CHAPTER

14

Cash Flows for Construction Companies

In this chapter you 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 for the necessary 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 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.

Companies should not wait until the need for cash arises but should be actively looking into the future, trying to anticipate the need for cash well in advance of the arising need. Waiting for the need to arise is dangerous for two reasons. First, it takes time to arrange for the necessary funding. If one waits until the need arises the company must struggle financially while the financing is obtained. Second, financing is easier to get when a company does not need it. For companies with a surplus of cash, the preparation of a cash flow projection allows the company to wisely plan the investment of its surplus cash. After setting target levels for revenues, gross profit margin, general overhead costs, and profit from operations, management should prepare a cash flow projection to determine the amount of cash needed to meet these target levels and develop a plan of how it is going to obtain this cash. Sometimes management may find that the target levels need to be revised because it cannot obtain the required cash. In addition to preparing the annual cash flow projection, it is a good idea to update this projection a few months before the end of the year, thus allowing management time to implement year-end cash management and tax strategies. Careful planning helps a company's management more fully utilize the company's financial resources.

The process of developing an annual cash flow projection may be broken down into the following steps:

1. Project revenues, construction costs, cash receipts, and cash disbursements for the individual projects, as outlined in Chapter 12. Combine the cash flow from the projects to get a cash flow for the company.
2. Determine the cash disbursement associated with the general overhead, as outlined in Chapter 9. Combine this cash flow with the combined cash flow from the projects to get the cash flow from operations.
3. Incorporate other income and expenses—for example, interest—and income taxes, and determine the monthly cash flow (income tax was covered in Chapter 13).
4. For companies that receive most of their revenue at the end of the month, check the minimum bank balance during the month.
5. Run what-if scenarios, sensitive analyses, and other simulations to determine how the company's needs change as the input parameters change.

Let's look at these steps.

Incorporating Construction Operations

Estimating the revenues, construction costs, cash receipts, and cash disbursements is the most difficult part of this process. The estimate should include not only current projects that will carry forward into the next year but also a realistic projection of new projects to be obtained during the year. For companies that rely heavily on open-market bidding, it is impossible to determine which projects they are going to win during the year. These companies must set target levels for each of these items as well as the amount of new work they will obtain during the year. The concepts discussed in Chapter 10 may be used to set these target levels. For companies that work for a few select clients on a negotiated basis or rely heavily on design-build projects, it is easier to project what projects they will be constructing during the next year. This is because they are often involved in the project during the design phase, giving them a better picture of what is coming in the future. As you develop these projections it is important to remember that they are only projections and will need to be revised during the year because schedules change, projects are delayed or canceled, and new opportunities arise. Developing these projections in a computer spreadsheet makes it easier to make changes as circumstances change.

There are two things to keep in mind when developing the company cash flow projection from project cash flow projections. First, some of the projects will start before or finish after the period of time for which the company's cash flow is being projected. When this happens, only the revenues, construction costs, cash receipts, and cash disbursements that occur during the period of time for which the company's cash flow is being projected are included in the calculations. Care

must be taken to ensure that unpaid revenues, unpaid retention, and unpaid bills are taken into account. For example, a project that is in progress before and finishes during the period of time for which the company's cash flow is being projected may have retention that was withheld prior to the period of time for which the company's cash flow is being projected. This retention will generate a cash flow that needs to be included in the company's cash flow projection. Second, the revenues, construction costs, cash receipts, and cash disbursements must be calculated for each individual project and then combined because the projects often have different payment schedules or retention rates.

Example 14-1: Determine the revenues, construction costs, cash receipts, and cash disbursements for a construction company that currently has three projects under contract for the next year and anticipates picking up a fourth project during the year.

For the first project, the project's owner is holding $50,000 in retention from this year's payments and will continue to hold 10% retention on all payments during the next year. The construction company is holding $26,000 retention on its subcontractors from the previous year's payments. The retention for this project is expected to be released in June. The estimated bill to the project's owner and construction costs for the first project are shown in Table 14-1.

For the second project, the project's owner is holding $150,000 in retention from this year's payments and will continue to hold 5% retention on all payments during the next year. The construction company is holding $82,000 retention on its subcontractors from the previous year's payments. The retention for this project is expected to be released the following year. The estimated bill to the project's owner and construction costs for the second project are shown in Table 14-2.

The third project is expected to start in February. The project's owner will hold a 10% retention on all payments during the year. The retention for this project is expected to be released in December. The construction company will withhold retention from the payments to its subcontractors. The estimated bill to the project's owner and construction costs for the third project are shown in Table 14-3.

TABLE 14-1 Bill to Owner and Construction Costs for the First Project

		Costs			
Month	Bill to Owner ($)	Material ($)	Labor ($)	Sub. ($)	Other ($)
Dec.	504,000	132,000	121,000	193,000	20,000
Jan.	448,000	98,000	109,000	192,000	15,000
Feb.	336,000	87,000	69,000	145,000	10,000
March	392,000	69,000	65,000	220,000	8,000
April	224,000	45,000	52,000	105,000	5,000
Total	1,904,000	431,000	416,000	855,000	58,000

TABLE 14-2 Bill to Owner and Construction Costs for the Second Project

		COSTS			
MONTH	BILL TO OWNER ($)	MATERIAL ($)	LABOR ($)	SUB. ($)	OTHER ($)
Dec.	160,000	54,000	55,000	18,000	15,000
Jan.	320,000	95,000	89,000	83,000	17,000
Feb.	256,000	85,000	85,000	38,000	20,000
March	288,000	85,000	81,000	69,000	21,000
April	320,000	82,000	76,000	104,000	22,000
May	320,000	75,000	81,000	107,000	21,000
June	320,000	65,000	69,000	127,000	23,000
July	320,000	62,000	59,000	139,000	24,000
Aug.	256,000	57,000	55,000	95,000	21,000
Sept.	192,000	45,000	49,000	58,000	18,000
Oct.	160,000	35,000	39,000	51,000	18,000
Nov.	192,000	30,000	33,000	92,000	15,000
Dec.	96,000	25,000	19,000	31,000	10,000
Total	3,200,000	795,000	790,000	1,012,000	245,000

The company anticipates picking up a fourth project from a current customer with a start date of October. The owner of this project will not hold retention. The estimated bill to the project's owner and construction costs for the fourth project are shown in Table 14-4.

The company's fiscal and tax year starts in January and December. The company uses the percentage-of-completion method of accounting. Cash receipts from the project's owner are received before the end of the month after the company bills its clients. Labor costs are paid weekly. Material bills are paid in full when the payment is received from the owner.

TABLE 14-3 Bill to Owner and Construction Costs for the Third Project

		COSTS			
MONTH	BILL TO OWNER ($)	MATERIAL ($)	LABOR ($)	SUB. ($)	OTHER ($)
Feb.	120,000	35,000	42,000	24,000	7,000
March	105,000	37,000	32,000	18,000	8,000
April	225,000	55,000	53,000	86,000	8,000
May	240,000	47,000	52,000	109,000	8,000
June	225,000	49,000	45,000	100,000	8,000
July	180,000	35,000	41,000	78,000	8,000
Aug.	135,000	39,000	36,000	39,000	8,000
Sept.	150,000	35,000	32,000	60,000	8,000
Oct.	120,000	22,000	29,000	50,000	7,000
Total	1,500,000	354,000	362,000	564,000	70,000

TABLE 14-4 Bill to Owner and Construction Costs for the Fourth Project

MONTH	BILL TO OWNER ($)	COSTS			
		MATERIAL ($)	LABOR ($)	SUB. ($)	OTHER ($)
Oct.	180,000	49,000	38,000	56,000	25,000
Nov.	300,000	75,000	67,000	111,000	27,000
Dec.	420,000	119,000	125,000	119,000	29,000
Total	900,000	243,000	230,000	286,000	81,000

Subcontractor bills are paid—less retention—when payment is received from the owner. The retention withheld from the subcontractor payments is based on the same retention rate that is held by the project's owner and will be paid to the subcontractor when the owner releases the retention. Other costs are paid at the end of the month the costs are incurred.

