

INTRODUCTION TO CONSTRUCTION FINANCIAL MANAGEMENT

In this section we introduce you to construction financial management, discuss how it is different from financial management in other industries, and why strong financial management is needed in the construction industry. This section includes:

- **CHAPTER 1:** Construction Financial Management

CONSTRUCTION FINANCIAL MANAGEMENT

In this chapter you will learn what financial management is and why the financial management of construction companies is different from the financial management of most other companies.

The construction business is riskier than any other average business. In 32 of the 37 years between 1977 and 2013, the business failure rate (percent of firms that had a positive employment during the first quarter of the previous year and zero employment in the first quarter of the subsequent year) for the construction industry was higher than the combined average failure rate for all business sectors in the United States (see Figure 1-1). In the remaining five years, the failure rate for the construction industry was slightly below average. These failures are divided among companies of all ages. Figure 1-2 shows the breakdown of these failures by age of the business for 2013. The percent of business failures by size of firm for 2013 is shown in Figure 1-3.¹ In 2012, the establishment failure rate for the construction industry was 12.5% compared to a combined average failure rate 9.9% for all business sectors in the United States. The United States Census Bureau defines an establishment as “a single physical location where business is conducted”

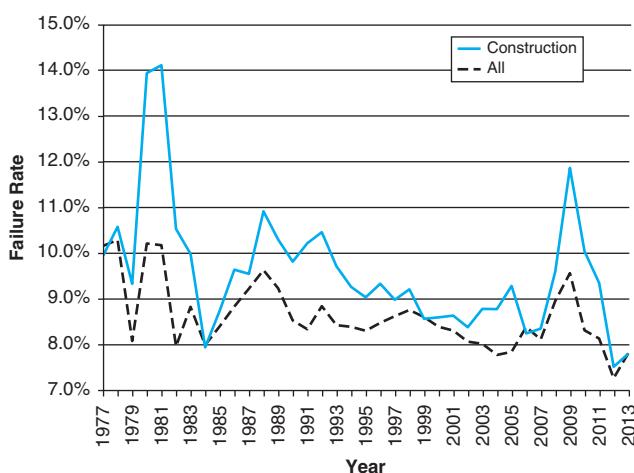


FIGURE 1-1 Business Failure Rates by Year

¹United States Census Bureau (2015). *Business Dynamics Statistics*. http://www.census.gov/ces/dataproducts/bds/data_firm.html. Accessed on August 9, 2016.

and does not include the individual construction jobsites. The residential sector had the highest establishment failure rate at 13.5%, followed by specialty contractors at 12.4%, non-residential building at 11.8%, and heavy and civil construction at 10.7%.²

What are the sources of failure for construction companies?

The Surety & Fidelity Association of America—an office that collects data on surety bonds—has identified five broad warning signs that a construction company is in trouble. They are “ineffective financial management systems... bank lines of credit constantly borrowed to the limits... poor estimating and/or job cost reporting... poor project management... [and] no comprehensive business plan”³ Four of these five sources of failure are directly related to the financial management of the company. The primary source of failure for a construction company is poor financial management, including improper accounting procedures and systems, failure to manage the company’s cash flow, failure to accurately track and manage job and equipment costs, excessive overhead, failure to plan for and achieve an acceptable profit margin, excessive debt, and failure to make business decision based on sound financial data. Without sound financial management, construction companies are setting themselves up for failure.

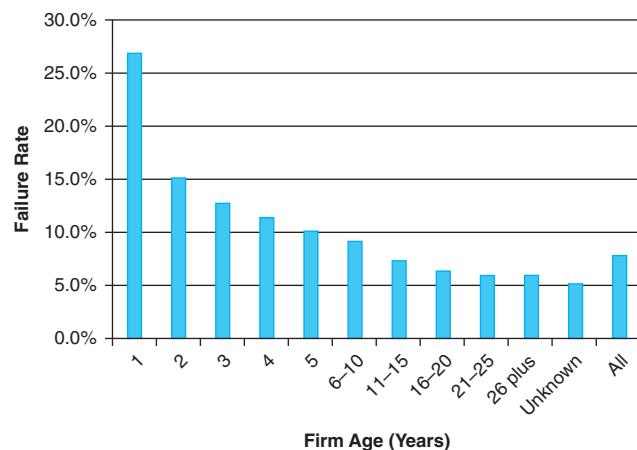


FIGURE 1-2 Business Failure Rate by Age of Firm for 2013

²United States Census Bureau (2016). *2011-2012 SUSB Employment Change Data Tables*. <https://www.census.gov/data/tables/2012/econ/susb/2012-susb-employment.html>. Accessed on August 9, 2016.

