

"THE WBS - WORTH A SECOND LOOK"

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Slide One:

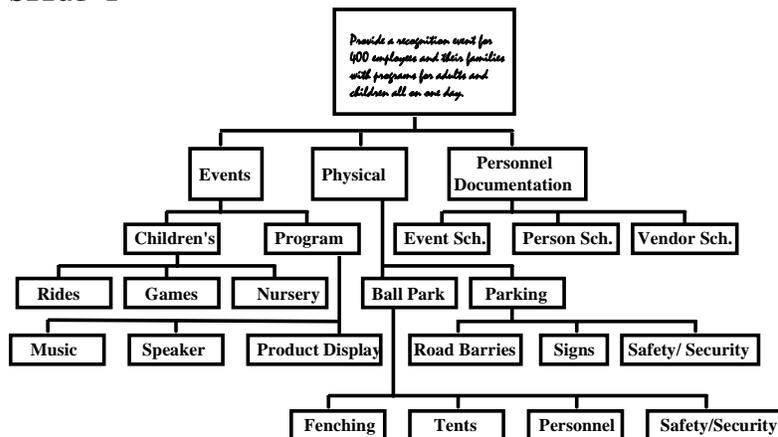
Title: "The WBS -- Worth a Second Look"

Speaker: Dennis P. Miller, PMP

The Work Breakdown Structure (WBS) is considered by many project managers as a tool for developing their project plan - most view it as only a means to that end. In fact, it's my opinion that most project managers wrongly view it as only the Gantt display in their project software.

On the other hand I view the WBS as both an essential step to a project plan and an end on to itself.

Slide 2



Slide 3

- 1.0 Recognition event
 - 1.1 Events
 - 1.1.1 Children's
 - 1.1.1.1 Rides
 - 1.1.1.2 Games
 - 1.1.1.3 Nursery
 - 1.1.2 Program
 - 1.1.2.1 Music
 - 1.1.2.2 Speaker
 - 1.1.2.3. Product Display
 - 1.2 Physical
 - 1.2.1 Ball park
 - 1.2.1.1 Fencing
 - 1.2.1.2 Tents
 - 1.2.1.3 Personnel
 - 1.2.1.4 Safety/Security
 - 1.2.2 Parking
 - 1.2.2.1. Road barriers
 - 1.2.2.2. Signs
 - 1.2.2.3 Safety/Security
 - 1.3 Personnel Documentation

My presentation will cover: 1) the WBS and its origin, 2) how our understanding of the WBS has evolved and 3) how to best build and use it during the execution of projects.

Slide 4

- **The Work Breakdown Structure (WBS) and its origin.**
- **How our understanding of the WBS has evolved.**
- **How to best build and use it .**

1 -- The WBS and its origin

The exact date when the WBS was developed and the reason for development has disappeared from *my* body of knowledge of project management. The far majority of my knowledge concerning the WBS seems to be based on *project management folklore*.

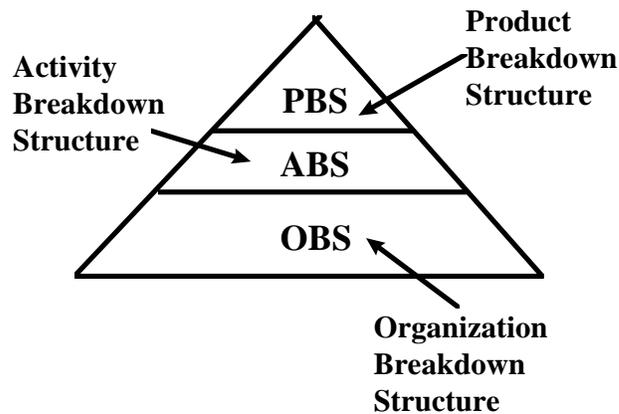
Slide 5:



Project management folklore in the making

The first reference to the WBS I was aware of was an article in a magazine in 1988 - and I have since lost even that article. I seem to remember a diagram showing the relationships between a deliverable, an activity and an organization.

