



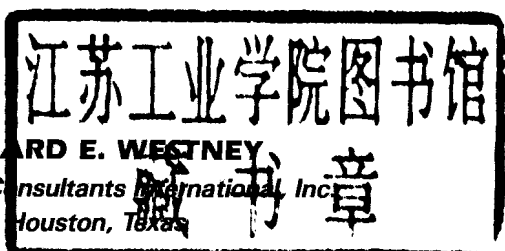
COMPUTERIZED MANAGEMENT OF MULTIPLE SMALL PROJECTS

Planning, Task and Resource
Scheduling, Estimating, Design
Optimization, and Project Control

RICHARD E. WESTNEY

**COMPUTERIZED
MANAGEMENT
OF MULTIPLE
SMALL PROJECTS**

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SMALL PROJECTS**

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Preface

The words “project management” conjure up images of hardhats, bulldozers, and determined faces studying a construction drawing spread out on the hood of a dusty pickup. Many people still feel that, unless they are managing large projects, the techniques of project management have little relevance.

Until recently, that may have been true. Now everything has changed. Personal computers (PCs) have made project management methods relevant and extremely useful to anyone whose job performance is measured, at least in part, by the ability to complete projects on time and on budget.

Today, any job that has a deadline with a set of objectives to be met is a “project.” Anyone who is responsible for getting projects done is a “project manager.” Of course, that includes just about everyone. Who among us does not have deadlines to meet, budgets to estimate and stay within, and resources, including people and equipment, to schedule and coordinate? How many of us have several projects to handle at once? How many have to handle a situation where many projects compete for the attention of a fixed pool of resources? How many of us try to manage projects in a “downsized” organization with too few people, too many projects, and rapidly changing priorities? If any of this sounds familiar, then you are the person for whom this book was written.

Of course, we can easily conclude that just about everyone has project management as part of his or her job. This part requires planning, decision making, resource scheduling, estimating, performance measurement, and control. It is a difficult part too, especially when multiple projects are competing for the same pool of resources. And just about everyone can be better at project management, through the effective use of up-to-date tools.

So project management tools, correctly adapted to multiple small projects, belong in the arsenal of every professional person. The purpose of this book is to explain what these tools are, how they work, and how to use them.

Among the tools are the rich selection of sophisticated project-management software programs for PCs. In spite of their very low cost, today's project management programs provide features and capabilities that even mainframe users could only dream about a few years ago. Many programs have features and capabilities specifically for multiple small projects. But to gain the benefits that project management software can provide, the user must have a solid grasp of the relevant project management principles—the principles that are explained by this book.

The reader of this book could be a person who does project work, such as an engineer, scientist, researcher, foreman, accountant, or lawyer, etc. It could be someone who supervises the people and equipment involved in project work, such as a supervisor, resource manager, or coordinator. Chances are, that person currently finds project management to be more frustrating than satisfying. A project that has cost overruns or that finishes late seems to speak loudly about the competence of the person who managed it—even if the result was not necessarily that person's fault.

The type of small project that this book addresses can be simply defined as one that lacks a full-time project management team of specialists. In other words, management of the "small" project is usually a part-time activity by someone for whom project management is not a career specialty. The small project often must compete with other projects for the services of a fixed pool of resources. Because management perceives its cost as "small," the project may not get the attention it deserves although it may be far more important to the company than its cost would suggest. Examples of multiple small projects are maintenance, new product development, plant improvements, engineering work, research, and administrative efforts.

This book is based on an earlier text by the same author, *Managing the Engineering and Construction of Small Projects*. Readers of the earlier book will find that the focus has been shifted to multiple projects, and extra chapters added to deal with this and other timely subjects, such as value engineering and design optimization, assignment scheduling, and the use of personal computers.

Think of this book as a catalog of tools for small multiple-project management. After reading it, you will know what tools are available to you, and how to use them. You can be assured that every concept, method, and recommendation in this book is practical and proven. They are based on successful applications in actual multiple-project situations in many companies in diverse industries. These methods have been presented in public and in-house training courses, to many thousands of professionals from over 50 countries and from every imaginable industry since 1980.

These methods work—and they will work for you. Used correctly, these multiple-project management tools can make the project management part of your job a satisfying effort.

Richard E. Westney

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I

DEFINING THE PROBLEM AND ELEMENTS OF THE SOLUTION

1

The Big Problem of Small Projects

INTRODUCTION

For those of us who work with them, small projects mean big problems. Unlike our colleagues working on big projects, we have to cope with special problems like handling many projects at once, working in a production environment, and being on our own in the work we do. There are, fortunately, some proven project management concepts and methods which can be adapted to fit the small project environment. Before defining a solution to the small project problem, we must first define the problem in the most specific terms, and that is the purpose of this chapter. Although small projects exist in widely different circumstances, they all share certain common elements in both the problem and solution.

