Module	6	Unit		6
PREPARING WORK BREAKDOWN STRUCTURE, RESPONSIBILITY MATRIX, AND MASTER SCHEDULE				
			Overview	

	Module Overview
	This module introduces the basic concepts of baseline planning including: ❑ Work Breakdown Structure (WBS) development ❑ Responsibility Matrix (RM) development ❑ Master Schedule development Additionally, the participant will practice development of the WBS, RM, and Master Schedule.
	Learning Goals – At The End Of This Module, You Will Be Able To
	❑ Describe the process to develop a Work Breakdown Structure, Responsibility Matrix, and a Master Schedule.. ❑ Develop a WBS, RM, and Master Schedule.
	Module Time 16 Hours and linked to participants own projects

Module	6	Unit	
			Introductory Text

Overview:

This module describes three very important steps in the baseline planning process for the project. Previous steps that would have been completed include the definition of objectives and the development of the scope for the project.

The development of the work breakdown structure, responsibility matrix, and the master summary schedule requires intense effort by the project manager and the project team. Therefore, it is recommended to hold a project kickoff meeting (project launch meeting) to create these deliverables in a controlled environment.

My Notes

Module	6	Unit	6.1.1
Baseline Planning Process			
Introductory Text			

My Notes

There are 10 steps in the baseline planning process. Each step is dependent on the completion of the previous step. By following the process as defined, the quality of the deliverables in the project plan is increased and rework is minimized.

Steps for Baseline Project Planning:

- Form the project team
- Review the Terms of Reference
- Validate the Terms of Reference
- Check the project scope
- Develop a work breakdown structure
- Develop Responsibilities Matrix
- Elaborate the project schedule
- Develop supporting plans
- Secure agreement from client
- Prepare baseline project plan

Definition of Work Breakdown Structure:

- A detailed delineation of all the project elements to be executed in delivering the project
- A top-down formulation of how project activities fit into the overall project structure
- Lowest level depends on preference - industry standard is 80 hour time duration for activity to facilitate effective control and status reporting at task level

Module	6	Unit	6.1.2
Responsibility Assignment Matrix Definition			
Introductory Text			

My Notes

- Responsibility assignment matrix - the grid that is used to assign responsibilities for each of the work tasks delineated in the work breakdown structure
- Identifies primary and support roles for each work package, task, or activity
- Ensures that all tasks are assigned and no redundancy exists in responsibility - not more than one person assigned responsibility for an activity

Master Summary Schedule

- High level summary view of major project elements and milestones against time
- Provides an easy method to discuss project summary activities in reference to time with management and the client

Module	6	Unit	6.2
Developing the Work Breakdown Structure			
Introductory Text			

My Notes

Developing the Work Breakdown Structure:

WBS development is one of the most critical activities in project planning. The definition of the required work activities for the project provide the ability to develop the project schedule, make assignments, and estimate the project budget using a definitive (bottom-up) estimating technique.

- Depends on development of project objectives and scope statement
- Requires participation by all project team members
- Is used to validate the project scope
- WBS is input for responsibility matrix and master/ detail schedule development

Benefits of the WBS:

Creating a WBS can be challenging, but it yields numerous benefits.

It helps the project team to specify and analyze all the work that a project must accomplish and to show how the work elements are related to one another and to the end product.

Seeing how elements relate to one another and to the end product helps the team analyze relationships among parts of the project. It establishes a foundation for preparing the master summary schedule (MSS) and the CPM plan.

Module	6	Unit	6.2
Developing the Work Breakdown Structure			
Introductory Text			

My Notes

The family-tree structure of the WBS is a model for structuring (1) the project cost summary system, (2) the project budget, (3) the work package management system, and (4) the framework for activity scheduling and tracking with CPM.

Preparing the WBS also may cause the project team to break the work into smaller elements to produce more manageable units and develop ownership in the project implementation plan.

- Graphically depicts all project work
- Relates work elements to each other and to the end product
- Provides structure for organizing
    - Cost summary system
    - Project budget
    - Work package management
    - The detailed schedule (CPM)
- Improves manageability of project

WBS Components:

The *work breakdown structure* is a hierarchical, product-oriented "family tree" that accounts for *all* the work to be performed within a project.

The WBS can be created using a top-down or bottom-up approach. We recommend the top-down approach, especially for complex projects, because it reduces the chance of forgetting to include an important element of work.

The top-down approach involves combining and categorizing information form the product structure, the life cycle (process structure), and the project's organization chart.

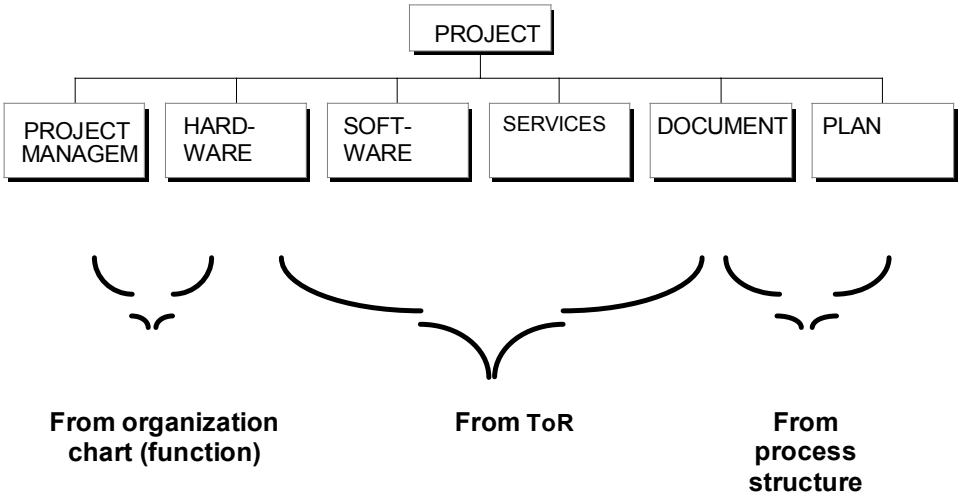
Module	6	Unit	6.2
Developing the Work Breakdown Structure			
Introductory Text			

My Notes

The bottom-up approach usually involves a brainstorming technique so that the project team can list as many activities, deliverables, components, and elements of work as possible (usually without concern for sequence, relationships, or coherence). These items are then grouped into broader and broader categories until a hierarchy of work elements is built up. This hierarchy of grouped work elements forms the basis for the WBS.

Regardless of which method one uses, the information must be combined so that *all* project-related work has a place on the WBS and only one place (i.e. categories are mutually exclusive). This includes work related to "HARD" deliverables, such as schools or roads "SOFT" deliverables, such as feasibility study or training, and *any other work that must be performed that is not directly related to any one deliverable.* This latter category includes process-related work, such as assemble and test, and organizational work, such as project management.

- All project work is accounted for on the WBS
- The WBS displays the *scope* of the project



Module	6	Unit	6.2
Developing the Work Breakdown Structure			
Work Breakdown Structure Format			

My Notes

The work breakdown structure is usually organized so that it emphasizes the product structure, but sometimes it is organized in terms of process structure (life cycle) or geography. The WBS also can involve combinations of these formats, for example, process and geography or product and geography. Each phase of the project life cycle can have different deliverables. For example, the product at the feasibility phase would be a report. Thus each phase might have a different WBS.

Our recommendation is to use the product-oriented structure, because it highlights the deliverables better than the other approaches. Any time a project has more than one deliverable, the product-oriented organization should be used for the WBS. This approach helps ensure that all product components are included in the planning and none are omitted.

