



PDHonline Course P206 (2 PDH)

Effectively Managing Multiple Projects

Instructor: Brian Steve Smith, PE, PMP, MBA

2020

PDH Online | PDH Center

5272 Meadow Estates Drive
Fairfax, VA 22030-6658
Phone: 703-988-0088
www.PDHonline.com

An Approved Continuing Education Provider

Effectively Managing Multiple Projects

Brian Steve Smith, P.E., MBA

COURSE CONTENT

1. Introduction: The Reality of Managing Multiple Projects

Remember the days when you had the luxury of managing one project at a time? In many ways, the job of a project manager is simpler when we have a single large project to manage, rather than a portfolio of smaller ones. Every project demands at least a certain level of attention, regardless of how limited in scope or budget, so a bunch of little ones usually adds up to more work than a single big one. The competitive nature of today's business climate demands that our companies do more with less, which means that, for most of us, the days of managing a single project at a time from cradle to grave are over.

There are some areas of business that will always demand multi-project management. Often we have areas of our business that generate small maintenance and enhancement projects. Sometimes even the "large" projects that consume large chunks of our capital are actually broken down into several smaller projects. Often we have regulatory demands that produce ongoing programs of projects that are repeated in recurring cycles, such as inspections & compliance projects. Many times our own project management skills (and successes) attract projects from other parts of the organization, resulting in an ever-expanding list of projects to manage.

In these environments, the success of individual projects often depends on the project manager's ability to systematically manage the entire portfolio or program of projects simultaneously. If the process breaks down, all of the projects suffer.

The process of multiple project management is an extension of the fundamental project management processes. Managing projects in a multiple-project environment involves planning and controlling project schedules and resources when the same resources are assigned to several different projects. A methodical, process-driven approach to managing multiple projects improves the ability to perform an array of projects, while juggling priorities and managing other daily responsibilities. In many companies, a significant amount of time and money are spent on many small projects. Sometimes the total dollars spent on small projects dwarfs the cost of the company's largest projects. The majority of project managers find that what most significantly influences the success of their projects is not their ability to properly sequence and execute the individual tasks on a given project, but rather the competition for resources and attention between projects in a multiple-project environment. For these and other reasons, it is critical that organizations recognize the need for a disciplined, process-oriented approach to managing multiple projects.

2. Project Management Processes

Throughout the life cycle of any project, two major aspects of the work effort must be addressed: performance and process. Performance is *what* we do to complete the tasks that accomplish the objectives of the project. Process defines *how* the project tasks are carried out. Project managers, contributors, and stakeholders focus most of our attention on performance. We all tend to focus on completing tasks within certain time constraints. This is necessary, and projects will not happen without this focus. However, we rarely give sufficient attention to our project management process, and often this is where we have the greatest opportunity to improve performance across entire portfolios and programs of projects. According to the Project Management Institute's *Project Management Body of Knowledge*, managing projects effectively is based on formal processes that cover the five phases of a project's life cycle:

- Initiating
- Planning
- Executing
- Controlling
- Closing

When a project manager is responsible for one project at a time, as long as the projects are completed to the satisfaction of all stakeholders, the process rarely comes into question. But as the project manager's time and attention become more thinly spread across an increasing number of projects, the presence or absence of sound project management processes becomes evident. Process orientation means that we monitor the effectiveness of the processes (*how* we're doing things), avoiding the trap of focusing exclusively on performance (*what* we're doing).

In many respects, the application of good project management processes to individual projects enables the successful management of multiple projects. In other words, the better our project management processes, the more seamlessly a project manager may transition from managing one project to managing several. As individual projects, they are all managed in essentially the same ways, using the same tools, following the same process, so that managing four or eight may not be significantly more complicated than managing two projects. This is especially true when we consider the difference between trying to manage a single project without good processes and managing several projects systematically and methodically.

3. Project Management and Portfolio Management

As we examine the challenges facing managers of multiple projects, let's define what we mean by Project Management and Portfolio Management.

Project management: the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.

Portfolio management: the process of identifying, evaluating, selecting, rejecting, and managing a mixture of projects that optimize the performing organization's objectives (e.g., rate of return).

Sometimes a set of interrelated projects is performed simultaneously and requires many of the same resources. Often a portfolio of unrelated (or loosely related) projects forces project managers to deal with overlapping time and resource demands. In these cases, the project manager's job is made more demanding because of the fact that she/he must manage the critical path of each individual project, while also managing resource and schedule conflicts that occur between projects.

4. Project Portfolio Management

The majority of the material in this course deals with project portfolio management, since most project managers have their own portfolio of projects for which they are responsible. Their organizations also have enterprise-level portfolios, comprised of the set of projects that are being worked on, or are waiting to be worked on. Project portfolio management includes project selection and prioritization activities, along with "gating" processes in which go/no-go decisions are made at key points in a project's life. Project portfolio management is a dynamic and iterative process that includes the selection and rejection of projects to and from the portfolio.

Project portfolio management deals with many projects that are in the "initiating" phase. As the portfolio is continuously reevaluated, it is expected that a number of proposed projects will not survive the selection process, and thus will never be planned, executed, etc. If the portfolio is managed effectively, the organization's scarce resources will be applied to only the projects that are linked to the strategic plan.

