



Increasing the probability of success

Why today's large-scale programs need effective project controls

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Large infrastructure programs are complex undertakings. From initial planning through delivery of the facility, one can expect a timeline spanning 15-20 years. Many of the projects take place in the urban core, sharing space with existing utilities, business owners, congested roadways, and pedestrians. Project success relies on well-conceived plans that include explicit management of the overall scope, budget, schedule and funding. Project Controls function as the nerve center for the project team by driving the formation, documentation, updating and reporting of actual progress against the baseline plan that support informed and timely decisions by the project team. In short: Plan the Work, Work the Plan. Delivering on this adage requires implementing a framework throughout the project lifecycle. As a partner at the project management table, project controls provide the framework, anticipate issues and develop solutions before those issues negatively impact the plan. This briefing explores how project controls are an integral part of delivering major programs.

Inside:

- Understanding the core functions
- How project controls have evolved to enhance project insights
- The benefits of a project management information system

Reversing the odds

With recent federal and local increases in infrastructure investments, transportation agencies across the country are preparing to package and deliver a backlog of improvement projects and launch expansive capital programs. The challenge will be delivering them on time and within budget. Historically, the odds have not been favorable.

According to the University of Oxford, 92 percent of the world's large-scale transportation projects exceed their original cost and schedule estimates, often by significant margins*. The good news is owners can reverse those odds by effectively implementing project controls.

Positioning projects for success

How do project controls accomplish all that? They provide the cornerstone of success by establishing:

- Scope, schedule and budget baselines for all elements of the work
- Objective status reports and consistent forecasting
- Integrated risk management
- Funding source management
- Cashflow tracking
- Staffing forecasts and monitoring
- Plan vs. actual/forecast comparisons
- Corrective action plans based on objective performance metrics

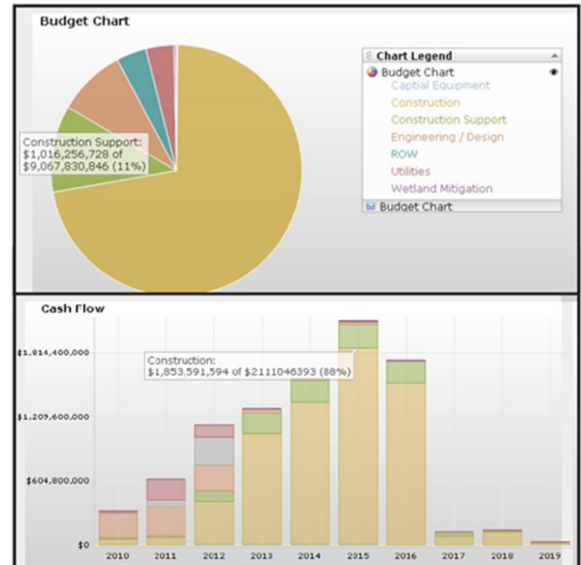
Project controls delivers the most benefit by driving a clear and comprehensive understanding of the program's scope, including an explicit statement of objectives and a clear definition of success. That clarity of objective and scope supports establishing baselines from the beginning of the project, which is paramount to monitoring status.

Core Functions

Three main program control functions help set expectations and deliver greater budget and schedule certainty.

- **Scope management** is the cornerstone of project controls. Defining the baseline scope and managing changes or refinements to the scope is a responsibility of the entire project management team. Project controls plays a vital role in this process since most scope changes result in an adjustment to the project cost and/or schedule. A disciplined configuration management approach that identifies and tracks scope changes, as well as the cost and schedule impact of those changes, is a critical function requiring project controls integration with the project management team.

- **Cost management** supports the control and reporting of estimated and actual costs. In the planning stage, the program controls team develops benchmark estimates founded on sound, clear assumptions. At schedule milestones, the cost estimates are updated by following a well-defined methodology that incorporates the appropriate level of detail



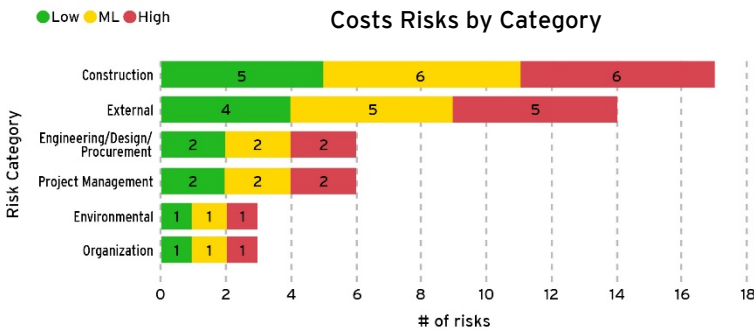
for that stage of the program. Effective project controls track commitments, actual costs, and provide updated cost forecasts throughout the project lifecycle. A disciplined trend management approach provides a consistent basis for cost forecasts that enables a fully informed estimate-at-completion for the project.

