

A Study on the Survey of Actual Conditions of Construction progress Management by Local middle or small Construction Companies

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1. Introduction

1.1 The Background and Purpose of Study

Recently the opportunities for Local middle or small construction companies to participate in a Large scale public construction work by inducement of private capital in SOC businesses are being increased in by the rationalization of management of the Construction Industry Act and the support of Local middle or small construction companies.

However, it is skeptical whether they have the capacity of management technology to handle National Policy Businesses because of their lack of fund raising and experience.

Thus, in this Study we are going to investigate the actual conditions of Local middle or small construction companies focused on Progress Management which is the base of field management technology.

This is a basic study to establish how to manage the fields of Local middle or small construction companies in order to heighten competitiveness caused by Opening of Construction Market.

1.2 The Method and Extent of Study

Referred to documentary records to see the present condition of Progress Management in middle and small-scale construction job-sites and conducted an interview survey to get information on usual practice of Progress Management in the construction job-site. On the basis of this, conducted a questionnaire survey focused on general matters, establishment of progress plan and progress control. Total 200 copies of questionnaire were distributed to the construction job-sites of Local middle or small construction companies in Chollabuk-do from June to August.

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1999. Analyzed available 114 copies (Withdrawal Rate : 57%) among collected 132 copies using Minitab.

2. The Concept of Progress Management

2.1 The Concept of Progress Management

2.1.1 The Definition and Objective of Progress Management

As today's construction work pursues large size, complexity, diversification, intelligence, more advanced scientific management techniques are required in planning and conducting construction. Construction management manages schedule, cost and resources of each work through construction planning, schedule planning, checking work progress, controlling, regulating so that construction can proceed according to the original plan.

Progress Management can be said to be the most important part in total progress of construction work. Its objectives are classified into five: First, pursue observance or shortening of fixed construction period. Second pursue optimization of schedule planning or work charge and increase the operating rate. Third, pursue the smoothness of work flow and prevent the stagnation of process by motivating the processes of partial works. Fourth, pursue the improvement of efficiency by improved construction ways and rationalization of work order. Finally, optimize Progress Management and reduce construction cost.

2.2 The Kinds of Progress Management Techniques

2.2.1 Milestone Chart and Flow progress Chart

Gantt Chart is not effective for effective management and control as it shows a project with a long time required or its part. Flow Progress Chart developed by Mr. and Mrs. Gilbreth is effective in operating plans, but subdivides activity too minutely and can not know when activity is begun. Therefore, Milestone Chart, as a unity of Gantt Chart and Flow progress Chart appeared. This is similar to Gantt Chart, but different in showing partial plan on parallel lines and indicating milestone with this. This milestone is not regular in Gantt Chart and is based on a middle course.

2.2.2 CPM(Critical Path Method)

CPM is a representative Progress Management technique. It shows relationship among each work, required time on network and calculates schedule and total construction period and solves and manages process problems with illustration or mathematical model. That is, it can know when each work begin and finish through schedule calculation and Float, so it is convenient to establish work plan.

2.2.3 PERT(Program Evaluation and Review Techniques)

PERT has developed with CPM. It is similar to CPM in a way to determine work schedule and construction period and to get Critical Path. These two Progress Management techniques are strikingly different in that CPM emphasizes on work expressed on network and PERT emphasizes on time material which these

works can be done.

2.3 The Performance of Progress Management

2.3.1 The Establishment of progress Plan

The establishment of progress plan is to make a progress schedule based on work division, work order, determination of work period, calculation of total construction period and determination of commencement date by process and to determine the way to perform the construction. Allot quantity and cost determined in work classification based on a estimate of construction cost.

(1) Construction Planning and Schedule Planning

Construction planning is to plan course and way to carry out construction in order to satisfy three conditions, quality, process and economy presupposing safe construction and harmony with environment around construction job-site and to establish overall plan to carry out construction by understanding all content of work. First, review contract documents on construction and check construction period, technical limitation and construction subject's duties. Then, review possibility of labor mobilization, supply of construction materials and problems in supplying equipments and divide construction into work referring to past construction information and estimate construction period by calculating the amount of materials. Based on materials, establish construction plan considering relationship among each work and supplying plan of labor, equipments and materials through optimization of resources.

