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PROJECT MANAGEMENT: A HANDBOOK OF FUNDAMENTALS FOR THE PACKAGING STUDENT AND PROFESSIONAL WITH A REVIEW OF CURRENT LITERATURE

By

Kenneth E. Fischer

A Thesis

Submitted to the

Department of Packaging Science

College of Applied Science and Technology

In partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE

Rochester Institute of Technology

2001

Department of Packaging Science

College of Applied Science and Technology

Rochester Institute of Technology

Rochester, New York

Certificate of Approval

M.S. DEGREE THESIS

The M.S. Degree thesis of Kenneth E. Fischer Student

has been examined and approved

by the thesis committee as satisfactory

for the thesis requirements for the

Master of Science Degree.

Craig E. Densmore

Dan Goodwin

Deanna M. Jacobs

June 12, 2001

Thesis Permission Release

ROCHESTER INSTITUTE OF TECHNOLOGY

COLLEGE OF APPLIED SCIENCE AND TECHNOLOGY

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Kenneth E. Fischer Date

DEDICATION

This thesis is dedicated to packaging students and professionals who seek to improve their project management skills, then creatively implement their knowledge.

ACKNOWLEDGEMENTS

I wish to thank the Tom Kendrick of Hewlett Packard's Project Management Institute and the Hewlett Packard Vancouver Site Librarians Barbara Delzell and Grace Lee. The depth and breadth of the information provided in this thesis could not have been accomplished without their research assistance.

ABSTRACT

This thesis seeks to introduce the basic concepts and techniques of project management to packaging students and professionals. After reviewing these fundamentals, packaging students and professionals should be able to facilitate successful project management in the work place:

- Develop an appropriate project plan for specific objectives
- Understand the scheduling techniques such as work breakdown structure, Gantt Charting, PERT Charting, Network Diagramming,
- Assign resources and manage the project team
- Interpret and optimize a project plan or schedule
- Identify and manage project dependencies
- Communicate project status information appropriately and effectively
- Determine the impact of potential problems and make appropriate decisions for project adjustment

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LIST OF ABBREVIATIONS

The following terms or acronyms are used in this thesis:

CPM - Critical Path Method

PDS - Project Data Sheet

PERT - Program Evaluation and Review Technique

WBS - Work Breakdown Structure

INTRODUCTION

This thesis seeks to introduce the basic concepts and techniques of project management to packaging students and professionals. The following handbook utilizes best practices as derived from current literature as well as from the real-world experiences of the author. The thesis starts with the assumption that management has approved the project, that resources have been allocated (equipment, people, materials, money, etc.) and now it's the packaging engineer's job to carry out the project to successful completion. The need for such a handbook is evidenced by the lack of available literature focused on packaging project management as well as from personal experience during interviews with recent Packaging Engineering graduates. The thesis concludes with an annotated bibliography with many quotations from the source material. The quotations are offered as information that project managers will find helpful and inspirational without having to reading these references in full.

Though project management is an outgrowth of systems management, it is beyond the scope of this document to outline the underlying principles of general system theory. Also beyond the scope of this document is information pertaining to management philosophy. Many of the resources listed in the Additional References section can provide this background information. It is important to understand the organizational management structure and culture that the project seeks to be accomplished within. It is not a goal or within the scope of this document to seek to change the culture of project management within organizations. However, project support and consensus within one's organization is very necessary for successful completion. The

goal of this document therefore is to benefit project managers and the project(s) themselves, not the organizations in which they must be accomplished.

The following subjects are beyond the scope of this document and not included, but are of interest to any project manager:

- organizational behavior or structure
- human psychology or behavior
- team development
- the theory of work
- motivation theory
- office politics
- budgeting or finance
- product design or development
- conflict management
- cost estimating, cost accounting, cost modeling or cash flow analysis (except to show MS Excel as a tool for documenting, calculating, tracking, and presenting costs)
- project estimating
- risk or decision analysis (e.g. the Hurwicz, Wald, Savage, or Laplace criterions)
- risk management
- transition or change management
- theory of management
- leadership
- probability
- large group meeting facilitation
- management science
- statistical analysis

- design of experiments
- compensation and rewards
- survey and evaluation of project management tools
- reward systems for successful project completion
- formal discussion on negotiation techniques (though some elements are discussed)
- formal discussion or instruction of network diagramming, programming or planning (PERT charting)
- formal discussion, instruction or calculation of critical path (CPM) or related techniques
- indented bills of material
- international aspects of and considerations in project management
- presentation skills or public speaking
- legal issues
- innovation theory
- common sense

The reader quickly gets the picture that project management is a complex undertaking, which it is. Packaging is usually part of the product development process and if it's not, it should be. Provided here are some simple approaches and information to facilitate project success for the packaging professional.

THE HANDBOOK

1. Project Definition

It's been said that one cannot score a touchdown if one does not know where the end zone is located. The same is true of projects. A project cannot be brought to successful conclusion if it is not defined or understood properly. According to Tom Demarco in *Controlling Software Projects : Management, Measurement and Estimation,* "…their projects failed. Why? They didn't design poorly or codes slowly or introduce too many bugs. In most cases, they simply failed to fulfill original expectations. I am convinced that most project failures are of this very nature, and, in most cases, it is not the fault of the project team at all. It is rather the fault of inflated and unreasonable expectations."

One simple technique used to capture a project definition is to use PDS or project data sheet. The format is irrelevant. This thesis will utilize the development of a new packaging structure (based on a new product introduction) to facilitate examples of concept contained within. The content of a PDS is key. The format of a PDS is up to the project manager, but a PDS should at a minimum include:

The Program Name	This is the name of the project or program
Date of the PDS	This is used for revision control purposes
The Project Owner	This is whomever has the responsibility to see the project through to it's completion
Project Sponsor	This is the person, and it should only be one

	person, who: - Determines the scope of the project - Provides the resources for the project - Determines the schedule of the project Project completion is determined by this person and any changes during the project must be approved by the sponsor.
Description of the project	This is usually a paragraph outlining the project and it's expected outcomes
The Project Objectives	This section outlines the scope of the project. Here one can detail the specific objectives or goals of the project (usually in bullet form). The objectives usually are attributes of the project outcome, not the specifics of the out come. For example, "Packaging solution not to exceed $1.25 per unit" or "Packaging to, as much as possible, utilized recyclable materials" are objectives.
Program or Product components	For packaging projects one needs to know what they are intending to package. List all the components here with and details that are necessary. This will ensure nothing is left out. For example, list the: - Model 123 VCR - Set up manual in shrink wrap - Singapore power cord in paperboard folding carton From here one should construct a bill of

	materials organize the included in the product and packaging components being utilized.
Volume Projections	Often, more than one version of a product is being developed which the packaging must accommodate. Usually, these versions will be tailored to separate customer types and may have separate volume expectations that can affect the design of the packaging.
Distribution	As with volumes, the versions of the product may have separate distribution expectations that can affect the design of the packaging.
Flexibility Chart	Three key elements to any project are the scope, schedule, and resources of the project. These elements each have levels of freedom (either constrained, somewhat constrained or unconstrained). However, only one element can have each of the levels of freedom. For example: Scope - somewhat constrained Schedule - constrained Resources - unconstrained As the project goes along and any problems come up, this chart helps the project manager understand what is available to solve the problems without initially having to consult the sponsor.
Resource Matrix	Usually this covers the people, their roles and

	responsibilities for the project. It's also a good idea to include everyone's contact information (e.g. phone number, fax number, and address if needed).
Budget	List budget or financial items not noted in the objectives. For example: - Tooling budget - Testing lab budget - Transportation test budget - Travel budget - Artwork budget - Prototype or samples budget
Potential Risks	List: - All the areas of risk for the project - The probability of the problem - Possible solutions
Schedule	List the key dates important to the program and project. For example: - Product Design Approval - Lab Release (when all R&D work is done) - Prototypes available - Product Design Freeze - Supplier Selection - Packaging Design Completed - Packaging Qualification Testing Completed - Packaging Documentation Completed - Manufacturing Pilot Run Completed - Manufacturing Start

For larger projects, this document will be more than one sheet of paper. Again, the content of a PDS is what's important. If a situation calls for additions, deletions or modifications of the contents of the PDS presented here, do not hesitate to make such changes to meet these needs.

A tool to help determine the scope of the project is to perform an Is/Is Not analysis. This is done according to Michael Doyle and David Straus in *How to Make Meetings Work: The New Interaction Method*, "In one column, write down facts you know about the problem: where it is, what its effects are, when it occurs, etc. Then do the same for what you know is not part of the problem."

With a PDS completed and reviewed by the team members and management, the sponsor should sign and approve the project. The appropriate support structure is now in place and ready to tackle the project, but how does one go about determining what needs to get done in order to ensure the projects completion?. There are tools available to the project manager for this purpose.

2. Project tools

The project is approved. Now what? The following tools are available to:

- understand what activities are needed for project success
- understand the relationship of these activities with each other
- understand the critical activities of the project
- understand the risks of the project and prepare for them
- ensure good communication with the project team

a. WBS

It's time to work backwards. From the PDS, the project manager knows where to go, but how does one get there? Like looking at a map, starting from the destination, one can work backwards to their starting point to chart a course. However, with a project one often doesn't even have a map. The Work Breakdown Structure or WBS can help determine the activities needed to complete the project, the project map.

A word of warning is warranted here. Do not develop a WBS alone. The project manager usually does not know all the tasks required to complete the project. For that, the project manager needs the assistance of the team. To that end, it is noted below that the "project kick-off" should be the first meeting of the project team.

With the project team assembled ask what tasks are needed to complete the project. The level of detail for each task is up to the project manager, but tasks taking from two days to one week should be noted individually. A popular technique for collecting the task is to note individual tasks on a Post-it® note. On each note, write:

- the task
- the time to complete the task
- who's responsible for completing the task

Of course, the project manager can take down the tasks in many forms (e.g. on a flip chart, white board, or even in a notebook). How

ever, the technique mentioned above has many benefits. The first benefit is that each of the team members can have their own pad of Post-it® notes. This allows each team member to work at their own pace in determining the tasks they believe are necessary to complete the project. This saves a lot of time. A second benefit is that as tasks are completed and posted on a board, the other team members can see the task and may be sparked to think of related tasks. The final benefit, at this stage is that the project manager can review all the tasks brought forward, ask for clarifications, and delete any duplicates. These tasks are now ready to be used for the next step in planning the project. Here's a comment by Reinhold Van Nostrand in *Developing Products in Half the Time* regarding this process, "We advise keeping the formal development process simple enough that everyone understands it and flexible enough to allow it to be adapted to specific situations."

b. Schedule

Now the project manager knows what needs to get done for the project to be completed. Now what? This jumble of tasks needs some organization. Otherwise, tasks will be completed without the project manager's knowledge. Some task may need to occur before other tasks can be started and some tasks may have very important constraints. Going along with the map analogy, we now have the cities on map, but we still don't have their position on the maps located hor do we have the streets that connect the cities. To organize the tasks of the project, three tools are available:

- Gantt Chart
- PERT Chart

- CPM

i. Gantt Chart

In a Gantt Chart, each task is represented in horizontal bar format that allows the project manager to show work planned and work done in the same space, comparing the bars to each other over a single timescale. Simple and effective, the Gantt Chart allows project managers to focus on the "big picture". Gantt Charts are best for conveying project schedule quickly, when used at a summary level, and for use reporting outside of the project team. Here's an example:

