Project Planning

By

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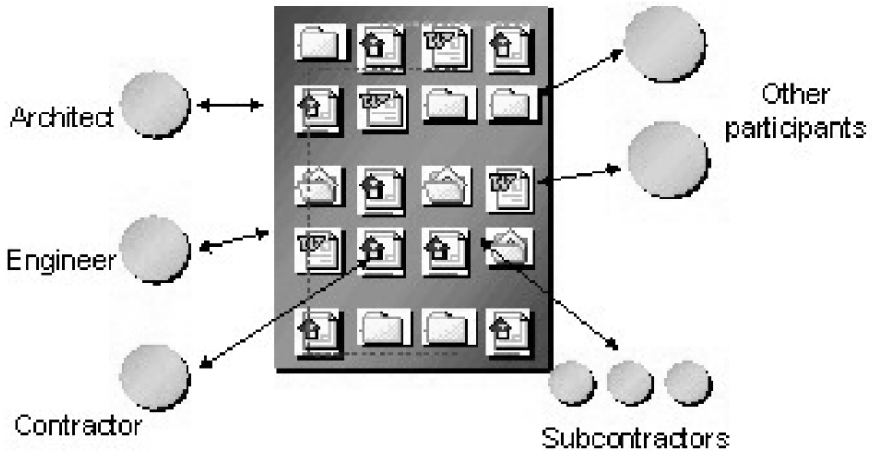
Web-Based Project Planning

- The Need
  - Considering that 1 to 2 % of project cost is simply paperwork, multimillion dollar amounts are expended to support communication and information transfer.
  - Geographically dispersed team members need to share information, documents, drawings, and strategies.
  - The likelihood of errors, or missed deadlines is reduced through web-based project management tools

Chapter-Opener (p. 90)

Web-Based Project Planning

- The Technology
  - With the Internet acting as the ultimate communications medium, web-based project management applications provide an instant, on-demand, secure online solution for all team members to communicate, share data and documents, and collaborate



Page 90
Centralization of data on server

Introduction

- The planning of a project:
  - Concept of an objective or facility
  - Scope of work.
- Bid package consisting of the plans and specifications establishes the scope of work.
- Work should broken into components, which defines work elements or building blocks.

Introduction

- Assumption is that the project is the summation of its sub-elements.
- Sub-element is defined as work packages.
- The summation of the work packages can be shown in a hierarchical format called a work breakdown structure or **WBS**.
- The figure on the next slide is a n example of a WBS for a small business.

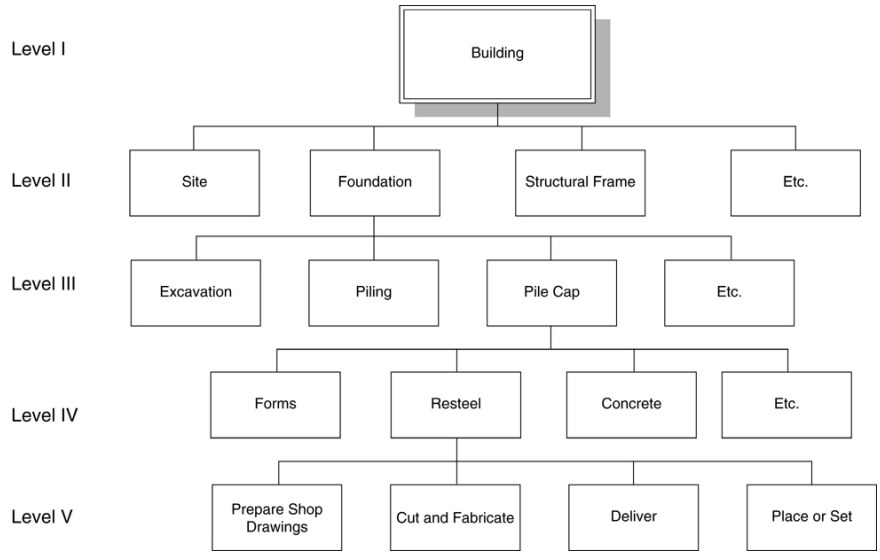


Figure 6.1 (p. 91)
Work Breakdown Structure (WBS) example.

Introduction

- Development of A WBS requires a through understanding of the project scope of work.
- Mentally, building a WBS structures the work which must be physically accomplished to realize the project and its end objective.