The objectives of project portfolio management include:

- Return on investment: The organization's chosen portfolio of projects should optimize the return on overall investment with the available resources within the needed time frame.
- Cycle time: The life cycle of projects in the portfolio should be managed such that customers' needs are met, and delivery of goods and services is accelerated wherever useful and profitable.
- Economy of resources: A well-managed project portfolio should allow the performing organization to complete more projects with the same resources by reducing time wasted on the "wrong" projects.
- Balanced portfolio: Like an individual's investment portfolio, the selection of projects within the organization's portfolio should allow for a mixture of projects which optimizes
 - Risk (combination of high and low risk/return projects)
 - Cash flow (short-term and long-term cash flow)
 - Supply and demand interests (projects that raise demand may need complementary projects that can produce additional supply)
 - Resource utilization (provide relatively steady utilization of resources).

5. Project Selection and Prioritization

At the heart of project portfolio management is the project selection process. This is the process that assesses the value and necessity of projects to the organization to ultimately determine which projects should be done, and assigns priorities to them. Each project must have a certain

amount of preliminary work performed to assess the rough scope, schedule, cost, and resource requirements since this information is critical to the evaluation and selection process. It is also important to understand the justification factors driving the need for each project. For example, an organization with constrained resources may have to choose between a commercially-driven project with a positive rate of return and a regulatory compliance project which, although it has no incremental profit associated with it, must be completed in order for the business to continue operating. These comparisons between projects are essential, thus it is important for the organization's leadership to have clear and complete input from project managers, sponsors, and stakeholders to help them make these decisions based on the best possible information.

The selection process in many organizations contains the steps outlined below.

- **Budget planning:** Most companies have limited funds with which to operate, so it is important to understand how many capital and expense dollars are available to execute the portfolio of projects.
- **Strategic planning:** As an output from the organization's strategic planning process, the strategic plan should provide guidance to assess which projects are most likely to advance the organization's strategy. For example, if a proposed project would expand the company's geographic footprint, but expanding the geographic footprint is not part of the company's strategic plan, this project may be a target for elimination from the portfolio. Thus, the strategic plan is a key input to the project selection process.
- **Regulatory requirements assessment:** It is important to understand the regulatory requirements that must be met during the portfolio planning cycle, and what projects will be required to comply with regulations.
- **Competitive position assessment:** The organization must understand what projects are required to keep up with (or outperform) competitors.
- **Resource planning:** During the project selection process, it is important to keep in mind the organization's capacity for project execution. Sometimes, even if funding seems unlimited and there are a multitude of high-value potential projects facing the company, it does little good to select and approve more projects than the people in the company are capable of performing.
- **Rate of return assessment:** Based on preliminary project cost estimates, schedules, and revenue estimates, each project should have an internal rate of return (IRR) or net present value (NPV) evaluation performed so that potential projects in the portfolio may be screened against the company's hurdle rate. For the projects that achieve the required hurdle rate, the IRR/NPV evaluations provide a basis for comparing the values of various projects in the portfolio.
- **Least cost determination:** Sometimes projects must be done that provide no incremental revenue, or return on investment, to the company. An example is a maintenance project that simply replaces a piece of worn out equipment. In this case, rather than a rate of return assessment, alternatives should be compared and the decision made based on the option that provides the required function & features at the least cost.
- **Selection and priority criteria determination:** The individuals responsible for selecting and prioritizing the organization's projects must have a clear and consistent basis on which to select and prioritize projects. These criteria should result from the steps outlined above.

Why the Project Selection Process is Important

Projects are performed to improve profits, reduce costs, comply with regulatory requirements, improve customer service, address specific customer needs or orders, address social and environmental concerns, capture technological advantages, etc. Projects are performed because of their benefit, or at least potential benefit, to the organization. In most cases, the availability of resources (human, financial, and other) and the capacity of the organization to absorb the projects' results, limit the number of projects that can be done in a given period. Selecting the right projects is critical to the organization's success. Project selection is the process that decides how best to use limited resources to achieve the organization's objectives. Often, poor project selection practices lead to chronic project performance problems (e.g., late project completions, quality problems, cost overruns, etc.). Effective project selection, and de-selection, removes the clutter of lower-value projects that can interfere with the performance of higher-value projects.

Project Prioritization

After projects are selected for inclusion in the portfolio to be managed, it is important to understand their relative priority. Most of the information needed to prioritize the projects was evaluated during the project selection process. The following are factors that might be included in the prioritization process:

- Rate of return (IRR) or net present value (NPV)
- Alignment with key strategic objectives
- Customer impact or interest
- Regulatory requirements, and consequences of non-compliance
- Competitive environment, and the reaction of competitors if the project is not executed
- Consumption of key resources, and the opportunity costs of having these resources tied up on a particular project
- Project risks

