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Using Job Cost Reporting to Mitigate Risk & Improve Profitability

As a CFM, you are responsible, in no small degree, for managing your company's risks.

You purchase insurance coverage that guards against losses inherent to the construction industry and work with underwriters to make sure that your employees benefit from the latest safety practices and loss prevention techniques.

You continually strive to protect your company's assets and monitor the financial wherewithal of its vendors, subcontractors, and customers. You establish accounting and reporting practices that ensure compliance with local, state, and federal requirements. And you are ever mindful of overhead costs, seeking efficiency and contributing the resulting cost savings to your company's bottom line. You are often viewed as a leader who protects and defends your company from undesired dangers.

But in the current market, being defensive is not enough. Today, CFMs must take a prominent role in managing and mitigating their companies' greatest risk: the cost of construction.

This article outlines cost reporting features, functions, and techniques that will assist CFMs in the early identification and mitigation of cost-related risks and help improve overall profitability.

The Cost Report

Throughout my career, I have worked with many GCs and specialty contractors as a cost control manager, controller, CFO, and currently as a construction claims consultant. During my early years in the industry, I was exposed to extraordinary cost reporting systems with tried-and-true procedures that produced reliable cost at completion projections.

As a cost control manager, my primary role was to provide project teams with reliable information that would enable them to manage the financial end of the work and maximize project profitability. My secondary role was to report reliable work in progress (WIP) information to the controller or CFO.

As a controller and CFO, I was responsible for ensuring that the project teams had current, actionable information. Enabling the timely identification of potential overruns was key to improving performance and profitability. The cost system also allowed for more accurate reporting of earnings, a fundamental role of a CFM that, when done properly, is invaluable to the stakeholders, sureties, and bankers.

I currently work with contractors that use a variety of cost reporting systems. The cost reports I often see consist of only one or two cost codes with summaries of the original estimate, cost to date, and remaining cost. As a result, these

1: Example Cost Report Format

Cost Code	Original Estimate	Revised Estimate	Estimated Cost Per Unit	Cost to Date	Unit Cost to Date	Estimated Total Cost	Estimated Remaining Cost	Projected +/-
910-0005 Install Light Pole Foundations	125 each	155 each		16.00			139.00	
				[10.32% complete]				
Labor	19,492.50	24,170.70	155.94	3,625.61	226.60	35,123.05	31,497.44	(10,952.35)
Small Tools	12,500.00	15,500.00	100.00	1,860.00	116.25	18,018.75	16,158.75	(2,518.75)
Permanent Materials	50,375.00	62,465.00	403.00	8,060.00	503.75	62,465.00	54,405.00	-
Subcontractors	31,250.00	38,750.00	250.00	2,500.00	156.25	38,750.00	36,250.00	-
Totals	\$113,617.50	\$140,885.70	\$908.94	\$16,045.61	\$1,002.85	\$154,356.80	\$138,311.19	\$(13,471.10)
Hours	485.00	601.00	3.88	75.00	4.69	726.56	651.56	(50.56)
Estimated Cost Per Man-Hour	\$40.19	\$40.22	Actual	\$48.34	Cost Per Man-Hour Savings/Excess			\$(8.12)



contractors often do not realize that their projects are in financial trouble until their budgets have been exhausted, even though there is still substantial work left to complete.

It may also provide a basis to analyze productivity or loss of efficiency if progress in one area is impacted due to variables out of a contractor's control.

In a perfect world (where profitability was guaranteed and there was no threat of claims or litigation), this minimal amount of information would be sufficient. But since construction projects rarely (if ever) proceed as planned, a cost reporting system should provide the tools that not only tell management where a project has been, but also where it is going.

Before discussing the fields and computations that might be found in a cost report, let's review the basics of a work breakdown structure (WBS) and cost codes.

Work Breakdown Structure

A well-defined project schedule defines the tasks to be performed, the time frames for performance, and often the resources required to perform the tasks. Your cost report should tell the same story through its cost codes.

You can ensure consistency between the project cost accounting system and schedule by establishing project cost codes that are consistent with the WBS that is used to define the activities in the project schedule.

