

Factors Causing Delay in Payment of Residential Building Projects in Thailand

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Key words: Construction delay; Residential building; Delay in payment.

SUMMARY

The objective of the study aims to investigate factors causing delay in payment from owner to main contractor in residential building projects in Thailand. The interview and questionnaire method was used in this research. Randomly distributed questionnaire technique was applied to selected samples of 123 various construction practitioners consisting of owners, consultants and main contractors to evaluate the severity of the 24 identified delay in payment factors. The result found that technical and inspection category was ranked as the highest category in causing the payment delay to main contractors. The results of the survey also indicated that owner financial problems, delay in work approval, major accidents, inaccurate bill of quantities and substandard workmanship were common factors in causing delay payment to main contractor. The evaluation of results showed that main contractors faced moderately severe level from delay in payment in building construction projects.

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1. INTRODUCTION

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Construction delay can be observed by several indication factors. One significant factor is owners' performance in making payment to their creditors. In other words, the prolong time required for the procurement and payment is a strong indicator that company is in financial difficulties. Mohan (2002) reported that on most projects experiencing in procurement delays and high turnover of staff in the firms employed in the projects, resulting in the loss of continuity of construction activities and consequent breakdowns in the command structure and communications. Poh (2005) mentioned that time delays and cost overruns, diminution of respect between parties, additional expense in managerial and administration, rework and relocation costs and possibility of litigation were the main causes of delay in client organizations. Rider and Finnegan (2005) mentioned that governmental fines and penalties, additional rental expense, interest charges and third party claims were main excuses for concurrent delay from owner's perspective. Toor and Ogunlana (2008) found in their study that lack of resources, poor contractor management, shortages of labour, design delays, planning and scheduling deficiencies, changed orders and contractor's financial difficulties were main problems that causing delay in major construction projects in Thailand. Koushki et al. (2004) also found that changing orders, owners' financial constraints and owners' lack of experience in the construction business, contractor-related problems, materials-related problems were the main causes of time delay and cost increase in the construction of private residential projects in Kuwait. Ogunlana et al. (1996) also surveyed and identified the main causes of delay in construction of high-rise building projects in Bangkok, Thailand were inadequacy of resource supplies, shortcomings and incompetence/inadequacy. Israngkura Na Ayudhya and Kunishima (2006) mentioned that reducing the number of permanent employees on their payrolls, elongating their payments due, selling off unnecessary construction machines and hire less qualified staffs were contractor's priority option to cut costs and alleviate the lost. Abd et al. (1998) reviewed on factors of non-excusable delays that influence contractor's performance, materials, equipment and labour related delays were identified as major causes of contractor's performance delays. Lan (1997) also found materials out of stock, limit workers and lack of safety performance were main cause of financial shortages which the main contractor companies were not much concern about their cash flow management. With the economic recovery currently taking place in Thailand, residential building construction contributes to a large portion of the construction sector. Therefore, the objective of this study is to determine the main causes of delay in payment for residential building projects in Bangkok, Thailand. This paper identified and examined the causes of delay in payment on the residential building projects which were the period after award of the contract when the actual construction was carry on. The study was based on data relating to residential building projects in Bangkok, Thailand.

2. LITERATURE REVIEW

Delay was generally acknowledged as the most common, costly, complex and risky problem encountered in construction project. Construction project could be susceptible to considerable pressure on the time delay. Such pressure environments lead to extension of time and cost. Delays in construction might be caused by one or a combination of several reasons. It might start with a simple reason and lead to a substantial set of interrelated complex disputes in

contract agreement. Most of the typical delays were unrealistic contract duration and cost, differing site conditions, change orders, delays, impact and ripple effects of delays, evaluation the quality and quantity of works, owner furnished items, difference in the interpretation of plans and specifications, unfulfilled duties, acceleration, inefficiency and disruption (Khalili and Al-Ghafly, 1999).

Delay payment between owner and their creditors in residential building projects were initially caused from imbalance between demand and supply in real estate which was consequence of financial crisis (Kongprasert¹, 2009). The situation initially had an impact on the debtor's ability to make mortgage loan payments under real estate purchase agreements, and then impact spread to the financial sector. The situation was the result of the burst of the real estate bubble because of the deep plunges in real estate prices. Therefore, the loan debtors were unable to pay their home mortgage installments, intentionally evaded their obligations under mortgage agreement (Kongprasert², 2009). Banks would then be tightening on their loan policy. Consequence, Banks would likely offer lesser amounts and shorter loan term. Owner companies could experience financial problems and subsequently had difficulties paying their main contractor, consultants and material suppliers, and thus the progress of project was compromised.

