

# To Study on the Risk Management, Risk Treatment Strategies and Insurance in Construction Industries

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**Abstract:** — *This study is concerned with the assessment of risk for major construction activities. Risk has been defined as a measure of the probability, the severity, and the exposure of all hazards of an activity.*

*Risk management is at the core of any business or organization, and construction industry and construction companies are no exception to this. This is central to any business regardless of size, activity, or sector. Construction industries can lose substantial sums of money as a result of failure to identify and evaluate risk in time. Industries may even forego their opportunity to take advantage of potentially beneficial opportunities arising in the course of their activities if risks are not recognized in good time. Risk management is, therefore, as much about looking ahead to identify further opportunities as it is about avoiding or mitigating losses.*

**Key Words**— *Risk management, Risk identification, Risk treatment strategies & Insurance in construction.*

## I. INTRODUCTION

The word “risk” was known in the English language in the 17th century. It is believed that the word was originally a sailor’s term that came from the Spanish and meant “to run into danger or to go against a rock.” The money spent to fund shipments overseas was the first example of risk business in the early days of travel.

Nowadays, there are a variety of definitions for the word risk.

“Risk” is used in many different ways and with many different words, such as “hazard” or “uncertainty.” There is perhaps no consistent use of the word. Every activity we do is, to a degree, characterized by the presence of risk. Risk can be of many kinds: safety risk, social risk, business risk, investment risk, military risk, political risk, etc. The riskier the activity is, the costlier the consequences if the wrong decision is made. Businesses would like to quantify risk for many reasons. Knowing how much risk is involved will help decide if costly measures to reduce the level of risk are justifiable.

Construction insurance is a major method of managing risks in the construction industry. Its primary function is to transfer certain risks from clients, contractors, subcontractors and other parties involved in the construction project to insurers to provide contingent funding in time of difficulty. Construction insurance plays an increasingly important role in guaranteeing the success of projects, with insurers sharing losses resulting from natural disasters and other contingencies.

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However, insurance sometimes doesn’t receive the attention it deserves because practitioners do not have a clear understanding of risk allocation and the strategy of risk management through insurance.

It is often claimed that formal risk management does not begin until the first actual risk assessment has taken place. Risks are rarely ignored when initial plans are made; however, it is very rare to identify all the risks systematically during the initial stages of planning projects. It is well known that managers and their teams generally know what could go wrong and what worthwhile opportunities might occur. Without the benefit of systematic risk analysis, however, it is not always maintain and update it equally; sometimes, when risks are foreseen, they are dismissed on the grounds what ‘it couldn’t happen here’. Thus, through all the phases of a construction project, risk assessment must be adopted as part of a continuous review process. By doing so, the many risks to the business originating out of construction projects can be identified and managed.

The benefits of systematic risk identification and risk management include:

1. More realistic business and project planning.
2. Actions being implemented in time to be effective;
3. Greater certainty of achieving business goals and project opportunities;
4. Appreciation of and readiness to exploit, all beneficial opportunities;
5. Improved loss control;
6. Improved control of project and business costs;
7. Increased flexibility as a result of understanding all options and their associated risks;
8. Greater control over innovation and business development; and
9. Fewer costly surprises through effective and transparent contingency planning.

## II. RISK AND RISK IDENTIFICATION PROCESS

Risk identification is the process of identifying all potential sources of project risks and their likely consequences, besides finding out the cause of those risks. Al-Bahar and Crandall (1990) define risk identification process as ‘the process of systematically and continuously identifying, categorizing, and assessing the initial significance of risks associated with a construction project’.

Some of the methods used for risk identification are—(1) brainstorming, (2) interviews, (3) questionnaires, (4) availing services of specialists, and (5) past experience.

The identification of risks should be done with a positive approach, and here, the objectives should be to identify not only the risks that present threat but also the presence of opportunities coupled with such threats.

The identification of risks should begin early to have maximum impact on the project.