³The Surety & Fidelity Association of America, *Why Do Contractors Fail?*—downloaded May 8, 2018.

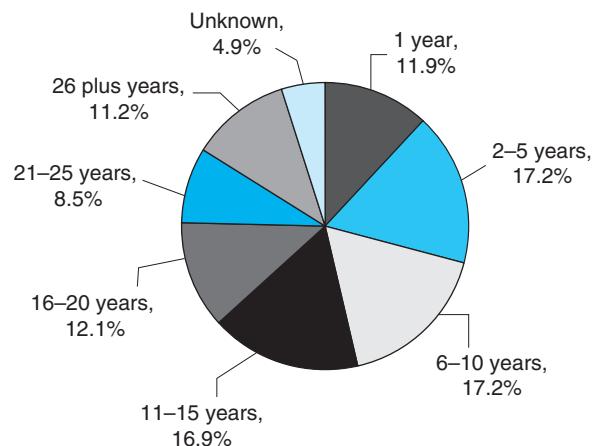


FIGURE 1-3 Percent of Business Failures by Age of Firm for 2013

WHAT IS FINANCIAL MANAGEMENT?

Financial management is the use of a company's financial resources. This includes the use of cash and other assets—such as equipment. Many everyday decisions affect a company's financial future. For example, the decision to bid on a large project can have a great impact on the finances of a company. When deciding whether to bid on a project, a manager may need to address the following questions: Does the company have enough cash resources to perform this work or will the company need outside financing? Can the company get bonded for this work? If not, what changes need to be made in the company's financial structure so that the company can get a bond for the project? Should the company hire employees to perform the work or should the company subcontract out this labor? Should the company lease or purchase the additional equipment needed for this project? If the company purchases the equipment, how should it be financed? Will this project require the company to increase its main office overhead? And, finally, what profit and overhead markup should be added to the bid? The answers to all of these questions will affect the company's finances. The answer to one of the questions may change the available options to other questions. For example, if the manager decides to hire employees to perform the work on the project, the project will require more financial resources than if the company had hired subcontractors to perform the labor and may leave the company with insufficient resources to purchase the additional equipment, and leave leasing the equipment as the only option.

WHY IS CONSTRUCTION FINANCIAL MANAGEMENT DIFFERENT?

Construction companies are different from most other companies and are faced with many unique challenges and problems not faced by companies in other industries. Although

the construction industry is producing a product—as do manufacturing plants—the construction of buildings, roads, and other structures is different from the manufacturing of most other products. Because of these unique characteristics, the financial management principles applied to other product-producing industries often need to be modified before they are applied to the construction industry, otherwise they are useless.

To understand the unique characteristics and challenges faced by the managers of construction companies let's compare the management of a construction company to the management of a manufacturing plant. For this example, we look at the manufacturing of fiberglass insulation. The manufacturing of fiberglass batt insulation can be summarized in the following steps:

1. Sand and other ingredients necessary to make glass are delivered to the plant and stored in silos.
2. The glass-making ingredients, delivered to the mixing bin by conveyor belts or other means, are mixed in the specified proportions.
3. After mixing, the ingredients are fed into a furnace, where they are heated to make molten glass.
4. The molten glass is passed through a machine that spins the glass into fibers, cools the fibers, and adds liquid binders that cause the glass fibers to stick together.
5. The spun glass is placed on a conveyor belt, where the speed of the conveyor belt controls the thickness of the insulation.
6. As the insulation proceeds along the conveyor belt, it is cut to width, and, if required, paper backing is added.
7. Finally, the insulation is cut to length, packaged, and stored for shipment.

