



PART 3
CASH FLOW
FORMULA:

And, now, back to the question that started this series:

**“What is the secret to
SUCCESSFULLY
FORECASTING CASH?”**

BY STEVEN D. LORDS

FORECASTING CASH

In “Cash Flow Formula – Part 1,” three basic concepts about cash management were introduced:

- That “cash” may be defined as “spending power.”
- That it was important to accelerate receipts and decelerate payments.
- That it was important to minimize current assets and maximize current liabilities.

These concepts were all linked to a simple formula for measuring changes in “cash.”

That formula also provided the foundation for Part 2 of this series, where theory was put into practice as we looked at how operational practices and procedures can impact cash flow.

Now it’s time to put the pieces together in order to master the techniques of successfully forecasting cash. We will start where we left off last time, with the cash flow formula.





In order to forecast cash using these techniques, you must be familiar with the cash flow formula – the common thread running through all three parts of this series:

EBITA, or earnings

- +/- Changes in A/R**
- +/- Changes in Inventory**
- +/- Changes in Net WIP**
- +/- Changes in Fixed Assets**
- +/- Changes in A/P**
- +/- Changes in Accruals**
- +/- Changes in Debt**
- = Cash Flow**

Let's examine the components of this formula as they relate to cash forecasting.

EBITA or Earnings

The key to effective cash forecasting (whether long- or short-term) is the ability to forecast Earnings, or EBITA (Earnings before interest, taxes, and amortization) with a reasonable degree of accuracy. Although this task may seem daunting at first, the process can be simplified.

First break down, or back into, the basic components that lead to Earnings: Sales, Cost of Sales (or Cost of Construction), Gross Margin, and SG&A Expenses. Then, use this simple formula to calculate EBITA:

$$\text{Sales} - \text{Cost of Sales} = \text{Gross Margin}$$

$$\text{Gross Margin} - \text{SG\&A Expenses} = \text{EBITA}$$

It is important to exclude interest, taxes, and amortization because these three factors are significantly affected by differences in organizational structure and taxing authorities. Also, by doing so, Earnings can be more easily compared with other companies in our industry.

Breaking down EBITA into its basic components readily shows that Earnings can be predicted with a reasonable degree of accuracy by forecasting each component individually. Here's how.

FORECASTING SALES

I have often heard contractors say they can't forecast Sales for their company. Generally speaking, this is because contractors may not have repeat customers. After

all, once the building is built, the customer probably won't need another one constructed in the foreseeable future (though this may not be true for larger or geographically disbursed business customers).

In addition, contractors often say they have difficulty forecasting Sales because they don't know if they will win the next bid. While this may be true, astute contractors know that, with a sound understanding of our business and the markets we operate in, we can forecast Sales.

Most well-run construction companies manage their estimating departments based on reasonably accurate estimates of the volume of contracts they expect to bid during the coming year. This bidding activity is usually separated into the broad categories of Hard Bid and Negotiated contracts.

These same companies also calculate their "success rate" – that is, the percentage of contract bids that result in contract awards. So, to estimate Sales volume:

$$\text{Annual Bidding Volume} \times \text{Success Rate \%} = \text{A reasonable estimate of the volume of work going into backlog during the coming year}$$

In reality, new contracts are not secured ratably (evenly from month to month). However, for long-term Sales forecasting, it is reasonable to add new contracts to backlog on an average monthly run rate. This rate is based on the success rate for Hard Bid and Negotiated contracts (or by a vertical or other market focus, if the company has "success rate" data on this basis).

When forecasting cash, forecast Sales (Billings) by month. In order to more effectively forecast monthly Sales, separate Sales activity into Sales for Existing Backlog and Sales for Projected Future Contracts.

Sales for Existing Backlog

While most contractors track their backlog, they may not forecast when this backlog will be worked off and billed. When a contract is awarded, a front-end loaded, estimated project billing schedule should be developed (as discussed in Part 2 of this series in the March/April 2006 issue).

Each month, this schedule should be updated by project management to include: **1)** actual billings for past months, **2)** any change orders, and



3) any changes in estimated future billings by month through the end of the project.