Solution: First, let's look at revenues. Because the company uses the percentage-of-completion method, the revenues are recognized when the company bills the owner; therefore, the monthly revenues equal the monthly billings to the project's owners. The revenues for January are calculated as follows:

$$\text{Revenues}_{\text{Jan}} = \$448{,}000 + \$320{,}000 + \$0 + \$0 = \$768{,}000$$

The revenues for the remaining months of the year are calculated in a similar manner. The revenues for next year are shown in Table 14-5.

Next, let's look at material costs. Because the company uses the percentage-of-completion method, the construction costs are recognized when the company receives the material bill; therefore, the material bills are received in the same month that the costs are recognized. This is true for labor, subcontractor, and other costs. We begin by calculating material costs in December of the current year, because these costs will be paid in January of next year and are needed to calculate January's cash flow. December's material costs are calculated as follows:

$$\text{Material}_{\text{Dec}} = \$132{,}000 + \$54{,}000 + \$0 + \$0 = \$186{,}000$$

TABLE 14-5 Revenues for Next Year

MONTH	REVENUES ($)	MONTH	REVENUES ($)
Jan.	768,000	July	500,000
Feb.	712,000	Aug.	391,000
March	785,000	Sept.	342,000
April	769,000	Oct.	460,000
May	560,000	Nov.	492,000
June	545,000	Dec.	516,000
		Total	6,840,000

TABLE 14-6 Material Costs for Next Year

MONTH	MATERIALS ($)	MONTH	MATERIALS ($)
Jan.	193,000	July	97,000
Feb.	207,000	Aug.	96,000
March	191,000	Sept.	80,000
April	182,000	Oct.	106,000
May	122,000	Nov.	105,000
June	114,000	Dec.	144,000
		Total	1,637,000

For this sample problem the material suppliers were paid when payment was received from the project's owner; therefore, they will be paid the month following receipt of their bill. When the payment terms for material suppliers are different from this, the cash flow should be adjusted to match the actual cash flow created by payment of their bills. The material costs for next year are calculated in a similar manner and are shown in Table 14-6.

Next, let's look at labor costs. To simplify calculations we assume all labor is paid during the month that it was performed, although the labor costs for the last weeks of the month will be paid during the first week of the next month. If labor is paid every two weeks, a better assumption would be that half of this month's labor and half of last month's labor is paid during this month. The assumption should try to predict the actual cash flow without overcomplicating the calculations. We begin by calculating labor costs in January of next year because December's costs will be recorded and paid in December. The labor costs for January are calculated as follows:

$$\text{Labor Costs}_{\text{Jan}} = \$109{,}000 + \$89{,}000 + \$0 + \$0 = \$198{,}000$$

The labor costs for the remaining months of the year are calculated in a similar manner. The labor costs for next year are shown in Table 14-7.

Next, let's look at subcontractor costs. Because the company uses the percentage-of-completion method, the subcontractor costs are recognized when the company receives the subcontractor's bill. We begin by calculating

TABLE 14-7 Labor Costs for Next Year

MONTH	LABOR ($)	MONTH	LABOR ($)
Jan.	198,000	July	100,000
Feb.	196,000	Aug.	91,000
March	178,000	Sept.	81,000
April	181,000	Oct.	106,000
May	133,000	Nov.	100,000
June	114,000	Dec.	144,000
		Total	1,622,000

TABLE 14-8 Subcontractor Costs for Next Year

MONTH	SUB. ($)	MONTH	SUB. ($)
Jan.	275,000	July	217,000
Feb.	207,000	Aug.	134,000
March	307,000	Sept.	118,000
April	295,000	Oct.	157,000
May	216,000	Nov.	203,000
June	227,000	Dec.	150,000
		Total	2,506,000

subcontractor costs in December of the current year because these costs will be paid in January of next year and are needed to calculate January's cash flow. The subcontractor costs for December of the current year are calculated as follows:

$$\text{Sub. Costs}_{\text{Dec}} = \$193{,}000 + \$18{,}000 + \$0 + \$0 = \$211{,}000$$

The subcontractor costs for next year are calculated in a similar manner and are shown in Table 14-8.

Next, let's look at the other costs. Because the company uses the percentage-of-completion method, the construction costs are recognized when the company receives the bills. We begin by calculating the other costs in January of next year because December's costs will be recorded and paid in December. The other costs for January are calculated as follows:

$$\text{Other Costs}_{\text{Jan}} = \$15{,}000 + \$17{,}000 + \$0 + \$0 = \$32{,}000$$

The other costs for the remaining months of the year are calculated in a similar manner. The other costs for next year are shown in Table 14-9.

The total construction costs for each month of next year equal the sum of the material, labor, subcontract, and other costs for each month. The total construction costs for January are calculated as follows:

$$\text{Const. Costs}_{\text{Jan}} = \$193{,}000 + \$198{,}000 + \$275{,}000 + \$32{,}000$$
$$\text{Const. Costs}_{\text{Jan}} = \$698{,}000$$

TABLE 14-9 Other Costs for Next Year

MONTH	OTHER ($)	MONTH	OTHER ($)
Jan.	32,000	July	32,000
Feb.	37,000	Aug.	29,000
March	37,000	Sept.	26,000
April	35,000	Oct.	50,000
May	29,000	Nov.	42,000
June	31,000	Dec.	39,000
		Total	419,000

TABLE 14-10 Total Costs for Next Year

MONTH	TOTAL ($)	MONTH	TOTAL ($)
Jan.	698,000	July	446,000
Feb.	647,000	Aug.	350,000
March	713,000	Sept.	305,000
April	693,000	Oct.	419,000
May	500,000	Nov.	450,000
June	486,000	Dec.	477,000
		Total	6,184,000

The total costs for each month are calculated in a similar manner. The total costs for next year are shown in Table 14-10.

Next, let's look at cash receipts. The company expects that the cash receipts will occur in the month following the recognizing of the revenue and will be reduced by the retention held by the project's owner. The reason the cash receipt occurs in the following month is because revenue is recognized when the owner is billed rather than when the cash is received under the percentage-of-completion accounting method. An additional cash receipt will occur when the project's owner releases the retention. The cash receipts—except for the receipt when the project's owner releases retention—for each project are calculated as follows:

$$\text{Cash Receipt}_n = \text{Revenues}_{n-1}(1 - \text{Retention Rate})$$

When the project's owner releases retention, the cash receipt will equal the current month's payment plus all of the retention withheld by the project's owner.

For the first project, the owner holds a 10% retention; therefore, January's cash receipt from the project is as follows:

$$\text{Cash Receipt}_{\text{Jan}} = \$504{,}000(1 - 0.10) = \$453{,}600$$

The retention withheld from January's payments is calculated as follows:

$$\text{Retention}_n = \text{Revenues}_{n-1}(\text{Retention Rate})$$
$$\text{Retention}_{\text{Jan}} = \$504{,}000(0.10) = \$50{,}400$$

The cash receipts and retention held for February through May are calculated in a similar manner.