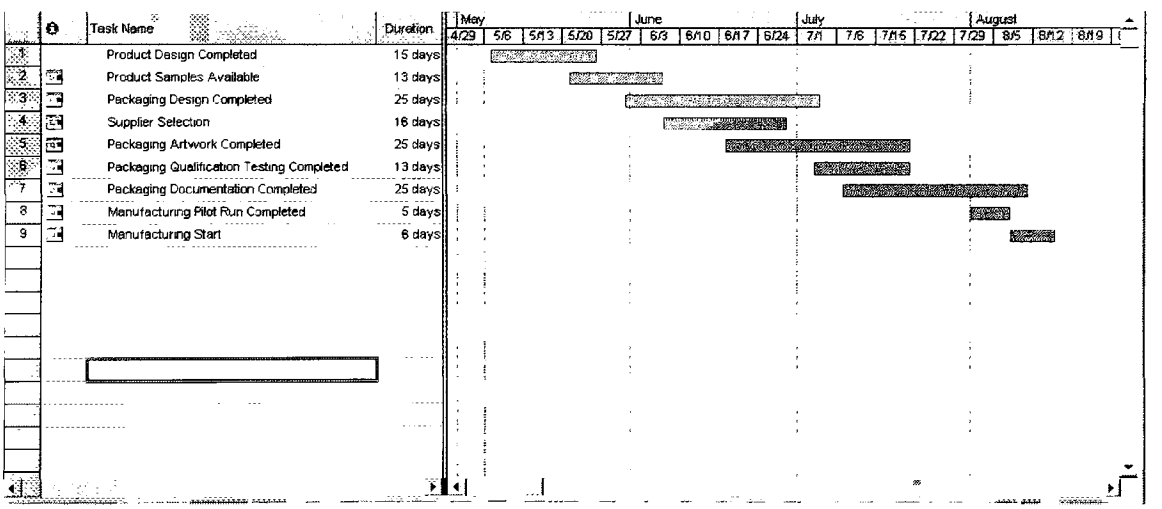

Illustration 1, Gantt Chart

ii. PERT Chart

The PERT Chart takes the Gantt Chart one step farther. It identifies the task's relationships to each other. Like a map, the PERT Chart layouts the cities of the map and connects them with streets. According to Harold Kerzner in *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, "Perhaps the best

known of all the relatively new techniques is the program evaluation and review technique (PERT)." He goes on to write, "The major discrepancy with Gantt, milestone, or bubble charts is the inability to show the interdependency between events and activities. Interdependencies are shown through the construction of networks. The following management information can be obtained from such a representation:

- Interdependence of activities
- Project completion time
- Impact of late starts
- Impact of early starts
- Trade-offs between resources and time
- 'What if' exercises
- Cost of a crash program
- Slippages in planning/performance
- Evaluation of performance

"A big advantage of PERT is the kind of planning required to create a major network. Network development and critical path analysis reveal interdependencies and problem areas that re neither obvious nor well defined by other planning methods. The second advantage of PERT is that one can determine the probability of meeting specified deadlines by development of alternative plans. A third advantage is the ability to evaluate the effect of changes in the program. Finally, PERT allows a large amount of sophisticated data to be presented in a well-organized diagram from which both contractor and customer can make joint decisions."

Using the above Gantt Chart, but adding these elements we make a PERT Chart:

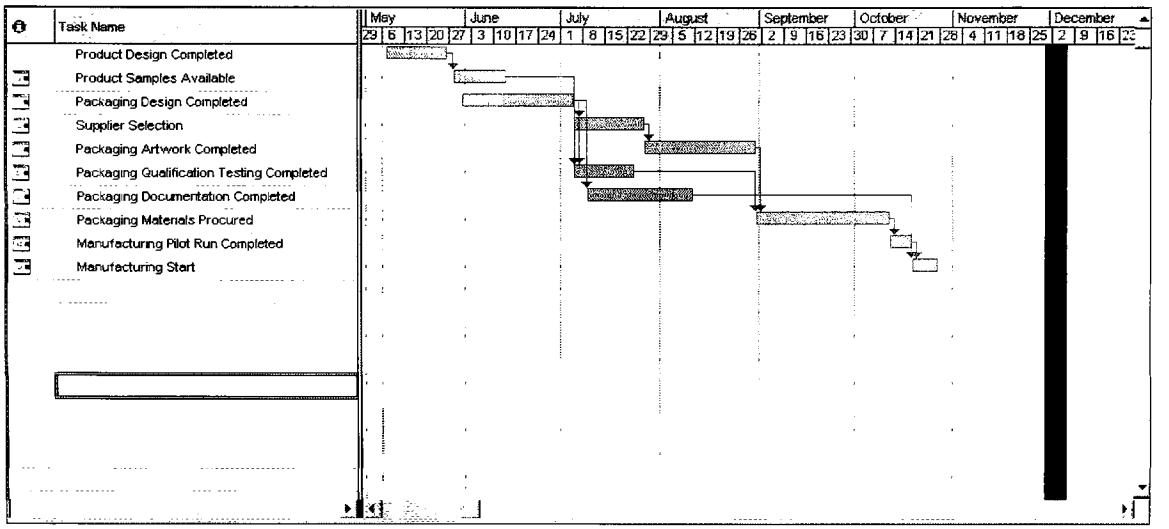

Illustration 2, PERT Chart

Another way to represent the PERT Chart is called a Network Diagram:

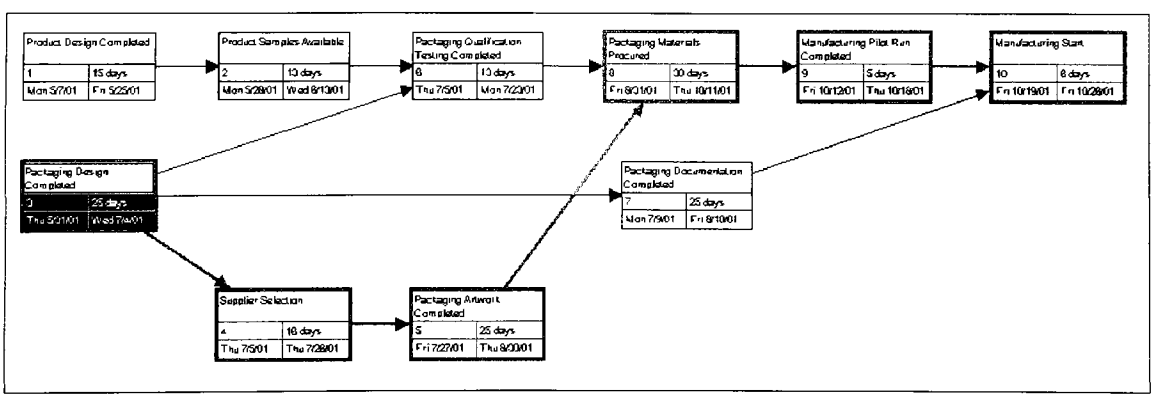

Illustration 3, Network Diagram example 1

A Network Diagram lists the tasks, their details, and their relationships. It does not show a time scale. This representation of the project can be useful for organizing the tasks by the departments

for which they are responsible. Here, the network diagram is modified to show these elements:

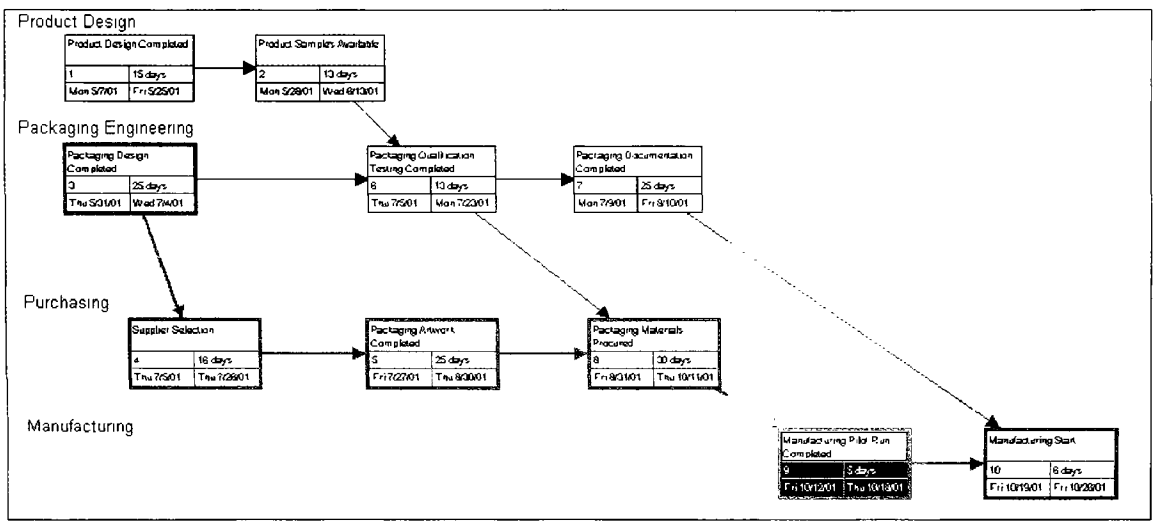

Illustration 4, Network Diagram example 2

iii. CPM

Now the project manager knows the tasks, their details, and relationships. But how long will the project take and what are the critical tasks to manage? The Critical Path Method or CPM can answer these questions. It takes the PERT Chart one step further by determining the most critical tasks of the project. According to Robert J. Graham in *Project Management As If People Mattered*, "Noncritical activities are said to have slack time. This slack time is the amount of time that an activity can be delayed without affecting the completion date. A critical activity is considered to have no slack."

c. Software Tools

Many software tools exist to assist project managers. Many of the illustrations above were created using Microsoft Project. In today's electronic age, such software tools allow project managers to develop projects and email schedules out to team members. In addition, project team members can subsequently modify schedule tasks or relationships directly and report back to the team and project manager. These tools can automatically calculate a projects critical path and will often highlight the critical path in red for emphasis. Many of the publications listed in the Bibliography and the Additional References sections discuss alternative software tools.

d. Resource Matrix

Why revisit the Resource Matrix? Because the team that attends the "Kick-Off" meeting will have changed by the project's completion. Team members will leave and be added. Periodically update the Resource Matrix and forward this onto the project team. This will allow new members to quickly know how to reach other team members as well as ensures that individuals no longer on the team are bothered unnecessary project details.

e. Risk Assessment

The level of detail taken with respect to risk assessment depends on the nature of the project, the company, and the project manager. For simplicity, a risk assessment seeks to determine risks to the project and possible solutions. This is a great activity for the project team to perform during one of the early project team meetings. This activity should be performed early so that if any of the risks manifest themselves, the team has time to implement the prescribed solution.

Using a flip chart, make two columns. Title one column "Risks", a second column "Possibility of this problem occurring", and a third column "Solutions." Then, brainstorm with the team to develop potential risks or problems to the project, their likelihood and potential solutions. Some of the risks will be more likely than others and some will be more catastrophic than others. The team should determine which risks deserve preemptive action (usually those that can be catastrophic to the project or those that are most likely to occur). According to Harold Kerzner in *Project Management: A Systems Approach to Planning, Scheduling, and Controlling,* "Project managers must like trouble. They must be capable of evaluating risk and uncertainty."

3. Project initiation

To get the project off to the right start a "project kick-off" meeting is called with all or most of members of the project team. This is usually the first meeting of the project team. More will be covered about conducting meetings shortly. The purpose of the meeting is to:

- Review the project (going over elements from the PDS)
- Answer any initial questions about the project
- Have each of the team members introduce themselves and their role in the project (or their function in the company).
- Ensure that the right members are gathered. Excuse anyone who's not appropriate for the project and if anyone else is needed, invite them.
- Set a general path forward until a formal schedule can be developed.
- Determine a time to place to meet on a regular basis.

This is usually enough detail to cover in the first meeting. It should last 30-90 minutes depending on the complexity of the project. As mentioned above, the next meeting or two can be used to determine the WBS.

4. Project Implementation

Now the work to implement the project begins. The project manager tracks the activity of tasks within the project. As mentioned above, regular team meetings are called to bring the group together to give status reports and discuss any changes to the project. Periodically the project manager will give status reports to the project sponsor to keep them up-to-date.

