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# Research and Application of BIM Project Group Management

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**Abstract.** The concept of BIM project group management comes from construction project group management, which is to coordinate and manage the project group aiming to achieve the goals and profits of the organization. According to the features of BIM projects, BIM project group management method and mode will be discussed in this paper.

## 1. Introduction

With the rapid development of BIM technology, more and more construction projects begin to apply BIM technology. BIM project management has also been studied by many scholars and become increasingly mature. However, how to manage the BIM project group is rarely being studied in this field. This article aims to discuss how to manage the BIM project group more efficiently that will explain mainly from the following three parts: project group management theory; Features of BIM project group; BIM project group management mode.

## 2. Project group management theory

Project group management refers to the overall control and coordination of multiple projects on the basis of single project management in order to achieve the strategic goals and benefits of the organization.

The project group manager does not directly participate in the management of each single project, but focuses on the overall planning and coordination; through resource allocation, process control, organization and coordination and other means, finally achieve the project group management goals.

According to the international project management association (IPMA), “project group management is the coordination and management of multiple projects, aiming to realize barrier-free communication among projects, and then achieve a set of business objectives.”[1]

## 3. Features of BIM project group

At present, most of BIM consultants serves construction project in the form of BIM team, according to the actual situation of the project to determine the composition of BIM team members, usually, BIM team members including BIM project managers, professional engineers, plus BIM coordinators.

Compared with construction management, BIM project management is more focused on application of BIM technology, and does not require participation in specific engineering. BIM service usually results in BIM model, drawings and animation. In terms of cost of BIM service, it is mainly based on labor cost and hardware cost.

Cost management, quality management and schedule management are the key points of BIM service project group management.



## 4. BIM project group management mode

### 4.1 BIM project group management system

Differs from BIM project management, BIM project group management is oriented by the strategic goals of the enterprise, which emphasizes on the overall goals of enterprise. To make sure that a set of goals of enterprise can be successfully achieved, the organization appoints BIM project group manager as the first person in charge to handle BIM project group daily operation. BIM project group management is between BIM project management and enterprise management, complete the management work of BIM project group, while achieving the goals of enterprise.

BIM project group manager shall consider the following issues during the start and implementation of the BIM project group: (1) Corporate strategic goals: decompose the objectives, determine the planned values of goals, and dynamically control the project during the implementation process. (2) Set BIM project group management standards, including software and hardware management, workflow, BIM project group management methods, etc. (3) Human resource management, including personnel allocation, training and evaluation, guidance and support. (4) Management during the implementation, including the control of project progress, quality and cost control in the process of implementation[2].

BIM project group manager is the head person of BIM project group, also the position between enterprise and BIM project manager, the duties include: (1) To complete the strategic target and strategic layout of enterprise. (2) Responsible for the management and implementation of the BIM project group. (3) To coordinate resources and relationships within the BIM projects. (4) To communicate with customers, and to manage customer relationship. (5) To make sure the overall goals can be achieved. (6) Get involved in the marketing. (7) To do project analysis and summary job. (8) To report the situation on the implementation of the BIM project group. Organization chart of BIM project group as follow:

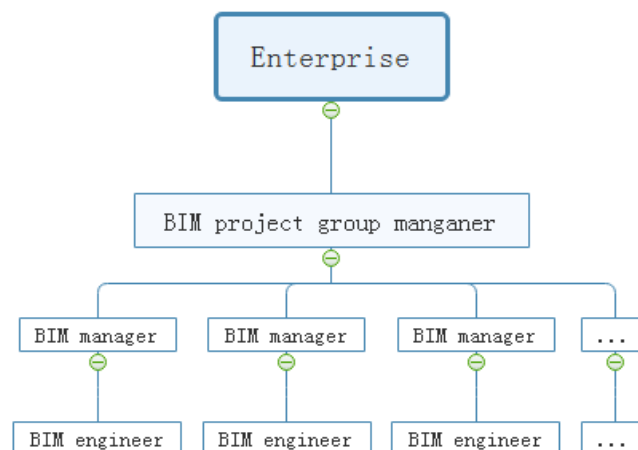


Figure 1. BIM project group organization chart

### 4.2 BIM project group resource management

In the management process of BIM project group, resource allocation is an important factor to ensure the efficient implementation of the project group. Reasonable resource allocation can not only save the project cost, but also speed up the progress and improve the quality. Therefore, before the

implementation of the project group, the requirements of each project should be analyzed, and the resource allocation plan should be made, so that resources can be used reasonably in the project group and the overall goal should be maximized.

*4.2.1 Human resource management.* Human resources directly affect the quality, progress and cost of the BIM project and play a decisive role in the realization of the BIM project goal. Therefore, human resource management is the highest priority in BIM project group resource management and should be given sufficient attention by the BIM project group manager.

The BIM project can be divided into two categories from the perspective of working mode. The first category is on-site service, which requires the BIM project manager and professional BIM engineer to be sent to the engineering site or engineering office for consultation according to the client and project situation. The second type of service method does not require personnel working on-site. Most of BIM implementation work is completed in the office, but requires communication with client regularly in the field or in the office.

Therefore, before the projects start, the BIM project group manager should analyze the needs of each project, such as on site number of staff, project schedule target, project overview and so on, on the basis of relative information to finally determine the resource demand plan. The following work is to do dynamic control during the process of the BIM project group management, which can on one hand reduce the cost, on the other hand to make sure the project could be completed efficiently. For example, when A project workload is large, BIM engineer of B project with small workload would be transferred to A project to support, in this way B project personnel input would be reduced, and the work task of A project could be guaranteed to complete. It can not only save costs, but also ensure the success in schedule and quality control.

