

Identifying and Analyzing Risks in the Construction of High Rise Buildings Along the Sky Train Rails in Bangkok

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Abstract

The research on Identifying and Analyzing Risk in the Construction of High Rise Buildings Along the Sky Train Rails in Bangkok has the objective of studying the risk factors, guidelines for the prevention and rectification of the risks in the construction of high rise buildings along the Sky train rails in Bangkok. The sample group consisted of those involved in the 6 developing projects of high rise building construction along the Sky train rails in Bangkok. Information collected from in-depth interviews, Analyzed results with risk assessment techniques and content analysis techniques. It is found from the study that the risk factors arose are both from internally and externally. That the highest risks occurred in every phrase of the construction, from the designing phrase to the post construction phrase. It is also found that the guidelines in preventing and rectification of risks, especially in the high risks, are by using the result-oriented management and proactive financial management. Apart from this, real estate developers must periodically follow-up and evaluate the risks continuously during every phrase of the construction.

Key word: Risk factors, construction of high-rise buildings, risks in constructing high-rise buildings

Background

The expansion of sky train system in Bangkok has increased very fast, causing the increase of high-rise buildings along the sky train rails in Bangkok. Most of the high-rise buildings are apartments or condominiums which are continuously in high demands of the consumers, as it is convenient, saving travelling time, no traffic problem (Sophon Pornchokchai, 2011; Sukulpat Khumpaisal and Surakarn Ratanawitoon, 2015; National Statistical Office, Ministry of Information and Communication Technology, 2013)

The increase of the high-rise buildings is the cause of implementation and delivery problems, shortage of contractor and qualified laborers in high-rise building construction work, together with shortage of purchasing material (Khumpaisal, 2011). The factor of the price of construction materials being highly variable (Sittiporn Tammahakin, 2011), is related to the country's economic conditions and the constant weather changes (Wasan Tirajetkul, Thapanat Daojaeng and Wanchalerm Khum charoen, 2016). Apart from this, to be able to complete the construction of the high-rise building according to the plans and contract, a good, efficient management system is needed. From planning, supervising, monitoring the working process, analyzing the problems and find resolutions efficiently (Dainty ARJ, Cheng M. L, Moore DR., 2005; Oglesby CH., Parker HW., Howell GA., 1989). In order not to affect or the impact to the consumer in quality, length of time in delivering and there might be an adjustment of price increase ((Wasan Tirajetkul, Thapanat Daojaeng and Wanchalerm Khumcharoen, 2016)

Therefore, in the construction of the high-rise buildings in Bangkok, there are risks which could arise in any phrase of the construction of the project: risk in documentation, organization, coordinating work process, conflict at work, understanding the contractor's design, together with the risk in the using of the material in the construction work and others (Chutipong Liangkobkit, 2009, ; Khumpaisal, 2011). There are risk factors all around, in both internally and externally through out the project period of time (Phattaraphorn Neeranate and Kongkoon Tochaiwat, 2015).

In order to be able to provide suitable information for the high-rise building construction developers, it is of the researcher's opinion to make a study in identifying and analyzing risk in the construction of high –rise buildings along the sky train rails in Bangkok. Apart from being useful to the high-rise building construction developers, the information will be beneficial to the real estate developers, developing the estate along the sky train rails and will be useful information for the overall economic of the country further.

Objective

1. To study the risk factors in the construction of high-rise building along the sky train rails in Bangkok
2. To study the ways of preventing and rectifying the risks in the construction of high-rise buildings along the sky train rails in Bangkok..

Methodology

The researcher collected information from the sample groups consisted of those involved in the 6 development projects of high-rise building construction along the sky train rails in Bangkok, completed in 2016-2017, and selling at not more than 150,000 THB per sq. meter and 3 projects of high-rise buildings of more than 150,000 THB per sq. meter. Collected information from in-depth interviews, analyzing the results with risk assessment techniques and content analysis techniques. The information obtained would be by Triangular inspection and to be further analyzed.

