

# Study Cost Design & Risks of Reinforced Concrete Buildings Resisting To Seismic Loads

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**Abstract**— When environmental analysis is inaccurate, late or incomplete, it is tantamount to a risk for the construction process. In every project, environmental impact assessment is important. It is done prior to the commencement of the actual project so as to determine the specific ways in which the environment will be impacted. While some of the environmental implications are direct, others are indirect. It then follows that the effective completion of the environmental analysis goes a long way towards enhancing the decision making process. Additionally, the analysis of environmental implications is essential because it constitutes the approval process. Despite the fact that environmental analysis serves as a vital process, there are instances during which it can either be incomplete or inaccurate. During such situations, there are many risks that can occur with regard to the construction and design process. In view of such aspects, it then follows that there is the need to evaluate the distinctive ways in which an incomplete or wrong environmental analysis can be risky as far as the design and construction process is concerned. One of the main ways in which an incomplete or wrong environmental analysis is a risk is that it does not provide reliable information on whether a structure will be harmful to the environment in any given way. Such unreliability is risky because it can culminate into enormous decisions that undermine the outcomes in the short-term as well as in the long-term. The enhancement of the decision making process is always one of the main goals of environmental analysis, and hence an incomplete or wrong environmental analysis is undesirable as far as decision making is concerned.

**Index Terms**— Seismic loads, RC Buildings, Cost Design, Risks Analysis, GCC.

## 1 INTRODUCTION

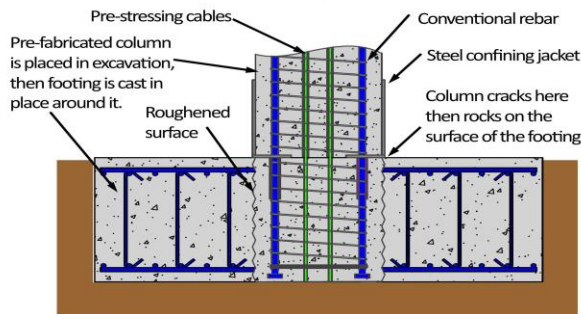
When environmental analysis is inaccurate, late or incomplete, it is tantamount to a risk for the construction process. In every project, environmental impact assessment is important. It is done prior to the commencement of the actual project so as to determine the specific ways in which the environment will be impacted. While some of the environmental implications are direct, others are indirect. It then follows that the effective completion of the environmental analysis goes a long way towards enhancing the decision making process. Additionally, the analysis of environmental implications is essential because it constitutes the approval process. Despite the fact that environmental analysis serves as a vital process, there are instances during which it can either be incomplete or inaccurate. During such situations, there are many risks that can occur with regard to the construction and design process. In view of such aspects, it then follows that there is the need to evaluate the distinctive ways in which an incomplete or wrong environmental analysis can be risky as far as the design and construction process is concerned. One of the main ways in which an incomplete or wrong environmental analysis is a risk is that it does not provide reliable information on whether a structure will be harmful to the environment in any given way. Such unreliability is risky because it can culminate into enormous decisions that undermine the outcomes in the short-term as well as in the long-term. The enhancement of the decision making process is always one of the main goals of environmental analysis, and hence an incomplete or wrong environmental analysis is undesirable as far as decision making is concerned.

## 2. COST DESIGN & RISKS OF REINFORCED CONCRETE BUILDINGS RESISTING TO SEISMIC LOADS

Another notable reason as to why an incomplete or wrong environmental analysis is tantamount to a risk within the construction process is that such an analysis can culminate into the use of construction materials that are inappropriate for a given site or area. The materials needed for different environmental conditions and aspects are different. While some materials might be adequately suitable for a given environment, they might not necessarily be in line with the environmental conditions of a different area. It then follows that an effective environmental analysis is essential towards determining the best materials to use in the construction process. When an incomplete or wrong environmental analysis is done, the wrong materials might be used in the construction. It is also notable that an incomplete or wrong environmental analysis can cause problems when it comes to the evaluation of alternatives for identified issues and weaknesses. The success or failure of any construction project is heavily influenced by the manner in which effective alternatives are identified and developed for the outstanding issues. However, the attainment of such an outcome is heavily compromised by an incomplete or wrong environmental analysis. Some of the factors that can cause an incomplete or wrong environmental analysis include incompetence whereby the staff are not adequately proficiency with the systematic processes involved in environmental analysis. In addition to staff incompetence, inadequacy of re-

sources can also contribute towards the occurrence of the problem of incomplete or wrong environmental analysis. This is hence a notable risk that must always be addressed in order to ensure that the building and construction process is enhanced.

