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TROUBLED PROJECTS IN CONSTRUCTION DUE TO INADEQUATE RISK MANAGMENT

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Abstract - *This thesis will focus on troubled projects in construction due to inadequate and insufficient Risk Management. I chose this topic because my vision is one day to work on troubled turn around projects" sector in a company. The main objective of the present document is not to propose a entirely renewed risk management process, but to attempt a composition of already known processes, at such way that it can be applied by the modern enterprises that deal with the undertaking or/and implementation of constructional work. This thesis will try to explain the main sources for the failure of a construction project due to the lack of risk management in projects, aiming that from now on the risk management matters will be considered more serious and professional. The benefits of risk management are not confined to large or risky projects. The process may be formalized in these circumstances, but it is applicable for all scales of project and procurement activity. It can be applied at all stages in the project cycle, from the earliest assessments of strategy to the supply, operation, maintenance and disposal of individual items, facilities or assets. It has many applications, ranging from the evaluation of alternative activities for budgets and business plans, to the management of cost overruns and delays in projects and programs. Risk management will also provide benefits in better accountability and justification of decisions, by providing a consistent and strong process that supports decision-making. I have examined existing data, results and extensive bibliographies, drew several outcomes and created a checklist for all those who are involved in construction project disasters. My expectation is to be realistic; there is not a magic stick that will turn a setback into a victory. However, a more positive outcome is possible, if we see the threats as opportunities and we try to learn from the trouble project.*

Key Words: Inadequate1, Assesment2, Procurement3, Opportunities4 etc

1. INTRODUCTION

The management of construction projects requires knowledge of modern management as well as understanding of the design and the construction process. Construction projects have a specific set of objectives and constraints such as a required time frame for completion. Also they are a costly undertaking so many people, in an effort to reduce the cost, become penny wise and pound-foolish. Change is inherent in construction work. The majority of the projects fail to meet deadlines, cost and quality targets. This is not too surprising considering that there are not known perfect engineers, any more than there are perfect designs or that the forces of nature behave in a perfectly predictable way. Change cannot be eliminated, but by applying the principles of risk management, engineers are able to improve the effective management of this change. In construction projects, each of the three primary targets of Cost, Time and Performance are likely to be subject to risk and uncertainty. Many people, in order to make change in the project with minimum cost, get the project into trouble. The lack of risk management, even an insufficient risk analysis, can put construction projects in insecurity.

1.1 Need Assesment

In this thesis, stakeholders include main contractors, sub-contractors, suppliers, and Project Managers who undertake construction projects. This thesis will provide stakeholders with:

- *Identification of problems due to insufficient and inadequate risk management*
- *Understanding how inadequate risk management can cause problems in construction project.*
- *How we can prevent these problems*
- *A tool or a set of recommendations to recover from this failure.*

1.2 Objectives

This study will provide evidence to show that sufficient use of risk management, in a construction project will help to ensure that it will succeed. This study will also show that failure to employ risk management strategies can lead to scope creep, schedule delays, and cost overruns.

2. LITERATURE REVIEW

Risk management is one of the most critical factors in project management practices to verify a project is successfully completed. But, what does "risk" mean? In the last publication of Project Management Book (PMI,2004, p. 238) is given the following definition for the risk: "Project risk is an uncertain event or condition that, if it occurs, has a positive or a negative effect on at least one project objective, such as time, cost, quality". Kaplan (1997, p.410) expressed risk "as a mathematical combination of an accident's event probability of occurrence and the consequence of that event, should it occur". Having defined the meaning of risk, the next step is to

determine the meaning of Risk Management process. Risk Management process is a formal process, via which we can achieve identification, analysis and response to risks, through out the life cycle of a project, in order to obtain the optimum degree of risk elimination, mitigation and control. Thus, risk management is in direct relation to the success completion of a project. There is a detailed and widely expressed literature about accepted risk management process. A simple, common and systematic approach to risk management, has three basic stages:

i. Risk Identification – determining the types of risks, identify, and assess the potential risks in the project.
ii. Risk Quantification – the probabilistic characteristics and the degree of the impacts for their impacts.
iii. Risk Response and Development Control – defining opportunities for managing changes in risk during the project life cycle.

Risks and uncertainties are handled everyday on a construction project. A dynamic risk is a risk where there is a possibility to gain something in the end, whereas a static risk has only losses in the outcomes. (Flanagan and Norman, 1993). From all the above, we can consider that in the early stage of a project, there is a high degree of uncertainty, which decreases when we have a high degree of background knowledge. It is however essential to mention that a Project Manager should always be aware both of random and epistemic uncertainty, because they both have great impact in the project outcome.