In June the retention will be released, which will include the $50,000 held during this year plus the retention held from next year's payments. The June cash receipt is calculated as follows:

$$\text{Cash Receipt}_{\text{June}} = \$50{,}000 + \$50{,}400 + \$44{,}800 + \$33{,}600 + \$39{,}200 + \$22{,}400$$
$$\text{Cash Receipt}_{\text{June}} = \$240{,}400$$

The cash receipts and retention withheld for the first project are shown in Table 14-11.

TABLE 14-11 Cash Receipts and Retention for the First Project for Next Year

MONTH	CASH RECEIPT ($)	RETENTION ($)
Jan.	453,600	50,400
Feb.	403,200	44,800
March	302,400	33,600
April	352,800	39,200
May	201,600	22,400
June	240,400	0
Total	1,954,000	

For the second project, the owner holds a 5% retention; therefore, January's cash receipt is as follows:

$$\text{Cash Receipt}_{\text{Jan}} = \$160{,}000(1 - 0.05) = \$152{,}000$$

The retention withheld from January's payments is calculated as follows:

$$\text{Retention}_{\text{Jan}} = \$160{,}000(0.05) = \$8{,}000$$

The cash receipts and retention held for February through December are calculated in a similar manner. The cash receipts and retention withheld for the second project are shown in Table 14-12.

For the second project, retention will not be released during the year. At the end of the year the company would have been paid $2,948,800 on the project and there will be $155,200 withheld in retention.

TABLE 14-12 Cash Receipts and Retention for the Second Project for Next Year

MONTH	CASH RECEIPT ($)	RETENTION ($)
Jan.	152,000	8,000
Feb.	304,000	16,000
March	243,200	12,800
April	273,600	14,400
May	304,000	16,000
June	304,000	16,000
July	304,000	16,000
Aug.	304,000	16,000
Sept.	243,200	12,800
Oct.	182,400	9,600
Nov.	152,000	8,000
Dec.	182,400	9,600
Total	2,948,800	

TABLE 14-13 Cash Receipts and Retention for the Third Project for Next Year

MONTH	CASH RECEIPT ($)	RETENTION ($)
March	108,000	12,000
April	94,500	10,500
May	202,500	22,500
June	216,000	24,000
July	202,500	22,500
Aug.	162,000	18,000
Sept.	121,500	13,500
Oct.	135,000	15,000
Nov.	108,000	12,000
Dec.	150,000	0
Total	1,500,000	

For the third project, the first cash receipt will be received in March and the owners will hold a 10% retention. In December the retention withheld will be released. The cash receipts and retention withheld for the third project are calculated in the same way they were for the first project and are shown in Table 14-13.

For the fourth project, the first cash receipt will be received in November. The owner will not hold retention. The monthly cash receipts are as follows:

$$\text{Cash Receipt}_{\text{Nov}} = \$180{,}000$$
$$\text{Cash Receipt}_{\text{Dec}} = \$300{,}000$$

The total cash receipts for the fourth project for next year are $480,000.

The cash receipts for the company equal the sum of the cash receipts for the individual projects. The cash receipt for January is calculated as follows:

$$\text{Cash Receipt}_{\text{Jan}} = \$453{,}600 + \$152{,}000 + \$0 + \$0 = \$605{,}600$$

The cash receipts for the remaining month of the next year are calculated in a similar manner. The cash receipts for the next year are shown in Table 14-14.

Next, let's look at cash disbursements. Because the timing of the disbursements is different for materials, labor, subcontractors, and other costs, these costs need to be addressed separately. The cash disbursements for each project will be calculated separately because retention is withheld from the subcontractor's payments and the retention rates vary from project to project.

The cash disbursements for materials will occur in the month following the receipt of the bill for the materials. Because retention will not be withheld from the payments, the cash disbursement will equal the material

TABLE 14-14 Cash Receipts for Next Year

MONTH	CASH RECEIPTS ($)	MONTH	CASH RECEIPTS ($)
Jan.	605,600	July	506,500
Feb.	707,200	Aug.	466,000
March	653,600	Sept.	364,700
April	720,900	Oct.	317,400
May	708,100	Nov.	440,000
June	760,400	Dec.	632,400
		Total	6,882,800

costs from the previous month. January's cash disbursements for materials on the first project are $132,000.

The cash disbursements for labor will occur throughout the month the labor costs are incurred. To simplify calculation we assume all labor is paid during the month that it was performed, although the labor costs for the last weeks of the month will be paid during the first week of the next month. January's cash disbursements for labor on the first project are $109,000.

The cash disbursements to subcontractors will occur in the month following the receipt of the bill from the subcontractors. For the first project a 10% retention is withheld from the subcontractor's payments; therefore, the cash disbursement for January is calculated as follows:

$$\text{Sub. Cash Disbursements}_n = \text{Sub.}_{n-1}(1 - \text{Retention Rate})$$
$$\text{Sub. Cash Disbursements}_{\text{Jan}} = \$193{,}000(1 - 0.10) = \$173{,}700$$

The retention withheld from January's payment to the subcontractors is calculated as follows:

$$\text{Retention}_n = \text{Revenues}_{n-1}(\text{Retention Rate})$$
$$\text{Retention}_{\text{Jan}} = \$193{,}000(0.10) = \$19{,}300$$

For other types of costs the cash disbursements will occur at the end of the month in which the other costs occur. January's cash disbursements for other costs on the first project are $15,000.

The total cash disbursements for the first project are the sum of the cash disbursements for materials, labor, subcontractors, and other costs. The cash disbursement for January is calculated as follows:

$$\text{Cash Disbursements}_{\text{Jan}} = \$132{,}000 + \$109{,}000 + \$173{,}00 + \$15{,}000$$
$$\text{Cash Disbursements}_{\text{Jan}} = \$429{,}700$$

The cash disbursements for the remaining months are calculated in a similar manner, except for the cash disbursements to subcontractors for the month of June. In June the retention will be released to the subcontractors,

TABLE 14-15 Cash Disbursements for Projects

MONTH	FIRST ($)	SECOND ($)	THIRD ($)	FOURTH ($)
Jan.	429,700	177,100	0	0
Feb.	349,800	278,850	49,000	0
March	290,500	223,100	96,600	0
April	324,000	248,550	114,200	0
May	139,500	282,800	192,400	0
June	111,500	268,650	198,100	0
July	0	268,650	188,000	0
Aug.	0	270,050	149,200	0
Sept.	0	214,250	114,100	0
Oct.	0	157,100	125,000	63,000
Nov.	0	131,450	67,000	199,000
Dec.	0	146,400	56,400	340,000
Total	1,645,000	2,666,950	1,350,000	602,000

which will include the $26,000 held during the previous year and the retention held from this year's payments. June's cash disbursements to subcontractors are calculated as follows:

$$\text{Sub. Cash Disbursements}_{\text{June}} = \$26{,}000 + \$19{,}300 + \$19{,}200 + \$14{,}500 + \$22{,}000 + \$10{,}500$$

$$\text{Sub. Cash Disbursements}_{\text{June}} = \$111{,}500$$

The cash disbursements for the remaining projects are calculated in the same manner. The cash disbursements for the projects are shown in Table 14-15.

The total cash disbursements for construction costs may be obtained by summing the cash disbursements for the individual projects. The monthly cash disbursements are shown in Table 14-16.

The revenues, construction costs, cash receipts, and cash disbursements may be calculated in spreadsheet format as shown in Figure 14-1.

