

# Advanced Project Management

**PMG 506**  
**Lecture 6**  
**Project Activity Planning**

## Project Activity Planning



## **Project Activity Planning**

The more time you spend planning, the less time you'll need to spend on implementation.

Careful planning is solidly associated with project success.

Sensible planners do not kill the plan with overanalyses. This leads to a well-known “paralysis by analysis.”

The primary purpose of planning, of course, is to establish a set of directions in sufficient detail to tell the project team exactly what must be done, when it must be done, what resources will be required to produce the deliverables of the project successfully, and when each resource will be needed.

## Project Activity Planning

Because the plan is only an estimate of what and when things must be done to achieve the scope or objectives of the project, it is always carried out in an environment of uncertainty. Therefore, the plan must include allowances for risk and features that allow it to be adaptive, i.e., to be responsive to things that might disrupt it while it is being carried out. The plan must include any constraints on activities and input materials proscribed by law and society

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

It is crucial that the project's objectives be clearly tied to the overall mission, goals, and strategy of the organization, such as might be reflected in the project portfolio process.

Unless all parties to the planning process have a clear understanding of precisely what it is the project is expected to deliver, planning is sure to be inadequate or misguided. The precise nature of the scope statement depends on the nature of the project itself, and because of this, it reflects the fact that all projects are, to some extent, unique.

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

Whatever the process, the outcome must be that: (1) technical scope is established (though perhaps not “cast in concrete”); (2) basic areas of performance responsibility are accepted by the participants; (3) any tentative delivery dates or budgets set by the parent organization are clearly noted; and (4) a risk management group is created.

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

Each individual/unit accepting responsibility for a portion of the project should agree to deliver, by the next project meeting, a preliminary but detailed plan about how that responsibility will be accomplished. Such plans should contain descriptions of the required tasks, and estimates of the budgets (labour and resources) and schedules.

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

Simultaneous with these planning activities, the risk management group develops a risk management plan that includes proposed methodologies for managing risk, the group's budget, schedule, criteria for dealing with risk, and required reports. It must be emphasized that the process of managing risk is not a static process. Rather, it is ongoing, with constant updating as more risks are identified, as some risks vanish, as others are mitigated.

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

The various parts of the project plan, including the risk management plan, are then scrutinized by the group and combined into a composite project plan. The composite plan, still not completely firm, is approved by each participating group, by the project manager, and then by senior organizational management.

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

Each subsequent approval hardens the plan somewhat, and when senior management has endorsed it, any further changes in the project's scope must be made by processing a formal change order. If the project is not large or complex, informal written memoranda can substitute for the change order. The main point is that no significant changes in the project are made, without written notice, following top management's approval.

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

### ***Outside Clients***

The fundamental planning process is unchanged except for the fact that the project's scope cannot be altered without the *client's permission*. A common “planning” problem in these cases is that marketing has promised deliverables that engineering may not know how to produce on a schedule that manufacturing may be unable to meet. This problem usually results when the various functional areas are not involved in the planning process at the time the original proposal is made to the potential client. We cannot overstate the importance of a carefully determined set of deliverables, accepted by both project team and client.

## 6.1 INITIAL PROJECT COORDINATION AND THE PROJECT PLAN

### ***Project Plan Elements***

The PM is authorized to direct activities, spend monies, request resources and personnel, and start the project on its way. Senior management's approval not only signals its willingness to fund and support the project, but also notifies subunits in the organization that they may commit resources to the project. Any project plan must contain the following elements:

## ***Project Plan Elements***

- Overview This is a short summary of the objectives and scope of the project. It is directed to top management and contains a statement of the goals of the project, a brief explanation of their relationship to the firm's objectives, a description of the managerial structure that will be used for the project, and a list of the major milestones in the project schedule.
- Objectives or Scope This contains a more detailed statement of the general goals noted in the overview section. The statement should include profit and competitive aims as well as technical goals.