Cost overruns might amount to a substantial percentage of the overall contract value and delays might reach disturbing proportions. The allocation of risk among the owner, the main contractor and the designer was stated in the construction contract. However, the construction contract was typically prepared by the owner who ensured that a considerable portion of the risk rests with the main contractor. The main contractor therefore faced a multitude of risk among which are inflation, strikes, labor problems, adverse weather, accidents, shortages of materials and staffs and unforeseen conditions at the construction site (Wong, 2006). Sambasivan and Soon (2007) have developed 28 construction delay factors in construction and categorized into eight main groups. These are client-related, contractor-related, consultant-related, material-related, labour and equipment related, financial related contract related and external factors. Algahbari et al. (2005) reported that a financial related factor was one of the most critical factors that cause delays in construction projects. Sweis et al. (2007) also found in their survey that financial difficulties factor caused delay in construction projects. As the size of construction increases further materials, time and labour are required. In which main contractors were forced to beyond their normal financial capability. Imbalances in risk allocation may usually end up in disputes between involved parties and probably seek for settlement in court. As the review of the literature above indicates that construction practitioners have not still received the attention from both national and international researchers in general, and or from the aggressive moment of demand and supply change on building residential market of the Bangkok in particular. Therefore, a further emphasize on empirical research to complement, understanding and extend existing knowledge is appropriated. The review has underscored that delay factors in construction projects were many and vary from country to country and from one circumstance to another. Therefore, In principle, delay hinder or even prevent the implementation of construction projects. The danger of appearance and consequences of delay increases with the duration of project. Delays are harmful and should be reduced to the objectively lowest level possible.

For that purpose, author tries to identify and evaluate the delay in payment risks in construction project. Recognition and assessment of identified possible delay in payment risks present a measure of the project team management's ability to control risks and thereby reducing the possibility of damage. The increased interest in construction delays and litigation are due, in part, to efforts by the government to reduce construction disputes.

3. METHODOLOGY

The data collection process involved two stages. The first stage consisted of literature review on the causes of delay from documents, reports, rules and regulations, guidelines and procedure prepared by the government institutions/agencies and the consultants and non-structured interviews of 25 key players involved in the implementation process. The purpose of interviewing the key players was essentially to validate a preliminary set of construction delay causes gleaned from the literature and to determine from their experience other factors which cause delay in payment on residential building projects in Thailand. Their positions are director of engineer division, director of legal and land acquisition division, director of procurement division, director of accounting division, director of budget administration division, project managers, site engineers, accountants, and top executive positions in private construction and consultant companies. This phase resulted in the identification of twenty-four (24) causes of delaying in payment.

The second stage involved the development of questionnaire incorporating with 24 causes of delay in payment and data collection. The questionnaire was structured according to the purpose of study. The questionnaire comprised open-ended and closed-ended questions. The key target is to examine the existing situation, perceptions, feelings, attitudes, problems and difficulties of owners and main contractors/consultants during construction. A hand-delivered questionnaire method was used. The interviewees were available to answer questions relating to the questionnaire. Therefore, low respondent problem could be minimized. The respondents/interviewees were divided into three main groups. The first group was the administration-related department who has responsible for checking and verifying all invoices and documents. Second group was technicals and engineering-related department which has obligation to inspection and issued the certificate of inspection. Third group was financial-related department who has duty to execute the payment. These were three groups which had been implemented in this study. The convenience or availability sampling approach was used in the selection of respondents. The survey results were analyzed by using the severity index approach and the Spearman's rank correlation coefficient formula to measure the degree of agreement in the ranking by contraction practitioners. Based on the response to the survey, a severity index was calculated to interpret the degree of seriousness effect of those problems. This index was calculated as follows (Dominowski, 1980)

$$\text{Severity index } (I) = \frac{(\sum_{i=0}^4 (a_i)(x_i))}{(4\sum x_i)} \times 100\% \quad (1)$$

where

a_i = constant expressing weight given to i th response: $i = 0, 1, 2, 3, 4$

x_i = variable expressing frequency of i

The response for $I = 0, 1, 2, 3, 4$ illustrated as follows:

x_0 = frequency of very often response and corresponds to $a_1 = 4$;

x_1 = frequency of often response and corresponds to $a_2 = 3$;

x_2 = frequency of moderate response and corresponds to $a_3 = 2$;

x_3 = frequency of not often response and corresponds to $a_2 = 1$;

x_4 = frequency of seldom response and corresponds to $a_1 = 0$;