To make objective decisions, the prioritization process should be formalized at least to the point that the organization has one master list of projects with a relative priority assigned to each project. For some organizations, using a "High-Medium-Low" priority system works, but for many organizations it does not. There is a tendency to give most of the projects a High priority, resulting in a priority system that provides no practical value. When most or all of the projects have the same priority, there is no priority system. If possible, it is best to rank the projects with a number that minimizes the number of projects that share the same "score." One way to do this is to give each of the factors listed above a weight, and then give each project a score relative to each factor. The example Project Prioritization Scorecard below illustrates this. In this example using Microsoft Excel, each "score" cell is multiplied by the corresponding "weighting" factor from the table at the bottom, and the sum of these products is each project's "Total Score". This is for illustration only. The prioritization criteria, and the weights associated with each of them, will be different for each organization. But this serves as one possible tool to support decisions related to project priorities. Tools like this lend objectivity to the prioritization process, which is often highly subjective. In the rudimentary example below,

Project 1 and Project 5 should be the company’s highest priority projects, while Project 9 should be the lowest priority. The scorecard indicates that Project 1 has a high rate of return (IRR), highly favorable impact on the customer, and has minimal impact on internal resources. What’s not to like about this project?

	A	B	C	D	E	F	G	H	I	J	K
		IRR Score (high score = high IRR)	Strategic Alignment Score	Customer Impact Score	Regulatory Compliance Score	Competitive Impact Score	Resource Demand Score	Risk Level Score (high score = low risk)	Total Score		
1											
2	Project 1	10	4	8	0	5	10	1	550		
3	Project 2	9	5	3	0	0	6	2	340		
4	Project 3	8	7	9	0	0	3	3	475		
5	Project 4	7	3	4	0	0	9	7	395		
6	Project 5	6	8	10	0	4	5	4	550		
7	Project 6	5	10	5	0	0	2	5	370		
8	Project 7	4	2	1	0	0	8	6	245		
9	Project 8	3	9	6	0	3	4	10	455		
10	Project 9	2	1	2	0	0	1	9	190		
11	Project 10	1	6	7	1	0	7	8	420		
12											
13	Weighting:										
14	IRR Score	15									
15	Strategic Alignment	10									
16	Customer Impact	25									
17	Regulatory Compliance	20									
18	Competitive Impact	10									
19	Resource Demands	10									
20	Risk Level	10									
21	Total:	100									
22											

Project Prioritization Scorecard example

6. Multitasking

In an organization that performs multiple projects simultaneously, many of the individuals working on any given project are also working on other projects. In some companies, there are so many active projects at any time that none of them seem to get finished. The Theory of Constraints (Goldratt, The Goal, 1984) and Critical Chain Project Management (Goldratt, Critical Chain, 1997) attribute this to “bad” multi-tasking, discussed in more detail below.

Multi-tasking has become so firmly ingrained in business management practices that most managers believe it is a positive practice. By multi-tasking, managers believe that resources are more efficiently and effectively utilized, and that workflow is not adversely impacted. But a 2001 study at the University of Michigan showed that as much as 20 to 40 percent of a worker's productivity is consumed in "task switching," which is the time and mental energy required to stop working on one task and re-engage productively in another task (Meyer, Evans, & Rubinstein, 2001). While we refer to the practice of trying to work on several tasks at once as "multi-tasking," the human brain simply cannot think about multiple complex tasks at the same time. Therefore, "task switching" is perhaps a better name for the practice, and productivity reductions are the real results.

Since task-switching among various projects diminishes productivity while increasing stress and frustration among individuals, why do we push ourselves and others into this practice? There are many answers, but among them are:

- Erroneous belief that multi-tasking actually helps meet tight, even conflicting, project timelines
- The need to show progress/results on a number of projects simultaneously
- Projects being pushed into the portfolio without assessing the impact on resources
- People being assigned to projects as part of their jobs, while they must also maintain other operational responsibilities
- Project managers pushing to meet time deadlines
- No systematic means for multi-project resource scheduling

Not all multi-tasking is bad. For example, if an engineer begins working on Project A, but soon reaches a point where she must wait a week for input from an outside source before continuing, it would be a good idea to have other project tasks to fill in the gaps while she waits. If she can find the equivalent amount of work to precisely fill this time gap, her multi-tasking is effective and efficient, simply reflecting good time management. As long as she is available to resume work on Project A when the information she was waiting for arrives, this is good multi-tasking. But if, in the week of downtime from Project A, she commits to a month's worth of work on Project B, she will soon find herself overcommitted and will suffer the adverse effects of "task switching," while she tries to work on both projects at the same time. Both projects will likely be delayed further as she bounces between tasks, losing 20% to 40% of her productivity with each bounce.

Below is a comparison of "Good" vs. "Bad" multi-tasking:

Good:

- Enables full utilization of resource time during project waiting periods
- Enables the resource to spend more time away from a complex task to think it through
- Individual tasks do not interrupt each other, minimizing the "task-switching"

Bad:

- Arbitrary bouncing between tasks
- Forces constant stopping & starting of a variety of unrelated tasks (task switching)
- Driven by continuously changing project priorities

inefficiencies for the individual

7. Measuring Success

In most organizations, the success of each individual project is measured using factors that often include:

- Whether the project's results meet business objectives
- Quality standards
- Scope adherence
- Schedule adherence
- Budget adherence
- Satisfaction of stakeholders

In the multiple-project environment, success is often measured in terms of whether or not these factors are satisfied across the entire portfolio of projects. When managed systematically with a process-orientation, the likelihood of success on each project is improved along with the likelihood of success of the entire program or portfolio. With a process-oriented approach, the changes that improve performance on one project are repeatable so that the performance of all projects is improved.

