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SOFTWARE PROJECT MANAGEMENT

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TOPIC ANALYSIS AND SYNTHESIS REPORT

Topic 102: A Project Is the Pursuit of a Solution

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Github Link: https://github.com/iamshreyans/SOEN6841-TAS-102-A-Project-Is-the-Pursuit-of-a-Solution

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Keywords: Work Breakdown Structure (WBS).

Abstract. This article discusses project management, with an emphasis on the value of creating a Work Breakdown Structure (WBS) to visualize a project's end result and involve all stakeholders in defining the project's work. In order to increase buy-in and ensure project success, the talk centres on how to develop a work breakdown structure (WBS) that incorporates team members and challenges norms. The WBS is a hierarchical representation of the project's whole scope broken down into deliverables that looks like an organizational chart. Deliverables are further broken down into smaller and smaller components once they are at the work package level. The subject matter also highlights how important it is to involve sponsors, other stakeholders, and the team in the WBS design process to ensure that the project's work is properly specified and satisfies everyone's expectations. The text warns against making the mistake of assuming that the project manager is the only one who can create an exhaustive list of all the tasks involved in the project, as this can lead to project failure. Finally, it stipulates that each assignee of a work package must generate a smaller project plan and submit it back into the master schedule. This ensures that the work is done efficiently and with superior techniques.

1 Introduction:

The work breakdown structure (WBS) is a hierarchical approach that breaks down the project's whole scope into smaller deliverables which is similar to company's divisions broken down into departments and teams. For the deliverables to reach the work package level, they are further subdivided into smaller and smaller components. A smaller project plan section should be created by each work package assignee and incorporated back into the master schedule. According to the topic, we can more successfully and economically plan, budget, and schedule by using a WBS. It can also be used as a brainstorming tool to identify potential hazards and increase the project's value, as well as a communication tool for internal and external stakeholders.
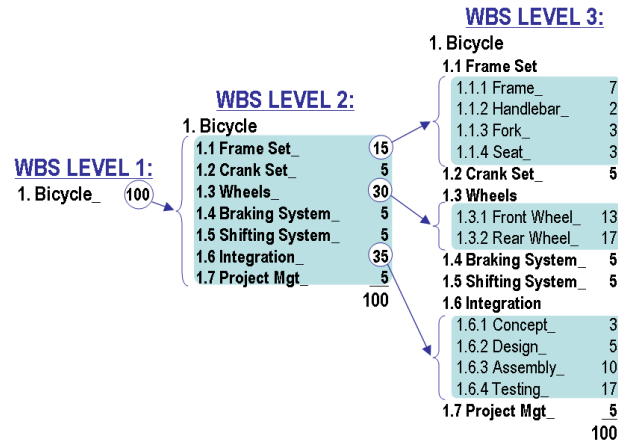
Fig. 1. The WBS construction technique employing the 100% rule during WBS construction.[16]

1.1 Problem Statement:

However, many project managers and team members may not fully understand the benefits of using a WBS or how to create one effectively. This can lead to confusion, miscommunication, and ultimately project failure. Therefore, the problem statement for this topic is the need to educate project managers and team members on the importance of using a WBS in project management and provide guidance on how to create one effectively.

1.2 Motivation:

The purpose of this topic is to make project managers and team members aware of the advantages of utilizing a work breakdown structure (WBS) in project management. We can plan, budget, and schedule more effectively and efficiently with the use of the powerful WBS tool. By incorporating the team, sponsors, and additional stakeholders in the development of a work breakdown structure (WBS), we can guarantee that the project's work is clearly defined and meets the needs of each party involved. The ultimate objective is to accomplish project excellence by utilizing a WBS as the basis for all other project management functions.
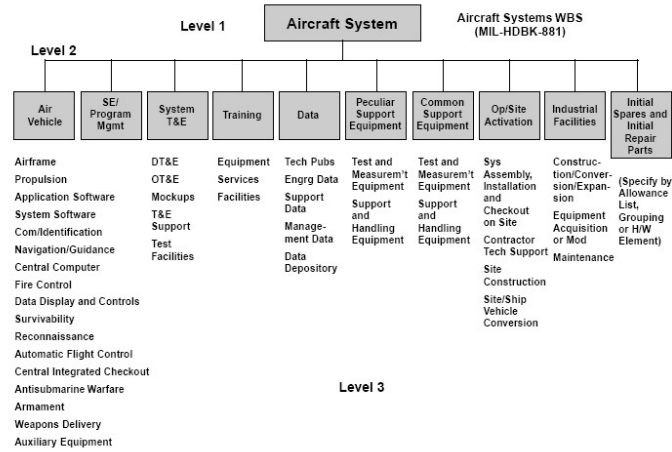
Fig. 2. Example from MIL-HDBK-881, which illustrates the first three levels of a typical aircraft system.[16]

