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Technology's Critical Role in Construction Cost Control

Learn how technology can create cost efficiency for the construction industry



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Using Software to Streamline Cost Management Workflows and Increase Profits

At the core of any successful construction project is effective cost management. It is needed at every phase of the project, from planning and design to change orders, and to the final sign-off on a project's completion.

Construction projects require a large cash flow with a high level of variability, making it difficult to predict total profits. Considering how many activities a general contractor manages concurrently every project—including ongoing payments to what can be dozens of subcontractors on each job—having the right amount of cash on hand is critical. Ultimately, cash flow depends directly on the work put in place, which is directly tied to the schedule and the work that teams are getting done.

Without proper cost management, projects will not stay on budget and profits are jeopardized. With the right technology, teams can control costs, ensuring the project is completed as planned.

However, ensuring that team members participate actively in this critical task isn't always simple. Cost management requires a high level of detail in data management; it requires access for every stakeholder to up-to-date information. When teams work in silos, this becomes impossible, and less profit is achieved.

As construction becomes increasingly complex, proper cost management practices become critical. This guide will highlight the importance of cost management, as well as the common pain points found throughout this endeavor. Next, the use of an interactive, real-time digital platform will be explored, with specific examples highlighting key workflows. Finally, ways to avoid the pitfalls of technology adoption will be discussed.

The Importance of Cost Management in Construction

From forecasting material costs to calculating overhead costs, cost management begins during pre-construction and continues until the project is finalized. Without the right strategy in place, cash flow is poorly managed and profits are minimal at best, nonexistent at worst.

In construction, the battle to keep costs as low as possible while ensuring quality and timely completion is constant. Added to this challenge is the headache project managers face when balancing a myriad of spreadsheets saved across numerous locations. In many cases, project members work in silos, increasing the risk of error, miscommunication, and higher project costs down the road. In fact, consulting giant KPMG estimates that, in 2015, only **31%** of all construction projects came within **10%** of their initial budgets.¹





Common Pain Points in Cost Management

The following scenarios illustrate the common challenges construction professionals face when managing project costs.

Challenge: No real-time view of the financial health of a project or an inability to see historic cost changes.

Solution

Linking all necessary spreadsheets can be arduous, if not impossible. One small budgeting mistake can have a massive impact. Rather than having to refer to static spreadsheets saved in different folders, an integrated cost management solution allows teams to centralize all cost activities in the cloud, providing an accurate view of project costs. Whether viewed on site or in the office, changes are made instantly, and everyone can view the real-time impact of a cost change.

With an interactive platform, data automatically updates across it, allowing teams to see the impacts of cost changes and visualize risk. Specific details on cost items and activity history to understand how specific cost items moved through the change order process. Additionally, as questions arise during construction, you'll have the ability to elevate an RFI to a potential change order to track the origin of changes easily. With the right tools, this can all happen in real time, ensuring a constant view of the financial health of a project.

Challenge

Juggling multiple change orders and documentation through the entire approval process.

Solution

Change orders are inevitable in construction, and properly managing contractually binding documentation is critical. With an integrated platform, teams can seamlessly manage all aspects of the change order process. Streamlined upstream and downstream change order workflows create clear accountability and ensure company-defined processes are completed.

Teams can have an at-a-glance view of all potential change orders—their type, scope, source, status, and cost-related impacts. Cost items can be associated with hierarchical build-ups if required to the PCO, to detail the effects of a change and connect it to the budget and contracts. With a click, cost items are moved quickly through the change process, predefined markup configurations are applied, and documents are automatically generated for review or e-signature. Throughout the entire process, a detailed activity log is captured for audit purposes.

Challenge

Managing multiple contracts and tracking costs for each trade with limited visibility into how it impacts the overall project budget.

Solution

Any given project can have dozens of subcontractors/suppliers who require individual contracts, payment terms, and payment tracking. Staying on top of multiple spreadsheets and folders to manage contracts and track payment applications can waste valuable time. By switching to a comprehensive cloud-based platform, teams can leverage custom document templates for the standardization and auto-generation of contracts and payment documentation.

Teams can also easily streamline and manage incremental payment applications with the ability to track both pending payments and completed payments against the total work to be completed, making it easy to balance cash flow and make accurate forecasts. The data automatically displays in the budget summary view, providing teams with a real-time view of the project's financial health.



