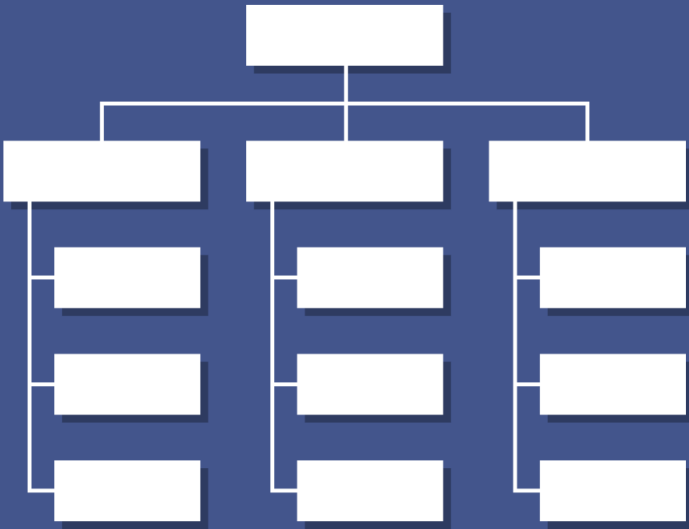# PRACTICAL ADVICE FOR WORK BREAKDOWN STRUCTURES

Pat Barker, DSMC

Before you Begin

Closed Captioning

The close captioning software we currently use is not 100% accurate. Not even close at times. It takes a while to edit the script and align it with the actual video. We are working on it. Some of you might prefer to turn off close captioning. If not you will be entertained at times ☺.

Browser Compatibility

This site should work with any browser, to include those on smart phones. If you have any problems, let us know!

Videos and Downloads

We provide numerous videos and downloadable forms and worksheets. Almost all the videos are under 3 minutes in length, many 2 minutes or less. Formal videos are the exception rather than the rule. We create them intentionally as informal discussions, much like stepping into our offices and having a conversation. The smart phone is our camera of choice.

Feedback

The only way this evolves is through your feedback! Please provide feedback on how this works for you!

- Is the guide clearly explained?
- Is it usable?
- Do the videos enhance the learning/application experience?
- What can we do even better?

No suggestion is too small. If you see it, write us about it! Email Pat Barker at patrick.barker@dau.mil for all comments - good, bad and ugly.

Why You Care

Let's have a conversation with you about the Work Breakdown Structure (WBS) and its evolution into a Responsibility Assignment Matrix (RAM), and describe why it is important.

Once upon a time a program manager was asked to establish on a WBS for his program and reacted with an emphatic: *"We don't have time to talk about philosophy!"* Philosophy? Okay, that was a new one.

We are a community of doers. We get tasked. We get things done. And program offices are 24/7/365 hair-on-fire crazy places to work (oh but what an amazing thing program offices do!!). So the resistance to slowing down and establishing something like a WBS is understandable, but in the end entirely unacceptable. This is the big leagues. We need to do it right.

As noted in the video clip below, the downright absence of a WBS won't prevent you from designing, developing, building and testing great things. But if you want to do all that cool stuff with any hope of staying near your cost and schedule targets then you really need one.

▶ [Lack of a WBS Will Bite You](#)

There are two great sources for figuring out how a WBS works:

References

If you want to get started on building a WBS and just want to get the right guides, then here are two of the best sources money can't even buy (because they are free)

This first actually comes from our Department of Defense. It is called Military Standard 881-D, or simply as MIL-STD 881D. You can download it directly below:

📖 [MIL-STD 881D](#)

It is a BIG document. Do not let that intimidate you. There are not that many pages in the front portion, which explain very well what a WBS is. The rest of the document is a whole bunch of examples. Templates.