In the stage of schedule planning, establish more subdivided work plan based on established construction plan. That is, based on a progress schedule made through progress plan, calculate the commencement and completion dates of each work, extra time and total work period. Regulate construction period by applying Progress Management theory and equalize or allot resources, if necessary. In addition, establish more realistic and subdivided schedule plan by reviewing construction plan, supplying plan of labor, equipments and materials established in the stage of construction planning. Make a Detailed schedule like a management standard progress schedule, which is a guideline to carrying out construction by the end of project.

2.3.2 Progress Control

Includes the measurement of seismic intensity, comparison between plan and results and establishment of changed plan based on a progress schedule.

(1) Checking Work Progress and Controlling and Regulating Work

Progress Control measures actual progress and planned progress by comparison and corrects or renews a progress schedule to supplement construction period in case any problems happen like construction delay. In the stage of checking work progress, analyze work progress based on construction plan, supplying plan of labor, equipments and materials made in the establishment of progress plan. For progress analysis, materials should be updated in a progress schedule periodically.

In the stage of controlling and regulating work, work out a future

countermeasure by planning, analyzing by comparison based on measured data. If difference between results and plan exceeds a certain level, it is necessary to establish a proper countermeasure and to revise a management standard progress schedule. Hereafter, when the content of contract is changed or construction period is delayed, all matters are discussed and settled in controlling/regulating stage.

3. The Present Condition of Domestic Progress Management

To grasp the actual condition of Process Management being performed among the local construction companies, first of all we fulfilled the preparation survey about general conditions of Construction Management.

And then, laying emphasis on the conditions of Process Management in those of Construction Management, We carried on main survey.

The Copy of questionnaire for the main one consists of 6 items with the general condition, with the construction planning and schedule planning, and with the checking work Progress and Controlling and Regulating work. By means of it we grasp the defects of each items.

3.1 General Matters

In order to know the characteristics of the subjects of study, Investigated the position and length of service. The result is position above manager, 60% of total respondents, showing a Project Manager, 41%, manager, 19%, assistant manager, 21% and engineer 19%. More than a half of respondents experienced the general of field management except for individual Work. In addition, in the length of service, more than a half of respondents worked in construction job-sites for more than 10 years, showing more than 10 years, 51%, 5~10 years, 33%, 2~5 years, 16%.

Investigated if there are staffs in charge of Progress Management and the result is construction companies with them, 49% and without them, 51%.

Investigated who plans schedule for Progress Management and the result is a Project Manager, 47%, a Project Engineer, 43%, engineer, 5%, headquarters team, 5%, which shows that a progress schedule for early Progress Management is made by a Project Manager and a Project Engineer.

Investigated management techniques used in construction job-sites for Progress Management and the result is Network Technique, 55%, the highest, Bar Chart, 43%, and other, 2%. Bar Chart is given much weight compared with other techniques, which shows a tendency laying emphasis on managerial convenience.

In addition, We investigated the actual conditions by subdividing planning, scheduling, monitoring and control for detailed investigation of Progress Management.

3.2 Construction Plan and Schedule Plan

Conducted a questionnaire survey on calculation of construction period and distribution of construction resources in order to investigate construction plan and schedule plan for effective Progress Management.

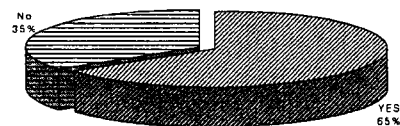
Investigated fixed construction period and actual period of public works by comparison in order to investigate propriety of fixed construction period and the result is insufficient, 53% and sufficient, 47%. In case of lack of construction period, the reduction of construction period through emergency constructions is 93%, very high than 7%, request for the extension of construction period.

Therefore, it seems that the rational construction progress must have the continuous Progress Management.

