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A BIM-Based Framework to Deal with Particular Claim before Construction Stage

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ABSTRACT

The Building Information Modeling (abbreviated as BIM) plays an important role in both design and construction industries. The established BIM-based framework is proposed to solve the problem of particular claim that is caused by the lack of communication among the different design teams for the different parts of the entire project before the construction stage. A mixed research methods approach is adopted in this research, the case study is used to demonstrate the necessary of dealing with particular claims in design stage and the amount of delays and overruns of cost can be reduced by the proposed framework. As a result, the data from the case shows that using the framework can reduce more than 29% cost of the particular claims.

Keywords: Building Information Modelling; Design Variation; Particular Claims; Costs and Delays; Construction Planning

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A BIM-BASED FRAMEWORK TO DEAL WITH PARTICULAR CLAIM BEFORE CONSTRUCTION STAGE

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Abstract

The Building Information Modeling (abbreviated as BIM) plays an important role in both design and construction industries. The established BIM-based framework is proposed to solve the problem of particular claim that is caused by the lack of communication among the different design teams for the different parts of the entire project before the construction stage. A mixed research methods approach is adopted in this research, the case study is used to demonstrate the necessary of dealing with particular claims in design stage and the amount of delays and overruns of cost can be reduced by the proposed framework. As a result, the data from the case shows that using the framework can reduce more than 29% cost of the particular claims.

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1. Introduction

People can solve the problem of poor communication between various types of work within Building Information Modeling. Before the BIM appeared, the production efficiency in construction industry is lower and the situation of wasting resources including manpower and materials can be seen in almost every corner of the project as a consequence of the changes of the construction drawings [1]. The popularization of BIM is not as developed as the traditional 2-D software such as AutoCAD. A principal reason for the lack of popularizing of BIM is the traditional tendering model, which is used very widely nowadays [2]. In the tendering, the overwhelming majority of winners' quotations are the lowest, sometime their quotations are almost equal to the costs of project, or even lower than the costs, therefore the main way for them to get the profits is to ask for the claims. The BIM-based framework is proposed to solve the problem of particular claim, the framework is as followed:

- 1) After all the design teams finish all kinds of construction 2-D drawing, such as the main structure, HVAC, water supply, drainage, sprinkler, fire hydrant, electricity and so on, make the different contractors who build or install different parts transform the 2-D drawing into 3-D BIM software with the same sequence of construction.
- 2) When every construction unit transform the construction drawing completely, another main task for them is finding out the defects which may cause the claims, then they can calculate the quantities of the potential variations and the costs of them.
- 3) The contractors should ask the proprietor for the claims which do not occurred but must happen in the future. However, for the compensation, only the costs are not enough, because the construction units prevent the variations before they occurred, and it can save lots of time and materials, so a coefficient for the claim is extremely necessary here. They can multiply the costs by the

coefficient which should be determined in the tendering stage with the proprietor.

2. Literature Review

The BIM technology has been applied in the construction planning area, including design, estimating, scheduling, the cost of project and so on. The project schedule will be improved and the hidden defect of the project will be detected by using BIM in construction planning, in other word, the BIM technology will make the construction planning more effective and accurate. Consequently, using BIM in construction planning can reduce the probability rate of delay, risk, cost overrun in project process [3]. The variations are always caused by the changes of construction drawing as a result of the fact that the proprietor wants to change the size, the style, and the materials of the construction project [4]. The variation occurs in construction projects frequently and a lot of researches have studied the effects of it. Nevertheless the delays and overruns of cost which are caused by the variation have appeared in almost every construction project [5]. The final purpose of the claim management is solving the dispute or problems effectively between the contractor and the proprietor, and it is also an intelligent way to avoid the arbitration [6].

3. Research Methods

A case study is used to reveal the necessary of dealing with particular claim before construction stage and how many delays and overruns of cost can be reduced by using the proposed framework; the interviews are used to figure out the construction project members' opinion of the traditional way to handle the claims and their reaction of the proposed framework. The data of the case includes the total cost of the construction project, the delays, the manpower costs and the materials costs caused by the claims which can be avoided by the proposed framework. Through analyzing this data, it can be seen

that the application of this framework can reduce not only the time delays but also the costs of project, in addition to this, the completion date of construction project can be reckoned more exactly than before.

4. Discussion and Conclusion

The point of my view is discussing the variety of cost caused by the claims, and the proportion of claims which can be avoided by using the proposed framework. As a result of the amount of claims in this whole project is too large, it is difficult to collect all the claims and analyze them, so I only collect the data from one of the contractors called China Construction First Division. There are 40 claims totally asked from contractor to proprietor, 16 particular claims can be solved by the proposal framework. The amount of these 16 claims is 418,145 NZ dollars, and the total amount of all claims is 1,399,207 NZ dollars, so we can get the rate of saving money of the established framework by dividing the saved amount by the total claimed amount:

$$418,145 \text{ NZ dollars} \div 1,399,207 \text{ NZ dollars} \times 100\% = 29.88\%$$

It can be seen clearly that using the established framework can reduce more than 29% of the total claimed amount for the proprietor, and the delays and waste of materials can accordingly be decreased significantly because the conflicts between different sectors are avoided before they occur.

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