Another <u>excellent</u> source for learning about a WBS comes from the Government Accountability Office (GAO). This is called the GAO Cost Estimating and Assessment Guide and what you will want to do is read Chapter 8. You can get the guide by clicking below:

📖 [GAO Cost Estimating and Assessment Guide](#)

This is one of 3 pretty cool guides put out by the GAO and it might be of interest to have the GAO Chief Technology Officer, Dr. Tim Persons, explain it on video:

▶ [The GAO Guides: Cost, Schedule, Performance](#)

A Little WBS 101

A Work Breakdown Structure (WBS) provides a consistent and visible framework for a program. With uniformity of definition and a consistent approach used for development of a WBS, the result is improved communication throughout the program lifecycle process.

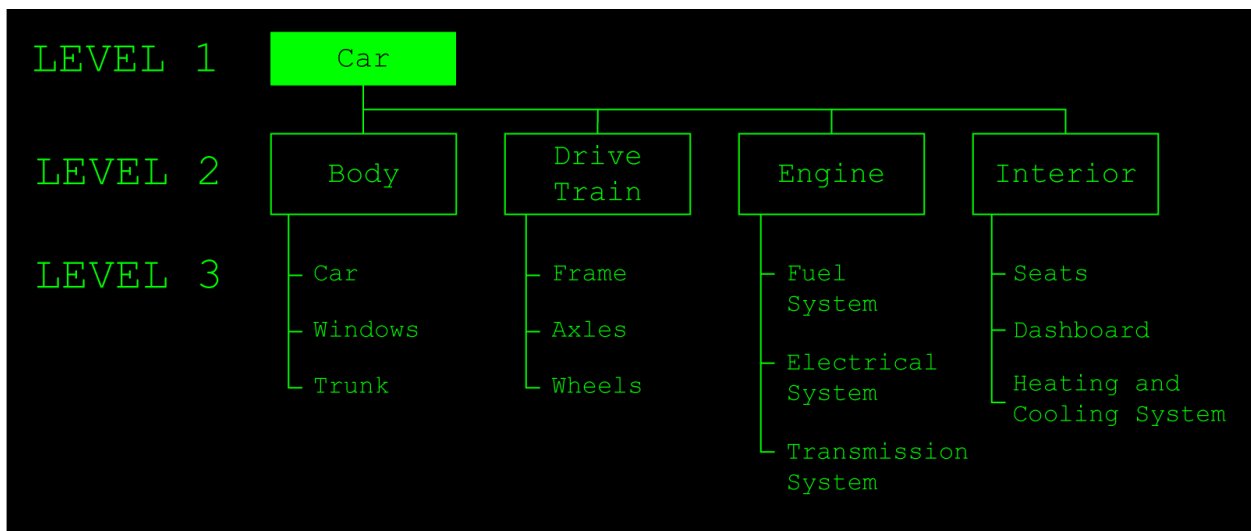Without a doubt, the WBS is THE cornerstone of every program. A WBS:

- Paints picture of program system
- Defines <u>work scope</u> in detail
- Establishes a <u>common frame of reference</u> for all program management activities

The WBS matters… a lot!

▶ [Some WBS reminders.](#)

So, what might a WBS look like? Here is a very simple example in the figure below.

Most of us do not build cars for a living but we do drive them. If we <u>were</u> building a car then "car" would be at what we call Level 1 of the WBS. This defines our system.

For the sake of argument, we might further break the car down into 4 sub-elements: body, drive train, engine and interior. We could choose 4 or more different elements (and different program teams will do exactly that depending upon conditions, to include specific management preferences, cost, risks, etc.) but for sake of argument this works just fine.

This is an example of what we call "parent-child" relationship. The car is the parent and the four Level 2 elements are the children. These 4 elements encompass the entire car, so when you add them back together you get the car. If you only add three of them (leaving the engine aside for example) then you will not have a "car." You will have a "car with no engine."

This is what we call the "100% rule." All the lower-level elements, when added together, must equate to 100% of the system.

Each level 2 element is further broken down into level 3 elements. So for example, we break the interior down farther into seats, dashboard and heating/cooling system. The 100% rule still applies: if we added up all the Level 3 "interior" sub-elements we would get Level 2 "interior"

What Makes a Good WBS?