Although the WBS may be displayed as either a tree diagram or an outline, the tree diagram makes it easier to see the hierarchical relationships among the work elements on complex projects. However, many project management software programs for CPM planning require the use of an outline organization

1. Highlights deliverables (objects to be developed or produced)
2. Each phase of life cycle may have different products
3. Best when project includes more than one deliverable
4. Better for CPM planning

Display as tree diagram or outline

Course Description

While there are many formats for WBS in use, the most common that is used across all industries include the definition of sub-elements down through the task level.

Work Breakdown Structure - Format

Level	Name	Level	Name
0	Program	0	Project
1	Project	1	Project Phase
2	Project Phase	2	Activities
3	Activities	3	Tasks
4	Tasks	4 - ?	Sub-tasks
5 - ?	Sub-tasks		

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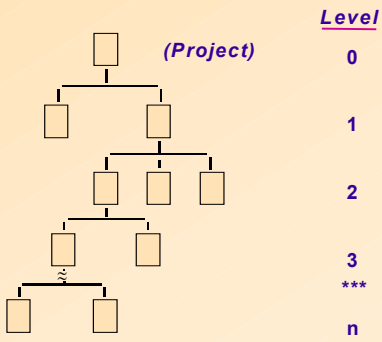
The Work Breakdown Structure (*WBS*)

- Structured from the top down
- More detail at each successive level
- Stops before reaching individual activities



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The WBS is organized from top down. Each successive level of indenture gives more detail than the previous level.

Participants' Notes

WBS Labeling Convention:

Labeling the different levels of indenture in the WBS may vary from organization to organization and from project to project. The convention we are using is the following:

The top level of the WBS describes the project, for example, building a house. It is labeled *Level 0* in the visual.

Level 1 is used to list:

- The deliverables
- The process subphases not picked up in the product structure, such as Planning, Assembly or Inspection
- Any organizational work that spans the entire project and is not accounted for in work already listed on the WBS, such as project management.

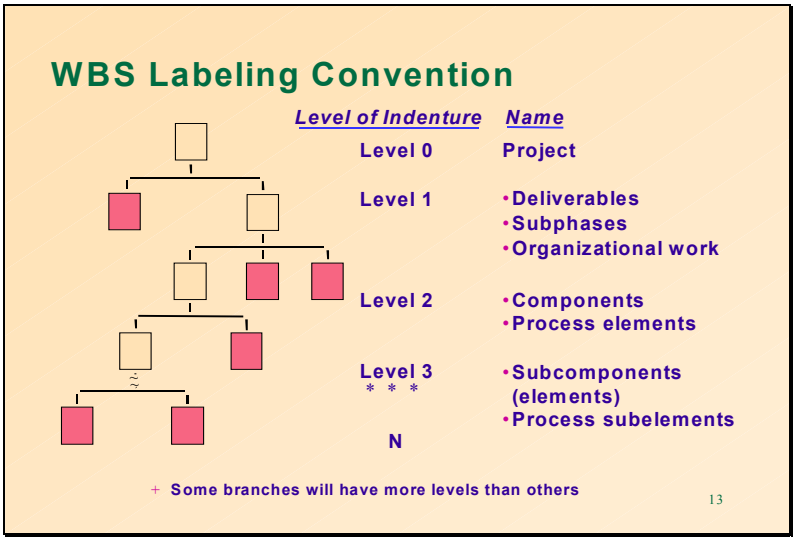
Level 2 is where the *components* that make up the deliverables are shown, along with the *process elements* that make up the sub-phases. Project management and organizational work specific to a component, rather than the project as a whole, also is listed at this level.

Level 3 is used to show further detail. *(Complex projects have additional levels.)* This level is used to show the *sub-components* (elements) that result from disaggregating components (of deliverables). Similarly, *process sub-elements* that result from the disaggregation of process elements are shown at this level, although such disaggregation rarely occurs.

Some deliverables require more levels of detail than others, even within the same project. Consequently, not every branch of the WBS will be broken down to the same level of detail. The levels of indenture may vary from one deliverable to another.

My Notes

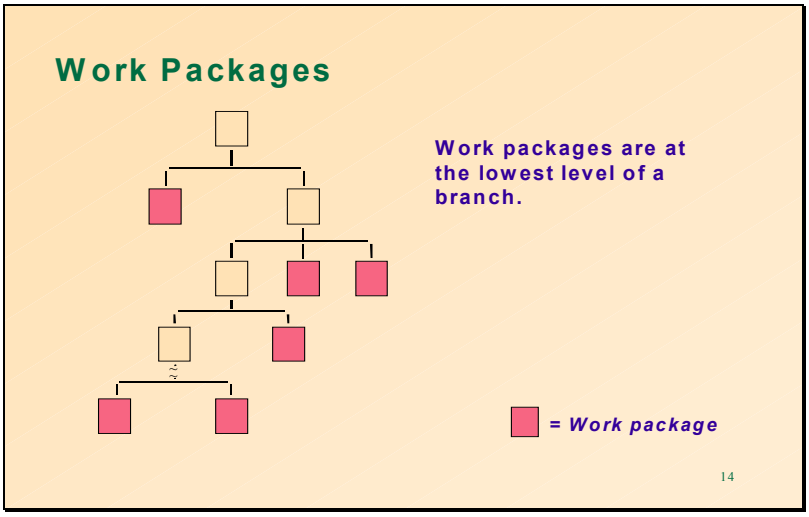
Course Description



Work Packages:

The work package is usually the smallest element of a WBS. Work packages can occur at *any* level of the WBS, as you can see in the visual.

Perspective is important when thinking about work packages. Work package is a relative concept and it is not always easy to define. One person's work package can be another person's component or someone else's project.



Participants' Notes

Course Description

Work Package Attributes

- One clear accomplishment
- One owner
- Easy to identify expenses
- Bounded
- Easy to assess quality
- Unique
- Can formally or informally assign work

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Work packages have these attributes:

One clear accomplishment—Each results in the achievement of a single visible outcome, for example, the roof of a house.

One owner—One organizational entity (or person, such as a subcontractor) is responsible for the completion of the activities that constitute the work package.

Easy to identify expenses—A single accounting number can be given to the package for budgeting and cost accounting purposes.

Bounded—There are clear start and finish points.

Easy to assess quality—There are clear quality criteria associated with the set of activities.

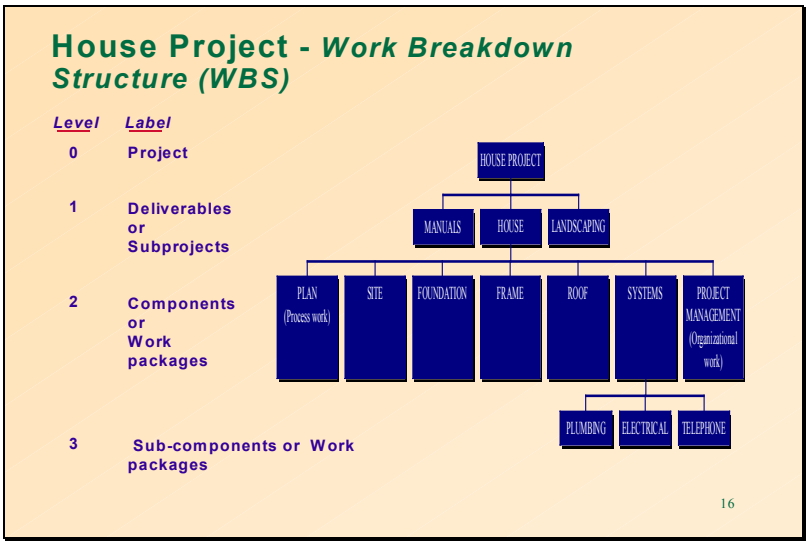
Unique—Each work package can be clearly distinguished from all other work packages and none share any work elements.