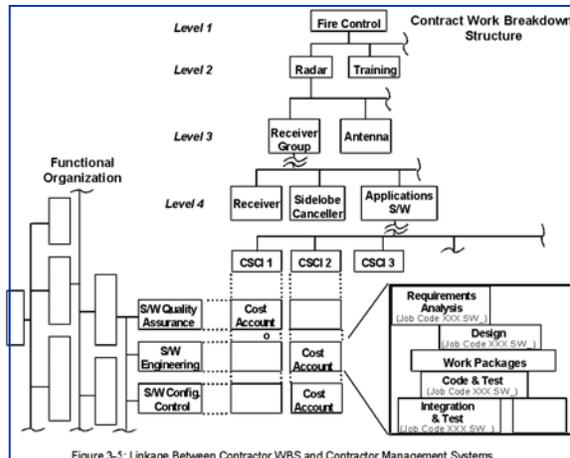
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Early description of the WBS

That article established that the WBS is made of three components: 1) the Product Breakdown Structure (PBS), 2) the Activity Breakdown Structure (ABS) and 3) the Organizational Breakdown Structure (OBS). It made clear the relationship between deliverables and activities but the organization relationship was not at all clear. The unanswered question was: "Is the Organization Breakdown Structure the deliverables-to-activity relationship or is it the organization (enterprise) that was either producing the deliverables or performing the activities?" The diagrams of the organization breakdown structure concept, as I remember it, showed a matrix like relationship between deliverables and organizational entities (departments).

Slide 7:



Organization-to-deliverable relationship

I remember being puzzled at the time by this diagram and it's implied orientation but I didn't see a need to pursue.

While searching for a reference of the WBS for my first book (1993), I became aware of the value of the World Wide WEB (WWW) as a research tool. I found a WEB site that described the WBS and why it was developed. The materials in the WEB site were dated 1987. That WEB site disappeared sometime in 2001.

The WBS diagrams were all related to Department of Defense (DoD) projects. It established the purpose of the WBS as a tool for managing a project - actually, as I remember, it really never mentioned the concept of "managing a project." I just sensed that managing a project was the purpose. In addition, the reference really never established the *orientation* of the WBS. By orientation, I mean whether a WBS is activity based or whether it is deliverable based - more on this point later.

The reference did not solve the mystery of why the WBS was developed for the DoD in the first place. I know that before 1988 the DoD was having difficulty completing projects on time and within budget. I can only guess, the budgetary problem prompted the development of the WBS. If so, then a piece of project management folklore comes into play.

In the early 1990's I was involved in project management training and consulting. At that time, I engaged a number of senior project managers who lifetime experiences as consultants included the development of many of our current project management tools. During that time, we spent many hours discussing project management concepts and tools. An outstanding example of that folklore was: "the inside information regarding the development of PERT and the WBS." These gentlemen had been involved as consultants to the DoD, the US Air Force and the US Navy in the Polaris submarine program in the mid-1950s. They were part of a larger team who developed the concept of, the algorithms for and the first diagrams of PERT.

However, since the Polaris program was top secret, their PERT concept was taken back to California, filed and not published. In the early 1970's, the DoD and the General Accounting Office (GAO) of the US Government engaged the same consulting group. This time they were instrumental in the development of the WBS. Be assured that this bit of folklore is based on their professional *word* and *credibility* and *my*

powers of recall. Because they were working with the GAO, I have made the extrapolation as to "why the WBS was developed."

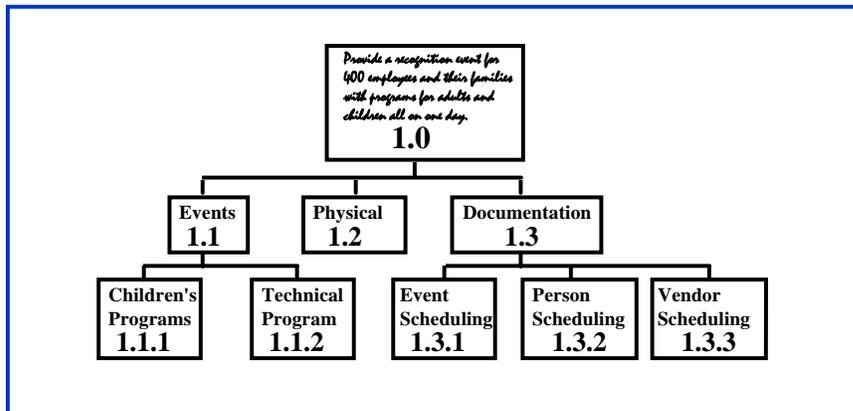
What was the problem..