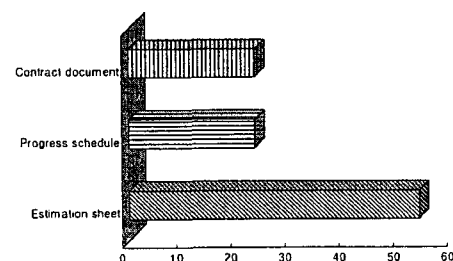
Investigated if there is the calculation of construction period took float on a progress schedule into consideration in order to investigate determination of work period and calculation of total construction period in the early stage of Progress Management and the result is those conduct the calculation of construction period, 65% and those do not consider it, 35%, which shows there are some problems in establishing construction period. In addition, investigated the standard of resource distribution of work the results is Estimation sheet, 54%, contract document, 23% and progress schedule, 23%.

Investigated the clear division of business on each process in order to check if process is divided and the result was clear classification of business, 72% and opposite case, 28%. In addition, investigated the standard of division of each process and the results is contract document, 51%, Estimation sheet, 35% and progress schedule, 14%, which work is divided mostly by contract document other than a progress schedule. In case work is not divided based on a progress schedule, effective management is not made by discontinuation of other managerial matters, such as schedule management and material management by a progress schedule. So the process standard of a progress schedule should be the standard of other field managerial matters for effective management.

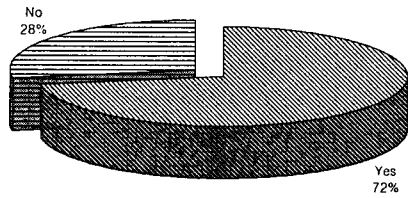
In order to perform Progress Management smoothly, effective establishment of work order and period and the commencement date by progress should be determined in the stage of planning and scheduling. Before this, the standard system of work division for establishment of progress plan should be made and clarify the concrete limit of responsibility on each process by using this system. And it is desirable to induce proper allotment of construction resources and establishment of work period though this.



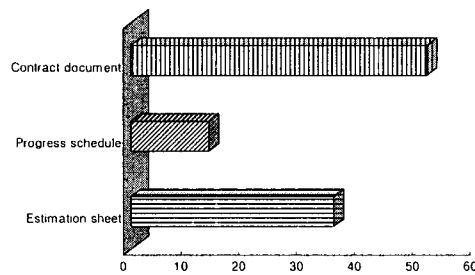
<Fig 1> Considering Float in Network



<Fig 2> Standard of resource distribution



<Fig 3> The clear division of business



<Fig 4> Standard of business division

As a result of Questionnaire survey on Construction Plan and Schedule Plan, Fixed construction period is large percentage of insufficient so wide spread emergency construction. And Construction Plan and Schedule Plan state is poor.

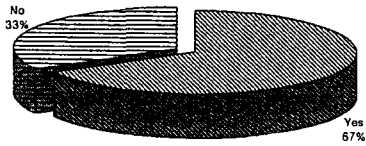
3.3 Progress Checking and Regulating

A completed progress schedule should constantly check work progress, control and regulate. Thus, investigated if there is any update in progress in case the delay or reduction of construction period and the result is yes, 67% and no, 33%, which shows that there is some problems on the Schedule Management in case of the latter.

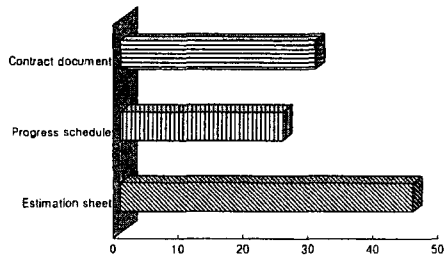
Investigated the standard of calculation and payment of construction cost and the result is detail, 45%, contract document, 30% and progress schedule, 25%. Investigated tools used in management and the extent of business in order to check the computerization and use of Progress Management in construction job-site for effective control and regulation in process.

Investigated the management method of completed process in order to check the computerization of Progress Management in construction job-site and the result is handwork, 50%, the highest, computerization, 19%, computerization and DB management, 19%, Just experience(Do not using progress schedule), 12%.