In addition to the above measures of individual project success, the set of projects is considered successful when each project has a clear connection to an organizational need or strategic objective, inter-project dependencies and relationships are clearly mapped and managed, and human resources are deployed across projects so that their individual workloads are manageable and the needed tools and resources are readily available to them.

8. A Five-Step Process for Managing Multiple Projects

In order to achieve measurable success across the portfolio of projects, a systematic multiple-project management process is needed. One such process that has been used effectively for managing multiple projects includes the following five steps:

- Organize the Portfolio
- Establish individual project plans
- Identify risks and dependencies between related projects
- Develop a consolidated Master Project Plan
- Execute the Master Project Plan

These steps are described in more detail below.

1. Organizing the Portfolio

The company's project portfolio is the source from which the individual projects will arise. The process of organizing and managing this portfolio should generate the flow of individual projects into the active multi-project environment. Within this step, it is important to prioritize the projects, as described above. As we have already observed, sometimes we waste scarce

resources on low priority projects. Often the best project decision that a company can make is to identify and eliminate low priority projects before they waste precious resources.

As project constraints are identified that might delay or defer one project, the prioritization process should be revisited so that other projects may be identified and moved in front of the deferred project(s). Occasionally new business opportunities or needs arise, introducing new projects to the portfolio which were not considered during the initial prioritization process. When this happens, the portfolio should be reviewed and re-prioritized in light of the new opportunities and needs. This may present the need to eliminate an existing project from the list to free up resources to execute the new one.

As simple as it sounds, it is important for the person managing multiple projects to make and maintain a Project List to compile and track all of the key information on the multiple projects. Too often the “list” grows informally and gradually as the project manager keeps track of the projects in her/his head. Ultimately the list becomes so long that projects begin to fall through the cracks. As soon as the list grows beyond a single project, the project manager should establish a project list. A simplified template is given below as food for thought. Ultimately, the project manager will know the relevant information that should be included in the project list.

Project Name	Key Objectives	Business Priority	Project Duration	Key Milestones	Status	Assumptions & Comments

2. Establishing Single Project Plans

We can only be successful in managing multiple projects if each individual project is successful. When managing a portfolio of projects, the need to develop detailed, well-documented project plans for individual projects remains. This includes, for each project, the development of:

- Project scope & scope management plan
 - What will the project build, develop and deliver as an end product(s)?
 - How will changes to the scope be handled when they arise? What process will be followed in evaluating requested scope changes? Who will make the decision of whether to approve or reject scope changes? How will approved scope changes be documented and communicated to the project team?
- Project task sequence/Work Breakdown Structure
 - What tasks will be performed concurrently?
 - What tasks must be performed sequentially? In what order?
- Project schedule

- How long will each task in the task sequence/Work Breakdown Structure take?
- Cost estimate
 - How much will the project cost?
 - What kind of estimate will be prepared?
 - Analogous – using the actual cost of previous, similar projects as the basis for estimating the cost of the current project.
 - Unit/Rate costs – estimate the units required to be produced on the project, then multiply the number of units by a rate. Example: Installing 1,000 square feet of flooring at a cost of \$7.00 per square foot results in a cost estimate of \$7,000.
 - Bottom-up – estimating the cost of individual work packages or individual schedule activities with the lowest level of detail. This detailed cost is then “rolled up” to higher levels for reporting and tracking purposes.
 - Parametric – using a statistical relationship between historical data and other variables to calculate a cost estimate.
 - Simulation software – using commercial cost-estimating software to produce an estimate.
 - Vendor bids – evaluation of actual bids from the contractors who would do the work.
- Quality management plan
 - What quality standards will apply to the tasks and/or products performed and/or produced in the project? How will adherence to these standards be assured? What kinds of testing and/or inspections will be required?
- Human resource/staffing plan
 - Prepare a RAM, or “Responsibility Assignment Matrix” (see Figure 1 in appendix)
 - What project functions will be handled by what individuals? What contract or consulting personnel will be used? How will the project staff be developed with training, team-building activities, etc.?
- Communications plan
 - See “Communication” section below
- Risk analysis & risk management plan
 - What risks have been identified that may impact the successful (scope, time, cost, & quality) completion of the project?
 - How will the identified risks be handled?
 - Mitigation Plans

- Contingency Plans
- Risk Acceptance
- Risk Transfer (e.g., insurance)
- Procurement plan
 - Who will procure what goods and services? How will procurement documents be prepared, approved and processed?

These plans need not be lengthy or complex. Some of them may only require a sentence or two, but as the project manager's attention moves from project to project in the multiple-project environment, it is important to have these decisions well documented so that decisions are consistently executed, rather than being needlessly revisited and re-made.

3. *Identifying Risks & Dependencies Between Related Projects*

Logical Dependencies: Once the project list has been developed, and project plans developed for each project, it is important to identify the logical dependencies between projects. For example, if one project involves building a train station, and another involves building railroad tracks to the station, it will be important to understand the schedule and functional dependencies that exist between these related projects.