I am willing to bet that the problem the GAO was trying to solve was: "What are we paying for?" One of the major roles of the GAO is to pay the government's bills. In that capacity and as good accountants, the GAO would want to understand the relationship between an invoice from a contractor and the value that the US Government would receive (a deliverable). Their knowing this relationship would be absolutely necessary in order for the GAO to fulfill their mandate.

My extrapolation..

If you will allow me an extrapolation *from what is essentially folklore* then -- **the Organization Breakdown Structure can be essentially a numbering scheme that shows the relationship between value received (a deliverable) and an invoiced expense.** The OBS is the numbering scheme you can use to relate deliverables, sub-deliverables, components, parts and pieces in their hierarchy. An accountant would call this scheme a chart of accounts.

Slide 8:



WBS with its OBS

This numbering scheme, to an accountant, provides a traceable relationship between moneys they will pay out and the deliverable components of the project.

Older Supporting Source

My extrapolation is supported by the oldest project management book in my library - "Managing High-Technology Programs and Projects", Archibald, 1976, ISBN 0-471-03308-1, page 147. Mr. Archibald calls this numbering scheme, "...a cost coding scheme(chart of a account)".

Recent Supporting Sources

There are several recent, public sources that also support my extrapolation.

DoD WEB Site

The current DoD WWW site does in part support my extrapolation. It describes the WBS in general terms but seems to emphasis the costing and cost accounting aspects of the WBS. The WWW URL for this site is

WWW.ACQ.OSD.MIL/PM/newpolicy/wbs/mil_hdbk_881/mil_hdbk.html. The materials on this site are all dated: 2Jan1998.

PMI Practice Standard

The second reference is the *PMI Practice Standard for WBS*. This reference uses a numbering scheme in all of its example diagrams - they call it a *coding scheme*. There are some references to costs and cost accounting but no direct reference is made to the coding scheme as an accounting tool. This document can be obtained from PMI's WEB site: www.pmi.org. This document was developed by a committee of PMI members and was first available in 2001. I will be using this document later to make another point.

Slide 9

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| <p>WWW WEB URLs:</p> <p>DoD WEB site:</p> <p>www.acq.osd.mil/pm/newpolicy/wbs/mil_hdbk_881/mil_hdbk.html</p> <p>PMI WEB site:</p> <p>www.pmi.org</p> |
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2 - How Our Understanding of How the WBS Has Evolved

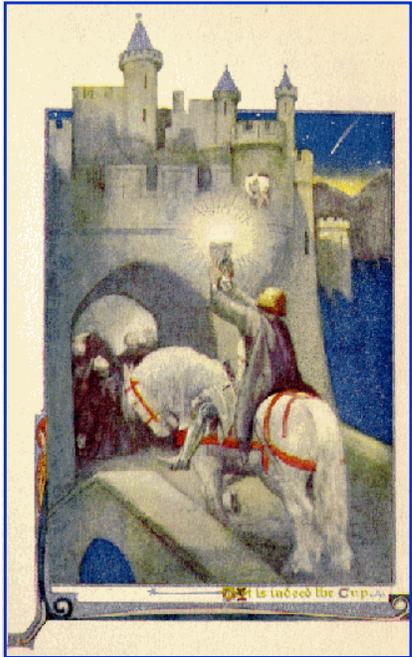
I believe that over a period as long as 25 years, the project management profession has developed a generally accepted definition of the WBS. I am concerned that the accepted definition is not conducive to its successful, practical application in a real project environment.