By establishing cost codes that parallel the schedule activities, the associated costs can be tracked in conjunction with the schedule's progress.

If an event impacts a project activity, then the schedule may be used to demonstrate the effect of the impact relative to time, and the discrete cost tracking may be used to demonstrate the additional costs related to the impact for that specific activity.

2: Summary of Original Estimate Fields

Cost Code	Original Estimate	
910-0005 Install Light Pole Foundations	125 each	← Planned Quantity
Labor	19,492.50	← Original Estimated Amounts
Small Tools	12,500.00	
Permanent Materials	50,375.00	← Actual Value of Purchase Order or Subcontract
Subcontractors	31,250.00	
Total	\$113,617.50	
Hours	485.00	← Estimated Labor Hours
Estimated Cost Per Man-Hour	\$40.19	← Labor Estimate/Estimated Hours

3: Summary of Revised Estimate Fields

Cost Code	Original Estimate	Revised Estimate	
910-0005 Install Light Pole Foundations	125 each	155 each	← 30 Additional Foundations
Labor	19,492.50	24,170.70	← Additional Estimated Cost & Commitment Change Orders
Small Tools	12,500.00	15,500.00	
Permanent Materials	50,375.00	62,465.00	
Subcontractors	31,250.00	38,750.00	
Totals	\$113,617.50	\$140,885.70	
Hours	485.00	601.00	← Additional Estimated Man-Hours
Estimated Cost Per Man-Hour	\$40.19	\$40.22	

4: Summary of Actual Cost & Quantity Fields

Cost Code	Original Estimate	Revised Estimate	Estimated Cost Per Unit	Cost to Date	
910-0005 Install Light Pole Foundations	125 each	155 each		16.00	← Installed Quantity
			[10.32% Complete]		← Quantity to Date/ Revised Estimated Quantity
Labor	19,492.50	24,170.70	155.94	3,625.61	← Actual Cost to Date
Small Tools	12,500.00	15,500.00	100.00	1,860.00	
Permanent Materials	50,375.00	62,465.00	403.00	8,060.00	
Subcontractors	31,250.00	38,750.00	250.00	2,500.00	
Totals	\$113,617.50	\$140,885.70	\$908.94	\$16,045.61	
Hours	485.00	601.00	3.88	75.00	← Man-Hours to Date
Estimated Cost Per Man-Hour	\$40.19	\$40.22	Actual	\$48.34	← Labor Cost/ Labor Hours

Project Cost Codes

Project cost codes should be discrete and describe distinct activities. However, they should not be so detailed that they impede accurate labor coding in the field.

For example, instead of separate cost codes for forming, reinforcing, and pouring concrete for a sidewalk, it may be more useful to set up one cost code to track “Installation of Sidewalk.”

If the schedule details separate sidewalk construction in distinct areas of the project, then establish discrete cost codes for each area so that those activity costs can be tracked separately. This type of cost tracking is especially beneficial if one of these activities is adversely impacted because of a change in the schedule activity; a discrete cost for that activity will likely demonstrate the impact.

In addition, change order costs outside of the scope of work should be tracked in discrete cost codes. By tracking change order costs discretely, you can identify actual costs of

changed work and establish the basis for substantiating the costs if requested by the project owner under an audit clause (or in the event of a dispute).

This segregation of costs also keeps the true cost of the original scope of work intact – an important concept in the event that a productivity analysis is required for an in-scope item.

Now that the cost codes have been defined, let’s talk about several additional data fields and computations that make the cost report truly functional.

Fields & Function

In Exhibit 1, cost code 910-0005 describes the costs and quantities in the activity “Install Light Pole Foundations.” The following is a discussion of the fields, functions, and uses of the cost report.