Now that you have a basic understanding of the process used to manufacture fiberglass insulation, let's compare the management of this process to the management of a construction company.

Project Oriented

The insulation manufacturer is process oriented, whereas the construction company is project oriented. Although the insulation manufacturer produces different types of insulation, the range of products that they produce is limited. In the above example, the insulation produced may be of different thickness or *R* values, different widths, with or without paper backing, and packaged in rolls or bundles of 8-foot batts. All of these products are similar with slight variations. For many construction companies, each product is unique but often the products are very different. It is not uncommon for a construction company to be working on a tenant finish in a high-rise tower, a fire station, and an apartment complex at the same time. Even when a construction company is working on similar products—such as a homebuilder or a company building a number of convenience stores—the projects are often different due to site

conditions and locations, which affects the availability of labor and materials.

Because insulation manufacturers have a limited number of products they produce repeatedly, it is easier for them to determine their production costs. When a manager has produced a million square feet of R-11 insulation with paper backing packaged in a 15-inch-wide by 40-foot-long roll, it is easier to project the cost to produce the next 10,000 square feet than it is if the product has never been produced before. Construction companies often give clients fixed prices for a product that the company has never built or for a product that the company has never built using the local group of suppliers and subcontractors available at the project location.

The insulation manufacturer sells the same product to a wide variety of buyers at locations other than the place the insulation is manufactured. In the construction industry, projects are often custom-built for a specific owner on a specific location. The insulation manufacturer can deal with fluctuation in demand by producing and storing extra products when demand is slower for use when the demand is higher. It is relatively easy to store 50,000 square feet of insulation for immediate shipment to meet some future demand. With most of a construction company's work occurring at the individual project's location, the construction company cannot store unused production during slow times for use on future projects. How can you store 500 cubic yards of excavation for immediate use on some future project? To deal with this, the construction company must constantly bid new work to keep the company's workforce fully utilized or build speculative projects—projects without owners or buyers. Speculative building is a risky venture for the company because the product cannot be moved and often must be modified before it can be sold to another buyer.

Almost everything a construction company does is a project. Because of this, a construction company must keep accurate construction costs for each and every project that it constructs. Not only must the cost be kept for each project, but also the cost must be kept for each group of components on a project. This data is necessary to control the costs of the current project and for use in the bidding of future projects. With each project requiring a different mix of labor, materials, and equipment, knowing the cost of the components for a project is necessary to bid future projects.

Decentralized Production

The insulation manufacturers perform all of their work at a centralized location, whereas the construction company performs its work at a number of decentralized locations. Insulation manufacturing plants are set up at a fixed location with the equipment being dedicated to a specific manufacturing process for years. Employees come to the same plant year after year. In the construction industry, the equipment and employees are seldom dedicated to a single project year after year. Equipment and employees may move from job

to job on a regular basis. As a result, the location of each employee and piece of equipment must be tracked to ensure that their costs are charged to the correct job. Additionally, each crew and piece of equipment must be managed as a profit center.

Payment Terms

The insulation manufacturer bills the buyer at the time the insulation is shipped or ordered, with the expectation that the buyer will pay the full bill within a specified number of days. For many construction companies, their work consists of long-term contracts for individual projects, with monthly progress payments being made by the owner as the project is being built. Additionally, the owners often withhold retention—funds used to ensure the contractor completes the construction project—thus deferring payment of a portion of the progress payment.

The insulation manufacturer is constantly shipping materials and billing for them, which creates a relatively uniform cash flow cycle throughout the month. For many construction companies, all of their projects are on a similar billing cycle, which creates huge spikes in the cash needed for the projects. As a result, construction companies have unusual cash flows and require modification to accounting and other financial procedures to handle retention and the timing of cash flows.

Heavy Use of Subcontractors

The insulation manufacturer would never subcontract out a step in its manufacturing process, yet many construction companies rely heavily on subcontractors' work. The use of subcontractors allows a construction company to tap into a subcontractor's financial assets during the construction process. The use of subcontractors has a great impact on the finances of a construction company.