My use of the WBS during a project and its resultant value to the project has evolved significantly and very positively. The value and use, as originally posed in my early project management training, was slight, if at all. There was little reference to the WBS and certainly no description of how to develop it. As a new project manager, I had little idea of its value to my projects.

My search for truth

This glaring difference between what I was taught and the experience I developed, caused me to search for the truth - what is the true meaning of a WBS? This became my search for the *holy grail of project management!* It became an *intelligential point-of-honor*.

Slide 10



The Search

My hypothesis

My hypothesis is: "Our understanding of the WBS appears to be very much a product of project management folklore and therefore my interpretation is just as valid as the next."

Sources of our understanding

Lacking any credible source for its history, I begin my search for any bits of folklore that would ultimately make up our understanding of the WBS.

There are of course many publications containing different authors' view of the WBS. On this subject, I have read over 25 recent books and over 60 older books (prior to 1994) on this subject. I found an almost singular view of the WBS - one consistent with the US Government publications of the 1980s. What I found interesting was an almost total lack of instructions on how to develop a WBS. If these authors approached the subject at all, they either reiterated the DoD point-of-view or they described, "how important it was to develop your WBS." Gee, that was obvious to me already!!

I then considered another source - commercial, personal computer software for project management. My review of these sources provided again a consistent view of the WBS - albeit different than the one I developed by experience. This view was at least more practical in nature than provided by the project management publications.

Because of the wide distribution of this software, I now consider these sources as probably, *the true sources of our folklore concerning the WBS.*

The software sources

The first software source and the most easily accessible was the operating instruction for the earlier releases (4.0) of Microsoft's

this time, many experienced, project managers have challenged three of my assertions:

1. The WBS is not Microsoft's Gantt display.
2. The WBS is product (deliverable) oriented.
3. All work (work package, tasks, effort) is not at the bottom of the WBS.

Slide 12

My Assertions:

- **The WBS is not Microsoft's Gantt display.**
- **The WBS is product (deliverable) oriented.**
- **All work (work packages, tasks, effort) is not at the bottom of the WBS.**

Let us look at each misinterpretation to maybe understand its source and my assertion.

Misinterpretation One

The first misinterpretation is: "The WBS is the Gantt display in Microsoft Project." Three years ago, I begin teaching a course on managing information technology projects and probably in over 95% of the occasions, my class would point to Microsoft Project's Gantt view as the WBS. I now believe that Dr. Frame has cleared this misinterpretation by calling it: "a convention." I can accept this convention like I can accept that most management call a precedence diagram a PERT chart and most people call an adjustable wrench a Crescent wrench or a tissue a Kleenex! I would appeal to you, to at least for yourself, make a distinction. The distinction is the difference between a WBS and a schedule. **The WBS is the basis for the schedule, not the schedule itself and certainly not Microsoft Project's Gantt view.**

Misinterpretation Two

The second misinterpretation is: "The WBS is activity oriented." I have argued against this point for many years but I am encouraged by recent events. As I said earlier, three years ago, I begin teaching a project management course. During each class, I also asked my students: "is the orientation of the WBS by deliverable or by activity?" The first year, the majority reply was: "activity oriented." Now just into the fourth year the majority reply is: "deliverable oriented." This shift in the view of the WBS orientation has probably been driven by recent publications and a PMI study:

- The DoD WEB Site states that the WBS is product oriented.
- The PMI Practice Guide for WBS states that the WBS is deliverable oriented - then all of its diagrams are activity oriented?????
- A 2001 study by PMI volunteers concluded that the WBS is deliverable oriented but, "...that it could contain activities."

Even though the view is changing within the ranks of practicing project managers, those contributing to our body of knowledge still show the WBS

as activity oriented. I would have to question whether those who are writing about project management have ever built a WBS???????

