Work break down

Identify project activities

Learning objectives:

- Recognize the difference between activities and tasks.
- Understand the importance of thecompleteness criteria to your ability to manage the work of the project.
- Explain the approaches to building the work breakdown structure.
- Generate a complete work breakdown structure.
- Understand top-down versus bottom-up processes.
- Use the work breakdown structure as a planning tool.

The work breakdown structure(WBS) is a hierarchical description of the work that must be done to complete the project as defined in the project overview statement(POS).

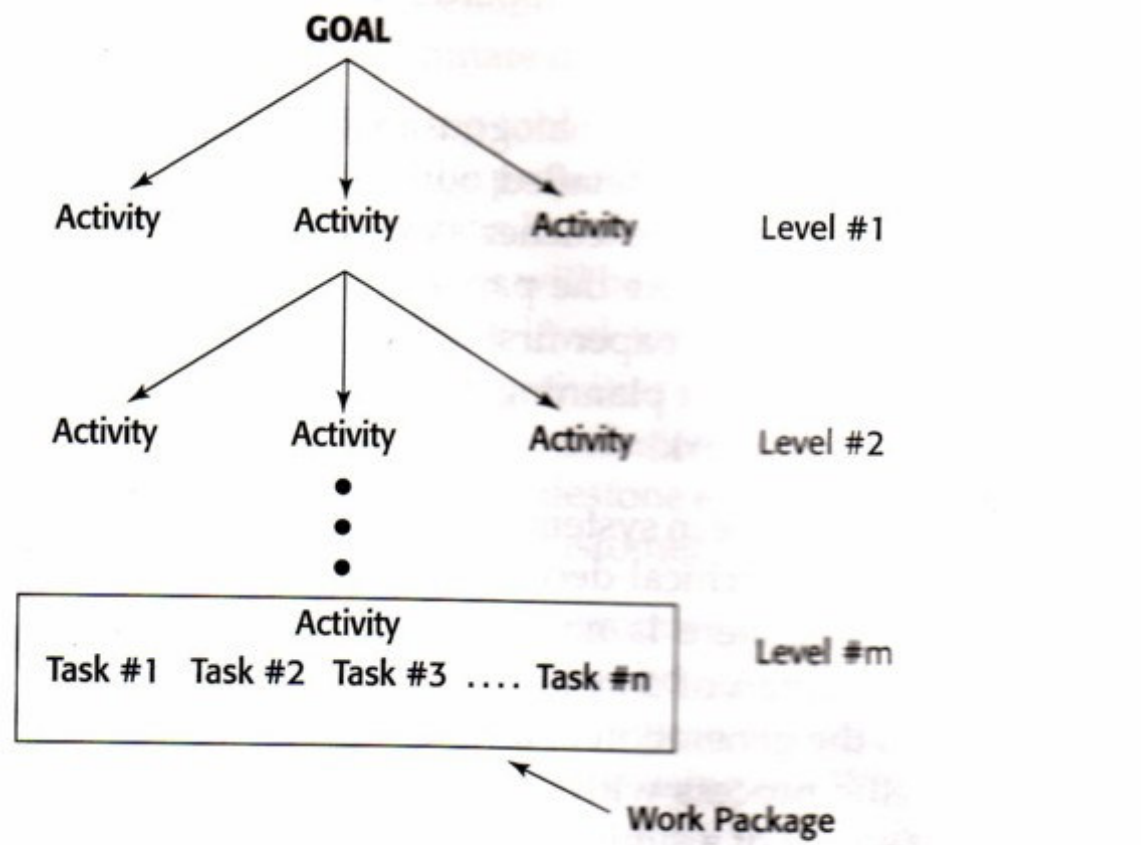


Figure 7.1 Hierarchical visualization of the Work Breakdown Structure.

The first term is an activity: simply achunk of work.

A task is a smaller chunk of work.

Here we refer to higher-level work as activities, which are made up of tasks.

We also use the term work package. A work package is a complete description of how the tasks that make up an activity will actually be done.

As a general rule, when an activity at level n is decomposed into a set of activities at level n+1 and the work associated with those activities is complete, the activity at level n, from which they were defined, is complete.

Uses for the WBS

There are four uses for the WBS:

1. **Thought process tool**. It is a design and planning tool. It helps the project manager and the project team visualize exactly how the work of the project can be defined.
2. **Architectural design tool**. A piecture of the work of the project and how items of work are related to one another.
3. **Planning tool**. It gives the project team a detailed representation of the project as a collection of activities that must be completed in order for the project to be completed.
4. **Project status reporting tool**. The project activities are consolidated from the bottom as lower-level activities are completed. Completion of lower-level activities causes higher-level activities to be partially complete. Thus, the WBS defines milestone events that can be reported to senior management and to the customer.