An epistemic risk or uncertainty is due to lack of knowledge about the behavior of the system. The epistemic uncertainty can, in principle, be eliminated by sufficient study and,therefore, expert judgments may be useful in its reduction (Oakley and O' Hagan, 2003, p.123). An epistemic uncertainty is thus an "unknown event from an unknown set of possible outcomes" (Hillson, 2003, p.88). Another and perhaps less complex explanation can be found in the philosophical view of decision theory (Hansson, 1994), which mentions that risk is somewhat calculable, since it has to do with probabilities; whereas uncertainty has no previous history relate to probabilities.

It is generally known that those within the construction industry are continuously faced with a variety of unknown, unexpected, frequently undesirable and often unpredictable factors (Fong, 1987). Ashley, Kangari and Riggs (Ashley, 1977), (Kangari and Riggs, 1989) have all agreed that these situations are not limited only to the construction industry, but in any commercial organization's profit structure and it is a basic feature of a free enterprise system. The need to manage risks into construction industry is related to all professionals and groups (client groups, design teams, project management team, contractors, etc.) in the construction industry which are concerned with cost, time and quality.

As we have already mentioned, risk management is a procedure to handle the risks in a project and try to mitigate their effects. (Toakley, 1989). According to Dr. Kerzner (Kerzner, 2003) "a risk management strategy must be established early in a project and that risk is continually addressed throughout the project life cycle". The identification of risks at the conceptual phase of a project is very important, not only because it enables project constraints and appropriate costs to be calculated, but also to focus project management attention on how to control and allocate them. (Perry and Hayes, 1986). A high-quality project risk management process must include the following prerequisites (Abrahamson,1973):

- *Fully detailed specification of the project, and all associated risks*
- *a clear perception of risks that being born by each party (client-contractor)*
- *sufficient capability, experience how to handle the risks*
- *motivation to manage risks, which requires a clear accountability,responsibility and authority of each party into the project. Handling risks means rewards.*

According to Loch (Loch, Meyer, Pich, p.103) "Learning in projects is the flexible adjustment of the project approach to the changing environment as it occurs". It is a repeated practice of asking, "What do we know, what do we need to know, and what might we not know that we do not know" (Loch, Meyer, Pich, p.120). The authors define selectionism as running various error trials in parallel. It is most appropriately used when the environment is so uncertain, that a single trial is unlikely to home in on an improper solution. The blend of these two above approaches which depend on project complexity and cost structure, may help us to tackle with the unk unks risks into a project. But because unk unks are new categories of risks, and the above method is still in development, we will avoid covering these risks.

According to Pitz and Wallsten (2000, p. 26) "the knowledge of experts cannot be expected to reduce random uncertainty although their knowledge may be useful in quantifying the uncertainty."

The definition of risk according to Project Management Institute, PMI (PMBOK, 2004) states that risk should consider both the positive and negative effects of a project objective. This is a broad view of risk that includes the terms of threats and opportunities, but is something that can work in theory and fail in practice. Risks and uncertainty could be addressed either as random or epistemic. Random risk means that we can estimate it using probabilities but it still has random outcomes, not predictable. This type or risk can occur because of natural unpredictable variation.

3. RISK IDENTIFICATIONS.

This is the first stage in a risk management process. Many people believe that it is the most important stage in this process, because if you don't know the risk, you cannot react efficiently; meaning, either to take the necessary actions in order to deal sufficiently with the threat, or to exploit the opportunity. Simply speaking, risk identification is trying to identify "causes and effects" (what could happen and what would be next) or the reverse, "effects and causes" (what outcomes muse be avoided or encouraged). The process by which risk identification is accomplished is varied between organizations but usually include one or more of the followings: interviews, brainstorming sessions into risk teams, site visits and a large volume of data from previous experience.

3.1. Internal Risks :

The only source of revenues for the construction contractors is the payment from the owners. When owners delay to pay the contractors, there appears a financial hardship among them. In many cases, mainly of Joint Ventures Company a very critical risk, which affects directly its performance, is the reduction of autonomy and the contribution of under qualified staff. All these factors affect negatively the company and create problems in its operation. As for disagreement among stakeholders, the author refers mainly to the owners. Owners many times intervene improperly in the construction phase of the project; they may require changes due to poor scope of work definition or changes in requirements. All this changes are very dangerous and jeopardize the whole project. If there is distrust among company staff relationship, and especially among the general manager and functional managers, then the project will have problems. The cooperation among all staff in the company is absolutely necessary in order to be efficient, with high performance and all members involved should be allied and not enemies. There is no time and space for personal ambitions, exploiting others. A change in technology is a critical factor for the success of the project. This might occur because of the uniqueness of each project. New technology demands qualified staff. On the other hand, each company exist .mainly for commercial gain, meaning that they are concerned with the completion of the project on time and with minimum cost and not for the use of technology.