Challenge

Budget overruns cut directly into profit margins. Teams need to be able to correctly plan allowances, such as general conditions, across the life of the project.

Solution

With an integrated platform, teams can visually plan time-based allowances and align them with the overall project schedule. This type of cost management tool allows you to manage budgets and associated sub-items by adding start and end dates, ratios of time changed, associated unit costs and more, displayed in a Gantt chart.

Challenge:

Disconnected job costing and project management software creates additional work caused by duplicate data entry. This wastes time and creates a risk that mistakes will be introduced during data entry.

Solution

A software platform that integrates your existing tools means that the right data will move freely from ERPs and other project management tools into your cost management solution. This eliminates the need for duplicate data entry, removes the risk of human-generated mistakes, increases transparency to needed information, and streamlines workflows.

An integrated cost management solution can also address the following issues:

- Cost activities being tracked in siloed systems resulting in a need to rely on others to update information for an accurate view of profitability
- Poor change management processes that lead to unreimbursed costs
- Forecasting with out-of-date information leading to inaccurate reporting of risk
- Unpredictable cash flow
- A cumbersome process to generate reports and check data
- Limited or no visibility into the status of change orders or payments

The Need for an Interactive Platform for Cost Management

Two leading indicators measure the success of any construction project

1. Time – was the project completed on schedule?
2. Cost – was the project completed within budget?

One of the greatest risks to success is change orders, which are inevitable on any project. In fact, according to a study by the Independent Project Analysis Group of over 12,000 projects, more than 35% of all construction projects will incur a major change.

With change ever-present and the need for accurate cost management at center stage, profit margins are at risk.





Challenges to Profit Margins

Resources are limited, and projects are becoming increasingly complex. Although more information than ever is available, gaps in data and challenges accessing that data present a hazard.

From bid to handoff, information is often fragmented, simply incorrect, or even lost. Using multiple systems that don't talk to each other leaves teams running paper documents back and forth while referencing dozens of spreadsheets that reside on local drives and are shared only periodically.

In the paper- and spreadsheet-based model, trying to find the right information wastes time. When information is spread across job sites, a clear or real-time view of the financial health of the project isn't easily attained.

These real challenges to profit margins can be addressed through the use of a single, interactive platform. Rather than having separate applications for different team members, the right technology offers a single source of truth.



Real-Time Data for Cost Management

A key to improving cost management is adopting technology that offers access to up-to-date data in a single location. A cloud-based platform like Autodesk Construction Cloud allows construction teams to work from anywhere at any time on the same project, with all cost activities managed in one place.

Through user-, role-, and company-based permission levels, teams can easily control who has access to specific information. Suppliers and owners can even be brought into the system to increase collaboration and streamline workflows. This allows suppliers to review their initial contracts, create their schedule of values, review their pay applications, and view their change orders directly within the platform.

The right technology also allows teams to adapt the system to their specific needs. Find a solution that does more than let you customize the budget structure. Look for technology that also enables you to:

- Customize terminology within the system
- Create custom calculated budget columns to incorporate within the budget summary view
- Configure multiple project-level financial markups
- Standardize documentation with custom document templates
- Save views
- Customize reports

Additionally, technology can automate repetitive processes. With an integrated platform like Autodesk Construction Cloud, teams can generate potential change orders from RFIs to easily track the origin of changes. With the click of a button, change orders can be moved through the approval process, generating contracts and documents faster.

Finally, by centralizing the management of all cost activities in the cloud, data is connected and auto-updated across a single platform, providing an accurate view of the project's financial health in real-time. Cost-related risk is highlighted, and teams are able to forecast more accurately through every stage of the project.

The result is that teams achieve a more predictable cash flow and profitability projections, increasing profit margins.



Supported Workflows

Each of the following workflows is critical to the success of any project. With an improved cost management strategy, real profit increases can be achieved.