Generating the WBS

Top-down approach

The top-down approach begins at the goal level and successively partitions work down to lower levels of definition until the participants are satisfied that the work has been sufficiently defined.

Once the project activities have been defined using the top-down approach, they will be defined at a sufficient level of detail to allow you to estimate time, cost, and resource requirements first at the activity level and then aggregate to the project level.

Once the activities are described, you can sequence the project work so that as many activities as possible are performed in parallel, rather than in sequence.

In other words, the list of activities can be sequenced so that the project duration will be much less than the sum of all the times needed to complete each activity.

Bottom-up approach

The bottom-up approach works as follows. The first steps are the same as those for the top-down approach. Namely, the entire planning team agrees to the first-level breakdown. The planning team is then divided into as many groups as there are first-level activities. Each group then makes a list of the activities that must be completed in order to complete the first-level activity. To do this they proceed as follows. Someone in the group identifies an activity and tells it to the group. If the group agrees, then the activity is written on a slip of paper and put in the middle of the table. The process repeats itself until no new ideas are forthcoming. The group then sorts the slips into activities that seem to be related to one another. This grouping activity should help the planning team add missing activities or remove redundant ones. Once the team is satisfied it has completed the activity list for the first-level breakdown, the members are finished. Each group then reports to the entire planning team the results of its work. Final critiques are given, missing activities added, redundant activities removed.

Six criteria to test for completeness in the WBS

How do you know that you've done this right? Each activity must possess six characteristics to be considered complete.

- Status/completion is measurable.
- Start/end events are clearly defined.
- Activity has a deliverable.
- Time/cost is easily estimated.
- Activity duration is within acceptable limits.
- Work assignments are independent.

Measurable status

The project manager can ask for the status of an activity at any point in time during the project.

An acceptable answer must state what has been actualy completed and what remains to be done, along with an estimate to completion.

Bounded

Each activity should have a clearly defined start and end event.

The deliverable is most likely the end event that signals work is closed on the activity.

Deliverable

The deliverable is a visible sign that the activity is complete.

Cost/time estimate

Each activity should have an estimated time and cost of completion.

Being able to do this at the lowest level of decomposition in the WBS allows you to aggregate to higher levels and estimate the total project cost and the completion date.

Acceptable duration limits

While there is no fixed rule for the duration of an activity, it is recommended that activities have a duration of less than two calendar weeks.

Activity independence

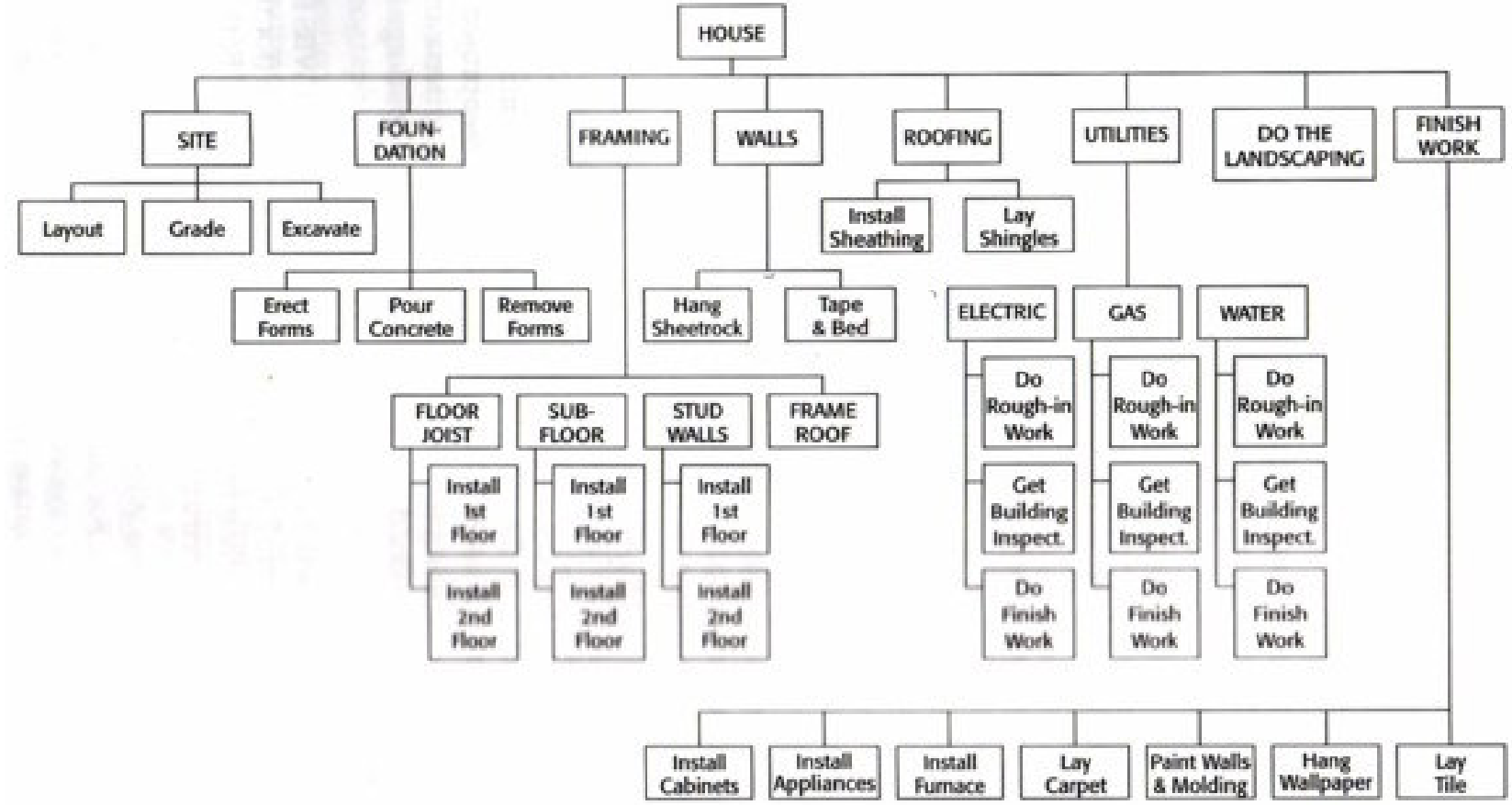
It is important that each activity be independent.