Logical dependencies are often described as one of five (5) types:

- Finish-to-Start (FS) – The finish date of the predecessor task sets the start date of the successor task.
- Start-to-Start (SS) – The start date of the predecessor task sets the start date of the successor task.
- Finish-to-Finish (FF) – The finish date of the predecessor task sets the finish date of the successor task.
- Start-to-Finish (SF) – The start date of the predecessor tasks determines the finish date of the successor task.
- Lead & Lag – In addition to the four dependencies described above, sometimes there is a lag time between the completion of one task and the start of the next. Also, sometimes a successor task must begin at a certain time before the completion of its predecessor, and we would refer to this as “lead” time.

The types of dependencies described above indicate how the scheduled completion of one task or project affects another. To provide some insight into what dependencies might exist between projects within a portfolio, let's consider some categories of multi-project dependencies, such as:

- Infrastructure - Multiple projects sometimes depend on a common infrastructure, which may be built as part of the multi-project portfolio. An example of this may be the design and construction of roads, underground cables, pipelines, grading, landscaping, and other such projects that must be managed as separate but related projects.

- Architecture - Multiple projects sometimes depend on a common architecture, which is developed as part of the multi-project portfolio. An example of this may be an IT project in which a common set of functions and features must be shared across a set of applications which are being developed as separate but related projects.
- Product Relationships – Multiple projects within the portfolio may be responsible for producing related products, causing one project to depend on the other, or perhaps rendering one useless without the other. An example of this might be the construction of a train station and a railroad line managed as separate but related projects.
- Project Performance Impacts – Multiple projects within the portfolio share certain performance constraints, such that if one project fails to deliver the desired performance, the performance of another project's product may suffer. An example from construction may be that one construction foreman is shared between multiple project sites. If one site has performance issues that occupy an inordinate amount of her/his time, the other projects may suffer.
- Project Delivery Impacts – Multiple projects within the portfolio share a common schedule for delivering the resulting products, and the schedule performance of one project affects the schedule performance of the other. For example, if the train station is completed behind schedule, how will this affect the delivery schedule of the railroad line?

Resource Dependencies: The purpose of this step is to evaluate and analyze the various independent project plans, especially the human resource/staffing plans (including the individual project RAM's), to see where there might be shared resources between projects. It will be important to understand which resources will be assigned to multiple projects, when their responsibilities will start and end for each project, and how much risk exists for the projects overlapping and potentially overloading the shared resources.

Identify and Manage Inter-Project Risks: This step is to identify risks that may affect the environment that influences all of the portfolio's projects. As an example of multiple projects sharing a common risk, suppose that three projects are dependent upon contracts from the same customer. In this case, the welfare of, and relationship with, this customer constitute a risk that is shared among the projects. If the customer takes their business elsewhere, all three projects may be cancelled. As an example of risks that may exist between projects, if the train station completion is delayed or cancelled, how will this affect the project plan of the railroad project? It is important to know how the delay or absence of one project affects the project plan(s) for the remaining project(s).

Inter-project risks are often unique to the individual organization or portfolio of projects, and must be managed as such. But there are some common techniques that may be useful in managing these risks.

- Create realistic schedules that recognize and resolve the dependencies between projects. Often it is tempting to schedule each project stand-alone, without regard to the risks and dependencies identified in the steps above. But the individual project schedules must recognize these dependencies and risks, and developing schedules that recognize them will help produce more realistic execution plans and stakeholder expectations.

- Be disciplined about establishing and maintaining project priorities. If project priorities within the portfolio change, these dependencies and risks must be re-assessed and the project schedules may need to be overhauled. Keeping priority changes to a minimum will help keep these risks in check.
- Break complex projects into sub-projects. Smaller sub-projects are often easier for the project manager to analyze and manage, or perhaps delegate to someone else. To the extent that a complex project may be understood and managed more effectively as a mini-portfolio of smaller, simpler projects, this step can be effective in improving the success of the larger, complex project.

4. Developing the Master Project Plan

This step includes creating a high-level plan that incorporates all of the outputs of the previous step (logical dependencies, resource dependencies, risks, etc.). This plan is used in the routine management and reporting activities for the combined group of projects. The Master Project Plan is more than a schedule or a rolled-up Gantt chart. It includes the multi-project procedures, tools, and activities that influence the plans of individual projects.

The content of the multi-project Master Project Plan should contain some or all of the following, plus additional information that the individual project manager may need:

- a. Portfolio name/Project Manager/Customer or Stakeholder Group
- b. Management Summary
 - i. List of all projects in the portfolio
 - ii. Multi-project goals & objectives
 - iii. Multi-project roles & responsibilities
 - iv. Multi-project schedule (major milestones - roll-up from individual project schedules)
 - v. Multi-project budget summary
 - vi. Overall multi-project risk summary
- c. Individual project plans

5. Executing the Master Project Plan

This step involves the measurement of the progress of the group of projects against their individual and collective goals. It also involves the assessment of issues, changes, etc. to the Master Project Plan and making any updates that are required. The Master Project Plan is different from the individual project plans in that it contains information about all of the projects in the Project List, possibly including those projects that have not started yet. This step is continued across the life cycle of the entire project group.