**2.2 Preliminary Checklist**

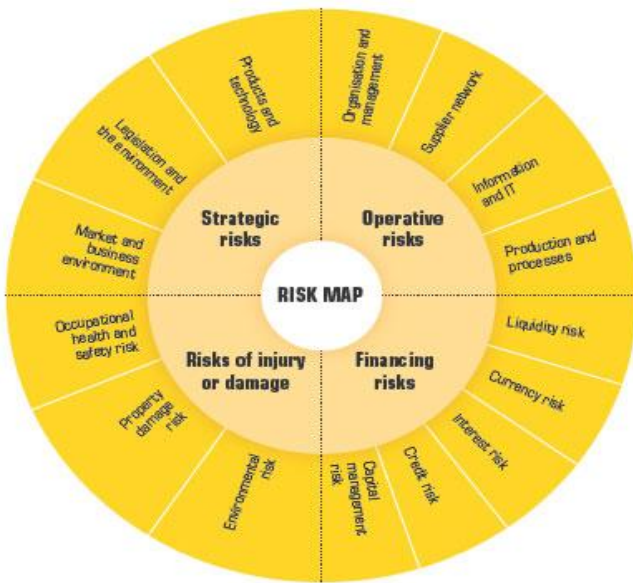
Preparation of a preliminary checklist is the first and the most important step towards identification of risks. The checklist includes all the risks that may affect project quality, performance, productivity and economy of construction. Brainstorming and questionnaire survey along with the past experience help in preparing the preliminary checklist. Some companies have a standard template to prepare the checklist.

**2.3 Risk Events Consequences Scenario**

After the preparation of checklist, the consequences for each of the risks identified are defined. The consequences could be in the form of economic gains or losses, injury to the personnel involved with the work, physical damage, and the cost related savings/overrun. These consequences are tried to be brought to a common scale, preferable in monetary terms.

**2.4 Risk Mapping**

Risk mapping is performed next; Risk map is a two-dimensional plot between probability of occurrence of the uncertainty and its potential severity. Risk map shows Iso-risk curves that are useful for a manager to understand the relative importance of each potential risk.

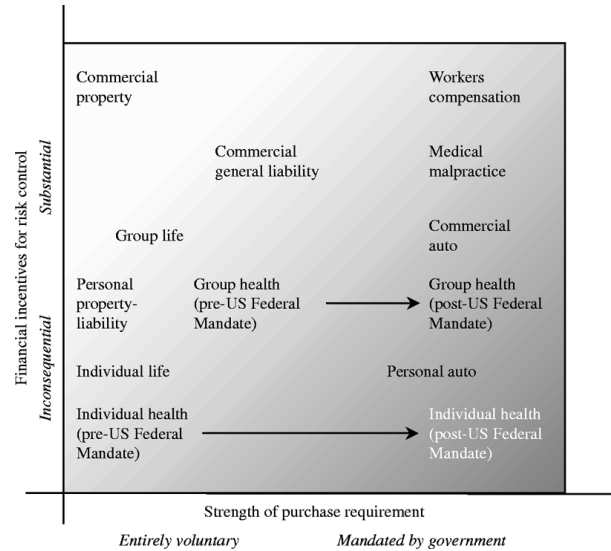


**Figure 2.1 Risk Mapping.**

**2.5 Risk Classification**

After the risk mapping, risks are classified under categories. Through several researchers tried deferent means of classifying risk. The classification is based on the nature and the potential impact of the risk, and has six broad categories;

1. Acts of God such as flood and earthquake
2. Physical damage such as damage to structure, worker, equipment, etc.
3. Financial- and economic-related such as infiltration and exchange-rate fluctuation
4. Political- and environment-related such as changes in laws and regulations and war and civil disorder
5. Design related such as incomplete design scope and defective design.
6. Construction- related such as labour productivity and different site condition.