- **Schedule management** is fundamental to delivering complex projects on time and within budget. Missing project milestones not only affects agency credibility with stakeholders and constituents, but also increases project costs due to increased escalation and contractual delay costs. Integrated into the overall management process throughout the life of the program, schedule management provides monitoring and insights that enable program managers to make informed decisions that prevent delays from having a domino effect. Deliverables include:
 - Updates that follow a defined process and maintain clear lines of accountability
 - Variance reports that highlight major differences between the baseline and forecast
 - Key critical-path or near-critical activity monitoring and reporting
 - Expenditure forecasting and earned value management leveraging cost- and resource-loaded schedules

Additional Functions

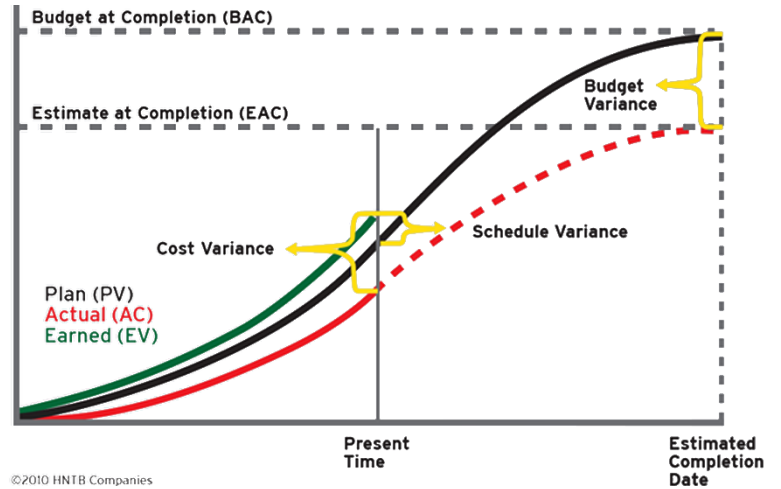
As the practice of project controls has matured, other functions have been incorporated to enhance the level of project information critical to the supervision of projects and programs. Below, is a brief summary of other functions and their contribution to successful delivery.

- Risk management** is the responsibility of the entire program management team, but the quantitative and analytical aspects are typically a project controls function. When executed correctly, the function reduces the likelihood and/or severity of risks that can delay schedules and inflate budgets while increasing the opportunity to identify and realize positive impacts on cost or schedule. Ultimately, risk management's specific, probability-driven cost and schedule assessments lend insights that guide project decisions such as risk mitigation and appropriate levels of contingency to hold.



- Funding management** tracks planned and actual allocations from multiple sources to assure each funding partner that its contributions were used in accordance with funding agreements. Funding management also produces a fund-specific cash flow forecast to predict the timing and amount of future financing activity, such as bond sales. Armed with these forecasts, owners can plan when additional bond sales are required, or how to meter project timing and manage within funding limitations.
- Document management** is often considered the project controls team's responsibility. The function has evolved to include the implementation of electronic document workflow systems. These systems allow the program manager to:
 - Maintain an accurate project record through a controlled storage process
 - Quickly retrieve any document based on intuitive search capabilities
 - Manage versioning and enable role-based access
 - Support consistent management of project business processes

Earned Value Management S-Curve

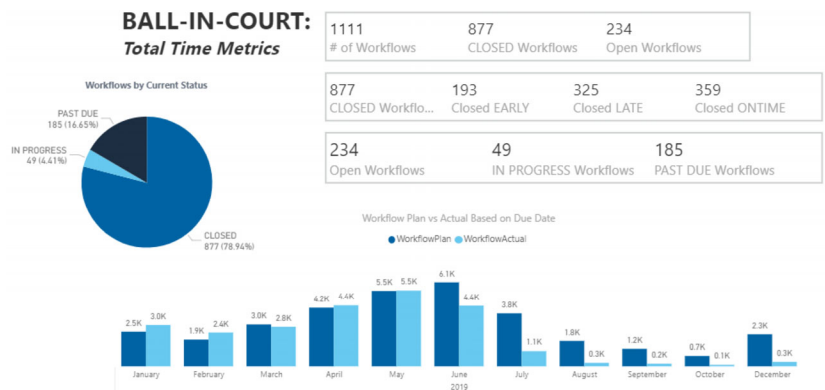


- Earned value management** creates a common measurement benchmark by converting the schedule plan and actual progress into planned and earned value metrics. As the schedule progresses and activities are completed, the schedule reflects earned value. The combination of planned value, earned value, and actual cost data points enables a unified approach to tracking the interrelationship of cost and schedule status versus the plan; this supports early identification of variances to both cost and schedule.

Using tools for efficient and targeted reporting and collaboration

Project controls teams are responsible for making sense of the massive amount of data that large projects generate. The team obtains data from numerous sources, consolidates and organizes the data, and then converts it into meaningful, actionable information that supports insightful management decisions. Deploying a Project Management Information System (PMIS) enables the project controls team to consolidate data in a single data warehouse and efficiently develop reports from a single source of truth that support project management operations.

BALL-IN-COURT: Total Time Metrics



PMIS tools also support robust project team collaboration. In today's distributed environment, the ability to rapidly deploy collaborative project

sites drives efficiency and enables quicker decisions and the automated maintenance of project records.

Conclusion

Controlling the complex scopes, schedules and budgets of today's mega transportation projects/ programs requires a focused, concerted and proactive approach that leaves nothing to chance. Owners who deploy an effective project controls capability can increase the probability of successfully delivering their large-scale endeavors on time and within budget.

Additional resources

For more information about program controls, consult:

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***Source:**

<https://www.nytimes.com/2021/11/28/us/infrastructure-megaprojects.html>

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