



OWNERS NEED PROJECT CONTROLS

PROJECT CONTROLS



INTRODUCTION.

As a consultant that supports numerous clients, both owners and contractors, with project delivery and dispute resolution, Spire often finds owners do not have adequate support for the necessary project controls for their projects. Instead, the contractor is tasked with providing this service as a part of its scope of work. The owner's project manager or other staff will provide review of the information provided by the contractor and manage changes to and from the contractor, but typically little else. Since many owners do not have staff experience in the delivery of capital projects, the staff assigned to project may not understand what project controls means or the value it can deliver. Many owners believe this is just a function for the contractor and entrusts this responsibility to the contractor. But a study has demonstrated when owners have their project controls staff supporting the project, projects have improved cost and schedule performance. This staff can be owner-direct employees or 3rd party providers in support of the owner. Owners that have project controls support on their team will not only benefit from improved outcomes on that project but also see long-term benefits from the knowledge they gain through this practice.

WHY OWNERS NEED PROJECT CONTROLS

As mentioned, many owners may not understand the need to provide their own project controls staff. Particularly when the contractor is working under a fixed price contract, owners may think all the risk is the contractor's responsibility. Regardless of the contract type, owners still have significant risk for project cost overruns and schedule delays.

Owner Costs and Responsibilities

Owner Costs – Although typically the contractor's cost is the largest component of a project, it is only a portion of the total project cost. Depending on the contract strategy implemented, owners may have separate design costs, equipment procurement, specialty contractors, licensing costs, consultants, project teams, and other costs. The owner needs someone to combine all the costs to report on the total project cost, not just the contractor's portion.

Owner Schedule – Owners typically have responsibilities for various activities on the project, separate from the contractor's scope of work. Owners may self-perform design, do some procurement, perform commissioning and start-up, and even manage some portions of the construction in existing facilities. Although the contractor may be responsible for incorporating some of these activities into its schedule, the owner needs someone to manage the development of those activities with regular updating.

Owner's Perspective

Independent Analysis – While a contractor's project controls reporting may not be intentionally biased, it is developed with the contractor's perspective in mind, and tends to focus on the elements the contractor wants the owner to see. Contractors can underrepresent contractor issues and overrepresent owner issues. Owners need an independent analysis of the contractor's cost and schedule performance and forecasts without any bias. Of course, owners can be biased as well. The owner's project controls staff needs to be careful to eliminate any bias in the project controls reporting so owners can make the best decisions possible in managing the project.

Early Warning System – The owner's project controls staff can serve as an early warning system to internal management. Whereas contractors may not want to report negative performance, the independent project controls analysis can identify issues in the early stages to allow proactive management and mitigation.

Owner Specific Requirements – Owner's project controls staff can also focus on specific reporting required by an owner, beyond what a contractor may provide. Projects that have joint venture owners, involve multiple countries

and currencies, and specific cashflow constraints may have special project controls reporting that an owner's project controls team can better manage than a contractor's team.

Enhanced Management

Improved Cost and Schedule Understanding – The owner's project controls staff can provide enhanced cost and schedule understanding and management for the owner. They can provide a better understanding of all phases of the project lifecycle and all scopes of work, not just those being executed by the contractor. They can help explain trends, performance issues, and provide specific analysis to help owners make more informed, proactive decisions in managing the project.

Improved Change Management – This staff can also improve change order management by analyzing the cost and schedule impacts of any potential changes or disputes. They will also typically manage the process on behalf of the owner to facilitate the efficient processing of owner changes and contractor requests.

Future Project Support – Long term, the owner's project control staff will help build a repository of data and lessons learned that will benefit future projects. This data will help in the development of future projects by providing realistic cost and schedule information in the early planning phases. It can also serve to benchmark new projects against actual project performance within the organization. The lessons learned will result in better performance through continuous improvement in organizing project teams, working with contractors, managing owner activities, and early warning signs, leading to additional consistency in the delivery of projects.