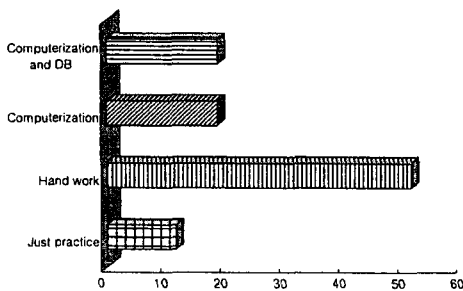
Investigated the extent of business through computerization and the result is the calculation of construction period and schedule regulating, 62%, the highest, Progress Management and DB, 14%, schedule regulating and resource allot plan, 12%, simple calculation of construction period, 12%. The calculation of construction period and schedule regulating are made mainly through computerization.



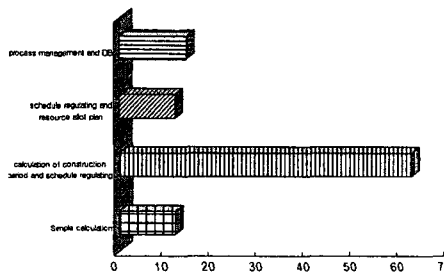
<Fig 5> Updating Progress schedule



<Fig 6> Standard of Calculation & Payment



<Fig 7> Management Method



<Fig 8> Computerization extent of business

As investigated, when the delay or reduction in process happens, the regulation of construction period is made on a progress schedule, but the payment or calculation of construction cost based on a progress schedule is not made. We can know there is limitation in effective use of a progress schedule because a progress schedule is used in only managing schedule.

As for the level of computerization, a progress schedule is managed largely by hand, so matters can not settled quickly and consistently. Also, the extent of business by computerization is only to regulate schedule, which shows limitation in effective management through computerization.

As a result of Questionnaire survey on Progress Checking and Regulating, Progress Management is limited to the completion and simplicity regulating of construction schedule, also the system of process division for Progress Management is out of use for Resource or Cost management. Interrelated works such as increase of construction cost or change of amount of supplied resources by change of schedule can not be done.

4. Conclusion

In order to check actual conditions of Construction Management of Local middle or small construction companies, investigated actual conditions of Progress

Management focused on construction job-sites of local construction companies through a questionnaire survey and reached the following conclusion.

(1) Investigated if there are staffs in charge of Progress Management in construction job-sites, who is the maker of Progress Management, what kind of management techniques are and found that the dualistic system of a Progress Management is in wide use.

That is, to set up a progress schedule is completed by a Project Manger or a Project Engineer and to apply the one is managed by the staff with exclusive responsibility.

And it shows that Bar Chart is in wide use as a management technique, but because of the characteristic of Bar Chart, it is thought that there are some problems which are difficulties in grasping relation to each progresses.

(2) Investigated whether the calculation of construction period is used by the progress schedule from Schedule Plan and whether the Resources Allotment Plan and the clear Division of Process are fulfilled by it from construction plan and found that most situations of construction Process depend on the contracted construction period rather than the construction period by those rational plans.

Therefore, to observe the contracted construction period, they have need to keep up the continuous management on the Resources Allotment plan, the Division of process and the construction plan etc.

(3) Investigated constant update of a progress schedule and the standard of calculation of construction cost on checking work progress and controlling and regulating work for constant management of process and found a progress schedule is updated constantly, but construction cost is paid separately from the content of Progress Management such as checking work progress.

Also, as for the level of computerization of Progress Management, basic works such as completing a progress schedule are made by computer, but the extent of business is limited to some functional parts such as schedule management.

As studied above, Local middle or small construction companies conduct a basic function of Progress Management, schedule management, but do not manage resources or cost management. Thus, Progress Management is limited to the completion and simplicity regulating of construction schedule, also the system of process division for Progress Management is out of use for Resource or Cost management. Interrelated works such as increase of construction cost or change of amount of supplied resources by change of schedule can not be done.

Computerization is only at the basic stage, so the extent of it should be expanded.

This Study analyzed problems by investigating actual conditions of Progress Management among various management businesses for managing construction job-site on Local middle or small construction companies. Further studies to find concrete ways for effective Progress Management of Local middle or small construction companies should be made.

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