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Project Management

Planning Studies

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- The majority of projects will have many thousands of operations, many of which will be interdependent.

- A trial and error approach is no longer valid and

planning is therefore vital!!

- The amount of detailed planning or sophistication involved is likely to be a function of the size of firm; complexity of project and management expertise

In practice the task of planning and controlling construction work is considerably more difficult than might be expected.

- Much happens to interfere with the smooth flow of work, for instance:

- **delays occasioned by weather;**
- **materials not being available;**
- **materials being rejected;**
- **breakdown of equipment;**
- **unwillingness to co-operate;**
- **inadequate detailing.**

- **Other delays may also be caused by external influences, such as:**

- **decisions of building permit authorities and**
- **lack of co-operation of statutory authorities.**

- **A planning technique will not automatically solve these problems.**

- **The main task of site management is to use the programme as a flexible guide in order to compare planned work against work actually achieved.**

- In this way, corrective action can be taken at the earliest possible moment

- **Planning is an intellectual operation** requiring determined conscious effort.

- Ideally, problems will be solved before they crop up on site, with all disadvantages of possible delay in sequence, costly remedies, etc.

- **Planning, therefore, is the process by which managers anticipate the probable effects of events that may change the activities and objectives of their business.**

- By planning, managers attempt to influence and control the nature and direction of the change and to determine what actions are necessary to bring about desired results.

Before a plan can be prepared the following should be done.

1. Decide the objective.

2. Find all relevant facts and information and analyze them.

3. Consider the facts in the light of future trends and outside influences and use foresight.

4. Consider the work already in hand or plans being prepared and take account of this.

According to David Cormican, the characteristics of a good plan should include the following:

1. Be based on a clearly defined objective and must be practicable.
2. Be simple and flexible.
3. Provide continuity and balance of work where possible.
4. Provide for easy control by establishing standards.
5. Be orderly.
6. Exploit existing resources to the maximum before new resources are obtained.
7. Be definite in its requirements.

8. Be arranged in a series of steps to be taken in sequence, each step being a miniature objective in itself.
9. Be made in consultation with those concerned and have their approval.
10. Be made with the help of those who are to carry it out.
11. Incorporate all old and new plans to cover the total new objective.
12. Consist of one master plan incorporating all sub-plans, i.e. Unity.
13. Be arranged in stages: that which is definite, that which is probable and that which is tentative.

Advantages of planning

a) Some advantages to the contractor

- the contractor knows more about the job
- the contractor know well in advance when provision has to be made for increased capital
- supply of labour required for each operation is known
- it becomes simpler to produce various schedules from the program:
  eg. Materials, plant
- easier to see if plant is being fully utilized
- assists coordination of subcontractors
- actual information on the progress of the work is obtained

Advantages for the client:

- the client will know exactly how long it will take to erect the building and

- what length of time his capital will be unproductive while tied up in construction of work.

- at the same time, he has a guide upon whom he can work for engaging staff or purchasing stock, equipment or furniture, etc. for use in the new building.

Advantages for the consultant:

- The program will normally be prepared by the contractor in close consultation with the consultant.

- After the contractor has prepared a clear, concise picture of the construction in the form of a program (e.g. network and/or bar chart) and targets have been laid down for the various operations, then a draft should be submitted to the consultant for his consideration.

- With this information on hand the consultant will know the anticipated rate of progress for all main operations.

- Delay in the issue of drawings can be avoided since a properly drawn up program will inform the consultant when each operation is to be carried out so that contractors cannot claim for extra payment.

Other people connected with the contract, including subcontractors, suppliers, financers, local authority etc. will derive benefit from a properly prepared program. They will know, well in advance, in what stages and when the work is to be carried out and will thus be able to plan accordingly.

Before the actual formulation of the program the following should be considered:

a) the planning technique to be used.

b) the number and type of programs required.

c) the purpose.

Planning technique to be used depends on:

- the complexity of the job;
- the expertise of the management team;
- degree of managerial experience on similar jobs;
- size of the firm;
- attitude of management to planning ‘techniques’;
- time period allowed between award of contract and commencement of site operations.

- Plans made at the upper levels of an organization generally cover a long period of time and affect everyone in the organization. These are known as ***major, strategic and/or policy plans.***

- The attainment of one major plan requires the preparation and implementation of many minor plans.

- **Minor plans** cover a shorter time period and are more detailed than major plans.

- On the operational level, a master plan or pre-contract plan must be underpinned by short-term detailed plans such as monthly, weekly and stage programs.

- Through these, progress can be monitored and if necessary early corrective action taken to ensure work is progressing according to the master or pre-construction plan.

It is generally the contract manager duty to coordinate the efforts of the planning team dealing item by item.

The following procedural checklist is thus adopted from the work of David Cormican are presented:

1. Carry out a site investigation, obtain subsoil information, prepare report and block plan, take photographs, etc.
2. Check available drawings required for the initial planning stage, i.e. 1:100 scale plans and alterations, block plan, 1:20 sectional details and schedules.
3. Obtain a full set of finished drawings as soon as possible.
4. Check Bill of Quantities (BOQ) to see that main items agree with drawings and calculate net labor costs.

5. Submit block plan to plant manager, and indicate dimensions of site accommodation. state commencement date.

6. Obtain from the estimating department a brief summary of the types of equipment and methods proposed that have been included in the estimate.