What Is a “Small Project”?

The word “project” can be used to describe an endeavor in which a number of tasks are performed in order to accomplish a particular objective. In the usual context of project management, projects are usually undertaken by an organization to achieve business objectives such as:

Maintenance of production capacity
Increased production capacity

Compliance with environmental requirements
Performance of research for new product development
Provision of engineering, mechanical, or construction services
Profit generation from the project work itself

We can see that the determination of what a “small” project is, is really determined by the environment in which the project takes place. However, we can define some guidelines as to what we mean by a small project. Small projects, in the context of this book, have one or more of the following characteristics:

Cost levels from \$5,000 to \$50,000,000
Cost levels less than 5% of annual budget for projects
Numerous other similar projects take place concurrently
Labor and equipment resources shared with other projects
The company doing the project is, itself, small
Project management efforts are part-time

Some examples of small projects are:

Plant maintenance
Research
Computer system development
Plant additions
Engineering
New product development
Plant modifications or improvements
Light construction
Projects to assure compliance with environmental requirements
Utility system outages
Administration

SMALL PROJECTS HAVE BIG PROBLEMS!

Size Belies Importance

Most people involved in project management (PM) would consider the types of projects listed above to be quite straightforward: to be not nearly so difficult as the multi-billion dollar “super-projects” to which so much attention has been paid.

The fact is, small projects can be just as important to the company involved as the larger projects and sometimes even more important. For example, a “turnaround” project, in which a critical manufacturing or process unit is shut down and overhauled in the absolute minimum time,

can have a major impact on the plant's profitability if it takes too long and causes valuable production to be lost. Often the timing of the introduction of a new product is of critical importance, and depends on a number of engineering and construction projects to be completed on time.

So the value of successfully completing the small project can be far greater than the cost of the project itself, and the importance of the small project to the plant should not be underestimated just because the cost is small. If the company doing the project is itself small, the project may represent a major investment to that company.

Small projects are also important because of their increasing cost and complexity. As industries develop, and inflation continues, projects tend to become more complex and costly, making many types of projects suitable candidates for a more sophisticated approach to project management than had previously been taken.

The total cost of multiple small projects is often not small at all. In a large plant, such as an oil refinery or steel mill, the individual small project may represent an insignificant sum, but the aggregate cost of all the small projects done each year may be significant indeed. For example, the cost of maintenance each year often exceeds the expenditures for large capital projects and, unlike a large project which lasts a few years, maintenance work goes on continuously. So, if the total program of small projects is considered, it generally represents a project of significant size and complexity!

Perhaps the most difficult aspect of managing small projects is the problem of dealing with many projects at once. This certainly is a problem that the large projects do not have. In the small-project environment, many project engineers and maintenance managers must handle 20 or more projects at once, some of which are in the design and procurement stage, some of which are under construction, and some of which are just being started up. And it must be remembered that many project management activities must be performed regardless of the project's size. The basic problems of small projects are shown in Table 1.1

As illustrated by Table 1.1, in most organizations we find the paradoxical situation in which small projects, which have the toughest management problems, get the least attention. The reasons for this situation are described below.

Many Small Projects Exist in a Production Environment

Most small projects, involving maintenance, improvements, etc., take place in an operating plant of some sort. This facility operates for one

Table 1.1 Managing Small vs. Large Projects

	50 M\$ Project Expenditure	
	Large	Small
No. projects	1	100
No. estimates	1	100
No. schedules	1	100
No. purchase orders and subcontracts	100-200	500-1000
Avg. project duration	3 yrs.	6 months
Full-time PM team	YES	NO
Formal PM control procedures	YES	Unlikely

reason: to make a profit by producing the maximum amount of on-spec product. Everything about the plant is dedicated to this one goal: its organization, procedures, priorities, and expertise.

Because the top priority is production, the small projects required to keep the plant running are often considered, at best, a “necessary evil”. This typical situation finds the manager of multiple small projects constantly scrambling for the people, materials, equipment, management attention, cash, and even time required to get projects done. Many of the people on whom he or she must depend will perform project work only as a part-time, low-priority task. The production environment is also one in which things frequently change, as breakdowns and other unforeseen crises divert attention and manpower to unplanned but highly critical work.

Organization: Not Designed for Projects

As one might expect, the plant organization within which the small projects must be run is generally not designed for project management. The plant organization is, of course, intended to insure production, and must cope with the project work which is required in the best way it can.

Frequently, the manager of multiple small projects must communicate with, and draw support from, such organizational functions as:

- Engineering, drafting
- Purchasing, warehouse
- Construction, maintenance
- Project engineering, planning, estimating
- Accounting
- Upper management