COST CONTROL ANALYTICS FOR THE ENGINEERING & CONSTRUCTION INDUSTRY

How intuitive dashboards can take the guesswork out of cost control on major construction projects.
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  Executives
  Finance & Accounting
  Regional Managers
  Project Managers
Every Dollar Counts

Cost control is always a top priority as business leaders must not only continue to increase revenues, but also demonstrate discipline in managing major projects as well as operating expenses.

To achieve these competing goals, we have to be smarter and more purposeful with vendor selection, estimates, and auditing to ensure the best returns. If you can consistently be able to win business away from big competitors, you will control costs on major construction projects.
When projects commence, they typically start with a budget.

The budget may be relatively easy to create, but it becomes difficult and cumbersome to track changes and performance to plan along the way, because:

• Budgets are complex and change quickly
• Budgets can contain thousands of line items that need to be tracked accurately
• Ongoing expenses —everything from costs of labor and field equipment to utilities, transportation expenses, and taxes—are dynamic and on the rise
• The information needed to plan and track budgets resides in multiple, disconnected systems
Budget Overruns are Common

During the execution phase of a project, effective cost control can be difficult due to the rate at which projects often change. In the matter of just a day or two, an under budget project can go over budget, which makes it difficult to compete in a market where access to capital is getting tighter.

If you are concerned with demonstrating competency in cost control as an organization, you are not alone.
A recent report by Ernst and Young found that most multibillion-dollar megaprojects exceed their budgets by **59%** of the initial estimate. **75%** of those projects also miss schedule deadlines.
Cost overruns are the unfortunate norm for most projects, large or small. In one recent survey, only **19% of North American respondents stated that their projects finished on budget**, compared with 29% of all respondents globally.

Only **39% of respondents** reported having a robust series of checks and balances in place to ensure that projects stay on track.
So what causes these major cost and time overruns? There are many culprits, but the fundamental problem lies in how we track budgets.

Most organizations perform tracking through the use of some combination of a project management tool, Microsoft Excel, and an ERP system. These can usually all handle standard reporting and tasks for a specific function, but they rarely interact with each other to help manage an overall project budget.
Top 7 Pitfalls of Poorly Managed Cost Control
1. Manual data entry and paper-based monitoring

Budgeting software tools typically lack automated tracking and monitoring technology, which requires you to manually input and manage cost estimates and invoices. This is a slow, challenging, error-prone process in Excel or some other inflexible legacy application.

The process prevents effective collaboration on budget management, and important information ends up stuck in a department’s file sharing system or stored on individual laptops.

Physical paper copies of information are only accessible by a handful of people which limits your ability to make quick changes and budget corrections to curtail cost overruns before they get out of control.
2. One-dimensional performance analysis

The analytics available in conventional budgeting tools can’t provide the granular level of detail required for in-depth accounting and cost tracking. Standard budget software only provides basic reports; there is no ability to attack a cost analysis from different angles, interact with the information, or drill down into individual line items. In order to reduce individual expense overages, it is essential to be able to track all line items.
3. Financial Data Lag

Project and Regional managers typically won’t know where spending compares with budget until weeks or months down the road. Even then, you still can’t slice and dice the information to understand where and why some projects are more profitable than others.

If you’re limited to looking in the past for budget tracking, then you don’t have the transparency you need to maximize your operational efficiency. This has far-reaching implications for your ability to manage project costs and time tables.

The long lag times between when information is collected in the field, entered into the system, and then transmitted to the back office, means that many budget management systems can’t provide the information points required to let managers know how they’re doing with spending right now. Real-time spend information is crucial to truly make adjustments to live projects.
4. Poor fiscal discipline

Leading enterprises are determined to demonstrate sound discipline in managing capital by keeping costs down and maximizing ROI. Inaccurate project estimates and cost overruns suggest a lack of capital discipline, leading potential investors to shy away from sinking money into a firm - they’ll simply search elsewhere for better returns.
5. Poor estimation

Inaccurate or incomplete project estimates can lead to cost overruns, unnecessarily high expenses, and overall lower project profitability. Not only does it limit the cash flow available to fund future projects and operations, it may require you to go back to executives or ultimately investors for supplemental budget to finish a project.
6. Shaky partner relationships