**Figure 2.2 Risk Classifications.**

**2.6 Risk Category Summary Sheet**

Preparation of risk category summary sheet is the last step in risk identification process. The objective of preparing the summary sheet is to involve all the participants in the project management team. The involvement of all the participants is important, as it would not be prudent to delegate the responsibility of judging the risk of single person. In the risk category summary sheet, each risk event is listed and described, and their interaction is studied collectively by the project management team.

**III. RISK ANALYSES AND EVALUATION PROCESS**

Almost everything we do in today's business world involves a risk of some kind: customer habits change, new competitors appear, and 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:

**3.1. 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.

### 3.2. 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.

### 3.3. 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.

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.

### Risk Value:

Risk analysis allows you to examine the risks that you or your organization faces. It is based on a structured approach to thinking through threats, followed by an evaluation of the probability and cost of events occurring.



Figure 3.1 Risk Value.

Risk analysis forms the basis for risk management and crisis prevention. Here the emphasis is on cost effectiveness. Risk management involves adapting the use of existing resources, contingency planning and good use of new resources.

## IV. RISK TREATMENT STRATEGIES

### 4.1 INTRODUCTION

The particular Risk Action Plans developed and implemented to treat an identified risk will depend on the nature of the project and the nature of the risk. They cannot be specified in detail in guidelines like these. However, some general suggestions can be provided. During the response identification and assessment process, it is often helpful to think about responses in terms of broad risk management strategies:

- Risk prevention (including risk avoidance):
- impact mitigation;
- risk sharing;
- insurance; and
- risk retention.

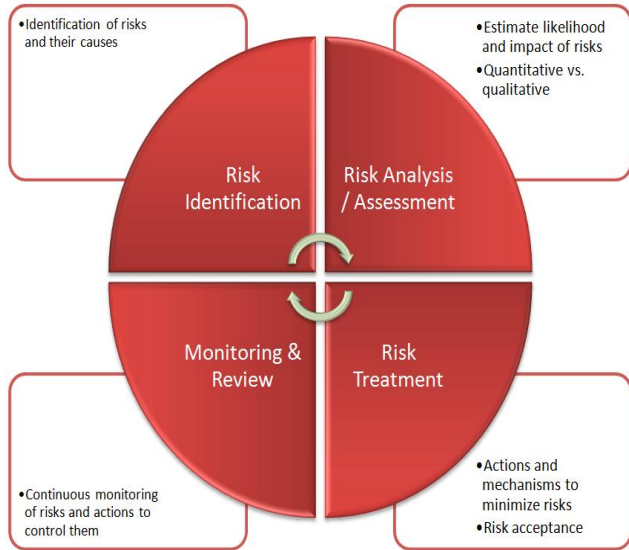
In practice, these categories overlap to some extent. Nevertheless, they provide a useful framework for thinking about how to deal with risks. These categories are in the nature of tactical responses. The organization should determine how they should be combined into its overall strategy, according to the extent to which it is prepared to accept or tolerate risk.



Policy decisions such as this must be made at senior levels in the organization, not left to individual managers.

**IV. 4.2 Risk Treatment**

Identification of Options | Development of Action Plan | Approval of Action Plan | Implementation of Action Plan | Identification of Residual Risks

