RISK MANAGEMENT

Risk management is probably the most difficult aspect of project management. A project manager must be able to recognize and identify the root causes of risks and to trace these causes through the project to their consequences. The use of risk management from the early stages of a project, where major decisions such as choice of alignment and selection of construction methods can be influenced, is essential. The benefits of the risk management process include identifying and analyzing risks, and improvement of construction project management processes and effective use of resources.

A typical risk management process includes the following key steps;

- Risk identification
- Risk assessment
- Risk response

Risk identification:

Risk identification is the first and perhaps the most important step in the risk management process, as it attempts to identify the source and type of risks. It includes the recognition of potential risk event conditions in the construction project and the clarification of risk responsibilities. Risk identification develops the basis for the next steps: analysis and control of risk management. Corrects risk identification ensures risk management effectiveness.

Risk assessment:

Generally two broad categories, namely, qualitative and quantitative analysis are distinguished in risk assessment. A qualitative analysis allows the key risk factors to be identified. Risk factors may be identified through a data-driven (quantitative) methodology or qualitative process such as interviews, brainstorming and checklists. It is considered as an evaluation process which involves description of each risk and its impacts or the subjective labelling of risk (high/medium/low) in terms of both risk impact and probability of its occurrence. Qualitative risk analysis assesses the impact and likelihood of the identified risks and develops prioritized lists of the risks for further analysis or direct mitigation.

Quantitative analysis involves more sophisticated techniques and methods to investigate and analyze construction project risks. Quantitative risk analysis attempts to estimate the frequency of risks and the magnitude of their consequences by different methods such as the decision tree analysis, the cost risk analysis. The application of the

quantitative risk analysis allows the construction project exposure to be modeled, and quantifies the probability of occurrence of the identified risk factors as well as their potential impact.

Risk response:

In the risk response step the action is taken to control the risks analyzed in the first two steps. Responses is often graded in four levels, namely risk retention, risk reduction, risk transfer and risk avoidance.

Risk retention concerns accepting the presence of risk and still conducting business as usual. The reasons for retaining the risk could be that the estimated probability, consequence or the combination of the two is low and at an acceptable level. A good everyday life example is when it comes to the choice of insurance premium. Either one takes a high premium and then gets reduced excess or chooses a lower premium and gets a higher excess. Still, the risk is there and retained.

Risk reduction is about decreasing the probability, the consequences or a combination thereof for a risk to breakout. This could be done in several ways, of which sharing with other parties or taking some action where the probabilities or consequences become reduced is common. One action to reduce risks is through educational training of personnel to increase the awareness about possible risks and to make people think in terms of ‘what if’. Other actions can be to physically reduce the risk by building systems, rails to eliminate falls, sprinklers to eliminate fire and so on. There could also be involvement of a third party as an extra assurance and quality control of projects to ensure that nothing is forgotten or overlooked. A common way to reduce risks at construction sites is through work planning. The work plans consist of timetables and allocation of resources such as staff and equipment.

Transferring the risk to another party is a fairly common way to deal with risks in the construction sector. It is transferred from the client to the contractor through the agreements in the contract, or from the contractor to the sub-contractor. In Design and Build contracts, great risk is on the contractor, since they take the full responsibility for both the design and construction.

Risk avoidance is about refusing to accept a risk. This is either done by simply refusing a project that is too risky to proceed with or by writing exceptional clauses in the tender.

Risk Management in Construction

Many methods are available to reduce high-rise construction risks. They are usually to be followed according to the following hierarchy, in decreasing order of importance and effectiveness:

(a) Elimination of scaffold risks:

- Apartment blocks are fabricated, or cast and cured at ground level, and then picked up
  and stacked one on top of another by cranes.
- Walls are case flat on the ground, and after curing, rotated up into position.

(b) Substitution of risky products or processes by less risky ones:

- Climbing formwork
- Mast climbers, single and double

(c) E

ngineering controls for risk mitigation:

(i) Stopping workers from falling ("Fall prevention"):

- Guardrails and toe-boards at open sides
- Roof brackets and slide guards
- Warning lines (tapes) and barricades

(ii) Stopping workers from hitting the ground and dying ("Passive fall arrest"):

- Lifelines and anchors for fall restraint and fall arrest systems
- Safety nets and air cushions

(d) Administrative controls for risk mitigation:

- Budget for safety management, training, posters, etc.
- Warning signs
- Safe work procedures
- Rotation of workers while doing fatiguing and difficult jobs
- Tagout and lockout signs

(e) Personal Protective Equipment (PPE):

PPE consists of: helmet, goggles, ear-plugs, gloves, safety shoes, gas mask, safety belt, body harness, etc. Belts and harnesses are referred to as "active fall arrest" equipment. The preceding four controls are for the entire workforce, protecting the

workers without their having to do or wear anything individually, but only to follow rules of their proper use.

But PPE is for the individual worker, depending for its effectiveness on the worker individually putting them on, wearing them, maintaining them, and using them every time they are needed, correctly. Because the worker may not use PPE correctly out of ignorance, negligence, carelessness, over-confidence, or oversight, it is relegated to the last position in the hierarchy. While they are essential, they may be only applied to the individual worker and cannot be depended upon as a general risk control method.

Even with all these risk control measures, there will be some residual risks left. These can be controlled and managed only by strict supervision and inspection, to ensure that the controls are implemented, maintained and applied properly, and that the PPE are used by the workers correctly and all the time.