TABLE 14-16 Total Cash Disbursements

MONTH	CASH DISBURSEMENTS ($)	MONTH	CASH DISBURSEMENTS ($)
Jan.	606,800	July	456,650
Feb.	677,650	Aug.	419,250
March	610,200	Sept.	328,350
April	686,750	Oct.	345,100
May	614,700	Nov.	397,450
June	578,250	Dec.	542,800
		Total	6,263,950

Incorporating General Overhead

Once the cash receipts and disbursements have been calculated for each of the anticipated construction projects and have been combined for a company-wide total, we are ready to determine the cash disbursements associated with the general overhead. At this point we do not include other income and expenses that are not from construction operations—such as interest—and do not include income taxes. The preparation of a general overhead budget was covered in Chapter 9. To prepare an annual cash flow, the general overhead budget must be prepared on a monthly basis and must be the general overhead budget prepared for cash flow purposes.

Example 14-2: Using the general overhead budget from Example 9-3, determine the cash disbursements associated with the general overhead budget for the company in Example 14-1. Assume that all overhead costs—except labor—are paid at the end of the month they occur. Labor will be paid weekly.

Solution: Because the costs are assumed to be paid in the month they occur, the general overhead budget is the same as the cash disbursement resulting from the general overhead budget. Using the general overhead budget from Example 9-3, we get the cash disbursements shown in Table 14-17 for the company in Example 14-1.

At this point we can determine the cash flow for the company from the construction operations and after accounting for the general overhead. This may be referred to as the cash flow from operations.

Example 14-3: Determine the monthly cash flow from operations for the company in Examples 14-1 and 14-2.

Solution: The cash flow equals the cash receipts less the cash disbursements resulting from construction costs less the cash disbursements from

Table 14-17 Monthly General Overhead Budget

Month	Budget ($)	Month	Budget ($)
Jan.	43,972	July	65,321
Feb.	41,949	Aug.	36,686
March	42,742	Sept.	35,851
April	46,946	Oct.	38,459
May	39,238	Nov.	37,537
June	39,066	Dec.	55,897
		Total	523,663

Project 1

Retention: 10%
Previous Retention: 50,000
Sub. Retention: 26,000
Retention Paid in: June

Month	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Revenues	504,000	448,000	336,000	392,000	224,000	—	—	—	—	—	—	—	—	1,400,000
Construction Costs														
Materials	132,000	98,000	87,000	69,000	45,000	—	—	—	—	—	—	—	—	299,000
Labor	121,000	109,000	69,000	65,000	52,000	—	—	—	—	—	—	—	—	295,000
Subcontract	193,000	192,000	145,000	220,000	105,000	—	—	—	—	—	—	—	—	662,000
Other	20,000	15,000	10,000	8,000	5,000	—	—	—	—	—	—	—	—	38,000
Total	466,000	414,000	311,000	362,000	207,000	—	—	—	—	—	—	—	—	1,294,000
Cash Receipts		453,600	403,200	302,400	352,800	201,600	240,400	—	—	—	—	—	—	1,954,000
Cash Disbursements		429,700	349,800	290,500	324,000	139,500	111,500	—	—	—	—	—	—	1,645,000

Project 2

Retention: 5%
Previous Retention: 150,000
Sub. Retention: 82,000
Retention Paid in:

Month	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Revenues	160,000	320,000	256,000	288,000	320,000	320,000	320,000	320,000	256,000	192,000	160,000	192,000	96,000	3,040,000
Construction Costs														
Materials	54,000	95,000	85,000	85,000	82,000	75,000	65,000	62,000	57,000	45,000	35,000	30,000	25,000	741,000
Labor	55,000	89,000	85,000	81,000	76,000	81,000	69,000	59,000	55,000	49,000	39,000	33,000	19,000	735,000
Subcontract	18,000	83,000	38,000	69,000	104,000	107,000	127,000	139,000	95,000	58,000	51,000	92,000	31,000	994,000
Other	15,000	17,000	20,000	21,000	22,000	21,000	23,000	24,000	21,000	18,000	18,000	15,000	10,000	230,000
Total	142,000	284,000	228,000	256,000	284,000	284,000	284,000	284,000	228,000	170,000	143,000	170,000	85,000	2,700,000
Cash Receipts		152,000	304,000	243,200	273,600	304,000	304,000	304,000	304,000	243,200	182,400	152,000	182,400	2,948,800
Cash Disbursements		177,100	278,850	223,100	248,550	282,800	268,650	268,650	270,050	214,250	157,100	131,450	148,400	2,666,950

Project 3

Retention: 10%
Sub. Retention:
Previous Retention:
Retention Paid in: Dec.

Month	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Revenues	—	—	120,000	105,000	225,000	240,000	225,000	180,000	135,000	150,000	120,000	—	—	1,500,000
Construction Costs														
Materials	—	—	35,000	37,000	55,000	47,000	49,000	35,000	39,000	35,000	22,000	—	—	354,000
Labor	—	—	42,000	32,000	53,000	52,000	45,000	41,000	36,000	32,000	29,000	—	—	362,000
Subcontract	—	—	24,000	18,000	86,000	109,000	100,000	78,000	39,000	60,000	50,000	—	—	564,000
Other	—	—	7,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	7,000	—	—	70,000
Total	—	—	108,000	95,000	202,000	216,000	202,000	162,000	122,000	135,000	108,000	—	—	1,350,000
Cash Receipts		—	—	108,000	94,500	202,500	216,000	202,500	162,000	121,500	135,000	108,000	150,000	1,500,000
Cash Disbursements		—	49,000	96,600	114,200	192,400	198,100	188,000	149,200	114,100	125,000	67,000	56,400	1,350,000

Project 4

Retention: 0%
Previous Retention:
Sub. Retention:
Retention Paid in:

Month	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Revenues	—	—	—	—	—	—	—	—	—	—	180,000	300,000	420,000	900,000
Construction Costs														
Materials	—	—	—	—	—	—	—	—	—	—	49,000	75,000	119,000	243,000
Labor	—	—	—	—	—	—	—	—	—	—	38,000	67,000	125,000	230,000
Subcontract	—	—	—	—	—	—	—	—	—	—	56,000	111,000	119,000	286,000
Other	—	—	—	—	—	—	—	—	—	—	25,000	27,000	29,000	81,000
Total	—	—	—	—	—	—	—	—	—	—	168,000	280,000	392,000	840,000
Cash Receipts		—	—	—	—	—	—	—	—	—	—	180,000	300,000	480,000
Cash Disbursements		—	—	—	—	—	—	—	—	—	63,000	199,000	340,000	602,000

TOTAL

Month	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Revenues	664,000	768,000	712,000	785,000	769,000	560,000	545,000	500,000	391,000	342,000	460,000	492,000	516,000	6,840,000
Materials	186,000	193,000	207,000	191,000	182,000	122,000	114,000	97,000	96,000	80,000	106,000	105,000	144,000	1,637,000
Labor	176,000	198,000	196,000	178,000	181,000	133,000	114,000	100,000	91,000	81,000	106,000	100,000	144,000	1,622,000
Subcontract	211,000	275,000	207,000	307,000	295,000	216,000	227,000	217,000	134,000	118,000	157,000	203,000	150,000	2,506,000
Other	35,000	32,000	37,000	37,000	35,000	29,000	31,000	32,000	29,000	26,000	50,000	42,000	39,000	419,000
Construction Costs	608,000	698,000	647,000	713,000	693,000	500,000	486,000	446,000	350,000	305,000	419,000	450,000	477,000	6,184,000
Cash Receipts	—	605,600	707,200	653,600	720,900	708,100	760,400	506,500	466,000	364,700	317,400	440,000	632,000	6,882,800
Cash Disbursements	—	606,800	677,650	610,200	686,750	614,700	578,250	456,650	419,250	328,350	345,100	397,450	542,800	6,263,950
Total Labor	176,000	198,000	196,000	178,000	181,000	133,000	114,000	100,000	91,000	81,000	106,000	100,000	144,000	1,622,000

