Scientific Journal Impact Factor (SJIF): 1.711

e-ISSN: 2349-9745
p-ISSN: 2393-8161

International Journal of Modern Trends in Engineering and Research
www.ijmter.com

The Coordination Goals for Multistoried Building Project

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Abstract- The effective coordination has been regarded in both theory and practice as a critical factor of success in construction projects. Therefore this study is carried out, for studying the actual coordination methods adopted by the contractors at construction site. Previous coordination studies have focused on the time spent on coordination, its frequency, and its relationship with performance. However, coordination goals have received less attention, and their relationships with coordination methods and performance are not known. To achieve objective of this study, a questionnaire was designed accordingly and sent to five project manager for survey. Follow-up interviews were conducted with one to two engineers from each project. It was difficult to investigate goals in this study without quantifying goal priorities. Assumptions made in quantifying the priorities of goals are examined here. The top three goals were scored 3, 2, and 1, respectively. The average percentage of goal achievement of different coordination methods is also found out to identify the better coordination method for all five construction projects.
In this way percentage goal achievement and respective goal replacement possibility is calculated. The charts are prepared on the basis of data collected; from this best company using effective coordination method is observed.

Keywords: Goal, Coordination Methods, Goal Achievement, Goal Replacement Possibility.

I. INTRODUCTION

The various team members involved in the major construction projects such as high-rise building are as follows

1) Architecture
2) Civil Engineer
3) Mechanical Engineer
4) Electrical Engineer
5) Plumbing Engineer (It involves sanitation, water supply and Fire Suppression sprinkler systems etc.)

The coordination between these team members is essential for the better performance of the project. Therefore it is essential to know the roles and responsibilities of these team members.

Civil engineers have a great deal of responsibility in their field. They are directly responsible for the planning and management of construction to take place. Not only do they aid in designing but also take an effective part in estimating, scheduling, obtaining materials, planning, costs, controlling costs and selecting equipment that is to be used. The electric supply required before construction (for lifts, offices, tower cranes, plants and machineries etc.) and after finishing the work is maintained by electrical engineer. Work for a construction firm managing construction sites, coordinating with manufacturers, making sure contractors are building properly and maintaining the schedule, etc.

Electrical engineer is required for testing of all equipment and systems upon completion of construction.

Following are the roles of plumbing engineer for high-rise buildings:

1) Design of Process and Fluid Flow Systems
2) Design of Plumbing Systems
3) Design of Heat and Energy Transfer Systems

The Plumbing Engineer supports the Civil Engineer for the plumbing systems outside the building including storm water, sewer, natural gas, fire suppression water, domestic water, irrigation water, and other special water and waste systems.

1.1 Scope of the Study

Construction projects, in particular, are highly fragmented with many parties involved at different construction stages, thus leading to interference and dependence. Most contractors coordinate work through meetings. Although communication frequency increases with the level of uncertainty and dependence, meetings, characterized by high cost, cannot always eliminate uncertainty. Therefore, effective coordination is necessary for parties to interact with one another to improve performance. In the construction project the coordination goals have received less attention, and their relationship with coordination methods and performance are not known. [2]

In this paper, the factors which affect the effective coordination and communication will be worked out from the various questionnaire surveys of different projects. For this purpose questionnaire are designed accordingly and respective answers should be collected from the contractor, engineer and project manager through meetings, informal discussion i.e. through Telephone, face-to-face conversation, site visits, schedules, reports, plans etc.

1.2 Objective of the Study

The main objectives of this paper are as below.

1) To study concept of coordination for multistoried building projects.
2) To involve the study of coordination goals on live projects.
3) To analyze the data of above project.
4) To give the discussion and suggestion for effective coordination for multistoried building projects.

II. LITURATURE SURVEY

A few previous studies have focused on coordination, and most discussed the relationship between the time spent on coordination or the frequency of coordination and performance. For example, Kupreuas (2003) concluded that holding one or more design team meetings per month reduces the design phase cost by more than 35%, whereas issuing one or more status reports per month reduces this cost by more than 14%. However, time-consuming coordination methods do not necessarily bring equivalent benefits or achieve coordination goals. Pocock et al. (1996) indicated that project performance does not appear to improve significantly beyond a certain degree of interaction. Patrashkove-Volzdoska et al. (2003) investigated 60 cross-functional project teams and found that communication frequency is curvilinear related to team performance. This means that more communication does not necessarily result in higher level of performance but may actually impede it. De Saram and Ahmed (2001) surveyed project managers in the Hong Kong and Singapore construction industries to ascertain the most important and most time-consuming coordination activities. Their results showed that only one out of six time-consuming activities is important.[1] Effective coordination and communication are critical factors of success in projects (Thomas et al. 1998). [1]

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increases with the level of uncertainty and dependence (Loch and Terwiesch 1998), meetings, characterized by high cost, cannot always eliminate uncertainty. Therefore, effective coordination is necessary for parties to interact with one another to improve performance (Cheng et al. 2001). [1]

A collectivity of data, in this paper is done from five different multistoried residential building projects rather than just collecting one individual response from each company by taking their personal interviews on projects site P1, P2, P3, P4, and P5.