Equation (1) was used to calculate the severity index for all delaying in payment factors. The severity index was categorized into five levels. The 0-15.5% was categorized as non severe; 15.5-38.5% is categorized as somewhat non-severe; 38.5-63.5% is categorized as moderately severe; 63.5-88.5% is categorized as severe; and 88.5-100% is categorized as most severe. The categorizations reflect the scale of the respondent's answers to the questionnaire. The severity index of a category was the average severity indexes of all its related problems. The results of the survey are shown in table 3.

Rank agreement

The spearman's rank correlation, coefficient, r_s was used to measure the degree of agreement in the ranking of owners and main contractors. The coefficient can be computed as follows (Dowdy, S & Wearden. S, 1985):

$$r_s = 1 - \frac{6\sum d^2}{N(N^2 - 1)} \quad (2)$$

where

r_s = Spearman's rank correlation coefficient.

d = The difference in ranking between the owner, consultant and main contractor, and

N = The number of variables, equals to 24 and 4 for all the delay factor and for the main categories of delay in payment, respectively.

4. RESULTS AND DISCUSSIONS

The owners, main contractors and consultants' perspective questionnaire results were computed and analyzed. The delay in payment factors were classified into 4 main categories as administration, financial, technical and inspection and other common category. On the basis of ranking of the factors by the various categories. Table 1 presented type of organization with their response rate. The total rate of return was 67% (123). The owners returned questionnaires with return rate of 58% (30) whilst main contractors and consultant

companies returned questionnaires with return rate of 72% (47) and 70% (46) respectively. The evaluation of overall return rate was considered as excellent (Babbie, 1989). He suggested that any rate of return over 50% can considerably be reported, while the overall value above 60% and 70% can be mentioned as good and excellent respectively.

Information on type of building projects showed in table 2. While, A summary of all causes of payment delay factors, ranking, and overall ranking as identified by respondents showed in the table 3. These profiles indicated that delay in making payment to main contractors in residential building projects were fairly common in Thailand. In table 4 showed comparison spearman rank correlation of the ranking of owners, consultants and main contractors for all the causes and for the main categories of delay in payment. The high values of rank correlation coefficients indicate a strong agreement between owners-main contractors, main contractors-consultants and owners-consultants on ranking of all delay in payment factors as well as the four main categories. This correlation between ranking of owners, consultants and main contractors is verified by a hypothesis testing at 95% significant where $Z = r_s \sqrt{N-1}$

Table 1. Type of organization with their response rate.

Respondents	Number of questionnaires		Percentage return
	Sent	Filled	
Owner	52	30	58
Main contractor	65	47	72
Consultant	65	46	70
Total	172	123	67

Table 2. Type of residential building works.

Respondents	Number of projects
High-rise building	50
Low-rise building(less than 6 story)	62
Total	112

Table 3. Comparison severity index factors in residential building projects.

Factors	Owner	Consultant	Main contractor	Overall rank
	SI (%)	SI (%)	SI(%)	
Administration category	59.5	63.1	64.1	2
Insufficient working drawing details	62.0	71.0	66.8	7
Inaccurate bill of quantities	67.4	69.4	69.4	4
Violating condition of the contract	60.2	68.9	68.6	10
Poorly done planning and scheduling	63.9	63.9	63.7	14
Change Orders	58.0	59.2	67.9	15
Verification submitted documents	60.8	65.3	66.0	13
Government/local rules and procedures	44.3	44.3	46.5	21
Financial category	52.1	51.3	46.0	4
Banks procedure	54.3	54.0	40.6	19
Knowing to manage the territory, protect the environment, evaluate the cultural heritage	72.4	73.8	73.1	1
Exchange rate	35.8	31.3	28.6	23
Inflation	34.2	30.6	24.5	24
Fluctuation in materials cost and labor	63.7	66.7	63.0	12
Technical and inspection category	61.8	64.0	62.2	1
Adverse weather conditions	61.1	68.4	66.5	11

Table 4. Comparison spearman rank correlation

Delay category	Spearman rank correlation coefficient	
	Main delay categories	All delay factors
Owners-Main contractors	0.8	0.85
Main contractors-Consultants	0.8	0.79
Owners-Consultants	1	0.61