This schedule, along with the project's current status report on estimated costs to complete, should be submitted to finance. The sum of these schedules, corresponding month by month for all projects currently in backlog, will provide a reasonably accurate estimate of future Sales (Billings) for projects in backlog.

Sales for Projected Future Contracts

The next step is to create estimated billing schedules for projected future work. For existing contracts, such schedules are developed based on contract terms and expectations, along with the detailed project construction schedule. Since this data does not yet exist for projected contracts, we must look elsewhere for guidance.

A sampling of past construction projects can help establish the average length and the pattern of monthly billings for an average project. This data can be plotted on a bell curve, and then used to make projections. Say the sampling shows the average project length is one year and the average monthly billings are:

Month 1, 5%	Month 7, 11%
Month 2, 8%	Month 8, 9%
Month 3, 9%	Month 9, 8%
Month 4, 11%	Month 10, 7%
Month 5, 12%	Month 11, 5%
Month 6, 12%	Month 12, 3%



(Remember, we have made reasonable attempts to front-load the projects as described earlier.) With these assumptions, we can create a simple Sales Forecasting Schedule, like the one shown in Exhibit 1.

This schedule shows a six-month forecast; however, the same format applies for forecasting periods up to one year or longer. I recommend forecasting one year out; longer forecasts can be done, but they tend to become less and less accurate as your knowledge of future market conditions diminishes.

According to the schedule, Projects A & B are currently in backlog, with billings prior to July (\$286K for Project A and \$105K for Project B). The estimated monthly billings for projects in backlog are based on the estimated project billing schedules submitted to finance each month by project management.

Exhibit 1: SALES FORECASTING SCHEDULE (000s)									
Project		Contract Price	Current Backlog	Jul. 2006	Aug. 2006	Sep. 2006	Oct. 2006	Nov. 2006	Dec. 2006
Project A	Adds./COs	1,300		0	0	0	0	0	0
	Billings			143	156	156	143	117	91
	Contract Bal.		1,014	871	715	559	416	299	208
Project B	Adds./COs	2,100		0	150	0	0	0	0
	Billings			168	203	248	270	270	248
	Contract Bal.		1,995	1,827	1,774	1,526	1,256	986	738
New Contracts - May Hard Bid	Adds./COs	N/A		2,900	0	0	0	0	0
	Billings			0	145	232	261	319	348
	Contract Bal.		N/A	2,900	2,755	2,523	2,262	1,943	1,595
New Contracts - June Hard Bid	Adds./COs	N/A		0	2,900	0	0	0	0
	Billings			0	0	145	232	261	319
	Contract Bal.		N/A	0	2,900	2,755	2,523	2,262	1,943
New Contracts - May Negotiated	Adds./COs	N/A		1,250	0	0	0	0	0
	Billings			0	63	100	113	138	150
	Contract Bal.		N/A	1,250	1,187	1,087	974	836	686
New Contracts - June Negotiated	Adds./COs	N/A		0	1,250	0	0	0	0
	Billings			0	0	63	100	113	138
	Contract Bal.		N/A	0	1,250	1,187	1,087	974	836
Small Contracts/ Service	Adds./COs	N/A		850	850	850	850	850	850
	Billings			850	850	850	850	850	850
	Contract Bal.		1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Monthly Billings				1,161	1,417	1,794	1,969	2,068	2,144
Changes in Net WIP				100	(120)	50	210	(90)	(110)
Net Monthly Billings				1,261	1,297	1,844	2,179	1,978	2,034





You can reconcile to the current actual billing status for each project by maintaining the Contract Balance line (the prior month's remaining contract balance, plus or minus change orders and the current month's billings).

New contracts have been added to the schedule for July and August and subdivided by Hard Bid and Negotiated contracts, since your company's success rate in bidding these two categories may be significantly different. New Hard Bid contracts have been added at a run rate of \$2,900K per month; new Negotiated contracts at a run rate of \$1,250K per month.

These run rates are based on the following formula:

$$\text{Forecasted Annual Bidding Activity} \times \text{Appropriate Success Rate (\%)} \div 12 = \text{Monthly Run Rates}$$

The monthly billing amounts for these future projects are entered based on your company's average billings by month over the life of an average 12-month project. The schedule can be expanded for additional projects in backlog, and for the additional months of new projects added in the Hard Bid and Negotiated categories.