3.2. Project-Specific Risk Factors :

A very critical risk factor is the client's problems. We separate this category in two sub-categories: i) problems with cash flow and ii) excessive demands from the client. Concerning the first option, it is the most critical factor for this category of risks. Always, there is the danger of a sudden bankruptcy from the client, so the project should be stopped at the moment. Also, the client may delay to pay, resulting to have serious delays in the schedule of the project. Clients, often impose tight time schedules which are impractical to achieve. Moreover, they try to rush the projects for obvious time and cost reasons.

3.3. External Risks :

The political risk includes threats for war, political volatility, changes in laws and convention, labor strikes and so on. It is considered the most significant risk for this category, because any political dispute and political change can affect the project negatively. Another critical factor is the environmental risks. We refer to the actions of God, events that occur as an outcome of nature and are often called natural phenomena. The common risks under this category include physical damages, destruction of facilities, equipment, material, even labor death. Social risk factors include security problems, different cultures, religion, and folkways. These risks are not so critical but we should respect them.

4. METHODOLOGY

The attitudes of construction organizations towards risks and uncertainties are generally known, little information is available concerning the use of risk management as a systematic tool within the organization. To evaluate attitudes and skills in risk management, a comprehensive multiple-choice questionnaire survey was adopted for this survey. The questionnaire survey was distributed to construction organizations. Sixty questionnaires were sent, and a total of 55 were returned, resulting to a response rate of 92%. From the received questionnaires 44 could be used for analysis.

Respondents	*Number of Respondents*	*Percentage of responses*
Assets developers	*3*	*6,8%*
Architects	*10*	*22,7%*
Structural Engineers	*12*	*27,2%*
Other Consultants	*8*	*18,2%*
General Contractors	*6*	*13,6%*
Financial managers	*5*	*11,4%*
Total	*44*	*100%*

The respondents are recognized experts in their fields with at least 10 years of construction experience. 80% of the respondents had a long-term construction experience of between 15 to 35 years and 90% had completed tertiary education. Almost 70% of the respondents were in the age group between 35 to 55 years old, with the average group being 38 to 48 years.

5. RESULTS

A total of 23 risk management measures were listed in the questionnaire for the risk factors and they were assessed for presents the most significant risk types included in the questionnaire without any specific order. These risk types were based on: a) extensive literature review and b) discussion with the key experts who participated in the survey.

List or results in the survey

Risk Types	Risk Significance			Risk Allocation		
	Not at all	Significant	Important	Owner	Contractor	Shared
Permits and ordinances	15%	64%	21%	76%	14%	10%
Lack of Scope of work definition	28%	32%	40%	73%	18%	9%
Delays in obtaining site access	18%	61%	21%	55%	25%	20%
Labor, material and equipment availability	0%	23%	75%	0%	97%	3%
Labor and equipment low productivity	0%	32%	68%	0%	95%	5%
Defective design	0%	24%	76%	55%	18%	27%
Changes in work	18%	60%	22%	75%	12%	13%
Unforeseen site conditions	8%	80%	12%	24%	75%	1%
Unexpected inclement weather	35%	65%	0%	8%	73%	19%
Quality problems of material	21%	41%	38%	0%	76%	24%
Changes in governments laws and regulations	17%	52%	31%	38%	37%	25%
Labor strikes and disputes	39%	55%	6%	0%	96%	4%
Accidents during construction	30%	64%	6%	0%	90%	10%
Inflation and changes in prices	26%	50%	24%	7%	72%	21%
Contractors' incompetence	8%	21%	71%	78%	11%	11%
Change order negotiations	5%	92%	3%	21%	6%	73%
Delays in third parties	4%	21%	75%	18%	60%	22%
Lack of coordination with subcontractors	6%	23%	71%	0%	94%	6%
Delays in resolving disputes	8%	70%	22%	29%	18%	53%
Delayed payment to contractor	0%	18%	82%	77%	11%	12%
Poor quality of work	8%	42%	50%	0%	87%	13%
Financial failure	0%	12%	88%	7%	21%	72%
War threats and political instability	36%	29%	46%	30%	0%	70%

6. CONCLUSIONS

Guidelines how to recover a project.

Many people have a theory that there are no obstacles in a project, only opportunities. Perhaps the most valuable merit in a troubled project is the chance to learn from it. Unfortunately, people who have been involved in a disaster, prefer to forget it the sooner. This is a terrible waste of experience, because the lessons you'll take can help you to improve your knowledge and can easily help you avoid the next disaster. Any organization who has been involved in a disaster should take a list of lessons learned in the end, including the following parts:

- *The causes.*
- *What was done well?*
- *What was done badly?*
- *What could have been done to prevent the disaster?*
- *What could have been done to improve the results?*
- *How can it be avoided next time?*

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BIOGRAPHIES

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