

Work Breakdown Structure (WBS) (Its use in determine project estimates)

The work breakdown structure (WBS) is a convenient method for dividing a project into smaller tasks or activities. A WBS reduces the likelihood of something falling through a crack. It subdivides the project into tasks that are each defined, estimated and tracked. It is best to structure the WBS on tangible, deliverable items.

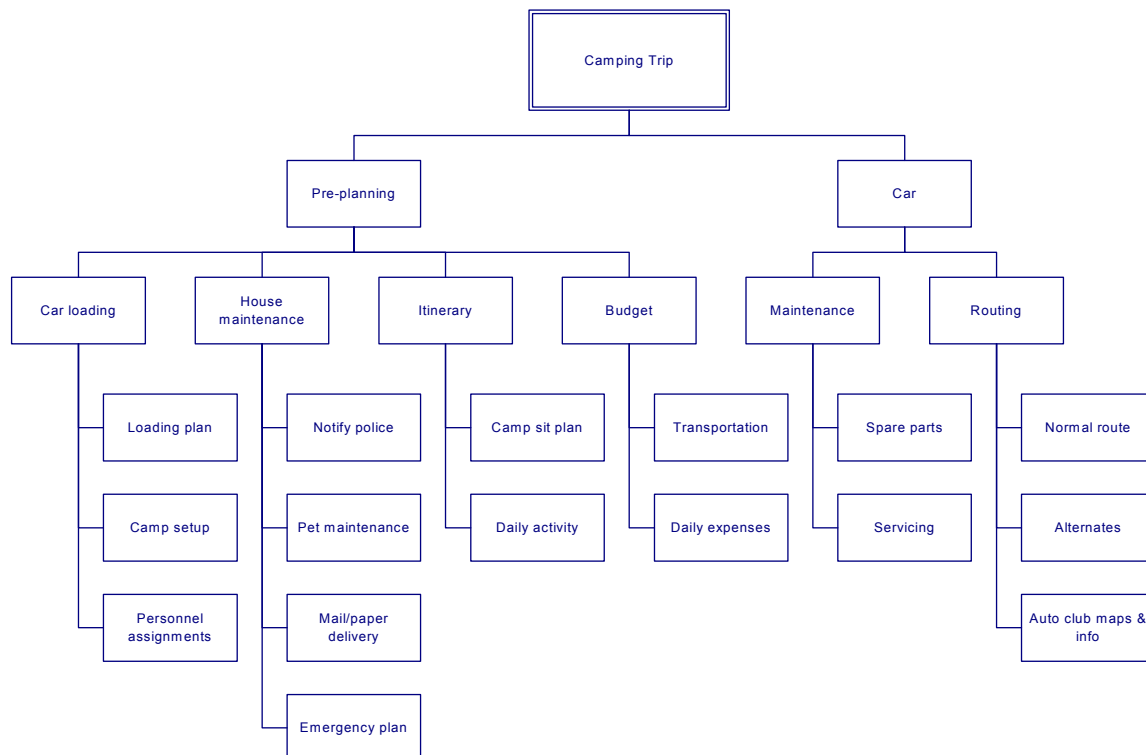
The WBS is a hierarchical approach to plan and integrate the various parts of a project. Because it provides the framework for building a project, it should be created early in the planning phase. The WBS tool not only identifies the tasks, subtasks and units of work to be performed, but it also can be used to track the costs of each of these elements.

To develop a WBS, you first identify each of the major tasks required to fulfill the project objectives. These major tasks are then broken down by steps and sub steps required to accomplish the task. Depending on the complexity of the task, these steps or subtasks can be further broken down. The number of levels depends upon the size and complexity of the project. The process of defining steps should continue until you are certain nothing major has been forgotten and accurate estimates can be applied to the lowest level or activity.

One of the major benefits of using a WBS is the greater probability that every requirement will be accounted. Each work unit or section of the WBS should be:

- Manageable – specific authority and responsibility assigned to each
- Independent – minimum interfacing with and dependence on other tasks
- Integratable – the total project is accounted for by the set of tasks
- Measurable – results measured in terms of progress by completion of tasks.

The WBS can be shown as a tree diagram similar to an organizational chart or in outline form. After the tasks are identified, determine who is responsible for the completion of the task. This individual should then supply the time estimate. This estimate should be the actual time to complete the task (i.e. the effort involved) not the duration or calendar time involved. An example WBS someone might make for taking a camping trip is displayed below.



The steps involved in defining a WBS and then using it to estimate the activities and tasks for a project are:

1. Look at whatever information you have about the project that you are planning. Identify or define the project goals and objectives, the scope, etc.
2. Identify all major tasks that will be required to achieve the goals and objectives.
3. Break each of these tasks into subtasks.
4. Continue step 3 until you are fairly sure that you have accounted for everything the group¹ feels is required and accurate estimates can be determined for the lowest level of task.
5. Identify who is responsible for each of the lowest level tasks.
6. Determine the effort required for each of the lowest level task². One practical way to do this is to have the people involved provide the following estimates of time:

T_o = an optimistic estimate of how long the task will take

T_p = a pessimistic estimate of how long the task will take

T_m = the most probably estimate of how long the task will take

Then determine the expected time T_e by using the following formula

$$T_e = (T_o + 4 T_m + T_p) / 6$$

7. Then average the estimates for the people involved.
8. Multiply the estimates by either the cost of the actual person responsible or by an average staff cost and combine for all tasks.
9. Add the costs of equipment or any materials not covered by tasks. This will be your estimate for the project.

¹ The people performing this exercise are important. Try to involve someone from every area that will be required to actually perform the work of the project. They are the experts and will be best at determining all the required subtasks.

² If the person to be responsible for each task is available, the best and most accurate information will come from them. If they are not available, use a group of knowledgeable people and apply the formula above.