Introduction

- Planning can be thought of as the definition and sequencing of the work packages within a given project:

PLANNING = WORK BREAKDOWN + WORK SEQUENCING

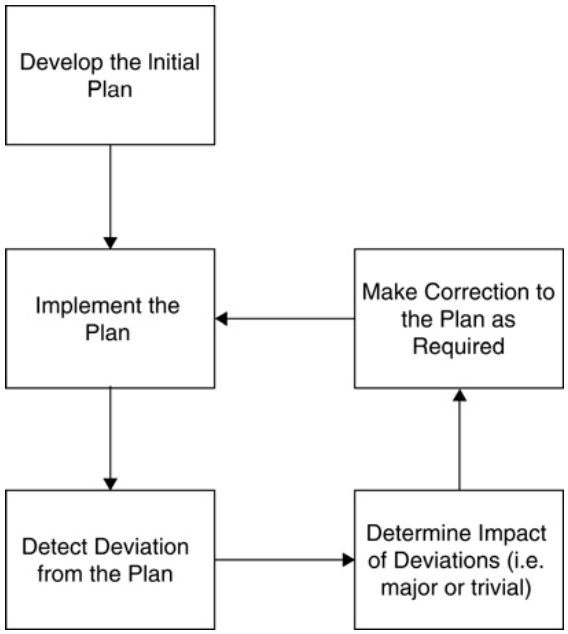
Introduction

- Planning leads to a refinement of the Scope of Work as established in the contract documents.
- A good plan reduces uncertainty and improves efficiency.
- Planning allows us to develop a framework for project
  - Execution
  - Monitoring, and
  - control

Introduction

- Planning is, however, an ongoing task and continues throughout the life of the project.
- The success of a project is tied to manager's ability in identifying deviations from the plan and solving the challenges precipitated by these deviations.
- The next figure reflects this cycle of planning in terms of a simple flow chart.

Figure 6.2 (p. 92)
The Planning/Management Cycle.



Developing The Work Breakdown Structure

1. Work packages must be clearly distinguishable from other work packages.
2. Each work package must have unique starting and ending dates.
3. Each work package should have its own unique budget.
4. Work packages should be small enough that precise measurement of work progress is possible.

A Work Breakdown Example

- Consider a small gas station.
- In construction, the various aspects of the work that contribute to breakdown of the project into packages relate to:
  1. Methods used to place work
  2. Skills needed for the work
  3. Craft workers involved
  4. Critical Resources (e.g., cranes, crew, etc.)

A Work Breakdown Example

- The definition of work packages can be facilitated by using four categories which help in establishing a level of uniqueness:

1. Location or Area within the Project (e.g., foundation – pile cap)
2. Material Type (e.g., concrete, steel, etc)
3. Method of placement (e.g., excavation)
4. Organizational Resources Required (e.g., labor and equipment needed

Work Packages for The Gas Station

- Packages and a WBS for gas station construction.
  - First, locations which are work package related will be determined.
  - The building foundation can be considered a location.
  - Whether the scope of work includes parking and service area surrounding the station.

Work Packages for The Gas Station

- For the purpose of this example, it is assumed that the project within the scope of the work.
- LOCATION work packages would be as follows:
  1. Parking and Service Area
  2. Foundation
  3. Building Walls/Structural Panels

Work Packages for The Gas Station

4. Building Roof
5. Interior Floors/Slabs (separate from the Foundation)
6. Interior Finishes
7. Exterior Finishes
8. Electrical Systems
9. Mechanical Systems

Work Packages for The Gas Station

- Adding the category of MATERIAL TYPE expands the number of work packages as shown in the Table of next slide.
- If mechanical work is expanded to cover location, material type, methods and resources, the following partial list of work packages would be added to the hierarchy of the WBS:

Table 6.1 Work Packages for the Gas Station Project

(1) Earthwork for Parking and Service (P&S) Area	(10) Interior Built-ins (e.g., Cabinets, etc.)
(2) Asphalt Paving for P&S Area	(11) Interior Painting
(3) Concrete Hardstands in P&S Area	(12) Interior Drywall
(4) Concrete Foundations	(13) Interior Doors, Frames, Hardware, etc.
(5) Walls–Masonry Bearing Walls	(14) Interior Floor Coverings (if required)
(6) Walls–Prefab Metal Sandwich Panels	(15) Exterior Brick Façade
(7) Interior Concrete Floors	(16) Exterior Glazing
(8) Built-up Roof	(17) Exterior Doors and Signage
(9) Roof Gutters/Drainage	(18) Mechanical Systems
	(19) Electrical Systems

Table 6.1 (p. 94)
Work Packages for the Gas Station Project

Work Packages for The Gas Station

1. Excavation of Waste Water System
2. Drainage Tile installation – Waste Water
3. Septic Tank Installation
4. Fresh Water Lines (piping)
5. Sinks, basins, toilets installation
6. Hot Water System installation
7. Air System installation

Determining Sequence of Work Packages

- The work is broken into work packages.
- Activities which facilitate time management and control can be defined and logically placed in sequence.
- The word ACTIVITY is generally used when discussing time control or scheduling to refer to the work elements which appear in the schedule in their expected sequence or logical order.

