper, the definition of risk is limited to the one that causes negative impact and hence the definition of risk management is limited to the process of dealing with adverse risks, as these pose the toughest hurdles to reaching agreement on sharing strategies and mechanisms. From the definition of risk management by PMBOK (2000), it can be seen that the risk management process involves three stages namely identifying, analyzing and responding. However, risk management, as a cycle of these three stages does not provide a detailed and substantial picture of the steps/stages involved as it consists of a number of sub processes, which themselves can be treated as steps/stages. A more detailed overview of the various stages involved is summarized in Rahman (2003) and is as follows:

"Risk Identification: The process of systematically identifying, categorizing and assessing the initial significance of risks associated with a construction project and documenting their characteristics.

Risk Analysis: The consideration of the sources of different risks; consequences associated with each type of risk or combination of risks and assessment of the impact of risk by various risk measurement techniques.

Risk Evaluation: The process of comparing the level of risk found during the analysis process with previously established criteria.

Risk Response: The process of identifying/developing risk response options and determining actions for treating the risk, targeting enhancing opportunities and reducing threats to project objectives.

Risk Monitoring: The process of keeping track of the identified risks, monitoring residual risks, identifying new risks, ensuring the execution of risk plans, and evaluating their effectiveness in reducing risk with respect to changing circumstances" (Rahman, 2003).

Risk analysis and risk evaluation involve similar and overlapping processes and hence are combined and treated as one stage named risk evaluation in this paper. The risk response stage as seen above clearly consists of two distinct sub steps namely identifying and developing response strategies and actual implementations of the identified responses and hence, these two are treated as distinct and discrete stages in this paper. Moreover, risk knowledge dissemination to all stakeholders, which theoretically plays an important role in the success of achieving a risk-controlled environment, is conspicuously absent as a step/stage in the framework. Hence, this research introduces a new step/stage to account

for knowledge dissemination and this step/stage is positioned between risk response planning and risk response implementation.

Six risk management stages are demarcated in this exercise as: (A) Risk Identification (B) Risk Evaluation (C) Risk Response Planning (D) Risk Knowledge Dissemination (E) Risk Response Implementation and (F) Performance Monitoring. These six step/stages are taken together to form the comprehensive and mutually exhaustive stages of a risk management cycle from initiation to completion. These six risk management stages are used to measure the percentage contribution of each preceding stage towards ideal performance of each succeeding stage in risk management cycle.

3. MEASURING CONTRIBUTION OF EACH STAGE TO THE RM CYCLE AS A WHOLE

In order to measure the contribution of each stage to the risk management cycle as a whole the following assumptions with respect to RM stages delineated above were made: (1) there is no essential overlapping of stages, (2) the stages are mutually exhaustive of all possible stages of risk management cycle and (3) the success of one stage is dependant on satisfactory performance of the previous stages. Based on these assumptions, a survey instrument was developed with two parts. This survey instrument targets experienced professionals in the domain to first evaluate the percentage contribution of each preceding stage towards ideal performance of each succeeding stage in the risk management cycle. The first part of the survey instrument is as shown in Figure 124.1 and is used to measure AB, AC, BC, AD and so on wherein the term AC signifies contribution of stage A (as named in the previous section) towards ideal performance of stage C and similarly for BC, AD and others.

Table 124.1 Contribution Matrix

	A	B	C	D	E	F
A		AB = 100	AC = 60.00	AD = 17.40	AE = 13.33	AF = 15.00
B			BC = 40.00	BD = 20.84	BE = 13.33	BF = 07.50
C				CD = 61.66	CE = 46.67	CF = 07.50
D					DE = 26.67	DF = 07.50
E						EF = 62.50
F						
	-	100	100	100	100	100