The questionnaire was used to survey the goals of the eight methods, along with the degree of goal achievement and the possibility of one method to be replaced by another. The answers of the interviewed contractor engineers about coordination goals, their achievement, and replacement possibility of different coordination methods are analyzed and the results are presented as follows.

For example, in Table 1 of the weekly progress meeting with the owner, one contractor engineer of project P1 thought the top three goals in sequence were control (Goal 4), clarification (Goal 2), and instruction (Goal 1). Those numbers were written down in the second column and obtained scores of 3, 2, and 1, respectively. The six goals in the weekly progress meeting of the five projects received score totals of 6, 8, 3, 9, 4, and 0, and those percentages are listed at the bottom in Table 1.

Table 1. Coordination Goals of Weekly Progress Meeting

Project	Goal Sequence			Goal Scores					
				(1)	(2)	(3)	(4)	(5)	(6)
P1	4	2	1	1	2		3		
P2	5	3	2		1	2		3	
P3	1	4	3	3		1	2		
P4	2	1	4	2	3		1		
P5	4	2	5		2		3	1	
TOTAL				6	8	3	9	4	
PERCENTAGE				25	33	13	38	17	

The top three goals by percentage (weight) of weekly progress meetings with the owner are Control (38%), Clarification (33%), and Instruction (25%).

Table 2. Top Three Goals for Meetings

Sr. No.	Goal Sequence	Goal	Coordination Goals (%)
1	4	Control	38
2	2	Clarification	33
3	1	Instruction	25

The coordination goals for each goals is calculated in this manner for informal discussion, site visits, Written correspondence, plans, schedules, reports and contract documents. The table 3 shows the priorities of the goals and their weights of the coordination methods were also calculated by totaling the assigned scores. The top three goals of coordination are facilitation (33%), instruction (28%), and clarification (24%) which account for 84% of the total score. A single goal with a weight less than 50% means their corresponding coordination methods have multiple goals. Moreover, the top three goals of schedules account for meeting 96% of the total (control is 42%), which implies that schedules has fewer goals. Site visits and contracts documents have the lowest score (only 75%), which indicates it can be used for more purposes.

Table 3. Top Three Goals of Coordination Methods

Coordination Method	First		Second		Third		Summary
	Goal	Wts (%)	Goal	Wts (%)	Goal	Wts (%)	
A	4	38	2	33	1	25	96
B	4	29	1	25	2	25	79
C	3	29	2	25	4	21	75
D	4	33	3	25	1	21	79
E	3	33	1	29	4	25	87
F	4	42	3	29	2	25	96
G	3	33	4	29	2	25	87
H	4	29	1	25	3	21	75
Avg.	3	33	1	28	2	24	84

The table 3 also shows that facilitation and control are the two major goals of the eight methods for the seven projects. This may be because the construction had passed the peak for the projects under study, and the need for instruction or discussion substantially decreased. In addition, information sharing and maintenance of relationships were not major goals, as the information was mostly already known by project participants and they had been acquainted for each other for three or four years in the construction periods.

2.1 Degree of Goal Achievement

It can be seen from table 3, the degrees of goal achievement in meetings, site visits, written correspondence, plans, schedules and contract documents are higher than 80% (the average). Informal discussion and reports achieved their goals at a level lower than the average, meaning their effectiveness needs improvement. The coordination goals achievement is different for different companies and also for different coordination methods. Only project 1 has 100% goal achievement in plans.

Above table 3 showing percentage degree of goal achievement by different coordination methods of P1 company. The degree of goal achievement for all coordination method is above 80%. The degree of goal achievement of plans is 100%, which is maximum. This company effectively uses the different coordination methods and becomes efficient as compare to other companies taken in this paper. On the project site, project coordinator arranges meetings when there is necessity.

