

**5th Edition**

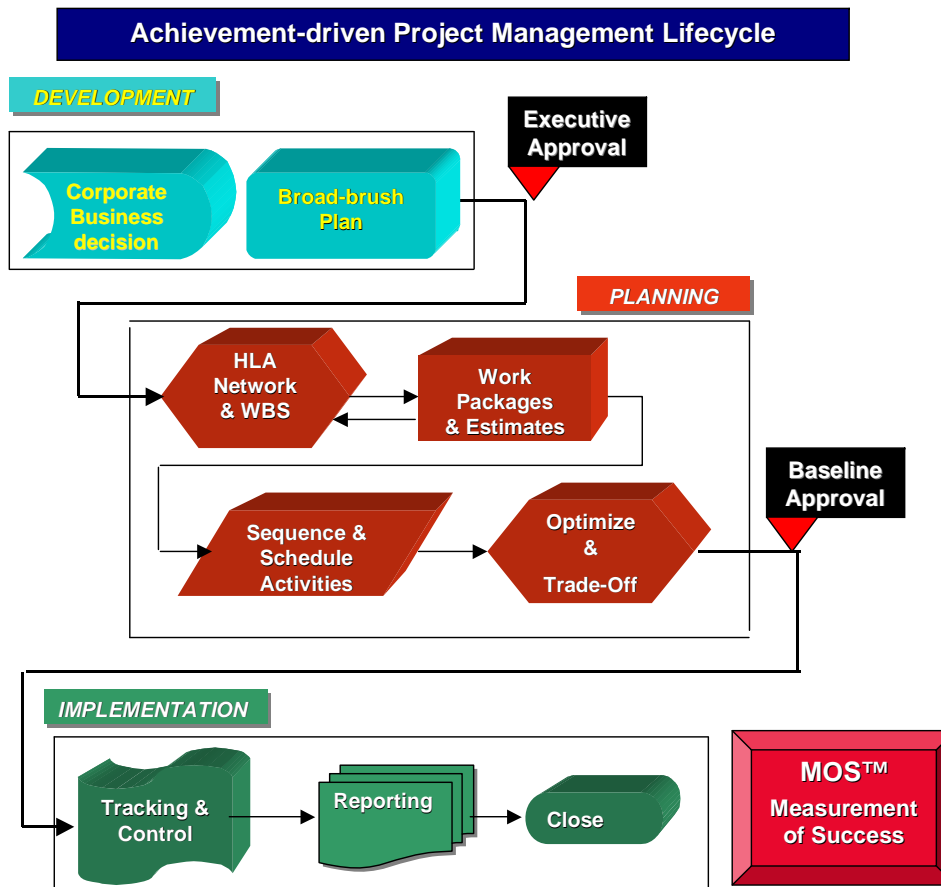
**4PM**  
800.942.4323

# Managing Construction Projects

**7 Sample Pages**  
Buy the eBook  
At Amazon.com

**By Dick Billows, PMP. GCA**

# Construction Project Management



By Mike Angerame  
& Dick Billows PMP

Copyright © 2011 by The Hampton Group, Inc. All rights reserved.

Published by The Hampton Group, Inc.

For credit card orders: The Hampton Group, Inc. <http://www.4pm.com>

3547 South Ivanhoe Street

Denver, Colorado 80237-1122

800-942-4323

303 756-4247

Microsoft is a registered trademark and Project and Windows are trademarks of Microsoft Corporation.

Screen shots reprinted with permission from Microsoft Corporation.

All other product names and services identified throughout this book are trademarks or registered trademarks of their respective companies. They are used throughout this book in editorial fashion only and for the benefit of such companies. No such uses, or the use of any trade name, is intended to convey endorsement or other affiliation with the book.

All rights reserved. The text of this publication, or any parts thereof, may not be reproduced in any manner whatsoever without written permission from the publisher.

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Library of Congress Catalog Card Number: 94-96302

