

CHAPTER 1

INTRODUCTION

THE BIG PARADOX

“A construction manager is like an Olympic decathlon athlete who must show great competence in a multitude of areas ranging from design of construction operations to labor relations.”*

Notwithstanding the multi-faceted nature of construction management, construction professionals are forced to focus heavily on the technical side of their work. Each project is a unique technological and organizational puzzle. A construction manager is in a race against time and money to reach targets relating to cost and required completion deadlines. Surprisingly, business objectives such as making a profit often take a back seat to the complex interplay of technology and organization. Bringing a project in on time and at bid price is like landing a jet fighter on an aircraft carrier in heavy seas.

Financial and business issues are often foreign to the interests of the field personnel who are locked in combat, on a day by day basis, with the solution of practice oriented problems in the field. It is almost as if making a profit is a secondary issue—a necessary evil. And yet, without profit, businesses fail. Small mistakes in judging the financial landscape often lead to big losses.

*Halpin, Daniel W., (2006), *Construction Management, 3rd Edition*, John Wiley and Sons, Inc. New York.

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WHAT IS FINANCIAL MANAGEMENT?

Financial management concerns all the decisions involving money that a company must take every day. Some financial choices, such as deciding to stop building condominiums in order to free up resources, can have a substantial impact on a company. Others may be of much smaller scope, such as deciding to take advantage of vendor discounts available by paying invoices in a timely fashion. Regardless of size or impact, financial decisions can be made using a rational analysis of relevant factors just on the basis of intuition. A main proposition of this book is that rational and informed decisions will prevail in the long run over intuitive but uninformed choices.

Financial management finds its way into almost every corner of human activity (think of how many things in life involve money). It would be nearly impossible to address all the issues within its scope. Taxes, for example, are of relevance for almost everyone. Computing a project's profit to date, however, is much more relevant for a construction professional than to a stock trader. Optimizing a stock portfolio, on the other hand, is of little direct significance in construction, but it is of utmost importance for a stock trader. Consequently, this book—like any other specialty-focused book—is a subset of all the topics that we could address in financial management. Its topics are not only a collection of standard areas found in most construction oriented financial textbooks but are also a selection of what, in the judgment of the authors, will be useful to you throughout your career.

As a construction professional, you need to know accounting fundamentals, project-related financial matters, and company-level financial issues. Each one of these three areas has a substantial impact on your ability to succeed in your career. Let us take a bird's-eye view of these topics with some attention to the issues that they comprise.

First Stop: Financial Accounting

Financial accounting involves the capture of information regarding the purchase and sale of effort and products (e.g., TV sets, bicycles, real estate, construction of concrete footers, etc.). The information of interest is the revenue derived from sale and the expense involved in producing work and products for sale. The history of accounting is as old as commerce in society. It led to early forms of mathematics so that a system of measures could be used to keep track of value and the transfer of value between individuals. Businesses exist to produce a profit, and accounting allows for the determination of whether a profit or loss is occurring because of the activities of a given business activity.

Records of purchase and sale offer interesting insights into the operations of society from the time of ancient civilizations up to the present day. We encounter references to bookkeeping or accounting in classical stories such as Charles Dickens famous *A Christmas Carol*. Bob Cratchit, one of the main

characters, is the bookkeeper for the firm of Marley and Scrooge. We see him sitting at a high desk writing figures into a ledger book using a quill pen.

Financial records maintained by historical figures tell us a great deal about their life and times. By studying accounting records from the eighteenth century, we can determine how founding fathers such as Washington, Jefferson, and John Adams fared financially throughout their brilliant and hectic careers. We can determine whether Mozart was really as poor as he is often portrayed (Actually, he had an annual income most of his adult life on the order of \$250,000.)

We, as individuals, become involved in accounting at an early age as we receive and spend money from parents, aunts, and uncles. At some point, we open a bank account and must deal with a checkbook. We learn to study and reconcile bank statements, comparing how much we have deposited to how much we have spent.

Accounting is founded upon the acquiring, storing, and analyzing of financial information. This implies extensive record keeping and data management. The data captured by accounting systems, when properly displayed and analyzed, tell us something about the financial position or health of a business entity (e.g., Blockbuster Construction Co.) or an individual (e.g., Sarah Smith). Let us take a first look at the main components of financial accounting, which will be addressed in detail in Chapters 2, 3, and 4.