7. Prepare a list of queries for engineer’s or architect’s attention.

8. Abstract domestic trades (e.g. carpentry and joinery) from the BOQ and submit these to the joinery shop, etc.

9. Check through correspondence available in connection with the project to date.

10. Abstract all subcontract quotations and arrange to submit further inquiries in order to finalize the various subcontracts as soon as possible.

11. Prepare a schedule of all prime cost items and obtain the names of nominated subcontractors and suppliers.

12. Prepare a list of technical queries to engineer. This can be compiled throughout the planning procedure with the information obtained from the engineer to suit the progress of the overall program. A copy will be retained in the head office and the other one for the site manager.

13. Arrange for the completion of necessary forms to comply with the statutory

14. Obtain all permits for hoardings, pavement crossings, etc. including preparing applications for telephone installations, electricity supply, sewer connections, water supply, etc.

15. Prepare a preliminary list of program elements and produce the initial logic network and/or bar chart.

16. Commence preparation of the program calculation sheets, i.e. abstract all the relevant items from the BOQ under separate headings for each program element. It should be prepared in duplicate with one copy for the head office and the other copy for the site manager.

17. Obtain the net labor included in the BOQ for each program element by multiplying the

18. Convert the total money valued for each program element into man-hours.

19. Superimpose on the site layout drawings, the position of all drain trench excavations and foundations trench excavations to obtain an accurate picture of the state of the ground during excavation work.

20. Prepare detailed method statement. Decisions will include type of equipment used; method of carrying out the work; size of gangs to be employed and amount of net labor included in the estimate for the work involved.

21. Plot the decisions made by the planning team, i.e.: (a) contracts manager; (b) site manager; (c) estimator; (d) planner, on each separate program calculation sheet. If a network is used convert to a bar chart.

22. At this stage it may be advantageous to invite the architect or engineer to attend the planning meeting.

23. Write to all subcontractors requesting them to attend the preliminary planning meeting. (Give approximately 2 weeks' notice).

24. Write to all nominated and domestic suppliers to obtain delivery details, notice required, etc. and details of any drawings they may require. A standard format would be very useful.

25. Continue the procedure as detailed in item 21, co-ordinating the various subcontractors and specialists for the remainder of the program elements.

26. Plot the dates for plant requirements, subcontractor's drawings, and indicate in the relevant positions allocated on the master program chart.

27. Using the program derive the following schedules:

(a) labor; (b) plant; (c) materials; (d) subcontractors.

28. Decide on commencement date and plot the calendar on the master program.

29. If necessary smooth resources to achieve optimum rhythm, utilization, balanced gangs, etc.

30. Submit prepared schedules to relevant department within the firm (e.g. plant dept., purchasing dept.) for action.

31. Submit schedule of drawings required to the engineer or architect as soon as possible.

32. Ensure distribution of programs to engineer/architect, site manager, general foreman, contracts surveyor, plant department and certain subcontractors.

33. Prepare in detail the first stage or short-term program.

34. Take each item in the short-term program, and ensure that all materials and plant have been requisitioned and ordered.

35. Complete the short-term program in greater detail.

36. Send relevant programs to site, including adequate supply of forms and planning calculation sheets.

Site layout

- The decisions to be taken can be divided roughly into four groups, although they are interdependent to some extent.
  - Provision of adequate access roads for the transport of equipment on to and about the site.
  - Location of major plant.

- *Storage areas*

- *Site accommodation*

a. A situation where there is natural light.

b. The agent and general foreman would require a location where the contract can be viewed from the window.

c. Offices need to be away from dust and noise of machinery.

d. Timekeeper's office needs to be near site entrance.

e. Materials controller’s office needs to be in a position where the entry of lorries in to and off the site can be controlled.

Special problems related to site layout

Confined sites

1. Site accommodation created on gantries over the footpath areas.
2. Use of two-or three-storey site offices.
3. Use of ready-mix concrete.
4. Use of a climbing tower crane.
5. Buffer stock of materials kept to absolute minimum.
6. All waste materials immediately removed from site.
7. Material deliveries restricted to off-peak times.

Tall buildings

1. Establish site accommodation, e.g. Canteens, toilets,

   etc. at, say, every sixth floor.

2. Install high-speed passenger lifts/hoists.
3. Ensure that tower crane is fully utilized.
4. Provide temporary services outlets for electric supply.
5. Use of strategically placed chutes to remove rubbish.

Method Statement

- It is to think widely in the initial stages of the optimum method to be adopted or plant to be used. The fact that one particular method has been successful on a previous project does not justify its exclusive use on all other similar projects.
- The method statement should include work of any consequence. It takes the form of a schedule. The method used to accomplish each major operation will be described together with plant, labor and duration.
- The method usually forms the basis for the program preparation.

Assignment 2

1. List and briefly discuss the engineering management functional categories taking into consideration the Ethiopian situation.

2. Suppose you are employed as a junior engineer in a project worth 700 Million Birr for the construction of G+20 multi-purpose building in Gondar. The site is a rectangular plot of 50m by 60m with a built-up area of 2000m^2. Consider the site to be in the city center having access to main road along one of the sides only. Locate: entrance, possible location of crane, storage area for various materials, site offices, parking, and other relevant functions for the execution of the project. You may make any reasonable planning assumption.

Thank you !!!