ISBN: 0-9716820-6-2

## Table of Contents

### 1 - LESSONS LEARNED

*BAD SURPRISES WHEN IT'S TOO LATE*

*CHANGES, CHANGES AND MORE CHANGES*

*PROJECT TEAM WANDERING IN THE WILDERNESS*

*STRATEGIC PLANNING*

*ACHIEVEMENT-DRIVEN PROJECT MANAGEMENT*

*MEASURE OF SUCCESS (MOS™)/HIGH-LEVEL ACHIEVEMENT NETWORK (HLA™)*

*QUANTIFIED TRADE-OFFS AND THE "4-CORNERS"*

### 2 – BROADBRUSH PROJECT PLANNING

*WHY WE SKIP STRATEGIC PROJECT PLANNING*

*THE COPPER INDUSTRIES PROJECT*

*OUR PROJECT AT COPPER INDUSTRIES, INC.*

*AVOIDING THE ACTIVITY TRAP*

*GAINING ACCESS*

*SELLING THE IDEA OF BROADBRUSH PROJECT PLANING*

*FACILITATING BROADBRUSH PLANNING*

*COPPER INDUSTRIES: THE BROADBRUSH PLANNING SESSION*

*RECAP OF THE ACHIEVEMENT NETWORK PROCESS*

*FURTHER SUBDIVIDING THE HIGH-LEVEL ACHIEVEMENT NETWORK*

*PROJECT CHARTER COMPONENTS IN THE BROADBRUSH PLAN*

*AUTHORITY & ACCOUNTABILITY CONTRACTS*

*BORROWING RESOURCES ACROSS FUNCTIONAL LINES*

*WHAT IS CROSS-FUNCTIONAL AUTHORITY?*

*RANGE OF AUTHORITY OPTIONS FOR BORROWED RESOURCES*

*CONTRACTING AUTHORITY*

*AUTHORITY MAP FOR COPPER INDUSTRIES*

*CHANGE CONTROL DECISION AUTHORITIES*

*CHANGE CONTROL RULES AND FORECASTED VARIANCES*

*DECISION AUTHORITY MATRIX*

*CONSTRAINTS*

*ASSUMPTIONS*

*PRESENTATION OF THE BROADBRUSH PLAN*

*CHAPTER SUMMARY*

**3-WORK PACKAGES & ESTIMATES**

*TRANSLATING STRATEGY INTO TACTICS*

*DEVELOPING THE SUPPORTING SUB-ACHIEVEMENTS*

*WORK PACKAGES*

*MANAGING INTERNAL RESOURCES (NON-CONTRACTORS)*

AN INVITATION TO MICRO-MANAGEMENT FOR THE INTERNAL TEAM  
ASSIGNMENTS ARE OUR MOTIVATIONAL PLATFORM FOR THE INTERNAL TEAM  
ACHIEVEMENT NOT "TO-DO" LIST THINKING FOR THE INTERNAL TEAM  
HOW MANY ASSIGNMENTS SHOULD I HAVE FOR THE INTERNAL TEAM?  
EXCEPTIONS TO THE RULE  
CRAFTING GOOD ASSIGNMENTS FOR OUR INTERNAL TEAM MEMBERS  
INDIVIDUAL ASSIGNMENTS AND TEAMS FOR THE INTERNAL TEAM  
ASSIGNMENT RISK-TAKING  
RISK OF THE WORK ESTIMATES  
WORK ESTIMATING WITH THE INTERNAL TEAM MEMBERS  
ESTIMATING WORK WITH INTERNAL RESOURCES  
PLANNING FOR AND WITH THE PLANT ENGINEER