In order to summarize financial activities at a point in time (i.e., December 31, 2010), one report has become the cornerstone document used worldwide to provide a picture of the financial position of a person or a business activity. This report will be described and discussed in great detail in Chapter 2. Suffice it to say, —the *balance sheet*—attempts to capture a snapshot of financial position *at a point in time*. This snapshot is expressed in terms of *assets and liabilities*.

Assets are financial entities that have value and are controlled or owned by a firm or individual. Assets are what you have or own. Your bank account, car, and CD player are assets. Even if you owe money on your car or furniture, they are still considered your assets as long your ownership can be established.

Liabilities are what you owe or are committed to pay based on agreements and commitments with other parties. If you borrow money to buy your car and the loan is still not paid off, the amount you owe is a liability. All of this derives broadly from the idea of property, ownership, and legally binding commitments (sometimes formalized as written contracts). Commitments are also referred to as obligations.

The document that attempts to capture and reflect assets held and the obligations of a company or person is called a balance sheet. The balance sheet structure is a reflection of the basic equation of financial accounting. Simply stated, it indicates what a person or company has or owns and what debts or obligations are pending against what is owned. What is owned is referred to as assets. When one subtracts the obligations pending from what one owns, we have calculated the net value or (in financial terms) net worth

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of the person or company. This can be calculated at any point in time. The balance sheet is a detailed report of what one owns and what one owes at any given point in time. A detailed discussion of the balance sheet and its structure will be presented in the Chapter 2. Chapter 3 centers on the interpretation of financial information, and Chapter 4 covers the mechanics of creating financial reports.

Why Construction Accounting Is Different from Accounting in Other Business Sectors*

Worldwide construction is the largest economic sector of the global economy. Construction ranks number two in the amount of economic activity contributed to the gross national product (GNP) of the United States. It is the largest U.S. industry that focuses on the production of a physical product as opposed to provision of a service (e.g., the health care industry.) The dollar volume of the industry is on the order of one trillion (1,000 billion) dollars annually. The process of realizing a constructed facility such as a road, bridge, or building, however, is quite different from what is involved in manufacturing an automobile, a computer, or a cell phone.

Manufactured products are typically designed and produced without a designated purchaser. In other words, products (e.g., automobiles or TV sets) are produced and then presented for sale to any potential purchaser. The product is produced on the speculation that a purchaser will be found for the item produced. A manufacturer of bicycles, for instance, must determine the size of the market, design a bicycle that appeals to the potential purchaser, and then manufacture the number of units that market studies indicate can be sold. Design and production are done prior to sale. In order to attract possible buyers, marketing and advertising are required and are an important cost center.

Many variables exist in this undertaking, and the manufacturer is “at risk” of failing to recover the money invested once a decision is made to proceed with design and production of the end item. The market may not respond to the product at the price offered. Units may remain unsold or sell at or below the cost of production (i.e., yielding no profit). If the product cannot be sold so as to recover the cost of manufacture, a loss is incurred and the enterprise is unprofitable. When pricing a given product, the manufacturer must not only recover the direct (labor, materials, etc.) cost of manufacturing but also the so-called indirect and general and administrative (G&A) costs such as the cost of management and the implementation of the production process (e.g., legal costs, marketing costs, supervisory costs, etc.) Finally, unless the enterprise is a “nonprofit,” the desire of the manufacturer is to increase the

*This and the following section is taken with permission from *Construction Management* by Daniel W. Halpin, published by John Wiley and Sons, 2006.

value of the firm. Therefore, profit must be added to the direct, indirect, and G&A costs of manufacturing.

Manufacturers offer their products for sale either directly to individuals (e.g., by mail order or directly over the Web), to wholesalers who purchase in quantity and provide units to specific sales outlets or to retailers who sell directly to the public. This sales network approach has developed as the traditional framework for moving products to the eventual purchaser. (See if you can think of some manufacturers who sell products directly to the end user, sell to wholesalers, and/or sell to retail stores.)

In construction, projects are sold to the client in a different way. The process of purchase begins with a client who has need for a facility. The purchaser typically approaches a design professional to more specifically define the nature of the project. This leads to a conceptual definition of the scope of work required to build the desired facility. Prior to the age of mass production, purchasers presented plans of the end object (e.g., a piece of furniture) to a craftsman for manufacture. The craftsman then proceeded to produce the desired object. For example, if King Louis XIV desired a desk at which he could work, an artisan would design the object, and a craftsman would be selected to complete the construction of the desk. In this situation, the purchaser (King Louis XIV) contracts with a specialist to construct a unique object. The end item is not available for inspection until it is fabricated. That is, since the object is unique, it is not sitting on the showroom floor and must be specially fabricated.