5. Project Communication

A project manager should utilize every form of communication possible with their team (e.g. personal conversation, phone, fax, email, and video conferencing). A subject that cuts across all communication mediums is meetings. Here are eighteen steps to a better meeting according to Michael Doyle and David Straus in *How to Make Meetings Work: The New Interaction Method*:

"Before the Meeting

1. Plan the meeting carefully: who, what, when, where, why, how many.
2. Prepare and send out an agenda in advance.

3. Come early and set up the meeting room.

At the Beginning of the Meeting

4. Start on time.
5. Get participants to introduce themselves and state their expectations for the meeting.
6. Clearly define roles.
7. Review, revise, and order the agenda.
8. Set clear time limits.
9. Review actions items from the previous meeting.

During the meeting

10. Focus on the same problem in the same way at the same time.

At the End of the Meeting

11. Establish action items: who, what, when.
12. Review the group memory.
13. Set the date and place of the next meeting ad develop a preliminary agenda.
14. Evaluate the meeting.
15. Close the meeting crisply and positively.
16. Clean up and rearrange the room.

After the Meeting

17. Prepare the group memo.
18. Follow-up on action items and begin to plan the next meeting."

6. Project wrap-up, retrospective and celebration

If all went well, the project has had a successful completion. The project manager and team can celebrate. The celebration can take many forms depending on the nature of the project, company, and project manager. Simple project completions can be celebrated by the project manager thanking each team member personally. Larger projects, budget permitting, can be celebrated with a party. Often project mementos are distributed to celebrate a successful project (e.g. t-shirts, hats, or wall plaques).

Sometime before the celebration begins, the project team should be called together one last time to reflect on the project. This is often called a project retrospective. Here, team members and the project manager can relate what went well in the project and what opportunities for improvement can be made in the next project. According to Tom Demarco in *Controlling Software Projects : Management, Measurement and Estimation*, "Missing the only chance to improve estimating skills is something that software project managers do all the time. For example, it is nearly unheard of to conduct a software project post mortem." He goes on to write, "The only unforgivable failure is the failure to learn from past failure."

A1. Annotated Bibliography with Quotations

Demarco,Tom and Timothy Lister. *Peopleware: Productive Projects and Teams, 2nd Ed.* Dorset House, 1999.

p. 1 "Most managers are prone of one part failing: a tendency to manage people as though they are modular components. We need to think about specific accommodation to the very nonmodular character of the human resource."

p. 3-4 "Each year since 1977, we have conducted a survey of development project and their results,. We've measured project size, cost, defects, acceleration factors, and success or failure in meeting the schedules. We've now accumulated more than five hundred project histories, all of them from real-world development efforts. We observe that about fifteen percent of all projects studied came to naught: They were canceled or aborted or 'postponed' or they delivered products that were never used. For bigger projects, the odds are even worse. For the overwhelming majority of projects we studied, there was not a single technological issue to explain the failure. The cause of failure most frequently cited by our survey participants was 'politics'. The major problems of our work are not so much technological as are sociological in nature. Included under 'politics' are such unrelated or loosely related things a communication problems, staffing problems, disenchantment with the boss or with the client, lack of motivation, and high turnover."

p. 5 "Our successes stem from good human interactions by all participants in the effort, and our failures stem from poor human interactions. The main reason we tend to focus on the technical rather than the human side of the work is not because it's more crucial, but because it's easier to do."

p. 8 "Fostering an atmosphere that doesn't allow for error simply makes people defensive. They don't try things that may turn out badly."

p. 10 "Unless you're riding herd on a canceled or about-to-be-canceled project, the entire focus o project management ought to be the dynamics of the development effort."

p. 11 "If you are charge with getting a task done, what portion of your time ought to be dedicated to actually doing the task? Not one hundred percent. There ought to be some provision for brainstorming, investigating new methods, figuring our how to avoid doing some of the subtasks, reading, training and just goofing off."

p. 16 "Workaholism is an illness, but not an illness like alcoholism that affects only the unlucky few. Workaholism is more like the common cold: Everyone has a bout with it every now and then. Our purpose in writing about it here is not so much to discuss it causes and cures, but to address the simpler problem of how you, the manager, ought to deal with your workaholics. If you exploit them, you'll eventually loose them."

p. 18 "People under time pressure don't work better; they just work faster."

p. 19-20 "Any step you take that may jeopardize the quality of the product is likely to set the emotions your staff directly against you. Managers jeopardize product quality by setting unreachable deadlines."

p. 22 "Quality, far and beyond that required by the end user, is a means to higher productivity."

p. 24 "Writing in 1954, the British author C. Northcote Parkinson introduced the notion that work expands to fill the time allocated for it, now known as Parkinson's Law."

p. 25 " Bureaucracies are prone to such problems, because they give little job-derived satisfaction to their workers. But you probably don't work in s bureaucracy. Even if you do, you go to great lengths to make sure that your people are spared it effects, otherwise they'd get anything done. The result is that your people have the possibility of lots of job-derived satisfaction. Their lives are just o short for any loafing on the job. Since they enjoy their work, they are disinclined to let it drag on forever…Every manager, at least some time in his or her life, has to deal with a worker who does seem to be avoiding work, or who seems to have no standard of quality, or who just can't get the job done. When a worker seems unable to perform and seems not to care at all about the quality of his work, for example, it is a sure sign that the poor fellow is overwhelmed by the difficulty of the work. He doesn't need more pressure. What he needs is reassignment."

p. 34 "The manager's function is not to make people work, but to make it possible for people to work."

p. 26-29 "Two respected researchers at the University of New South Wales, Michael Lawrence and Ross Jeffery, run a project survey every year. (They) set out to determine the productivity effect of various estimating methods. Programmers (those doing the work) seem to be a bit more productive when they can do the estimate themselves, compared to cases in which the manager does it without even consulting them. When the two do the estimating together, the results tend to fall in between. Projects were a third party, typically a systems analyst, prepared the estimates substantially outperformed the project in which estimating was done by a programmer and/or a supervisor. Why? The systems analyst tends to be a better estimator than either the programmer or the supervisor. He or she typically knows the work in as much detail, but is not hampered by the natural optimism of the person who's actually going to do the job or the political and budgetary biases of the boss. Going further. Projects on which the boss applied no schedule pressure whatsoever ("Just wake me up when you're done."1) had the highest productivity of all. The decision to apply schedule pressure to a project needs to be made in much the same way you decide whether or not to punish your child: If your timing is impeccable so the justification is easily apparent, then it can help. If you do it all the time, it's just a sign that you've got troubles of your own."

p. 31 "We're all under a lot of pressure to improve productivity. The problem is no longer susceptible to easy solutions, because all the easy solutions were though of and applied long ago. Yet some

organizations are doing a lot better than others. We're convinced that those who do better are not using any particularly advanced technology. Their better performance can be explained entirely by their more effective ways of handling people, modifying the workplace and corporate culture, and implementing some of the measures we'll discuss in Parts II through IV (office environment, the right people, and teamwork)."

p. 35 "There are a million ways to lose a work day, but not even a single way to get one back."

p. 41 "As long as workers are crowded into noisy, sterile, disruptive space, it's not worth improving anything but the workplace."

p. 43 "Staying late or arriving early or staying home to work in peace is a damning indictment of the office environment. Changing the environment is not beyond human capacity."

p. 48 " The bald fact is that many companies provide developers with a workplace that is so crowded, noisy and interruptive as to fill their days with frustration. That alone could explain reduced efficiency as well as a tendency for good people to migrate elsewhere."

p. 50 "The top quartile, those who did the exercise most rapidly and effectively, work in space that is substantially different from that of the bottom quartile. The top performer' space is quieter, more private, better protected from interruption, and there is more of it."

p. 51 "A penny saved on the workspace is a penny earned on the bottom line, or so the logic goes."

p. 52 "Meaningful measurement of productivity is a complex and elusive thing."

p. 56 "Noise is directly proportional to (office) density, so halving the allotment of space per person can be expected to double the noise."

p. 62 "Thirty percent of the time, people are noise sensitive (working alone, and the rest of the time they are noise generators (working with others). Those working alone are particularly inconvenienced by this clash. Though they represent a minority at any given time, it's a mistake to ignore them, for it is during their solitary work periods that people actually do the work."

p. 57 "When the office environment is frustrating enough, people look for a place to hide out. People are hiding out to get some work done. Some of your workers can't be found at all. If this rings true to your organization, it's an indictment. Saving money on space may be costing you a fortune."

p. 59 "Gilb's Law: Anything you need to quantify can be measured in some way that is superior to not measuring it at all."

p. 63 "Each time you're interrupted, you require an additional immersion period to get back into (the) flow (of work). During this immersion, you're not really doing work."

p. 69 "When you begin to collect data about the quality of work time, your attention is automatically focused on one of the principal causes of interruption, tin incoming telephone call. You don't even consider not answering the phone. But there are certain steps that can be taken to minimize the negative impart of interruptive calls. The most important of these is to realize how much we have allowed the telephone to dominate our time allocation."

p. 72 "The path toward sanity in working conditions is a new attitude toward interruptions and toward the telephone."

p. 73 "When electronic mail was first proposed, most of us thought that the great value of it would be the saving in paper. That turns out to be trivial, however, compared to the saving in reimmersion time (getting back into the work flow after an interruption). The big difference between a hone call and an electronic mail message is that the phone call interrupts and the e-mail does not; the receiver deals with it a his or her own convenience."

p. 74 "People must learn that it's okay sometimes not to answer their phones, and they must learn that their time - not just the quantity but its quality - is important."

p. 93 "...you succeed or fail based on your decisions of when and where to deploy your faceless resources."

p.97 "Strong managers don't care when team members cut their hair or whether they wear ties. Their pride is tied only to their staff's accomplishments."

p.99 "Your organization may have rigor mortis, but your little piece of it can hop and skip."

p.114 "The maddening thing about most organizations is that they are only as good as the people who staff them."

p.119 "What seemed to be happening was that the change itself wasn't as important as the act of changing. People were charmed by differentness, they liked the attention, they were intrigued by novelty. This has come to be called the Hawthorne Effect. Loosely stated, it says that people perform better when they're trying something new…You almost never hear of a study that analyzes ten-year-old 'improvements' to see if they are still worthwhile. They probably aren't. With only a modicum of cynicism, we subscribe to the view that the Hawthorn Effect accounts for most productivity gains. "

p.120 "To allow the Hawthorne Effect to work for you, you have to make nonstandard approaches the rule. Whatever standard there is should be brief and gentle."

p.121 "In the best work groups. The ones in which people have the most fun and perform at their upper limits, team interactions are everything. They are the reason that people stick it out, put their all into the work, overcome enormous obstacles."

p.123 "A jelled team is a group of people so strongly knit that the whole is greater than the sum of the parts…Once a team begins to jell, the probability of success goes up dramatically."

p.123 "Teams by their very nature are formed around goals."

p.126 "There is very little true teamwork required in most of our work. But teams are sill important, for they serve as a device to get everyone pulling in the same direction."

p.135 "If you're the manager, of course you're going to feel that your judgment is better than that of people under you. You have more experience and perhaps a higher standard of excellence than they have; that's how you go to be the manager. At any point in the project where you don't interpose your own judgment, your people are more likely to make a mistake. So what? Let them make some mistakes. That doesn't mean you can't override a decision (very occasionally) or give specific direction to the project. But if the staff comes to believe it's not allowed to make any errors of its own, the message that you don't trust them comes through loud and clear. There is no message you can send that will better inhibit team formation."

p.137 "No one can be part of multiple jelled teams."

p.152 "The cult of quality is what Ken Orr calls 'the direct in the oyster.' It is a focal point for the team to bind around."

p.152 "It may be news to some, but the human creature needs reassurance from time to time that he or she is heade3d in the right direction. Teams of human creatures need it, too. Such reassurance comes from what psychologists call closure."

p.183 "…coaching is an important factor in successful team interaction."

p.187 "…standards are good, but it's worth pointing out that the great triumph of standards in the modern world is almost entirely the success of standard interfaces."

p.197 "The fundamental response to change is not logical, but emotional."

p.215 "The ultimate management sin is wasting people's time."

