

Planning & Scheduling

CSTM 462

Managing a project through time and resources.

The need for proper planning and scheduling.

Project Management Objectives

1. Eliminate or reduce project RISK.
2. Obtain a thorough understanding of PROJECT OBJECTIVES/MILESTONES.
3. Formulate strategy for achieving objectives with available RESOURCES.
4. Develop a framework for MONITORING AND CONTROLLING THE PROJECT

What is it?

Defining activities for a project, through their relationships we can identify the project duration.

We will learn a new way of managing projects through the critical path method.

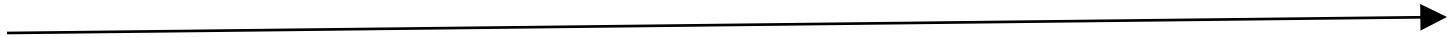
Learning Objectives

- Understand the Scheduling players
- Time is of the essence
 - Success or Failure
 - Think in Man-hours
 - Estimators can lead to costs schedulers look to hours.
- Understand WBS
- Understanding Steps

Understand the Scheduling players

Worker

Owner



And all between.

Why schedule the construction project?

Owner

- Owner requirement
- Communication of the construction plan
- Monitor and measure progress
- Manage change

General

Contractor/Subcontractor/ Supervisors/Worker in Field

- Establish production goals
- Manage change
- Communication of the construction plan

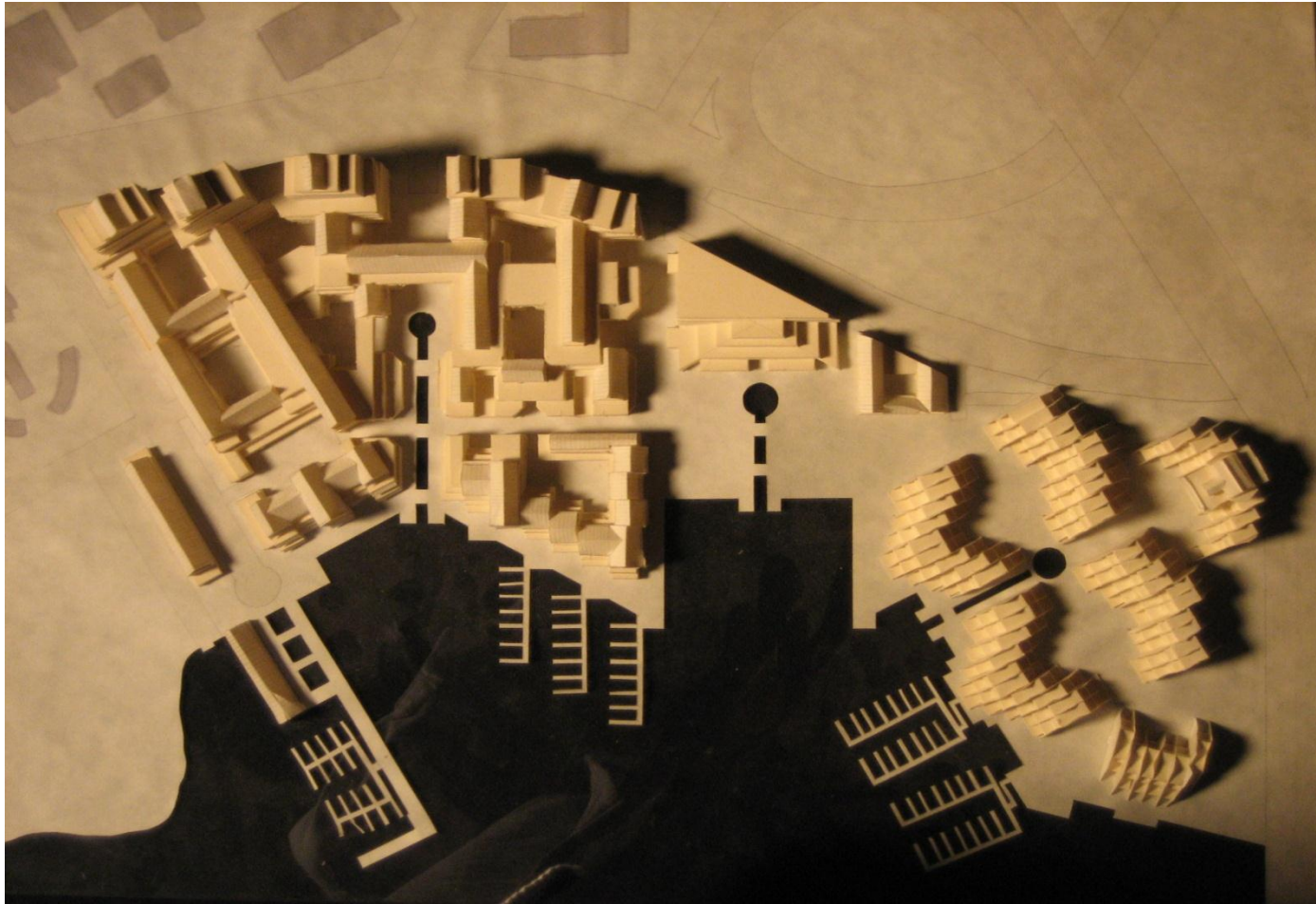
Time is of the essence

- Success or Failure
- Think in Man-hours
 - Estimators can lead to costs schedulers look to hours.

