



## Risk Management in Construction Industry

### KEYWORDS

Risk, Risk analysis, construction industry and risk associated in it.

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### Introduction

In the design and construction, the risk can be described as a systematic methodology and continuous process in which events that may significantly affect the final product can identify, quantify, model, manage and monitor. This tool is especially useful as a method of governance and project planning, because the construction is inherent risk, the risk mitigation methods are applied to operations cost, schedule, performance / quality, safety, and business projects, increases especially in the risk with the size of the project. Suitable methods of risk management ultimately measure the degree of confidence in the project continuously, and allow the introduction of corrective measures, monetary and schedule contingency float to minimize the project losses and increase the likelihood that the project was completed on schedule and within the budget.

The application of risk management procedures in construction can give potential "problem" and possibilities, where the effort and money early in the design and construction phases are paid to the vulnerability, insurance early visibility, business or mission reduced. interruption, and states identify early risks ensures that the design performance and the team focuses on the critical areas, focusing on the actions and resources of projects where there is a high risk of exposure, or when the greatest time savings / cost can be made through re-engineering and agile project management. The goal is to proactively manage projects, where problems are reduced as they are identified, unlike the traditional approach of building, waiting to develop critical problems and then implements an immediate response (and usually expensive) than the impact can be limited to the project, but probably not to avoid losses. More effective response early risk over time, the risk management of projects is a historical profile of risks based on knowledge and experience, which will build. Better management of future projects. Risk management is an organized method of identifying and measuring risk and then developing, selecting, implementing and managing options for addressing risks. There are several types of risk that an owner should consider as part of risk management methodology. These include:

- Schedule risk
- Cost risk
- Technical feasibility
- Risk of technical obsolescence
- Dependencies between a new project and other projects
- Physical events beyond direct control

Risk management aims to identify and ultimately control possible future events and proactively rather than be reactive. To be effective, the management of risks based on the tools and techniques that help predict the likelihood of future events, the effects of these future events and methods to address. These future events Risk management is the responsibility of everyone involved in a project.

### Tools and Techniques

With attention to detail and execution of expenditure and a

calendar control will help in the analysis and management of risks. However, one area that deserves closer scrutiny is the use of range estimating as a risk analysis tool. Range calculation can be made by selecting the 20 percent of the articles in an estimate that 80 percent of the costs involved in developing a set for each of the 20 percent and by a simple process a Quite simply the addition of the low and high range.

A more sophisticated approach can take the same 20 percent of the products, set the range, and then one of several software packages available to perform a Monte Carlo simulation and produce risk. This approach would be a more accurate projection of the high and low logic levels involved giving drivers at 20 percent. A sensitivity analysis can also prepare key risk parameters vary.

Finally, it is possible to have a complete package that includes risk analysis estimating and preparation of a risk that unforeseen confidence sets use estimates quantities. This approach can solve unforeseen, not only for individual projects, but for the entire program.

Monte Carlo or risk analysis is used to establish a baseline or a baseline change during budget formulation. The contingency plan developed based on the Monte Carlo analyzes must be within the ranges presented contingency reserve previous fall.

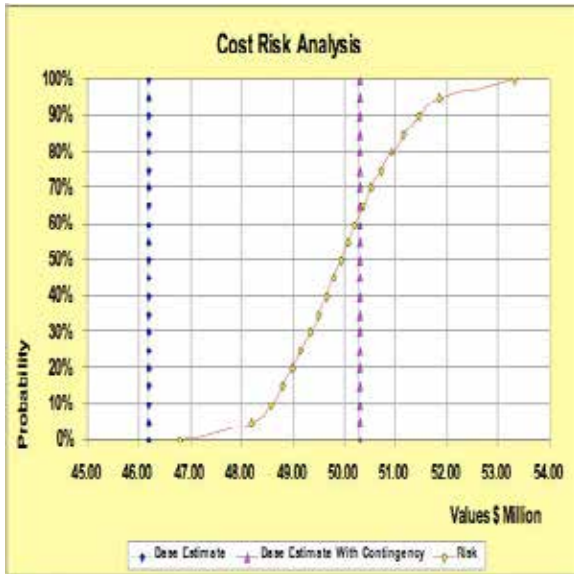
Monte Carlo analysis and other risk assessment techniques use a similar methodology to obtain. Estimates unforeseen There are several software packages both public and trade. The evaluator must estimate or tasks divided into phases and accuracy of cost data to evaluate each step separately. After data entry project and checked, the computer calculates various contingencies embedment of the entire project based on the probability of the project. The random number generator is well known in the estimation accuracy. Once the iterations of the program (usually 1000) has been completed an overall contingency plan for the project with some precision.