OWNER PROJECT CONTROLS VALUE

Independent Project Analysis (IPA), a benchmarking company, has studied project controls best practices and the benefits associated with them. The best practices include owners 1) conducting an independent validation of the estimate, 2) providing owner project controls staff, and 3) collecting cost and schedule metrics for future projects. The study determined that owners that include project controls best practices on their projects experienced several benefits, including:

- + Lower cost growth from the approved budget on cost-reimbursable contracts
- + Lower total cost of the project compared to similar construction
- + Less slippage in the project completion schedule from its approved schedule
- + Less total time required to execute a project compared to similar construction
- + Actual cost and schedule results are captured, which can be used in future project planning and benchmarking
- + All of these benefits are realized through an improved understanding of the project progress, performance, cost, and schedule data. Owners can better understand the implications of changes to the project cost and schedule.

In addition to these benefits, Owners are in a better position to resolve issues with the contractor through improved vision of the project data and analysis to address performance, cost, and schedule issues involved in a potential dispute.

CONTRACTING STRATEGY AND OTHER FACTORS

The fundamentals of cost and schedule management on a project will remain constant regardless of project type, industry, location, project phase, or contract type. But the details of how the project controls will be applied may vary depending on these factors.

- ✓ **Contract Type** - Different contract structures allocate the risk differently between the owner and contractor. Fixed Price contracts place the greatest risk on the contractor while cost reimbursable contracts place the greatest risk on the owner. Other contract types fall somewhere between these two. But even with Fixed Price contracts, the owner is at risk for issues beyond the contractor's control and schedule delays. Even if the contract has schedule penalties, it does not recoup the time lost.
- ✓ **Project Type and Industry** - Projects in different industries can often be executed differently. Owners in heavy industrial projects, such as oil & gas projects, typically have much greater involvement in the project. They often use contractors that provide engineering, procurement, and construction (EPC) services. They are also driven by the technology being utilized for the facility. Commercial and other types of building owners often contract separately for the design of the facility before contracting for the construction work. They may be less involved in the execution of the project, relying more on the contractor to manage the work.
- ✓ **Location and Culture** - Projects in different parts of the world can be executed differently in terms of contract types, how the work is subcontracted, and just how parties deal with each other. Regulatory and legal requirements can vary significantly in different parts of the world impacting reporting requirements and how contractors and owners interact with each other.

Ultimately, while all these factors may influence the details of how project controls are applied, the primary elements are the same – How is the work progressing? Is the work performing as planned? What is the current cost forecast versus our current budget? What is our schedule completion forecast versus our current target? If an owner has strong project controls support on their team, they will be able to answer these questions with confidence.

MAJOR OWNER PROJECT CONTROLS TOOLS

Project Controls analyzes multiple facets of how a project is being executed, including cost, schedule, changes, and performance measurement. For all of these facets, analysis starts with a baseline – the approved design basis, the original budget, the approved schedule, the planned progress per period, and productivity metrics. Owners need to ensure they develop or capture this information and retain it for comparison to actual performance as the project progresses.

Key Cost Control Tools

Establishing Baseline Data – Owners should have a detailed breakdown of the project scope with quantities for each type of material, material unit rates, manhours estimated to install each type of material, labor rates, construction equipment durations and rates, temporary facilities and costs, staff and costs, and detailed estimates of all other costs for the total project. This information is necessary to be able to assess actual performance, determine variances and trends, and address disputes over performance. Under a fixed price contract, often this information is not available or not available at a detailed level, but any information that can be gathered is useful.