Misinterpretation Three

The third misinterpretation is: "All work packages are at the bottom levels of the WBS." I have been fighting this statement for years and I had pretty well given up hope of changing the profession's view until recently! This misinterpretation has in part been changed by the profession's growing acceptance -- the WBS is deliverable oriented. If in fact, the WBS is deliverable oriented, I have to ask: "how can the bottom levels of the WBS contain all the work (activities)?" The new convention of "deliverable orientation" flies in face of the persistent, written statement: "all work is at the bottom level."

As my experience with the WBS grew, so did my realization that the WBS is started best as a deliverable oriented, diagram. I soon realized that a *pure* deliverable orientation would not solve all of my practical problems in guiding a project team through developing their plan. The problem was that the contracted deliverables did not fully describe all the work to be performed. At that time, I added another step to my WBS build process. This step took into account those intermediate deliverables that are necessary for the team but not delivered to the client - deliverables such as specifications, strategies, designs, etc.

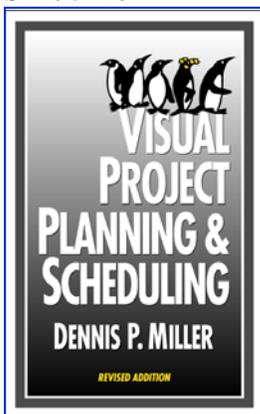
Also, I soon realized that a pure reliance on the deliverables as a basis for the activities would cause the team to miss a considerable number of activities related to the combining of low-level deliverables into higher level, deliverables. These activities are the integration, testing and customer relationship activities of any project. I call them the: "the glue activities" -- they bring together all the sub-deliverables into a final deliverable.

So, maybe now you can understand, if only through my thought process, how the definition of the WBS may have evolved.

3 -- HOW TO BEST BUILD AND USE THE WBS

As you might guess, I started using the WBS in my projects with mixed results. However, overtime and with lots of experience, I developed a project planning process based on the WBS.

Slide 13

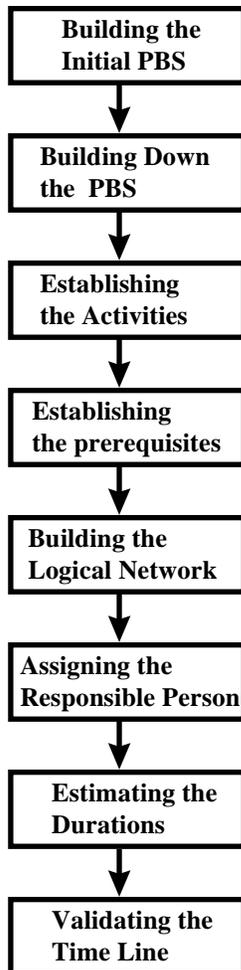


In my recent book (to be released today), I call it the: Visual Project Planning & Scheduling (VPP&S) process. Let me share with you an outline of this process:

The VPP&S process

The VPP&S process is a fairly intuitive process that has been developed over many years and many projects. It is a process that lends itself to modification as the situation calls.

Slide 14

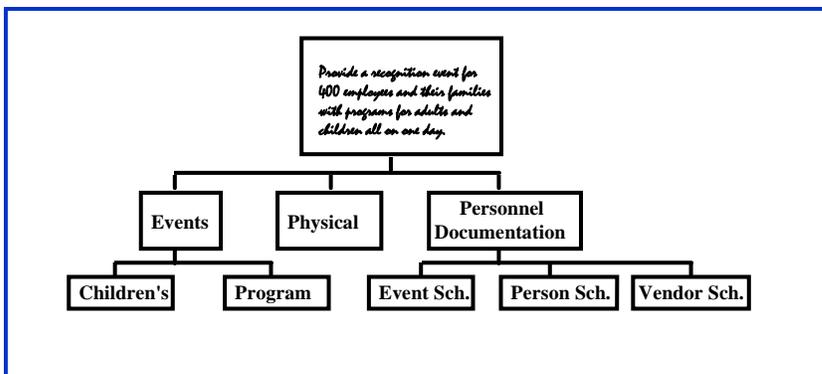


A flowchart of the VPP&S process.