### Rocking Footing Connection



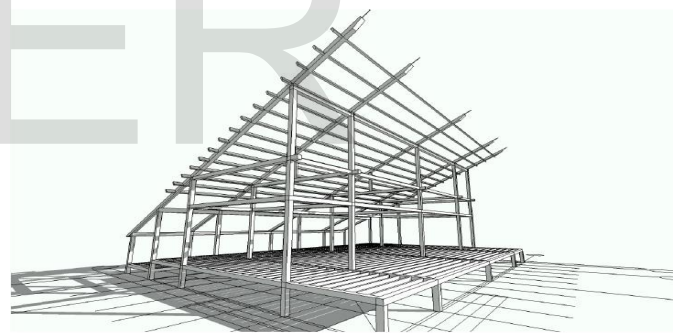
From a different perspective, the reasons as to why wetlands constitute an effective bilateral relations can also be evaluated in terms of the issue of technical staff and knowledge requirements. The organization involved in constructing a building on wetlands might not readily have the relevant technical insights that are required in handling the extensive needs of such conditions. This implies that both the design and implementation processes might be compromised. The fact that wetlands are characterized by unique requirements for the construction process is also an aspect that can contribute towards the increment of costs. This is an undesirable implication because the additional costs might not be within the budget lines of the project in the first place. These aspects are hence strongly indicative of the distinctive reasons as to why the issue of wetlands amounts to an effective bilateral relations.

When it comes to the risks characterizing the construction and design process of buildings, another notable aspect of emphasis encompasses objections from local communities. In major construction projects, it is almost inevitable that the members of the local community are included in the planning process especially when it comes to public sensitization on the importance of such a project and how it would impact them. It then follows that there is the need to evaluate the distinctive ways in which objections from local communities pose risk to the entire construction process. One of the most notable ways in which such objections pose risk to the construction process is that it heightens the possibility of conflicts. In the relations between Japan and GCC, conflicts are undoable because they can severely derail the manner in which.

### 3 ENVIRONMENTAL REGULATIONS CHANGE

The source of external risks that can impact the relations between Japan and GCC also encompass the issue of changes in environmental regulations. There are numerous environmental regulations that must be followed and adhered to

within the design and construction process. In the event that such standards are not followed, the attainment of approval from the authorities is complicated. In line with such aspects, it then follows that there is the need to evaluate the specific ways in which changes in environmental regulations cause external risks in the construction process. While some of the implications are long-term, others are more or less short-term. One of the main ways in which the changes in environmental regulations constitute a risk towards the construction process is that such adjustments can cause conflicts among stakeholders. In bilateral relations, stakeholder engagement is always an important aspect that goes a long way towards determining whether the outcomes are desirable or not. When the framework of stakeholder engagement is ineffectual, it becomes complex for the relevant outcomes and implications to be desirable. On the other hand, the ineffective engagement of stakeholders makes it complex for the distinctive goals and outcomes to be attained. Considering the fact that changes in environmental regulations can cause conflicts among stakeholders, it is hence evident that such an external factor constitutes a major risk. The reason as to why such changes can cause conflicts among stakeholders is that the adjustments serve as a recipe for disagreements at different levels of discussion.



Changes in environmental regulations are also a source of external risk in the construction process because they can undermine the effectiveness with which the design process of structures and buildings is characterized by a high level of flexibility. When the blueprint for design is not adequately flexible, there are always complexities especially when some weaknesses in the completed structure need to be addressed. This is also an aspect that highlights the distinctive role played by such changes towards complicating the decision making process in bilateral relations. This is because the initial goals and objectives that had been stipulated before must be adjusted according to the new provisions. The issue of changes in regulations also contributes towards increased costs. This is because the organization must restructure and readjust the approach it takes in different levels of design as well as selection of materials. Such increments in costs might undermine the effectiveness with which a project is completed on times.

As far as the risks emanating from the environment are concerned, water quality issues constitute an important issue of emphasis. This is a problem that encompasses the degradation of water standards especially in terms of acceptable limits of certain toxins such as heavy metals. There are numerous ways in which water quality issues contribute towards the risks for construction. One of the main ways in which such issues pose a risk to the construction and design process is that it creates hazardous conditions for the employees working at the construction site. The use of such water is undesirable in that it can cause numerous health complications for employees after they come into contact with it. This is risky because it can undermine the effectiveness with which the employees execute their respective tasks and responsibilities.