The findings

From the study, the findings are as followed:

1. The study of risk factors of the high-rise building construction

The risk factors of the high-rise building construction along the sky train rails in Bangkok, it is found that there are both risk factors of internally and externally in each phrase of the construction as shown in Table 1-2

Table 1 Shows the internal risk factors of the high-rise building construction along the sky train rails in Bangkok

| Construction Phrase | Factor | Risk factor | Level |
|--------------------------|------------|---|----------|
| Designing phrase | Process | 1. Insufficient survey and information collecting for the design | Moderate |
| | | 2. The design is not in consistent with the demand of the project | Low |
| | Management | 1. The coordination between the designers of each section | Low |
| | | 2. The management of the constraints of design | Moderate |
| Pre-construction phrase | Management | 1. Selection of contractor during the bidding of the price | Moderate |
| | | 2. Preparation of construction material and equipment | Moderate |
| | Financial | 1. Income from sale price being lower than estimated | High |
| | | 2. Expenses in purchasing material higher than estimated | Moderate |
| | | 3. Expenses in EIA higher than estimated | Moderate |
| Construction phrase | Technic | 1. The contractor did not meet the time line | Moderate |
| | | 2. The changing of additional/reducing work according to the employer's model | Moderate |
| | Processing | 1. Coordination of the subcontractor in each section | High |
| | | 2. Inappropriate and inadequate supervision of the subcontractor | Moderate |
| | | 3. Inappropriate and inadequate inspection, testing and assignment given | Moderate |
| | | 4. Delays from inexperienced subcontractor in each section | High |
| | Personnel | 1. Shortage of engineers and specialists | Moderate |
| | | 2. Conflicts between personnel, employer/contractor/subcontractor | Moderate |
| | Safety | 1. Implementation, supervision according to the safety law | High |
| | | 2. Accidents from construction | High |
| | Financial | 1. Income from sale price being lower than estimated | High |
| | | 2. Higher costs and expenditure which has not been in the budget estimation | High |
| Post construction phrase | Processing | Project delivery / delivery according to the stated time | Moderate |
| | | 2. Implementation of contract procedures and conditions. | High |
| | Marketing | 1. Marketing strategy in highly competitive conditions. | High |
| | | 2. Services and after-sale services that build confidence | Moderate |
| | Financial | 1. Loans under fluctuating interest rates | Moderate |
| | | 2. The ability to repay the loan interest of the company. | Moderate |
| | | 3. The ability to achieve the required performance. | High |

From Table, the internal risk factors of the high-rise building construction along the sky train rails in Bangkok, it is found that in the designing phase, there is no high level of risk.

In the pre-construction phase, there is one factor with high risk which is in financial, the income from the selling price being lower than estimated.

In the phrase during construction, it is found that there are 2 high risk factors: 1) Coordination of the subcontractor in each section and 2) Delays due to inexperienced subcontractor in each section. In safety, there are 2 risk factors: 1) Implementation, supervision according to the safety law 2) Accidents from construction. In finance, there are 2 risk factors: 1) Income from the selling price being lower than estimated 2) Higher costs and expenditure which has not been in the budget estimation.

In the designing phase, there is no high risk factor.

In the pre-construction phase, there a high risk factor in economy: Income from the selling price being lower than estimated

In the construction phase, it is found that there are 2 risk factors: 1) Coordination of the subcontractor in each section and 2) Delays in each section of the work due to inexperienced subcontractors. In safety, there are 2 risk factors: 1) Implementation, supervision according to the safety law 2) Accidents from construction. In financial, there are 2 risk factors: 1) Income received from the selling price being lower than estimated 2) Higher costs and expenditure has not been in the budget estimation.

In the post construction phase it is found that, there is 1 high risk factor in processing: 1) Implementation of contract procedures and conditions. In marketing, there is 1 risk factor: 1) Marketing strategy in highly competitive conditions and in financial, there is 1 risk factor: 1) The ability to achieve the required performance.

Table 2 Shows the external risk factors of high-rise building construction along the sky train rails in Bangkok

| Construction Phrase | Factors | Risk Factors | Level |
|----------------------------|------------------|--|----------------------|
| Designing phrase | Legality | 1. The changing of law, regulations affecting the working process 2. Strict local law enforcement affecting the working process | Moderate High |
| | Social community | 1. Community complaints against construction project. 2. Social condition, risking having criminal offences | Moderate Moderate |
| | Environment | 1. Environmental impact assessment of advisory unit 2. Weather conditions and natural disaster | High Moderate |
| Pre-construction phrase | Social community | 1. Unfair bidding for the construction 2. Problems of local and foreign laborers | Moderate Moderate |
| | Economy | 1. Fluctuation of the loan interest rate 2. The increase of minimum wage rates | Moderate High |
| | Legality | 1. Ambiguity of the relevant law. 2. Strict local law enforcement affecting the working process. | Moderate High |
| During Construction phrase | Environment | 1. High dusty weather conditions that affect construction. 2. Construction creating pollution | High Moderate |
| | Economy | 1. Shortage of construction material/equipment in the market 2. Approval of buyer's credit line by bank | Moderate High |
| | Legality | 1. State officials do not follow the law. 2. Social community lawsuit caused by the construction. | High Moderate |
| Post construction phrase | Economy | 1. Fluctuations in inflation and interest rates | High |
| | | 2. Real estate overflow | High |
| | Legality | 1. State officials do not follow the law. 2. Litigation of not in accordance with the contract. | Moderate Moderate |
| | Delivering | 1. Problem of not accepting the delivery of work of the buyer | High |
| | | 2. Transferring ownership to the buyer | Moderate |