Time is of the Essence

Time shall be strictly of the essence of the contract. The Contractor shall promptly begin the work under the contract and all portions of the project made the subject of the contract shall be begun and so prosecuted with necessary plant, equipment, procedures, and overtime that they shall be completed and ready for full use in the time stated in the special conditions.

Understand WBS



A Work Breakdown Structure helps in organizing *what* needs to be done in small packages of activities.

Work Breakdown Structure

The work breakdown structure (WBS) is a hierarchical system that represents the construction project in increasing levels of detail to define, organize and display the project work in measurable and manageable components.

Work Breakdown Structure

Level 1	Project
Level 2	Subproject
Level 3	Sub-network
Level 4	Activity
Level 5	Sub-activity

WBS LEVEL 1:

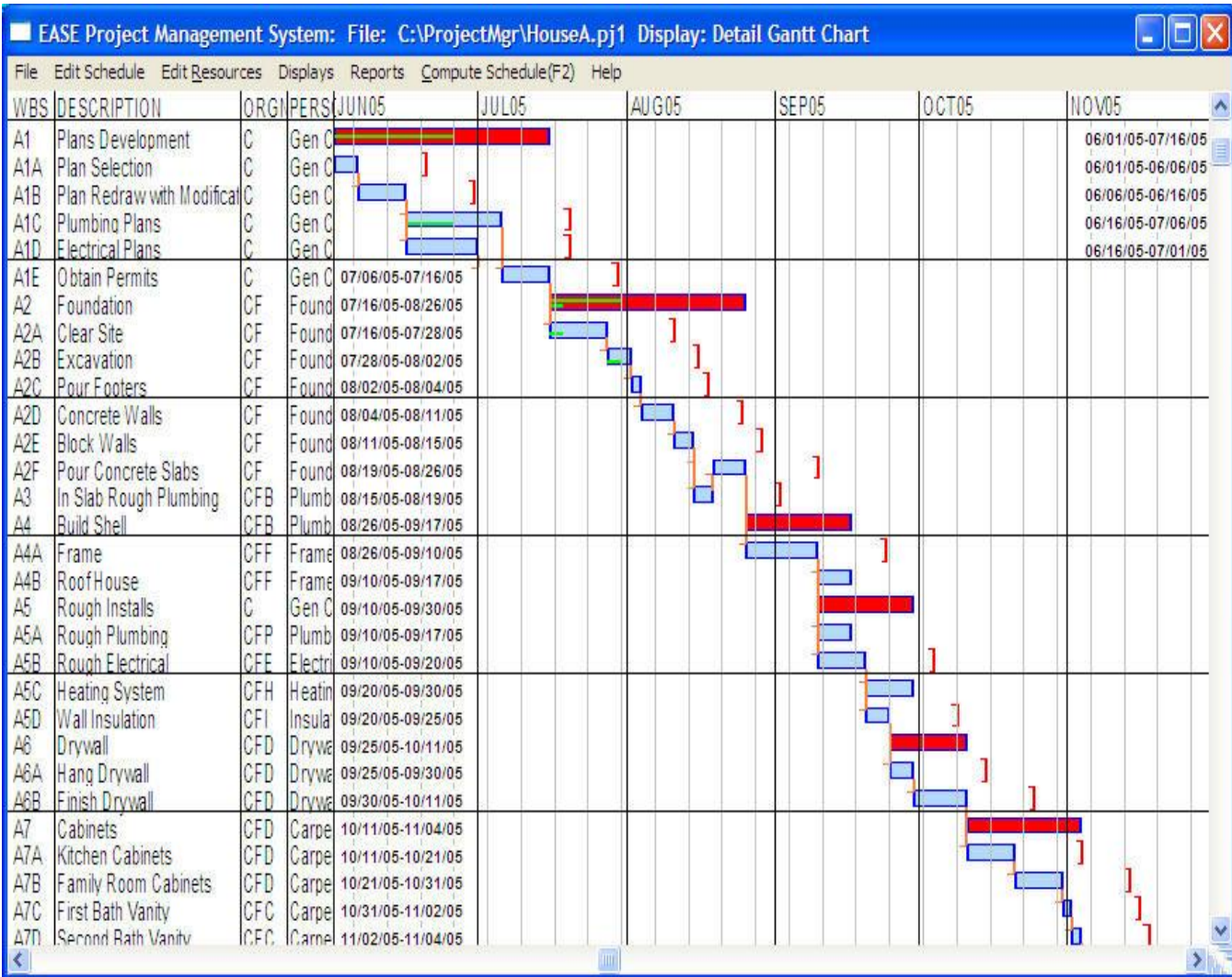
1. Bicycle_ (100)