Because of these unique characteristics, it is important for the manager of a construction company to have a sound understanding not only of financial management but also of how financial management principles are applied to the construction industry. The tools that financial managers are taught in business schools must be modified to take into account the unique characteristics of the construction industry, if they are to be useful to construction managers.

WHO IS RESPONSIBLE FOR CONSTRUCTION MANAGEMENT?

The person ultimately responsible for the financial management of a construction company is often the owner or general manager. Many of the tasks related to financial management are delegated to estimators, superintendents, or project managers—particularly those tasks that are project specific. For this reason, and because many project managers, superintendents, and estimators aspire to move up

within the company or start their own construction business, it is important for all construction management students to understand the principles of financial success for a construction company. Nothing will put an employee on the fast track to success within a company faster than increasing the company's profitability through sound construction financial management. In this book the term *financial manager* is used to designate superintendents, project managers, estimators, general managers, or owners who are responsible for all or part of the financial management of a construction company or a construction project.

WHAT DOES A FINANCIAL MANAGER DO?

The financial manager is responsible for seeing that the company uses its financial resources wisely. A financial manager's responsibilities may be broken down into four broad areas that include accounting for financial resources, managing costs and profits, managing cash flows, and making financial decisions.

Accounting for Financial Resources

Financial managers are responsible for accounting or tracking how the company's financial resources are used, including the following:

- Making sure that project and general overhead costs are accurately tracked through the accounting system.
- Ensuring that a proper construction accounting system has been set up and is functioning properly.
- Projecting the costs at completion for the individual projects and ensuring that unbilled committed costs—costs that the company has committed to pay but has not received a bill for—are included in these projections.
- Determining whether the individual projects are over- or underbilled.
- Making sure that the needed financial statements have been prepared.
- Reviewing the financial statements to ensure that the company's financial structure is in line with the rest of the industry and trying to identify potential financial problems before they become a crisis.

Chapters 2 through 6 will help prepare you to fulfill these functions.

In Chapter 2 you will be introduced to the structure of construction financial statements, including the different ledgers used by construction accounting systems. You will also learn the difference between accounting systems that are used for cost reporting and systems that are used for controlling costs, as well as the different accounting methods available to construction companies. Because of the unique characteristics of construction companies, there are some key differences between accounting systems and financial

statements for the construction industry and other industries. Before you can understand how to read a construction company's financial statements or how construction costs are tracked and managed, you must understand how construction accounting systems operate.

In Chapter 3 you will gain a better understanding of how different accounting transactions are processed in the accounting system. There are a number of unique transactions that take place in construction accounting that do not occur in other industries. Most of these transactions are a result of the construction industry's focus on job costing, equipment tracking, and accounting for long-term contracts. Understanding these transactions is important for three reasons: First, some project costs—such as labor burden and equipment costs—are often generated by the accounting system rather than an invoice or time card. Understanding how these costs are obtained will help you gain a better understanding of how to estimate these costs and incorporate them in the financial analysis of the project. Second, financial managers must review the accounting reports for errors—improperly billed costs and omitted costs—and ensure that the necessary corrections are made. Understanding how the costs are generated will help you better understand how to interpret the accounting reports. Finally, for the general manager and owner, understanding construction accounting is necessary to ensure that the accounting system is set up to meet the needs of the company. Some construction companies are using substandard accounting systems because the management does not understand how accounting systems should be structured to meet the needs of the construction industry.

In Chapter 4 you will increase your understanding of construction accounting systems. You will learn to track committed costs outside the accounting system if your company's accounting system does not track committed costs, which will also help you understand how accounting systems track committed costs. You will learn to use committed costs to project the estimated cost and profit at completion for projects. You will also learn to calculate over- and underbillings. Finally, you will learn about the internal controls needed to protect your financial resources and what to look for in computerized construction accounting systems.

In Chapter 5 you will learn the differences among the methods available for depreciating construction assets, including the methods used for tax purposes. Understanding the difference in depreciation methods is necessary for a manager to interpret the financial statement and financial ratios, which is covered in the next chapter. Simply put, changing the method of depreciation can have a significant impact on the company's financial statements. An understanding of depreciation is also necessary when preparing income tax projections, which is discussed in Chapter 13.