FIGURE 14-1 Revenues, Construction Costs, Cash Receipts, and Cash Disbursements

TABLE 14-18 Monthly Cash Flow from Operations for Next Year

MONTH	BUDGET ($)	MONTH	BUDGET ($)
Jan.	–45,172	July	–15,471
Feb.	–12,399	Aug.	10,064
March	658	Sept.	499
April	–12,796	Oct.	–66,159
May	54,162	Nov.	5,013
June	143,084	Dec.	33,703
			95,187

the general overhead. January's cash flow from operations is calculated as follows:

$$\text{Cash Flow} = \text{Cash Receipts} - \text{Cash Disbursements} - \text{Overhead}$$
$$\text{Cash Flow}_{\text{Jan}} = \$605{,}600 - \$606{,}800 - \$43{,}974 = -\$45{,}174$$

The cash flows for February through December are calculated in a similar manner. The cash flows for each month of the year are shown in Table 14-18.

INCOME TAXES, INTEREST, LOAN PAYMENTS, AND CASH BALANCE

To get the monthly cash flow, the cash flow from operations needs to be reduced by the cash flows as a result of paying other expenses (such as loan payments) and income taxes and increased by the monthly cash flows resulting from other income (including interest).

The monthly cash flows will then affect the company's cash balance at the end of the month, which cash balance is stored in bank accounts. A negative cash flow for the month will reduce the company's cash balance, whereas a positive cash flow will increase the company's cash balance. Because the company's cash balance changes each month as a result of the monthly cash flows, which affects the amount of interest paid on the bank accounts, which in turn affects the next month's cash flow, incorporating interest is best done by starting at the first month and working through the year to the last month. When calculating the monthly interest we should use a cash balance that is representative of the average balance for the month. During the course of the month our beginning balance in the bank will be reduced by the bills paid during the month until the time the revenues are received. For many companies a representative balance may be calculated by averaging the beginning bank balance with the bank balance just before the revenues begin to occur. For the company in Examples 14-1 to 14-3, the balance just before the revenues occur may be approximated by reducing the beginning balance by the monthly labor costs, which are the only costs that are

paid throughout the month. The balance may then be averaged with the beginning balance to get a representative average balance for the account.

If income taxes are paid during months other than the last month of the year, the payment of taxes will result in a cash flow that reduces the amount of cash in the bank, which reduces the amount of interest paid by the bank, which reduces the amount of taxes. This creates a loop or circular reference that can be solved only by iteration. This iteration is easily handled by spreadsheets; however, when preparing the calculations manually it is time consuming to use iteration to solve the problem.

Example 14-4: Determine the monthly cash flow and ending balance of the bank account for the company in Examples 14-1 to 14-3. The new computer system, included in the general overhead budget, will be subject to 200% declining-balance depreciation using the midyear convention and a five-year life. Depreciation from previous year's purchases of office equipment is $6,000 per year. The company has an outstanding loan with a payment of $1,626 per month. Of the entire year's loan payments, $10,900 will be in the form of interest and the remaining will reduce the outstanding loan balance. The surplus cash from each month will be placed in a bank account earning a monthly interest rate of 0.5%. Negative cash flows will be covered by funds in this bank account. At the beginning of the year the balance for the bank account will be $200,000. Inasmuch as the company is an S corporation, the estimated income taxes for the year will be distributed to the company's owners at the end of the year. The disbursement will be based on a marginal tax rate of 35%. Ignore underbillings and overbillings.

Solution: To get the cash flow for January we must add the interest from the bank account and subtract the loan payment. The interest on the loan is included in the loan payment and is included when we subtract the loan payment. To get the interest on the bank account we take the average of the beginning balance and the balance just before payment occurs, which will be approximated by reducing the beginning balance by the labor costs—the only costs that are paid throughout the month. The labor should include labor on the construction projects as well as general overhead labor. The average balance for January is calculated as follows:

$$\begin{aligned}
\text{Average Balance} &= [\text{Beginning Balance} \\
&\quad + (\text{Beginning Balance} - \text{Labor})]/2 \\
\text{Average Balance} &= \text{Beginning Balance}/2 \\
&\quad + \text{Beginning Balance}/2 - \text{Labor}/2 \\
\text{Average Balance} &= 2 \times \text{Beginning Balance}/2 - \text{Labor}/2 \\
\text{Average Balance} &= \text{Beginning Balance} - \text{Labor}/2 \\
\text{Average Balance}_{\text{Jan}} &= \$200{,}000 - (\$198{,}000 + \$22{,}618)/2 \\
\text{Average Balance}_{\text{Jan}} &= \$89{,}691
\end{aligned}$$

The interest on the bank account for January is calculated as follows:

$$\text{Interest} = \text{Average Balance (Interest Rate)}$$
$$\text{Interest}_{\text{Jan}} = \$89{,}691(0.005) = \$448$$

The cash flow for January is calculated by adding the interest to the cash flow from operations and subtracting the monthly loan payment, as follows:

$$\text{Cash Flow}_{\text{Jan}} = -\$45{,}174 + \$448 - \$1{,}626 = -\$46{,}352$$

This cash will be withdrawn from the bank account leaving it with a balance of $153,648 ($200,000 − $46,352). The average balance for February is calculated as follows:

$$\text{Average Balance}_{\text{Feb}} = \$153{,}648 - (\$196{,}000 + \$22{,}618)/2$$
$$\text{Average Balance}_{\text{Feb}} = \$44{,}339$$

The interest on the bank account for the month of February is calculated as follows:

$$\text{Interest}_{\text{Feb}} = \$44{,}339(0.005) = \$222$$

The cash flow for February is calculated as follows:

$$\text{Cash Flow}_{\text{Feb}} = -\$12{,}400 + \$222 - \$1{,}626 = -\$13{,}804$$

This cash will be withdrawn from the bank account, leaving it with a balance of $139,844 ($153,648 − $13,804). The interest on the bank account, the monthly cash flow, and ending bank account balance for the months of March through November are calculated in a similar manner. At the end of November the balance in the bank account will be $251,425.

The average balance for December is calculated as follows:

$$\text{Average Balance}_{\text{Dec}} = \$251{,}425 - (\$144{,}000 + \$22{,}618)/2$$
$$\text{Average Balance}_{\text{Dec}} = \$168{,}116$$

The interest on the bank account for the month of December is as follows:

$$\text{Interest}_{\text{Dec}} = \$168{,}116(0.005) = \$841$$

The total interest paid throughout the year is calculated as follows:

$$\text{Interest} = \$448 + \$222 + \$198 + \$186 + \$235 + \$546 + \$1{,}291 + \$1{,}235 + \$1{,}308 + \$1{,}247 + \$929 + \$841$$
$$\text{Interest} = \$8{,}686$$

To get the cash flow for December we must include the cash distributed to the owners. This distribution is based on the estimated income taxes for the year, which equals the marginal tax rate times the taxable income. The estimated taxable income equals the revenues less construction costs less the portion of overhead that is tax deductible less other expenses (namely, interest paid) plus other income (namely, interest received).

