



{ Creativity Innovation Change } *

* No more band-aids

Work Breakdown Structures

Waterfall Work Breakdown Structure

- A work breakdown structure (WBS) is a visual, hierarchical and deliverable-oriented deconstruction of a project.
- It is a helpful diagram for project managers as it allows them to work backwards from the final deliverable of a project and identify all the activities needed to achieve a successful project.
- All the steps of a project are outlined in the organizational chart of a work breakdown structure making it an essential project management tool for planning and scheduling.



Work Breakdown Structures

Waterfall Work Breakdown Structure

- The final deliverable rests on top of the diagram, and the levels below subdivide the project scope to indicate the phases, deliverables and tasks that are needed to complete the project.
- Project managers make use of project management software to lay out and execute a work breakdown structure. When used in combination with a Gantt chart that incorporates WBS hierarchies, project management software can be especially effective for planning, scheduling and executing projects.



Work Breakdown Structures

WBS Levels

A WBS takes large, complex projects and breaks down the project scope into more manageable pieces to make it easier to plan, schedule and deliver. Tiers of project deliverables and tasks are created to support the planning, execution, and monitoring of projects. There are four main levels of a WBS, which are outlined below:

- **The Top Level:** Project title or final deliverable.
- **Controls Account:** Main project phases and deliverables.
- **Work Packages:** Group of tasks that lead to the controls account level.
- **Activities:** Tasks needed to complete the work package.

These tiers are found within all the different types of a work breakdown structure.



Work Breakdown Structures

WBS Types

Deliverable-based, and phase-based.

Deliverable-based WBS identifies the project's deliverables and scope. Phase-based WBS displays the final deliverable on top, with the level below showing the five phases of a project (initiation, planning, execution, control and closeout).

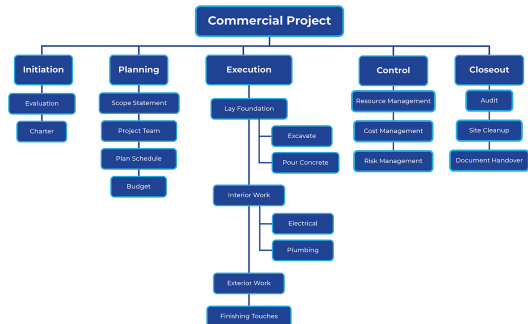
There are a few uncommon types of work breakdown structures as well:

- A verb-oriented WBS defines the deliverables in terms of actions.
- A noun-oriented WBS defines work in terms of components (this is also called a product breakdown structure).
- A time-phased WBS breaks the project into phases for long-term projects.



Work Breakdown Structures

Work Breakdown Structure



Work Breakdown Structures

WBS Types

A WBS is the first step in developing a project schedule. It defines **all the work that needs to be completed (and in what order)** to achieve the goals and objectives of the project.

Visualizing the project in this manner, resources can collaborate on defining mission critical tasks, their subtasks and the inter-dependencies between them.

A well-constructed WBS helps with important project management processes such as cost estimation, resource allocation, and risk mitigation. In addition, a WBS helps avoid common project issues such as missed deadlines, scope creep and cost overrun, among others.

In other words, a work breakdown structure serves as your map through



Work Breakdown Structures

WBS Types

A work breakdown structure serves as a map through complicated projects. One project may include several phases, or smaller sub-projects—and even those sub-projects can be broken down into deliverables, sub-deliverables and work packages! In doing so, you gain clarity into the details needed to accomplish every aspect of a project.



Work Breakdown Structures

WBS Components

- **WBS Dictionary:** A document that defines the various elements of the WBS. It's an important component of a WBS because it allows the project participants and stakeholders to understand the phases, deliverables and work packages with more clarity.
- **Task Number & Description:** Giving each task a number makes it easy to identify them. A description will help define what the task is, which will provide direction for the team when it's time to execute it.
- **Task Owner:** The owner is the person, organization or department who oversees the task from assignment to completion and ensures that it has been properly executed.