COST CODE	DESCRIPTION	UOM	QTY	TOTAL HOURS	LABOR \$'S	MATERIAL \$'S	TOTAL \$'S
	Civil				\$	\$	\$
04.001	Carpenter GF's	hours	480	480	\$38,880	-	\$38,880
04.002	Concrete Formwork/Embeds	sq ft	14693	2764	243,232	74,374	317,606
04.003	Concrete Reinforcement	lbs	191938	1536	127,488	99,808	227,296
04.004	Place and Finish Concrete	cu yds	1846	1459	93376	180,768	274,144
04.005	Grouting	cu ft	244	406	25,578	63,650	89,228
04.006	Bollards	ea	4	20	1660	1500	3,160
04.007	Aux Bldg Interiors	hours	277	277	21,570	21,460	42,512

Figure 1 – Example of Detailed Baseline Cost Budget Data

Cost Summary Table – The cost summary table is the heart of the project controls effort into which all other components feed. It is a summary breakdown of the original budget, approved changes, the current budget, variances and trends, the current forecast, commitments, expended amounts, and to go amounts. This table reflects where the project started with the budget and where it is going with the forecast and where the project is along that journey. It should include all project costs including the contractors, any designers or other consultants, and all other owner costs.

	ORIGINAL CONTROL BUDGET	CHANGES	CURRENT CONTROL BUDGET	CURRENT FORECAST	EXPENDED & ACCRUED TO-DATE	COMMITMENTS	TO-GO/ UNCOMMITTED
Capital	11,200,000	210000	11410000	11620000	2035000	4170000	7350000
Project Management	500,000	-	500,000	520,000	210,000	220,000	300,000
Engineering	2,000,000	40,000	2,040,000	2,100,000	1,300,000	1,400,000	700,000
Procurement	4,000,000	100,000	4,100,000	4,200,000	500,000	2,500,000	1,700,000
Construction	3,700,000	70,000	3,770,000	3,900,000	25,000	50,000	3,850,000
Contingency	1,000,000	-	1,000,000	800,000	-	-	800,000
Expense	500,000	(30,000)	470,000	480,000	20,000	20,000	460,000
Construction	400,000	(30,000)	370,000	390,000	-	-	390,000
Other	100,000	-	100,000	90,000	20,000	20,000	70,000
Total Project	11,700,000	180,000	11,880,000	12,000	2,055,000	4,190,000	7,810,000

Figure 2 – Example of Cost Summary Table

Budget and Forecast Tracking – This chart provides a graphical history of the project budget and the periodic forecasts since the start of the project. It can be a great visual tool to show if the forecast revisions are being driven by changes to the budget or by other influences. This chart can be combined with the cashflow forecasting chart.

Cashflow Forecasting – This chart provides a graphical summary of the planned and actual plus forecasted cashflow for the project. Many owners need to manage project cashflows depending on how the funds have been allocated and projects can only spend funds as they have been released.