Budget Administration and Contract Creation

From the earliest stages of any project, a single platform can streamline cost management. The right technology can improve budget and contract management when it can do the following:

- Customize budget structures that work with any accounting system and work breakdown structure
 - Import the master budget list
 - Rearrange, rename, or create custom calculations within budget columns to show the most critical information
 - Auto-generate contracts and other documentation using custom document templates
 - Compile appendices from multiple locations into a single package
- Easily create and manage main/prime contract(s) and supplier contracts
 - Define the schedule of values from the budget and create connections between the main contract and supplier contracts
 - Streamline invoice and expense management by linking accounting/ERP systems
 - Generate Excel-like summary views for easy data consumption
 - Update data across the platform automatically for clear visibility into cost-related risk
 - Make forecast adjustments, track actuals, and leverage custom columns to more accurately project cost to complete, final cost, and variance
 - Define user-, role-, and company-based permission levels

Change Orders

Effectively managing change orders is critical to controlling project costs. A single platform that includes the following capabilities allows for better change order management and alleviates the risk of error:

- Streamlines upstream and downstream change order workflows to create clear accountability
 - Provides an at-a-glance view of all potential change orders— their type, scope, source, status, and cost-related impacts
 - Associates cost items with hierarchical build-ups to detail the effects of a change and connects to budget items and contracts
 - Creates potential change orders from RFIs
 - Auto-generates documents needed during the change order process
 - Automatically syncs approved change order data into the budget and relevant payment applications
 - Customizes change order terminology to align with your company or project standards
- Sends requests for quotes to validate the cost impact of change orders to suppliers directly from the system
 - Sends a request for a quote to multiple suppliers in a single, simple workflow when a potential change order is recognized
 - Groups suppliers into cohorts to simplify the process and ensure the right suppliers are notified
 - Brings suppliers into the system to increase collaboration and streamline workflows





Payment Applications

Payment applications can be complex. However, technology can help alleviate the pain by:

- Managing owner and supplier payment applications in a single integrated system
- Easily creating main/prime contracts and automatically generating the Schedule of Values from selected budget items, creating a connection to supplier contracts
- Defining billing periods to manage instrumental payment applications easily
- Visualizing and tracking supplier payments against total work to be completed

- Auto-generating payment documents
- Quickly collating all supplier payment applications, change orders, and back-up sheets for each billing period to provide the foundation for the budget payment application
- Automatically incorporating approved supplier change orders into the budget summary and relevant payment applications
- Easily exporting payment applications to Excel
- Streamlining workflows with owners and suppliers by bringing them into the platform for review and approvals

Forecasting

A critical component of cost management, forecasting is an ongoing task, requiring accurate, real-time data to ensure success. Choose a platform solution that offers the following to improve forecasting:

- Centralizes all cost management activities in the cloud
- Updates budget summary automatically with approved expense and change order data
- Makes accurate forecast adjustments in real-time with the latest and greatest data
- Provides a budget summary view that includes forecast information (e.g., forecast adjustments, forecast cost to complete, forecast final cost, and forecast variance columns)

Conclusion

It is easy to see why switching to a cloud-based solution benefits the cost management process. However, to ensure that the adoption of a new system is successful, choosing the right system is vital. The following pointers will help guide teams as they look to improve their cost management workflow through implementing new technology:

1. Look for technology that will become a single source of truth. Rather than having multiple spreadsheets saved in different locations, a common data platform allows teams to centralize cost data in one place, accessible anytime and anywhere.
2. Look for technology that connects all systems. A cloud-based platform with an open API allows for integrations to other cost applications and connects with other construction workflows.
3. Look for a flexible solution. Many teams default to using Microsoft Excel because they can easily customize fields and equations to meet their needs. This flexibility also needs to be built into any new technology adopted, allowing budget codes, hierarchical buildups, and custom segment options to be customized.
4. Look for technology that improves collaboration. Unlike static spreadsheets or outdated desktop software, anyone on the team must have real-time access to the financial health of a project to make well-informed decisions.
5. Look for technology that is secure. An integrated cloud platform like Autodesk Construction Cloud allows teams to set user permissions, ensuring that only the right people have access to the information they need.

Technology is leading cost management in construction to a better place. Through software solutions like Autodesk Construction Cloud, teams can more accurately track costs, predict risks, and ensure effective collaboration across key stakeholders. The end result is increased profits—the ultimate goal of any construction professional.