Cost Types

Some contractors track too few cost types while others track too many. I am an advocate of keeping it simple, and

5: Summary of Unit Cost Fields

Cost Code	Original Estimate	Revised Estimate	Estimated Cost Per Unit	Cost to Date	Unit Cost to Date	
910-0005 Install Light Pole Foundations	125 each	155 each		16.00		
				[10.32% Complete]		
Labor	19,492.50	24,170.70	155.94	3,625.61	226.60	Estimated Cost/Revised Estimated Quantity
Small Tools	12,500.00	15,500.00	100.00	1,860.00	116.25	
Permanent Materials	50,375.00	62,465.00	403.00	8,060.00	503.75	
Subcontractors	31,250.00	38,750.00	250.00	2,500.00	156.25	Cost to Date/Quantity to Date
Totals	\$113,617.50	\$140,885.70	\$908.94	\$16,045.61	\$1,002.85	
Hours	485.00	601.00	3.88	75.00	4.69	
Estimated Cost Per Man-Hour	\$40.19	\$40.22	Actual	\$48.34		

6: Summary of Estimated Total Cost Fields

Cost Code	Original Estimate	Revised Estimate	Estimated Cost Per Unit	Cost to Date	Unit Cost to Date	Estimated Total Cost	
910-0005 Install Light Pole Foundations	125 each	155 each		16.00			
				[10.32% Complete]			
Labor	19,492.50	24,170.70	155.94	3,625.61	226.60	35,123.05	Labor/Percent Complete
Small Tools	12,500.00	15,500.00	100.00	1,860.00	116.25	18,018.75	Small Tools/Percent Complete
Permanent Materials	50,375.00	62,465.00	403.00	8,060.00	503.75	62,465.00	Total Committed Value
Subcontractors	31,250.00	38,750.00	250.00	2,500.00	156.25	38,750.00	
Totals	\$113,617.50	\$140,885.70	\$908.94	\$16,045.61	\$1,002.85	\$154,356.80	
Hours	485.00	601.00	3.88	75.00	4.69	726.56	
Estimated Cost Per Man-Hour	\$40.19	\$40.22	Actual	\$48.34			



generally believe that cost types should be classified in no more than the following categories:

- Labor (Fully Burdened);
- Owned Equipment;
- Rented Equipment;
- Fuel and Oil;
- Overhead/Other (site utilities, performance and payment bonds, overhead allocations);
- Small Tools, Small Materials, Expendables;
- Permanent Materials (Material Purchase Orders);
- Subcontractors; and
- Contingency.

Since most cost estimates are summarized at the cost category level, presentation of a consolidated cost type helps simplify the comparison of actual and estimated costs in the cost report.

For example, labor-related costs (such as base labor, fringe benefits, insurances, and employer taxes) are often associated with a dozen or more discrete payroll and cost category codes. Report designs can and should be programmed to consolidate these costs into one simple “Labor” category.

Original Estimate

The cost report should include the original estimate of costs by type as well as the associated labor hours, cost per man-hour, and planned quantity (see Exhibit 2).

The original estimate for “Permanent Materials” and “Subcontractors” should be adjusted to reflect the original contract

amount for each vendor and subcontractor. By doing so, the risk for that scope is quantified and presented and the unknown variable is eliminated from the cost report. Many contractors also reflect their value engineering efforts in the original estimate column, which reduces noncommitted amounts (usually labor) to strive for greater cost efficiency.

Revised Estimate

One of the primary goals of the cost report is to reflect the current state of the project estimate. So, the revised estimate should be updated to reflect owner change orders, changes to planned quantities, and change orders to material suppliers and subcontractors. Exhibit 3 demonstrates these types of changes.

Cost & Quantity to Date

The accounting process should ensure that costs are charged to the proper cost code and category (Exhibit 4).

Many contractors fail to record the “installed quantity” in their cost report. Installed quantity typically serves as the basis for payment, so it is likely tracked in the field. It is also the key element in computing the contractor’s actual performance and will be used to compute percent complete (Quantity to Date/Revised Estimated Quantity), unit cost to date, as well as projected total cost. (We will discuss those computations shortly.)

Payroll is typically produced weekly and invoices are processed in A/P on an ongoing basis. The cost report may be updated weekly to reflect those additional costs. CFMs should create a procedure to accurately track and report quantities installed during the payroll period in order to produce a continuous stream of important project performance information.