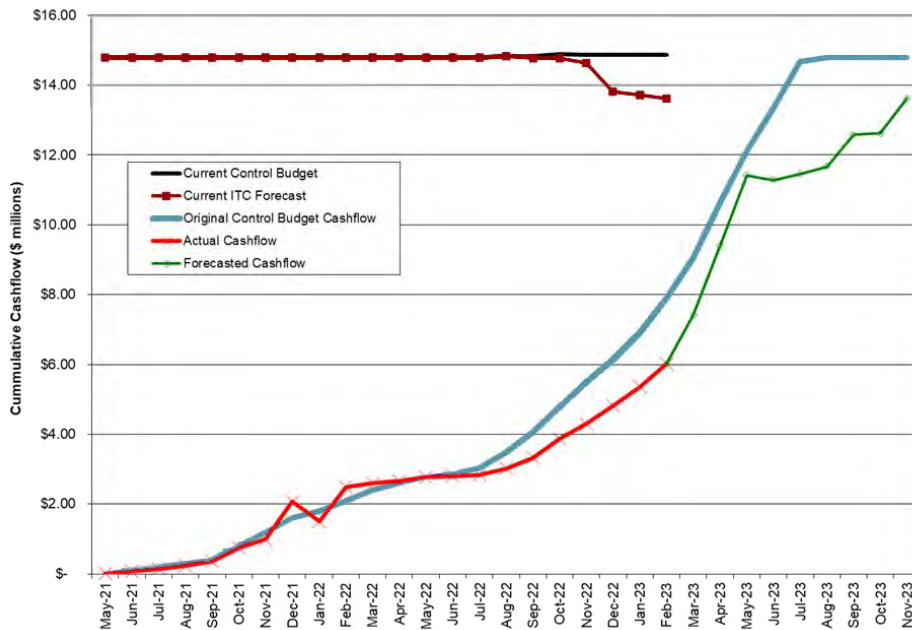


Figure 3 – Example of Cost Budget, Forecast, and Cashflow Tracking Chart

Unit Rate Tracking (Labor, Material) – Unit rate cost tracking can take many forms depending on the contract structure. If the project is cost reimbursable, costs may be tracked by material per discipline. Labor costs can be tracked at costs per manhour for each discipline. These actual unit rate costs can be tracked against the baseline data to determine if costs are trending above, on, or below the baseline budget. Some projects have Key Performance Indicators (KPI’s) established based on unit rate costs. If so, the project controls team needs to track this data or verify the contractor’s tracking of the data. Even with a fixed-price contract, if this information is available, the owner should try to ascertain how the contractor’s unit rate costs are tracking against the baseline. If the costs are tracking above the baseline, the owner may be at risk of the contractor seeking additional compensation.

Contingency Tracking – Almost all projects are budgeted with a certain amount of contingency to address risks that are not yet identified or general uncertainty in the estimate at the time the budget is established. The owner needs to track the actual usage of this contingency over the life of the project to forecast whether it has sufficient contingency for the balance of the project or will need supplemental funding before completion of the project.

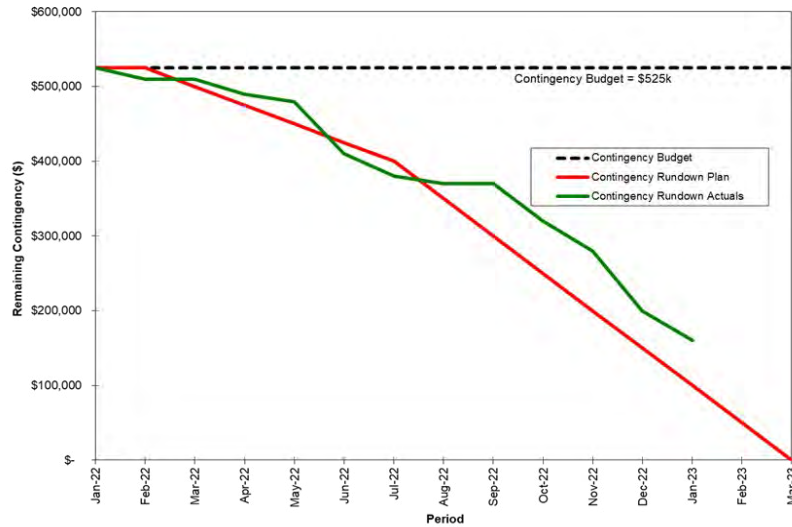


Figure 4 – Example of Contingency Usage Tracking Chart

KEY SCHEDULE CONTROL TOOLS

Summary Schedule – Owners need to have a good understanding of their overall project schedule and how it fits into their capital program of projects and ongoing operations. How does this project’s timeline fit against other projects at the same location or commitments made to the markets, clients, and employees? It helps identify key constraints and “need-by” dates for projects that should be monitored over the life of the project.