Work packages are as a means of assigning work to entities or people within the organization or of letting the work to contractors.

Participants' Notes

Course Description

Example of a WBS:



This is a sample work breakdown structure for the construction phase of the house project. Work elements are hierarchically listed. This is also referred to as *levels of indenture*.

Level 0 is the project name.

Level 1 lists the deliverables for the project: manuals, house, and landscaping.

The next level of indenture (Level 2) is where we account for the work that is required to produce the house deliverable. This work includes components of the house deliverable, plus any process-related deliverables, such as the plan for the house, or organizational work, such as project management, that relates only to the house deliverable (and not to the project as a whole).

Participants' Notes

Course Description

For the purpose of this example, we will simplify the WBS so that it fits on one page. We will only disaggregate the house deliverable, and we will not include all the necessary components. Notice that the deliverable has been broken into five components. Site, Foundation, Frame, Roof, and Systems from the product structure. In addition we have Project management from the organization chart and Plan from the process structure.

Project management represents organizational work that is not related to the other components and that is specific to the house deliverable. While project management usually is associated with the project as a whole and therefore would appear as a Level 1 entry on a WBS, exceptions can occur, as in this example. Here, we are assuming that the project manager is only responsible for building the house and not for the landscaping or assembling the manuals. (The owner is taking care of the other deliverables.) Consequently, it would be inappropriate to associate the project manager's work and its related cost with the project as a whole. Instead the project manager's work (and related cost) should be attributed only to the house deliverable.

Level 3 is the next level in the hierarchy. Here, we show the results of disaggregating the systems component to an additional level of detail.

Work Breakdown Structure Coding:

When preparing a WBS, a numbering system is usually used to identify the work elements and clarify their relationships.

The coding system has a number of purposes:

- It provides a structure for setting up the budget and various tracking systems.
- It serves as the basis for generating plans and management reports of varying levels of detail.

Participants' Notes

Course Description

Most organizations have a chart of accounts that is used with data processing and accounting systems to plan, track, and report expenditures. The chart of accounts is simply a list of items, often grouped into categories, such as personnel, travel, office supplies, and equipment rentals. Each category and each item within a category is assigned a code number. For example, 001 for personnel or 002 for travel. These code numbers from the chart of accounts are used to plan, track, and report expenditures. This system maintains order in the organization's accounts and keeps the controller happy.

Ideally, the numbering system used on the WBS will relate in some way to the account structure and coding system used by an organization's financial department to budget and track expenses (i.e., its *chart of accounts*). When the chart of accounts and the WBS are related through a relational database management system, planning and tracking progress and expense are much easier. This may not be possible, however, and it is likely that the project manager will have to create an additional, informal expense tracking system for the project.

Work Breakdown Structure - Coding

- Use numbering system
- Numbering system should
  - Give each entry a unique identification number
  - Provide a structure for planning the budget and tracking systems
  - Indicate family relationships for computer planning and reporting
  - Relate to organizational chart of accounts
  - Take into account a variety of project needs

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Participants' Notes

Course Description

Creating the Work Breakdown Structure:

The internal kickoff meeting serves as a facilitated work environment for the project manager and the project team to develop the baseline planning deliverables. The preparation for the meeting and the step-by-step process is defined on the following pages.

How To Create the WBS

- Internal Kickoff meeting environment - group participation
  - Gain buy-in through team member identification of activities
  - "Vision of project" revealed to team members
  - Provides a controlled environment for parallel development of work breakdown structure

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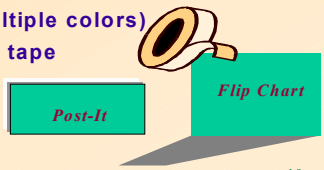
How To Create the WBS Cont'd

- Utilize visible process to increase sharing of information
- Supplies needed include:
  - Paper approximately 18 - 36 inches wide, 20 - 30 feet long (flip chart pages can be substituted)
  - Post-its (3x3 or 3x5 in multiple colors)
  - Push pins and packaging tape



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Participants' Notes

Course Description

How To Create the WBS Cont'd

- Place paper on room walls
- Position each team member in front of an area of the paper
- Communicate the following instructions:
  - Start at highest level and work down in descending order (80 hour rule)
  - Create a post-it for each activity

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How To Create the WBS Cont'd

- Document the following information on each post-it
  - Task name (begin with a verb - action)
  - Type of resource and skill level
  - Number of hours required to complete activity
  - Other expense (travel, tools, etc.)
  - Any dependencies to start / complete activity
  - Any potential risks

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Participants' Notes

Course Description

Important Questions to Ask Project Team Members:

Project team members sometimes struggle with definition of WBS activities. The project manager can provide a list of essential questions that will assist the team members in definition of their activities.

How To Create the WBS Cont'd - Important Questions to Ask Team Members

- What work must be performed?
- Who will complete the work?
- How long will it take to complete the work (units of time - not start / complete dates)?
- How many resources will be performing the work?
- What or who is the start / completion of your work dependent upon?

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Post-It Note Example:

How To Create the Work Breakdown Structure - Post-It Example

Create Inventory (Task Name)
Clerk Familiar w/ Excel (Resource Type)
72 Hours (# Hours Required to Complete Work)
Travel / lodging $1500, Excel software $299
Data Receipt, Laptop & Software (Dependencies)
Risks: 1)High - available clerk unhappy
2)Low - laptop not available

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Participants' Notes

Course Description

Creating the WBS – More Structured Approach:

The project manager may desire to develop a WBS to the management or organizational level prior to holding the internal kickoff meeting. The slides on the following pages describe this process.

Creating the WBS (For each phase)

Draw product structure as a tree diagram

- **Include *soft* items such as documentation and training**
- **Check for appropriate detail**
- **Do not include activities on WBS**
- **Utilize team expertise**

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Steps in Creating the WBS:

- ❑ Determine which phase of the project life cycle you are in. (The deliverables may be different for the different phases of the life cycle.)
- ❑ Start with the product structure. The products or deliverables flow from the objectives of the project. We suggest changing the outline format into a family-tree diagram so that you can see the hierachical relationships more easily. However, if you are using a software package that only accepts information in outline form, you may want to work in outline form.
- ❑ Make sure *soft* items, such as documentation and training, are included if they are part of the project's deliverables.
- ❑ Determine if the product structure has enough detail or if any branches need additional detail. (Consider how much information a given level of management needs.)

