

Chapter 1

Introduction

For as long as anyone reading this book can remember, architects, designers, builders, and tradesmen have been using 2D paper drawings to design buildings, estimate quantities, layout buildings, build foundations, build walls, roofs, and install mechanical systems. Builders and trades that are provided with precise details and drawings will execute the building process with precision. This has been going on for centuries, but it is a process that is fraught with unclear or missing details and prone to mistakes, delays, and cost overruns. The designer must convey intent with their drawings and the builder must be able to read, understand, and execute to build the intended structure. For the past three decades, CADD (computer-aided design and drafting) has become the standard, virtually eliminating hand-drawn plans, other than conceptual ideas. But this has still been primarily used for 2D drawings. Typical drawing sets include floor plans, elevations, and a few sections and details. These still may not convey the full design intent or may be missing vital information or views.

We see in 3D, so why don't we design in 3D? Technology is finally available to allow designers and builders to design, view, and study structures in 3D and better understand how to build the structure and how it will look *before* it is built. By now, you have probably heard of BIM (building information modeling), which is essentially the process of creating digital representations of the building process. A large part of BIM involves 3D modeling of the project. SketchUp is a simple yet powerful tool for creating 3D models for any and all components of a building project. SketchUp comes with standard tools for creating,

texturing, organizing, and viewing geometry and they allow third-party developers to create “Extensions,” also known as “Plugins,” which extend the toolset and functionality that comes with the program. These are typically “scripts” utilizing Ruby Programming, a language built into SketchUp. These scripts are usually geometry-creating, time-saving, and reporting extensions that magnify the power and ease of use of SketchUp. Construction Documents can be generated using LayOut, the accompanying program that comes with SketchUp Pro.

WHO SHOULD READ THIS BOOK?

Anyone desiring to create 3D models for any and all aspects or phases of the construction process, from the design itself, to construction and how some or all of the pieces come together. Builders, architects, interior designers, landscape architects, carpenters, and trades will learn methods and techniques to create 3D models for their projects, big and small, as well as how to create construction documents, acquire takeoff information, create renderings, animations, virtual tours, and much more.

WHY SHOULD YOU READ THIS BOOK?

This book summarizes the workflow, practices and methods acquired and developed over years of practice, trial and error, and real-world applications from a seasoned custom home builder and designer with 30 years of experience in the construction industry. You will learn what to do, and more importantly, what *not* to do in modeling projects in SketchUp. The tips scattered throughout the book are worth the read. The goal is not only to create 3D models, construction documents, and visualizations, it is also to understand what you are building *before* it is built, and to avoid costly mistakes, delays, and overruns during the construction process.

WHAT IS IN THIS BOOK?

This book begins by covering SketchUp essentials and will guide the reader through modeling a construction project from start to finish. It is loaded with tips, methods, and tricks that were learned from years of modeling literally every phase of construction, for residential and light commercial, completely inside of SketchUp.

Part One: SketchUp Essentials

- ☑ SketchUp Free versus SketchUp Pro
- ☑ LayOut—an Introduction

- ☑ 3D Warehouse
- ☑ Extension Warehouse
- ☑ Online Resources
- ☑ SketchUp Basics—Review the basic toolsets included with SketchUp and how to navigate in your models.
- ☑ Geometry Creation, and how it relates to construction
- ☑ Groups and Components, and the important differences between the two
- ☑ Plugins/Extensions—How to install and use
- ☑ How to import drawings—Learn how to import and use drawings to create accurate models
- ☑ File management, including layer management and templates

Part Two: Phases of Construction

- ☑ Existing site modeling—Using topographic data to generate existing site models
- ☑ Foundations—Modeling footings, foundations, and slabs
- ☑ Walls—Learn how to model walls from simple to complex framed walls
- ☑ Floor systems—Conventional joists, TJs and floor trusses, subflooring
- ☑ Roof systems—From simplex to complex, conventional framing to trusses
- ☑ Mechanical systems—HVAC ductwork, plumbing, and electrical
- ☑ Exterior finishes—Modeling veneers, windows and doors, and other finishes
- ☑ Interior finishes—Cabinetry, flooring, trim, doors, etc.
- ☑ Final site modeling—Creating the final site model with landscape and hardscape elements

Part Three: Quantity Takeoffs and Estimating

- ☑ Attributes—Learn how to takeoff length, area, volume, and weight for use in your favorite estimating spreadsheet or program
- ☑ Volume—Must be a *solid*! Learn how to ensure and fix
- ☑ Estimator for SketchUp—An estimating extension for SketchUp that provides a disciplined approach to modeling accurate estimates

Part Four: Construction Documents

- ☑ LayOut—Learn how to create construction documents and presentations using LayOut

Part Five: Renderings, Animations, and Virtual Tours

- ☑ Rendering programs
- ☑ Animation programs
- ☑ Virtual tours
- ☑ Virtual reality versus augmented reality