*4.2.2 Software and hardware management.* The overall demand of the hardware and software should also be analyzed by the BIM project group manager in advance. Use indicator control method to control the hardware and software. Computers and workstations are configured according to the principle of 'one person, one machine'. Multiple projects can share one software as necessary to save costs.

*4.2.3 Technical guidance and training.* Before the start of BIM project, the project manager and relevant technical personnel will be trained. The training focuses on technical standards, management process, job duties and other contents. The purpose is to offer the best BIM technology service.

In the process of BIM project implementation, the BIM project group manager should be clear with the implementation progress of every BIM project. When the BIM project meet the particular problem that is hard to solve, the BIM project group manager should organize professional director and project manager to discuss solutions, trying to get through of it.

#### *4.3 Target control*

*4.3.1 BIM project group target control.* The schedule control of BIM project group is based on the schedule of a single BIM project. BIM project group schedule target is not only to add period of implementation of every single project together, yet through scientific analysis, find out the key work of line, and control the key work strictly, if necessary, add the appropriate staff to ensure the key work can complete successfully, also in combination with the key work of construction project, involved in advance. Whether the project can be completed on time is directly related to the BIM project cost, so the realization of the project group schedule is particularly important.

The methods of schedule control include: controlling the critical project node time, increasing the manpower appropriately for key work, regularly monitoring the project completion status, and regularly training personnel to improve business capacity[3].

*4.3.2 BIM project group quality control.* The quality target control of BIM project group depends on the quality control of single BIM project. The quality completion of BIM project directly affects cost, schedule, customer relationship, market development and other aspects. Dynamic management would be implemented in BIM project group quality management, including pre-event management, in-process management and after management.

At the startup of BIM project, the BIM project group manager shall organize BIM project managers and professional engineers to hold quality conference, define the quality objectives of each project, and formulate related quality control methods, such as BIM model creation standard and BIM in-depth design standard.

During the implementation of the BIM project, regularly monitored the executive condition of the BIM standard in real time, at the same time the quality inspection BIM project is carried out regularly, supervise to solve the quality problems within a limited time. For the key and difficult work, the BIM project group manager should control throughout the process, develop key and implementation plan with BIM manager and the person in charge of the professional office, and monitor regularly during the process of implementation[4].

After the BIM service, check the quality of outcomes. Meanwhile, to communicate with the client that ask about the project satisfaction. Analyze and summarize the parts that fail to achieve the quality target, and form the reward and punishment system for the relevant responsible person.

*4.3.3 BIM project group cost control.* Cost control of a single BIM project mainly includes labor cost, hardware input cost, software usage fee and marketing cost. The method of annual labor cost control adopts annual labor cost index control method, means that the annual labor cost should be controlled within a limited index. The use of hardware and software is managed and deployed by enterprises and the input quantity of hardware and software is strictly controlled, which not only ensures the successful implementation of the project but also controls the cost of software and hardware within the target range.

The BIM project group manager shall make overall calculation of the BIM project group cost, formulate related cost control indicators, supervise and check in the project implementation process, and execute dynamic control[5]. When cost overruns occur, it is necessary to find out the reasons and solve the problems to make the overall cost of the project group within the target control range, and take steps to prevent from happening again.

*4.3.4 Business target.* The business target of BIM project group mainly includes the project contract payment collection target and marketing target. Contract payment collection targets include the down payment, progress payment and final payment. Contract payment management needs to combined with the progress management, quality control, the BIM project group manager needs to manage all project contracts uniformly and be familiar with the contract content of each single project, make request payment plan and prepare for request payment in advance, make complete receive the payment record.

While managing BIM project group, the BIM project group manager should also do a good job in project marketing and prepare well for market development. Marketing methods include publicity of project results, customer relationship management, and active participation in BIM project bidding.

#### *4.4 Performance evaluation*

The performance of BIM project group management is to assess the management results of single BIM project. The management performance indicator system is established by the BIM project group manager, mainly for the assessment of the progress, quality and cost of a single BIM project. According to the actual situation to increase or reduce the assessment items. The management performance indicator system is as follows:

Table 1. Management performance indicator system.

	1 <sup>st</sup> index	2 <sup>nd</sup> index	Evaluation standard
BIM project management performance indicator system	Schedule management	Schedule plan	Whether the BIM project schedule implementation plan is completed and whether the quality meets the requirements
		Schedule control	Whether there are corresponding measures for the implementation of the progress plan, the progress can be optimized according to the actual situation
		Schedule completion	Completion status of major planning nodes
	Quality management	Executive situation of BIM standards	Check the completion status of BIM implementation standards to control the quality completion status
		Quality control	Whether the quality control measures are in place
	Outcome	Project technology outcomes	Patents, technical papers and related summary documents
		Project publicity	Conference, BBS, promotional articles
		BIM rewards	BIM rewards

## 5. Conclusion

This article mainly discusses the BIM project group of management concept and mode. It has been more mature for a single BIM project management model. However, along with the increase in BIM development, BIM project group of management will be more and more complex, and BIM project group of management also plays an important role. Managing the relationship between the project group and individual project is the key to enterprise strategic goals because BIM project group management will be the hot spot of future research and practice.

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