## ***Project Plan Elements***

- *General Approach* This section describes both the managerial and the technical approaches to the work. The technical discussion describes the relationship of the project to available technologies. For example, it might note that this project is an extension of work done by the company for an earlier project. The subsection on the managerial approach takes note of any deviation from routine procedure—for instance, the use of subcontractors for some parts of the work.

## ***Project Plan Elements***

- *Contractual Aspects* This critical section of the plan includes a complete list and description of all reporting requirements, customer-supplied resources, liaison arrangements, advisory committees, project review and cancellation procedures, proprietary requirements, any specific management agreements (e.g., use of subcontractors), as well as the technical deliverables and their specifications, delivery schedules, and a specific procedure for changing any of the above. Completeness is a necessity in this section. If in doubt about whether an item should be included or not, the wise planner will include it.

## ***Project Plan Elements***

- *Schedules* This section outlines the various schedules and lists all milestone events. Each task is listed, and the estimated time for each task should be obtained from those who will do the work. The projected baseline schedule is constructed from these inputs. The responsible person or department head should sign off on the final, agreed-on schedule.

## ***Project Plan Elements***

- *Resources* There are two primary aspects to this section. *The first* is the budget. Both capital and expense requirements are detailed by task, which makes this a project budget. One-time costs are separated from recurring project costs. *Second*, cost monitoring and control procedures should be described. In addition to the usual routine elements, the monitoring and control procedures must be designed to cover special resource requirements for the project, such as special machines, test equipment, laboratory usage or construction, logistics, field facilities, and special materials.

## ***Project Plan Elements***

- Personnel This section lists the expected personnel requirements of the project. Special skills, types of training needed, possible recruiting problems, legal or policy restrictions on work force composition, and any other special requirements, such as security clearances, should be noted here. It is helpful to time-phase personnel needs to the project schedule.  
This makes clear when the various types of contributors are needed and in what numbers. These projections are an important element of the budget, so the personnel, schedule, and resources sections can be cross-checked with one another to ensure consistency.

## ***Project Plan Elements***

- *Risk Management Plans* This covers potential problems as well as potential lucky breaks that could affect the project. Sometimes it is difficult to convince planners to make a serious attempt to anticipate potential difficulties or benefits. One or more issues such as subcontractor default, unexpected technical breakthroughs, strikes, hurricanes, new markets for our technology, tight deadlines and budgets, and sudden moves by a competitor are certain to occur—the only uncertainties are which, when, and their impact. In fact, the timing of these disasters and benefits is not random.

## ***Project Plan Elements***

There are times in the life of every project when progress depends on subcontractors, the weather, or timely technical successes. Plans to deal with favourable or unfavourable contingencies should be developed early in the project's life. Some PMs avoid dealing with risk because "Trying to list everything that can go wrong gets everyone in a negative state of mind. I want my people to be positive!"

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Some PMs disdain this section of the plan on the grounds that crises and lucky breaks cannot be predicted. Further, they claim to be very effective firefighters. No amount of current planning can solve the current crisis, but preplanning may avert or mitigate some. As Zwikael et al. (2007) report, in high-risk projects better project planning improved success on four measures: schedule overrun, cost overrun, technical performance, and customer satisfaction. They conclude that improving the project plan is a more effective risk management approach than using the usual risk management tools.

## ***Project Plan Elements***

- *Evaluation Methods* Every project should be evaluated against standards and by methods established at the project's inception, allowing for both the direct and ancillary goals of the project. This section contains a brief description of the procedure to be followed in monitoring, collecting, storing, and evaluating the history of the project.

## ***Project Planning in Action***

Project plans are usually constructed by listing the sequence of activities required to carry the project from start to completion. This is not only a natural way to think about a project; it also helps the planner decide the necessary sequence of things, a necessary consideration for determining the project schedule and duration. The life-cycle events common for software and hardware product can be divide into nine segments:

## ***Project Planning in Action***

- Concept evaluation
- Requirements identification
- Design
- Implementation
- Test
- Integration

- Validation
- Customer test and evaluation
- Operations and maintenance

Each segment is made up of activities and milestones (significant events). As the project passes through each of the segments, it is subjected to a series of “quality gates” (also known as “phase gates,” “toll gates,” etc.) that must be successfully passed before proceeding to the next segment.