References

- [1] [KPMG Global Construction Survey](#)
KPMG International, 2015



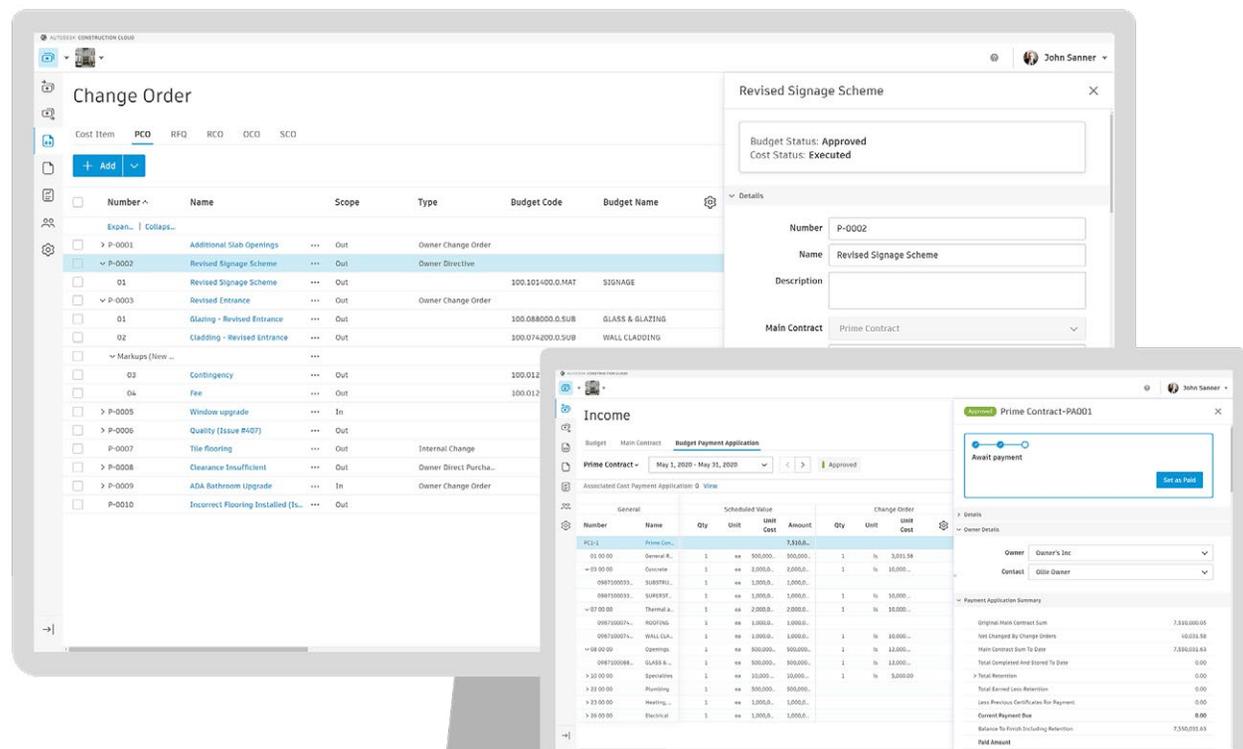
See the Future of Connected Construction

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Our industry requires solutions that connect their information, teams, and technology –breaking down data silos and disconnected processes that hinder true transformation. As we navigate the ever-present push to do more with less, we need to uncover new ways of working, enhance connected digital workflows, and incorporate advanced analytics. To support us on this journey of transformation, we must lean into tools that connect construction – from design to plan, build, handover, and operations.

Built on a unified platform and common data environment, Autodesk Construction Cloud is a powerful and complete portfolio of construction management products that empowers general contractors, specialty trades, designers and owners to drive better business outcomes. Autodesk Construction Cloud combines advanced technology, a unique builders network and predictive insights to connect teams, workflows and data across the entire building lifecycle.

While the industry experiences unprecedented transformation, our mission remains the same: to help construction teams meet the world's rapidly expanding building and infrastructure needs while making construction more predictable, safe, and sustainable. And we've remained steadfast in our promise to deliver the industry's most compelling solutions, connecting data, teams and workflows from the field. This is our commitment to connected construction.





With Autodesk software, you have the power to Make Anything. The future of making is here, bringing with it radical changes in the way things are designed, made, and used. It's disrupting every industry: architecture, engineering, and construction; manufacturing; and media and entertainment. With the right knowledge and tools, this disruption is your opportunity. Our software is used by everyone - from design professionals, engineers and architects to digital artists, students and hobbyists. We constantly explore new ways to integrate all dimensions of diversity across our employees, customers, partners, and communities. Our ultimate goal is to expand opportunities for anyone to imagine, design, and make a better world.

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