

CONSTRUCTION MANAGEMENT

LECTURE FIVE: TYPES OF PROJECT INFORMATION

Construction projects inevitably generate enormous and complex sets of information. Effectively managing this bulk of information to insure its availability and accuracy is an important managerial task. Poor or missing information can readily lead to project delays, uneconomical decisions, or even the complete failure of the desired facility. Pity the owner and project manager who suddenly discover on the expected delivery date that important facility components have not yet been fabricated and cannot be delivered for six months! With better information, the problem could have been identified earlier, so that alternative suppliers might have been located or schedules arranged. Both project design and control are crucially dependent upon accurate and timely information, as well as the ability to use this information effectively. At the same time, too much unorganized information presented to managers can result in confusion and paralysis of decision making.

As a project proceeds, the types and extent of the information used by the various organizations involved will change. A listing of the most important information sets would include.

- cash flow and procurement accounts for each organization,
- intermediate analysis results during planning and design,
- design documents, including drawings and specifications,
- construction schedules and cost estimates,
- quality control and assurance records,
- chronological files of project correspondence and memorandum,
- construction field activity and inspection logs,
- legal contracts and regulatory documents.

Some of these sets of information evolve as the project proceeds. The financial accounts of payments over the entire course of the project is an example of overall growth. The passage of time results in steady additions in these accounts, whereas the addition of a new actor such as a contractor leads to a sudden jump in the number of accounts. Some information sets are important at one stage of the process but may then be ignored. Common examples include planning or structural analysis databases which are not ordinarily used during construction or operation. However, it may be necessary at later stages in the project to re-do analyses to consider desired changes. In this case, archival information storage and retrieval become important. Even after the completion of construction, an historical record

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may be important for use during operation, to assess responsibilities in case of facility failures or for planning similar projects elsewhere.

The control and flow of information is also important for collaborative work environments, where many professionals are working on different aspects of a project and sharing information. Collaborative work environments provide facilities for sharing datafiles, tracing decisions, and communication via electronic mail or video conferencing. The datastores in these collaborative work environments may become very large.

Planning Construction Budget:

A project budget reflects the financial plan of operations with specified goals and the costs expected to be incurred for achieving these. The primary purpose of having a budget is to assign financial targets and resources to each functional group so as to establish some basis for controlling their performance and to make participants plan with cost – consciousness instead of purpose – less routine- working . The basis of budget is the project plan and its schedule of work. The budget preparation involves:

- Structuring of project functional organization into production.
- Services and administration responsibility centres.
- Assigning each responsibility centre its goals in the form of sales budget and production targets.
- Allocating resources with budgeted costs necessary to achieve the assigned goals.
- Compiling the project financial plan in the form of the project master budget.

The Project Budget:

For cost control on a project, the construction plan and the associated cash flow estimates can provide the baseline reference for subsequent project monitoring and control. For schedules, progress on individual activities and the achievement of milestone completions can be compared with the project schedule to monitor the progress of activities. Contract and job specifications provide the criteria by which to assess and assure the required quality of construction. The final or detailed cost estimate provides a baseline for the assessment of financial performance during the project. To the extent that costs are within the detailed cost estimate, then the project is thought to be under financial control. Overruns in particular cost categories signal the possibility of problems and give an indication of exactly what problems are being encountered. Expense oriented construction planning and control focuses upon the categories included in the final cost estimation. This focus is particular relevant for

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projects with few activities and considerable repetition such as grading and paving roadways.

For control and monitoring purposes, the original detailed cost estimate is typically converted to a project budget, and the project budget is used subsequently as a guide for management. Specific items in the detailed cost estimate become job cost elements. Expenses incurred during the course of a project are recorded in specific job cost accounts to be compared with the original cost estimates in each category. Thus, individual job cost accounts generally represent the basic unit for cost control. Alternatively, job cost accounts may be disaggregated or divided into work elements which are related both to particular scheduled activities and to particular cost accounts. In addition to cost amounts, information on material quantities and labor inputs within each job account is also typically retained in the project budget. With this information, actual materials usage and labor employed can be compared to the expected requirements. As a result, cost overruns or savings on particular items can be identified as due to changes in unit prices, labor productivity or in the amount of material consumed.

PROJECT CONTROL PROCESS:

- It aims at ensuring the execution of work as per the planned schedule and the application of necessary corrective measures , including re-planning to achieve the project objective
- Control involves organizing the control responsibility centers , designing , accounting and monitoring methodology ,codifying data and developing the information systems so as to make decisions speedily

The Cost Control Problem:

During the execution of a project, procedures for project control and record keeping become indispensable tools to managers and other participants in the construction process. These tools serve the dual purpose of recording the financial transactions that occur as well as giving managers an indication of the progress and problems associated with a project. The problems of project control are aptly summed up in an old definition of a project as "any collection of vaguely related activities that are ninety percent complete, over budget and late." The task of project control systems is to give a fair indication of the existence and the extent of such problems.

The problems associated with resource utilization, accounting, monitoring and control during a project. Interpretation of project accounts is generally not straightforward until a project is

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completed, and then it is too late to influence project management. Even after completion of a project, the accounting results may be confusing. Hence, managers need to know how to interpret accounting information for the purpose of project management. In the process of considering management problems, however, we shall discuss some of the common accounting systems and conventions, although our purpose is not to provide a comprehensive survey of accounting procedures.