## 6.2 SYSTEMS INTEGRATION

Sometimes called (systems engineering or concurrent engineering) is one part of integration management and plays a crucial role in the performance aspect of the project.

Systems integration is concerned with three major objectives:

## 6.2 SYSTEMS INTEGRATION

### 1. Performance

Performance is what a system does. It includes system design, reliability, quality, maintainability, and repairability. Obviously, these are not separate, independent elements of the system, but are highly interrelated qualities. Any of these system performance characteristics are subject to overdesign as well as under design but must fall within the design parameters established by the client.

## 6.2 SYSTEMS INTEGRATION

If the client approves, we may give the client more than the specifications require simply because we have already designed to some capability, and giving the client an overdesigned system is faster and less expensive than delivering precisely to specification. At times, the aesthetic qualities of a system may be specified, typically through a requirement that the appearance of the system must be acceptable to the client.

## 6.2 SYSTEMS INTEGRATION

### 2. Effectiveness

The objective is to design the individual components of a system to achieve the desired performance. This is accomplished through the following guidelines:

- Require no component performance specifications unless necessary to meet one or more systems requirements.
- Every component requirement should be traceable to one or more systems requirements.
- Design components for effective system performance, not the performance of subsystems.

## 6.2 SYSTEMS INTEGRATION

It is not unusual for clients or project teams to violate any or all of these seemingly logical dicta. Tolerances specified to far closer limits than any possible system requirement, superfluous “bells and whistles,” and “off the shelf ” components that do not work well with the rest of the system are so common they seem to be taken for granted by both client and vendor. The causes of these strange occurrences are probably associated with some combination of inherent distrust between buyer and seller, the desire to overspecify in order “to be sure,” and the feeling that “this part will do just as well.”

## **6.2 SYSTEMS INTEGRATION**

### **3. Cost**

Considered to be a design parameter and can be accumulated in several areas. Added design cost may lead to decreased component cost, leaving performance and effectiveness otherwise unchanged. Added design cost may yield decreased production costs, and production cost may be traded off against unit cost for materials. Value engineering (or value analysis) examines all these cost trade-offs and is an important aspect of systems integration (Morris, 1979). It can be used in any project where the relevant cost trade-offs can be estimated. It is simply the consistent and thorough use of cost/effectiveness analysis.