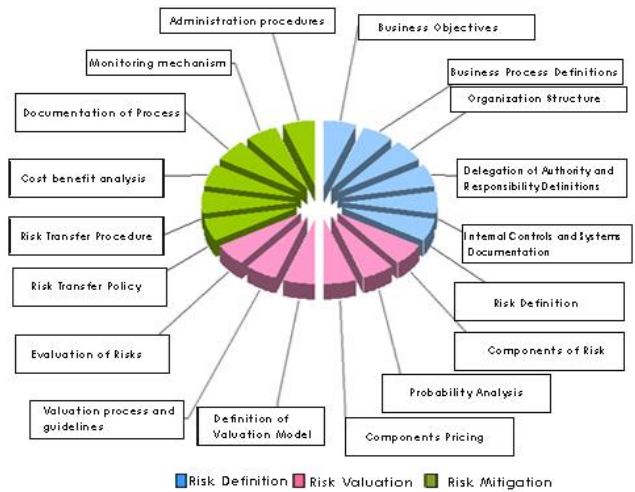


According to its definition, Risk Treatment is the process of selecting and implementing of measures to modify risk. Risk treatment measures can include avoiding, optimizing, transferring or retaining risk. The measures (i.e. security measurements) can be selected out of sets of security measurements that are used within the Information Security Management System (ISMS) of the organization. At this level, security measurements are verbal descriptions of various security functions that are implemented technically (e.g. Software or Hardware components) or organizationally (e.g. established procedures).

**A. 4.3 Identification of Options**

Having identified and evaluated the risks, the next step involves the identification of alternative appropriate actions for managing these risks, the evaluation and assessment of their results or impact and the specification and implementation of treatment plans.

Since identified risks may have varying impact on the organization, not all risks carry the prospect of loss or damage. Opportunities may also arise from the risk identification process, as types of risk with positive impact or outcomes are identified.



Management or treatment options for risks expected to have positive outcome include:

- starting or continuing an activity likely to create or maintain this positive outcome;
- modifying the likelihood of the risk, to increase possible beneficial outcomes;
- trying to manipulate possible consequences, to increase the expected gains;
- sharing the risk with other parties that may contribute by providing additional resources which could increase the likelihood of the opportunity or the expected gains;
- Retaining the residual risk.

Management options for risks having negative outcomes look similar to those for risks with positive ones, although their interpretation and implications are completely different. Such options or alternatives might be:

- to avoid the risk by deciding to stop, postpone, cancel, divert or continue with an activity that may be the cause for that risk;
- to modify the likelihood of the risk trying to reduce or eliminate the likelihood of the negative outcomes;
- to try modifying the consequences in a way that will reduce losses;
- to share the risk with other parties facing the same risk (insurance arrangements and organizational structures such as partnerships and joint ventures can be used to spread responsibility and liability); (of course one should always keep in mind that if a risk is shared in whole or in part, the organization is acquiring a new risk, i.e. the risk that the organization to which the initial risk has been transferred may not manage this risk effectively.)
- to retain the risk or its residual risks;

In general, the cost of managing a risk needs to be compared with the benefits obtained or expected. During this process of cost-benefit judgments, the Risk Management context established in the first process (i.e. Definition of Scope and Framework) should be taken into consideration. It is important to consider all direct and indirect costs and benefits whether tangible or intangible and measured in financial or other terms.

More than one option can be considered and adopted either separately or in combination.

An example is the effective use of support contracts and specific risk treatments followed by appropriate insurance and other means of risk financing.

In the event that available resources (e.g. the budget) for risk treatment are not sufficient, the Risk Management action plan should set the necessary priorities and clearly identify the order in which individual risk treatment actions should be implemented.

#### B. 4.4 Development of Action Plan

Treatment plans are necessary in order to describe how the chosen options will be implemented. The treatment plans should be comprehensive and should provide all necessary information about:

- proposed actions, priorities or time plans,
- resource requirements,
- roles and responsibilities of all parties involved in the proposed actions,
- performance measures,
- Reporting and monitoring requirements.

Action plans should be in line with the values and perceptions of all types of stakeholders (e.g. internal organizational units, outsourcing partner, customers etc.). The better the plans are communicated to the various stakeholders, the easier it will be to obtain the approval of the proposed plans and a commitment to their implementation.

#### C. 4.5 Approval of Action Plan

As with all relevant management processes, initial approval is not sufficient to ensure the effective implementation of the process. Top management support is critical throughout the entire life-cycle of the process. For this reason, it is the responsibility of the Risk Management Process Owner to keep the organization's executive management continuously and properly informed and updated, through comprehensive and regular reporting

#### D. 4.6 Implementation of Action Plan

The Risk Management plan should define how Risk Management is to be conducted throughout the organization. It must be developed in a way that will ensure that Risk Management is embedded in all the organization's important practices and business processes so that it will become relevant, effective and efficient.