7: Summary of Estimated Remaining Cost Fields

Cost Code	Original Estimate	Revised Estimate	Estimated Cost Per Unit	Cost to Date	Unit Cost to Date	Estimated Total Cost	Estimated Remaining Cost	
910-0005 Install Light Pole Foundations	125 each	155 each		16.00			139.00	← Revised Quantity – Quantity to Date
			[10.32% Complete]					
Labor	19,492.50	24,170.70	155.94	3,625.61	226.60	35,123.05	31,497.44	← Estimated Total Cost – Cost to Date
Small Tools	12,500.00	15,500.00	100.00	1,860.00	116.25	18,018.75	16,158.75	
Permanent Materials	50,375.00	62,465.00	403.00	8,060.00	503.75	62,465.00	54,405.00	
Subcontractors	31,250.00	38,750.00	250.00	2,500.00	156.25	38,750.00	36,250.00	
Totals	\$113,617.50	\$140,885.70	\$908.94	\$16,045.61	\$1,002.85	\$154,356.80	\$138,311.19	
Hours	485.00	601.00	3.88	75.00	4.69	726.56	651.56	← Estimated Total Hours – Hours to Date
Estimated Cost Per Man-Hour	\$40.19	\$40.22	Actual	\$48.34				

Unit Costs

Exhibit 5 depicts the “Unit Cost” fields in the cost report. “Estimated Unit Cost” is computed by dividing estimated costs, by cost category, by the revised estimated quantity. “Unit Cost to Date” is computed by dividing cost to date, by cost category, by the installed quantity to date. We see that the actual unit cost to date is greater than the estimate for labor, small tools, and materials, which indicates cost overruns.

Be aware, however, that permanent materials and subcontractors should never be paid more than the committed value. And, the unit cost to date will not always be in line with the estimate because of the timing of material deliveries and related billings.

Estimated Total Cost

So far, you’ve established discrete cost codes to complement the WBS, entered original estimates and commitments, updated change orders, tracked costs to the appropriate cost

codes, and recorded the installed quantities. Now, it’s time to put that information to use.

In the cost code example, we have quantified the materials and subcontractors by issuing purchase orders and subcontracts. The remaining risk to be managed is in labor and small tools.

Since the report shows that 10.32% of the work has been completed, there is enough information to project estimated total cost. By dividing cost to date by percent complete for the “Labor” and “Small Tools” categories, we are able to complete the computation shown in Exhibit 6.

The computation assumes that if labor performance remains consistent at \$226.60 per unit, then the total cost will be \$35,123.05 (\$226.60/unit x 155 units). Essentially, the computation is a straight-line extrapolation of the achieved productivity to date.

Keep in mind that the estimated total cost for permanent

8: Summary of Projected Underrun/Overrun Fields

Cost Code	Revised Estimate	Cost to Date	Estimated Total Cost	Estimated Remaining Cost	Projected +/-	
910-0005 Install Light Pole Foundations	155 each	16.00		139.00		
		[10.32% Complete]				
Labor	24,170.70	3,625.61	35,123.05	31,497.44	(10,952.35)	← Revised Estimate – Estimated Total Cost
Small Tools	15,500.00	1,860.00	18,018.75	16,158.75	(2,518.75)	
Permanent Materials	62,465.00	-	62,465.00	62,465.00	-	
Subcontractors	38,750.00	-	38,750.00	38,750.00	-	
Totals	\$140,885.70	\$5,485.61	\$154,356.80	\$148,871.19	\$(13,471.10)	
Hours	601.00	75.00	726.56	651.56	(50.56)	← Revised Estimate Hours – Estimated Total Hours
Estimated Cost Per Man-Hour	\$40.22	\$48.34	Cost Per Man-Hour Savings/Excess		\$(8.12)	