Kerzner, Harold. *Project Management : A Systems Approach to Planning, Scheduling, and Controlling, 6th edition.* John Wiley & Sons, 1998

Inside cover

"Dr. Kerzner's 16 Points to Project Management Maturity

1. Adopt a project management methodology and use it consistently.
2. Implement a philosophy that drives the company toward project management maturity and communicated it to everyone.
3. Commit to developing effective plans at the beginning of each project
4. Minimize scope changes by commit to realistic objectives
5. Recognize that cost and schedule management are inseparable.
6. Select the right person as the project manager.
7. Provide executives with project sponsor information, not project management information.
8. Strengthen involvement and support of line management.

9. Focus on deliverables rather than resources.
10. Cultivate effective communication, cooperation, and trust to achieve rapid project management maturity.
11. Share recognition for propjet success with the entire project team and line management.
12. Eliminate non-productive meetings.
13. Focus on identifying and solving problems early, quickly, and cost effectively.
14. Measure progress periodically.
15. Use project management software as a tool - not as a substitute for effective planning or interpersonal skills.
16. Institute an all-employee training program with periodic updates based upon documented lessons learned."

P6. "Today, the definition of project success has been modified to include completion:

- within the allocated time period
- within the budgeted cost
- at the proper performance or specification level
- and acceptance by the customer/user
- with minimum or mutually agreed upon scope changes
- without disturbing the main work flow of the organization
- without changing the corporate culture"

p.7 "Most companies have six resources:

- Money
- Manpower
- Equipment
- Facilities

- Materials
- Information/technology

The project manager does not control any of these resources directly, except perhaps money. The project managers just, therefore, negotiate with the line managers for all project resources."

p. 47 "Concurrent or simultaneous engineering is an attempt to accomplish work in parallel rather that in series. This requires that marketing, R&D, engineering and production are all actively involved in the early project phases and making plans even before the product design has been finalized. But, it does come with serious and potentially costly risks, the largest one being cost of rework."

p. 160 "Project managers must like trouble. They must be capable of evaluating risk and uncertainty. Other basic characteristics include:

- Honesty and integrity
- Understanding of personnel problems
- Understanding of project technology
- Business management competence
- Management principles
- Communications
- Alertness and quickness
- Versatility
- Energy and toughness
- Decision-making ability"

p. 170 "Ten specific skill requirements for program managers:

- Team building
- Leadership

- Conflict resolution
- Technical expertise
- Planning
- Organization
- Entrepreneurship
- Administration
- Management support
- Resource allocation"

p. 226-7 "Controlling is a three-step process of measuring progress toward an objective, evaluating what remains to be done, and taking the necessary corrective action to achieve or exceed the objectives."

p. 227-8 "Directing is the implementing and carrying out (through others) of those approved plans that are necessary to achieve or exceed objectives. Directing involves such steps as: staffing, training, supervising, delegating, motivating, counseling, and coordinating."

p. 228 "Directives are most effective when the KISS (keep it simple, stupid) rule is applied."

p. 243-5 "Perhaps the most common barriers (to project management team development) occur as a result of the need to delegate:

Barriers in the delegator

- Preference for operating
- Demand that everyone 'know all the details'
- 'I can do it better myself' fallacy
- Lack of experience in the job or in delegating
- Insecurity

- Fear of being disliked
- Refusal to allow mistakes
- Lack of confidence in subordinates
- Perfectionism, leading to overcontrol
- Lack of organizational skill in balancing workloads
- Failure to delicate authority commensurate with responsibility
- Uncertainty over tasks and inability to explain
- Disinclination to develop subordinates
- Failure to establish effective controls and to follow up

Barriers in the delegatee

- Lack of experience
- Lack of competence
- Avoidance of responsibility
- Overdependance on the boss
- Disorganization
- Overload of work
- Immersion in trivia

Barriers in the situation

- One-man-show
- No tolerance of mistakes
- Criticality of decisions
- Urgency, leaving no time to explain (crisis management)
- Confusion in responsibilities and authority
- Understaffing"

p. 250-1 "We recommend that the project leader at the start of the project talk with each team member on a one-to-one basis about the following:

1. What the objectives are for the project.

2. Who will be involved and why.
3. The importance of the project to the overall organization or work unit.
4. Why the team member was selected and assigned to the project. What role he/she will perform.
5. What rewords might be forthcoming if the project is successfully completed.
6. What problems and constraints are likely to be encountered.
7. The rules-of-the-road that will be followed in managing the project (e.g., regular status review meetings).
8. What suggestions the team member has for achieving success.
9. What the professional interests of the team member are.
10. What challenge the project will present to individual members and the entire team.
11. Why the team concept is so important to project management success and how it should work."

p. 268 "Proper communications are vital to the success of the project. Communications are the process by which information is exchanged. Communications can be:

- Written formal
- Written informal
- Oral formal
- Oral informal"

p. 273-4 "Knowing how to communicate does not guarantee that a clear message will be generated. There are techniques that can be used to improve comminations. These techniques include:

- Obtaining feedback, possibly in more than one form

- Establishing multiple communications channels
- Using face-to-face communications if possible
- Determining how sensitive the receiver is to your communications
- Being aware of symbolic meanings such as expressions on people's faces
- Communicating at the proper time
- Reinforcing words with actions
- Using a simple language
- Using redundancy (i.e., saying it two different ways) whenever possible"

p. 274 "With every effort to communicate there are always barriers. The barriers include:

- Receiver hearing what he wants to hear. This results from people doing the same job so long that they no longer listen.
- Sender and receiver having different perceptions. This is vitally important in interpreting contractual requirements, statements of work, and proposal information requests.
- Receiver evaluating the source before accepting the communications.
- Receiver ignoring conflicting information and doing as he pleases.
- Words meaning different things to different people."

p. 274 "Three important conclusions can be drawn about communications techniques and barriers:

- Don't assume that the message you sent will be received in the form you sent it

- The swiftest and most effective communications take place among people with common points of view. The manager who fosters a good relationship with his associates will have little difficulty in communicating with them.
- Communications must be established early in the project."

p. 275 "Communication is also listening. The advantages of being a good listener, both professionally and personally, are that:

- Subordinates know you are sincerely interested.
- You obtain feedback
- Employee acceptance is fostered"

p. 276 "The following are general guidelines for conducting a more effective meeting:

- Start on time. If you wait for people, you reward tardy behavior.
- Develop an agenda 'objectives'.
- Generate a list and proceed; avoid getting hung up on the order of topics.
- Conduct one piece of business at a time.
- Allow each member to contribute in his own way.
- Support, challenge, and counter; view differences as helpful; dig for reasons or views.
- Silence does not always mean agreement. Seek opinions: 'What's your opinion Peggy?'
- Be ready to confront the verbal member: 'Okay, we've heard from Mike on this matter; now how about some other views?'
- Test for readiness to make a decision.
- Make the decision.

- Test for commitment to the decision.
- Assign roles and responsibilities (only after decision-making).
- Agree on follow-up or accountability dates
- Indicate the next step for this group.
- Set the time and place for the next meeting.
- End on time.
- Was the meeting necessary?"

P. 277 "Project review meetings are necessary to convince key personnel that orderly progress is being made on a project. There are three types of review meetings:

- Project team review meetings
- Executive management review meetings
- Customer project review meetings"

P. 277 "Having both too many or too few meetings can prove detrimental."

p. 319 "Disciplined time management is one of the keys to effective project management."

p. 374 "Projects are established with objectives in mind. Project objectives must be:

- Specific, but not general
- Not overly complex
- Measurable, tangible, and verifiable
- Realistic and attainable
- Established within resource bounds
- Consistent with resources available or anticipated

- Consistent with organizational plans, policies, and procedures"

p. 375 "Many projects are directed and controlled using a management-by-objective (MBO) approach based upon effective project/functional communications and working relations. The philosophy of management by objectives:

- Is proactive rather than reactive management.
- Is results-oriented emphasizing accomplishment.
- Focuses on change to improve individual and organizational effectiveness."

p.431 "In small companies, the project manager has to wear multiple hats and may have to act as a project manager and line manager at the same time."

p.454 "There are certain actions that the project manager and team can take in order to stimulate project success. These actions include:

- Insist upon the right to select key project team members.
- Select key team members with proved track records I their fields.
- Develop commitment and a sense of mission from the outset.
- Seek sufficient authority and a projectized organizational form.
- Coordinate and maintain a good relationship with the client, sponsor, and team.
- Seek to enhance the public's image of the project.
- Have key team members assist indecision making and problem solving.
- Develop realistic cost, schedule, and performance estimates and goals.
- Have back-up strategies in anticipation of potential problems.

- Provide a team structure that is appropriate, yet flexible and flat.
- Go beyond formal authority to maximize influence over other people and key decisions.
- Employ a workable set of project planning and control tools.
- Avoid overrelience on one type of control tool.
- Stress the importance of meeting cost, schedule, and performance goals.
- Give priority to achieving the mission or function of the end item.
- Keep changes under control.
- Seek to find ways of assuring job security for effective project team members."

p. 471 "Project sponsorship has evolved into the best way that executives can provide support for a project. As a project sponsor, the executive provides guidance for both the project manager and line managers. The executive becomes the sponsor for the entire project team."

p.472 "Not all projects need a project sponsor. Sponsorship is generally needed on those projects that require a multitude of resources or a large amount of integration between functional lines or have the potential for disruptive conflicts or the need for strong customer communications."

p. 483 "Project management is both an art and a science. The science aspect includes the quantitative tools and techniques for planning, scheduling, and controlling. The art aspect involves dealing with a

wide variety of people. The science portion can be learned in the classroom, whereas the art portion can come only on-the-job experience. Perhaps the most important characteristics are interpersonal skills and communication skills."

p. 519 "The most important responsibilities of a project manager are planning, integrating, and executing plans."

p. 519 "Planning in a project management may be described as establishing a predetermined course of action with a forecasted environment."

p.520 "One of the objectives of project planning is to completely define all work required (possibly through the development of a documented project plan) so that it will be readily identifiable to each project participant."

p. 522 "Planning is determining what needs to be done, by whom, and by when, in order to fulfill one's assigned responsibility."

p. 523 "At the working group or functional level, planning must include:

- Agreement on purpose
- Assignment and acceptance of individual responsibilities
- Coordination of work activities
- Increased commitment to group goals
- Lateral communications"

p. 534-5 "Effective total program planning cannot be accomplished unless all of the necessary information becomes available at project initiation. These information requirements are:

- The statement of work (SOW)
- The project specifications
- The milestone schedule
- The work breakdown structure (WBS)"

p. 535 "The statement of work (SOW) is a narrative description of the work to be accomplished. It includes the objectives of the project, a brief description of the work, the funding constraint if one exists, and the specifications and schedule."

p.544 "The WBS (work breakdown structure) is the single most important element because it provides a common framework from which:

- The total program can be described as a summation of subdivided elements.
- Planning can be performed.
- Costs and budgets can be established.
- Time, cost, and performance can be tracked.
- Objectives can be linked to company resources in a logical manner.
- Schedules and status-reporting procedures can be established.
- Network construction and control planning can be initiated.
- The responsibility assignments for each element can be established (responsibility matrix)."

p. 562 "No matter how hard we try, planning is not perfect, and sometimes plans fail. Typical reasons why plans fail include:

- Corporate goals are not understood at the lower organizational levels.
- Plans encompass too much in too little time.
- Financial estimates ere poor.
- Plans were based on insufficient data.
- No attempt was made to systematize the planning process.
- Planning was performed by a planning group.
- No one knows the ultimate objective.
- No one knows the staffing requirements
- No one knows the major milestone dates, including written reports.
- Project estimates are best guesses, and are not based on standards or history.
- Not enough time was given for proper estimating."

p. 567 "Activity scheduling is probably the single most important tool for determined how company resources should be integrated so that synergy is produced. Activity schedules are invaluable for projecting time-phased resource utilization requirements as well as providing a basis for visually tracking performance."

p. 568 "The schedules serve as master plans from which both the customer and management have an up-to-date picture of operations. Certain guidelines should be followed in the preparation of schedules, regardless of the projected use or complexity:

- All major events and dates must be clearly identified.
- The exact sequence of work should be defined through a network in which interrelationships between events can be identified.