More specifically, Risk Management should be embedded in the policy development process, in business and strategic planning, and in change management processes. It is also likely to be embedded in other plans and processes such as those for asset management, audit, business continuity, environmental management, fraud control, human resources, investment and project management.

The Risk Management plan may include specific sections for particular functions, areas, projects, activities or processes. These sections may be separate plans but in all cases they should be consistent with the organization's Risk Management strategy (which includes specific RM policies per risk area or risk category).

The necessary awareness of and commitment to Risk Management at senior management levels throughout the organization is mission critical and should receive close attention by:

- obtaining the active ongoing support of the organization's directors and senior executives for Risk

Management and for the development and implementation of the Risk Management policy and plan;

- appointing a senior manager to lead and sponsor the initiatives;
- Obtaining the involvement of all senior managers in the execution of the Risk Management plan.

The organization's board should define, document and approve its policy for managing risk, *including* objectives and a statement of commitment to Risk Management. The policy may include:

- the objectives and rationale for managing risk;
- the links between the policy and the organization's strategic plans;
- the extent and types of risk the organization will take and the ways it will balance threats and opportunities;
- the processes to be used to manage risk;
- accountabilities for managing particular risks;
- details of the support and expertise available to assist those involved in managing risks;
- a statement on how Risk Management performance will be measured and reported;
- a commitment to the periodic review of the Risk Management system;
- A statement of commitment to the policy by directors and the organization's executive.

Publishing and communicating a policy statement of this type demonstrates to the organization's internal and external environment the commitment of the executive board to Risk Management and clearly specifies roles and accountability on a personal level.

The directors and senior executives must be ultimately responsible for managing risk in the organization. All personnel are responsible for managing risks in their areas of control. This may be facilitated by:

- specifying those accountable for the management of particular risks, for implementing treatment strategies and for the maintenance of controls;
- establishing performance measurement and reporting processes;
- Ensuring appropriate levels of recognition, reward, approval and sanction.

As it becomes apparent, the actual implementation of security measurements for the underlying IT platform is not part of this activity. Rather, the implementation of action plans is concerned with the actions to be performed to reduce the identified risks. The work necessary at the level of the technical implementation of security measures is conducted within the ISMS, that is, outside the Risk Management process.

Last but not least, an important responsibility of the top management is to identify requirements and allocate necessary resources for Risk Management. This should include people and skills, processes and procedures, information systems and databases, money and other resources for specific risk treatment activities. The Risk Management plan should also specify how the Risk Management skills of managers and staff will be developed and maintained.



#### 4.7 Identification of Residual Risks

Residual risk is a risk that remains after Risk Management options have been identified and action plans have been implemented. It also includes all initially unidentified risks as well as all risks previously identified and evaluated but not designated for treatment at that time.

It is important for the organizations management and all other decision makers to be well informed about the nature and extent of the residual risk. For this purpose, residual risks should always be documented and subjected to regular monitor-and-review procedure.

### V. INSURANCE IN CONSTRUCTION INDUSTRIES

In the construction industry, insurance is one of the most important ways to tackle risk. In fact, insurance is considered as a synonym for risk management in the industry. The majority of construction companies rely on insurance policies for different risk scenarios. They purchase a number of insurance policies depending on the project and contractual requirement. While selecting a given type of policy, risk mitigation measures it has under its disposal.