9: Example Cost Report Format

Cost Code	Original Estimate	Revised Estimate	Estimated Cost Per Unit	Cost to Date	Unit Cost to Date	Estimated Total Cost	Estimated Remaining Cost	Projected +/-
910-0005 Install Light Pole Foundations	125 each	155 each		16.00			139.00	
				[10.32% Complete]				
Labor	19,492.50	24,170.70	155.94	3,625.61	226.60	35,123.05	31,497.44	(10,952.35)
Small Tools	12,500.00	15,500.00	100.00	1,860.00	116.25	18,018.75	16,158.75	(2,518.75)
Permanent Materials	50,375.00	62,465.00	403.00	8,060.00	503.75	62,465.00	54,405.00	-
Subcontractors	31,250.00	38,750.00	250.00	2,500.00	156.25	38,750.00	36,250.00	-
Totals	\$113,617.50	\$140,885.70	\$908.94	\$16,045.61	\$1,002.85	\$154,356.80	\$138,311.19	\$(13,471.10)
Hours	485.00	601.00	3.88	75.00	4.69	726.56	651.56	(50.56)
Estimated Cost Per Man-Hour	\$40.19	\$40.22	Actual	\$48.34		Cost Per Man-Hour Savings/Excess		\$(8.12)



materials and subcontractors will be governed by the committed value of the purchase orders and subcontracts.

Estimated Remaining Cost

“Estimated Remaining Cost,” as demonstrated in Exhibit 7, is the difference between “Estimated Total Cost” and “Cost to Date.” These computations, based on productivity and commitments to date, tell us the additional amounts we can expect to spend if performance and commitments re-main the same through project completion.

Projected Underrun/Overrun

Finally, the projected savings, or overrun, is calculated by subtracting the “Estimated Total Cost” from the “Revised Estimate.” The truncated table in Exhibit 8 demonstrates this computation.

What Does It All Mean?

So, you’ve built a cost reporting system and are producing weekly cost reports for your PMs and project teams. How are you going to use these reports to identify and mitigate

your project cost-related risks? Let’s take another look at the sample cost report in Exhibit 9.

The original scope of 125 foundations has been increased in quantity and estimated cost by the owner’s change order. In addition, 16 (or 10.32%) of the foundations have been completed. Labor – the primary at-risk cost element for this activity – seems to be in trouble. How can you tell?

First, the actual labor unit cost to date is \$226.60 vs. the estimate of \$155.94. Secondly, the average cost per man-hour is \$48.34 vs. \$40.22. The result of the performance to date is a projected labor overrun of \$10,952.35. The Small Tools category is also projecting an overrun of \$2,518.75.

What Is Causing the Projected Overrun?

There are several issues that stand out. With respect to labor, it appears that the average labor rate is \$8.12 above the estimate.

Is there overtime that wasn’t considered in the estimate? Is the crew composed of the anticipated mix of foremen,

10: Example Cost Summary Report

	Original Estimate	Revised Estimate	Monthly Cost	Cost to Date	Estimated Total Cost	Estimated Remaining Cost	Projected +/-
Labor	1,105,050	1,180,050	18,947	242,661	1,386,450	1,143,789	(206,400)
Fuel/Oil	125,000	135,000	9,752	23,252	128,250	104,998	6,750
Rented Equipment	725,000	775,000	72,014	149,514	868,000	718,486	(93,000)
Owned Equipment	275,000	285,000	13,256	41,756	285,000	243,244	-
Overhead/Other	125,250	150,250	12,757	27,782	142,738	114,956	7,513
Small Tools & Expendables	120,000	130,000	35,292	48,292	123,500	75,208	6,500
Permanent Materials	2,525,000	2,775,000	456,750	734,250	3,052,500	2,318,250	(277,500)
Subcontractors	15,100,250	15,975,250	2,021,525	3,619,050	15,975,250	12,356,200	-
Contingency	-	676,000	-	-	676,000	676,000	-
Job Totals	\$20,100,550	\$22,081,550	\$2,640,293	\$4,886,557	\$22,637,688	\$17,751,131	\$(556,138)
Man-Hours:	27,626.00	29,520.00	401.00	5,375.00	30,707.50	25,333.00	(1,187.50)
Cost per Man-Hour:	\$40.00	\$39.97	\$47.25	\$45.15	\$45.15	\$45.15	\$(5.18)

ORIGINAL CONTRACT SUMMARY

Original Contract Value	23,100,000	
<Less> Original Estimate	20,100,550	
Original Estimated Profit	\$2,999,450	12.98%