From Table 2, the external risk factors of high-rise building construction, it is found that: In designing phrase, there is a high risk factor in 1) Strict local law affecting the working process. In environment, there is 1 risk factor of 1) Environmental impact assessment of advisory unit

In the pre-construction phrase there is a high risk factor in economy: 1) The increase of minimum wage rates. The high risk factor in legality: 1) Strict local law affecting the working process

In the during-constructing phrase, there is a high risk factor: 1) High dusty weather conditions that affect construction. A high risk factor in economy: 1) Approval of buyer's credit line by bank and a high risk factor in legality: 1) State officials do not follow the law.

In the post construction phrase, there are 2 high risk factors: 1) Fluctuations in inflation and interest rates 2) Real estate overflow. A high risk factor in delivering: 1) Problems of not accepting the delivering of the buyer

2. The study on the guidelines for the prevention and rectification of risks in the construction of high-rise buildings.

Risk factors in the construction of high-rise buildings along the sky train rails, both internally and externally, it is found that there are high levels of risk which have been brought to be analyzed, to find the guidelines for the prevention and rectification of risks in the construction of high-rise buildings along the sky train rails in Bangkok, as shown in Table 3

Table 3 Shows the guidelines for the prevention and correction of risks in the construction of high-rise buildings along the sky train rails in Bangkok

| Risk | Pre-construction phrase | During construction phrase | Post construction phrase |
|--|------------------------------------|---|--------------------------------|
| 1) Income received from the sale 2) High competition 3) Ability to gain profit | Proactive marketing | Accessibility at the construction site | Sales proportion |
| 4) Coordination of the contractors 5) Contractor's experience | Selection of the contractor | Periodically meetings jointly | AAR Meeting |
| 6) Safety supervision 7) Accidents | Seminar/Training | Review and prevention | Reward |
| 8) Cost control | Management aiming at the outcomes. | On schedule delivery at the site | Using the control chart |
| 9) Operation according to the contract 10) Strict implementation of law | Use of legal relationship | Use of legal relationship | Use of legal relationship |
| 11) EIA Assessment | Selection of advisor | Public Relation | Public Relation |
| 12) High dusty condition | Geographic Information Systems | Geographic Information Systems | Geographic Information Systems |
| 13) Approval of credit line 14) Inflation and interest rates 15) Market overflow | Joint planning with the bank | Planning adjustment with the bank | Joint planning with the bank |
| 16) Increasing minimum wage | Wages according to the ability | Wages according to the ability | Wages according to the ability |
| 17) Acceptance of the buyer | Inspection of the delivery | Inspection of work done in every phrase | Delivery |

From the Table, it is found that the guidelines for the prevention and rectification of risks in the construction of high-rise buildings which could occur both internally and externally, could be grouped in 17 risk plans. Overall, managing internal risks by using the results-oriented management process and proactive financial management. External risks, by participatory risk management and risk transfer. Apart from this, real estate developers must follow and periodically evaluate the risks continuously during each phrase of the construction.

Conclusion

1. The risk factors in the construction of high-rise buildings along the sky train rails, it is found that:

- 1) There are risks, both, internally and externally
- 2) There are risk factors in the designing phrase, pre-construction phrase, during the construction phrase and post-construction phrase
- 3) There are 10 high risk factors in financial, processing, safety and marketing
- 4) There are 10 high external risk factors in law, environment, economy and delivering

2. The guidelines for the prevention and correction of risks in the construction of high-rise building, it is found that

- 1) The guidelines could be used in 17 plans of risk prevention by implementing an overall risk plan which is a proactive risk management
- 2) Internal risk planning , using result-oriented management process and proactive financial management
- 3) External risk planning, is by participatory risk management and risk transfer
- 4) Real estate developers must follow and evaluate the risks periodically and continuously throughout every phrase of the construction.

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