Search through almost any company’s investor reports, and you will see commitment to operational effectiveness as one of their top priorities. Are you delivering against your cost management goals? Failing to deliver the numbers as promised on your projects will make it difficult, if not impossible, to create new joint ventures in the future. It may also make your current partners think twice before joining you on the next opportunity.
7. Overpriced capital

Access to new capital can be tough to obtain in a volatile market. In today’s competitive capital market, companies have to prove to investors that they can offer a low-cost structure with a proven track record of performance. Companies who fail to manage their costs and increase the economic ROI for their investors will find it difficult to secure capital in the future. Those that do secure funding will likely pay a premium in the form of higher interest rates and more aggressive payback terms.
Deeper Insights Drive Better Results

Companies that hope to thrive (or just survive) in a competitive and volatile market need to adopt a **culture of cost control** based on new ways of thinking as well as new tracking tools and technologies.

These challenges are compelling companies to seek out tools and technologies that can help them better manage their budgets and track spending to optimize their operational efficiency. Increasingly, they are realizing that **real-time visibility** of all cost information by all stakeholders is the key to better cost control and budget management.
Information visualization and analytics tools help bring complete visibility into budget management. Customized project cost-tracking dashboards unite company-wide departmental information from systems including Sage, Oracle, Penta, Jonas, and other systems for budgeting and cost data management. The data from these various solutions are accessible from a central repository, which fuels intuitive dashboards that provide insights and fast answers for key decision-makers in their forecasting and cost control efforts. You don’t have to wait for someone to track down numbers or chase down pieces of information from several different places. With the most up-to-date information at their fingertips, users across the organization can manage and forecast spending with confidence.

A dashboard-driven budget management system provides solutions to a number of common budgeting challenges that have vexed companies in their attempt to maximize profitability and deliver the highest ROI for investors.
By giving more people access to more information, project managers can pinpoint and investigate the root cause behind any cost overrun. When you can scrutinize information at a more granular level, expenses can be reviewed on a line-by-line basis for better cost control. This level of review allows managers to more quickly and efficiently pinpoint the cause of any discrepancy in a project.

If part of the project is running long or going beyond its allocated spend, the manager can investigate whether the discrepancy is a single instance, an expense coding issue, a systemic problem tied to specific kinds of projects, equipment delays or downtime, specific vendors, or some regional change like a spike in utility or raw material prices.
Manage by exception

Because you can’t manage what you can’t see, a dashboard provides instant visibility into project costs so managers can identify cost overruns before they start to impact profitability. Once you have discovered which costs are trending too high compared to the original estimates, you can focus your attention on the “why.” Move quickly past the parts of the projects performing to plan, and drill down on specific segments that need correction.

Managers can easily collaborate with other business users, with up-to-date information accessible from the centralized, integrated data warehouse tied to the dashboard tool. All users can keep tabs on any variances between actual and budgeted expense levels, quickly work together to uncover the root cause, and develop a solution that stops overspending to get the project back on track.
Enhancing what you have

A budget dashboard solution works with the existing licenses and accounting/LOB software already in place. The goal is not to replace these software tools; instead we need to enhance their effectiveness.

Start building a centralized data warehouse that sources information from these existing departmental systems and other sources you routinely use, then create customized dashboards that pull in the relevant information required to manage your part of the budget.

This allows you to get a deeper sense of the progress in a single location, without having to scrap existing licenses and start from scratch.

As part of the build-out, there is also the opportunity to evaluate and re-engineer relevant cost data capture and coding processes.
Taking quick action

Information visualization via dashboards allows users to quickly identify any variances between actual spend against the budgeted estimate and dig into the root cause of this discrepancy. Is a vendor invoicing too often or at too high a price? Is there an accounting error? Was some cost improperly allocated to the budget?