The risks caused by water quality issues within the context of relations between Japan and GCC also encompass the challenge of site preparation. Within the framework of construction and design, site preparation is always an important aspect of emphasis. The overall quality of outcomes in the construction process is heavily influenced by the extent to which the site is prepared. In the event that the framework for site preparation is ineffective, it then follows that the quality of outcomes is compromised. On the other hand, the use of an effective blueprint of site preparation goes a very long way towards enhancing the overall quality of outcomes. In line with such aspects, it is hence evident that the occurrence of water quality problems undermines the construction process in terms of compromising the manner in which site preparation is implemented.

It is also essential to accentuate the fact that water quality issues leads to the risk of corrosion of some of materials that have been used in the construction of a structure or building. Some toxic components in polluted water can corrode the metallic parts of supportive pillars in structures, and this is always an undesirable aspect as far as risk management is concerned. Unless the relations between Japan and GCC is aligned toward such an issue, it can be complex for the risk to be addressed effectively in the short-term as well as in the long-term. It is also vitally important to highlight that the issue of poor quality of water can compromise the extent to which the organization is issued with the relevant permits and licensing in order to go ahead with the construction process. This is because regulatory authorities perspective such a construction as an occurrence that would potentially cause more problems as far as water quality is concerned. In line with such an aspect, it is hence evident that there are numerous risks that emanate from water quality issues. Within the analytical phase for risk identification, there is the need for such an issue to be evaluated extensively so as to facilitate for an effective decision making process. Additionally, such an approach enhances the extent to which there is a balance between the

design as well as the needs of the construction phase as pertains to the quality of outcomes.

When it comes to the framework of external risks, there is also the need to highlight the fact that new information requirements for permits serves as a major issue of emphasis. This occurs when the regulators or authorities develop new standards or protocols that should be followed by constructors in a given jurisdiction such as a city or even country. Despite the fact that regulatory standards constitute an important component of the construction process, it is vitally pertinent to accentuate that there are various ways in which changes in information requirement can cause risks. One of the main ways in which such changes can cause external risks is that they can cause delays in the formulation of design as well as the actualization of the different phases of construction. Such delays are always undesirable because they compromise the effectiveness with which distinctive tasks and processes are actualized. Additionally, such delays are risky because they can result into a scenario whereby erratic weather conditions compromise the construction process.



In addition to the occurrence of delays, new information on permits can be undesirable in terms of complicating the process with which programs for design are selected. Although there are many factors that impact the construction process, the manner in which the design process is actualized is always an important aspect of emphasis. In the event that a design is incomplete or inaccurate, other phases of the construction process are compromised. On the other hand, the use of an effective and reliable platform of design goes a long way towards ensuring that the short-term and long-term goals are attained. The design is complicated by the changes in information because what might have been acceptable before might not be approved after the changes. Similarly, these changes can increase the time it takes for the construction process to be aligned towards the new standards. This is an aspect that can create confusion within the entire planning and implementation phase. Such aspects are undesirable as far as the success of the relations between Japan and GCC is concerned. The



implications of changes in information requirements can also be evaluated in terms of the fact that such changes can create a problem when it comes to the blueprint for resource allocation. The manner in which resources are allocated in the construction process is always influential in that it determines the quality of outcomes. In the event that the blueprint for resource allocation is ineffective, it then follows that it is complex for the best possible outcomes to be attained. On the other hand, the use of an ineffectual framework of resource allocation compromises the quality of outcomes. In line with such aspects, the changes in information and regulatory requirements make it complex for the entire framework of resource allocation to be effective. This is an aspect that must always be integrated into the relations between Japan and GCC.

An environmental impact statement is a common regulatory requirement needed for the approval of construction projects in most parts of the world. This implies that the construction project of a building or structure might not be given the relevant go-ahead unless an environmental impacts treatment is developed. In essence, the environmental impact statement is the main outcome of an environmental impact assessment. In view of such aspects, there is hence the need to evaluate the specific ways in which an environmental impact statement is tantamount to a risk within the context of risk management. One of the main reasons as to why an environmental impact statement constitutes risks is that extensive resources are required in order to develop it. This not only pertains to financial resources, but also human resources as well as time. An environmental impact statement cannot be developed effectively unless adequate time is allocated towards the process. This implies that such a requirement creates the risk of delays in the completion of construction projects within the stipulated schedule. This is an aspect that is undesirable as far as the successful completion of construction projects is concerned. In terms of financial requirements, the funds required in the completion of an environmental impact statement might be so high in such a way that other vital processes are compromised.