The application of such quantitative risk exposure makes the construction project can be modeled, and quantifies the probability of occurrence and potential impact of the identified risks. The results can be used to create a realistic representation of produce. Graphics s-curve shape complete uncertainty and project risk Referring to s-curve figure below as an example, an unexpected amount of approximately \$ 4,000,000 represents 65% confidence in the achievement of project costs. For 80% confidence, the contingency should be such that the total cost of the project is \$ 51 million increase.

### Sample project cost s-curve

Risk with probabilistic modeling used the event to the project based on an estimate of 10-20% a quantified amount, typically in the range of 3-8% reduction. As the project progresses, and the degree of confidence in the higher cost of

the project, the early release of contingency amounts are reached and the money can be spent elsewhere.



**Risk Mitigation and Monitoring**

Risk and the development of appropriate response actions is often the weakest part of the risk management process - the ongoing management and monitoring of the risks identified, and the addition of new risks for the model, which requires monitoring constant.

When risk management, there are several risk strategy options to consider. The risks can be avoided completely (usually by eliminating the cause or root), transferred to another party (through contracts or insurance), or exposure can be reduced (for planned action steps) to the risk. Risk taking should be considered only as a last resort and should only be used for items that cannot be addressed. The other strategy

For each element of risk, an objective set of achievable risk reduction and proactive steps or action items identified that the goal can be achieved. Mitigation measures must be appropriate, effective and cost. The development of these steps should encourage problem solving and innovative solutions, with the objective of avoiding the risks or reducing their impact as much as possible. When discussing action items, it is important to remember that interpretation of each risk will differ from person to person, with the recommended course of action varying according to the person or organization's perceptions of project management, objectives, environment, experience, and risk tolerance level. Similarly, opportunities can be discussed, and steps or action items developed which can increase their probability of occurrence or their level of impact.

In addition to creating action items for the risk, the risk manager may want to ask the following questions:

- What is the root cause or trigger for this risk?
- Does this risk have an impact on business, or just on the project?
- How will we know when the risk has occurred?
- What will happen if the risk occurs?
- How are we currently handling this risk?
- What steps can we take to better manage or mitigate this risk?
- What should we do if we fail to manage this risk?

The risk assessment sheet (RAS) or risk registration, the place all information is known about the risks of taking. The RAS also be managed in a database such as MS Access.

**Risk Assessment Sheet sample with action**

Risk management is a continuous and iterative process that must be performed. Throughout the lifecycle of the project any risk manager to its risks on a monthly or more frequently revise and update the risk assessment sheets, but just keep in mind that there has been no change.

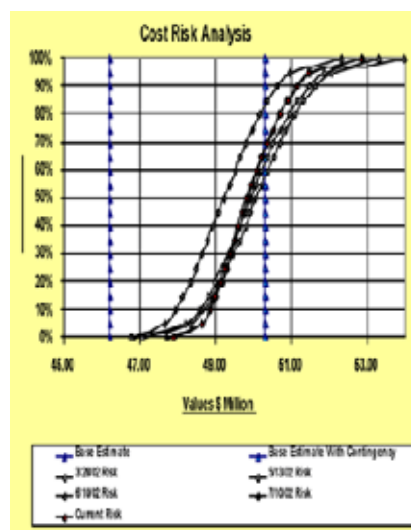


**The risk management cycle**

The risk management process or program is usually driven by a single person, the risks of the project manager, in consultation with the project manager or other high-level control. Individual responsibility of the risks can be assigned so that any risks to your own manager. Updates to risk managers should be collected periodically by the risk manager of the project, and added to the model.

Risk communication and knowledge should occur regularly as part of normal project meetings to dial. Changes in Existing Risk probability of the risk may increase or decrease as the time and cost impact. Changes in items like appointments estimate or actual cost date equipment must also be updated in the model. If the actions are executed and the original risks are reduced, "downside risks" extras may arise, which must be added to the model. Because the design and construction progress, new risks are also identified. Changes in the consolidation perimeter also be accommodated in the risk model, by analyzing their overall impact on the project results. The steps of identifying, quantifying the management model should consider all new risks, secondary risks, and changes in the project scope.

The nature of the construction is such that, as time passes, the range of minimum and maximum values that are expected is narrower and increases reliability in the most likely value, modeled for each element of risk. This ensures that the curve-s project to straighten and move right or left as the exposure increases or decreases the location. The project risk manager should periodically review and update the risk model, and again the risk simulation.