Small Contracts and/or Service activity are added in aggregate. Forecasts are based on average run rates for new small contracts and/or service work and monthly billings for the same. The schedule in Exhibit 1 shows a flat run rate; however, your individual company may experience more seasonality and/or growth.

Reconciling Billings vs. Sales

In construction, the difference between "Billings" and "Sales" is reconciled through entries to create over- and underbillings (or more properly, Costs and Earnings in Excess of Billings and Billings in Excess of Costs and Earnings).

To handle the monthly Changes in Net WIP, or net changes in over- and underbillings, I have simply added a line at the bottom of the schedule following Total Monthly Billings. With this factored in, we have a proper monthly forecast for Monthly Billings or Sales.

COST OF SALES AND/OR GROSS MARGIN

Cost of Sales and Gross Margin are the inverse of each other; therefore, if we can forecast one, we can forecast the other. Since Gross Margin on projects is the focus of most estimating efforts (and subsequently becomes the base measurement of project profits in the construction industry), this will be our measurement focus.

Our best estimate of future Gross Margin on construction projects begins with the Gross Margin percentage your company has achieved on its most recent projects; this should be modified up or down for current market conditions or specific changes planned in methods of performance. To convert Gross Margin percentage to dollars, multiply it by forecasted Sales.

SG&A EXPENSES

Just as Gross Margin is a standard measure of profitability for the construction industry, SG&A Expenses are a common business benchmark and a standard component of most P&L statements. Once again, most astute contractors know what their overhead (SG&A Expenses) rate is as a percentage of Sales.

This rate may change with significant fluctuations in Sales volume, since some components of SG&A Expenses are fixed, rather than variable, costs.

Estimate future SG&A Expenses by taking the SG&A Expenses percentage achieved over the most recent past and modifying it for current market conditions or specific changes planned in spending patterns.

Note: I have discussed the Cost of Sales and/or Gross Margin and SG&A Expenses to address the predictability of all parts of our simplified formula for EBITA. For forecasting purposes, only the Sales and EBITA numbers are required.

All Other Components of the Cash Flow Formula

Returning to our formula, we are only interested in *changes* in A/R, Inventory, Net WIP, Fixed Assets, A/P, Accruals, and Debt. Our ability to predict these changes will be based on our knowledge of how individual balances have changed in the past.

We will need to establish predictable patterns (trends) for each component, and to understand the underlying reasons for these trends, as well as how operational practices affect them (as discussed last time in Part 2).

These patterns can be established by using the same schedule we will ultimately use for forecasting future cash flows. Exhibit 2 shows a sample Schedule of Monthly Cash Flow. Collecting the data and filling out the schedule for prior months should get you comfortable with how the schedule works, and make it easier to forecast future months.



THE BASICS

The schedule includes all of the basic benchmarks discussed so far. The data is listed in columns by month, and totaled by quarter, in the same order down the page as the Cash Flow Formula.

In addition, a line for Sales has been inserted at the top of the schedule, and lines for SG&A Expenses and SG&A Percentage have been added at the bottom. Sales, EBITA, and SG&A Expenses are the only three non-balance sheet items on the schedule and, accordingly, are single entries by month from the company's P&L statements.

The other components of the Cash Flow Formula are presented in three-line sets that show the beginning and ending balances, and the monthly change in each.

Only the changed numbers for Fixed Assets and Debt are provided; however, these are calculated in the same manner as the other components. (For my company, changes in Fixed Assets and Debt are typically inconsequential, so I have chosen to simplify the presentation. You may choose to break them out into the same three-line presentation as the other components.)

Cash Flow (at the bottom of the schedule) is calculated as the sum of EBITA and the change number for each component, just as the Cash Flow Formula dictates.

TRENDS & ANALYSES

Trends can be established using just this data; however, it is useful to expand the analyses by providing benchmarks of how the four main components (A/R, Inventory, WIP, and A/P) change relative to Sales. Since A/R is generally composed of more than one month's Sales, the schedule compares the monthly balances as a percentage of the most recent three months of Sales (noted on the chart as End A/R / MR 3 Mos).