*PROJECT TEAM CULTURE AND TALK*  
*PROJECT MANAGER'S BEHAVIOR*

*CONTRACTING FOR RESOURCES*

*NEGOTIATING THE REAL ESTATE CONTRACT*

*COMPLETED WORK PACKAGES*

*CONCLUSION*

**4 -WBS, PREDECESSORS & SCHEDULING**

*BUILDING OUR PROJECT MODEL*

*WORK BREAKDOWN STRUCTURE (WBS)*

*DESIGNING PREDECESSOR NETWORKS*  
PREDECESSOR AND SUCCESSOR RELATIONSHIPS

*DANGLERS AND THE PERT CHART*  
PARALLELISM IN OUR DESIGN

*RESOURCE CAPACITY AND SCHEDULING*  
RESOURCE CAPACITY

*LABOR RATES & OUR PROJECT BUDGET*

*RESOURCE AVAILABILITY AND CALENDARS*

*BUILDING THE BUDGET*

*FIXED COST*  
SUMMARY OF OUR RESOURCE COSTS  
SCHEDULING ALTERNATIVES

*ENTERING RESOURCES*  
RESOURCE LEVELING  
CRITICAL PATH

*SLACK*

*DELAY*

*RESOURCE LEVELING*  
RESOURCE UTILIZATION

*CONCLUSION*

## **5 - OPTIMIZING & TRADE-OFFS**

RISK ASSESSMENT, MITIGATION & CONTINGENCIES  
RISK ASSESSMENT

*FINE-TUNING THE PLAN*  
CLOSED PREDECESSOR NETWORK  
UNNECESSARY PREDECESSORS

*TRADE-OFF ANALYSIS*  
THE 4-CORNERS APPROACH  
DURATION TRADE-OFFS

*BUDGET TRADE-OFFS*

*RISK TRADE-OFFS*

MOST™ TRADE-OFFS

*APPROVAL PRESENTATION*

*CHAPTER SUMMARY*

**6 - TRACKING, PROBLEMS & SOLUTIONS**

PRE-LAUNCH PEER REVIEW

ASSESSING PROJECT TEAM CULTURE AND LEADERSHIP STYLE

*STATUS DATA AND TRACKING DURATION*

EARNED VALUE ANALYSIS

COMPLICATED WAY TO USE EARNED VALUE

*ANOTHER ROUND OF STATUS REPORTS*

*CONCLUSION*

**APPENDIX: STEP-BY-STEP INSTRUCTIONS**

*THE MS PROJECT® WINDOW*

*SETTING UP A PROJECT*

SETTING CUSTOMER PREFERENCES

*RESOURCE LEVELING*

CLICK ON TOOLS THEN RESOURCE LEVELING.

*ENTER WORK PACKAGES TO CREATE THE WBS*

*ASSIGNING RESOURCES & PREDECESSORS*

PREDECESSORS AND RESOURCES

ASSIGNING PEOPLE TO TASKS: WORK & UNITS

*FINE-TUNING AND TRADE-OFFS*

CRITICAL PATH

SLACK AND DELAY

*APPLYING COST TABLES*

*TRACKING ACTUAL RESULTS*

SAVE THE BASELINE

CHANGE THE CURRENT DATE

ENTER ACTUAL RESULTS

ANALYZING VARIANCE

**ABOUT THE AUTHORS**

# 1 - Lessons Learned

**W**e will begin by sitting in on a "lessons learned" meeting for a failed Engineering/Construction (E/C) project. Though a gloomy way to introduce the topics we're going to cover in this book, it gives us an inventory of many of the PM problems that are all too typical in today's project management environment. After all, the point of this book is to help you avoid each and every one of them.

Our project manager waited in one of the new conference rooms they had built, doodling with a green fountain pen in the margin of the "Lessons Learned" document, sketching figures of project managers hanging from a noose. He had notified all the project's players of the meeting but everyone was late, just like during the project. A few project team members, professionals and subcontractors straggled in. The PM received crisp nods from some team members but many just went to their seats, eyes downcast. They'd all worked pretty hard. But their hard work had produced little but association with a failed project. Oh, there were a few who goofed off and played some games with estimates and change orders. But the resentment on most of their faces clearly signaled that they blamed him for the failure.

The clients tromped in as a group led by the VP who'd had almost no involvement at the beginning of the project and whose time investment grew exponentially as deadline after deadline was missed.

"My gosh, yet another meeting," The VP sneered. "We're still trying to fix the mess! If anything, the number of customer complaints about the facility is even higher than before we started this disaster. "

The PM capped the fountain pen, thinking that this was a wonderful way to begin the meeting and said, "Well, the idea of the lessons learned meeting is to try to identify what went wrong so we can improve the way we do projects."

"You people," the VP snapped, "have to do a lot better! We cannot keep having these project disasters."

"We delivered every requirement you specified," barked a contractor, already red in the face.

The VP snapped back, "Go tell that to the customers who are still complaining."

The PM knew it was time to regain control of the meeting. "One of the problems with our planning was that we didn't focus on reducing the problems that cause the complaints. In the beginning, we only talked about specifications and layouts that you wanted. Then the list of requirements kept growing every week."

From the expression on the faces of the customer's people, the PM knew the last comment was a mistake.

"It kept growing because you never gave us what we wanted," one of them said.

The VP pushed back from the table and stood up, "This is getting us nowhere!" Then the VP pointed a finger at the PM's face and said, "You were seven months late and \$300,000 over budget and we still have the same problems in the new facility that we had in the old one."

The VP turned and took two steps toward the door before whirling back and saying, "And what I like the least about the way you people do projects is that all the bad news always comes at the end, when we can't do anything about it!"

### ***BAD SURPRISES WHEN IT'S TOO LATE***

As the project team and customer group continued the debate, the PM thought about the VP's last words. There had been a lot of bad news late in the project. Sure, some of it could be attributed to overly optimistic estimates and some to scope creep. He also wished that several of the contracts had included a bit more "carrot and stick" in them. Several of the time and materials contracts had been killers and an open invitation to change orders he was all but powerless to control. As the completion date kept getting pushed out, his staff and the customer's people got real nervous about reporting problems and tried to hide slippage and overruns. When he found them or they eventually came to light, the sky fell on the internal staff from all quarters. Including, the PM had to admit, from him. Although they should have been honest enough to report problems, he knew he could have done a better job accepting bad news and protecting them from executive tongue-lashings. Getting bad news was better than not hearing about it because then no corrective action was possible. Another real problem was not having the tools to spot small problems early. With the project plan they had built, both the team members' status reporting and Jack's reporting to management and the customer were too vague until near the end.