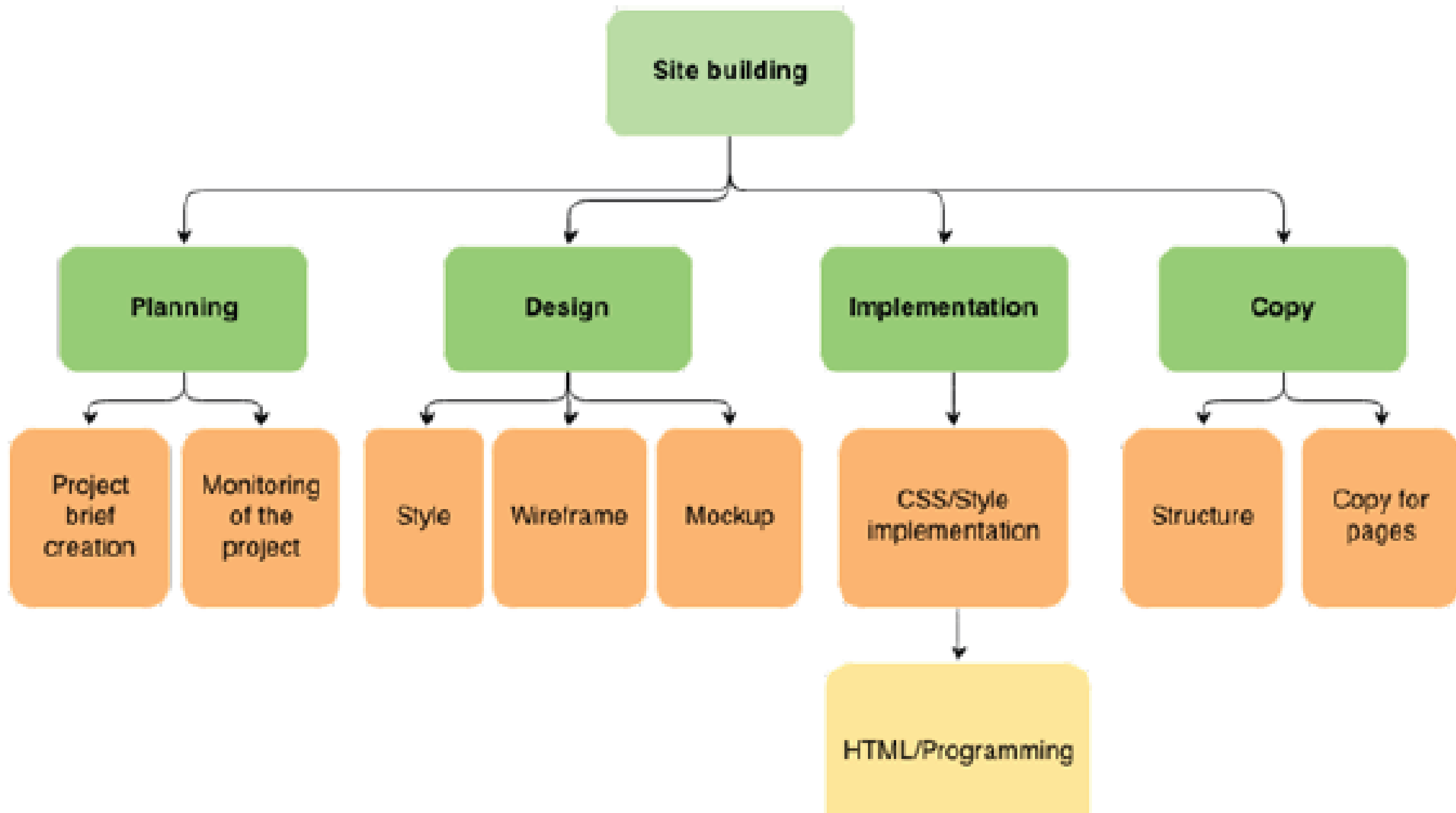
## 6.3 THE ACTION PLAN

We need to know exactly what is to be done, by whom, and when. All activities required to complete the project must be precisely delineated and coordinated. The necessary resources must be available when and where they are needed, and in the correct amounts. Some activities must be done sequentially, but some may be done simultaneously. If a large project is to come in on time and within cost, a great many things must happen when and how they are supposed to happen. Yet each of these details is uncertain and thus each must be subjected to risk management.

## 6.3 THE ACTION PLAN

A simple method to assist in sorting out and planning all this detail is a hierarchical planning system—a method of constructing an action plan and a WBS. We have also named it the “level planning process.”

To accomplish any specific project, a number of major activities must be undertaken and completed. Make a list of these activities in the general order in which they would occur. This is Level 1. A reasonable number of activities at this level might be anywhere between 2 and 20. (Two is the minimum possible breakdown, and 20 is about the largest number of interrelated items that can be comfortably sorted and scheduled at a given level of aggregation.)



## 6.3 THE ACTION PLAN

Now break each of these Level 1 items into 2 to 20 tasks. This is Level 2. In the same way, break each Level 2 task into 2 to 20 subtasks. This is Level 3. Proceed in this way until the detailed tasks at a level are so well understood that there is no reason to continue with the work breakdown.

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## 6.3 THE ACTION PLAN

Factors that should be associated with success in implementation projects:

1. *Project mission.* It is important to spell out clearly defined and agreed-upon objectives in the project plan.
2. *Top management support.* It is necessary for top managers to get behind the project at the outset and make clear to all personnel involved that they support successful completion.
3. *Project's action plan.* A detailed, scheduled plan of the required steps in the implementation process needs to be developed, including all resource requirements (money, raw materials, staff, etc.).