In Chapter 6 you will learn to use financial ratios to analyze the company's financial statements, including comparing the company's ratios to industrial averages. This will include adapting commonly used ratios to the unique characteristics of the construction industry. Analysis of the

financial statements will help the financial manager identify problems before they become a crisis. These problems may be life threatening to the company (such as realizing that the company will not be able to pay its bills in the upcoming months) or simple planning issues (such as identifying that the company's equipment is aging and that funds need to be set aside to replace this equipment in the next few years).

Managing Costs and Profits

Financial managers are responsible for managing the company's costs and earning a profit for the company's owners. Financial managers rely heavily on the reports from the accounting system in their management of costs. Managing the company's costs and profits includes the following duties:

- Monitoring and controlling project costs
- Monitoring project and company profitability
- Setting labor burden markups
- Developing and tracking general overhead budgets
- Setting the minimum profit margin for use in bidding
- Analyzing the profitability of different parts of the company and making the necessary changes to improve profitability
- Monitoring the profitability of different customers and making the necessary marketing changes to improve profitability

Chapters 7 through 11 will help to prepare you to fulfill these functions.

In Chapter 7 you will learn to monitor and control construction costs for materials, labor, subcontractors, equipment, other costs, and general overhead. You will also learn to measure the success of the project by monitoring profitability, using the schedule performance index, the cost performance index, and project closeouts. These skills help financial managers determine the success of projects and identify problem areas on projects, regardless of whether you are a project manager or superintendent who wants to know how your project is doing, or a general manager or owner who wants to know how well your project managers and superintendents are running their projects.

In Chapter 8 you will learn to determine the labor burden markup. This helps you better understand how to project these costs, whether they are to be used to bid a new job, price a change order, or project the cost to complete the project. This helps the general manager and owner determine the labor costs needed to prepare a general overhead budget.

In Chapter 9 you will learn how to prepare a general overhead budget that may be used to track overhead costs. It is easy for a company to squander its profits by failing to control general overhead costs. Construction managers often spend enormous amounts of time and effort budgeting, tracking, and controlling construction costs while ignoring general overhead costs. Just as a project manager or

superintendent tracks and manages construction costs on a project, the general manager or owner needs to track and manage the general overhead costs. The key to doing this is to set and follow a general overhead budget. A general overhead budget is also needed to prepare the company's annual cash flow projection, which is discussed in Chapter 14.

In Chapter 10 you will learn to set profit margins for use in bidding and how the profit changes as the volume of work changes. You will also learn to determine the volume of construction work and profit and overhead markup necessary to cover the costs associated with the general overhead. Profits are used to pay for general overhead costs and provide the owners with a profit. If the profits are insufficient to cover the general overhead costs, the company will consume its available cash and fail. If the profits fail to provide the owner with a reasonable profit, the owner may decide that there are better places to invest his or her money and the company will lose financing.

In Chapter 11 you will learn to analyze the profitability of different parts of the company and identify where the company needs to make changes to improve profitability. You will learn to choose between hiring a subcontractor and self-performing work. You will also learn to monitor the profitability of different customers and identify which customers should be developed and which customers your company would be better off without.

Managing Cash Flows

Financial managers are responsible for managing the cash flows for the company. Many profitable companies fail because they simply run out of cash and are unable to pay their bills. The duties of a financial manager include the following:

- Matching the use of in-house labor and subcontractors to the cash available for use on a project
- Ensuring that the company has sufficient cash to take on an additional project
- Preparing an income tax projection for the company
- Preparing and updating annual cash flow projections for the company
- Arranging for financing to cover the needs of the construction company

Chapters 12 through 16 will help prepare you to perform these functions.

In Chapter 12 you will learn to develop a cash flow projection for a construction project from both the perspective of a construction company that is receiving progress payments (draws) from the project's owner and from the perspective of a construction company that receives a single payment when the project is sold—such as is the case with many homebuilders. For companies in either of these situations, the company must pay for some or all of the construction costs—especially labor—from the company's funds

before being reimbursed for these costs. To cover these costs the company needs cash. Because inadequate funding of the construction company can spell doom for a construction project as well as for all of the companies involved, it is important that managers accurately project both the amount and timing of the cash required by a construction project. Understanding the cash flow for a construction project is a prerequisite to preparing a cash flow for an entire construction company, which is discussed in Chapter 14.