A supervisor's angry voice broke the PM's reverie.

"We never understood that technical mumbo jumbo you made us sign off on! Signing a list of specifications when you don't understand it means nothing. "

"Well if it meant nothing, why did you keep adding to the list each week?" A foreman snapped back. "If you want these projects finished on time you can't keep changing things!"

We need processes supported by tools that forecast problems early not just report them after the fact when it's too late to consider options.

## *CHANGES, CHANGES AND MORE CHANGES*

Both the foreman and the supervisor were right. Sure, they'd tried to "freeze" the specification and they'd gone through a very thorough approval and sign-off process on the technical specs. But then every week the list of features and changes grew. The customers would see walls go up and say, "This won't work for us the way you've got it." Then the project team member would say, "Well, I'll have to fill out a change request because that's a change and it'll take more time and cost more money." The two would go around and around debating whether this was or was not a change and it would be escalated. Then the same debate would occur at a higher level with everyone becoming more and more angry. Most times the change was added to the plan but usually without sufficient increase in budget or duration. That gave the contractors all kinds of reasons for finishing late. If he insisted on budget and duration increases to reflect the cost of a change in the project, the team was blamed for doing a poor job of laying out the specifications.

The fact was the customers did not understand the technical language and there was very poor linkage between those technical requirements and the improvements in operating performance. It was also true that neither he nor the team had a clear understanding of the business and performance results the customers were seeking from the project. Of course, at the beginning the customers did not seem to understand what success was either. In fact, their part of the effort, beyond a vague mention of changing their processes and workflow, was not part of the plan. There was tremendous pressure to get started and little interest in integrating customer process changes into the planning.

Another loud voice, "The work was shoddy!"

"We didn't do bad work," a contractor retorted. "You didn't decide what you really wanted until we were almost done."

The PM had to admit that there had been some problems with quality that didn't come out until near the end. But there had been so many changes throughout the project that they'd cut back on the time allocated to testing and inspection. The result was serious flaws that came to light during the acceptance phase and had to be fixed on top of another round of customer changes. Those changes late in the game were really expensive and cost hundreds of times what the same changes would have cost earlier.

A field engineer, whose face was an ugly blotch of red and white, finished shouting at the customer and stormed from the room. He knew the engineer had worked very hard on the project, spending a lot of evenings and weekends to get the work done.

## *PROJECT TEAM WANDERING IN THE WILDERNESS*

As everyone watched the violent exit, the PM scanned the angry frustrated faces of his project team members. They were a pretty good group. The PM speculated that many would be gone before the next project. The original completion date had been "plucked from the sky" before the PM had even been selected as project manager, much less done any analysis. He argued about the date but got nowhere trying to convince the executives of the impossibility of reaching it. As a result, the duration and many work estimates were jokes and everyone on the project team knew they would fail to hit the due date before they even started work. They had no commitment to their individual due dates. The situation got worse when the customers kept adding new requirements with few increases in budget or duration.

They planned the first few elements of the project with a lot of clarity but the rest was murky, to say the least because they had no clear business outcome at which to aim. As a result, a lot of time was wasted each week with a continuing effort to complete the plan and there was poor integration between the construction effort and the customer's operational changes. It was like they had several separate projects that never got tied together. Many customer activities that should have started early in the project, dropped by the wayside.

Just then, one of the customers raised the 60 page project plan over her head and threw it at the garbage can, missing by four feet and scattering Gantt charts all over the floor. The PM looked at all those Gantt charts fluttering to the conference room floor and wondered if the project plan had been a little too detailed. They started the planning with a lot of talk about the business outcomes and clear direction. But all the pressure to get started with the work led to the project plan being little more than a very detailed list of E/C micro-activities. Was that micro-management, he wondered? And the plan had not really specified the things required from the customer, like process changes, training and staffing. Either way the project plan had been useless. They weren't but two weeks into the effort when people started saying, "We've already done that" or "we can't do that yet because..." so all those details in the project plan really didn't provide the project team with guidance. And some of the more experienced people seemed to make a point of doing things in sequences other than what was laid out in the project plan. They explained that they'd found a better way to do it but the PM often felt that their point was just doing it differently than the plan.

In the still rapidly deteriorating lessons learned meeting, a designer screamed, "Why didn't you tell us in the beginning about the big problem with customer complaints?"

"We did!" chorused the three remaining people from the customer area.

Team members who have to guess the end result that is expected don't give us their "best work" nor do those we micromanage.