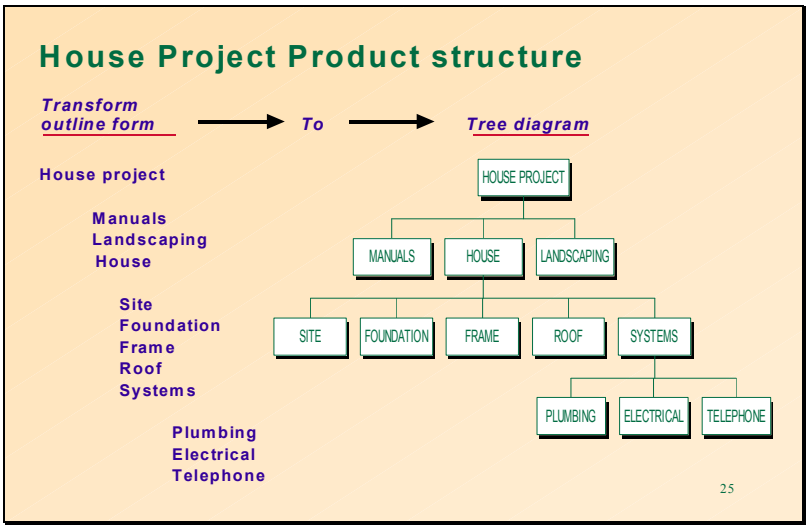
Participants' Notes

Course Description

- Only go to the level of detail that is useful for a given level of management.
- Always stop before reaching individual activities.
- The team member with the most expertise in a particular component should be responsible for dissaggregating that component. (This can be an assignment completed before the internal kickoff meeting.

Creating the Tree Diagram:

This visual shows how the product structure is simply redrawn as a family tree diagram for our example of the house construction project.



Participants' Notes

Course Description

Preparing the WBS:

The next step in making the WBS is to review the life cycle (i.e., the process structure).

- Examine the process structure to identify any required work elements that are not inherent in the product-oriented items already included on the WBS. Look for items that relate to several deliverables such as:
  - Inspection/test/review
  - Assemble
  - Initial planning
- Add any missing process-related work to the appropriate level of the WBS. In doing this, you are converting a process step that involves action, for example the act of planning, into a deliverable (or outcome of the action), such as a written plan or an assembled product.
- Determine if additional disaggregation would be useful for management.

Preparing the WBS
Check Process and Organization Structure

- Check the process structure for work missing on the WBS
  - *Inspection/test/review*
  - *Assemble*
  - *Initial planning*
- Add missing work to appropriate level of WBS
- Determine if additional disaggregation needed

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Participants' Notes

Course Description

- Review the organization chart to help identify any other work that may be necessary but not already included on the work breakdown chart. Look for items that relate to several deliverables but which cannot be specifically charged to any one of those deliverables, such as:

  - Project management
  - Legal and accounting support
  - Contract administration
  - Quality assurance

It is not always clear which organizational and process-related work elements should be included on the WBS. For example, is legal work on a project sufficiently intertwined with the various work packages that it cannot easily be separated from them, or is it really something that deserves to be singled out and treated as a separate component or work package? If the former, it would not appear on the WBS but would consist of individual activities in various work packages in the CPM. If the latter, it would be treated as a component or major work package.

Our rule is that the WBS must account for all project work. If developing the implementation plan is not included in the product structure, then we need to add it as a process element.

- Add any missing organizational work to the appropriate level of the WBS.
- Determine if additional disaggregation would be useful for any of these.
- Not every deliverable has to be broken down to the same level of detail. Some will stop at the second or third level. Others may have four or five levels.
- Code the WBS. Give each element a unique number that relates it to its category and level.

Participants' Notes

Course Description

Many projects run into problems with cost control during implementation because the categories in the cost accounting system do not match the categories in the WBS and the CPM. This makes it difficult, if not impossible, for the cost accounting system to match expenditures with the work completed. For example, if the organization's chart of accounts only provides one account number for charging the costs for ready-mix concrete, the project manager will not be able to easily determine if the concrete is being used for roadways or the bridge foundation. The WBS should provide a structure so that when the project-level accounting system is developed, it is possible to relate costs with specific components and deliverables.

Preparing the WBS

Check Process and Organization Structure

- **Review organization chart for work missing from the WBS. Look for items such as:**
  - ***Project management***
  - ***Legal and accounting support***
  - ***Contracts***
  - ***Quality assurance***
- **Reminder: Level of detail will vary from branch to branch**
- **Code the WBS**

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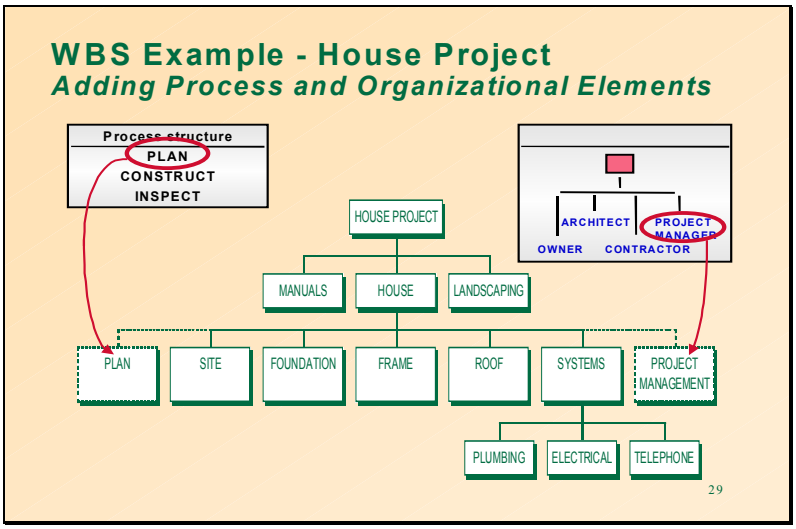
Participants' Notes

Course Description

House Project Example:

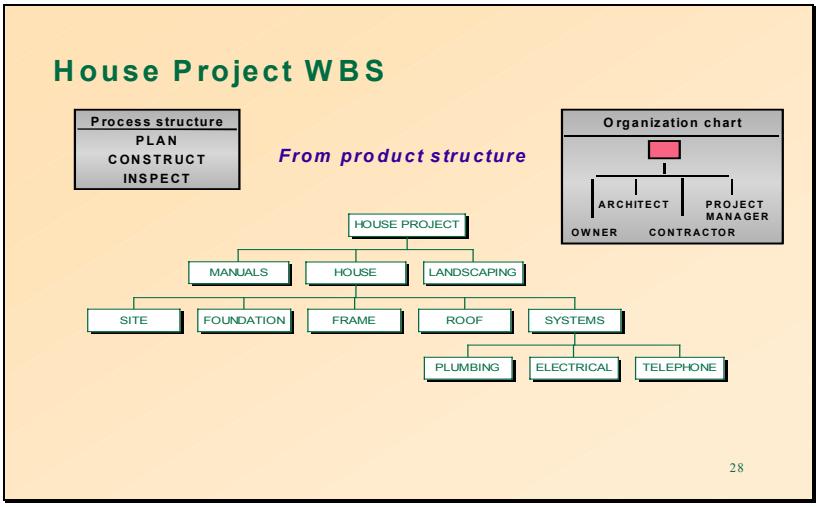
Let us consider the house project example. For simplicity, we will continue to look only at the house deliverable, ignoring landscaping and manuals. We'll also continue to assume that the project manager is only responsible for the house deliverable and that the owner will take care of the landscaping and the manuals. We will further simplify the example by ignoring the termination sub-phase.

Here is the beginning of the WBS (made from the product structure). Look at the process structure and organization chart. What process- or organization-related work is not already accounted for and must be added to the WBS-in-progress?



Participants' Notes

Course Description



Here is how we've modified the WBS-in-progress:

(1) We've explicitly added under the house deliverable:

- *Plan* from the process structure
- *Project management* from the organization structure.

(2) We did not add *Inspection* from the process structure to the WBS.

