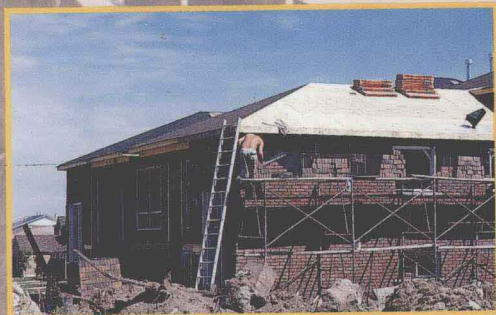
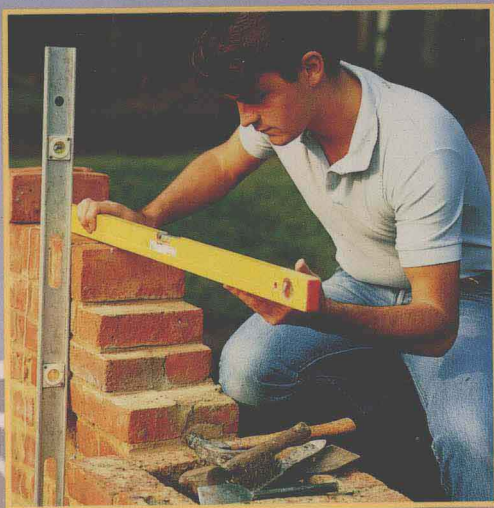


Bart Jahn and Paul Dettenmaier

- Rough grading
- Underground utilities
- Block & concrete walks & drives
- Walls, fences, & gates
- Irrigation & drainage
- Development considerations



OFFSITE CONSTRUCTION

Offsite Construction

Bart Jahn

Paul Dettenmaier

McGraw-Hill

New York San Francisco Washington, D.C. Auckland Bogotá
Caracas Lisbon London Madrid Mexico City Milan
Montreal New Delhi San Juan Singapore
Sydney Tokyo Toronto

Library of Congress Cataloging-in-Publication Data

Jahn, Bart.

Offsite construction / Bart Jahn and Paul Dettenmaier.

p. cm.

Includes index.

ISBN 0-07-016561-0

1. House construction—Case studies. 2. Building sites—Case studies. 3. Dwellings—Defects—Case studies. I. Dettenmaier, Paul. II. Title.

TH4812.J3498 1997

690'.89—dc21

96-40097

CIP

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1 2 3 4 5 6 7 8 9 0 DOC/DOC 9 0 2 1 0 9 8 7

ISBN 0-07-016561-0

The sponsoring editor of this book was Zoe G. Foundotos, the editing supervisor was Paul R. Sobel, and the production supervisor was Claire B. Stanley. It was set in New Century Schoolbook by Tanya Howden and Kim Sheran of McGraw-Hill's Professional Book Group composition unit, Hightstown, New Jersey.

Printed and bound by R. R. Donnelley & Sons Company.

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*We would like to graciously dedicate this book to:
Dad, Evelyn, Mom, Paul, Brian, Barry, Sonny
and Beverly, Ethan, Liza, Abby, Sara, and of
course, Robin*

Introduction

No two building-construction projects are exactly alike. Although there is enough repetition and similarity among projects in building construction to establish standard practices, there is also just enough variety in the characteristics of each individual building site and product type to create construction problems. This is why, despite the participation of experienced builders, professionally trained architects and engineers, licensed contractors, and certified inspectors, a number of costly problems and mistakes still manage to occur on every construction project.

If the current level of construction technology produces a building construction process that is 95 percent efficient and trouble free, there is still five percent remaining for a goal of 100-percent efficiency. In other words, formal education in the form of professional training and licensing, practical field training and licensing, and practical field experience, may still leave building construction a few percentage points short of assembly line efficiency. Therefore, some new approach must be found to make up this difference.

The fundamental problem in attempting to improve and debug the building-construction process on a industry-wide basis is that each individual building-construction project is an isolated, one-time event. Building-construction projects are isolated due to geographical distances between building sites, the economic competition between construction companies, and the finality of the construction at the end of each project. Mistake prevention and problem-solving information does not travel from one project to another, because there are no avenues of communication available that can bridge these barriers. Therefore, two similar construction projects built side by side by different companies may have the same costly construction mistakes without either company knowing about or benefiting from the other's experience.