For this example, we have assumed that the monthly general overhead costs are paid in the month that they are incurred; therefore, the general

overhead is expensed in the same month as its associated cash flow occurs. Because of this, we can calculate the tax deduction by beginning with the cash flow from the general overhead budget and make the necessary adjustments. These adjustments include replacing the cash flow associated with depreciable assets with their depreciation (including assets whose cash flow occurred in previous years) and deducting nondeductible items (such as half of meals and entertainment). Alternatively, we could have prepared a general overhead budget for use in projecting profits. We would need to prepare a general overhead budget for use in projecting profits if the general overhead budget's cash flow did not occur in the same month as the expenses. The following adjustments must be made to our general overhead budget to determine how much of the budget is tax deductible.

In the current overhead calculations 100% of meals and entertainment has been deducted, whereas only 50% of meals and entertainment is deductible. This will decrease the tax-deductible overhead by 50% of the meals and entertainment cost or \$5,202 (\$10,404 × 0.50).

In the current overhead calculations the money spent on a new computer system has been deducted and depreciation has been ignored. The money spent on the computer system must be depreciated over five years using the 200% declining-balance method and the midyear convention. Because the company cannot deduct the cost of the computer system, these costs will decrease the company's tax-deductible overhead by \$18,000. In lieu of writing off the costs the company may deduct 20% (see Table 5-6) of the purchase price during the first year as depreciation or \$3,600 (\$18,000 × 0.20). Additionally, the company has \$6,000 in depreciation from previous year's purchases. Depreciation will increase the company's tax-deductible overhead by \$9,600 (\$3,600 + \$6,000). The tax-deductible overhead is calculated as follows:

$$\text{Overhead} = \$523{,}682 - \$5{,}202 - \$18{,}000 + \$9{,}600 = \$510{,}080$$

The taxable income equals the revenues less construction costs less overhead less interest paid plus interest received and is calculated as follows:

$$\begin{aligned}\text{Taxable Income} &= \$6{,}840{,}000 - \$6{,}184{,}000 - \$510{,}080 \\ &\quad - \$10{,}900 + \$8{,}686 \\ \text{Taxable Income} &= \$143{,}706\end{aligned}$$

The estimated taxes are 35.0% of the taxable income or \$50,297 (\$143,706 × 0.35). The taxable income and estimated taxes may be calculated in spreadsheet format as shown in Figure 14-2. There are small differences between the numbers shown in Figure 14-2 and the calculations in Example 14-4, which are due to rounding in the example.

In a spreadsheet the tax costs could be allocated to the months when tax payments are due; however, this will change the cash flow, which will change the monthly bank account balance, which will change the interest paid during the month, which will change the taxable income and income taxes due, which will change the tax payment. This circular loop can be solved using a spreadsheet. For manual calculations you would need to see if the

FIGURE 14-2 Tax Calculations

Tax Rate	35.0%
Tax Calculations	
Revenues	6,840,000
Construction Costs	6,184,000
Gross Profit	656,000
Overhead—Cash Flow	523,663
Less 50% of Meals & Enter.	5,200
Less Office Equipment	18,000
Plus Past Depreciation	6,000
Plus New Depreciation	3,600
Total Deductible Overhead	510,063
Net Profit from Operations	145,937
Less Interest Paid	10,900
Plus Interest	8,687
Taxable Income	143,724
Estimated Taxes	50,303

changes caused by the circular loop were significant if you were going to spread out the tax payments throughout the year.

The cash flow for December is calculated as follows:

$$\text{Cash Flow}_{\text{Dec}} = \$33{,}702 + \$841 - \$1{,}626 - \$50{,}297 = -\$17{,}380$$

This cash will be withdrawn from the bank account, leaving it with a balance of $234,045 ($251,425 − $17,380). The beginning and ending bank account balances, monthly interest, income taxes, and monthly cash flows for the year are shown in Table 14-19.

TABLE 14-19 Monthly Balances, Interest, Income Tax, and Cash Flow

	Bank Account				
Month	Beginning Balance ($)	Interest Received ($)	Ending Balance ($)	Income Taxes ($)	Monthly Cash Flow ($)
Jan.	200,000	448	153,648	0	−46,352
Feb.	153,648	222	139,844	0	−13,804
March	139,844	198	139,073	0	−771
April	139,073	186	124,836	0	−14,237
May	124,836	235	177,606	0	52,770
June	177,606	546	319,608	0	142,002
July	319,608	1,291	303,800	0	−15,808
Aug.	303,800	1,235	313,471	0	9,671
Sept.	313,471	1,308	313,650	0	179
Oct.	313,650	1,247	247,110	0	−66,540
Nov.	247,110	929	251,425	0	4,315
Dec.	251,425	841	234,045	50,297	−17,380

From Example 14-4 we see that the smallest projected balance in the company's bank account at the end of each month during the year is $124,836, which occurs at the end of April.

Determining the Minimum Monthly Balance

For construction companies, the balances at the end of the month may or may not be representative of the company's needs for cash during the month. For construction companies whose cash receipts are distributed evenly throughout the month, the balances at the end of the month are often fairly representative of the entire month. For many medium- to large-volume homebuilders who have multiple sales spread throughout the month, this is the case. For many commercial construction companies, the bulk of their cash receipts occur during one week of the month, often near the end of the month. These companies have to fund cash disbursements that occur from the beginning of the month until the cash receipts begin. Because the company is using its cash to pay these bills, the available cash is reduced below the balances reported at the end of each month, often by a significant amount. Let's look at the company in Examples 14-1 through 14-4 that had a minimum balance in the bank account for the year of $124,836.

Example 14-5: Determine the minimum balance of the bank account for each month for the company in Examples 14-1 through 14-4. Does the company have sufficient funds for the next year?

Solution: Because all of our receivables occur at the end of the month, the bank account will be reduced during the courses of the month by the labor paid throughout the month. The minimum bank account balance during the month may be estimated by subtracting the monthly labor costs from the previous month's ending balance for the bank account, which is the same as this current month's beginning balance. The labor costs include the labor portion of the construction costs and the labor included in the general overhead. The minimum monthly balance for January is calculated as follows:

$$\text{Minimum Balance}_{\text{Jan}} = \$200{,}000 - \$198{,}000 - \$22{,}618$$
$$\text{Minimum Balance}_{\text{Jan}} = -\$20{,}618$$

The remaining months are calculated in a similar manner. The minimum monthly balances for the year are shown in Table 14-20.

The minimum balance for the bank account for the year occurs in February at −$64,970. For the first five months of the year—January through May—the company has a negative balance in the bank just before it begins receiving payments from the owners. After May the bank account no longer has a negative balance each month because the retention is released from Project 1, which provides the company with an infusion of cash. To

TABLE 14-20 Minimum Monthly Balances

MONTH	BUDGET	MONTH	BUDGET
Jan.	−20,618	July	196,990
Feb.	−64,970	Aug.	190,182
March	−60,774	Sept.	209,853
April	−64,545	Oct.	185,032
May	−30,782	Nov.	124,492
June	40,988	Dec.	84,807

be on the safe side, the company should secure an additional $65,000 to $100,000 in cash for the upcoming year.

The revenues, construction costs, general overhead, interest, loan payments, income taxes, cash flow after income tax, savings account balances, and minimum monthly bank account balances may be calculated in spreadsheet format as shown in Figure 14-3. There are small differences between the numbers shown in Figure 14-3 and the calculations in Examples 14-1 through 14-5, which are due to rounding in the example. This spreadsheet can be combined with the spreadsheets in Figures 9-5, 14-1, and 14-2 to create a financial model that can be adjusted quickly to make changes in the assumption and input data.