Here is our logic for these decisions:

The WBS must account for all the work on the project (or, in this case, the deliverable, house). Work will be expended to create a plan for the house, to manage the house deliverable, and to inspect each component of the house. Therefore each of these types of work needs to be accounted for in some way on the WBS, either as (1) a separate entry on the WBS or (2) as an activity subsumed within a work element or work package (and consequently not explicitly shown on the WBS).

Participants' Notes

Course Description

Project management is a major category of work and needs to be accounted for on the WBS. It is listed as a separate item on the WBS because it encompasses many different types of work. Because we've stipulated for this example that the project manager is only responsible for the house deliverable, we will list

Project management as a separate work package under the house deliverable. If the project manager were responsible for all the deliverables, *Project management* would be listed with the other deliverables under the project title.

In deciding to list *Plan* as a separate work package under the house deliverable, we made two key assumptions:

(1) There will be a separate plan for the house structure and a separate plan for the landscaping but there will not be one comprehensive plan for the project as a whole.

(2) The plan for the house deliverable will be for all the components of the house deliverable (e.g., frame, roof, systems, etc.) and the components will not have individual plans of their own.

The first assumption leads us to list *Plan* under the house deliverable (not as a Level 1 item on the WBS). The second assumption results in our listing *Plan* as a separate work package on the WBS rather than treating it as an activity associated with each component and, consequently, not showing it on the WBS.

We did not show *Inspection* on the WBS because it seemed to be an activity within each component rather than a separate work package. That is, it was not clearly bounded. There was no single period when all inspection would occur. Rather, the foundation would be inspected at one time, the frame at another, the roof at another, and landscaping at still another.

Participants' Notes

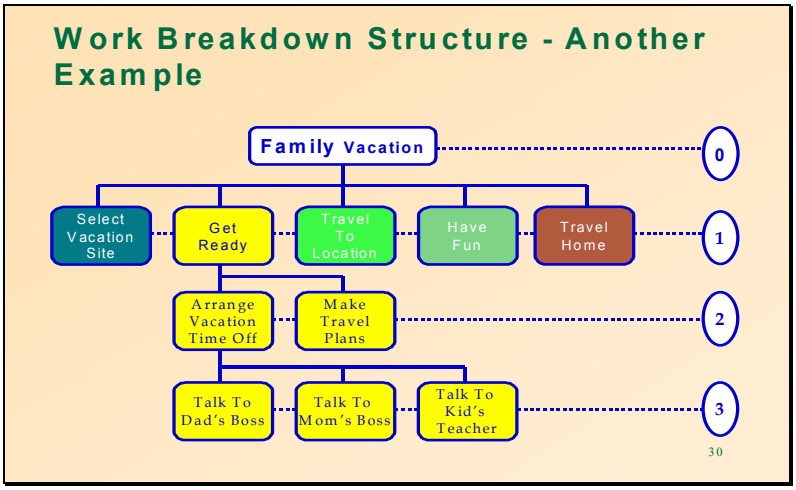
Course Description

Personnel would probably vary with each inspection, as would the quality criteria and methodology employed. It would not be easy to create a single budget category for *Inspection* or to assign the responsibility to one organization. Under such circumstances, *Inspection* seemed less a work package than a series of unique and relatively independent activities, each closely associated with a specific component, such as foundation, frame, or roof.

Consequently, we opted to treat *Inspection* as an activity within each component and not explicitly list it on the WBS, either at the project level or under a deliverable. (Each separate inspection activity will be broken out later when we prepare the complete WBS at the internal kickoff meeting.)

Another Example:

This example identifies the WBS from the project level to the activity level.



Participants' Notes

Course Description

Common Mistakes in WBS Development:

The next two slides identify some of the common mistakes in WBS development.

Common mistakes: *Don't make them!*

- Skipping the WBS
- Not focusing on the deliverables
- Omitting some of the work on the project
- Forgetting opening and closing phases such as planning and assembly
- Overlooking *soft* end items such as services, information, or software

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Common mistakes: *Don't make them!*

- Forgetting that groupings must be mutually exclusive - Work can only appear in one place
- Including too much or too little detail
- Overlooking the requirements of computer programs

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Participants' Notes

Course Description

***Exercise 2-1: Develop a* Work Breakdown Structure for current project to 2nd WBS level and expand one branch to the lowest level.**

Exercise Debrief:

1. What worked well for the group? Not well?
2. What would they do different the next time?
3. What are other areas of learning for the groups?
4. Review the WBS's at the highest levels, they are different, why?

Participants' Notes

Course Description

Developing the Responsibility Matrix (RM)

- What is it?
  - A tool for clarifying organizational roles and responsibilities
    - *Every organizational role is clear*
    - *Each work package has an identified "owner"*
    - *No two groups think they are responsible for the same work package*

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Developing the Responsibility Matrix (RM)

- Why is it important?
  - Promotes discussion and agreement about roles, responsibilities, and organizational relationships
  - Clarifies who is responsible for each work package
  - Source of information for preparing the master summary schedule and CPM plan

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Overview:

One of the priority activities of the project manager is to understand the work that must be performed for the project and "who" will perform the work. The Work Breakdown Structure (WBS) process is used in defining the work activities for the project. The WBS process allows work activities to be broken down from very high-level summary activities to detail activities.

Participants' Notes

Course Description

The definition of the more detail activities provide a clearer view of "who" is responsible for the work. At the higher WBS level, the responsibility may only be identified to an organization where as at the lower level, more detail of the actual work is defined, and the responsibility for the work can be identified to a specific resource.

Therefore, with the WBS as a source of input for the Responsibility Matrix, the work activities are clearly defined. The focus of the RM development process is to provide the relationship of the work activities to the "who". Additionally, a specific coding scheme is used to define the actual role / responsibility of the "who".

The typical view of the Responsibility Matrix is a simple x and y axis with project activities identified on the x axis and resource names identified on the y axis.

PROJECT X Resource Name ➔ 🡻 Work Activities (from WBS)	Engineering I. Draw	Furniture Vendor I. Move	Building Vendor I. Build	Landscape Vendor I. Plant	Heating/Air Vendor I. Plumb	Carpet Vendor I. Lay Carpet
1.0 Draw house plans	**R**					
2.0 Construct house			**R**			
3.0 Install plumbing					**R**	
4.0 Install carpet						**R**
5.0 Deliver furniture		**R**				
6.0 Landscape lot				**R**		

By adding specific coding, it is very easy to see the relationship of the work activities to the organization / resource name. The **"R"** is generally used to identify "who" is responsible for the work activity.

A typical example of a Responsibility Matrix is displayed in Attachment 2-2.

Participants' Notes

Course Description

Example:

The following is a sample responsibility matrix for the house deliverable for a house project. It is derived from the WBS of a simple house construction project. The WBS elements are listed in the left-hand column of the matrix. Along the horizontal axis (i.e., column heads) are the key organizations or individuals that are involved with the project. A simple alphabetic code is used to indicate what relationship, if any, a particular organization has with a specific work package.

Here, for example, the codes indicate whether an organization is responsible for performing the work **(W)**, must be consulted **(C)**, or must give approval **(A)**, and an **(I)** for information only.

Responsibility Matrix (partial)
House Deliverable Project

Organizational unit

WBS element	*Owner*	*Architect*	*Government*	*Contractor*	*Project manager*
Plan	A	W	C	C	C
Site		A	C	W	A

Code
W = Does work
C = Must be consulted
A = Approve
I = Information only

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Participants' Notes

Course Description

An example of coding is the RACI scheme, which is used across the industries for Responsibility Matrices as well as for process reengineering. The definition of the codes are: Responsible **(R)**, Accountable **(A)**, Consult **(C)**, and Inform **(I)**.

