

## **Risk Management in the Florida Construction Industry**

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### **Abstract**

Construction is a highly risk-prone industry with not a very good track record of coping with risks. The participants in the industry, as a result, have been enduring the agonizing outcomes of failure in the form of unusual delays in project completion, with cost overruns and many times sometimes failing to meet quality standards and operational requirements. Thus, an effective analysis and management of construction associated risks remain a big challenge to the industry practitioners. This paper, via questionnaire survey and in-depth interviews, evaluates the current practices of risk analysis and management adopted by the general contractors in the Florida construction industry and presents the comparison with four other States that are considered to have highly a profitable and modern construction industry. The results reveal that in the Florida construction industry, risk analysis and management techniques are rarely used by the general contractors due to a lack of knowledge coupled with doubts on the suitability of these techniques for the construction industry. It is recommended that formal and informal training of general contractors and construction managers is essential to implement such techniques in Florida. This will lead to improved profitability, reduced conflicts and on time and within budget project completions.

### **Keywords**

Risk analysis, Risk management, Construction, Project management, Contractors

### **1. Introduction**

The construction industry is subjected to more risk and uncertainty than many other industries. The process of taking a project from initial investment appraisal to completion and into use is complex, generally bespoke, and entails time-consuming design and production processes. It requires a multitude of people with different skills and interests and the co-ordination of a wide range of disparate, yet interrelated, activities. Such complexity is further compounded by many uncontrollable external factors (Flanagan and Norman, 1983). The construction industry has a poor reputation in coping with risks, many projects failing to meet deadlines and cost targets. Clients, contractors, the public and others have suffered as a result (Edwards 1995).

Construction risk is generally perceived as events that influence project objectives of cost, time and quality. Some of the risks associated with the construction process are fairly predictable or readily

identifiable; others may be totally unforeseen. Construction risk can be classified in six categories as follows: i) Acts of God, e.g. floods, hurricanes; ii) Physical risks, e.g. labor injuries, fire, damage to equipment; iii) Financial and economical risks, e.g. inflation, unavailability of funds; iv) Political and environmental risks, e.g. changes in rules and regulations, political uncertainty; v) Design-related risks, e.g. defective design, and vi) Construction-related risks, e.g. change orders, labor productivity, etc. (Al-Bahar,1990)

In project management terms, the most serious effects of risk can be summarized as follows:

- failure to keep within the cost estimate
- failure to achieve the required completion date
- failure to achieve the required quality and operational requirements

The purpose of risk analysis and management is to help stakeholders avoid these failures (Thompson and Perry, 1992). Risk analysis helps in estimating potential impacts of risk and in making decisions regarding which risks to retain and which risks to transfer to other parties. Both quantitative and qualitative techniques are available for risk analysis. The quantitative methods rely on probability distribution of risks and may give more accurate results than the qualitative methods, if the available data is strong and reliable. On the other hand, qualitative methods depend on the personal judgment and past experiences of the analyst and the results may vary from person to person. Hence the quantitative methods should be given precedence if both choices are available (Ward and Chapman, 1997).

Risk management may be defined as a process to control the level of risk and to mitigate its effects. It is a systematic approach for identifying, evaluating and responding to risks encountered in a project (Nummedal et al., 1996). There are four distinct ways of responding to risks in a construction project, which are: i) Risk elimination (e.g. by placing a very high bid), ii) Risk transfer (e.g. hiring subcontractors), iii) Risk retention (e.g. via insurance) and iv) Risk reduction (e.g. training staff about risk perception and its management). Details about these methods can be found in the references (Kelly, 1996; Thompson and Perry, 1992; Carter and Doherty, 1974).

## **2. Research Significance and Objectives**

The effect of not delivering a project according to its predetermined specifications, within budget and on time can be disastrous to all the parties concerned. Therefore, risk management is fundamental to the success of a construction project. The aim of this study is to evaluate the effectiveness of different risk management practices used by the Florida general contractors. The comparison is made with the general contractors in Georgia (GA), North Carolina (NC), Illinois (IL) and New York (NY), as these states are considered to have remarkably profitable and modernized construction industries (US construction statistics, 2000). The thrust of this study is to find out the most suitable way of managing the construction risks in Florida to ensure on time and within budget project completions, reduced conflicts and improved profitability.