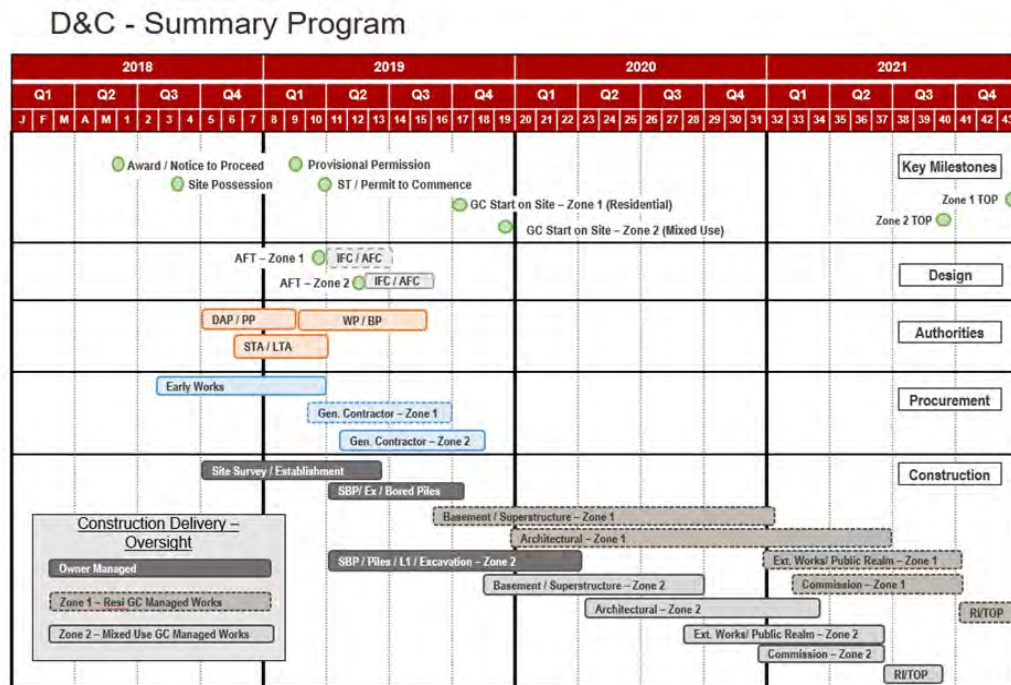


Figure 5 – Example of Summary Program Schedule

Establishing Baseline Schedule – The contractor is typically responsible for developing a detailed schedule for its activities in the execution of the construction. The owner has two responsibilities with this schedule – 1) to review

the submitted baseline and ensure it meets the requirements of the contract and industry standards for planning and scheduling, and 2) to supplement the schedule with any activities by owners or others that need to be integrated with the contractor’s schedule to provide a complete schedule for the project.

Owner Activities – Owners need to develop a schedule for their activities or provide information for the contractor to incorporate into their schedule. After these activities are developed, the owner needs to continue to monitor its progress in managing those activities and ensure the schedule activities are updated periodically in conjunction with the contractor updates. The owner has a responsibility to manage its activities and ensure it is tracking the schedule for the forecast and execution of those activities.

Update Reviews – Owners need to review each schedule update issued by the contractor. The effort includes 1) identifying how the current reporting period’s work performs against the agreed upon baseline, 2) ensuring the progressed activities accurately represent the work performed during the reporting period, 3) reviewing any modifications made to the remaining work to ensure they are appropriate and agreed to by the owner, 4) incorporating approved changes into the schedule, 5) forecasting work to reflect the current plan for the balance of execution and, and 6) analyzing variations in the key milestones to understand why the forecasted dates may have shifted, and what can be done to help recover any schedule slippage.

Milestone Tracking – Milestone tracking is a tool for quickly assessing how the project is progressing towards key completion dates in the schedule. This type of tool can be a table, chart, or combination. A chart such as the one in Figure 6 indicates which milestones are tracking ahead of schedule (below the line) and behind schedule (above the line).