I have used this same three-month benchmark for all four components. (You may choose to use a different comparative benchmark that you feel is more representative of your company.)

PROBLEMS & OPPORTUNITIES

In addition to providing cash flow data for forecasting purposes, the schedule can also highlight developing problems and areas where cash management might be improved. For example, note that the A/R-Net balances (net of allowances for bad debt) as a percentage of Sales

Exhibit 2: SCHEDULE OF MONTHLY CASH FLOW
(000s)

	FY 2005				FY 2006				FORECAST											
	Jul. 05	Aug. 05	Sep. 05	Total Q3	Oct. 05	Nov. 05	Dec. 05	Total Q4	Jan. 06	Feb. 06	Mar. 06	Total Q1	Apr. 06	May 06	Jun. 06	Total Q2	Jul. 06	Aug. 06	Sep. 06	Total Q3
TOTAL SALES	18,246	24,274	24,088	66,608	21,519	23,538	24,653	69,710	19,083	23,845	21,057	63,985	17,574	21,461	22,806	61,841	20,825	22,110	22,050	64,985
EBITA	1,104	1,747	4,016	6,867	195	(637)	(24)	(466)	458	2,285	2,012	4,755	414	2,173	2,708	5,295	2,241	2,505	2,532	7,278
A/R - NET:																				
Beg A/R	59,363	59,866	60,172		59,198	64,460	59,508		58,725	60,286	59,939		61,908	63,314	57,538		57,559	56,800	55,900	
End A/R	59,866	60,172	59,198		64,460	59,508	58,725		60,286	59,939	62,856		63,314	57,538	57,559		56,800	55,900	55,100	
Change	(503)	(306)	974	165	(5,262)	4,952	783	473	(1,561)	347	(2,917)	(4,131)	(1,406)	5,776	(21)	4,349	759	900	800	2,459
(End A/R / MR 3 Mos)	95%	94%	89%		92%	86%	84%		90%	89%	98%		101%	96%	93%		87%	85%	85%	
INVENTORY:																				
Beg INV	7,258	7,365	6,857		6,988	7,029	7,045		7,011	6,883	7,038		7,143	7,290	7,030		7,019	6,700	6,800	
End INV	7,365	6,857	6,988		7,029	7,045	7,011		6,883	7,038	7,143		7,290	7,030	7,019		6,700	6,800	6,600	
Change	(107)	508	(131)	270	(41)	(16)	34	(23)	128	(155)	(105)	(132)	(147)	260	11	124	319	(100)	200	419
(End INV / MR 3 Mos)	12%	11%	10%		10%	10%	10%		10%	10%	11%		12%	12%	11%		10%	10%	10%	
WIP - NET:																				
Beg WIP	(50)	(617)	815		(710)	(3,044)	(753)		(4,373)	(4,167)	(2,887)		(2,221)	(3,559)	(2,497)		(4,006)	(4,100)	(4,200)	
End WIP	(617)	815	(710)		(3,044)	(753)	(4,373)		(4,167)	(2,887)	(2,221)		(3,559)	(2,497)	(4,006)		(4,100)	(4,200)	(4,050)	
Change	567	(1,432)	1,525	660	2,334	(2,291)	3,620	3,663	(206)	(1,280)	(666)	(2,152)	1,338	(1,062)	1,509	1,785	94	100	(150)	44
(End WIP / MR 3 Mos)	-1%	1%	-1%		-4%	-1%	-6%		-6%	-4%	-3%		-6%	-4%	-6%		-6%	-6%	-6%	
FIXED ASSETS (CHANGE)	(63)	(259)	(17)	(339)	(69)	(10)	48	(31)	14	(19)	(1)	(6)	(10)	(5)	70	55	(15)	5	45	35
A/P:																				
Beg A/P	(12,785)	(4,718)	(11,941)		(19,340)	(3,242)	(8,739)		(19,199)	(9,283)	(13,855)		(18,549)	(8,835)	(11,440)		(15,024)	(6,500)	(11,500)	
End A/P	(4,718)	(11,941)	(19,340)		(3,242)	(8,739)	(19,199)		(9,283)	(13,855)	(18,549)		(8,835)	(11,440)	(15,024)		(6,500)	(11,500)	(17,500)	
Change	(8,067)	7,223	7,399	6,555	(16,098)	5,497	10,460	(141)	(9,916)	4,572	4,694	(650)	(9,714)	2,605	3,584	(3,525)	(8,524)	5,000	6,000	2,476
(End A/P / MR 3 Mos)	-12%	-19%	-29%		-5%	-13%	-28%		-8%	-12%	-29%		-14%	-19%	-24%		-6%	-11%	-27%	
ACCRUALS:																				
Beg DEF INCOME	(6,616)	(6,295)	(6,180)		(6,443)	(6,799)	(6,645)		(6,819)	(6,533)	(6,411)		(6,972)	(6,819)	(6,419)		(6,537)	(6,650)	(6,700)	
End DEF INCOME	(6,295)	(6,180)	(6,443)		(6,799)	(6,645)	(6,819)		(6,533)	(6,411)	(6,972)		(6,819)	(6,419)	(6,537)		(6,650)	(6,700)	(6,750)	
Change	(321)	(115)	263	(173)	356	(154)	174	376	(286)	(122)	561	153	(153)	(400)	118	(435)	113	50	50	213
DEBT (CHANGE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CASH FLOW	(7,390)	7,366	14,029	14,005	(18,585)	7,341	15,095	3,851	(11,369)	5,628	3,578	(2,163)	(9,678)	9,347	7,979	7,648	(5,013)	8,460	9,477	12,924
SG&A EXPENSES	3,382	5,506	4,261	13,149	4,588	6,250	5,986	16,824	4,732	4,898	4,149	13,779	3,890	5,000	4,373	13,263	3,950	4,320	4,100	12,370
SG&A PERCENTAGE	19%	23%	18%	20%	21%	27%	24%	24%	25%	21%	20%	22%	22%	23%	19%	21%	19%	20%	19%	19%