## **3. Methodology**

Data for this research was collected by administering a questionnaire survey. Target group was medium-to-large scale construction companies in Florida (FL), Georgia (GA), North Carolina (NC), Illinois (IL) and New York (NY). The annual revenue of each company is \$80 million or more. The companies were selected from the Contractor's list published by the Associated General Contractors (AGC) of America (Associated General Contractors, 2000). The questionnaire contained 25 questions grouped into 4 separate sections: i) background information to elicit information about the respondent and the company

itself; ii) identification of critical risks and their impact on cost, time and quality; iii) company strategies to handle identified risks; and iv) awareness about the availability of current risk analysis and response techniques.

This was followed by structured interviews (through telephone, e-mail) with professionals in the selected companies. The purpose was to gather further comments, elaboration and explanation of the results of the questionnaire survey. Based on all the gathered information, quantitative analysis was performed and the results are discussed in the following sections. It is important to note that the results of the section (ii) of the questionnaire are beyond the scope of this paper and will be presented in a separate paper.

## 4. Analysis of Results and Discussion

### 4.1 Questionnaire response rate

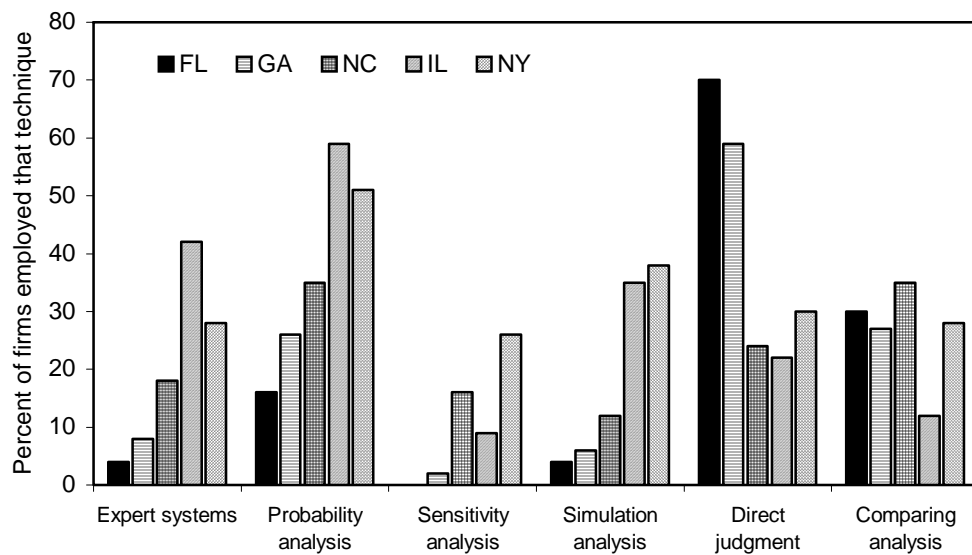
The questionnaires were completed by top management in the organizations (mainly directors and partners) and almost all of them (more than 90%) had over 10 years of construction experience. On the basis of their position, education, work experience and professional background, it can be inferred that the respondents have adequate knowledge of the activities associated with construction. The response rate for completed questionnaires is shown in Table 1.

**Table 1: Breakdown of Responses**

State	FL	GA	NC	IL	NY
<b>No. of participating companies</b>	100	50	50	50	50
<b>No. of companies that responded</b>	34	14	17	15	13
<b>Response rate (%)</b>	34	28	34	30	26

### 4.2 Evaluation of Risk Analysis Techniques

Based on the results of questionnaire survey, the top six risk analysis techniques employed by most of the companies (around 85%) in the selected states are summarized in Figure 1.