Work Breakdown Structures

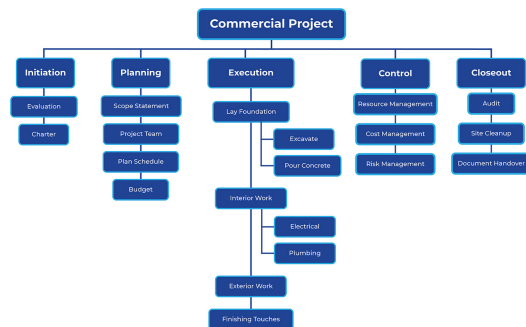
WBS Components

- **Task Status:** The status of the task will show whether it's assigned or not, in progress, late or complete, which helps with tracking.
- **Task Dependency:** Some of the tasks on the path to the final deliverable will have to wait until another task is done or started before they can begin. This is called a "task dependency" and requires linking the two dependent tasks together in order to avoid slippage later in the project.
- **Cost of Task:** Every task is going to have a cost associated with it. You'll want to note that to keep track of your budget.
- **Start, Finish and Estimated Completion of Task:** Add the start and finish dates for each task, and estimate the time you have on your schedule to execute it.



Work Breakdown Structures

Work Breakdown Structure



Work Breakdown Structures

WBS Construction

There are five steps to creating a work breakdown structure. These are the big steps, 30 000 ft view of a WBS, which eventually gets down to the granular level.

- **Define goals and objectives:** Begin with the project charter—the scope, objectives and who is participating in the project—determine what it is and describe it.
- **Project phases:** break the larger project statement of intent into a series of phases that will take it from conception to completion.



Work Breakdown Structures

WBS Construction

- **Deliverables:** List them all and note what is necessary for those deliverables to be deemed successfully delivered (sub-deliverables, work packages, resources, participants, etc.).
- **Break deliverables down:** Every single task and subtask that is necessary to deliver them. Make a list of all those tasks.
- **Assign them to the team:** Give each team member the tools, resources and authority they need to get the job done.



Work Breakdown Structures

WBS Construction

At the top of the work breakdown structure is your final deliverable (construction project).

Beneath that is the next stage of deliverables, which are the main tasks required to complete the project.

Each of those five project phases – initiation, planning, execution, control and closeout – branch off the main deliverable at the top.

Once decided, they are then broken down into a series of tasks. For example, the initiation phase includes site evaluation work and creating the project charter.



Work Breakdown Structures

WBS Construction

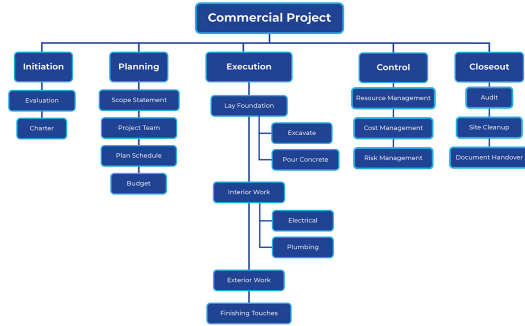
These tasks, however, can be further distilled into smaller subtasks. In the execution phase in our construction example, we can look at the interior work. This task is divided into two subtasks, which are installing the plumbing and setting up the electricity.

The WBS, when created as thoroughly as possible, is the roadmap to guide you to completion of what would seem to be a very complicated project. However, when broken down with a WBS, the project suddenly becomes much more manageable.



Work Breakdown Structures

Work Breakdown Structure



Work Breakdown Structures

Burndown Chart – Agile WBS

A burndown chart is a graphic representation of how quickly the team is working through the total workload. The burndown chart shows the total effort against the amount of work for each iteration or deliverable.

Using a burndown chart is a means of seeing how much work is left and how much time there is to do it in. It's a graphical representation, offering in a picture what a thousand words might not be able to communicate as clearly.



Work Breakdown Structures



<rant>



Activities
or Tasks



Deliverables
or Products



Work Breakdown Structures

Burndown Chart – Agile WBS

The quantity of work remaining is shown on a vertical axis, while the time that has passed since beginning the project is placed horizontally on the chart, which shows the past and the future. The burndown chart is displayed so everyone on the team can see it and is updated regularly to keep it accurate.



Work Breakdown Structures

Burndown Chart – Agile WBS

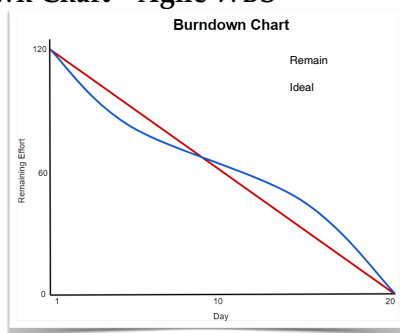
The burndown chart has several points. There's an x-axis, which is the project or iteration timeline. The y-axis is the work (effort) that needs to get done in the project. The specific point estimates for the work that remains is represented by this axis.