Some program management sources and textbooks might instead put "build the seats" as a WBS element vice "seats." This is not the best idea. Best practice for a WBS is to make it "product-oriented" which is to say everything thing in a WBS is a "thing." If you want to think of a WBS in terms of parts of speech then a WBS is nothing but nouns. It may sound like a minor thing but when we get into other tools such as a schedule it will make a difference (by the way a schedule is all about verbs).

Anyway, the table below give you some critical characteristics of a WBS:

Characteristic	Significance
Decomposed using 100% rule	A "parent" WBS element is decomposed into 2 or more "child" elements. Each element is decomposed until reasonably manageable units of work (owned by a single individual or team) are defined. The sum of the "children" equals the "parent"
Product-oriented	The WBS is about products (work, equipment, hardware, software, services). Products are nouns. If you see verbs then put it in the schedule. If you see adjectives they go into the IMP
Standardized Program Reporting Anchor	Everything traces to the WBS. Every requirement, risk, opportunity, IMP element, IMS line, individuals' work efforts: they all should trace to 1 or more specific WBS elements
Has Accompanying Dictionary	The WBS dictionary is a collection of short narratives that define each element, its scope and how it relates to other elements. It describes resources, required material and functional activities.
Uses common elements across all major systems and subsystems	Integration, assembly, test & checkout; systems engineering, program management, system test and evaluation; training; data; peculiar support equipment; common support equipment; operational and site activation; industrial facilities; initial spares and repair parts.

Balanced (Data vs. Management)	Creating and mining available data to build historic files to aid in the future development of similar defense materiel items is a very valuable resource. **However, the primary purpose of the WBS is to define the program's structure, and the need for data should not distort or hinder the program definition. "**

WBS In Practice

According to 881D, a WBS comes with two major challenges:

"The primary challenge is to develop a WBS that defines the logical relationship between all program elements without constraining work necessary to achieve program objectives and meets all program reporting requirements. **A WBS should be sufficient to provide necessary program insights for effective status reporting and risk mitigation**, facilitating the contractor's ability to effectively execute the program."

"A secondary challenge is to **balance the program definition aspects of the WBS with its data-generating aspects**. Using available data to build historic files to aid in the future development of similar defense materiel items is a very valuable resource. **However, the primary purpose of the WBS is to define the program's structure, and the need for data should not distort or hinder the program definition. "**

All that is very true. Many have lived it and seen it across many thousands of programs.

However, there is a third challenge with a WBS, and that is the actual process of building it. Building a WBS takes leadership. It is not something that one gives a couple program personnel as a tasker and then have them "throw it over the fence" for last-minute review. As the video below explains, if you are going to do it, then the PM has to lead it.

▶ [PM Must Lead the WBS Development](#)

In any case you will want to have a numbering system for your WBS. Check out either document and see what they use. It makes a difference when you want to build a real management system and tie your different tools together.

Towards the RAM

Great, so we have this cool WBS. What is next? As the program manager, you cannot be everywhere at once. Therefore you need to delegate management across the program, but in doing so you have to be smart by matching the right people with the right level of WBS. And where you place your management attention will vary on a whole host of issues from cost to risk to stakeholder interest to simple challenges in span of control. Whatever the reason, a RAM will help you make that happen. When you match up the program organizational chart (which can include outside players) with the WBS you create what is called a RAM. The RAM, as the video explains, helps you determine management control points in your program.

▶ [RAM 101](#)

Another very useful contribution of the RAM is it can form that basis of your team assignments and help you determine to what degree you can manage with cross-functions (e.g. multi-disciplinary) teams. This video will help explain how that might happen.

▶ [Using RAM to Create Teams](#)

The Bottom Line

Give your program a fighting chance to work that continual tug-of-war among cost, time and performance. Anchor your program management upon the WBS. Make sure everything ties to it: Schedule, Risks, Opportunities, Requirements, Cost and Technical Performance Measures to name a few. As you transform your WBS into a RAM you enable your teams to tie to products or functions and ensure clear lines of communication and accountability.

Start slow to end fast. Build a WBS.