1.3   Background:

A Work Breakdown Structure (WBS) is a hierarchical decomposition of a project into smaller, more manageable components. It organizes and defines the total scope of the project, breaking it down into deliverable-oriented tasks. Each level of the WBS represents a level of detail, helping project managers and teams to understand the project's scope, plan effectively, and track progress.

Components of a WBS:

1. **Root Node:** Represents the entire project.

2. **Level 2 Nodes:** Major project phases or deliverables.

3. **Sub-level Nodes:** Breakdown of major phases into smaller tasks or work packages.
4. **Work Packages:** Lowest level, representing specific tasks that can be assigned and tracked.

Some of the needs for a Work Breakdown Structure:

1. **Scope Definition:** WBS helps in defining and clarifying the scope of the project. It breaks down the overall project into smaller, more manageable pieces, making it easier to understand and communicate.

2. **Project Planning:** WBS provides a foundation for project planning by identifying all the tasks that need to be completed. It enables the creation of realistic schedules and resource allocation.

3. **Resource Allocation:** By breaking the project into work packages, WBS allows for effective resource allocation. Project managers can identify which resources are required for each task and allocate them accordingly.

4. **Communication:** WBS serves as a visual communication tool, helping project teams, stakeholders, and sponsors understand the project structure, milestones, and dependencies. It fosters clear and concise communication.

5. **Risk Management:** WBS facilitates risk identification by breaking down the project into manageable components. This allows for a more thorough analysis of potential risks associated with each task or work package.

All in all, a well-structured Work Breakdown Structure is an essential tool in project management. It not only facilitates effective planning and execution but also enhances communication, collaboration, and control throughout the project lifecycle.
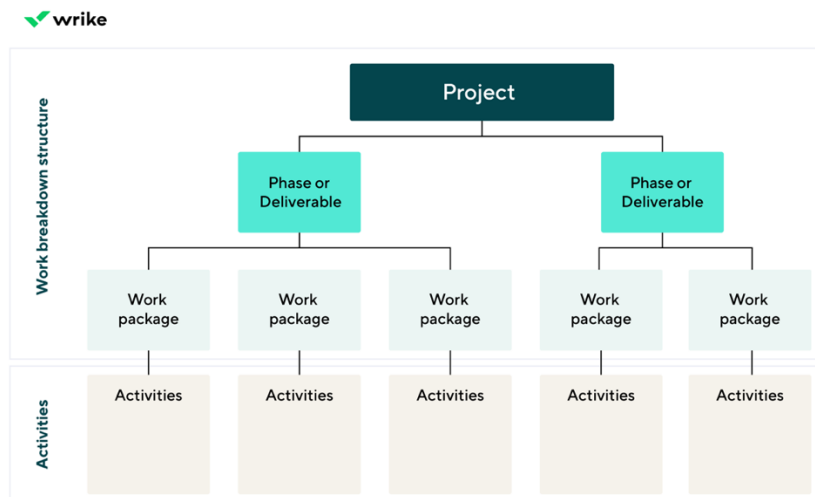

Fig. 3. Methodology chart of Work Breakdown for Project Planning.[15]

2   Methodology:

The creation of a Work Breakdown Structure (WBS) in project management involves a systematic and structured methodology to ensure its effectiveness. Here's a step-by-step methodology for developing a WBS[12] :

1. **Define Project Objectives.**
2. **Identify Major Deliverables.**
3. **Engage Stakeholders.**
4. **Create a Work Breakdown Structure Dictionary.**
5. **Decompose Major Deliverables.**
6. **Use a Hierarchical Structure breaking project into smaller components.**
7. **Follow the 100% Rule:** Include 100% of the project in the WBS.
8. **Use Action Verbs** to clearly define what needs to be done in a task.
9. **Consider Logical Dependencies** between tasks.
10. **Review and validate.**
11. **Assign unique identifiers** to each element in the WBS. This numbering system aids in referencing and cross-referencing between project documents.
12. **Update WBS as Needed.**
13. **Integrate with Project Schedule.**
14. **Training and Familiarization of team members with WBS.**

By following this systematic methodology, project managers can develop a robust and effective Work Breakdown Structure that becomes a valuable tool for planning, executing, and controlling projects in the future.