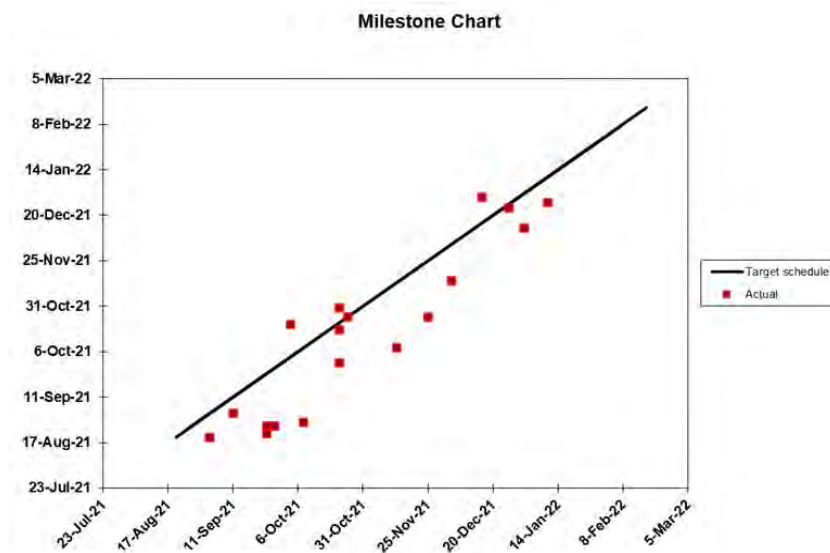


Figure 6 – Example of Milestone Tracking Chart

Manpower Planning/Tracking/Forecasting – A key component of progressing the schedule is the resources used to install the work. The contractor should have a baseline resource plan for performing its work and track actuals against that plan. Charting this information can quickly show if the contractor has been able to deploy resources as planned or not. This information can be used in conjunction with overall progress measurement and productivity tracking to

assess schedule performance. If the contractor is not progressing the work as planned, is it a productivity issue or a manpower issue? This information can help answer that question.

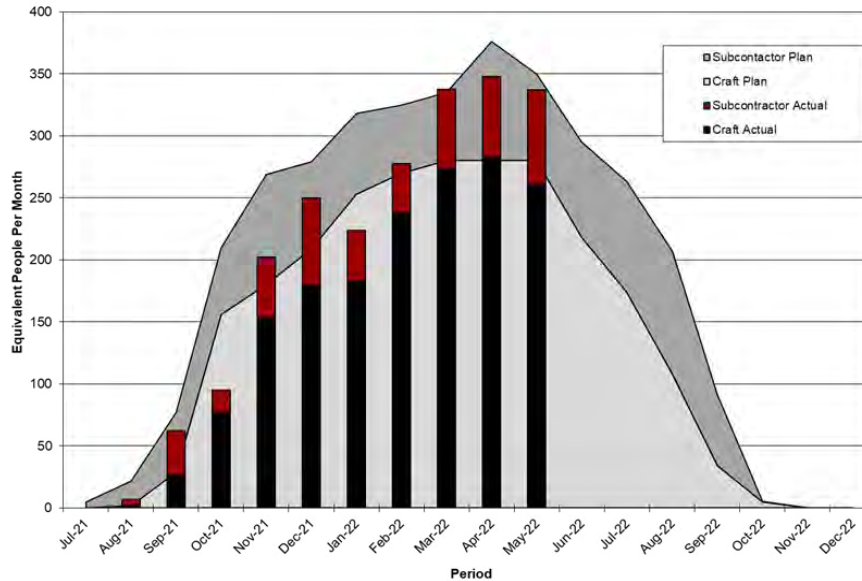


Figure 7 – Example of Manpower Plan and Actual Tracking Chart

CHANGE MANAGEMENT

Change Reviews – During the project execution, events may occur that the contractor perceives as changes to the contract. If so, the contractor may give notice or submit a proposal requesting compensation for the change. In either case, one of the first steps is to evaluate if the event qualifies as a change under the contract and if the contractor is entitled to compensation for any impacts due to the event. Project controls staff can support the evaluation of the entitlement based on a study of the events and contract terms. This evaluation can help facilitate the timely processing of change requests.