From this example we see that the cash balance at the end of the month is not always representative of a company's cash balance during the month. In Chapter 16 we discuss ways to supply the additional cash needs of a company.

FINE TUNING, WHAT IF, AND SENSITIVITY ANALYSIS

The calculations performed in Examples 14-1 through 14-5 are easily set up in a spreadsheet. Setting up a spreadsheet to perform the cash flow analysis for the company is less time consuming than performing the calculations manually. There are three additional reasons to set up the cash flow analysis in a spreadsheet.

First, it allows the user to easily change the input parameters and immediately see how the changes affect the cash flows. This is essential for fine-tuning a cash flow analysis. For example, after running the cash flow analysis, we decide that we need to reduce our overhead to ensure that we are profitable. This can be done quickly by changing the budgets for the individual overhead items until we meet our profitability goals.

Second, we can ask ourselves "What if . . ." and see what happens. For example, we may ask ourselves "What if the retention on Project 1 is released in July instead of June? How will that affect our need for cash during the next year?" By making the change we would see that

Annual Cash Flow from Operations

Item	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cash Receipts	605,600	707,200	653,600	720,900	708,100	760,400	506,500	466,000	364,700	317,400	440,000	632,400	6,882,800
Cash Disbursements	606,800	677,650	610,200	686,750	614,700	578,250	456,650	419,250	328,350	345,100	397,450	542,800	6,263,950
Overhead:													
Advertising	7,680	7,120	7,850	7,690	5,600	5,450	5,000	3,910	3,420	4,600	4,920	5,160	68,400
Promotion	—	—	—	—	—	—	8,000	—	—	—	—	15,000	23,000
Car and Truck Expenses	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	13,200
Computer and Office Furniture	—	—	—	—	—	—	18,000	—	—	—	—	—	18,000
Employee Wages and Salaries	22,618	22,618	22,618	22,618	22,618	22,618	22,618	22,618	22,618	22,618	22,618	22,618	271,416
Employee Benefits	750	750	750	750	750	750	750	750	750	750	750	750	9,000
Employee Retirement	679	679	679	679	679	679	679	679	679	679	679	679	8,142
Employee Taxes	2,340	2,256	2,054	1,998	1,925	1,878	1,809	1,809	1,809	1,646	1,144	1,144	21,811
Insurance	4,366	4,086	4,451	4,371	3,326	3,251	3,026	2,481	2,236	2,826	2,986	3,106	40,514
Taxes & Licenses	100	—	—	—	—	—	—	—	—	—	—	—	100
Office Supplies	500	500	500	500	500	500	500	500	500	500	500	500	6,000
Office Rent	500	500	500	500	500	500	500	500	500	500	500	500	6,000
Office Utilities	350	350	250	250	250	350	350	350	250	250	350	350	3,700
Postage and Delivery	100	100	100	100	100	100	100	100	100	100	100	100	1,200
Janitorial and Cleaning	433	433	433	433	433	433	433	433	433	433	433	433	5,200
Telephone	440	440	440	440	440	440	440	440	440	440	440	440	5,280
Charitable Contributions	—	—	—	—	—	—	—	—	—	—	—	3,000	3,000
Dues and Memberships	—	—	—	1,500	—	—	—	—	—	—	—	—	1,500
Legal and Professional Services	1,000	—	—	3,000	—	—	1,000	—	—	1,000	—	—	6,000
Meals and Entertainment	867	867	867	867	867	867	867	867	867	867	867	867	10,400
Bank Fees	50	50	50	50	50	50	50	50	50	50	50	50	600
Miscellaneous	100	100	100	100	100	100	100	100	100	100	100	100	1,200
Total Overhead	43,972	41,949	42,742	46,946	39,238	39,066	65,321	36,686	35,851	38,459	37,537	55,897	523,663
Cash Flow from Operations	(45,172)	(12,399)	658	(12,796)	54,162	143,084	(15,471)	10,064	499	(66,159)	5,013	33,703	95,187
Interest Received	448	222	198	186	235	547	1,292	1,235	1,308	1,247	929	841	8,687
Loan Payments	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626	19,512
Estimated Income Taxes	—	—	—	—	—	—	—	—	—	—	—	50,303	50,303
Cash Flow After Income Tax	(46,350)	(13,803)	(770)	(14,236)	52,771	142,005	(15,806)	9,673	181	(66,538)	4,317	(17,385)	34,059
Savings Account													
Beginning Balance	200,000	153,650	139,847	139,077	124,841	177,613	319,617	303,812	313,484	313,665	247,127	251,444	
Deposit or (Withdrawal)	(46,350)	(13,803)	(770)	(14,236)	52,771	142,005	(15,806)	9,673	181	(66,538)	4,317	(17,385)	34,059
Ending Balance	153,650	139,847	139,077	124,841	177,613	319,617	303,812	313,484	313,665	247,127	251,444	234,059	
Monthly Labor Costs	220,618	218,618	200,618	203,618	155,618	136,618	122,618	113,618	103,618	128,618	122,618	166,618	
Minimum Monthly Bank Balance	(20,618)	(64,968)	(60,771)	(64,541)	(30,777)	40,995	196,999	190,194	209,866	185,047	124,509	84,826	

FIGURE 14-3 Spreadsheet for Examples 14-1 through 14-5

although the cash flow for June and July changed, we still needed the same amount of cash for next year and it would not increase the number of months over which the additional cash was needed.

The third reason is so we can perform a sensitive analysis to determine which input variables the cash flow analysis is most sensitive to. By changing some variables by a large amount we may see little change in the cash flow analysis, whereas minor changes to other variables may make a major change in the cash flow analysis. For example, if we doubled bank fees from $50 to $100, little change would occur and we would say that the cash flow analysis is not very sensitive to the bank fees. However, if we reduce the amount of work subcontracted out on Project 1 during the month of February by 10% and perform that work with our labor, we increase the amount of additional cash we need from $64,970 to $79,468. Here we see that we are very sensitive to the amount of labor performed by our company during the month of February.

Conclusion

Companies should prepare an annual cash flow projection based on their target levels for revenues, gross profit margin, general overhead costs, and profit from operations to determine the amount of cash needed to meet these target levels and arrange for the necessary financing. Additionally, companies should prepare a cash flow projection for the remaining months in the year at the beginning of the last quarter of the year so that they have time to implement year-end cash flow and tax strategies.

It is best to prepare a company's cash flow projection in a computer spreadsheet so adjustments may be easily made to the spreadsheet, until the spreadsheet has been fine-tuned. Developing a cash flow projection may be broken down into the following steps:

1. Project revenues, construction costs, cash receipts, and cash disbursements for the individual projects, as outlined in Chapter 12. Combine the cash flow from the projects to get a cash flow for the company.
2. Determine the cash disbursement associated with the general overhead, as outlined in Chapter 9. Combine this cash flow with the combined cash flow from the projects to get the cash flow from operations.
3. Incorporate other income and expenses—for example, interest—and income taxes and determine the monthly cash flow.
4. For companies who receive most of their revenue at the end of the month, check the minimum bank balance during the month.
5. Run what-if scenarios, sensitive analyses, and other simulations to determine how the company's needs change as the input parameters change.

It is important to check the minimum cash balance during the month because for many construction companies, the balances at the end of the month are not representative of the company's need for cash during the month.