increased significantly at the end of Q1 and the beginning of Q2. Note also that the WIP-Net credit balance (net of credit and debit balances), or overbilling, significantly improved during Q4 and has remained there.

Note, too, that the balances in A/P regularly drop at the beginning of each quarter, then build through the end of the quarter. This may be important for publicly traded companies, as it strengthens a company's overall cash position, and less important for privately held companies.

Forecasting Future Cash Flows

So, using these theories and practical tools, you can now begin forecasting future cash flows for your company, as shown in Exhibit 2. Sales figures would come from the Sales Forecasting Schedule explained earlier.

The EBITA forecast would be derived from a combination of prior actual results and knowledge that, for example, your company's profitability is stronger during the summer months.

Changes in the other components of the cash flow formula are forecast based on trends established over the prior months and quarters, as well as expectations based on such things as market conditions, changes in company policies, operational practices, etc.

And, keep this in mind: In the interest of not overstating estimated cash flow, *it is best to be conservative when forecasting*, especially as it relates to factoring in market conditions and improvements based on changes in operational practices.

Once you understand the schedules, you can customize them to fit your company's individual needs. For instance, you may not care to see the numbers presented by quarter, or you may want additional breakouts on Fixed Assets and Debt.

Short-Term Cash Forecasting

So far, we have been talking about long-term cash forecasting, which is forecasting at least a year out. But, the same principles apply to short-term cash forecasting and the same schedules can be used. However, your assumptions should be more accurate relative to the short-term since you can rely more on known circumstances.

For instance, your Sales forecasts should be more accurate because you can look at monthly billings for specific projects. EBITA estimates can take into account recent profitability, rather than last year's averages.

However, changes in the balance-sheet components of the formula will tend to strongly follow the trends that you have identified – and you will probably not want to forecast any significant short-term changes anticipated as the result of improved business practices. Generally, it takes a while to see the effect of such changes.

Conclusion

This concludes our series on forecasting cash. With your expanded definition of cash and grasp of the concepts that drive cash flow, along with your understanding of the Cash Flow Formula and how operational practices affect cash flow, you should be able to produce a reliable cash forecast with confidence.

Since every construction company is unique with its own individual culture and set of strengths and weaknesses, your challenge as a CFM is to apply your new knowledge and tools in the manner most appropriate for your company. **BP**

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