Once work has begun on the activity, it can continue reasonably without interruption and without the need of additional input or information until the activity is complete.

Representing the WBS.

The lowest-level activities are defined by a work package. A work package is simply the list of things to do to complete the activity.

1. SITE PREPARATION
   - 1.1. Layout
   - 1.2. Grading
   - 1.3. Excavation
2. FOUNDATION
   - 2.1. Erect Forms
   - 2.2. Pour Concrete
   - 2.3. Remove Forms
3. FRAMING
   - 3.1. Floor Joists
     - 3.1.1. Install first-floor joists
     - 3.1.2. Install second-floor joists
   - 3.2. Subflooring
     - 3.2.1. Install first-floor subflooring
     - 3.2.2. Install second-floor subflooring
   - 3.3. Stud Walls
     - 3.3.1. Erect first-floor stud walls
     - 3.3.2. Erect second-floor stud walls
   - 3.4. Frame the roof
4. UTILITIES
   - 4.1. Electrical
     - 4.1.1. Do Rough-in Work
     - 4.1.2. Get Building Inspection
     - 4.1.3. Do Finish Work
   - 4.2. Gas
     - 4.2.1. Do Rough-in Work
     - 4.2.2. Get Building Inspection
     - 4.2.3. Do Finish Work
   - 4.3. Water
     - 4.3.1. Do Rough-in Work
     - 4.3.2. Get Building Inspection
     - 4.3.3. Do Finish Work
5. WALLS
   - 5.1. Hang Sheetrock
   - 5.2. Tape and Bed
6. ROOFING
   - 6.1. Install Sheathing
   - 6.2. Lay Shingles
7. FINISH WORK
   - 7.1. Install Cabinets
   - 7.2. Install Appliances
   - 7.3. Install Furnace
   - 7.4. Lay Carpet
   - 7.5. Paint Walls and Molding
   - 7.6. Hang Wallpaper
   - 7.7. Lay Tile
8. LANDSCAPING


HOUSE
SITE
FOUN-DATION
FRAMING
WALLS
ROOFING
UTILITIES
DO THE LANDSCAPING
FINISH WORK
Layout
Grade
Excavate
Erect Forms
Pour Concrete
Remove Forms
Hang Sheetrock
Tape & Bed
Install Sheathing
Lay Shingles
ELECTRIC
GAS
WATER
FLOOR JOIST
SUB-FLOOR
STUD WALLS
FRAME ROOF
Do Rough-in Work
Get Building Inspect.
Do Finish Work
Install 1st Floor
Install 2nd Floor
Install Cabinets
Install Appliances
Install Furnace
Lay Carpet
Paint Walls & Molding
Hang Wallpaper
Lay Tile