In Chapter 13 you will learn the fundamentals of income taxes and how to prepare an income tax projection. Income taxes are a significant expense to the company and need to be included in the company's annual cash flow projection. Having an unexpected income tax bill can reduce the funds available for use on construction projects to a dangerously low level.

In Chapter 14 you will learn how to prepare an annual cash flow projection for a construction company. This is necessary to ensure that the company has sufficient cash for the upcoming year. Should a financial manager find that there are insufficient funds, he or she will have time to arrange financing to provide the necessary funds. Annual cash flow projections for a company are prepared by projecting the annual revenues and construction costs for the construction company by combining the cash flows from the individual jobs or are based on historical data. The financial manager must then combine the projected revenues, construction costs, the general overhead budget, and the projected income taxes with the company's available cash to determine the cash needs of the company.

In Chapter 15 you will learn to convert cash flows occurring in one time period to an equivalent cash flow occurring at another time period or into a uniform series of cash flows occurring over successive periods. Understanding the time value of money is a prerequisite to understanding debt financing and how to compare two or more financial options, which are the topics of Chapters 16, 17, and 18. Additionally, you will learn how to adjust interest rates for inflation.

In Chapter 16 you will learn about financial instruments that can be used to provide the necessary cash for a construction company's operation. You will also learn to compare debt instruments with different conditions and learn how loan provisions and closing costs can increase the effective interest rate on a loan or line of credit. An understanding of these principles helps you reduce borrowing costs and determine the best way to provide the cash needed to operate a construction company. Success in obtaining financing for a company can allow the company to take on additional projects, whereas failure to obtain financing can spell doom for a company.

Choosing among Financial Alternatives

Financial managers are responsible for selecting among financial alternatives. These decisions include the following:

- Selecting which equipment to purchase
- Deciding in which areas of the business to invest the company's limited resources

There are many financial tools that are available to quantitatively analyze the alternatives. In Chapters 17 and 18 you will learn to use these tools.

In Chapter 17 you will learn 10 quantitative methods that may be used to analyze financial alternatives and choose the alternative that is best for the company. Without some quantitative method, it is hard for managers to determine which option is best. Understanding these skills is necessary for any manager who must decide where to invest limited capital.

In Chapter 18 you will learn how income taxes can influence the choice of financial decisions and how to incorporate income taxes into the decision-making tools from Chapter 17. If income taxes affected all alternatives in the same way, income taxes would not be an issue; however, income taxes can make some financial alternatives preferable. With income tax rates of up to 37%, financial managers must take income taxes into account by weighing financial alternatives.

Conclusion

A construction company is a risky venture. Each year, many construction companies go out of business. Operating a successful construction company requires a specialized set of financial management skills, because of the unique nature of the construction industry. Unlike other industries, the construction industry faces a number of challenges including: (1) constantly building unique, one-of-a-kind projects, (2) building a project at a different location each time, (3) dealing with retention and progress payments, and (4) relying heavily on the use of subcontractors to complete the projects. This book is designed to help the reader develop the financial management skills required to become a successful construction manager.

Discussion Questions

1. According to the The Surety & Fidelity Association of America, what are the warning signs that a construction company is in financial trouble?
2. Who is responsible for financial management in a construction company?
3. Why is construction financial management different from the financial management of other companies?
4. What activities are involved in accounting for the company's financial resources?
5. What activities are involved in managing the company's costs and profits?

6. What activities are involved in managing the company's cash flows?
7. List some examples of financial decisions that construction managers must make.
8. Using the journal articles, newspapers, and the Internet, find one article that discusses the reasons why construction companies fail or outlines the failure of a specific construction company. Answer the following questions about the article you selected:
 - a. Who wrote the article and what makes the writer(s) a creditable source?
 - b. What sources of failure does the writer(s) identify?
 - c. Which of these sources of failure could be grouped under accounting and financial management?
 - d. How does this article underscore the need for a great accounting system and strong financial management?

Come to class prepared to discuss your findings.