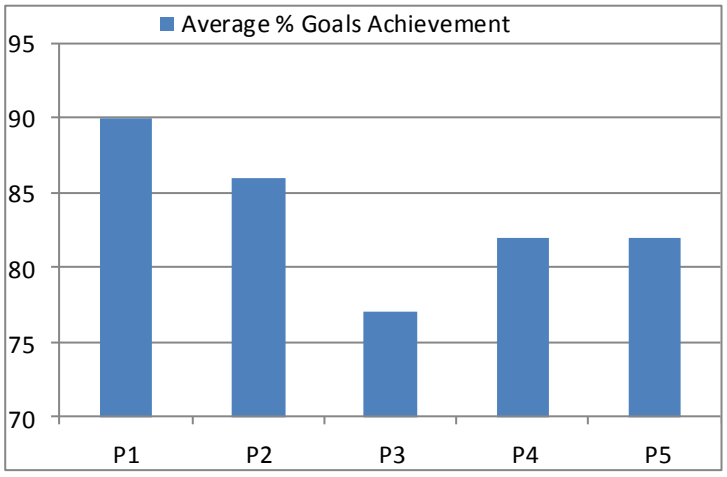

Chart 1. Company-wise Average % Goal Achievement

The chart 1 shows the company wise percentage goal achievement. The Percentage goal achievement of P3 company is minimum i.e. 77%. The project P1 company construction has maximum percentage goal achievement i.e. 90 %. The coordination methods used by this company on construction project are most effective. On these project site there is one project coordinator who

effectively and accurately communicate relevant project information with the employees. The P1 company engineers and management team fully (90%) focus on the plans. And it achieves better coordination in between various construction processes.

2.2 Goal Replacement Possibility with other Coordination Methods

Total 10 interviews are taken with owner and project manager of construction site. The questionnaire includes the replacement possibility of coordination method with another method. For example if meetings have achieved 78% goal in particular project, and it is replace by other seven methods it should be noted. The respective percentage of goal replacement possibility is then calculated.

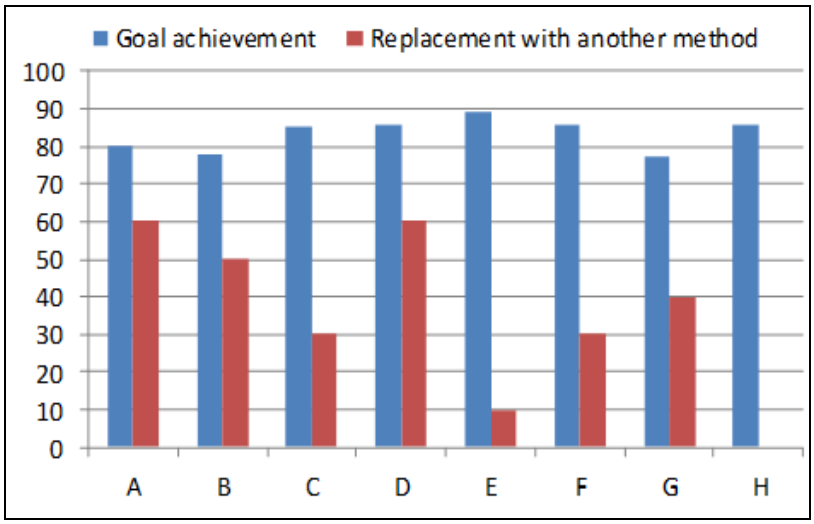

Chart 2. Goal Achievements and Replacement Possibility

The chart 2 shows that written methods, including plans, schedules, reports and contract document, are important and could not be replaced by other methods. The replacement possibilities for meetings, informal discussion and written correspondence are higher than 50%, which means that these methods could be replaced by more effective methods.

III. DISCUSSIONS AND SUGGESTIONS

This paper explores coordination goals by proposing a way of evaluating goal achievement and alternate coordination methods for five construction projects. This research was exploratory because few studies have been done on this subject. Case studies are considered an appropriate methodology for developing theoretical frameworks, and so that is the approach used in this project. The number of case projects was not large. Parts of the research findings are only valid for their specific cases. The project P1 & P2 has maximum percentage of goal achievement. The top management teams in these companies only focus on plans. On P1 project site, project coordinator arranges meetings when there is necessity. For informal discussion purpose, there is provision of walky-talky system which creates instant contact. The inspection of site is done by the engineer in-charge regularly. P3 has goal achievement is minimum. For the further improvement in future I want to suggest the owner as well as engineers to follow the other methods of coordination i.e. informal discussion written correspondence and reports.

IV. CONCLUSION

Effective coordination is important on construction projects because many participants are involved; this leads to interface and dependence. On the basis of this project study, the conclusion is elaborated as below.

1) Now a day's on many construction projects, oral communications such as meetings are usually adopted as the major coordination method on construction projects. But the contract documents and

written correspondence in this project study show positive relationships with coordination effectiveness in quality and useful quantity, respectively.

2) Most coordination methods have multiple goals. The top three goals of the eight coordination methods for the seven projects are facilitation, control, and clarification, which account for 84% of the total score.

3) Meeting quality was positively related to coordination effectiveness with moderate significance. This indicates that meeting quality alone does not ensure coordination effectiveness. In the meeting quality, clarity of communication was more significantly related to coordination effectiveness than utility.

4) The projects with good performance use coordination methods effectively. The degree of goal achievement in these projects is higher than average. In contrast, the projects with poor performance did not use the coordination methods well. Their degrees of goal achievement are lower.

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