The project starting point is the farthest point to the left of the chart and occurs on day zero of the project or iteration. The project end point is farthest to the right and marks the final day of the project or iteration.



Work Breakdown Structures

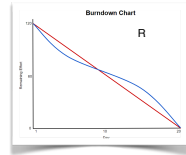
Burndown Chart – Agile WBS



Work Breakdown Structures

Burndown Chart – Agile WBS

There is an ideal work remaining line, which is a straight line connecting the start point to the end point (red). It shows the sum of the estimates for all the tasks that need to be completed. At the end point, the ideal line crosses the x-axis and shows there is no work left to be done. **This line is based on estimates and therefore not always accurate.**



Work Breakdown Structures

Burndown Chart – Agile WBS

Then there is the actual work remaining line that shows the actual work that remains in the project or iteration (blue). At the beginning, the actual work remaining and the ideal work remaining, are the same, but as the project or iteration progresses the actual work line will fluctuate above and below the ideal work line. Each day a new point is added to this line until the project or iteration is done to make sure it's as accurate as possible.

If the actual work line is above the ideal work line, it means there is more work left than originally thought. In other words, the project is behind schedule. However, if the actual work line is below the ideal work line, there is less work left than had been predicted and the project is ahead of schedule.



Work Breakdown Structures

Burndown Chart – Benefits

- Provides an updated status report on the progress of the project. Having a visual representation of this most important data keeps everyone on the same page.
- By displaying it prominently for all to see, it keeps everyone involved and encourages the team to deal with issues before they become problems. Therefore, the bigger the chart, the better. It should be the focal point of the workspace, so that it cannot help but direct conversation towards the project and its progress.
- Because of its simplicity. It's a great way to see the velocity history of the project. Velocity is an agile term that means the total effort estimates associated with user stories that were completed during an iteration.



Work Breakdown Structures

Burndown Chart – Limitations

- Only shows the number of points completed. It doesn't show any changes in the scope of work as measured by the total points in a backlog.
- It can be hard to tell if changes in the burndown chart are because of the backlog items having been completed or because of an increase or decrease in workload changes. Having a burnup chart (derived from a changelog) can resolve this problem by having a separate line in the graph for overall backlog size.
- Neither a burndown nor a burnup chart offers any indication of which product backlog items have been completed. Therefore, a burndown chart might show progress but not whether the team is working on the right thing. These charts are a way to show trends rather than whether the team is delivering the right product back log items.



Work Breakdown Structures

Burndown Chart – Limitations

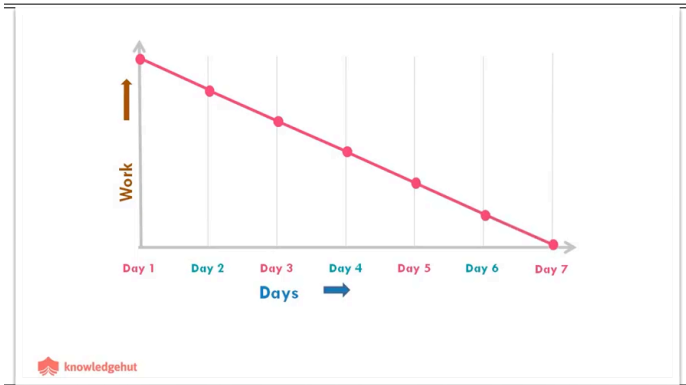
Another issue with burndown charts concerns the accuracy of the ideal work line. Whether the actual work line is above or below the ideal work line depends on the accuracy of the original time estimates for the tasks:

- If a team is overestimating time requirements, progress will appear on track if not ahead of schedule.
- If they are underestimating time requirements, it will appear that they are behind schedule.

There is a way to respond to this issue, and that's by incorporating an efficiency factor into the burndown chart. Therefore, after the first iteration of a project, the efficiency factor is recalculated to allow for more accuracy.



Work Breakdown Structures



Work Breakdown Structures

