

Part IV

Engineering Practice



Figure IV.1 A construction site exemplifies the practice of civil, mechanical, electrical, and other engineering specialties. Project management is common to the practice of all engineering disciplines, and all engineers are responsible for ensuring public and worker safety.

Engineers, regardless of discipline, have something in common: the ability and responsibility to solve problems, particularly problems of engineering design. Part IV introduces

- the creative design process and how to stimulate creativity,
- the interaction of engineers with the business world,
- the protection of intellectual property that results from design,
- the planning and scheduling of engineering projects,
- the assessment of the critically important need for safety in engineering,
- the management of risk.

These key aspects of engineering practice are discussed in the following chapters:

- Chapter 15 The engineering design process:** Whether a design is totally different from a previous design or only a minor modification, the problem-solving technique followed by the design engineer usually follows a well-known series of general steps. This chapter describes the steps in a typical engineering design project and illustrates the process with examples.
- Chapter 16 The engineer in business:** Most engineers are employees, but some are consultants and some have their own companies. This chapter discusses the basics of business structures and a method for evaluating a small company, either during its creation or shortly thereafter.
- Chapter 17 Intellectual property:** Engineering work creates results that may qualify for legal protection as intellectual property. The principal types of intellectual property are patents, trademarks, copyright, industrial designs, and integrated circuit topographies. This chapter defines these types, explains how to protect them, and also how to use patent literature to stimulate ideas for future designs.
- Chapter 18 Project planning and scheduling:** This chapter briefly explains two basic, commonly used project-management tools: Gantt charts and the critical path method.
- Chapter 19 Safety in engineering design:** As an engineer, you will be responsible for the safety of any design that you approve. This chapter gives a basic introduction to safety requirements in engineering design, together with guidelines for eliminating workplace hazards. The importance of engineering codes and standards is also described.
- Chapter 20 Safety, risk, and the engineer:** This chapter further examines safety in engineering design and describes techniques for evaluating and managing risk in complex engineering projects.