WBS LEVEL 2:

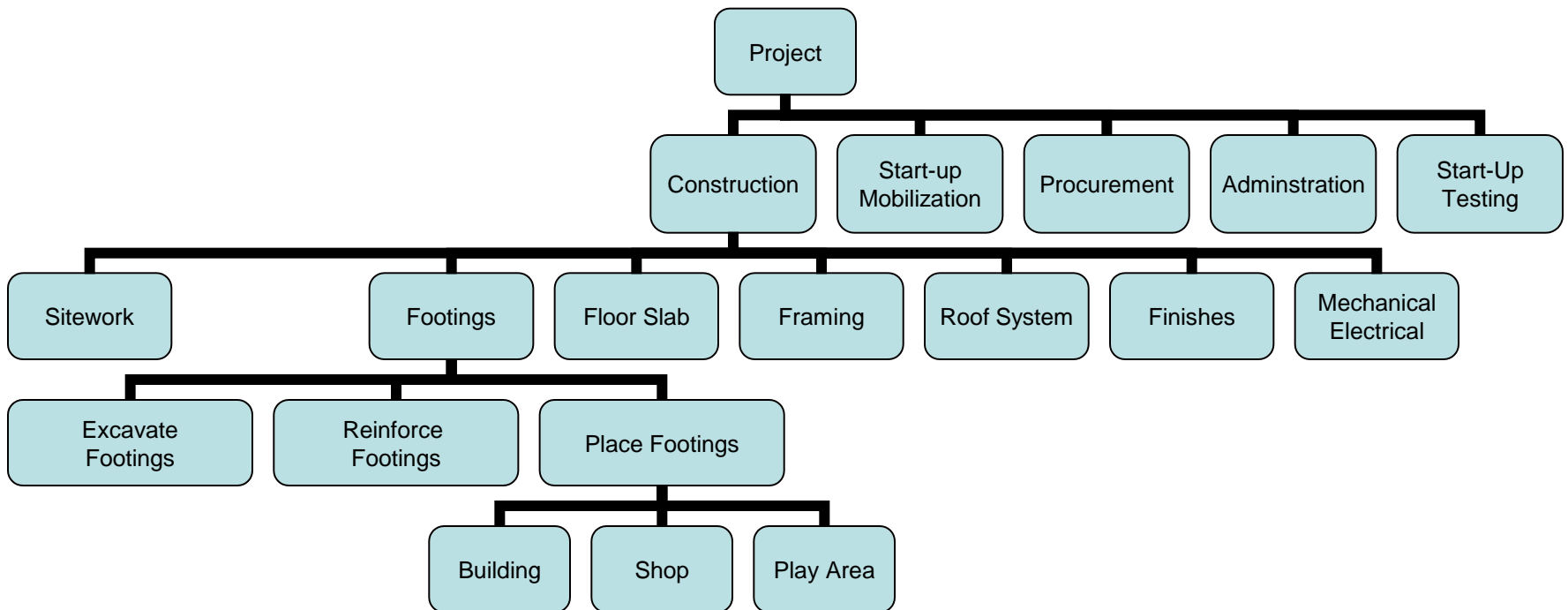
1. Bicycle	
1.1 Frame Set_	15
1.2 Crank Set_	5
1.3 Wheels_	30
1.4 Braking System_	5
1.5 Shifting System_	5
1.6 Integration_	35
1.7 Project Mgt_	5
	100

WBS LEVEL 3:

1. Bicycle	
1.1 Frame Set	
1.1.1 Frame_	7
1.1.2 Handlebar_	2
1.1.3 Fork_	3
1.1.4 Seat_	3
1.2 Crank Set_	5
1.3 Wheels	
1.3.1 Front Wheel_	13
1.3.2 Rear Wheel_	17
1.4 Braking System_	5
1.5 Shifting System_	5
1.6 Integration	
1.6.1 Concept_	3
1.6.2 Design_	5
1.6.3 Assembly_	10
1.6.4 Testing_	17
1.7 Project Mgt_	5
	100



