

# Preface

This textbook is the product of 10 years of facilitating the educations of numerous construction graphics students in the construction management program at California State University, Sacramento. Helping these students understand how constructors use construction drawings was an involved task requiring a wide variety of references and assignments. Architects and engineers write many of the references used by construction management students, and their product orientation is reflected in their work (e.g., will the structure serve its intended purpose, will it add value to its environment, will it protect its users during all sorts of natural events?). While this helps construction students understand the interests and concerns of the design professional—useful information to know—it sheds little light on what drawings mean to constructors, who are process-oriented (what does the project consist of; how much time and money will I need to construct it; what kind of equipment, materials, and personnel are required; where do I start, and so forth?). This book is designed to bridge the gap between what the design professional conceives and depicts and what the construction professional—and construction management students—must see in terms of the materials and processes required to produce the product.

The book was written primarily for freshman and sophomore construction management or building technology students who have had some technical drawing experience, although anyone whose experience with construction drawings is limited may also benefit from using it. Design professional students may also derive a benefit from using the text, since it reveals the value system of a contractor as it relates to construction drawings. The text focuses mainly on building construction projects.

Throughout the production of this text, I kept the following hypothetical conversation with the reader in mind: “Here is a basic construction system. Here is how the system is designed to function. The design professional depicts the system this way. These symbols mean this; these lines mean that, this is how big it is and this is where it fits. This, however, is a picture of what the builder has to consider: here is the access to and staging on the site; here is the hole in the ground that we have to create. Here is the temporary structure (formwork, for example) that we have to build in order to give workers reasonable, safe access to their work and to hold the concrete in the desired shape. Here are the parts that must be installed after the temporary structure is in place, but before the concrete is placed and finished. Here is how we’ll transport, place, and cure the concrete. And this is what we must consider when we take this temporary structure down. This is what these drawings mean to us.”

Chapters 1 through 5 consist of an overview of graphic communication, the construction business environment, the design professional’s work product, and drawing fundamentals, with an emphasis on sketching. Chapters 6 through 13 cover eight basic categories: site construction; foundations; framing systems; cladding, glazing and exterior doors; roof systems; interior construction; mechanical systems; and electrical systems. These basic categories include virtually all of the tasks involved in constructing a building, and for the most part follow the Construction Specifications Institute’s (CSI) UniFormat™ classification system. Chapter 14 addresses shop drawings.

All the chapters follow the same format. Each begins with a list of key terms and concepts, followed by a description of the role that the subject system plays in the

overall context of the project. Comments on what to anticipate in the drawings and the typical projections, lines, symbols, and other graphic conventions used to describe the system are next, followed by illustrations of the processes used to construct a system (where it was practical to include them). Fundamental quantity surveys of the system, or portions of it, as well as exercises conclude each chapter. Selected references follow at the end of the book. Requiring students to develop simple plans for constructing parts of systems and to perform quantity surveys while they are studying graphic depictions of them serves to integrate project planning, graphics, construction materials and processes, structural design, the fundamentals of estimating and, to some extent, scheduling; and it immediately gives students something to sink their teeth into

that is undeniably construction-oriented. For younger CM students who have several years to go before they will actually practice their discipline, this approach can be engaging.

In the creation of this book, it was my intention to show the respect and appreciation that I genuinely feel for all of the participants in the construction process, from the owners who develop the projects and the designers who conceive and describe them to the remarkable people who construct them, including the laborers on the project site.

This textbook is a work in progress; the publisher and the author welcome input from readers as to how the material might be more effectively organized and presented, as well as how it might be supplemented or reduced in size.