## **6.4 THE WORK BREAKDOWN STRUCTURE AND LINEAR RESPONSIBILITY CHART**

The Work Breakdown Structure (WBS) is not one thing. It can take a wide variety of forms that, in turn, serve a wide variety of purposes. The WBS often appears as an outline with the Level 1 tasks on the left and successive levels appropriately indented. The WBS may also picture a project subdivided into hierarchical units of tasks, subtasks, work packages, etc. as a type of tree constructed directly from the project's action plan. Another type of WBS shows the organizational elements associated with specific categories of tasks.

## **6.4 THE WORK BREAKDOWN STRUCTURE AND LINEAR RESPONSIBILITY CHART**

The WBS is an important document and can be tailored for use in a number of different ways. It may illustrate how each piece of the project contributes to the whole in terms of performance, responsibility, budget, and schedule. It may list the vendors or subcontractors associated with specific tasks. It may be used to document that all parties have signed off on their various commitments to the project. It may note detailed specifications for any work package, establish account numbers, specify hardware/software to be used, and identify resource needs. It may serve as the basis for making cost estimates or estimates of task duration. Its uses are limited only by the needs of the project and the imagination of the PM.

## **6.4 THE WORK BREAKDOWN STRUCTURE AND LINEAR RESPONSIBILITY CHART**

The following general steps explain the procedure for designing and using the WBS:

1. Using information from the action plan, list the task breakdown in successively finer levels of detail. Continue until all meaningful tasks or work packages have been identified and each task or package can be individually planned, budgeted, scheduled, monitored, and controlled.

## 6.4 THE WORK BREAKDOWN STRUCTURE AND LINEAR RESPONSIBILITY CHART

2. For each such work package, identify the data relevant to the WBS (e.g., vendors, durations, equipment, materials, special specifications). List the personnel and organizations responsible for each task. It is helpful to construct a linear responsibility chart (sometimes called a responsibility matrix) to show who is responsible for what. This chart also shows critical interfaces between units that may require special managerial coordination.
3. All work package information should be reviewed with the individuals or organizations who have responsibility for doing or supporting the work in order to verify the WBS's accuracy. Resource requirements, schedules, and subtask relationships can now be aggregated to form the next higher level of the WBS, continuing on to each succeeding level of the hierarchy.

## **6.4 THE WORK BREAKDOWN STRUCTURE AND LINEAR RESPONSIBILITY CHART**

4. For the purpose of pricing a proposal, or determining profit and loss, the total project budget should consist of four elements: direct budgets from each task as just described; an indirect cost budget for the project, which includes general and administrative overhead costs (G&A), marketing costs, potential penalty charges, and other expenses not attributable to particular tasks; a project “contingency” reserve for unexpected emergencies; and any residual, which includes the profit derived from the project, which may, on occasion, be intentionally negative.

## **6.4 THE WORK BREAKDOWN STRUCTURE AND LINEAR RESPONSIBILITY CHART**

5. Similarly, schedule information and milestone events can be aggregated into a projected baseline schedule. The projected baseline schedule integrates the many different schedules relevant to the various parts of the project. It is comprehensive and may include contractual commitments, key interfaces and sequencing, milestone events, and progress reports. In addition, a time contingency reserve for unforeseeable delays might be included.

6. The PM can continually examine actual resource use, by work element, work package, task, and so on up to the full project level. By comparing actual against planned resource usage at a given time, the PM can identify problems, harden the estimates of final cost, and make sure that relevant corrective actions have been designed and are ready to implement if needed.

## **6.4 THE WORK BREAKDOWN STRUCTURE AND LINEAR RESPONSIBILITY CHART**

Finally, the project schedule may be subjected to the same comparisons as the project budget. Actual progress is compared to scheduled progress by work element, package, task, and complete project, to identify problems and take corrective action.



**Thank You**