Work Breakdown Structure

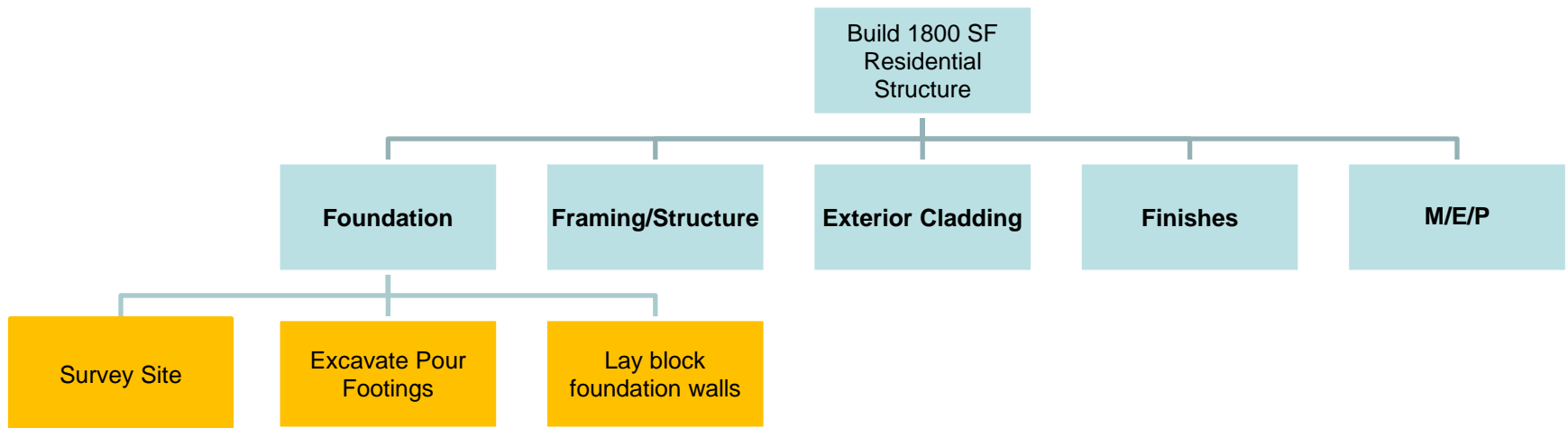


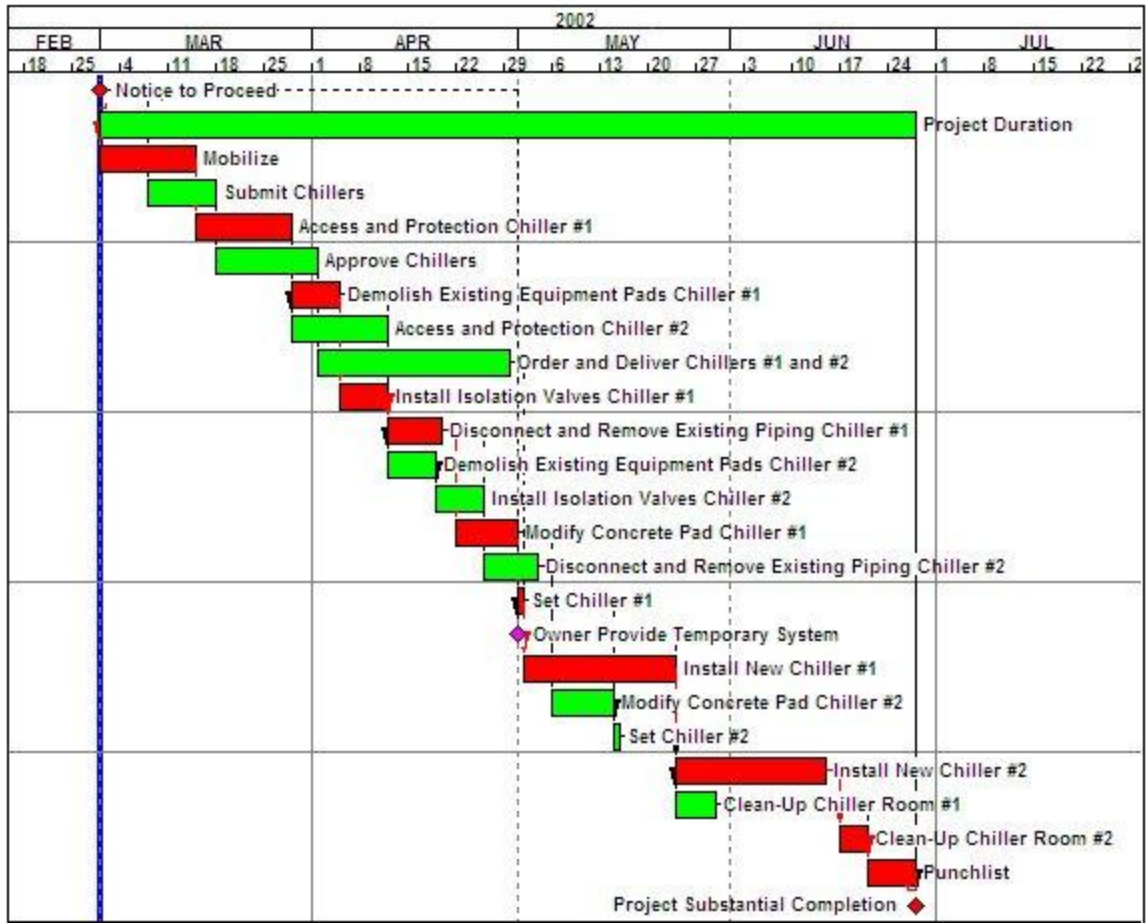
Example WBS

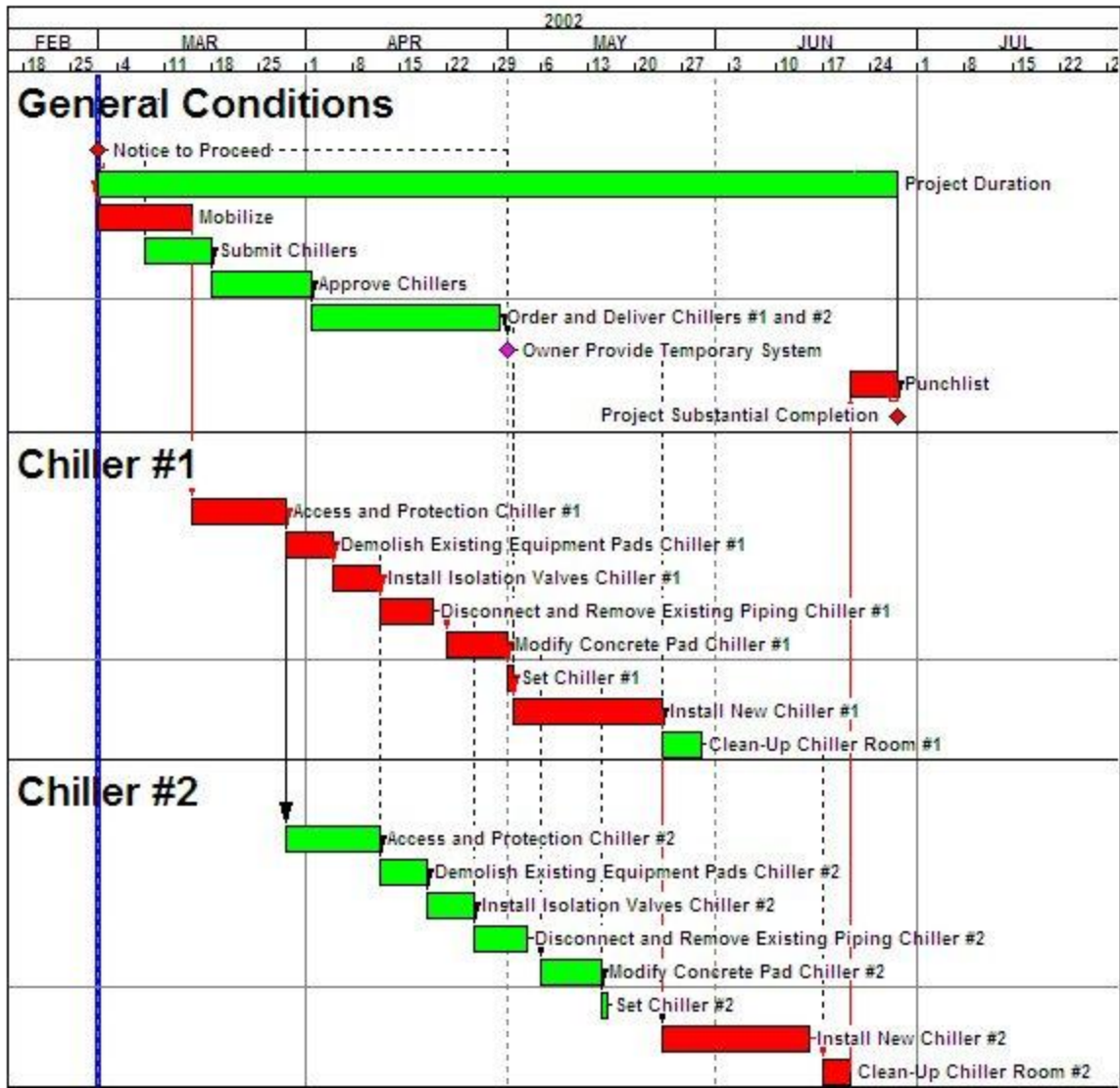
3 Unit Townhouse

- Unit One (WBS)
 - Site Work (WBS)
 - Excavate Footings (Activity)
 - Build foundations (WBS)
 - Erect structure (WBS)
 - Install Mechanical/Electrical (WBS)
 - Electrical Rough-In (Activity)
 - Electrical Finish (Activity)
 - Interior finish (WBS)
 - Exterior Finish (WBS)

WBS-Residence









Lets look at it as a layperson.

- Steps to complete a project.
 - Brushing your teeth
 - Cooking dinner

What is it?

Defining activities for a project, through their relationships we can identify the project duration.

The relationships of each activity

- When one activity can start
- The sequence of each activity
- The duration of each and when it can finish.

We will learn a new way of managing projects through the critical path method.