Because of the “one of a kind” unique nature of constructed facilities, this is still the method used for building construction projects. The purchaser approaches a set of potential contractors. Once an agreement is reached among the parties (e.g., clients, the designer, etc.) as to the scope of work to be performed, the details of the project or end item are designed and constructed. The purchase is made based on a graphical and verbal description of the end item, rather than the completed item itself. This is the opposite of the speculative process, where the design and manufacture of the product are done prior to identifying specific purchasers. For instance, it would be hard to imagine building a bridge without having identified the potential buyer. (Can you think of a construction situation where the construction is completed prior to identifying a buyer?)

Who Is at Risk?

The nature of risk is influenced by this process of purchasing construction. For the manufacturer of a refrigerator, risk is related primarily to being able to produce units at a competitive price. For the purchaser of the refrigerator, the risk involves mainly whether the appliance operates as advertised.

In construction, since the item purchased is to be produced (rather than being in a finished state), there are many complex issues that can lead to failure to complete the project in a functional and/or timely manner. The

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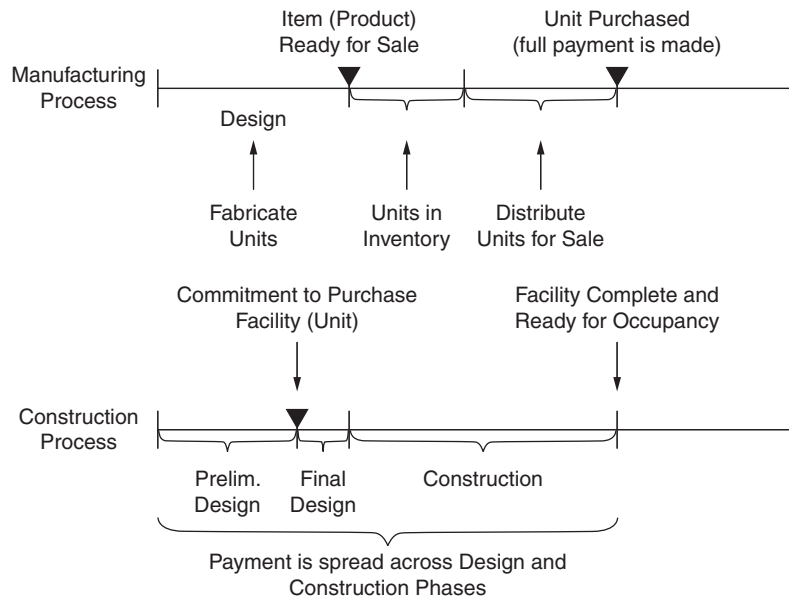


Figure 1.1 Manufacturing vs. construction timeline.

number of stakeholders and issues that must be dealt with prior to project completion lead to a complex level of risk for all parties involved (e.g., the designer, constructors, government authorities, real estate brokers, etc.). A manufactured product is, so to speak, “a bird in the hand.” A construction project is a “bird in the bush.”

The risks of the manufacturing process to the consumer are somewhat like those incurred when a person goes to the store and buys a music CD. If the recording is good and the disk is serviceable, the risk is reduced to whether the customer is satisfied with the musical group’s performance. The client in a construction project is more like a musical director, who must assemble an orchestra and do a live performance, hoping that the performance and the final effect will be pleasing. The risks of a failure in this case are infinitely greater. A chronological diagram of the events involved in the manufacturing process versus those in the construction process are shown schematically in Figure 1.1.

Projects: The Output of the Construction Process

Another aspect that greatly influences the way in which construction is accounted for relates to the project format used for delivering the completed product. As noted previously, the construction industry is generally focused on the production of a single unique end product. That is, the product of

the construction industry is a facility that is usually unique in design and method of fabrication. It is a single “one-off” item that is stylized in terms of its function, appearance, and location. In some cases, basically similar units are constructed, as in the case of town houses or fast-food restaurants. But even in this case, the units must be site adapted and stylized to some degree.