Responsibility Matrix *(Another Example)*

SYSTEMS PROJECT - RACI DIAGRAM

PROJECT DELIVERABLES \ PROJECT TEAM	C.JAY	C.KELLEY	B.JEFF	D.MORRIS	R.DAWSON	G.MOORE	M.HAROLD	J.CLIFF	D.WATSON	B.U. PMs	B.U. TEAMS	B.U. MGRS	D.DEVON	IT STEERING COMM.
Overall Direction	C	I	I	I	I	I	I	I	I			C	A	C
System Implementation	A													
Technical Infrastructure	I	I	I	I	I	I	A/R	I	I	R	R	C	I	C
Capacity Optimization Process	I	R	A	R	I	I	I	I	I	R	R	R/C	I	R/C
Business Process Set	C	R	R	R	R	R	R	A	R	R	R	R/C	I	C
Technology Enablers	C	R	R	R	R	R	A	C	R	R	R	C	I	C
Systems Retirement	I	C	C	C	C	C	A/R	C	C	R	R	C	I	C
Universal Training Program	C	R	R	R	R	R	R	A/R	R	C	C	C	I	C
Lessons Learned Process	R	R	R	R	R	R	R	R	A/R	C	C	C	I	C

Note: R=Responsible, A=Accountable, C=Consulted, I=Informed

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Why Prepare a Responsibility Matrix (RM)?

The responsibility matrix is a tool for clarifying organizational roles and responsibilities. Its purpose is to make sure that:

- Every organizational unit's role and responsibility is clear.
- For each work package, the "who" has been identified for responsible, consulted, and approval authority.
- No two groups (resources) are identified with responsibility for the same work package.

Participants' Notes

Course Description

Preparing the Responsibility Matrix

- Draw matrix (grid)
- List WBS elements down the left-hand side (row)
- List organizational units along the top (column)
- Use codes for level of involvement
- Discuss and agree on roles

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Steps in Creating the RM:

The mechanics are relatively simple compared to the Work Breakdown Structure process. The value of the RM development process comes from the discussion and clarification of the roles and responsibilities of the various organizations and individuals involved in the project.

- ❑ Draw a matrix (grid) that combines the organization chart with the WBS. Work elements from the WBS are listed in the left-hand column. Ideally activities should be identified to the Work Package level, which is the lowest level of detail of the WBS for control purposes. The organizational units or individuals involved with the project are listed horizontally along the top as column headings.

- ❑ For each work package, discuss and obtain agreement from each organizational representative in regard to that organization's role and level of responsibility. Write this on the matrix.

Participants' Notes

Course Description

Steps in Creating the RM continued:

- Use such codes as:

  - W for owner (Does the work)
  - C for consultation required
  - A for approval required
  - I for information only

Note: Different coding symbols could be used to fit the specific needs of various stakeholders and projects.

- Avoid assigning shared responsibility for any work package. Each category should have only one organization or person responsible for its accomplishment. The idea here, is to ensure that the ultimate decision making element for a work package is the responsibility of a certain organization / resource name.

- Double-check with the project team to make sure that all team members agree to the roles and responsibilities as negotiated and documented.

- Ask project team members to present the matrix to their management for review and approval.

The mechanics of creating the responsibility matrix are relatively simple. However, the process of determining roles and responsibilities is a very important one. The project manager should make sure that every organization and individual involved with the project understands the role and responsibility that they are to perform in relationship to each work element or work package.

Participants' Notes

Course Description

Administrative and Strategic Needs in Developing the Responsibility Matrix:

The process steps in developing a Responsibility Matrix include both administrative and strategic needs. While administrative needs are easy to identify and execute, strategic needs are often not completely known or understood until the development process is actually underway. This may require the project manager to modify the strategic approach to the development process. Examples of administrative and strategic needs include the following:

Administrative needs:

- ❑ Responsibility Matrix development process that can be communicated to, and understood by the project team and stakeholders.
- ❑ Comfortable meeting environment.
- ❑ Adequate audio / visual equipment to allow the project team to be interactive with the development process.
- ❑ Form and format to document the Responsibility Matrix.
- ❑ Work Breakdown Structure output if completed in a separate meeting.
- ❑ Etc.

Strategic needs:

- ❑ 100% of project team and involved stakeholders available for the meeting.
- ❑ Understanding of the roles and responsibilities (at least at a high level) of all team members and stakeholders.
- ❑ Negotiation strategy for unclear areas; i. e., no organization performs the required work today.
- ❑ Escalation strategy (a plan) to be executed when agreement cannot be reached. If the lack of agreement stalls the development process, the entire project team is wasting time until agreement can be reached.
- ❑ Etc.

Participants' Notes

Course Description

The key to successful development of the RM is to be prepared to address both administrative and strategic needs. The focus is not for the project manager to think in a negative sense, but to be prepared with contingency plans for roadblocks to avoid lost time.

Responsibility Matrix Development Process:

Example 2-3: Typical Process Steps In Developing A Responsibility Matrix is displayed on Attachment 2-3 and provides a high level overview of the RM development process. While all potential process steps are not identified, this is appropriate since strategic needs may require additional, modified, or deletion of steps.

Additionally, the actual environment for the meeting to develop the RM has an impact on the outcome of the meeting. Therefore, it is recommended to use a facilitator, where available, to add control to the process. This also allows the project manager to act as a meeting participant in a less controversial role. Example 2-4: Meeting Roles For Facilitator And Team Leader is displayed on Attachment 2-4 and provides some general guidelines to assist in this area.

***Exercise 2-5: Develop a* Responsibility Matrix using the WBS created in previous exercise.**

Participants' Notes

Course Description

Exercise Debrief:

1. What worked well for the group? Not well?
2. What would they do different the next time?
3. What are other areas of learning for the groups?
4. Review the RM's for proper use of codes. Is there any redundancy in assignments?

Summary – Responsibility Matrix:

The development of the Responsibility Matrix (RM) must be viewed as a major priority for the project manager. The simplicity of the development process often encourages the project manager to develop the RM without contacting the responsible organizations. While the actual RM document is important, the negotiations and agreements that are discussed directly with the responsible organizations are the "key" in ensuring that all project performers and stakeholders understand and agree to their respective roles and responsibilities for the project.

Therefore, it is recommended to develop the Responsibility Matrix at the project kickoff meeting where all organizations are represented and the discussions and negotiations can be heard and agreed to by all performers and stakeholders.

Participants' Notes

Course Description

Overview:

The MSS is a rough schedule for the project used for preliminary planning and reporting, especially to senior management. It is based on s*ummary activities,* which are life-cycle sub-phases from the process structure, such as plan, mobilize, or construct, linked to work packages from the WBS-

Developing the Master Summary Schedule (*MSS*)

- **What is it?**
  - **Schedule of summary activities (life-cycle subphases and process elements)**
  - **Combination of WBS and process structure**
    - ***Work elements (objects) and actions***
    - ***Nouns and verbs***

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Importance of the MSS:

Refining the master summary schedule is a very important intermediate planning step for the project manager. It offers the project team an initial opportunity to think about time and to consider if there is adequate time to complete the project within the constraints established in the PAR. Refining the MSS typically causes the project team to identify schedule issues and to begin the process of thinking of ways to resolve these issues when they develop a detailed WBS and schedule. Creating a revised and more detailed master summary schedule also provides the team with a better framework and point of departure for the much more detailed scheduling activity that occurs as part of the CPM analysis.