As the Master Project Plan is executed, it is critical that the project manager stay organized. Daily or weekly updates to schedules and execution plans are usually easier, and lend themselves to more timely intervention into problems, than infrequent or ad-hoc updates.

Manage by deliverables and due dates. In the single-project environment, delegation is an important skill for a project manager. In the multiple-project environment, delegating effectively becomes even more crucial. Here are some tips for delegating effectively:

- Delegate deliverables, not activities. This way the assigned resource knows exactly what he/she is responsible for supplying to the project. As an example, a well delegated deliverable may be “John Doe is to provide a complete motor control center design, including all breaker, fuse & motor starter sizes and cubicle assignments, on or before December 1, and progress is to be reviewed weekly with the project manager;” which is better than “John Doe is responsible for electrical design.”
- Delegation should include a precise description of the deliverable, the due date, and the follow-up method.
- Close the feedback loop. Make sure that the resources understand their deliverable assignments by having them acknowledge them either verbally or in writing. There are few things more frustrating to a project manager than to reach a critical project juncture and have someone say, “I didn’t know you needed me to do that!”
- If at all possible, avoid the situation of being both the technical resource (e.g. project engineer) and project manager. See that the technical details are being carried out – spot check if you need to – by the other resources assigned to your projects. But avoid the temptation to re-engineer everything yourself. Someone else is likely to be assigned to cover the engineering tasks on your projects. But as the project manager, rest assured that no one else is going to do your project management work while you’re doing someone else’s technical work.
- Make a tracking log for each project that lists outstanding issues and tasks, who is responsible for them, when they are due, and what will be the follow-up mechanism. Review these logs daily to keep things from falling through the cracks.

9. Communication

Communication is one of the most critical aspects of project management in any environment, and is even more critical in the multiple-project environment. Communication is the transfer of information between people. It involves a sender and a receiver. It is often necessary for the sender to verify that the information was received as intended. The objective of the project manager is to plan project communications so that project information is accurately transferred from those who have it to those who need it, at the right time, in a cost effective manner.

Some of the key issues in project communications include:

- Straight talk: It is important to maintain an environment in which project stakeholders, contributors, and the project manager can talk openly and frankly when needed. When stakeholders withhold information because they do not feel safe sharing it, the project is in jeopardy.

- Formal communications planning: Remember the old adage, “People do not plan to fail, they simply fail to plan?” Nowhere is this truer than in communications. It is difficult to maintain effective communications on a project with an effective communications plan, and it is impossible to do so without a plan.
- Formal multiple-project reporting: Key information must be reported to project stakeholders, especially decision-makers, in a timely manner.
- Negotiation and conflict resolution: The key to project/portfolio success is not in avoiding conflict, but in the productive resolution of it when it arises.

Effective communication is achieved when there is mutual and accurate understanding of the content by all who need the information. It also involves the right people getting the information they need when they need it, and official, written project records being available and easily accessible by project stakeholders. In managing multiple projects, communication related to individual projects is required, along with a summary-level view of the entire portfolio of projects that are being managed together. Effective multiple-project reporting should include open, transparent reports that candidly show the status and progress on each project along with its effect on the portfolio of projects.

Project breakdowns often occur as a result of one or more stakeholders not getting the information they need when they need it. It is important to include all stakeholders of the multiple-project portfolio in project communications. These stakeholders include customers, the project sponsor(s), functional managers, contractors, and the project team, to name a few.

Effective communication is sometimes difficult because individual project participants or stakeholders may not have the skills (or motivation) to communicate effectively. Some of the barriers that often inhibit effective project communications include:

- Fear of blaming and retribution
- Different cultural norms among project team members
- The absence of a formal communication plan
- Hidden agendas
- Failure to understand the information needs of other stakeholders

To reduce the likelihood or impact of these barriers, the project manager must consistently pursue planned, deliberate communications across the portfolio of projects, throughout the life of each one. Some actions that the project manager may undertake to reduce or eliminate communication barriers include:

- Establish a communications plan
 - Clearly address who is responsible for providing what information in what format, at what time (or interval), to whom
 - Explicitly address any interpersonal or cultural issues that have been identified on the project team

- Establish agreements regarding the treatment of sensitive or confidential information, so that it is not unnecessarily “hoarded”
- Define the location and access methods of shared project documentation
- Meetings
 - In project update meetings, always review the critical path schedule with stakeholders as a primary agenda item. This can yield early warnings of projects that are veering off-course. And it should go without saying that meetings should always have, and follow, an agenda.
- Electronic communications
 - Internet/Intranet sites can be very useful places to store and share project documents among stakeholders.
 - Recognize the pro’s and con’s of e-mail. With project resources scattered across multiple locations, e-mail may be the most efficient means for communicating timely information with all affected stakeholders. But it is important to realize that the person reading the e-mail does not have the benefit of seeing physical cues, like facial expressions and body language. Therefore, they must infer the tone with which the e-mail was intended. In the multiple-project environment, we’re often in a hurry and may write terse e-mails. Always pause to consider how the e-mail is likely to be interpreted by the readers.
 - Recommendation: If possible, communicate face to face or by phone, and document key decisions/results via e-mail, copying all stakeholders.
- Project reporting
 - Written reports are perhaps the most effective means for regularly communicating ongoing project issues, status, changes, etc. In the multiple-project environment, it is important that a common format be used on all projects for the benefit of those preparing the reports as well as those reading them. An example of a written project update report is given in Figure 2 of the appendix. The project report should contain, as a minimum:
 - Status
 - Actual & forecasted costs vs. budget
 - Actual & forecasted schedule vs. baseline/estimated schedule
 - Issues
 - Decisions needed from management or stakeholders
 - Other action required by management or stakeholders
 - Changes
 - Approved scope changes