- Schedules should be directly relatable to the work breakdown structure.
- All schedules must identify the time constraints and, if possible, should identify those resource required for each event."

p. 573 "The plan serves as a cookbook for the duration of the program by answering these questions for all personnel identified with the program:

- What will be accomplished?
- How will it be accomplished?
- Where will it be accomplished?
- When will it be accomplished?
- Why will it be accomplished?"

p. 574-5 "Take a hard look at:

- Program requirements
- Program management
- Program schedules
- Facilities requirements
- Logistics support
- Financial support
- Manpower and organization

The program plan is more than just a set of instructions. It is an attempt to eliminate crisis by preventing anything form 'falling through the cracks."

p. 588 "Now, let us assume that management wishes to keep the end date fixed the start date is delayed because of lack o f adequate funding.

How can this be accomplished without sacrificing quality? The answer is to fast-track the project. Fast-tracking a project means that activities that are normally done in series are done in parallel. An example of this is when construction begins before detail design is completed. Fast-tracking a job can accelerate the schedule but requires additional risks be taken. If the risks materialize, then either the end date will slip or expensive rework will be needed."

p. 641-2 "Scheduling techniques have taken on paramount importance since World War II. The most common techniques are shown below:

- Gantt or bar charts
- Milestone charts
- Line of balance
- Networks
- Program Evaluation and Review Technique (PERT)
- Arrow Diagram Method (ADM) [sometimes called the Critical Path Method (CPM)]
- Precedence Diagram Method (PDM)
- Graphical Evaluation and Review Technique (GERT)"

p. 642 "Perhaps the best known of all the relatively new techniques is the program evaluation and review technique (PERT)."

p. 642 "PERT was originally developed in 1958 and 1959 to meet the needs of the 'age of massive engineering' where the techniques of Taylor and Gantt were inapplicable. The Special Projects Office of the U.S. Navy, concerned with performance trends on large military development programs, introduced PERT on it Polaris Weapon System in 1958, after the technique had been developed with the aid of the

management consulting firm of Booz, Allen, and Hamilton. Since that time, PERT has soared rapidly throughout almost all industries. At about the same time the Navy was developing PERT, the DuPont Company initiated a similar technique known as the critical path method (CPM), which also has spread widely, and is particularly concentrated in the construction and process industries."

p.644 "The major discrepancy with Gantt, milestone, or bubble charts is the inability to show the interdependency between events and activities. Interdependencies are shown through the construction of networks. The following management information can be obtained from such a representation:

- Interdependence of activities
- Project completion time
- Impact of late starts
- Impact of early starts
- Trade-offs between resources and time
- 'What if' exercises
- Cost of a crash program
- Slippages in planning/performance
- Evaluation of performance"

p. 643 "A big advantage of PERT is the kind of planning required to create a major network. Network development and critical path analysis reveal interdependencies and problem areas that re neither obvious nor well defined by other planning methods. The second advantage of PERT is that one can determine the probability of meeting specified deadlines by development of alternative plans. A third advantage is the ability to evaluate the effect of changes in the program. Finally,

PERT allows a large amount of sophisticated data to be presented in a well-organized diagram from which both contractor and customer can make joint decisions."

p. 646 "Large projects can easily be converted into PERT networks once the following questions are answered:

- What job immediately precedes this job?
- What job immediately follows this job?
- What jobs can be run concurrently?"

p. 657 "Transferring resources from slack paths to more critical paths is only one method for reducing expected project time. Several other methods are available:

- Elimination of some parts of the project
- Addition of more resources
- Substitution of less time-consuming components or activities
- Parallelization of activities
- Shortening critical path activities
- Shortening early activities
- Shortening longest activities
- Shortening easiest activities
- Shortening activities that are least costly to speed up
- Shortening activities for which you have more resources
- Increasing the number of work hours per day"

p. 674-5 "Today, project managers have a large array of software available to help in the difficult task of tracking and controlling projects. While it is clear that even the most sophisticated software package is not a substitute for competent project leadership - and by

itself does not identify or correct any task-related problems - it can be a terrific aid to the project manager in tracking the many interrelated variables and tasks that come into play with a modern project."

p. 679 "Today there exist more than 200 software packages on program management ranging from the large $100,000+ mainframe packages to the small $10 diskette that simply calculates the critical path."

p.746 "Project plans are 'living documents' and are therefore subject to change."

p. 746 "Risk management must be an integral part of project management throughout the entire life cycle for the project. Some common risks include:

- Poorly defined requirements
- Lack of qualified resources
- Lack of management support
- Poor estimating
- Inexperienced project manager

p. 746 "Risk identification is an art."

p.1064 "Cause-and-effect analysis uses diagramming techniques to identify the relationship between an effect and its causes. Cause-and-effect diagrams are also known as fishbone diagrams."

p.1064-5 "Six step are used to perform a cause-and-effect analysis:

Step 1. Identify the problem

Step 2. Select interdisciplinary brainstorming team

Step 3. Draw problem box and prime arrow

Step 4. Specify major categories

Step 5. Identify defect causes

Step 6. Identify corrective action"

p.1031 "With concurrent engineering, creeping scope becomes a way of life. The ideal way to handle creeping scope is to freeze the specification/scope and treat all further changes as a separate project with its own budget, schedule, and requirements."

p. 282-3 "Below are twenty project management proverbs that show you what can go wrong:

- You cannot produce a baby in one month by impregnating nine women.
- The same work under the same conditions will be estimated differently by ten different estimators or by one estimator at ten different times.
- The most valuable and least used word in a project manager's vocabulary is 'NO'.
- You can con a sucker into committing to an unreasonable deadline, but you can't bully him into meeting it.
- The more ridiculous the deadline, the more it costs to try to meet it.
- The more desperate the situation, the more optimistic the situatee.
- Too few people on a project can't solve the problems -to many create more problems that they solve.
- You can freeze the user's specs but he won't stop expecting.

- Frozen specs and the abominable snowman are alike: They are both myths, and they both melt when sufficient heat is applied.
- The conditions attached to a promise are forgotten, and the promise is remembered.
- What you don't know hurts you.
- A user will tell you anything you ask about -nothing more.
- Of several possible interpretations of a communication, the least convenient one is the only correct one.
- What is not on paper has not been said.
- No major project is ever installed on time, within budget, with the same staff that started it.
- Projects progress quickly until they become 90 percent complete; then they remain at 90 percent complete forever.
- If project content is allowed to change freely, the rate of change will exceed the rate of progress.
- No major system is ever completely debugged; attempts to debug a system inevitably introduce new bugs that are even harder to find.
- Project teams detest progress reporting because it vividly demonstrates their lack of progress.
- Parkinson and Murphy are alive and well -in your project."

Smith and Reinertsen. *Developing Products in Half the Time*. Van Nostrand Reinhold, 1991

p. 3 "Many competitive advantages accrue from a fast development capability. Perhaps most obvious but least important is that the product's sales life is extended. As a second benefit, early product

introduction can increase market share. The first product to market has a 100 percent share of the market in the beginning."

p.7 "How can we tell when a project should be on the fast track and when it merits a slower approach? One technique is to make use of cost-benefit analysis to help make such decisions. There are often clear, quantifiable benefits available from rushing a project. The costs of rushing are also quantifiable. They may include overtime charges, extra laboratory equipment, and similar development expenses."

p.9 "One should not get the impression from our emphasis on time that other factors like product performance, quality, reliability and cost are somehow less important."

p.12 "We must consider lost time as in fact a consumed resource and factor it cost into every decision."

p.15 "Finally, many people connect accelerated product development with project management. Here again this perspective is too marrow, because it ignores the product-specific elements and the characteristics unique to product development projects. All to often 'project management' fails because it's key element is ignored: management does not provide the 'project manager' with the authority or support necessary to reach the objective, an ambitious schedule in this case. We stress the importance of selecting and empowering the project manager."

p. 15 "Good products must always be guided by the needs of the customer, who is the best judge of these needs."

p. 62 "The difficulty with the big project is that it carries and enormous learning burden, which means there will be a long and unpredictable development period. Project difficulty is deceptive, because it does not grow in proportion to the number of new items. Instead, it grows by compounding. Each new element usually has to interact with a number of existing ones, so as the base project grows bigger the addition of a new element becomes increasingly difficult."

p.76 "In order for the product development process to move ahead rapidly, it must have a fixed target an not change course."3 "If a new product is not delivered quickly the market shifts, requiring forecasts to be revised and design goals to be changed, and the development process stretches out, thus opening the possibility of yet another shift in the market. The way to get out of this circular trap is to agree that at a certain point the design is to be frozen."

P.109 "A second common problem is 'creeping elegance,' a design that slowly acquires more features and usually misses its cost and schedule targets. Some flexibility is necessary in every specification, however it must be controlled because feature growth can sometimes overrun a system's margins and trigger a massive redesign."

p.81 "Specifications provided input that is critical to both the product and the development process. A poorly executed specification can both delay the start of development and stretch out the development cycle."

p. 108 "Good system design has contingency plans. Once the high-risk modules have been defined there must be some alternative in mind in

case they cannot be completed on schedule. Such backup plans are normally made for high-risk subsystems."

p.118 "The team leader's first job is to staff the team with the right people."

p.124 "Suppliers must be considered potential candidates when forming a team. A substantial and growing portion (presently 80 percent in some industries) of a product's value is purchased. Suppliers should be involved as early as possible."

p.173 "Beyond the distinctions between schedule-oriented and cost-oriented controls there is a difference between hard and soft controls. Soft controls are the relatively subtle ways there are of empowering and motivating people to work effectively in meeting project goals. Hard controls are simply variants on familiar types o f product development procedures, project planning, and project reviews."

p.174 "In accelerated projects team leaders spend a lot of time "chatting"3 with members of the team to keep up to date on progress and problem areas and make sure activities dovetail smoothly."

p.175 "Electronic mail speeds u some parts of the process, but it still does not get around the three fundamental flaws of written communication. One flaw is that the very act of composing a written message can unwittingly draw a person into solidifying a position, advocating a particular audience of events that will involve others, and making assumptions about how a reader of it will respond. Second, written communication can easily go into inappropriate detail or

neglect important information, because it lacks the feedback of an audience saying, 'I know that' or 'I don't understand.' Finally, the timing of a response to written communication is unpredictable."

p.176 "The team needs to have its own regular meetings to discuss the project's status and share new information that may affect the project."

p.178 "Every company that develops products uses some kind of procedure that is intended to control progress."

p.180 "There are limits, of course, to how detailed a codified development process should be. It can easily get too complicated and lose its value."

p.180 "We advise keeping the formal development process simple enough that everyone understands it and flexible enough to allow it to be adapted to specific situations."

p.181 "The project plan is a central item in an accelerated development project."

p.181 "The plan should be created by the team, who should be prepared to execute it."

p.181 "The first step in planning is to set a clear end point for the project and back the schedule up from there."

p.183 "Measurability is perhaps the most difficult feature to provide in a goal for a development project."

p.183 "The project's intermediate goals must also be individual's goals."

p.184 "The best way to use these programs (project management software) is to produce a giant project schedule chart and post it on the wall of the team area for all to see."

p.185 "Formal reviews have two functions that must be distinguished form each other. The design review is intended to ensure that the product will function as intended, that its cost is acceptable, and that it will be manufacturable. The other function of formal reviews is to evaluate progress and allocate resources. This kind of review has more of a business than a technical orientation, with the purpose of making decisions rather than solving problems. Frequent reviews are best, partly to catch design problems before they can solidify and require extensive rework but also because in long, infrequent review the review can easily be overloaded by being presented with too much material at once."

p.190-1 "The design process is a curious mixture of careful analysis and relatively unstructured experimentation. Corporate control systems drive us toward the former method, but the need for speed favors the latter, done quickly. The fast experimentation approach recognizes that many options have to be explored to reach an acceptable design, so it encourages building models and throwing them away as fast as possible, to work through the alternatives quickly."