Participants' Notes

Course Description

The master summary schedule is revised after the detailed schedule is developed and then continuously updated during the project. It is an excellent tool for reporting progress in relation to plan to senior management. Project management software can automatically print a master summary schedule after the detailed CPM schedule has been developed.

The Master Summary Schedule *(MSS)*

- **Why is it important?**
  - **CPM planning: Disaggregate summary activities into activities for CPM**
  - **Useful for reporting to senior management**

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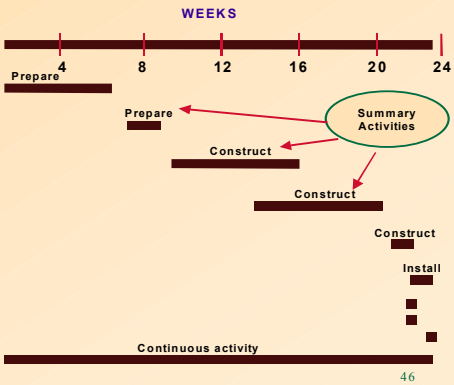
Example of a Master Summary Schedule:

Master Summary Schedule
House Deliverable

CODE		RESP.
	From WBS	
10	Plan	(A)
20	Site	(C)
30	Foundation	(C)
40	Frame	(C)
50	Roof	(SC)
60	Systems	(SC)
	Plumbing	*(P)*
	Electrical	*(E)*
	Telephone	*(T)*
70	Project mgt	(PM)



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Participants' Notes

Course Description

The slide on the bottom of the previous page is the master summary schedule for the house deliverable. (Remember, this is a simplified example. Typically the MSS would be for the entire project, not just one deliverable.).

The master summary schedule shows the major actions that will be performed to complete each work package that is listed on the WBS. These are called *summary activities*. The master summary schedule also shows the *duration* of each summary activity and the *sequence* in which they will occur.

Notice that each row represents an entry from the WBS. The columns represent units of time (in months, in this case) based on the control period. Because management typically wants (at least) monthly reports for development projects with a duration of a year or longer, most master summary reports use the month as the unit of time for the control period. For multiyear projects, the quarter (3-month interval) may be used as the control period for reporting to senior management.

The bars are the summary activities. They are process sub-phases (actions) linked to work elements. Whenever possible, the names of the summary activities should incorporate the verbs from their corresponding life-cycle phases (sub-phases). For example, the summary activity *construct foundation*, links the noun *foundation* with the verb *construct* from the life-cycle phase *construct*. This reduces confusion among team members about the meaning of terms, decreases errors caused by misunderstandings, and leads to greater efficiency.

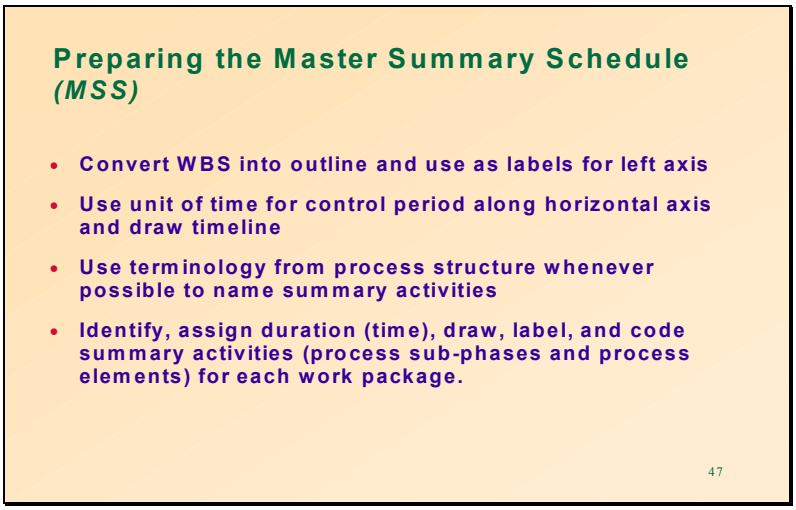
Each bar (summary activity) also needs an identifying code if the project manager plans to use computer project management software for CPM planning and scheduling. Such a code is also important for budget planning and tracking and, as with the code for the WBS, should relate in some way to the organization's chart of accounts.

Participants' Notes

Course Description

In this example, because each work package only has one summary activity or bar associated with it, the code for each work package can be used as the code for its summary activity. For example, the summary activity code for *Prepare Plan* would be 2-10, indicating the *House deliverable* and the *Plan* work package. If a work package has more than one summary activity associated with it, each summary activity must have a unique identifying code.

Steps in Preparing the Master Summary Schedule:



The steps to prepare the master summary schedule are the following:

- ❑ Take the WBS and convert it from a tree diagram into an outline and use the outline as labels for the left axis of the master summary schedule. (Each work element from the WBS will be a row label if you are using a spreadsheet or project management software.)
- ❑ Use the unit of time that defines the control period (usually months) as the unit of time on the horizontal axis.

Participants' Notes

Course Description

- Draw a timeline to scale along the horizontal axis. A computer software package will automatically draw this to scale.
- Use the terminology from the process structure for naming summary activities whenever possible.
- Take each work package and do the following:
  - Identify the life-cycle sub-phases (or process elements) that apply to the work package (e.g., plan, construct, inspect, accept). This is a critical task that the project team should perform with care and deliberation.
  - Assign an estimated duration (i.e., length of time) to each life-cycle sub-phase or process element.
  - Draw a bar in sequential order for each sub-phase or process element. (This yields approximate start and finish dates of each summary activity.)
  - Label each bar to identify the sub-phase (process element) it represents and the person or group responsible. Be consistent with the terminology of the process structure.
- Identify each bar with a numerical code (for computer-based planning and expense tracking).

Participants' Notes

Course Description

***Exercise 2-6: Develop a* Master Summary Schedule using the WBS created earlier**

Exercise Debrief:

1. What worked well for the group? Not well?
2. What would they do different the next time?
3. What are other areas of learning for the groups?
4. Review the MSS's – did all groups include the same information? Why?

Summary:

Summary

- **WBS** Work breakdown structure → *Framework for planning budgets, schedules, and control systems*
- **MSS** Master summary schedule → *Draft overall schedule*
- **RM** Responsibility matrix → *Clarify roles and responsibilities*

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Participants' Notes

Course Description

We've just finished describing three planning tools that can help further refine a project's key parameters: the work breakdown structure, the responsibility matrix, and the master summary schedule.

The WBS is a tool for hierarchically organizing all the work that needs to be accomplished on a project. It establishes a framework that will be used for planning budget categories, making work assignments, and planning and tracking progress.

The responsibility matrix provides the project team with an opportunity to clarify roles and responsibilities.

The master summary schedule provides a means of developing a rough schedule for the project and yields summary activities.

Together, these three planning tools move the project team an important step closer to the creation of a detailed, activity-based schedule and critical path plan.

Participants' Notes

EXERCISE

2-1	DEVELOP A WORK BREAKDOWN STRUCTURE Page 1
✓	**Exercise Instructions**
Purpose:	The purpose of this exercise is to provide the participant with the opportunity to practice developing a work breakdown structure.
Inputs:	❑ Notes referencing WBS. ❑ Participant knowledge of current project being managed.
Directions	1. Form teams based on instructions from instructor. 2. Elect a project manager. 3. Select a project that is currently being managed by one of the team members. 4. Develop a WBS to the 2nd level for the entire project. 5. Develop the WBS to the lowest level for one branch. 6. Project Manager to present WBS to class for review.
	20 minutes
Deliverables	Documented WBS.