Standardized architectural, engineering, and construction practices account for the core 95 percent of the activities that go smoothly during building construction. It is the small percentage remaining around

the edges of that core that result in costly repairs, schedule delays, and lower quality. These types of problems are routinely debugged out of assembly lines for products that are smaller in size and mass produced in larger numbers than buildings. Therefore, without channels of communication between projects, if the core 95 percent of applied technology in building construction is not broad enough to encompass the unique peculiarities and elements of surprise found on each individual building site, the only remaining option for the builder is to record the leftover mistakes on a case by case basis. This is one area of information that is missing from the current building-construction technology. If building construction is to improve its efficiency and lower its costs, the technology needs to expand to include mistake prevention and problem-solving information.

This book is the third in a series that is aimed at identifying costly construction problems and mistakes. It presents about 350 residential offsite construction problems, issues, and mistakes that occurred on actual construction projects. Some of these problems arose on large projects built by established, well-known developers, while others occurred on single-family houses built by less experienced contractors and individual owner-builders.

The first book entitled *Practical Cost-Saving Techniques for Housing Construction* (Jahn, McGraw-Hill, 1995) covers onsite construction problems involving concrete to flooring. The second book *McGraw-Hill's Best Practices for Housing Construction* (Jahn, McGraw-Hill, 1996) covers problems and issues involving project management, scheduling, customer service, and quality assurance.

Most importantly, all of these offsite construction mistakes fall outside the norm of accepted standards and practices. Otherwise, these mistakes would have been avoided by practicing standard, learned techniques and guidelines. If the unique mixture of unanticipated circumstances in each case was not greater than the technology designed to avoid such problems, then these mistakes would not have happened. The builders involved on these projects did not see these problems and mistakes coming until it was too late. These builders were faced with costly repairs, schedule delays, or lost opportunities to save money by simplifying field operations. The goal of this book, and the other two books in the series, is to forewarn the reader of costly construction problems and mistakes, before the lessons are learned the hard way through first-hand experience.

For many people in residential construction, the term *offsites* represents the final hurdle of construction knowledge to master. Most general contractors and builders are not professionally trained architects, civil engineers, geologists, or landscape architects, but instead have come up through one of the building trades. A builder should therefore use this book as a starting point for discussing issues that apply to the

builder's type of products and construction with the architect, civil engineer, soils engineer, landscape architect, and the various offsite construction contractors. With the aid of this book, the builder can compile a preconstruction checklist to be used at the start of each new project to reduce the occurrence and impact of offsite construction mistakes.

One of the factors contributing to offsite construction mistakes is the timing of important design decisions and the choice in who will make these decisions. If a design or technical decision is not made at the proper time, it is certain that this decision will be made eventually by someone. The builder wants to avoid having these decisions made by the wrong people at the wrong time, due to the expediency of the moment or procrastination about analyzing a situation fully. If a potential design or construction problem is known in advance, the builder can refer the problem or question to the proper professional consultant within the time-frame it needs to be addressed. This control helps to reduce the number of occurrences in which superintendents, foremen, and tradespeople are placed in the position of having to make on-the-spot aesthetic or technical design decisions outside their own area or level of expertise.

Finally, in researching the material for this book, we interviewed some of the leading design consultants, builders, and contractors in our area. We asked them to describe some past "horror stories" and typical problems that occur in offsite construction that are not discussed in textbooks or covered in the public works standards publication. The larger problem in building construction, especially residential offsite construction, is that each of these people is walking around with a different piece of the overall puzzle and no means of being able to pass along their knowledge to others. The practical result of this is that hundreds of thousands of people working in housing construction find themselves at different points on the uphill slope of the learning curve repeating many if not most of the same hard-earned lessons. This is a waste of time, energy, and money.

This book is one of the most cost-effective books a developer, builder, or general contractor will ever buy. This book discusses offsite-construction problems and mistakes that actually occur and can be expensive to repair. By avoiding only one or two of these mistakes, your cost savings will greatly exceed the cost of this book. Some of the major offsite-construction mistakes discussed in this book, which resulted in substantial monetary losses to the parties involved, would probably exceed the combined cost of several bookstores.

For the architectural, engineering, and construction-management student in college and for the beginning design consultant just out of school, this book can serve as a starting point for discussing and exploring practical field issues that might otherwise take years to discover. For the housing developer, this book can serve as a starting

point for establishing a preconstruction checklist of issues to consider at the start of every new project. For the established design consultant, this book can serve as a source of potential issues the consultant may want to consider and analyze more closely with the client in order to save money and reduce liability for both the consultant and the client. Finally, the goal of this book is to make housing construction a little easier, smoother, and more enjoyable for everyone involved.

Thanks to the following contributors: Don Glowacz, Robert Jahn, Brian Jahn, Michael Johnston, Vanessa Kay, John P. Kreitzer, Bruce Lewis, John Montoya, Rodger More, Dennis Post, and Scott Thomas.

Bart Jahn
Paul Dettenmaier

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