Change Reviews – If the owner requests a change from the contractor or if the contractor submits a change request and is entitled to an adjustment, then the owner’s project controls staff can evaluate the cost and schedule impacts to determine if reasonable. The contract may define material and labor rates for changes. If not, actual rates or current market rates should be applied. Schedule extensions should be based on a Time Impact Analysis (TIA) prepared by the contractor that indicates how the event in question impacts the activities in the schedule and the overall completion. The TIA has to be evaluated to determine appropriately developed and analyzed. Owners need project controls staff skilled in the evaluation of cost and schedule changes to ensure that contractors receive adjustments that are accurate, justified, and reasonable.

Change Log/Tracking – It is important for owners to maintain a log with the status of all changes and change requests throughout the life of the project. It helps to be able to assess how the budget has been modified through changes and pending changes that may still impact the project. Defining the type of change can also help both with understanding the high-level drivers of project cost changes and developing a means to avoid those types of changes on future projects.

DESCRIPTION OF CHANGE	CHANGE ORDERS		DEVIATIONS		PENDING		TOTAL
Design Development	0 each	-	23 each	67,086	0 each	-	(67,063)
Safety	0 each	-	0 each	-	0 each	-	-
Operability	0 each	-	0 each	-	0 each	-	-
Estimate Adjustment	5 each	17,467	11 each	(588,981)	0 each	-	(571,503)
Budget Transfer	1 each	(12,306)	3 each	(626,100)	1 each	-	(638,402)
Execution Basis	0 each	-	5 each	(289,365)	0 each	-	(289,360)
Scope Change	8 each	77,492	1 each	-	1 each	-	77,494
Rework	0 each	-	0 each	-	0 each	-	-
Total	14 each	82,653	43 each	(1,571,532)	2 each	-	(1,488,834)

Figure 8 – Example of Change Log Status Summary Table

PERFORMANCE

Progress – Understanding how the project is progressing versus the plan is one of the most important aspects of project controls. This information is critical in analyzing the cost and schedule performance of the project and forecasting realistic outcomes. Progress tracking should be utilized for both design and construction activities to understand how each phase is progressing. Progress can be measured in multiple ways, but the key is to have a baseline of expected progress and earned measurement system to evaluate the work completed to date, i.e. the progress achieved. Is the contractor or design consultant performing to, ahead of, or behind the plan? How does the period rate of progress compare to the plan? The two most common methods for developing a plan and tracking progress are through 1) a resource-loaded schedule that bases progress on the resources planned per period in the baseline schedule and resources “earned” as the schedule is progressed, and 2) an earned value measurement system that breaks the scope down by quantities of major components to be installed per period, the estimated resources to install them, and recording actual quantities installed per reporting period. Some contractors provide this type of information as a part of their reporting. Owners need to evaluate the reporting to ensure the data is accurate and present a true analysis of the project progress.