CONTRACT SUMMARY

Original Contract Value	23,100,000
Approved Change Orders	2,377,200
Approved Contract Value	\$25,477,200

CASH FLOW SUMMARY

Gross Billings	4,900,000
<Less> Retention	(490,000)
<Less> A/R Balance	(1,850,000)
Net Cash Received	\$2,560,000

ESTIMATED PROFIT SUMMARY

Total Contract Value	25,477,200	
<Less> Estimated Total Cost	22,637,688	
Estimated Profit	\$2,839,513	11.15%

OWNED EQUIPMENT SUMMARY

	Total	Per Man-Hour
Budget	285,000	9.65
Recovery	41,756	7.77

Job to Date Cost	4,886,557
<Less> A/P Balance	(985,000)
<Less> Internal Equipment	(41,756)
Net Cash Outflow	\$3,859,801
+/- Cashflow	(1,299,801)
Overbilled/Underbilled	(599,492)

journeymen, and apprentices? Are the local wages higher than anticipated? You can find the answers to these questions by looking at the accounting and estimate records, as well as talking with the project team.

Why Is this Information Important?

From a project management perspective, we've taken information that is readily available and discovered that performance and profitability are not what was expected. You can now find out the root cause and attempt to correct the issue.

For example, the crews may have been forced to work overtime that they had not planned. If that's the case, then you may now discretely track the overtime for this activity. If this overtime is reimbursable under the terms of the contract, then you can provide the owner with timely notice and prepare a change order request to be compensated for the additional premium time costs.

If the crew composition is not what was planned, then the project team may right-size the crew to lighten the average hourly cost. And, if the crew's performance is the issue, the management team can take steps to improve productivity.

So, you are able to discover the risk to profitability at 10% complete, while there is time and available budget to correct the problem. Contractors with numerous projects will be able to identify and mitigate these types of risks on hundreds (or perhaps thousands) of activities throughout the course of their projects.

Cost Summary Report

CFMs can't review hundreds of pages of cost reports each week in order to identify the project cost-related risks that we've discussed. A single-page summary report that rolls up all project cost codes is a means of simplifying the task. Exhibit 10 is an example of a Cost Summary Report.

How Do I Use this Information?

The goal of this type of summary report is to provide a quick snapshot that identifies potential issues and risks of a project that the CFM can act on and mitigate. The basic format is straightforward. The top section of the report summarizes all of the cost code activities in the fields that we reviewed above. The bottom section contains summaries related to estimated profit, approved change orders, owned equipment absorption, project cash flow, and over/underbillings.

At the most basic level, the report should be used to confirm estimated profit amounts that are being reported in the WIP schedule. For example, if the project team has reported

\$3.25 million in profit on the WIP, then the summary report might call that projection into question. A review of the report shows that the anticipated profit is \$2.839 million; while there is a budget of \$676,000 of apparently unused contingency in the project, further investigation and discussion is needed to ensure that the WIP projection is reasonable.

At a secondary level, the report can help identify cost categories that may pose a risk to the project's profitability. In this example, we see that there is a projected labor cost, man-hour, and labor rate overrun, as well as a projected overrun in the rented equipment and permanent material categories.

The projected overruns should prompt the project team and CFM to investigate the detailed cost report to find the cause and initiate a mitigation effort. In the case of permanent materials, the overrun may merely be the result of certain costs being charged to the wrong cost code. An investigation will help answer the question.

Finally, CFMs and project teams can easily monitor other project metrics. For example, we see that while the project has received \$2.377 million in approved change orders, it is underbilled by almost \$600,000 with a negative cash flow of almost \$1.3 million.

This summary report shows numerous negative signals, but at approximately 20% of project completion. This early recognition gives CFMs the ability to identify the specific underlying causes and lead the charge in proactively mitigating those risks. ■

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With more than 25 years in the construction industry, Bill specializes in the calculation of delay- and disruption-related damages, construction cost accounting systems consulting, construction financial reporting consulting, and expert testimony.

A member of CFMA's Greater Pittsburgh Chapter, Bill serves on the ICCIFP's Board of Trustees, and holds a copyright for an automated construction financial reporting model he designed while serving as a CFO.

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