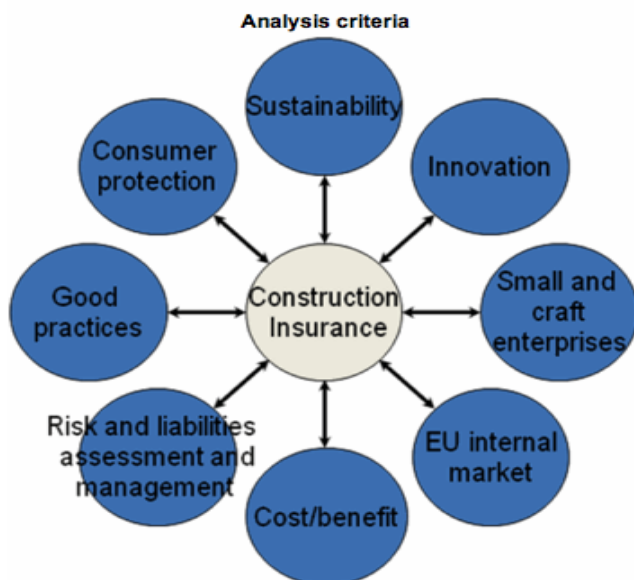


Figure 5.1 Construction Insurance.

Insurance is a contract, a risk transfer mechanism whereby a company (Underwriter) promised to compensate or indemnify another party (Policyholder) upon the payment of reasonable premium to the insurance company to cover the subject-matter of insurance. If you are well conversant with these principles, you will be in a better position in negotiating your insurance needs.

#### 5.1. Insurable interest.

This is the financial or monetary interest that the owner or possessor of property has in the subject-matter of insurance. The mere fact that it might be detrimental to him should a loss occurred because of his financial stake in that assets gives him the ability to insure the property.

#### 5.2. Umbria faded.

It means utmost good faith, this principle stated that the parties to insurance contract must disclose accurately and fully all the facts material to the risk being proposed. That is to say that the insured must make known to the insurer all facts regarding the risk to be insured (Looker Vs Law Union and

Rock 1928). Likewise, the underwriter must highlight and explain the terms, conditions and exceptions of the insurance policy. And the policy must be void of 'small prints'.

#### 5.3. Indemnity.

It stated that following a loss, the insurer should ensure that they placed the insured in the exact financial position he enjoyed prior to the loss (Leopard Vs Excess 1930).

#### 4.4. Contribution.

In a situation where two or more insurers is covering a particular risk, if a loss occurred, the insurers must contribute towards the settlement of the claim in accordance with their ratable proportion.

#### 5.5. Subrogation.

It has often been said that contribution and subrogation are corollary of indemnity, which means that these two principles operates so that indemnity does not fail. Subrogation operates mainly on motor insurance. When an accident occurred involving two or more vehicles, there must be tortfeasor(s) who is responsible for accident. On this basis, the insurer covering the policyholder who was not at fault can recover their outlay from the underwriter of the policyholder who is responsible for the incidence.

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### VI. CONCLUSION

Risk management is an important concept for every construction Industries. A successful industrialist must know how to identify, Risk management is at the core of any business or organization, and construction industry and construction companies are no exception to this. This is central to any business regardless of size, activity, or sector.

1. Risk is Bad / Negative and Risk Management is the responsibility of specialist
2. Risk Management is the responsibility of specialist. All Risks can be transferred
3. All Risks can be transferred. And Better informed , leading to reliable Plans / Schedules & Budgets
4. Better informed, leading to reliable Plans / Schedules & Budgets.
5. Adopting best Practices at all levels.
6. Meaningful assessment of Contingencies.
7. Protect Margins & Avoid Low yield projects.
8. Building data / information for better mgt of future projects.
9. Objective analysis & comparison of alternatives.
10. Identifying responsibility with the Risk Owner.

Construction insurance plays an important role in transferring risks in the construction Industry. The future research can focus on the issues of motives for construction Insurance purchase, special risk considerations, changing environment, interaction to risk Management and alternative risk transfer solutions. They will contribute a better Understanding for both industries, i.e.



the insurance industry and especially the Construction industry because the changing business environment needs the construction Industry to improve its ability to manage construction risks.

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