**Figure 1: Response from Selected States about Different Risk Analysis Techniques**

The results indicate that the majority of companies (over 70%) in Florida depend on intuition/judgment/experience to manage risks involved in construction. The computer-based techniques are not really used and in fact, most of the companies (around 81%) are even not aware of these techniques. However, the situation is reverse in North Carolina, Illinois and New York where most of the companies (over 80%) rely more on computational methods and hence has good track record in managing the risks.

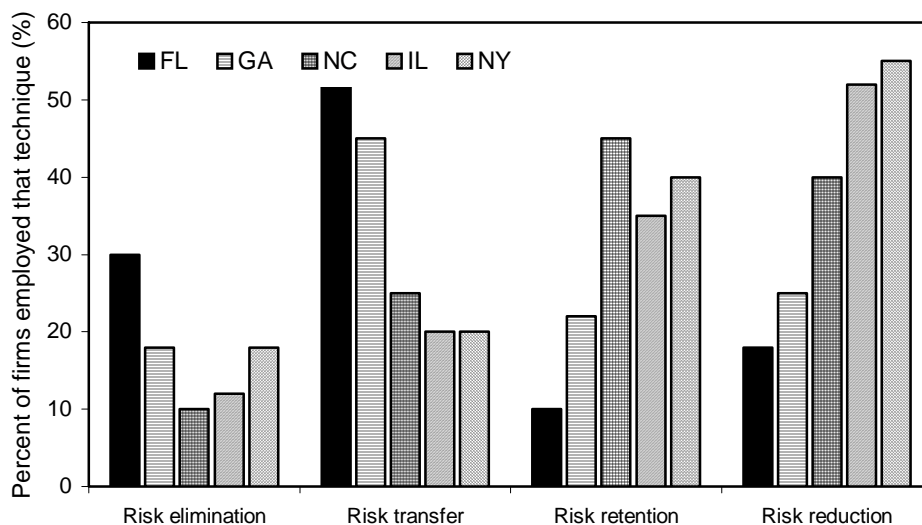
The respondents were asked in the structured interviews, after analyzing the questionnaire responses, for the reasons why some of these techniques are not used in their firms. The reasons provided by the companies in Florida are listed below. The responses from the other states are not shown here, as this paper is specific to the Florida construction industry.

1. Lack of familiarity with risk management techniques.
2. The degree of sophistication involved in the techniques is unwarranted if compared with project size.
3. Doubts whether these techniques are applicable to the construction industry.
4. The majority of risks are contractual or construction-process related, and are fairly subjective, hence they are better dealt with based on experience from previous contracts.
5. Risk analysis of construction projects is seldom formally requested by clients. They expect project management practice to manage risks.
6. Risk management techniques require availability of sound data, which is difficult to collect to ensure confidence.

Lack of familiarity featured prominently amongst the reasons provided by the respondents for non-use of formal risk analysis techniques in Florida. This is followed by the claim that the amount of calculations involved using the techniques are unnecessary in order to meet the project objectives of cost, time and quality. Lack of confidence on the applicability of these techniques was found as another important reason. The comments are not particularly unexpected considering the lack of formal training in risk analysis and management techniques by most of the respondents in Florida.

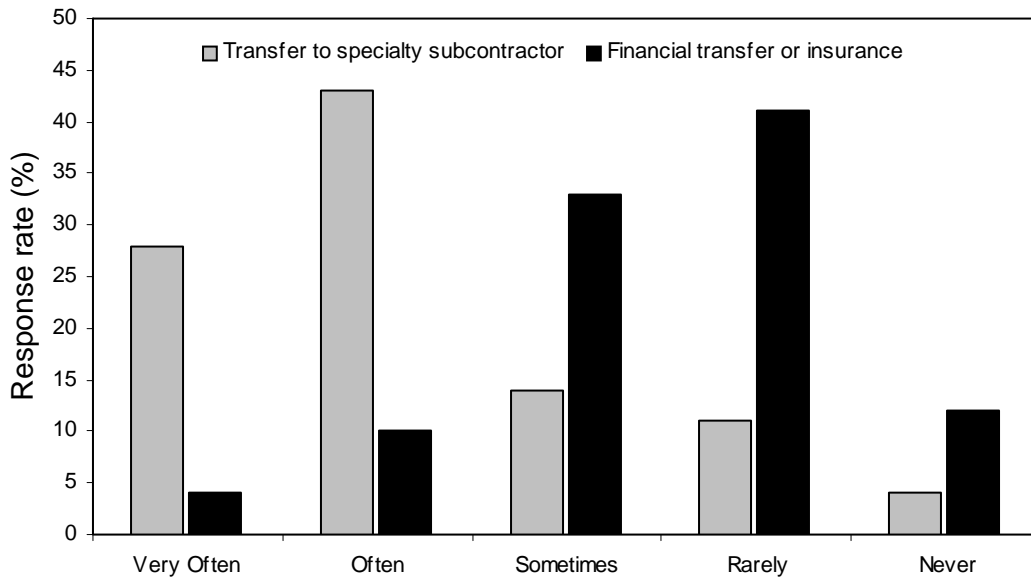
### 4.3 Evaluation of Risk Response Practices