Determining Sequence of Work Packages

- In arranging the work package sequence for time control, the criteria for:
  1. Location
  2. Material
  3. Method, and
  4. Required resources

  must be reconsidered from the perspective of how these criteria impact the order or sequence of work activities.

Determining Sequence of Work Packages

- For instance, location can determine sequence.
- It is normal to complete the structure of the 1st floor of the building before beginning work on the structural frame for the 2nd floor. This can be considered a physical constraint.
- Such physical constraints or physical logic are common in construction operations.

Determining Sequence of Work Packages

- Example:
  - The floor must be complete before installing the floor covering.
- Location aspects of a work package may, therefore, determine its sequence in the overall project

Determining Sequence of Work Packages

- Again, consider the small gas station project.
- A preliminary sequencing of the work packages is shown in the figure of the next slide:

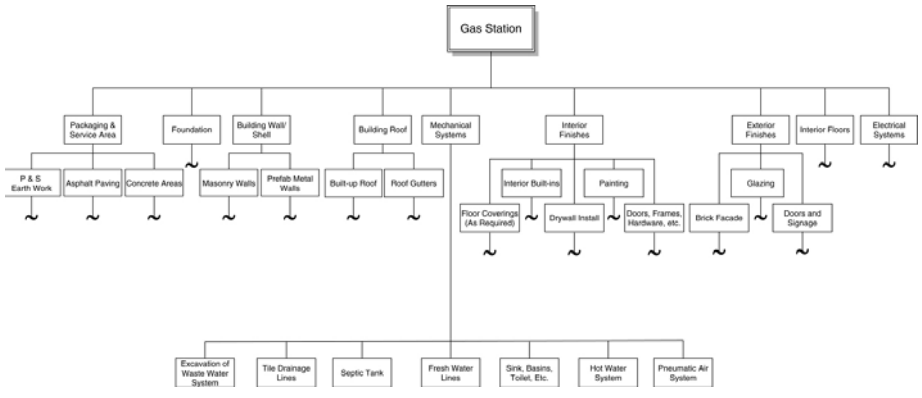


Figure 6.3 (p. 96)
WBS for Gas Station Project.

Determining Sequence of Work Packages

- As a more detailed time plan (i.e.; schedule) is developed, consideration must be given to other time consuming activities which are not necessarily identified using location, material, method, and resource criteria:
  1. Administrative actions such as inspections, permit, issuance, noise constraints, etc. must be considered in developing the time schedule logic.

Determining Sequence of Work Packages

2. Deliveries of materials and similar logistically issues must also be factored into the schedule.
3. Finally, certain special activities tied to the physical properties of the materials or procedures required (e.g., curing of concrete, moisture content measures for soil compaction, etc.) must be included in the time schedule.

A well defined WBS facilitates the development of both preliminary and detailed schedules.

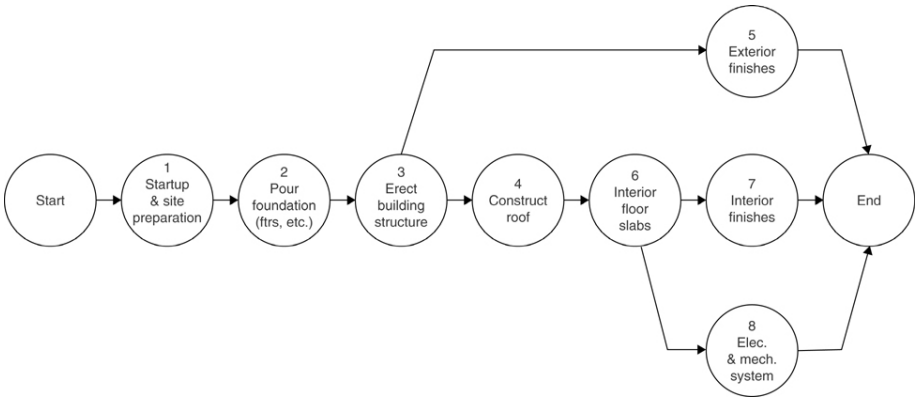


Figure 6.4 (p. 97)
Preliminary project breakdown.