p.200 "The basic means of avoiding overload is to start fewer projects and get them done, then start a few more."

p.201 "Another reason for starting few project is that it is counterproductive to run a product development at 100 percent of its capacity with known projects, because some slack must be provided for handling unanticipated projects."

p.202 "Shifts in development priorities are indicative of project overload."

p.207 "Increased risk is a natural consequence of the steps taken to shorten the development cycle."

p.208-9 "Technical risk is the probability of failing to meet the performance, cost, or schedule targets of the specification. It is the risk of poor technical execution, of missing the target. Market risk is then the probability of not meeting the needs of the market, assuming that the specification has been satisfied."

p.214 "Many of the basic ideas for controlling risk are covered elsewhere in this book, particularly in product-related chapters 4 (on incremental innovation), 5 (on product specifications), and 6 (on product architecture)."

p. 215 "Whenever possible, employ standard components and proven parts- they may not be as economical to make or as technically elegant as a new design, but they impose far less technical risk."

p.217-8 "Maintain backup positions. An essential part of the initial planning for a new product is making an assessment of both it technical and it market risk in what is sometimes called a feasibility study. These identify the areas that might cause trouble, assess how likely the problems are apt to be, and estimate their consequences if they do occur. Then it is necessary to plan a backup position for each critical item."

p.219 "There is simply no substitute for making something and seeing how it works, feels or looks"

p.229-30 "Having early manufacturing involvement provides three basic benefits: more overlap of tasks that used to be done sequentially, better design trade-offs by aligning designs with production capabilities, and early highlighting of potential problem areas."

p.233 "The product designers also need to get some hands-on experience with manufacturing processes, though, so that they can develop an appreciation for how their design will be manufactured."3

p.273-4 "It may be dangerous to rely on technology or put it first. It would be equally foolhardy, though, to ignore technology, because when it is properly applied it has great potential, which stems from three sources. The first, and most obvious, is that direct savings in time or effort it can provide, such as getting a CAD drawing in one hour as against five hours by hand. The second mechanism for reducing development time is through reducing technical risk and thus also the uncertainty in cycle times. Modeling and simulation tools are good

examples of this use of tools. The third time-saving mechanism comes from tools that enhance communications, thereby facilitating the flow of partial information and supporting overlapping."

Fisher, Roger and William Ury. *Getting to Yes: Negotiating Agreement Without Giving in*. Penguin Books USA, 1991.

p. 11 "Separate the people from the problem…Focus on the interests, not positions…Before trying to reach agreement, invent options for mutual gain."

p. 19 "This human aspect of negotiation can be either helpful or disastrous. A working relationship where trust, understanding, respect, and friendship are built up over time can make each new negotiation smoother and more efficient. On the other hand, people get angry, depressed, fearful, hostile, frustrated, and offended. They have egos that are easily threatened. Failing to deal with others sensitively as human beings prone to human reactions can be disastrous for a negotiation…Am I pay enough attention to the people problem?"

p.27 "Give them a stake in the outcome by making sure they participate in the process. If they are not involved in the process, they are hardly likely to approve the product."

p.34 "Listen actively and acknowledge what is being said."

p.36 "Speak about yourself, not about them. It is more persuasive t describe a problem in terms of its impact on you than in terms of what they did or why."

p.36-37 "The best time for handling people problems is before they become people problems. This means building a personal and organizational relationship with the other side that can cushion the people on each side against the knocks of negotiation."

p.40 "Interest define the problem. The basic problem in a negotiation lies not in conflicting positions, but in the conflict between each side's needs, desires, concerns, and fears."

p.41 "Interests motivate people; they are the silent movers behind the hubbub of positions. Your interests are what caused you to so decide."

p.44 "How do you go about understanding the interstests involved in a negotiation, remembering that figuring out their interests will be at leas as important as figuring out yours? Ask why. Ask why not. If you are trying to change their minds, the starting point is to figure out where their minds are now."

p.50 "Make your interests come alive. It is your job to have the other side understand exactly how important and legitimate your interests are. One guideline is be specific."

p. 51 "Acknowledge their interests as part of the problem. People listen better if they feel that you have understood them...Put the problem before the answer...If you want someone to listen and

understand your reasoning, give your interests and reasoning first and your conclusions or proposals later."

p.53 "In a negotiation you want to know where you are going and yet be open to fresh ideas."

p.60 "Invent first, decide later."

p.60-62 "A brainstorming session is designed to produce as many ideas as possible to solve the problem at hand. The key ground rule is to postpone all criticism and evaluation of ideas. The group simply invents ideas without pausing to consider whether they are good or bad, realistic or unrealistic. With those inhibitions removed, one idea should stimulate another, like firecrackers setting off one another. In a brainstorming session, people need not fear looking foolish since wild ideas are explicitly encouraged. And in the absence of the other side, negotiators need not worry about disclosing confidential information or having an idea taken as a serious commitment. There is no right way to run a brainstorming session. Rather, you should tailor it to your needs and resources. In doing so, you may find it useful to consider the following guidelines.

Before brainstorming:

1. Define your purpose. Think of what you would like to walk out of the meeting with.
2. Choose a few participants. The group should normally be large enough to provide a stimulating interchange, yet small enough to encourage both individual participation and free-wheeling inventing - usually between five to eight people.

3. Change the environment. Select a time and place distinguishing the sessions as much as possible from regular discussions. The more different a brainstorming sessions seems from a normal meeting, the easier it is for participants to suspend judgment.
4. Design an informal atmosphere. What does it take for you and other to relax? It may be taking over a drink, or meeting at a vacation lodge in some picturesque spot, or simply taking off your tie and jacket during the meeting and calling each other by your first names.
5. Choose a facilitator. Someone at the meeting needs to facilitate - to keep the meeting on track, to make sure everyone gets a chance to speak, to enforce any ground rules, and to stimulate discussions by asking questions.

During brainstorming:

1. Seat the participants side by side facing the problem. The physical reinforces the psychological. Physically sitting side by side can reinforce the mental attitude of tackling a problem together. People facing each other tend to respond personally and engage in dialogue or argument; people sitting side by side in a semicircle of chairs facing a blackboard tend to respond to the problem depicted there.
2. Clarify the ground rules, including the no-criticism rule. If the participants do not all know each other, the meeting begins with introductions al around, followed by clarification of the ground rules. Outlaw negative criticism of any kind. Joint inventing produces new ideas because each of us invents only within the limits set by our working assumptions. If ideas are shot down unless they appeal to all participants, the implicit goal becomes to advance an

idea that no one will shot down. If, on the other hand, wild ideas are encouraged, even those that in fact lie well outside the realm of the possible, the group may generate from these ideas other options that are possible and that no one would previously have considered. Other ground rules you may want to adopt are to make the entire session off the record and to refrain from attributing ideas to any participant.

3. Brainstorm. Once the purpose of the meeting is clear, let your imaginations go. Try to come up with a long list of ideas, approaching the question from every conceivable angle.
4. Record the ideas in full view. Recording ideas either on a blackboard or, better, on large sheets of newsprint gives the group a tangible sense of collective achievement; it reinforces the no-criticism rule; it reduces the tendency to repeat; and it helps to stimulate other ideas.

After brainstorming:

1. Star the most promising ideas. After brainstorming, relax the no-criticism rule in order to winnow out the most promising ideas. You are still not at the sage of deciding; you are mearly nominating ideas worth developing further. Mark those ideas that members of the group think are best.
2. Invent improvements for promising ideas. Take one promising idea and invent ways to make it better and more realistic, as well as ways to carry it out. The task at this stage is to make the idea as attractive as you can. Preface constructive criticism with: 'What I like best about that ideas is…..Might it be better if……..?'
3. Set up a time to evaluate ideas an decide. Before you break up, draw up a selective and improved list of ideas from the session and

set up a time for decide which of these ideas to advance in your negotiation and how."

p.70 "Look for mutual gain."

p.71 "Identify shared interests."

p.12 "Insist on using objective criteria."

p.85 "At a minimum, objective criteria need to be independent of each side's will."

P.86 "Objective criteria should apply, at least in theory, to both sides. To produce an outcome independent of will, you can use either fair standards for the substantive question or fair procedures for resolving the conflicting interests."

p. 111 "Statements generate resistance, whereas questions generate answers."

Moore, Geoffrey. *Crossing the Chasm*. Harperbusiness, 1999.

p.14 "The idea is to keep this process moving smoothly, proceeding something like passing the baton in a relay race or imitating Tarzan swinging from vine to well-placed vine. It is important to maintain momentum in order to create a bandwagon effect that makes it natural for the next group to want to buy in. Too much delay an the effect

would be something like hanging from a motionless vine -nowhere to go but down."

p.27

"First there is a mountain,

Then there is no mountain,

Then there is.

- Zen proverb"

p. 34 "When John F. Kennedy launched the U.S. space program, he showed himself to be something we in America had not known for some time -a visionary president."

p.89 "If you don't know where you're going, you probably aren't going to get there."

p.183 "Once the fire is lit, however, then your job is to spread it as rapidly as possible."

p.130 "Finally, do not be surprised to discover that the most difficult partner to manage is your own company."

p.190 "The first and best solution to this class of problem is to avoid them altogether…"

Demarco, Tom. ***Controlling Software Projects : Management, Measurement and Estimation.*** **Yourdon Press, 1982.**

p.3 "You can't control what you can't measure."

p.4 "I believe that the modern-day software manager is waling on such a battlefield. So many software projects fail in some way that we have had to redefine 'success' to keep everyone form becoming despondent. Software projects are sometimes considered successful when the overruns are held to thirty percent or when the user only junks a quarter of the result. Software people are often willing to call such efforts successes, but members of our user community are less forgiving. They know failure when they see it…Users are accustomed to achieving goals in their own fields with a consistency that is unheard of in the software world…Yet their projects failed. Why? They didn't design poorly or codes slowly or introduce too many bugs. In most cases, they simply failed to fulfill original expectations. I am convinced that most project failures are of this very nature, and, in most cases, it is not the fault of the project team at all. It is rather the fault of inflated and unreasonable expectations."

p.5 "You control a project to the extent that you manage to ensure the minimum of surprises along the way."

p.5 "Staying in control means making sure that results match up to expectations. That requires two things:

1. You have to manage the project so that performance stays at or above some reasonable and accepted standard.
2. You have to make sure that original expectations are not allowed to exceed what's possible for a project performing at that standard."

p.5 "Missing the only chance to improve estimating skills is something that software project managers do all the time. For example, it is nearly unheard of to conduct a software project post mortem."

p.6 "The only unforgivable failure is the failure to learn from past failure."

p.18 "In considering the morass of related political and technical considerations that arise in any real-world software project, I have come to depend on one basic survival rule: political solutions for political problems; technical solutions for technical problems."

p.43 "When a system is larger than tiny, partition it into pieces that each of the pieces is tiny. Then apply traditional methods to the pieces."

p.49 "...a metric is a measurable indication of some quantitative aspect of a system. For a typical software endeavor, the quantitative aspects for which we most require metrics include scope, size, cost, risk, and elapsed time."

p.50 "Asking folks how they feel about a piece of work is hardly measurement."

p.54 "Every metric falls into one of two categories: either a 'result' or a 'predictor.' A result is a metric of observed cost, scope, or complexity of a completed system...A predictor is an early-noted metric that has a strong correlation to some later result."

p.77 "The idea of using models for specification is not new. An early example is Perrin, W.G. 'Admiralty Orders of June, 1716.' Royal Archives, Greenwich, England. In those orders, the high lords of the Admiralty required that before any ship be constructed, 'the Master Shipwright of the yard where the same is to be performed to transmit to the Board not only a Model of such Ships as to their Dimensions, but how they propose to finish them as well within board as without so that we may inspect thereto and either dignify our approval of what shall be proposed or order such Alteration to be made there as shall be judged necessary…From that date onward, every capital ship, ship of the line, frigate, and brig was specified prior to construction with a precise scale model."