- Changes to project budget
- Changes to baseline schedule

It is important to be purposeful with project communication. Just as each individual project's success rises and falls on communication, as resources are stretched thinner between multiple projects, the potential for communication breakdowns increases for each project. It is critical that communication of project issues between stakeholders be methodical and systematic.

10. Resource Management in the Multiple-Project Environment

One of the biggest risks to any organization's portfolio of projects is resource constraints. Just as it is critical to identify potential resource constraints during the planning phase of projects, it is equally important to monitor and manage the application and allocation of resources during project execution. As is the case with most dimensions of project management, even with the best resource plan, reality rarely follows the plan. Thus, the plan is in a constant state of evolution.

In most organizations, the human resources that are involved in the execution of a project do not report to the project manager, but rather to a functional manager elsewhere in the organization. It is important for the project manager to have regular, planned communication with these functional managers (and other project managers) to ensure that the resources needed for the portfolio of projects are available when they are needed. Surprises will happen, resources will have to be reallocated, and plans will have to be revised, but these should be identified and communicated early while there is still time to respond with an alternative plan and/or alternative resources (e.g., other departments, contractors instead of company employees, etc.).

If each project is scheduled with Microsoft Project, a hardcopy of the project Gantt chart showing resource assignments should be reviewed and discussed regularly with functional managers so that it is clear what resources need to be working on which projects (and which tasks) at what time to keep the projects on schedule. This is important even in a single-project environment, but in the multiple-project environment where common resources are shared between several projects, it is even more critical that resource assignment, allocations, and workloads are reviewed regularly.

11. Multiple Project Scheduling Issues

Resource management among multiple projects often amplifies the issues and concerns found in a single-project environment. Some of the problems include:

- Bad multi-tasking – As described above, the performance of individuals who switch between multiple project tasks in unproductive ways will likely cause schedule delays in individual projects and in the overall project portfolio.
- Student syndrome – A common tendency to wait until just before the task's due date to start on the task. This is bad in a single project environment, but terrible in a multiple-project environment.

- Parkinson's Law –Work expands to fill the available time. We know it is better to finish a task early rather than late, so we often give ourselves padding or “fat” in each task. But padded schedules usually do not result in significantly better schedule performance because the tasks expand to fill the time we allot for them.

There is no universal solution to solve all of the problems that persist in the multiple-project environment, but some possible solutions include:

- Ensure that tasks begin as soon as possible when resources become available. Any task that can be completed early will pay dividends across the entire portfolio.
- Finish tasks in less than the allotted time if at all possible. If a week has been allocated to a task in the schedule, and it can be finished in less than a week, completing the task in less time should be pursued with all diligence.
- Stay focused on the critical path activities. If something has to slip, make sure it is not a critical-path task.
- Reduce “bad” multi-tasking as described above.

12. Managing Multiple-Project Risks

Risk identification, analysis, and management should be performed as part of every project. When working on multiple projects, it is necessary to include specific multi-project risks in the planning of individual projects and to consider risks that exist between projects. Risk is amplified by complexity, such that the greater the complexity of a project or portfolio of projects, the greater the risk of negative occurrences. In the five-step process described above, these dependencies and risks were identified in step 3.

One area of risk that is amplified in the multiple-project environment is that of changing project requirements. It is critical that the entire organization understands the risks imposed on the project any time the requirements change during project the life of the project. Generally, the further into the project execution phase the change occurs, the more costly these changes will be in terms of dollars, schedule, and impact on other projects in the portfolio. Some organizations have staff, skills, systems, and a culture that are relatively mature in their capabilities to execute projects, while most organizations are not. In organizations that have lower capabilities in terms of staff maturity, skills, systems, and project management culture, projects with continuously changing requirements are doomed to fail, particularly if the project is staffed with a relatively inexperienced project team. In the multiple-project environment, this may sink the entire portfolio. Even in more mature organizations, late changes to project requirements can have significant adverse impacts on the multiple-project portfolio. Scope management on individual projects becomes critical, and any changes to the project plan must be thoroughly evaluated with an impact analysis on the entire portfolio.

Any time a risk is encountered, it may be dealt with in one of the following ways:

- Transfer the risk (buy insurance, make it someone else's problem)
- Accept the risk (continue, and be prepared to accept the consequences)
- Mitigate the risk (develop contingency plans to maximize the chances of survival)

- Minimize the likelihood of the adverse event
- Minimize the probability of adverse consequences
- Maximize the probability of positive consequences

The one thing we cannot do with risk is ignore it, thinking it will go away. It must be managed in some combination of the above ways.