Mass production is typical of most manufacturing activities. Some manufacturing sectors make large numbers of similar units or batches of units that are exactly the same. A single item is designed to be fabricated many times. Firms manufacture many repetitions of the same item (e.g., telephone instruments, thermos bottles, etc.) and sell large numbers to achieve a profit. In certain cases, a limited number or batch of units of a product is required. For instance, a specially designed transformer or hydropower turbine may be fabricated in limited numbers to meet the special requirements of a specific client. This production of a limited number of similar units is referred to as batch production.

Mass production and batch production are not typical of the construction industry. Since the industry is oriented toward the production of single unique units, the format in which these one-off units is achieved is called project format. Both the design and production of constructed facilities are realized in the framework of a project.

Construction projects are completed over extended time periods. Even simple construction projects require many weeks or months to complete and can often extend over more than one year. This means that the client typically makes partial or progress payments to the constructor over the life of the project. Therefore, construction is paid for in a “pay as you go” format as opposed to the payment of a single amount at the time ownership is transferred. This requires a totally different method for recognizing the value transferred payment by payment. Methods used to account for the sale of manufactured products (e.g., refrigerators) are not applicable when dealing with projects delivered to the client over an extended period of time. A different form of accounting is needed, and that project form of accounting is a major focus of this text.

PROJECT-LEVEL CONTROLS

Since projects are the main business units for any construction company, a fundamental *raison d'être* for financial management, as applied in the construction industry, is the development and use of appropriate controls at the project level. We will address the financial planning and control at the project level in Chapters 5 and 6. Chapter 5 emphasizes the planning and control of operations. How can we know whether a project is ahead of or behind schedule, and over or under its budget? We will use the concepts of earned

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value, scheduled value, and actual value to anchor the simple and ingenious principles applied in modern cost control and analysis. Chapter 6 centers on the estimating of the cash requirements for a project. A contractor can execute a million dollar project with much less than one million dollars invested in the project at any given time. The progress payments paid by the project owner to the contractor, as well as the trade credit that a contractor can procure, serve to reduce the cash requirements needed to build the project. As noted above, the project is sold month by month to its owner as the construction proceeds.

TIME VALUE OF MONEY

No enterprise can survive the modern business environment without a very good grasp of the concepts and techniques related to the time value of money. At the most obvious level, the company must be able to estimate the payments that it will make to repay borrowed money. But, many other, more subtle issues can be equally important. Determining the attractiveness of a business scheme, comparing several alternatives, and finding the true cost of a business proposition when interest is considered are examples of the immediate and critical usefulness of these techniques. Chapter 7 addresses the time value of money, using the techniques of *engineering economy*.

ENTREPRENEURIAL ISSUES

No text on construction financial management would be complete without including information about two crucial aspects of the construction business—the financing process and tax issues. Chapter 8 is about construction loans and credit. How does a company get the financial resources to execute a contract? The role and cost of lines of credit and term loans are critical to the success of a project. How an entrepreneur procures the money to build the project will be examined. This aspect is sometimes underestimated by contractors. The financial merits and attractiveness of a project are of great importance to the contractor. Money is, after all, a cascading resource. If the source of money runs dry at the entrepreneur's level, the contractor and everyone working under him will suffer the consequences. The policy of paying suppliers in a timely manner to receive discounts on the invoiced amounts will also be discussed.

Chapter 9 offers an introduction to tax issues affecting the typical contractor. On one hand, there are opportunities to save money paid in taxes when there is an understanding of the rationale and implementation of the current tax system. On the other hand, the lack of such knowledge can result in missed opportunities at best and imprudent decisions at worst.

REVIEW QUESTIONS AND EXERCISES

1. What attracted you to the construction industry? Discuss the advantages and disadvantages of a career in construction. List in descending order what you like the most about this industry. Develop a similar list with the factors that you dislike.
2. Write a one-page review of the financial challenges for a major ongoing construction project or for a current issue in the construction industry involving the management of finances. You can use sources such as the *Engineering News Record* (ENR), a magazine available in most college and public libraries. A great deal of information is also available on the Internet, including a free, limited version of ENR.
3. Contrast the effort of building a car and building a residential unit. Which one requires more initial capital? What kinds of resources are involved? What are the main differences in their management needs?
4. Would the cost of residential construction benefit from a greater use of prefabricated building components? Why is it that prefabrication is not more widely used in this industry?
5. Interview a construction professional, and report the financial controls that he or she currently uses. In that person's opinion, how could these controls be used more effectively?
6. This chapter discusses some important differences between the manufacturing and construction industries. Can you think of issues that are common to both industries?