This affords a degree of capital discipline that was not possible with non-visual, manual management methods. Conventional methods might not uncover cost overruns until long after the project has been completed, which is far too late to protect your project partners and investors. Now, users can recognize potential cost overruns early, using information provided in real time and from multiple sources, so that appropriate action can be taken while there is still time to get the project back on track and ensure the best ROI for investors.
Better KPI tracking

In today’s competitive and volatile marketplace, every dollar matters. With all project costs available from a dashboard, users can closely track where they stand on current spend versus project completion—an important metric for developing meaningful key performance indicators (KPIs).

The KPI tracking afforded by the budget dashboard highlights progress at both macro and micro levels. On the macro end, if 60% of the project’s money has been spent but the project has only progressed 30% toward budgeted completion, should this raise a red flag to management to investigate further and make the appropriate cost correction measures? Many times, the biggest opportunities for cost savings come from finding many smaller opportunities spread throughout the project.

On the micro side, the dashboard allows users to mine cost data points at a fine level of detail and find these smaller opportunities for savings. Taken together, these small opportunities can add up to big savings on the project, and prompt the company to set new KPIs based on this new savings metric. The dashboard allows this process to be repeated as many times as desired to keep improving the company’s KPI tracking.
Take the Guesswork Out of Budget Analysis

Example Dashboards for:

- p.25 Executives
- p.30 Finance & Accounting
- p.36 Regional Managers
- p.42 Project Managers
Cost Control Analytics for Executives

Failure to control supplemental spending eats into your ROI, and hurts your company’s ability to attract future capital. Additionally, you need to know if and when you’re under budget because you can’t afford to lock up dollars that could be spent elsewhere. You have to scrutinize every dollar and demonstrate the highest possible operating efficiency.
Executive Scenario

Today’s time-pressed executives require budget dashboards that surface critical information in an easy to consume format. High-level dashboards do just that by highlighting how current and historical spend by Region and Area are tracking against their plans.

In the chart below, executives can easily compare the status of Project Budgets by region. In this case, three out of the five major regions have issues. Colorado and California estimates exceed their budgeted amounts by $1.58M and $16.49M. In the Utah region, the company has already paid out $10.95M more than the submitted estimates, indicating either an accounting problem and/or missing or inaccurate estimates.

### EXECUTIVE DASHBOARD

**Budget Monitor Main (Values in $MM) (OK if Posted Capex < Estimate < Budget)**

All OK when: Budget (black) is over Estimate (blue) which is leading Posted Capex (Red).

<table>
<thead>
<tr>
<th>District</th>
<th>Posted vs Est Vs Budget</th>
<th>EstOverA</th>
<th>Est&gt;A</th>
<th>P&gt;E</th>
<th>P&gt;A</th>
<th>PostOverAorE</th>
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<tbody>
<tr>
<td>California</td>
<td></td>
<td></td>
<td>16.49</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td>1.58</td>
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<tr>
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<td></td>
<td>-11.97</td>
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<td></td>
<td>-7.33</td>
</tr>
<tr>
<td>Utah</td>
<td></td>
<td></td>
<td>-29.59</td>
<td></td>
<td></td>
<td>10.95</td>
</tr>
</tbody>
</table>

**DASHBOARD LEGEND**

- **Black Vertical Line:** Current total CAPEX (budget) authorized for this project
- **Light Blue Bar:** Cost estimate of all work completed on this project to-date
- **Pink Line:** Total posted CAPEX to date for this project
- **Dark Blue X:** Alert that your estimates are over budget
- **Maroon X:** Alert that your posted CAPEX is over estimates
- **Red X (on following charts):** Alert that your posted CAPEX is over budget but not necessarily over your estimates
Executive Scenario

Drilling down into the regional budget data exposes the individual projects most responsible for the cost-overruns.

The Ford project in the California Region has estimates slightly over budget (only $.01MM), but its posted capital exceeds the estimates and budget by $6.67MM.

Lasorda’s estimates exceed by $12MM, making it the top concern because it looks like it is already over budget and will require supplemental appropriations.