The results exhibited that there were several important factors underlying causes of delay in payment from owner to main contractor in residential building projects. The five highest severity index factors agreed by owners, consultants and main contractor showed in table 3. The owner's perspective was owner financial problems, unexpected social events, supervisor incompetence, inaccurate bill of quantities and delay in work approval. Whereas, consultant's perspective on delay in payment from owner to main contractor were owner financial problems, delay in work approval, unexpected social events, insufficient working drawing details and supervisor incompetence. While, main contractor's point of view on cause of delay in payment were owner financial problems, delay in work approval, slow in making decision from owner, substandard working manship and inaccurate bill of quantities.

In residential building projects, there were several delays on both interim and final payment of completed work which had been found from interviews. Failure to provide adequate funding

resources to main contractors for work done would make it difficult for main contractor to meet agreed objectives.

The first most important factor attributing to the cause of delay in payment from owner to main contractor was owner financial problems. For the medium scale of owners, the delay in payment was caused unpredicted events. The construction projects were too expensive for one owner to raise capital without co-investors support. As the result from unexpected events, the owners budget were affected. Owners did not prepare for unexpected events especially borne with further expense than it was originally estimated. A flexible capital budget usually came with further interest loan rate. While, larger size company had a greater capacity for allocating resources and absorbing risks which lead to greater assumption of control. The ability to absorb risk, allocate abundant resources, and decrease transaction costs permits a reduction in uncertainty related to delay in payment and completion of the project.

The second most important factor was delay in work approval. There were often complains from main contractors to consultants and owners that the evaluation of both quality and quantity of completed work was caused in late payment. This was due to difference on aspect of quality and measurement of quantity of completed works. Presently, the quality control was responsible by the main contractor side whereas the acceptance testing responsibility falls into the public engineer's hand. The acceptance testing includes inspection, identification and evaluation according to the result. Therefore, the quality assurance was fully responsible by owner side. Consequence, as the size of project increases the monitoring control for quality assurance was forced to its limit with the inspection performance.

The third most important factor was major accidents. Fatal or serious accidents could cause serious delay to construction schedule. Involved authorities would take seriously on accident and probably cease construction related activities till safety procedure was employed. Such fatal accident would normally take a week to investigate on site. Furthermore, it was sometime impossible to foresee accident which affected the work and schedule of construction project. Unexpected social events and surprises were often discovered, the existence of worker funeral. Friends and their relative of host normally took a few days off to pay their respect on sad event. The most frequent causes of serious accidents at work were falls, workers' presence within a machine operation danger zone and falling objects. Common causes for irregularities leading to accidents include unsuitable work methods, poor work organization, inadequate equipment, lack of attention, underestimating or lack of familiarity with hazards, poor or insufficient work safety for workers, and inadequate or non-existent supervision by superiors.

The fourth most important factor was inaccurate bill of quantities. This caused repetition of works and further expense on correction of damages. The payment was only made to main contractor when all required documents were verified. If there was a mistake in number it would affect both quality and quantities of the work consequence create problems among involved parties.

The fifth most important factor was substandard workmanship. A common of this defect was cracks in the structure and foundation of a building. However, interviewees gave further explain on substandard workmanship that can be caused from a combination of unskilled labors, lack of supervision, low bidding offer which lead enviably sublet work to low quality nominated subcontractors. It was a duty of quantity surveyor and inspection engineer to verify and inspect accordingly to contract agreement. Therefore, works were needed to be redone till agreed requirement.

5. CONCLUSIONS

The conclusion can be drawn from the result of the study inwhich sought the views of clients, consultants and main contractors on the relative importance of the delay in payment factors in residential building projects in Bangkok, Thailand. This study had classified four main categories which were administration, financial, technical and inspection and other common and identified twenty-four causes of delay in payment factors. The result showed that main contractors faced moderately severe impact from four main categories of delaying in payment. All the three groups of respondents generally agreed that the top five causes of delay in payment factors arranged in descending order of severity were owner financial problems, delay in work approval, major accidents, inaccurate bill of quantities and substandard workmanship. However, accumulated conflict and dispute experiences between owners of the projects and their main contractors lead to a tendency of resulting in construction delays and cost overruns. Therefore, main contractors had usually been disqualified and replaced.

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BIOGRAPHICAL NOTES

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