13. Conclusion

If projects are a normal part of your company's business, it is important that project management be systematic and consistent. This is facilitated by the establishment of a standard project management methodology within the organization. It is recommended that guidelines, based upon project management standards, be established and documented as part of the company's business processes and procedures, and that all members of the company who contribute to projects be trained in the methodology. The Project Management Institute's "Project Management Body of Knowledge" is a very effective standard on which to base a company-specific methodology. With the principles described above, your organization should be able to create a set of processes that works for your specific environment. Then you can let the process work for you.

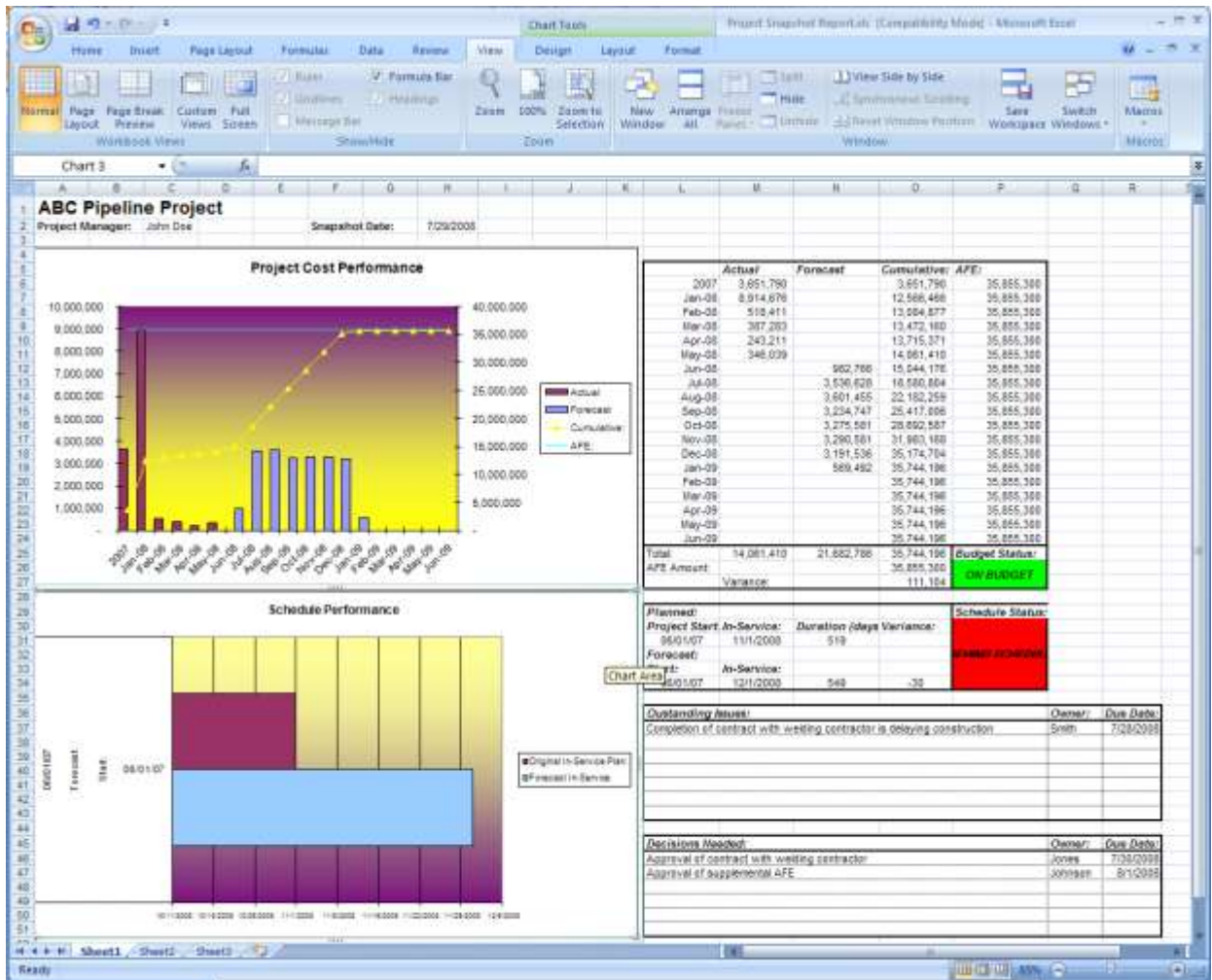


Figure 2. Project Update Report

The screenshot shows a Microsoft Excel spreadsheet titled "Multi-Project Summary Report Example.xlsx". The spreadsheet contains the following data:

Project Name	Schedule status	Cost status	Approved scope changes	Dependencies	Comments
Project 1	On schedule	\$250,000 over	4		Cost overruns due to scope changes
Project 2	1 week behind	On budget	1	Project 5	Expect budget status to change in order to catch up,
Project 3	On schedule	\$50,000 over	2		
Project 4	On schedule	\$10,000 under	1		
Project 5	2 weeks behind	\$300,000 over	7	Project 2	1 week of schedule slip is due to project 2
Project 6	On schedule	On budget	0		

Figure 3. Multi-Project Summary Report

External References:

www.pmi.org, Project Management Institute

www.iil.com, International Institute for Learning, "Managing Multiple Projects"