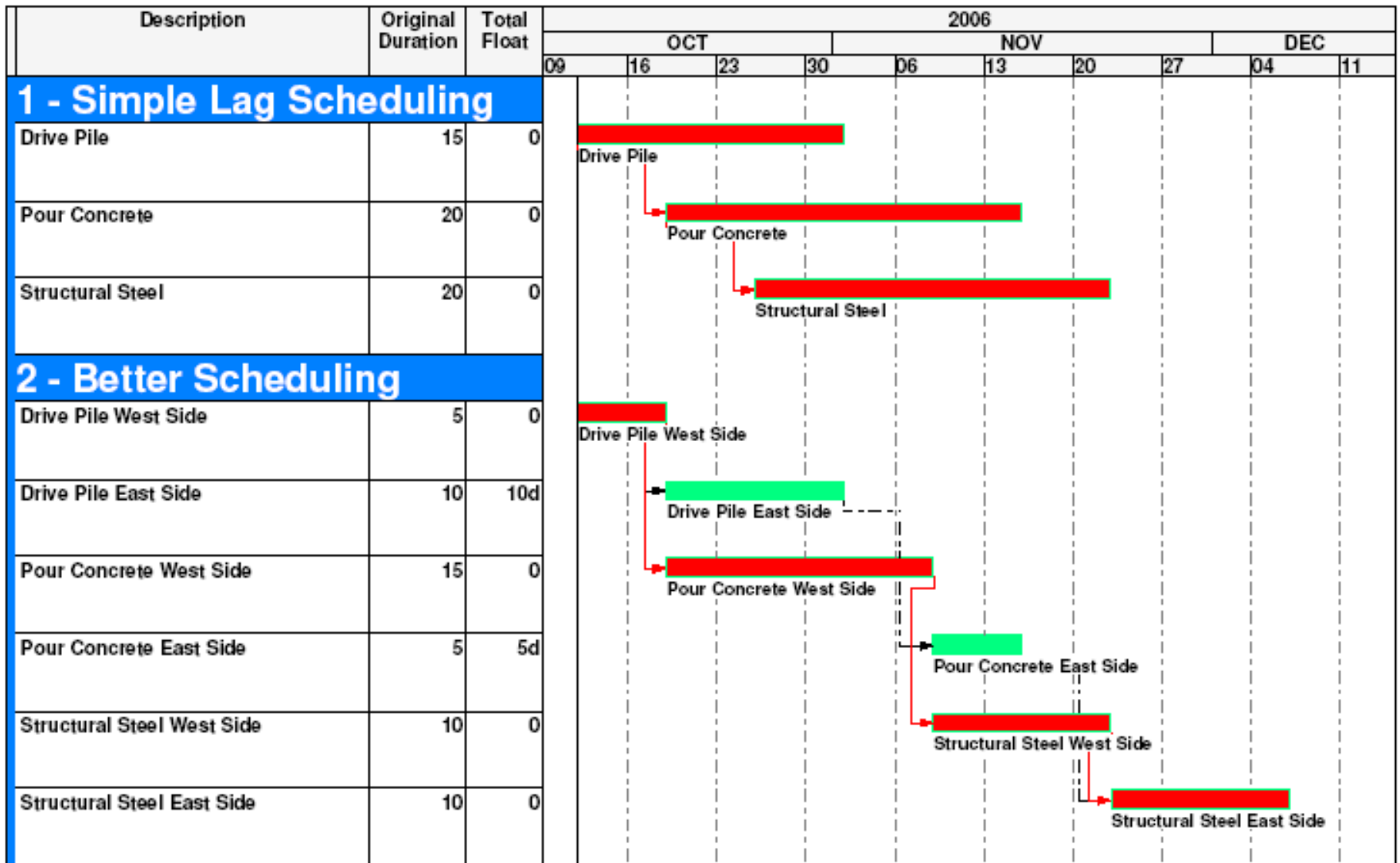
Understanding Steps

- Everyone identifies steps differently.
- Standards in Industry
- The Key is:

➤ **LEVEL OF DETAIL**

Level of Detail

- Owner requirement
- As needed to manage the project
- Sequencing & Experience
- No more than five days
- Type of work
 - Hour to day duration
- Project Requirements



Nature of the Work

- Productivity should increase as experience is gained for repetitive tasks. Activities composed of repetitive tasks should benefit from the increased task productivity and have decreasing activity durations.
- Depending on the work, difficulty can increase if uncommon work tasks are grouped together in an activity.

