



# **Project Management** **IN CONSTRUCTION**

SIXTH EDITION

- Quality Control/Quality Assurance
- New ConsensusDOCS®, AIA, and Lean Construction Contracts
- The Latest Green Building Guidelines



**Sidney M. Levy**

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# Project Management in Construction

Sidney M. Levy



Sixth Edition



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**Project Management in Construction, Sixth Edition**

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## ABOUT THE AUTHOR

Sidney M. Levy is an independent construction industry consultant with more than 40 years of experience in the profession. He is the author of numerous books on construction methods and operations, including *Construction Databook*, Second Edition, *Design-Build Project Delivery*, and *Construction Superintendent's Operations Manual*. Mr. Levy was awarded the British Chartered Institute of Building Silver Medal for *Project Management in Construction*, Third Edition, in the category of Managing Construction.

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# Preface

The importance of the project manager's role in the construction process cannot be overstated. From the 2-D plans and specifications that mark the first step of the building process to the ribbon cutting ceremony at project completion, the project manager is a key player.

The path from point A to point B is rarely without its detours and roadblocks, and the project manager is charged with the responsibility of traversing those detours and tearing down the impasses.

A project manager must be technically competent and possess the management skills necessary to effectively control the teams of subcontractors, vendors, and field personnel required to provide the smooth flow of tradespeople and materials needed to get the job done. A little knowledge of accounting procedures, legal matters, and state and federal regulations is also best in order to effectively deal with the many forces that bear on the construction process.

Part-time instructor, father confessor, disciplinarian, and mediator, one thing is for sure, a project manager's daily routine is never the same. Only change is constant.

In the end, project management is an exercise in control: control over quality, schedule, and costs—each one a full-time job, yet all falling under the aegis of the project manager. *Project Management in Construction*, now in its sixth edition, examines some of the basic tenets of managing a construction project and explores new technologies that will impact how we do business in the future.

I have been associated with the construction industry for more than 40 years, progressing from summer jobs in high school to time clerk, labor foreman, assistant superintendent, project manager, senior vice president of a major New England builder/developer, and now owner of my own consulting business in Baltimore, Maryland. These experiences have given me a broader view of the construction process, and this book is an attempt to share some of my experiences with you, the reader.

To quote an anonymous but savvy old-timer, “Smart men learn from experience. Wise men learn from the experience of others.” It is my hope that *Project Management in Construction*, Sixth Edition will provide some new insights, keeping that old adage in mind.

SIDNEY M. LEVY

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# An Introduction to the Construction Industry

The construction industry, like so many basic American industries, is being transformed to meet the new demands of the twenty-first century. Project delivery concepts are changing—design-bid-build, in both the private and public sectors is, now recognized as less than efficient when it comes to both time and money, often promoting litigation and restricting innovation. New documents—ConsensusDOCS<sup>®</sup>, created by the Associated General Contractors of America (AGC), and the Integrated Project Delivery Agreement, prepared by the American Institute of Architects (AIA)—are further contractual efforts to enhance the “team” approach to project development. Relationships between owners, design consultants, and contractors are changing as well, given how the emphasis on design-build has reinforced the positive effects of team collaboration. Technological advances have produced 3-D, 4-D, and beyond, building-information modeling, resulting in the potential to construct a building, step-by-step, virtually within a computer before a shovel is ever placed in the ground.

These new building delivery systems and technologies place more responsibility on the project managers who, as before, are charged with “getting it built.” The construction industry in the United States, which exceeded \$1.1 trillion in 2005, began to decline in 2007 to \$1.065 trillion due to the worldwide recession and continued falling to \$964 billion in 2009 and to \$802.3 billion as of October 2010. However, according to a U.S. Bureau of Labor Statistics *2010–2011 Occupational Handbook*, for the period 2008–2018 employment in the construction industry is expected to rise by 19 percent and to remain a vital part of the economy, providing jobs for more than 7.3 million construction employees and 2.4

million architects and engineers, along with untold millions in revenue to those industries dependent on construction activities. We are a unique business, incorporating everything from small residential remodeling contractors to giant multinational constructors.

The construction industry can also be characterized as being highly fragmented, and although there were approximately 884,300 construction establishments in the United States in 2008, according to the Bureau of Labor Statistics, 269,700 were building contractors, 57,600 were heavy and civil engineering or highway contractors, and 557,000 were specialty contractors (subcontractors). Most of these establishments were small; 68 percent employed fewer than five workers in the United States, and slightly more than 63 percent are specialty contractors (subcontractors). There were 1.8 million self-employed and unpaid family members as of 2008 who worked directly for property owners or acted as contractors on small jobs such as remodeling and maintenance projects. A highly competitive business, it is one in which profit margins are slim. Statistics compiled by the Construction Finance Management Association in Princeton, New Jersey, reveal that over the past several years, net profit, after taxes, for industrial and non-residential contractors ranged from 1.2 percent to 1.5 percent, which is slightly more than the current interest on a bank certificate of deposit.

Like so many other businesses and institutions, the new century holds untold opportunities and challenges, as well as plenty of detours for the unwary. The paperless workplace predicted by computer gurus decades ago is now gradually unfolding. With the lowered cost of building information modeling (BIM) software and the increase in its use by architects and engineers, many of the problems relating to constructability and conflicts between building systems have been significantly reduced, and in some cases eliminated.

The Bureau of Labor Statistics in its *Career Guide to Industries: 2010–2011 Edition* paints a bright picture of the construction industry in years to come. It expects the number of wage and salary jobs in the construction industry to grow 19 percent through the year 2018, compared with 11 percent projected for all industries combined.

Demand will come from the need for more medical treatment centers and long-term care facilities to meet the demands of our growing elderly population. Employment in heavy and civil engineering construction, such as roads, bridges, and tunnels, will be necessary to repair and upgrade our infrastructure, which is likely to require \$2.2 trillion to bring it back to “good” condition.

And employment of managers of construction projects is expected to grow due to the increased complexity of projects and the retrofitting of existing structures to make them more energy efficient.



## Critical Issues Facing Contractors in This New Millennium

As the first decade of the new century unfolds, some demanding issues in the construction industry have become apparent, while others remain more subtle. Both institutional perception and resource changes are taking place, affecting all facets of the industry, such as the following, which will act as the headings of upcoming sections in this chapter:

- How our industry is perceived
- Information technology
- Human resources—the changing workforce
- Productivity
- Quality control
- Project delivery systems
- The organization
- Construction technology
- Safety

### How our industry is perceived

In 2010, the Construction Management Association of America (CMAA), in collaboration with FMI (the management consulting firm headquartered in Denver), conducted the 11th Annual Survey of Owners to obtain their views on the design and construction industry.

This new study by both FMI and CMAA did not include any of the 2004 contractor-related ethical issues expressed by owners. This 2010 report revealed a number of responses that bear attention:

- Owners have reduced staff by layoffs, attrition, and early retirement. Nearly half of the 300 surveyed indicated that they will probably not resume hiring until 2012 or 2013. Twenty-eight percent said they do not plan to rehire at any time in the future. This means that any construction projects initiated by owners with reduced staff will undoubtedly place more burden on the contractor's staff.
- Owners, as they have in past surveys, commented on the poor quality of design documents—34 percent reported a reduction in design document quality, and 33 percent reported a decline in construction drawing quality.
- Builders were not immune from criticism. Sixteen percent of respondents reported a decline in performance of construction management services, and 18 percent reported worsening construction execution.