Step One - Building the initial PBS

During step one you will begin to organize your project's scope - its deliverables. You will begin by developing the initial Product Breakdown Structure with Post-Its™. You end with a presentation of your PBS to your client.

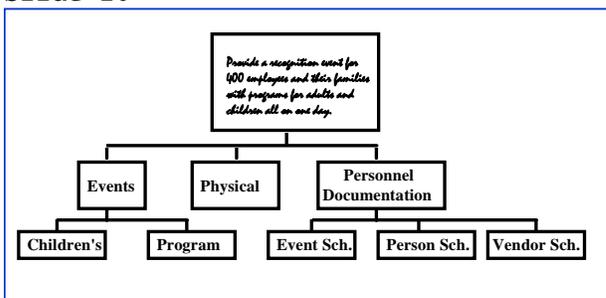
Slide 15



Step Two - Building down the PBS

During step two you will build down your initial Product Breakdown Structure by adding additional deliverables -- Post-Its™. You will complete your preparation for the project planning session.

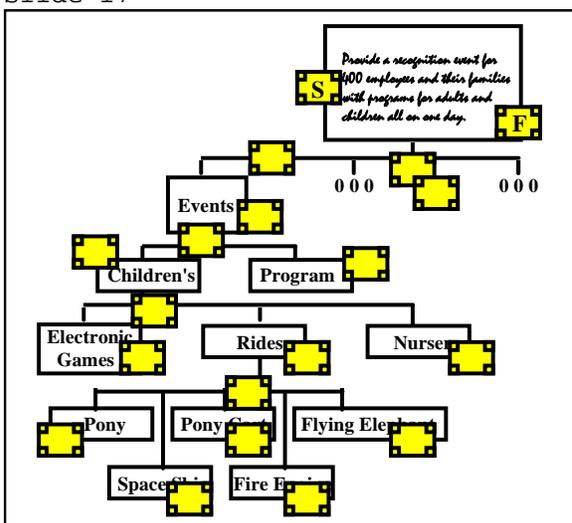
Slide 16



Step Three - Establishing the activities

During step three you will engage your project team at the start of the project planning session by showing and discussing the initial PBS. You will then lead them through a *buy in process* of modifying the PBS and developing their activities. The result is *their* Activity Breakdown Structure built from Post-Its™ and overlaying the PBS.

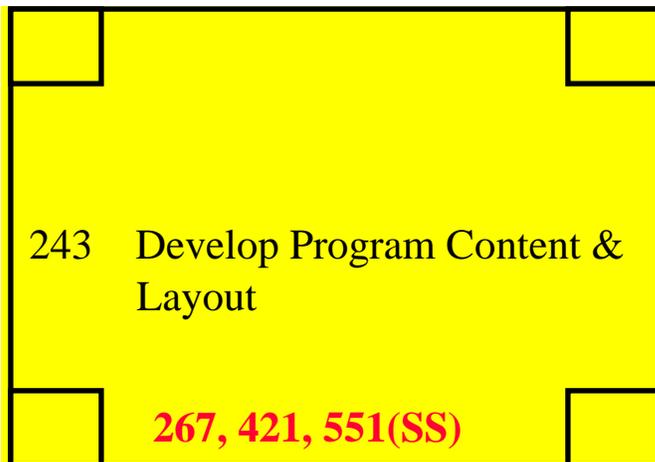
Slide 17



Step Four - Establishing the prerequisites

During step four your team will develop their activity's relationships - their prerequisites. They will refine their activity's Post-Its™.

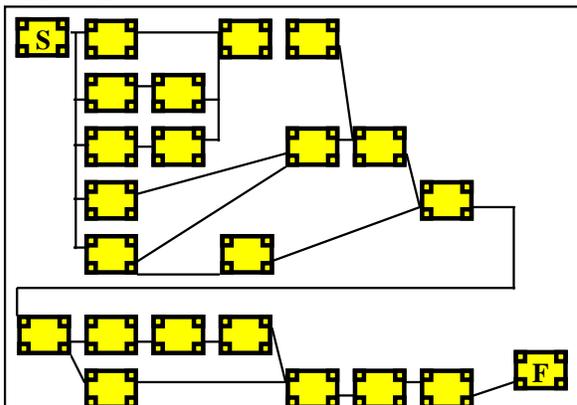
Slide 18



Step Five -- Building the logical network

During step five your team will construct their logical network from their ABS. They will continue to refine both their ABS and their PBS.