In the questionnaire, the respondents were asked which risk response method(s), their respective companies employed. The responses to the four principal methods, i.e. elimination, transfer, retention and reduction, are summarized in Figure 2.



**Figure 2: Response from selected states about different risk response techniques**

The results reveal that risk elimination and risk transfer are the two most favorite risk response methods employed by the general contractors in Florida, with a total response rate of 85%. On the basis of structured interviews, it was found that when these companies try to eliminate risks, they do so either by not bidding for a job, or by bidding at a very high price. Risk transfer was chosen by over 55% of the respondents in Florida as their risk management strategy. Hence, in the interviews the frequency of risk transfer, either to a specialty subcontractor or through financial means such as insurance was investigated. The results are shown in Figure 3. The general contractors in the Florida construction industry use both methods but favors transferring the risk to a specialty sub-contractor when the expected loss is higher. Although, it is generally recognized that risk should be transferred to the party that is in the best position to deal with, the situation where a general/prime contractor tries to transfer all risks involved in a project may point towards lack of innovation. The interviews with the respondents further revealed that this situation leads to low productivity, poor quality and project delays.



**Figure 3: Amount of use of the two methods of risk transfer in Florida**

The risk retention and risk reduction were found to be the most applicable techniques in North Carolina (NC), Illinois (IL) and New York (NY). This is not surprising as most of the construction companies in these states are utilizing the latest computational tools like Monto Carlo simulation, Expert systems etc., for analyzing the risks and hence are able to retain and reduce the risks by themselves. The construction industry in Georgia was found to be comparable with Florida in terms of risk management techniques and technology.

## 5. Conclusions

The formal risk analysis and management techniques are rarely used by the Florida construction industry due to the lack of knowledge and expertise. The industry is also skeptical about the suitability of these techniques to construction. In most situations, the contractors and consultants perceive risk based on their experience and judgment. The risk elimination and risk transfer to a specialty sub-contractor were found to be the most favored method of risk management in Florida. However, it was suggested by the respondents that these practices lead to low productivity, poor quality and project delays.

## 6. Recommendations

It is apparent from the study that most prime contractors and construction managers in the Florida construction industry (over 81%) do not know much about the formal risk management techniques. So it would be appropriate to develop some sort of formal and/or informal education and training modules. Formal education could be graduate studies in construction project management. Informal education and training could take the form of career development programs (like risk management awareness program) organized by academic institutions or professional organizations such as the American Society of Civil Engineers (ASCE) or Associated General Contractors of America (AGC). It should not be expected that this would be an immediate solution, but it will be a move in the right direction that could bring long-term benefits.

As a suggestion to further study, an overall generic risk management model can be developed for the Florida construction industry, which would help both prime and sub contractors to correctly identify and classify the risk elements as being either controllable or uncontrollable, measure their impacts and probabilities of occurrence. The model could help decide whether to avoid risk completely, retain it and/or try to reduce its impact by taking preventive steps; or transfer it to a party better suited to handle it. Such a model is expected to result in improved profitability and competitiveness for both the prime and the sub contractors.

## 7. Acknowledgement

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