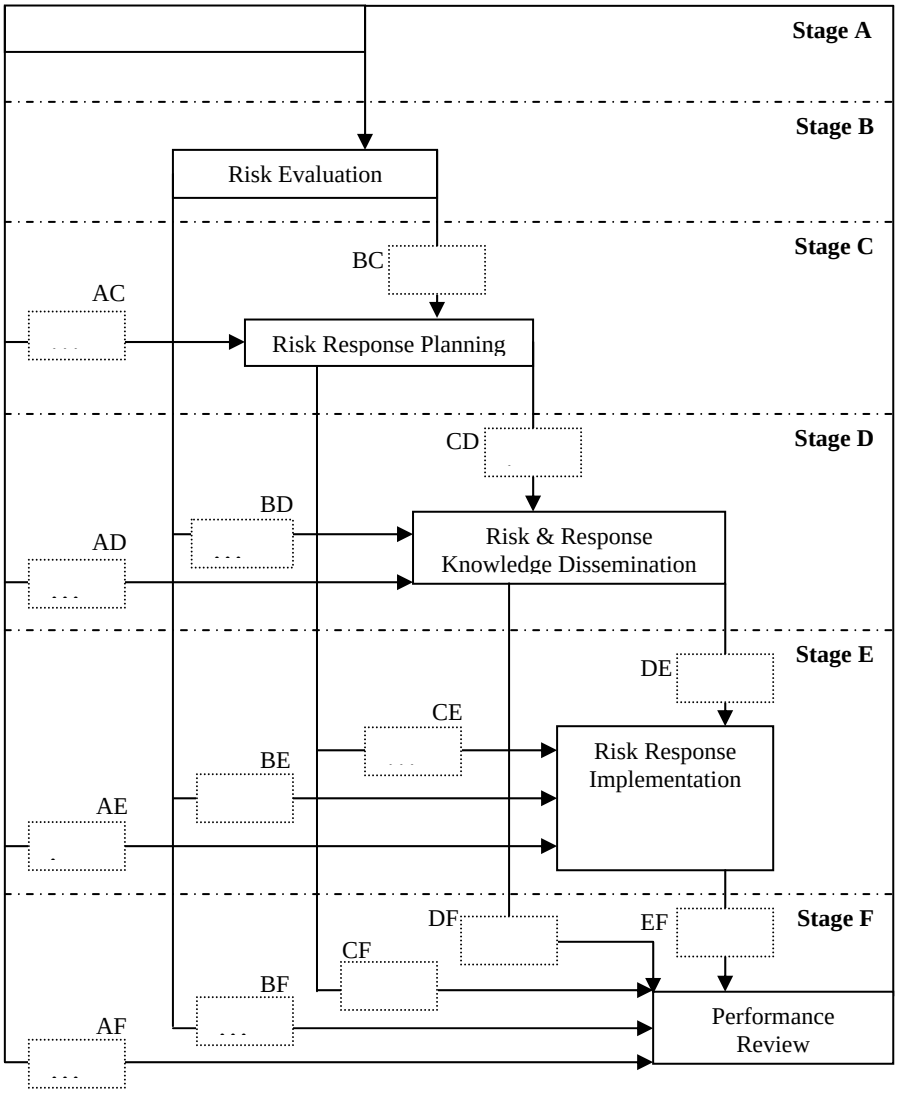

Figure 124.1 Survey instrument format – part 1

The respective mean values as ascertained from a pilot survey with a sample size of 7 are as illustrated in Table 124.1. The respondents were project managers and above with a minimum experience of 3 years and above in construction risk management (two from contractors, two from clients and three from consultants). The values indicate that risk identification and risk response planning contribute the most to a successful risk management cycle.

4. IDENTIFYING THE PARTY BETTER ABLE TO MANAGE EACH STAGE OF RISK MANAGEMENT CYCLE

A set of risks were identified from the literature review and the second part of the survey instrument referred above was developed similar to the sample shown in Table 124.2 but encompassing all stages of the risk management cycle. It is proposed that through this instrument, for each of the specified risks in the 1st column, opinion from experienced professionals in the domain can be extracted as to whether Owner (O) or Contractor (O) or either (C/O) is better placed to manage each stage of risk management cycle or whether it should be managed jointly. In the case of 'jointly' being the preferred answer, they could fill in the perceived contribution of each stakeholder for better managing that risk stage on a scale of 1 to 100.