EXAMPLE

2-2	TYPICAL RESPONSIBILITY MATRIX FORM
	Page 1

_____ (Project Name) **Organization Resource Name ➔ ➔ Work Activities From WBS**										

RACI Coding: **R = Responsible**
C = Consulted
A = Accountable
I = Informed

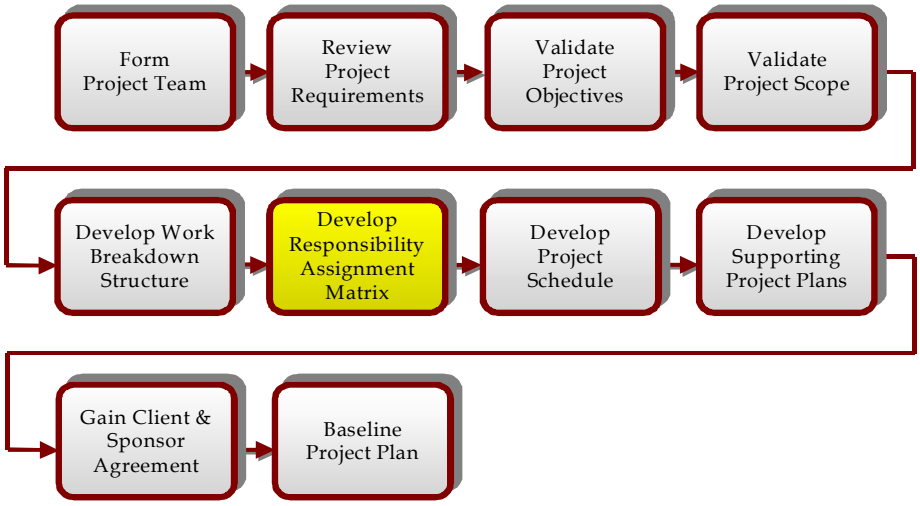
Note: Only one "R" can be assigned for each work activity.

EXAMPLE

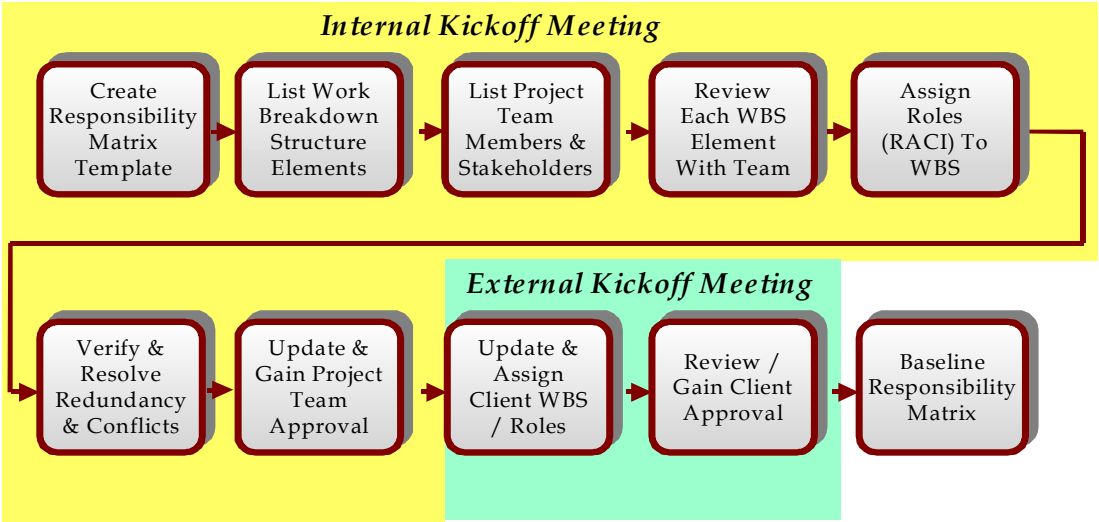
2-3 TYPICAL PROCESS STEPS IN DEVELOPING A RESPONSIBILITY MATRIX

Page 1

Where RM Development Fits in Planning Process



Responsibility Matrix Development Process



EXAMPLE

2-4	MEETING ROLES FOR FACILITATOR AND TEAM LEADER Page 1

MEETING ROLES

Facilitator:

The Facilitator may be external to the project team or a member of the team who agrees to facilitate the meeting to ensure that the purpose and "end in mind" for the meeting are accomplished. The Facilitator functions as an objective participant rather than a participating team member. Major roles include:

- ❑ Ensures that participants stay on target and the discussion is related to the purpose of the meeting.
- ❑ Ensures that the "end in mind" for agenda items and meeting are being met.
- ❑ Asks questions which require closure to get consensus.
- ❑ Documents action items, identifies responsibility and closure date for each.
- ❑ Documents items for "parking lot" resolution.
- ❑ At the end of the meeting, reviews action items and parking lot issues for commitment to resolution by team members.

Team Leader:

The Team Leader (Project Manager) leads the meeting with support from the Facilitator and the Time Keeper.

- ❑ Follows-up with team members to obtain action item / parking lot status for review at the next meeting.

Note Keeper and Time Keeper:

The Note Taker and Time Keeper documents the meeting and ensures that presenters and attendees adhere to the time allotments for discussion and presentations.

- ❑ Takes notes and gives presenters advance notice of remaining time, so that they can negotiate additional time from other presenters if possible.
- ❑ Distributes meeting notes with action and parking lot items within 48 hours of meeting.

Note: While the guidelines here are ideal and preferred for all meetings, in the real world this concept can only be used with facilitation for very important meetings (such as planning, strategy, etc.) due to the additional costs of the facilitator unless the facilitator is a team member who volunteers for the role.

EXERCISE

2-5	CREATE A RESPONSIBILITY MATRIX FOR YOUR CURRENT PROJECT Page 1
✓	**Exercise Instructions**
Purpose:	The purpose of this exercise is to provide participants practice with the development of the Responsibility Matrix using familiar data from their own projects.
Inputs:	❑ Notes from Responsibility Matrix lecture. ❑ Participant knowledge of current or previous projects. ❑ Work Breakdown Structure from previous exercise.
Directions	In your formed teams, develop a Responsibility Matrix for roles and responsibilities clarifications for the WBS prepared in previous exercise. 1. Elect a different project manager. 2. Develop the WBS portion of the RM from the previous exercise. 3. Think about all the key stakeholders affecting these deliverables. 4. Agree on the stakeholder groups accountable for each deliverable. 5. Construct the complete Responsibility Matrix. 6. Prepare a presentation for the class using the tools of your choice.
	20 minutes
Deliverables	Presentation of Responsibility Matrix.

EXERCISE

2-6	CREATE A MASTER SUMMARY SCHEDULE Page 1
✓	**Exercise Instructions**
Purpose:	The purpose of this exercise is to provide participants practice with the development of the Master Summary Schedule using familiar data from their own projects.
Inputs:	❑ Notes from Master Summary Schedule lecture. ❑ Participant knowledge of current or previous projects. ❑ Work Breakdown Structure from previous exercise.
Directions	In your formed teams, develop a Master Summary Schedule using the WBS prepared in previous exercise. 1. Elect a different project manager. 2. Develop the MSS. 3. Think about all the key stakeholders affecting these deliverables. 4. Prepare a presentation for the class using the tools of your choice.
	20 minutes
Deliverables	Presentation of Master Summary Schedule.