The limited objective of project control deserves emphasis. Project control procedures are primarily intended to identify deviations from the project plan rather than to suggest possible areas for cost savings. This characteristic reflects the advanced stage at which project control becomes important. The time at which major cost savings can be achieved is during planning and design for the project. During the actual construction, changes are likely to delay the project and lead to inordinate cost increases. As a result, the focus of project control is on fulfilling the original design plans or indicating deviations from these plans, rather than on searching for significant improvements and cost savings. It is only when a rescue operation is required that major changes will normally occur in the construction plan.

Finally, the issues associated with integration of information will require some discussion. Project management activities and functional concerns are intimately linked, yet the techniques used in many instances do not facilitate comprehensive or integrated consideration of project activities. For example, schedule information and cost accounts are usually kept separately. As a result, project managers themselves must synthesize a comprehensive view from the different reports on the project plus their own field observations. In particular, managers are often forced to infer the cost impacts of schedule changes, rather than being provided with aids for this process. Communication or integration of various types of information can serve a number of useful purposes, although it does require special attention in the establishment of project control procedures.

IMPORTANCE OF PLANNING, SCHEDULING AND CONTROLLING PROJECTS

Planning Benefits

The object of planning construction project is to per determine how the project objectives will be achieved. Planning precedes all managerial activities and the process combines systematic creative thinking with planning techniques to develop a project plan. The project plan comprises time plan, resources plan and plan for controlling project. It also includes schedules of design and drawing preparation, work quantities, progress of work planned resources allocations, budgeted coasts and cash flow estimates.

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- Project plan clearly defines projects scope of work. It breaks down project objectives into clear, identifiable, quantifiable, attainable and verifiable goals which are assigned to individuals and responsibility centres for accomplishment.
- Project plan aids the management in performing its function efficiently and effectively. It is the spine of the system and at the core of all management activities. It stream lines the project management process and supports the management organizational structure and functioning.
- Project plan forms the basis of project operations and directions and shows how the project is to be run. It also specifies the committed future course of actions on the basis of current decision made with available knowledge of the future.
- Project plan identifies critical activities, thus enabling the managing of project by exceptions.
- Project plan provides the yard-stick for measuring progress and evaluating resources performance-it aids in developing information system and decision making during the implementation stage. It further simplifies and smoothens communication to enable coordination among all those involved in project management.
- Project plans provide the basis for coordinating the efforts of clients, consultants, architects, designers, quantity surveyors, specialists, suppliers, contractors and the project staff.
- A project plan maintain continuity of work, specially when project organizations is temporary and its staffing is transient in nature.
- Project plan has build in flexibility in the form of floats, to navigate changes in the planned path for meeting fast changing environments.
- Project plan creates healthy environment. It promotes unity of purpose among functional diversities to make people time and cost conscious. It commits individuals to tasks and motivates them to achieve challenging targets.

Scheduling Benefits:

Work scheduling serves a five-fold purpose:

- a) Schedule simplifying a project plan. The bar chart type work schedule provides a simplified version of the work plan which can be easily understood by all concerned with planning, coordination, execution and control of projects.
- b) Schedule validates time objectives. Work schedule shows the plannes sequence of activities, data-wise. It takes into considerations, the reduction in efficiency resulting from climatic effects on resources while putting the plan of work on

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calendar basis. A schedule verifies the accomplishment of tasks on dates imposed for completion of the project and the achievement of milestone.

- c) Schedule aids in the optimization of resources employed. Work schedule is based on economical employment of the resources of men, materials and machinery. It avoids abrupt changes from time to time.
- d) Schedule enables forecasting of input resources and earned value to indicate the pattern of requirement and the financial state of the project in terms of investment, expenditure, output and income.
- e) Schedule brings out implications of time and resources constraints.

Control Benefits

The control system aids the management at various levels to perform its functions efficiently and effectively for achieving the overall project objectives. The illustration given below shows the typical pyramidal management structure with the nature of control exercised at each level.

The benefits which can be derived at each level of management through an effective control system are outlined below:

a) Operational Control at Supervisory level

It improves productivity by:

- Minimizing unproductive man hours
- Preventing wastage of materials
- Economizing plant and machinery utilization
- Reducing activity execution time

b) Administrative control at managerial level

It assists in ensuring project organizational efficiency and effectiveness by:

- Updating the work quantities status and determining the balance scope of work
- Analyzing project time status and its implications on project time objectives.
- Evaluating production cost status and forecasting future trends
- Calculating income status and forecasting cash inflows
- Computing budget status and forecasting cash inflows
- Computing budget status and analyzing the implications of variances of future expenditure

c) Directional control at general managers/project managers level

It helps in formulating and directing policies for achievement of project objectives by:

- Analyzing project time cost behavior and making decisions on time saving when required.
- Reviewing project costs and profitability, and making profitability improvement decisions concerning wastage reduction through rigorous cost control, value engineering techniques, cost benefit analysis, workers incentive schemes and alternate methods of construction which cost less
- Auditing managements performance

d) Strategic control at corporate level

It provides information concerning corporate goals and assistance in formulating corporate strategies by:

- Determining overall profitability
- Budgeting and allocating funds and resources
- Updating the company's planning norms and unit rates for securing future works.