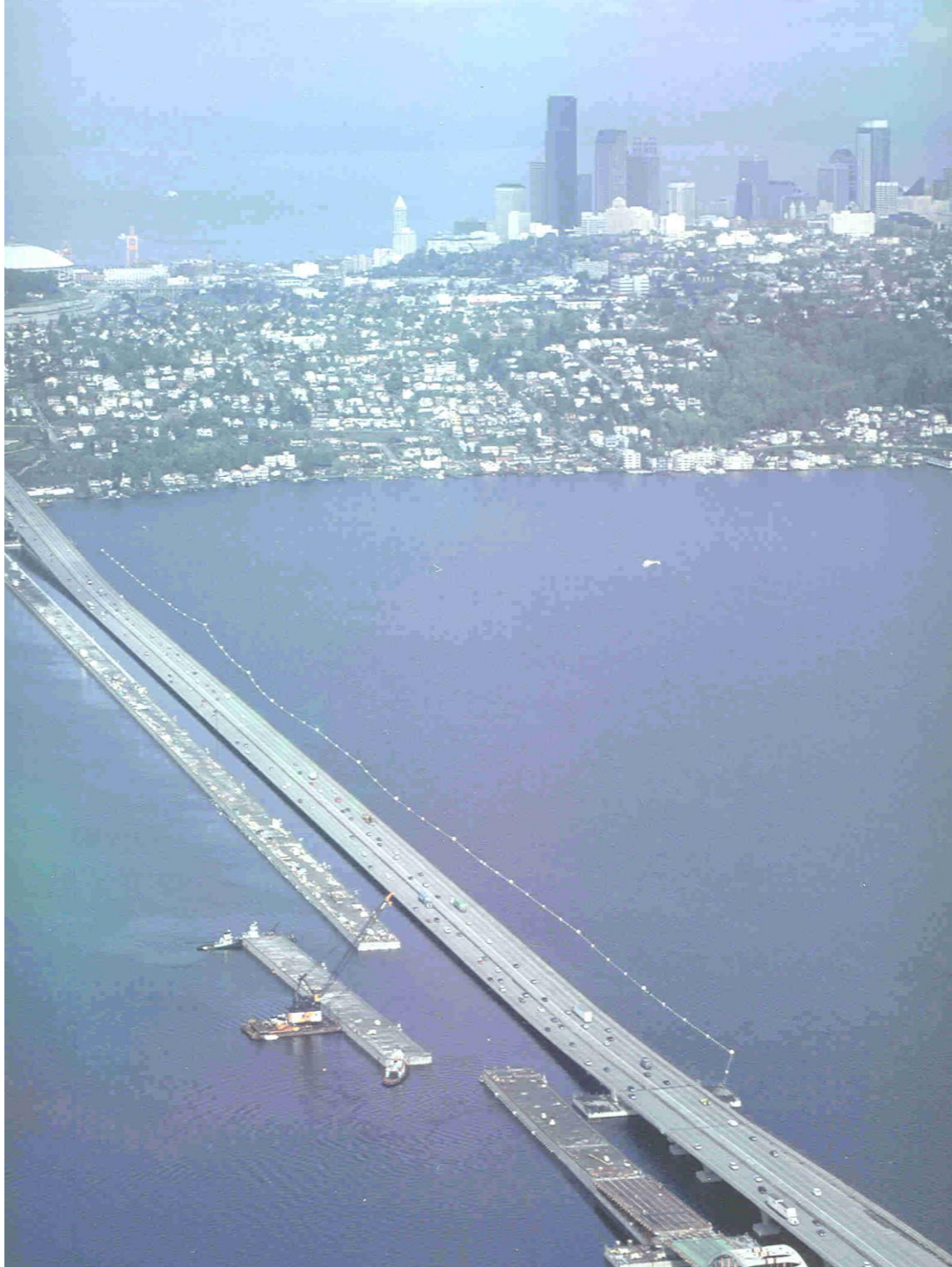
of Activities or Steps



Room
Deck
Residence

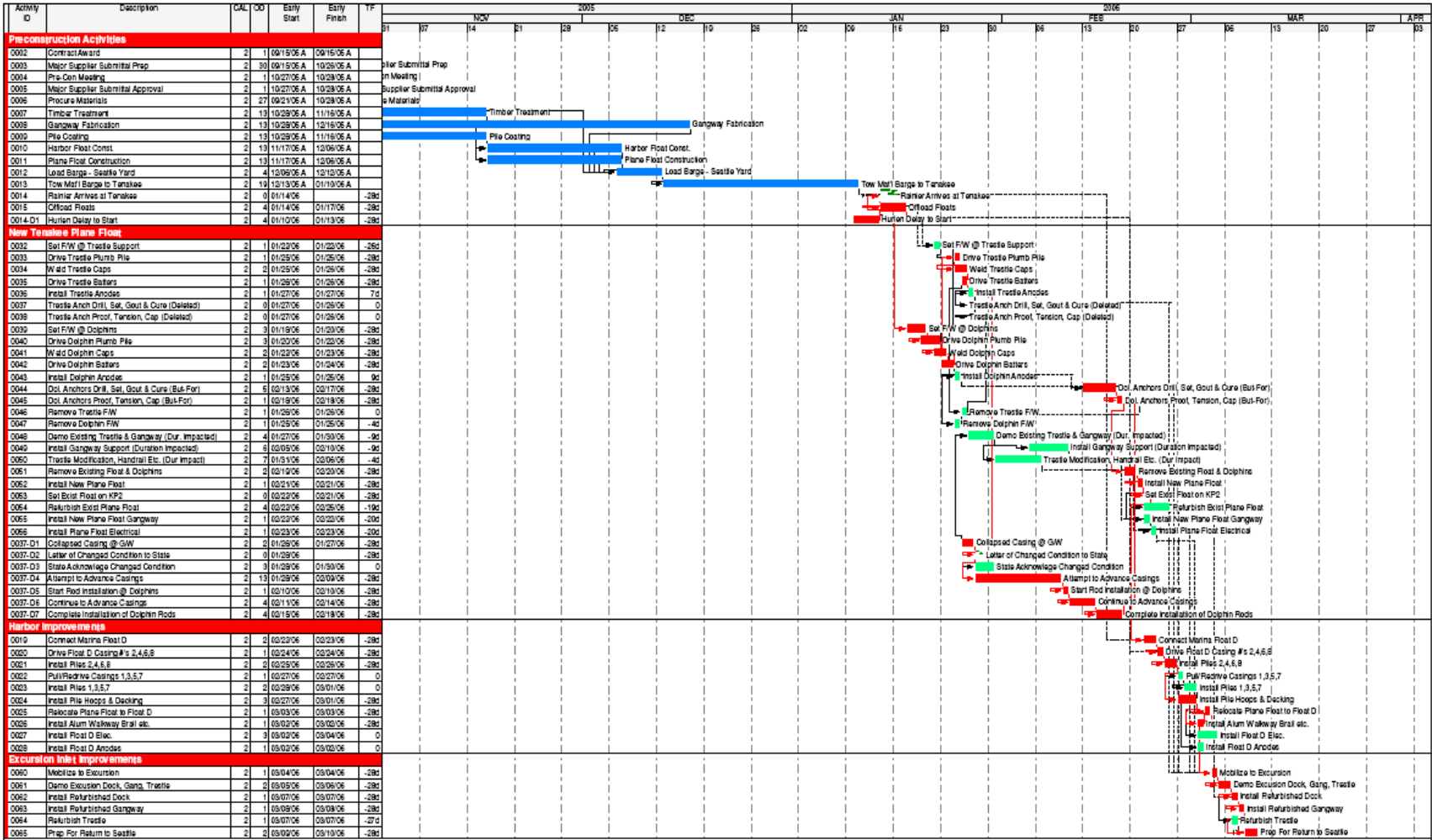
Warehouse
Movie Theater
Office Building
School
Regional Airport

Hospital
Hydroelectric
Dam
Power Plant
Nuclear Plant





CPM Scheduling





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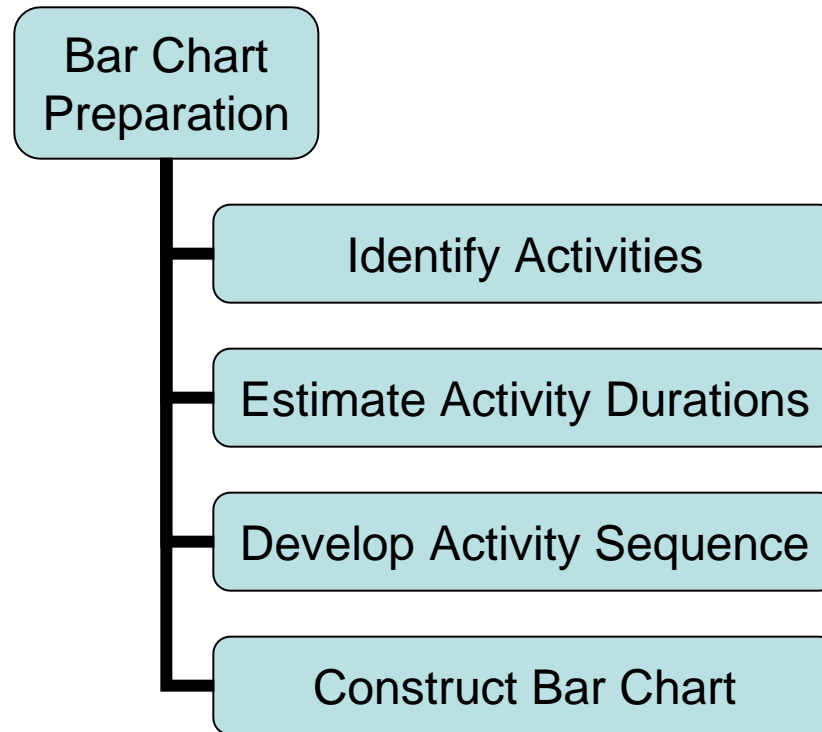


BAR CHARTS

- The most commonly used method of planning and scheduling construction projects.
- *A historical tid-bit in the history of planning and scheduling.*
- The bar chart was developed by Henry L. Gantt around the turn of the century and is sometimes referred to as the

GANTT CHART

Bar Chart Schedules



Constructing a Bar (Gantt)Chart

- How should the bar (Gantt) chart schedule be laid out?
- What time units should be used?
- Should work days or calendar days be used?
- What about non-continuous work?

Gantt Chart Advantages & Disadvantages

- Easy to prepare
- Easily Understood
- A good communication tool

- Does not show the relationships between activities.
- Lack of relationships between activities.
- Difficult to determine what the effect of an activity that is ahead or behind schedule will have on the overall project.