Sample project cost s-curve after several iterations

As the project risk is being monitored, the data and trends can be collected and compared against the baseline risk assessment. From these trends, progress can be measured and "lessons learned" can be documented. The information can also be stored as historic risk data for future projects.

### Evaluating and managing the risks that you face

Almost everything we do in today's business world involves a risk of some kind: customer habits change, new competitors appear, factors outside your control could delay your project. But formal risk analysis and risk management can help you to assess these risks and decide what actions to take to minimize disruptions to your plans. They will also help you to decide whether the strategies you could use to control risk are cost-effective.

### How to Use the Tool:

Here we define risk as 'the perceived extent of possible loss'. Different people will have different views of the impact of a particular risk – what may be a small risk for one person may destroy the livelihood of someone else.

One way of putting figures to risk is to calculate a value for it as:

$$\text{risk} = \text{probability of event} \times \text{cost of event}$$

Doing this allows you to compare risks objectively. We use this approach formally in decision making with Decision Trees.

### To carry out a risk analysis, follow these steps:

#### 1. Identify Threats:

The first stage of a risk analysis is to identify threats facing you. Threats may be:

- Human – from individuals or organizations, illness, death, etc.
  - Operational – from disruption to supplies and operations, loss of access to essential assets, failures in distribution, etc.
  - Reputational – from loss of business partner or employee confidence, or damage to reputation in the market.
  - Procedural – from failures of accountability, internal systems and controls, organization, fraud, etc.
  - Project – risks of cost over-runs, jobs taking too long, of insufficient product or service quality, etc.
  - Financial – from business failure, stock market, interest rates, unemployment, etc.
  - Technical – from advances in technology, technical failure, etc.
  - Natural – threats from weather, natural disaster, accident, disease, etc.
  - Political – from changes in tax regimes, public opinion, government policy, foreign influence, etc.
  - Others
- This analysis of threat is important because it is so easy to overlook important threats. One way of trying to capture them all is to use a number of different approaches:
- Firstly, run through a list such as the one above, to see if any apply.
  - Secondly, think through the systems, organizations or structures you operate, and analyze risks to any part of those.
  - See if you can see any vulnerability within these systems or structures.
  - Ask other people, who might have different perspectives.

#### 2. Estimate Risk:

Once you have identified the threats you face, the next step is to work out the likelihood of the threat being realized and to assess its impact.

One approach to this is to make your best estimate of the probability of the event occurring, and to multiply this by the amount it will cost you to set things right if it happens. This gives you a value for the risk.

### 3. Manage Risk:

Once you have worked out the value of risks you face, you can start to look at ways of managing them. When you are doing this, it is important to choose cost effective approaches – in most cases, there is no point in spending more to eliminating a risk than the cost of the event if it occurs. Often, it may be better to accept the risk than to use excessive resources to eliminate it.

#### Risk may be managed in a number of ways:

##### • By using existing assets:

Here existing resources can be used to counter risk. This may involve improvements to existing methods and systems, changes in responsibilities, improvements to accountability and internal controls, etc.

##### • By contingency planning:

You may decide to accept a risk, but choose to develop a plan to minimize its effects if it happens. A good contingency plan will allow you to take action immediately, with the minimum of project control if you find yourself in a crisis management situation. Contingency plans also form a key part of Business Continuity Planning (BCP) or Business Continuity management (BCM).

##### • By investing in new resources:

Your risk analysis should give you the basis for deciding whether to bring in additional resources to counter the risk. This can also include insuring the risk: Here you pay someone else to carry part of the risk – this is particularly important where the risk is so great as to threaten you or your organization's solvency.

### 4. Review:

Once you have carried out a risk analysis and management exercise, it may be worth carrying out regular reviews. These might involve formal reviews of the risk analysis, or may involve testing systems and plans appropriately.

### Conclusion

Risk management is a proactive management tool used for projects to reduce the sensitivity losses in the course of the action, allowing an audit trail of changes. The process focuses on reducing the vulnerability of project resources, early visibility of potential problem areas and the creation of mitigation measures.

A good risk management should involve the entire project, including the design, engineering, business, contracts, finance, purchasing, estimating and project management. It is an ongoing process, an endless cycle and the process of identification, measurement, modeling, iterative management and monitoring. The analysis may involve risks, estimates and calendar entries, new risks, secondary risks, changes in the scope of consolidation, change orders and actual costs for a graphical representation of the changing nature of the project contingencies time.

As mentioned above, the risk management probabilistic models are used for the event of the project from an estimate of 10-20% reduced to a value quantitatively determined, typically in the range of 3-8%. As the project progresses, and the degree of confidence in the higher cost of the project, the early release of contingency amounts are reached and the money can be spent elsewhere.

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