3   Critical Thinking:

3.1   Issues/Challenges:

1.   Scope Creep:
One of the significant challenges is preventing scope creep. It's important to clearly define the scope at the beginning and resist the temptation to include tasks that are not part of the original project scope.

2.   Lack of Stakeholder Involvement:
Incomplete or inaccurate WBS may result from not involving key stakeholders in the creation process. It's crucial to gather input from project team members, clients, and other relevant stakeholders to ensure a comprehensive breakdown.

3.   Overlooking Work Packages:
Identifying the right level of detail can be challenging. If the breakdown is too high level, important tasks might be overlooked. On the other hand, if it's too detailed, it can become overwhelming and difficult to manage.

4. Ambiguous Task Descriptions:
Poorly defined or ambiguous task descriptions can lead to misunderstandings and misinterpretations. Clear and concise descriptions are essential for everyone involved in the project.

5. Dependency Mismanagement:
Failure to identify and manage task dependencies can result in delays and disruptions. It's important to clearly outline dependencies to ensure tasks are completed in the correct sequence.

3.2   Supporting Arguments:

To support the use of Work Breakdown Structure (WBS) in project management for several compelling reasons, these are some that can be listed below:

1. Clarity and Structure:
WBS provides a structured and hierarchical breakdown of the entire project. This clarity helps in understanding the project's scope, objectives, and tasks in a systematic manner.

2. Effective Planning:
WBS facilitates effective project planning by breaking down the project into manageable work packages. This allows for more accurate scheduling, resource allocation, and milestone setting.

3. Improved Communication:
It helps in conveying complex project details to team members, stakeholders, and sponsors, fostering better understanding and collaboration.

4. Scope Management:
Clearly defining and managing the project scope is critical for project success.

5. Resource Allocation:
Identifying resource requirements for each work package is crucial for effective resource allocation. WBS assists in this by providing a clear picture of the tasks involved and the resources needed.

6. Risk Identification and Management:
WBS supports proactive risk management by breaking the project into smaller components, making it easier to identify and address potential risks associated with specific tasks.

3.3   Empirical Evidence:

Empirical evidence supports the argument that breaking down work packages into smaller components can lead to more accurate estimation of time and resources required for each task. According to a study by the Standish Group, projects with smaller work packages had a higher success rate than those with larger work

packages. Specifically, projects with work packages of less than 20 hours had a success rate of 79%, while projects with work packages of more than 40 hours had a success rate of only 25% (Standish Group, 2015) [14]. This suggests that breaking down work packages into smaller components can lead to more accurate estimation of time and resources required, which can help prevent delays and cost overruns. Concrete examples also support the argument that breaking down work packages into smaller components can lead to more efficient and effective project management. For example, a construction project manager may break down the work package for pouring a foundation into smaller components, such as excavation, formwork, rebar installation, and concrete pouring. By breaking down the work package into smaller components, the project manager can more easily track progress and identify potential issues before they become major problems. This can help ensure that the project is completed on time and within budget. In conclusion, empirical evidence and concrete examples support the argument that breaking down work packages into smaller components can lead to more accurate estimation of time and resources required and more efficient and effective project management. The Standish Group's study provides statistical evidence in support of this argument, while the example of a construction project manager illustrates how breaking down work packages into smaller components can lead to more efficient and effective project management. [14]

4   Conclusion:

In the real world of project management, the use and need for a Work Breakdown Structure (WBS) are paramount. The WBS is a fundamental tool that provides structure, clarity, and strategic organization, all of which contribute to the success of the project. In conclusion, using a work breakdown structure in the real world is not only advantageous but frequently essential for navigating the challenges of project management. The Work Breakdown Structure (WBS) is a crucial component for the effective management of projects in various industries and settings due to its extensive functions in planning, communication, risk mitigation, and overall project control.

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6   Appendix

Prompts used to take reference/help from ChatGpt and ChatPdf:

1. What could be the possible motivation for the study of this topic according to you?

2. What is the background and need for the Work Breakdown in project management, according to you?

3. List the step by step methodology of creating a WBS for a project.

4. According to you, what are the salient points raised by this topic?

5. What could be the possible issues while creating a Work Breakdown Structure? Support it with some possible arguments according to your knowledge.

6. How would you strengthen these arguments with some actual statistics?

7. How would you conclude the use and need of WBS in successful Project Management in real world scenarios?