Scheduling Techniques

Lecture 2

Inputs to Scheduling and Bar (Gantt) Charts

Scheduling

- Is the allocation of resources (time, equipment, ..., etc.).
- Steps
  - Calculate detailed information (activity)
  - Assign time to activities
  - Give consideration to resources
  - Allocate resources
  - How much will it cost?

Activity

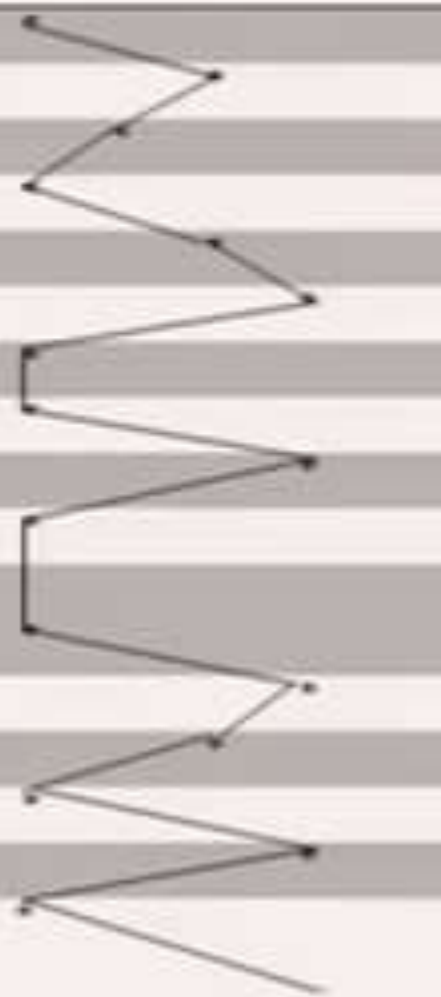
- The elements into which the project is subdivided into manageable minor steps are called activities (tasks).
- An activity is a single work step, that has a recognizable beginning and an end.
- what about the number of activities? Is there any guideline?
- Task description & attributes
- **Activity is the actual performance of a task, such as**
  - Install computers
  - Test

Task types

- **Value adding activities** or production activities or the direct physical progressing activities (Engineering or construction).
- **Non-value adding activity** (Breaks in the work)
- **Non-value adding activity, but necessary**.

Flow Process Chart

S.No	Description of Activity	Time(min)	No of Labours
1	Truck with rebar arrives at site	0	-
2	Wait for Engineer to come	25	-
3	Visual Inspection	10	-
4	Receipt by engineer	10	-
5	Wait for the labours to arrive	20	2
6	Taking the sample to get it cut for the testing	10	2
7	Cutting the sample for further test by third party	5	2
8	Receipt by Quality in charge	10	-
9	Travelling of truck till weighing machine	3	-
10	Weight of the truck(W1)	.5	-
11	Feeding details of arrived truck in system by verifying the receipts at weighing machine	15	-
12	Movement of truck to the steel yard	6	-
13	Wait for labours to arrive	20	-
14	Unloading manually	60	4
15	Movement of truck to the weighing machine	5	-
16	Weight of empty truck(to calculate weight of steel)	5	-



Activity duration:

- The time required for each activity for its completion
  - all time-consuming activities are assigned a duration.

- **Most difficult a time managing activities**: estimating the correct time which will take for completing a project.
  - Low estimate or high estimate
- Direct method using total quantity and daily production rate
  - Ex: find the duration of painting for 400 m^2 using a crew of 12 m^2/hr
  - Answer is 400/12=33.33 hrs = 34 hrs app.

Estimating Techniques

- **Expert judgment**
  - One of the most frequently used methods for estimating the duration of activities in projects
  - An estimator using this approach relies on his expertise and is guided by historical information and experience with similar project
  - For improved accuracy, this is often used in combination with other techniques

- **Analogous estimating**
  - It requires you to analyze previous projects to approximate the length of the activity
  - It depends on selecting a completed project or sections of it, similar to the new project, and using the definite time from the finished project to estimate duration of the new project.
  - Estimator needs to factor in any differences between the new work being estimated and the previous task being used for comparison
  - This method provides quick and easy estimates for projects or tasks that are not very complicated

Estimating Techniques

- Heuristic estimating
  - Here, the estimating is based on a 'rule of thumb'
  - These are based on parameters derived from past experiences
- Parametric estimating
  - Parametric estimating uses the statistical correlation that exists between a set of historical data and a series of delineated list of other variables
  - This technique can be applied to any situation in which sufficient historical data are available
- The Delphi Technique
- Phased estimating
- Top-down estimating
- Bottom-up estimating
- Monte-Carlo Simulation

Dependency Relationships

- Logic/dependency relationship
  - Order in which the activities are to be accomplished
  - A logical relationship exists between two activities when the start (or finish) of one activity depends physically on the finish (or start) of another activity
- Links - need not follow conventional FS
- Loops/cycles
  - When two or more activities are linked in a circular manner
- Redundancies
- Logical relationships should not be confused with constraints

There are sequential and parallel which is a common relationship which we use in construction phase alone.

Constraints

- Constraint is when an activity is subject to constraint such as approval of an owner or an government agency, funding availability, or workspace availability, etc.

- Constraints
  - Flexible constraints – as soon as possible, as late as possible there is no deadline. There is no demand
  - Moderate constraints – start no earlier than, finish no later than there is a deadline only for the start,
  - Inflexible constraints – must finish on, must start on, zero total float