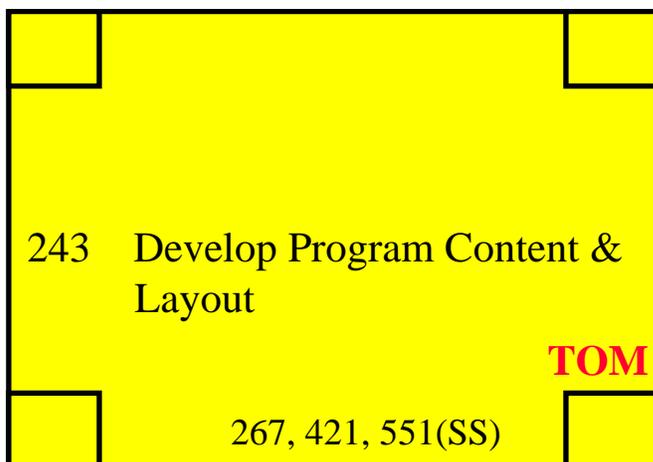
Slide 19



Step Six -- Assigning the responsible person

During step six your team will assign the responsible persons to each activity's Post-Its™. They will continue to refine their PBS and ABS.

Slide 20



Step Seven -- Estimating the durations

During step seven your team will develop their estimates of their activity's duration and add it to their Post-Its™. They will continue to refine their PBS and ABS.

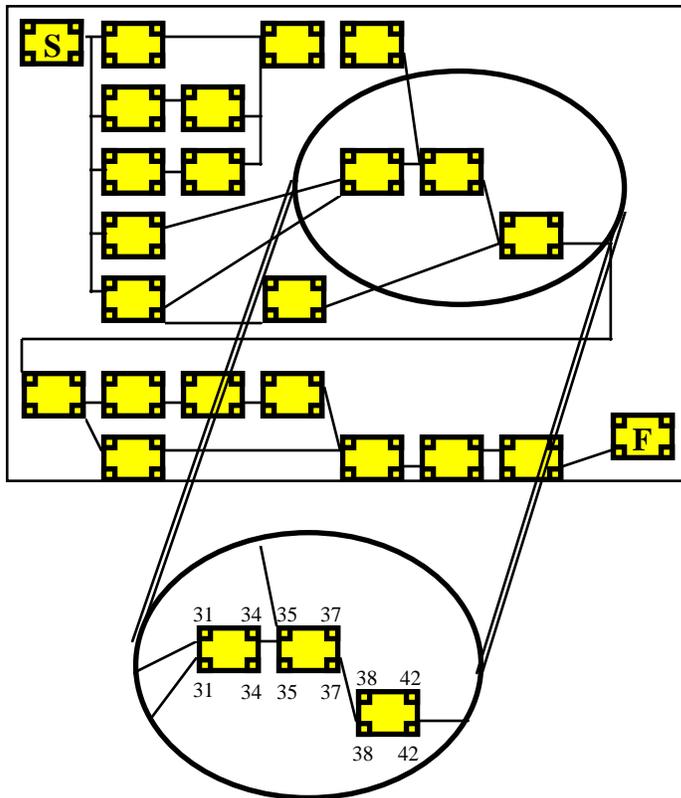
Slide 21



Step Eight -- Validating the time line

During step eight your team will perform critical path analysis to establish their project's critical path(s). They will continue to refine their PBA and ABS and recalculate the critical path(s).

Slide 22



I wish you the very best of luck (if that has anything to do with it) either on your next or current project.

I hope I have upset your view of the Work Breakdown Structure to the point that you develop your own, practical idea of what it is and what it can do for your next project.

Remember: Your practical view of the WBS will be just as valid as mine!