Problems

1. Set up Examples 14-1 to 14-5 in a spreadsheet.
2. How would the company's cash needs change for the company in Examples 14-1 to 14-5 if they subcontracted out $25,000 of labor per month for $26,000 per month on the first project for the months of January through April?
3. How would the company's cash needs change for the company in Examples 14-1 to 14-5 if the third project started in May instead of February and the retention was not released until the following year?
4. Other than borrowing more money—increasing the beginning balance of the bank account—what could the company in Examples 14-1 through 14-5 do to ensure that it had enough funds to prevent the bank account balance from going negative during the year?
5. Prepare a cash flow projection for a construction company that currently has two projects under contract for the next year and anticipates picking up a third and fourth project during the year.

   For the first project, the project's owner is holding $24,200 in retention from this year's payments and will continue to hold a 10% retention on all payments during the next year. The construction company is holding $9,400 of retention on its subcontractors from this year's payments. The retention for this project is expected to be released in June. The estimated bill to the project's owner and construction costs for the first project are as follows:

		Costs			
Month	Bill to Owner ($)	Material ($)	Labor ($)	Sub. ($)	Other ($)
Dec.	126,800	25,500	24,900	51,200	10,200
Jan.	52,900	9,900	10,100	22,400	4,100
Feb.	88,000	16,600	15,600	32,200	6,800
March	25,700	5,000	5,100	10,400	2,000
Total	293,400	57,000	55,700	116,200	23,100

   The second project started last December and the owner has yet to make a payment. The project's owner will hold a 10% retention on this project and is expected to release the retention in August. The construction company will withhold retention from the payments to its subcontractors. The

estimated bill to the project's owner and construction costs for the second project are as follows:

		Costs			
Month	Bill to Owner ($)	Material ($)	Labor ($)	Sub. ($)	Other ($)
Dec.	11,900	3,400	3,700	1,400	1,300
Jan.	33,300	10,300	9,400	4,300	4,000
Feb.	42,200	11,100	10,700	4,900	4,400
March	44,600	14,700	14,500	6,300	5,400
April	70,000	21,500	19,100	9,500	7,600
May	32,200	8,900	8,800	3,600	3,100
June	45,300	12,800	12,800	5,400	5,000
July	15,200	4,600	4,100	1,900	1,700
Total	294,700	87,300	83,100	37,300	32,500

The third project is expected to start in April. The project's owner will hold a 5% retention on the project and the construction company will withhold retention from the payments to its subcontractors. The retention for this project is expected to be released in September. The estimated bill to the project's owner and construction costs for the third project are as follows:

		Costs			
Month	Bill to Owner ($)	Material ($)	Labor ($)	Sub. ($)	Other ($)
April	36,300	6,400	9,400	6,300	4,000
May	50,800	9,400	12,400	7,600	5,500
June	61,800	10,800	15,100	10,300	6,500
July	36,100	7,400	8,600	6,000	3,900
Total	185,000	34,000	45,500	30,200	19,900

The fourth project is expected to start in August. The project's owner will hold a 10% retention on the project and the construction company will withhold retention from the payments to its subcontractors. The retention for this project will not be released this year. The estimated bill to the project's owner and construction costs for the fourth project are as follows:

		Costs			
Month	Bill to Owner ($)	Material ($)	Labor ($)	Sub. ($)	Other ($)
Aug.	19,000	4,600	5,300	2,900	1,800
Sept.	53,200	16,500	16,200	8,700	5,000
Oct.	61,600	16,100	21,500	9,800	6,900
Nov.	73,700	19,900	21,300	11,800	7,600
Dec.	115,400	32,700	33,400	17,000	10,800
Total	322,900	89,800	97,700	50,200	32,100

The company's fiscal and tax years start in January and end in December. The company uses the percentage-of-completion method of accounting. Revenues are received before the end of the month after the month the company bills its clients. Labor costs are paid weekly. Material bills are paid in full when the payment is received from the owner. Subcontractor bills are paid—less retention—when payment is received from the owner. The retention withheld from the subcontractor payments is based on the same retention rate that is held by the project's owner and will be paid to the subcontractor when the owner releases the retention. Other costs are paid at the end of the month the costs are incurred.

Include in the general overhead budget the following. The budget for advertising is to be 0.5% of revenues. The budget for promotions is to include $1,000 in July for a company picnic, $200 in December for Christmas cards and gifts, and $1,300 in December for a company Christmas party. The monthly fuel and maintenance cost for the company vehicle driven by the owner is estimated to be $225 per month. In April, the company plans on purchasing a new copier for $2,000. The new copier will be subject to the 200% declining-balance depreciation method using the midyear convention and a five-year life.

The company employs three workers: the owner, an estimator, and a secretary/bookkeeper. The owner is paid $5,000 per month. The estimator is paid $15.00 per hour and works an average of twenty-five hours per week. The secretary/bookkeeper is paid $13.50 per hour and works an average of forty-five hours per week. All of the hourly employees are paid for fifty-two weeks of work per year. Time-and-a-half must be paid to hourly employees for work over 40 hours per week. The company contributes $175 per month per employee—including the owner—for health insurance. They also deposit $0.50 in an employee's 401(k) account for every dollar the employee deposits. The maximum the company would deposit is 3% of an employee's wages. The company's owner is included in this match. Historically, the employees have taken full advantage of this benefit. The current social security rate is 6.2% to $97,500 of wages per employee. The current Medicare rate is 1.45%. The company's FUTA rate is 0.8% on the first $7,000 of wages per employee and their SUTA rate is 2.5% on the first $9,000 of wages per employee.

The company is charged 0.45% of revenues, 0.65% of wages for hourly employees, and 1.5% of wages for salaried employees for general liability insurance. In January the company pays $25 for a business license. It is anticipated that office supplies will cost $150 per month. Rent for the office space is $425 per month and includes sewer and water. Office utilities are expected to run as follows: $150 per month for power in June, July, and August and $100 per month during the remaining months of the year; and $130 per month for natural gas during November, December, January, and February and $30 per month during the remaining months of the year. It is anticipated that the company will spend $50 per month for postage and

$100 per month for janitorial services. The estimated telephone costs are $125 per month for telephone and long-distance service and $100 per month to provide mobile phone service for the owner. In December the company plans on making a $500 charitable contribution to a local university. In April the company must pay $500 for its annual plan room membership. The company plans on spending $250 at the first of each quarter for accounting services to close the previous quarter's books and an additional $500 in April for tax services. The estimated cost of meals and entertainments is $50 per week. Bank fees are $50 per month. Allow $75 per month for miscellaneous expenses.

Assume that all overhead costs—except labor—are paid at the end of the month they occur. Labor will be paid throughout the month that the costs occur. Also assume that all of the months are the same length—four and one-third weeks.

In addition to the above costs, the company depreciation from previous year's purchases of office equipment is $3,000 per year. The company has an outstanding loan with a payment of $575 per month. Of the monthly loan payments, $3,730 will be in the form of interest and the remaining will reduce the outstanding loan balance. The surplus cash from each month will be placed in a bank account earning a monthly interest rate of 0.45%. Negative cash flows will be covered by funds in this bank account. At the beginning of the year the balance for the bank account will be $55,000. Inasmuch as the company is an S corporation, the estimated income taxes for the year will be distributed to the company's owners at the end of the year. The disbursement will be based on a marginal tax rate of 25%. Ignore underbillings and overbillings.

Does the company have sufficient funds for the next year? If not, what changes can the company make to ensure that it has sufficient funds?