Table 124.2 Survey Instrument Format – part 2

Type of Risk	Risk Identification					Risk Evaluation				
	O	C	O/C	Joint		O	C	O/C	Joint	
				O	C				O	C
Risk 1										
Risk 2										

Table 124.3 Frequency - Risk Management with respect to Each Stage

Type of Risk	Risk Identification				Risk Evaluation				Risk Response Planning			
	O	C	O/C	Joint	O	C	O/C	Joint	O	C	O/C	Joint
Site Access	-	5	1	-	-	6	-	-		5	1	-
Unforeseen Ground Conditions	-	5	1	-	-	6	-	-	1	4	1	-
Quantity Variations	-	4	-	2	-	3	3	-	1	1	1	3
Weather	-	6	-		-	6	-	-	-	6	-	-
Acts of God/Nature	4	-	-	2	3	1	-	2	2	-	2	2
Inflation	4	-	2	0	3	-	-	3	2	-	-	4

The survey results for the second part of the pilot survey in terms of frequency of respondents with an opinion as to which party is best able to manage the risk management stage for the first of the five risks out of 20 risks evaluated are indicated in the table 124.3. The patterns of results indicate that for some simple risks such as weather, the present approach of allocating it to one single party can achieve the desired results. However for some complex risks, even when an individual stage was allocated to a single party, the same respondent sometimes allocated other stages to different parties suggesting that at least in some cases the present approach of allocating the entire risk management to a single party is flawed. This supports the hypothesis of this paper albeit, only with respect

to complex risks. Further, there are risks for which, a considerable number of respondents opted for joint management across most of the stages.

From these preliminary results, it can be postulated that risk allocation is risk dependent and hence risk sharing mechanisms should also be risk dependent (i.e. risk sharing ratio's need not be the same for all the risks). Further, it is also inferred that allocating different risk management stages to different parties may be helpful in case of unique and complex risks.

5. APPLYING THE EVALUATED VALUES FOR RISK MANAGEMENT

As mentioned earlier, shared risk pricing leading to a target cost coupled with a pain share/gain share arrangement is a popular risk sharing mechanism. An example of a situation which requires sharing of risks can be where a project requires materials which are not locally available and are under import controls, and the project management believes that joint efforts are required to deal with the risks involved with the import of these materials. Further, it can be seen that that a contractor could be best positioned to identify the risks, evaluate them and plan responses but the client is in a better position to implement them because of its stature and his relations with potential suppliers. This being a unique case, the project's overall pain share / gain share ratio may not be satisfactory to deal with the situation and may require a risk specific mechanism. In cases like this, evaluated values from this survey instrument can be used for developing risk specific pain share / gain share arrangements.

Further, to deal with a case like the one discussed above, especially in the case of pain share, only a risk specific pain share / gain share arrangement may not be enough. What happens if one party is able to perform its responsibilities and the other fails and the risk materializes resulting in losses? For example, suppose in the case above, RM stages A, B, C, D and F were allocated to the contractor and stage 'E' was to be taken care of by the Owner; the contractor was successful in taking care of his responsibilities on stage A, B, C and D but the owner failed in stage 'E' thereby derailing not only stage F, but also the overall risk management of that risk resulting in expenses above allowed contingencies.

This case calls for a flexible pain share / gain share arrangement that reflects the success / failure of each party in performing its responsibilities. Evaluated values from the presented survey instrument can support development of flexible pain share/gain share arrangements in the case of different risk management stages being allocated to different parties by mathematical deduction. They can also be treated as base values while negotiating pain share / gain share arrangements. Further, allocating different stages of risk management to different parties is expected to increase risk management interactions between the parties thereby strengthening the relationships and transfer of both risk related and other (more general) knowledge.

7. CONCLUSION

The conceptual framework presented in this paper takes a bottom-up approach (for Jointly managing risks on the basis of choosing parties best able to handle each of the individual stages of risk management and thereby deciding their share of responsibilities in overall risk management). This can be useful for joint risk management, especially in case of unique and complex risks. Although the observations are preliminary, being based on initial 7 responses, the results also justify conducting a further extensive survey to test and increase their reliability.

However, the survey needs to be refined to target few specialized risks based on pilot survey outcomes rather than an expanded list, as extracting responses for an extensive list is seen to be time consuming and complex. In this regard, the survey instrument may be designed to reflect one risk at a time.

8. ACKNOWLEDGEMENTS

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