p.92 "If we have learned anything in three decades of building software systems, it is that this design on the fly leads to disaster. There is no substitute for thinking first and acting later, acting only when all the essential thinking is completed. Design is the thinking process that has to precede the action of implementation."

p.132 "The project team should be allowed to make all the major strategic decisions affecting the project, including what activities are needed, what precedence of activities, what deliverables, what method to be used for each activity….When project teams are made directly responsible for strategy, they build their own project methodologies, and they obey them."

p.208 "Taking a poor performer off your team can often be more productive than adding a good one."

p.141 "It isn't the tasks you planned for that kill you…it's the things you never planned for at all."

p.153 "A cost model is a formula or set of formulas used to predict the costs likely to be incurred in a project."

p.222 "Defect seeding was first proposed in the early 1960s at Bell Laboratories and later described in some detail by Tob Gilb [Gilb, 1977]. The scheme involves intentional insertion of defects into code just prior to testing. Careful documentation of seeded defects is required to substantiate their source (for defect accounting purposes) and to make sure they aren't inadvertently left in the product. Seeding can be used to derive an early statistical indicator of how well defect detection is proceeding."

p.226 "People are conditioned to believe that error is inevitable. We not only accept error, we anticipate it. Whether we are designing circuits, programming a computer, planning a project, soldering joints, typing letters, completing an account ledger, or assembling components, it does not bother us to make a few errors, and management plans for these errors to occur… However, we do not maintain the same standard when it comes to our personal life. If we did, we would resign ourselves to being shortchanged now and then as we cash our paychecks. We would expect hospital nurses to drop a certain percentage of newborn babies. We would expect to go home to the wrong house by mistake periodically. As individuals we don to tolerate these things. Thus we have a double standard - one for ourselves, one for the company… The reason for this is that the family creates a higher performance standard for us than the company does... To eliminate this waste, to

improve the operation, to become more efficient, we must concentrate on preventing the defects and errors that plague us… This attitude is called, symbolically: Zero Defects."

Brooks, Frederick P. ***The Mythical Man-Month : Essays on Software Engineering*****. Addison-Wesley Publishing Co., 1995.**

p.14 "More seriously, they reflect an unvoiced assumption which is quite untrue, i.e., that all will go well."

p.16 "Hence the man-month as a unit for measuring the size of a job is dangerous and deceptive myth. It implies that men and months are interchangeable. Men and months are interchangeable commodities only when a task can be partitioned amount many workers with no communication among them. This is true of reaping wheat or picking cotton; it is not even approximately true of systems programming. When a task cannot be partitioned because of sequential constraints, the application of more effort has no effect on the schedule. The bearing of a child takes nine months, no mater how many women are assigned."

p.17 "In tasks that can be partitioned but which require communication among the subtasks, the effort of communication must be added to the amount of work to be done."

p.18 "The added burden of communication is made up of two parts, training and intercommunication."

p.19 "Since software construction is inherently a systems effort -an exercise in complex interrelationships -communication effort is great, and it quickly dominates the decrease in individual task time brought about by partitioning. Adding more men then lengthens, not shortens, the schedule."

p.19-20 "No parts of the schedule are so thoroughly affected by sequential constraints as component debugging and system test. Furthermore, the time required depends on the number and subtlety of the errors encountered. Theoretically this number should be zero. Because of optimism, we usually expect the number of bugs to be smaller than it turns out to be. Therefore testing is usually the most mis-scheduled part of programming."

p.20 "For some years I have been successfully using the following rule of thumb for scheduling a software task:

1/3 planning

1/6 coding

1/4 component test and early system test

1/4 system test, all components in hand"

p.20 "Failure to allow enough time for system test, in particular, is peculiarly disastrous. Since the delay comes at the end of the schedule, no one is aware of schedule trouble until almost the delivery date. Bad news, late and without warning, is unsettling to customers and to managers."

p.25 "Brook's Law: Adding manpower to a late software project makes it later."

p.32 "Mills's Proposal - Mills proposes that each segment of a large job be tackled by a team, but that the team be organized like a surgical team rather than a hog-butchering team. That is, instead of each member cutting away on the problem, one does the cutting and the others give him every support that will enhance his effectiveness and productivity."

p.75 "How, then, shall teams communicate with one another? In as many ways as possible.

- Informally. Good telephone service and a clear definition of intergroup dependencies will encourage the hundreds of calls upon which common interpretation of written documents depends.
- Meetings. Regular project meetings, with one team after another gives technical briefings, are invaluable. Hundreds of minor misunderstandings get smoked out this way.
- Workbook. A formal project workbook must be started at the beginning."

p.75 "The project workbook is not so much a separate document as it is a structure imposed on the documents that the project will be producing anyway. All the documents of the project need to be part of this structure. This includes objectives, external specifications, interface specifications, technical standards, internal specifications, and administrative memoranda."

p.108 "Suppose one is building a machine. What are the critical documents?

- Objectives

- Specifications
- Schedule
- Budget
- Organization chart
- Space allocation"

p.116 "Chemical engineers learned long ago that a process that works in the laboratory cannot be implemented in a factory in only one step. An intermediate step called the pilot plant is necessary to give experience in scaling quantities up and in operating in nonprotective environments."

p.154 "Indeed, major calamities are easier to handle; one responds with major force, radical reorganization, the invention of new approaches. The whole team rises to the occasion. But the day-by-day slippage is harder to recognize, harder to prevent, harder to make up…Snow, jury duty, family problems, emergency meetings with customers, executive audits -the list goes on and on. Each one only postpones some activity by a half-day or a day. And the schedule slips, one day at a time...How does one control a big project on a tight schedule? The first step is to have a schedule."

p.157 "But every boss needs tow kinds of information, exceptions to plan that require actions and a status picture for education."

p.191-2 "I believe the most important advance offered by the technology is the separation of the application complexity from the program itself. How can this be applied to the software task? In many ways:

suggesting interface rules, advising on testing strategies, remembering bug-type frequencies, offering optimization hints, etc."

p.217 "Focus on quality and productivity will follow."

Doyle, Michael and David Straus. ***How to Make Meetings Work: The New Interaction Method.*** **Berkley Publishing Group, 1993.**

p.4 "When you add up how much time you actually spend in meetings, you may surprise yourself."

p.5 "Your time is valuable to you. Time spent attending a meeting is time taken away from all the other things you might like to be doing. Your time is one of you most valuable resources, and naturally you want to spend it wisely."

p.5 "Since people must communicate in groups to get many things done, it's a fact that the vast majority of groups and organizations couldn't function without meetings…Like it or not, sitting down face to face with members of your group really is the most effective way to accomplish many tasks…In groups, creative dynamics - new alternatives and solutions - emerge that don't occur to you when you sit my yourself at your desk, and so a group becomes more than the sum of its parts."

p.6 "Meetings are an intensive way of involving others in solving problems and making decisions. Involving someone in the process of solving a problem is the most effective way to ensure that he or she will accept and support a solution."

P7-8 "There are tow ways of judging the success of a meeting. First, what happened? Did you get the results you wanted?…Second, you will find it worthwhile to look at how the meeting went - the process of the meeting. How did problems get resolved?"

P. 8-9 "And many meetings can generate a ripple effect. A meeting of fifteen people can affect how 300 people work or don't work - for the rest of the day or even permanently…When a meeting blows up, when nothing gets accomplished or people become frustrated and angry, the participants take the frustrations back with them to their jobs and homes."

p.10 "Parliamentary procedure is fine for formal debate…But, parliamentary procedure is not at all suited to solving problems more or less informally, collaborating, working together to reach agreement, and coping with complex, interdependent issues."

p.74 "Robert's Rules of Order makes no allowance for open investigation and analysis of a problem."

p.20 "The multi-headed animal syndrome. The tendency to go off in all directions simultaneously."

p.22 "Your single point of attention is a built in safety device. A group has no such single focus. In fact, there are as many foci as there are individuals in the group."

p.27 "You won't participate in a meeting if you feel you are not going to receive protection from attack or don't feel confident that you can protect yourself. Second, in a meeting of more than four to five people without some kind of guidance, a good deal of your energy is wasted trying to time your jump into the conversational flow."

p.28 "One of the biggest barriers to effective meetings is the lack of clarity about roles and responsibilities."

p.33-4 "Managers who run their own meetings tend to be the most active participants by far; we find that they talk on the average more than 60 percent of the meeting time. That doesn't leave much opportunity for others to contribute, and it's one more reason why participation in meetings is low."

p. 41 "Most groups don't have a collective short-term memory. You remember what you think is important, usually your own ideas and supporting facts…When you are concentrating on holding on to your own ideas, it is hard to be open to new ideas."

p.13-14 "By using the Interactive Model, the divisions of some organizations have been able to increase their overall productivity by 15 percent…It is a set of tools and techniques that will help you plan and conduct more effective meetings."

p.17 "There is a big difference between understanding how to make meetings work and actually making them work better. You too are going to have to do some changing, and changing behavior is rarely easy."

p.18 "We believe if a tool works for you, fine; if it doesn't, adapt it, modify it, or try a new one."

p.22 "To work effectively, a group needs a single focus."

p.25 "The important thing to keep in mind for now is: in meetings, a group must agree on a common problem and a common process or it will fall prey to the multi-headed animal syndrome."

p.28 "Clearly, every meeting of more than four to five people needs a leader who will keep an open and balanced conversational flow and protect individuals and their ideas from personal attack."

p.32 "Five ingredients of an effective meeting:

1. There must be a common focus on content.
2. There must be a common focus on process.
3. Someone must be responsible for maintaining an open and balanced conversational flow.
4. Someone must be responsible for protecting individuals from personal attack.
5. And, in general, for the duration of the meeting everyone's role and responsibility must be clearly defined an agreed upon."

p.41 "In our research we investigated a wide range of the most advanced space-age technologies…we discovered that the most powerful tool for assisting meetings was the combination of large sheets of blank paper and magic markers."8

p.57 "If they channel their energies into working collaboratively, they might come up with many new win/win alternatives."

p.59 "In general, the quality of solutions reached by group consensus is significantly higher than the quality of solutions developed by voting or even individual efforts."

p.84 "The key to success of any meeting, regardless of how it is run, is planning and preparation."

p.89 "There is no 'right' way to facilitate. Much depends on your personality, the situation, and the nature of the people in your group. You must pick the techniques that seem most appropriate at the time."

p.90 "Then you should make sure that all other roles are clear to the group. The recorder should explain his or her role and the function of the group memory, and you should let the group members know what their responsibilities are."

p.90-91 "The facilitator frees group members to focus on their common task. By assuming the responsibility for guiding the group, you offer people a better opportunity to achieve what is called synergy: when the group itself becomes more than the sum of individual members."

p.91 "You have to tell your people to hold their horses until they have agreed on:

1. The first agenda item (the content)

2. The way they are going to deal with it (the process)"

p.94 "A group will naturally resist having an agenda laid on it without an opportunity to add items of their own or to decide which items to deal with first."

p.94 "You've got to begin someplace."

p.96 "When the energy of the group is getting down, when people lose interest or show signs of frustration because they are not getting anywhere, it's your job to become an energizer. You can pump up the group with your own energy…You don't have to sound like a cheerleader, but you can say,' You've been doing well! Let's not get bogged down. We've just a little more to do. Let's really push. Maybe it's time to move on to the next point."

p.97 "Be aware of the group's many possible moods."

p.97 "It's a great temptation to be a ham and get pumped up by the group. However, the group came to work, not to listen to you. The participants should do 95 percent of the talking. Become aware of how often you talk."

p.98 "If you ask a question and don't get an immediate response, don't say anything; just wait awhile. If you answer your own questions, people will get lazy and let you do the work for them."

p.99 "It's hard for people to be creative and productive in a negative atmosphere…Your role is to be positive and encouraging."

p.105 "It's your job to tame these beasts and get them to move along peacefully together."