#### 4 RESAULT & DISSCUSION

From another perspective, the reasons as to why environmental impact statement amounts to an external risk is that there is the possibility that some of the information therein might be misleading. The officers involved in performing the environmental impact assessment might not disclose important information that has direct implications on a project completion and design. This is a risk because it curtails the effectiveness with which the construction project is aligned towards the distinctive needs and requirements of the site. This is also a risk because it can compromise the effectiveness with which decision making processes are actualized.

The reasons as to why an environmental impact

statement serves as a risk also encompasses the issue of licensing. The absence of such a statement can undermine the extent to which the relevant licensing and permission is obtained for the project. This is an aspect that directly impacts the relations between Japan and GCC in the short-term as well as in the long-term. There is also the need to highlight the fact the process of environmental impact assessment might be impeded by political issues especially when influential leaders have vested interests in the construction. This can undermine the relations between Japan and GCC especially when it comes to making independent decisions that do not compromise the extent to which the intended outcomes are attained. In view of these aspects, it is hence evident that the issue of environmental impact assessment can be a major source of external risks in design and construction of buildings.

When a structure is being erected on a historic site, numerous risks can occur. One of the main risks associated with the construction of structures on historic sites is that such locations are characterized by numerous stakeholders. This not only includes the developers, but also authorities as well as members of the public. In bilateral relations, there is always the need to ensure that adequate emphasis is placed on the interests of all stakeholders. This is essential in that it creates a balance. However, a site with numerous stakeholders such as a historic site is likely to elicit many opinions and viewpoints. These can cause conflicts among the many stakeholders especially when there are disagreements on how the scarce resources should be used. It is also notable that such a site is associated with the risk of persevering the cultural heritage that is attached to it. This is not an easy task especially when it comes to the design and construction process. While some designs might enforce or be in line with such cultural values, other designs might be perceived as being detrimental towards the preservation of the cultural heritage. This makes it complex for the designers and constructors to develop a structure that balances between all needs and expectations. This is a risk that can compromise the attainment of success and the intended outcomes.

The risks associated with a historic site also encompass the issue of costs. In view of the sensitivity associated with the construction of a structure in such a location, it is notable that there is the need to implement each phase or stage of the construction as systematically as possible. While there are many implications of such an approach, the issue of costs is one of the most important. The budgetary requirements for the construction of a building on a historic site might not be readily available. This is an aspect that can derail the effectiveness with which the entire project is completed. It is also notable that there is always the risk of potential destruction of a property or structure that has been erected on a historic site. This is because of the immense interest from the public. The risk of destruction can increase the costs in the long-term. It then

follows that constructing buildings on historic sites is associated with many external risks that must be aligned into the relations between Japan and GCC.



When it comes to external sources of risk in the construction and design process, the pressure to compress environmental reports is one of the main issues of emphasis. This occurs when external parties including investors or influential leaders increase the pressure on project implementers to develop and complete environmental analysis as hurriedly as possible. In view of such aspects, it then follows that there is the need to evaluate the distinctive ways in which such pressure amounts to a risk. The fact that environment audit helps in decision making within the design process serves as one of the main reasons as to why pressure to complete the reports serves as a source of risk. When the environmental schedule or analysis is done quickly, there is the risk that important information is excluded from the final report. This increases the risk of a subjective approach towards decision making as opposed to maintaining the highest standards of objectivity. In the relations between Japan and GCC, objectivity is always important because it enhances the extent to which the various processes and actions are aligned towards the existing issues. Unless such objectivity is imagined in the environmental analysis and reporting, the relations between Japan and GCC is compromised extensively.

## 5 CONCLUSION

Another notable reason as to why pressure to compress the environmental schedule serves as a source of external risk is that it creates the possibility that some important stakeholders are excluded from the decision making process especially when it comes to the allocation of resources. This is always an undesirable aspect that compromises the extent to which short-term and long-term goals are attained. In view of these elements, it is hence evident that the issue of pressure to compress the environmental schedule serves as a major risk within the construction and design process.

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