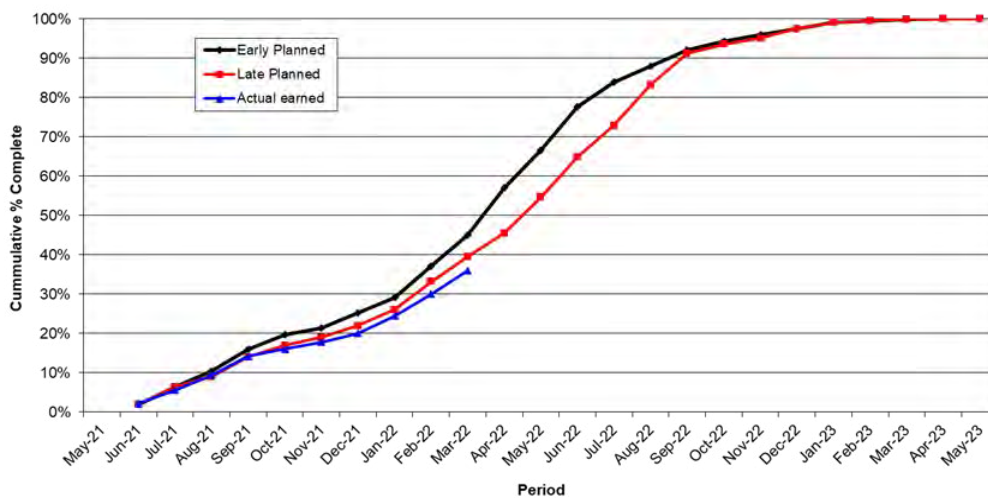


Figure 9 – Example of Progress Tracking Chart

Productivity – Utilizing the information provided through the progress measurement system can also allow the owner to analyze the designer’s and contractor’s productivity, ideally at the discipline level. Analyzing the hours required

in design per deliverable or to install material per unit allows the owner to assess if the design firm or contractor is achieving the planned productivity or performing better or worse than planned. Even if the designer or contractor has a fixed price contract, the owner may bear some risk for poor productivity if the causes are due to events attributable to the owner or beyond the contractor’s control. Not only may the owner be at risk of needing to compensate for productivity issues, but it is also a strong contributor to schedule performance. If the contractor is having poor performance, it is highly likely to have schedule delays unless it increases its manpower supporting the project. It is important to understand if there are productivity issues and the underlying reasons.

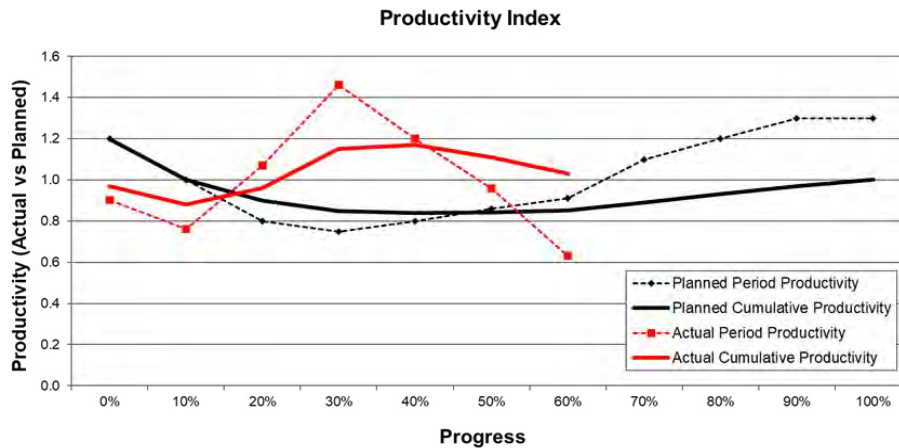


Figure 10 – Example of Productivity Tracking Chart

REPORTING

Owner Project Controls Report – Owners need to have their own project controls report, separate from whatever the contractor is providing. The owner’s report covers progress, forecasts, and issues for the entire project, not just the contractor’s portion. It will also include information that is important to the owner and be structured to meet the owner’s needs. Major projects that include JV partners may need costs split by partner or reporting in multiple currencies. The owner’s report will also provide the owner’s project controls staff’s perspective on the contractor’s performance and issues, not just regurgitating what the contractor provided. The owner’s report is typically much more useful to the owner’s management than what the contractor provides and better supports the owner’s decision-making process.

CONCLUSION

While owners often require contractors to provide project controls data and reporting, owners still need their own reviews to provide holistic project controls management for all project activities, including overall project cost, schedule, change management, and other aspects. The owner’s project controls staff also provides an analysis of the contractor’s performance against the agreed upon contract and baseline, independent of the contractor’s team. While owners may struggle to understand the value added by this function, it has been proven to deliver improved cost and schedule performance and helps keep projects on track to meet their overall objectives.

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Project Controls
Project Management
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RELIABILITY BUILT ON EXPERTISE.