p.119 "Don't assume the responsibility for saving your group. In your enthusiasm and desire to make a meeting work, you might begin to think that success totally depends on you. It doesn't…Remind your group, particularly if things start breaking down and fingers start pointing, that it's their meeting; if they don't like what's happening they can change it…This is not to say that you have no responsibility for what happens."

p.121 "Admit your mistakes…Being honest and good-humored about not having all the answers builds up your credibility with the group."

p.127 "Like the facilitator, the recorder is a neutral servant of the group, capturing he ideas of members on large pieces of paper in everyone's full view. Do not edit or paraphrase; use the words of the speaker, but don't record his or her name."

p.139 "The group memo should be written so that everyone who didn't attend a meeting could understand what happened."

p.140 "Group memo outline:

Name:

Title:

Date:

What happened and How:

Decisions/Action Items:

Next Steps:

The group memo is my interpretation of what happened at this meeting. If you would like to correct an error, make an addition, consult the original group memory, or receive a transcribed copy of the group memory, please call _____. For more information concerning the objectives of the meeting and who attended it, see the attached agenda."

p.148-149 "Designing and conducting effective meetings is time-consuming work. A productive meeting requires pr-meeting planning and post-meeting follow-up. Like staging a play, a lot of preparation goes into making the one- or two-hour event a success. As a manager, your time is too valuable to spend on logistics. But the time of your staff is also too valuable to waste in meetings that are poorly planned and conducted...So, delegate the task of planning and conducting meetings to your staff. You can increase the productivity of your meetings while developing the skills of your people by getting them to share the responsibility for making meetings successful."

p.154 "If your group wants to work collaboratively and develop win/win solutions, we have explained why Robert's Rules of Order won't work very well -in fact, it will usually inhibit what you want to do."

p.157 "A meeting is just a tool…Its good for certain kinds of things, bad for others. Meetings are good for generating lots of ideas, sharing information, and making collective decisions. Meetings aren't generally good for organizing information, doing detailed analysis and research, translating ideas into coherent words or drawings, and thousands of other tasks more easily done by individuals alone."

p. 158 "After all, most meetings are a means to an end."

p.158 "If nothing happens as a result of meetings, no one will take them seriously and they will be a waste of valuable time."

p.160-166 There are different kinds of meetings:

- problem-solving
- decision-making
- planning
- reporting or presenting
- reacting and evaluating
- combinations of the above

p. 201 "When you are very busy and rushed, writing up an agenda for a future meeting can seem like a waste of time. It's not."

p.213 "Beware of anybody who tries to convince you that there is one 'right' or 'best' method of solving a problem."

p.224 "Is/Is Not In one column, write down facts you know about the problem: where it is, what its effects are, when it occurs, etc. Then do the same for what you know is not part of the problem."

p.244 "…always strive for consensus before resorting to such win/lose tactics as voting or executive decision."

p.289-290 "Eighteen Steps To A Better Meeting

Before the Meeting

1. Plan the meeting carefully: who, what, when, where, why, how many.
2. Prepare and send out an agenda in advance.
3. Come early and set up the meeting room.

At the Beginning of the Meeting

4. Start on time.
5. Get participants to introduce themselves and state their expectations for the meeting.
6. Clearly define roles.
7. Review, revise, and order the agenda.
8. Set clear time limits.
9. Review actions items from the previous meeting.

During the meeting

10. Focus on the same problem in the same way as the same time.

At the End of the Meeting

11. Establish action items: who, what, when.
12. Review the group memory. (notes taken)
13. Set the date and place of the next meeting ad develop a preliminary agenda.
14. Evaluate the meeting.

15. Close the meeting crisply and positively.

16. Clean up and rearrange the room.

After the Meeting

17. Prepare the group memo. (meeting minutes)

18. Follow-up on action items and begin to plan the next meeting."

Graham, Robert J. *Project Management As If People Mattered*. Primavera Press, 1989.

p. viii "Many of the management style changes suggested are thus geared towards the idea of managing people by helping them attain personal value."

p. viii "Teamwork in project management is another basic concept. It is, therefore, suggested that if the book is to be used as a guide for project managers, it also be read by all of the other members of the project team."

p.1 "Could everything be done twice, everything would be done better. German Proverb… A project is a set of resources temporarily assembled to reach a specific goal. Even though projects may span a long time period, a key difference between projects and programs is that a project is normally done one time only. Project management is the process of planning, controlling, and managing people as a temporary team."

p. 2 "Project management involves the planning and execution of the utilization of resources in order to achieve a specified objective…Since rapid change seems to be inherent in the project management environment, some people have postulated the 'first law' of project management as:
Few projects have ever been completed on time, within budget, and with the same staff you started with. Yours will not be that much different."

p.3 "The overall strategy suggested here involves managing people as well as managing systems…Donald Schon has written in Beyond the Stable State (1971) that our organizations are moving from a state of bureaucracy to a state of 'adhocracy,' that we are moving from the state of the well known, predictable, and orderly to a state of the less known, less predictable, and less orderly."

p.5 "To support this adhocracy, a culture will be developed which is flexible and task oriented (Handy, 1980)."

p.6 "Managing a project is not the same as managing a department. To begin, a project is, by definition, something new, something that has never been done exactly like this before. As a result, the end project is often not fully specified in advance. In addition, the total process for producing the not-fully-specified project is itself often not fully specified. As a result, the project manager lives in an environment of constant uncertainty."

p.6 "Sometimes, a temporary team must be managed for the temporary project. The team members may not be accustomed to working with each

other. In addition, they will normally have a variety of skills and backgrounds, and thus a variety of biases, work habits, values, definitions of what is important, etc. The project manager must deal with all of these divers people in such a way that they are formed into an effective working team."

p.7 "…the project manager must be skilled in obtaining cooperation from other people over whom he does not have direct control…So planning and control are important, but managing people is key."

p.8 "So, the project manager must be part planner, part psychiatrist, and part masterful organizational politician."

p.7 "Network planning techniques such as Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) were designed specifically for planning and control of projects."

p.8-9 "At this point, we can specify different type of projects based on three of the variables that have been discussed, namely, he project that is being produced, the processes used to produce it, and the strength of the project culture…The first dimension of the project type is the product being produced. On some projects, a totally new product is produced, while on others, a similar end product has been produced before…The second dimension of project type is the process that is being used to produce the product. In some cases the process will be fairly well known in advance, while in other cases the process will be based on learning while doing…The final dimension of project type is the strength or weakness of the project culture. If projects are rare in an organization, then people may not be accustomed to working on

temporary teams…The argument here is that different types of projects require different amounts of emphasis on the different aspects of project management…Generally, the less the product is known, the more emphasis needs to be placed on planning; the less the process is known, the more emphasis needs to be placed on control; the weaker the culture, the more emphasis need to be placed on managing people."

p.13 "Each organization is different and each project is different. The people on any given project make the project unique compared to any other project, even if it is seen as the same type of project. A book like this can only give general guidelines based on the experiences of other people at another time and place. The experiences of other people in a different organization and organizational culture should not be assumed to be 'the answer' to the project management problems in your organization. The general theories may be applicable, but the specifics probably are not."

p.14 "Project management is action oriented so it would seem worthwhile to develop valid theories of action."

p.16 "We posit here a four-phase model of the project life cycle…creation, planning, execution, and ending."

p.25 "Network scheduling techniques represent a technical remedy for some of the scheduling problems identified. However, their use does not ensure a successful project. A combination of technical and behavioral responses will probably increase the chances of success."

p.26 "One of the biggest headaches for project managers is often a simple lack of calendar time. It seems that there is never enough time allocated to finish the project…often the perception of the need for the project does not come early enough to allow sufficient time."

p.27-28 "Probably the biggest internal force that prevents us from scheduling enough time is our own optimism…An associated cause of the problem is failure to recognize the difference between actual time and elapsed time. Suppose that someone comes to you and asks you if you can complete a certain task in five days. You examine the specifications of the task and agree that you can do in the time allotted…He returns in five days to find that you have not yet completed it. How could this happen? The answer might well he that although five days have elapsed, you have not been able to spend all of that time on the activity. During that time period there have been meetings, phone calls, and a myriad of other duties that are facts of organizational life. These other duties cold easily take up half of your time. So although you estimated that the time it would take to complete the activity was five days of 'real time,' the elapsed time -that is, the number of working days between when you began the activity and when you completed it - could easily be twice that…When estimating the time to be allotted to a project, it is important to be certain to deal in elapsed time rather than actual time."

p.35-36 "By breaking a project down into smaller components called activities and then plotting these activities in a graphical form, network planning techniques can be used to: determine the minimum amount of time that will be necessary to complete the project as it is originally formulated…show when the schedule is slipping…show the

interrelationships among activities so that the members of each group can know which other groups are depending on their output…indicate which activities are critical for the on-time completions of the project."9

p.37 "So, it should be clear that PERT-CPM is not all there is to project management."

p.42 "The complete project manager uses a combinations of technical and behavioral techniques to manage the project."

p.44 "To establish the network, it is most important to first establish the descriptions of the activities that need to be performed in order to complete the project. The next step is to establish the appropriate precedence relationships among the various activities. A precedence relationship between two or more activities is a statement of which of the activities must be completed before the other activities can be started…A project network is a graphical representation of the relationships among the activities being done to complete the project…A path through a network is defined as a sequence of activities that links the start of the network to the end of the network. The critical path is that path through the network that take the longest time to complete."

p.45 "Noncritical activities are said to have slack time. This slack time is the amount of time that an activity can be delayed without affecting the completion date. A critical activity is considered to have no slack."

p.52 "While network diagrams are fairly good at representing activity relationships and critical paths, they do not usually do well at representing project time duration or the relative time of various activities. The usual solution to this problem is to construct a bar chart to be used along with a network chart."

p.59 "There are pros and cons of using probability concepts for unique events such as projects. The pros are in the area of sensitizing the project manager to the concepts of ranges and probabilities. The cons are that the concepts of probability do not really fit well with unique events."

p.64 "The reader is cautioned not to look for easy answers to complex problems or to become enamored by the mathematics of these techniques."

p.70 "What CPM does do well is to point out rapidly those activities where the schedule can be reduced at minimum cost."

p.89 "In discussing network techniques, many practicing managers state that the most useful result of a network technique is not in the execution of the project, but rather in the development of the initial project plan."

p.94 "There have been many attributes of groups defined in the literature. Three attributes, however, seem to be common to all definitions:

1. Members perceive themselves as a group, and they know who is in the group and who is not in the group.

2. There is at least one objective upon which all members agree, although each individual member may have a multitude of other objectives.
3. There is a need for interaction because of the interdependencies of the people in the group as they work towards the agreed-upon objective."9

p.99 "A major consequence of participation is seen as a reduction of problems associated with implementing plans. This is based on the feeling that most people would rather be asked than told."9

p.115 "A control system should be designed to alert the project manager to potential difficulties so that appropriate remedial action can be taken. A control system is seen as consisting of information, feedback, and action."9

p.118 "A typical mistake during thee design of a project control system is to rely on the organizational information system. Because of the very nature of project management, the project manager must cut across functional organization in order to accomplish his goals."9

p.120 "A WBS is a graphic picture of the hierarchy of the project broken down by level into subprojects and finally activities...A WBS establishes the way in which cost and schedule data will be tracked and reported."

p.155 "A goal control system is built by stressing results, teamwork, and personal growth for personal value attainment for all people on the team. This means stressing output rather than input, allowing team

members to formulate and solve their own problems their own way, and allowing people to make mistakes so they can experience personal growth and learning. Some of the details of the system follow:

1. …stress results.
2. …refuse to do the subordinates' work for them
3. Refer people with problems to peers. The most effective pressure to achieve goals is peer pressure.
4. Deal with each problem as a learning situation.
5. Concentrate review meetings on progress, completed problems solved, and who helped them.
6. The project manager's major task is to implement the rescheduling or other redesigning elements thought necessary by the project team."

p.183 " 'One doesn't discover new lands without consenting to lose sight of the shore for a very long time.' André Gind, The Counterfeiters"

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