

CE 4990 - Construction Scheduling

Week 1 *Fall 2011*

January 11, 2012

The Planning & Scheduling Process

Project planning and management involves four major functions - estimating, scheduling, project monitoring and control. The first two functions occur primarily during the pre-construction phase, while the next two functions are prevalent during the project execution phase. This process can be summarized in the following 6 steps:

- Understanding the project - carefully studying project documents (contracts, project drawings, specifications), recognizing site limitations, identifying project goals and priorities
- Plan the project: develop a Work Breakdown Structure
- Identifying project activities - establishing the relationships between activities and constraints governing them
- Assigning resources to activities, estimating production rates and calculating activity durations
- Developing a plan of work and creating a formal schedule
- Analyzing the schedule to plan for contingencies
- Developing a monitoring and control approach

The schedule depicts critical relationships and activities that drive a construction project, supports planning and it is also a formal project document that is used to support a contract.

Work breakdown Structure

A Work breakdown Structure (WBS) provides a framework for describing the high level tasks/ components of a project schedule. It is not merely a sequence of activities that need to be completed - rather, it provides a logical organization of activity groups in successively greater detail by level. For example, a project to build a warehouse can be “broken down” as follows:

Project level: Warehouse

- Subproject level: Administration, Mobilization, Procurement, Construction, Project Startup
 - Network level: Mobilization ...
 - Network level: Construction → Sitework, Footings, Floor slab, Masonry walls, Steel columns & joists, Roof system, Interior finishes
 - * Activity level: Footings → Excavate footings, Form & reinforce footings, Place footings

1. Subactivity level: Excavate footings → Materials, Equipment, Labor
 2. Subactivity level: ...
- * Activity level: ...
 - Network level: Procurement ...

Activites

Activities are discrete work items with an unique scope of work that tend to have the following properties:

- Take time to complete → Duration
- Need resources to complete → Materials, Equipment, Labor
- Are related to other activities by time and resource constraints
- Specific parties/stakeholders can be made responsible for completion
- Are expressed in units that can be used to measure progress quantitatively

Is an activity the same as an operation?

Schedule: The Nature of Time

Time can be represented as

- Time points (e.g. class starts at 10:00 a.m.)
- Time intervals (e.g. the game will last for 3 hours) - when associated with a calendar is often defined by time points (e.g. the game will be played from 3:00 p.m. to 6:00 p.m): consider a bar chart
- A sequence of discrete events: Useful for studying and representing operations