Figure 6.5 (p. 98)
Cost Control Cycle.

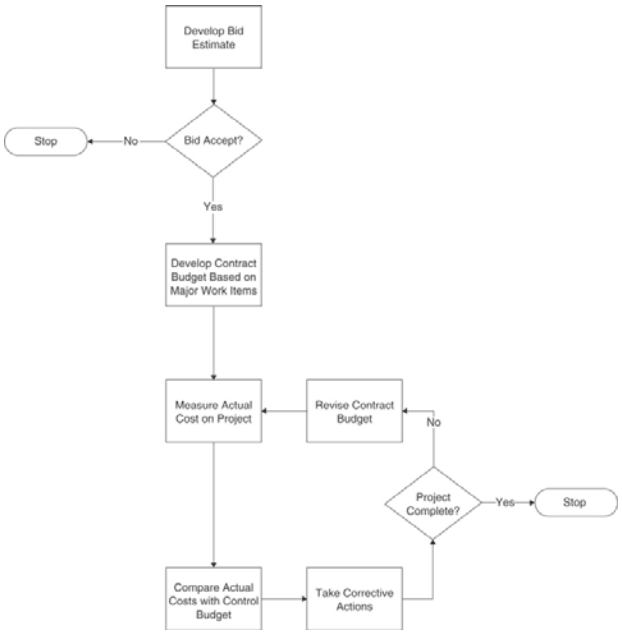


Table 6.2 Cost Code Structure (Example)

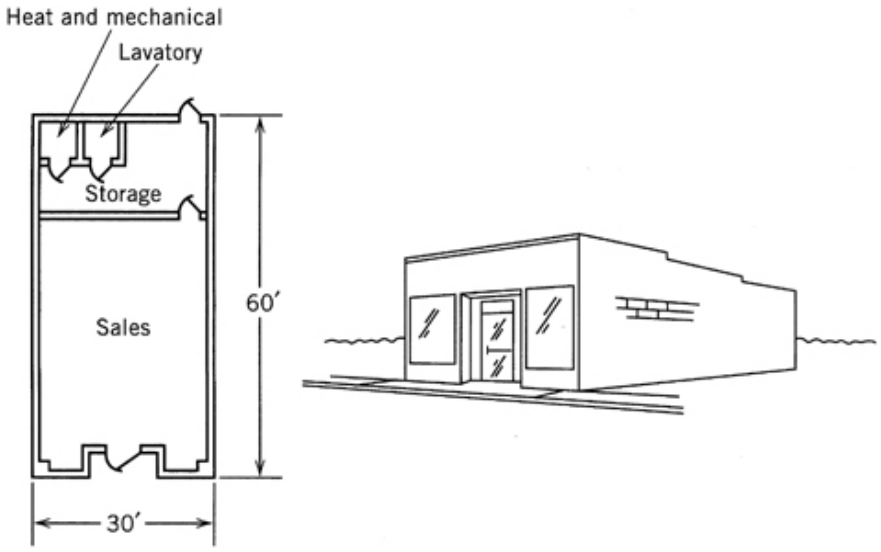
Level	Project	Area	Discipline	Trade
1	21300			
2		804		
3			724	
4				112

Cost Code = 21300 – 804 – 724 – 112

Table 6.2 (p. 99)
Cost Code Structure (Example)

Work Package Identification 06-123 Description: Concrete Placement Interior Floor Slabs						
	Materials					Actual Productivity
Resource Code	Description	Unit	Qty	Unit Cost	Extension	
101	Concrete, 2500psi	CY	30	40.00	1200.00	
	Installed Equipment					Notes
	Crew Labor	NR	Hours	Cost/Hr	Extension	Cost Summary
020	Foreman	1	8	30.00	240.00	Actual Cost
029	Laborer	4	8	15.00	480.00	Labor =
022	Finisher	1	8	20.00	160.00	Materials =
063	Pump Operator	1	8	25.00	200.00	Equipment =
				Total	1080.00	Variation from Budget
Equipment Not Charged As Indirects						
		NR	Hours	Cost/Hr	Extension	
505	Vibrator	1	8	10.00	80.00	
517	Finisher	1	8	15.00	120.00	
308	Concrete Pump	1	8	150.00	1200.00	
				Total	1400.00	

Figure 6.6 (p. 99)
Work Package Control Account Sheet.



Problem 6.2 (p. 100)