<table>
<thead>
<tr>
<th>Region</th>
<th>Project</th>
<th>Budget Over/Under</th>
<th>Posted Over/Under</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>LASORDA</td>
<td>Over $12.20</td>
<td>Under $12.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LYONS</td>
<td>Over $6.76</td>
<td>Under $6.76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DUFFY</td>
<td>Under $3.70</td>
<td>Over $3.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HUNTER</td>
<td>Over $3.70</td>
<td>Under $3.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FORD</td>
<td>Under $0.01</td>
<td>Over $6.67</td>
<td></td>
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<tr>
<td></td>
<td>LINDSTROM</td>
<td>Over $2.17</td>
<td>Under $2.17</td>
<td></td>
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<tr>
<td></td>
<td>JACKSON</td>
<td>Under $7.71</td>
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<td></td>
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<tr>
<td>Colorado</td>
<td>BARROW</td>
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<tr>
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<td>GIBSON</td>
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<td>Over $1.97</td>
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<td>KLEM</td>
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<td>Over $0.53</td>
<td></td>
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<td>FINGERS</td>
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<td>Over $0.22</td>
<td></td>
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<td>BAKER</td>
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<td>Over $1.19</td>
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<td>GELES</td>
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<td></td>
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<tr>
<td></td>
<td>GEHRIG</td>
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<td>Over $31.98</td>
<td></td>
</tr>
<tr>
<td>Northern</td>
<td>BENCH</td>
<td>Under $12.81</td>
<td>Over $4.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MIZE</td>
<td>Under $3.32</td>
<td>Over $37.81</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KELLY</td>
<td>Under $6.11</td>
<td>Over $8.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FELLER</td>
<td>Under $7.06</td>
<td>Over $9.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CONNOR</td>
<td>Under $11.73</td>
<td>Over $82.75</td>
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<tr>
<td>Utah</td>
<td>DAWSON</td>
<td>Under $0.27</td>
<td>Over $2.25</td>
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<td></td>
<td>DRYSDALE</td>
<td>Under $1.92</td>
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<tr>
<td></td>
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<td>Under $7.36</td>
<td>Over $0.55</td>
<td></td>
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<tr>
<td></td>
<td>FERRELL</td>
<td>Under $20.04</td>
<td>Over $12.97</td>
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<tr>
<td>Wyoming</td>
<td>GALVIN</td>
<td>Under $1.94</td>
<td>Over $6.17</td>
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<tr>
<td></td>
<td>FOX</td>
<td>Under $10.03</td>
<td>Over $1.16</td>
<td></td>
</tr>
</tbody>
</table>
Questions to ask yourself

Are we monitoring costs with the scrutiny that stakeholders expect?

What are the potential risks in our costs and capital expenditures?

What is our budget versus the actual numbers?

Are we on track to hit our numbers and, if not, how much are we off?

Which divisions, regions, and projects need the most attention?

Where can we cut costs?
Entrance’s executive dashboards are a smarter way to use your capital by enabling you to focus on cutting costs and spending money in areas that deliver the greatest ROI. Our custom budget dashboard solution for executives can:

- Alert you on in-progress projects that are tracking to be over or under budget
- Provide better forecasting with assurance of accurate spending capture for proper accruals each month/quarter.
- Present analysis of variance between budgets, field estimates, and actuals.
- Track current costs against historical performance for all budgets over many projects.
- Review budgets in the context of the entire investment program.
- Display interactive charts with the status of all capital investments.
- Provide comprehensive tracking on actuals and budgets for enterprise capital expenditure outlook.

Get a demo @ 1-888-343-5669
Your biggest concern is managing financial risk such that projects meet their internal rate of return estimates. You need absolute assurances that your programs are on track. With hundreds, if not thousands, of budgets to manage, it can be an all-consuming process to track down all the different spreadsheets and reports to get the information you need—both for yourself and for everyone else who comes knocking on your door.
As a Finance & Accounting professional, you are your company's capital discipline champion. That requires the ability to hunt out and fix all troubled budgets, even in regions that (at the highest level) appear to be in control, like the Gehrig below.

For ROD 11, an unplanned event in Q1 resulted in an additional $300K of spend in Q2. The lead accountant realizes she should have received the approved supplemental spend request by now and immediately reaches out to Ron to see where the breakdown in the process has occurred.

In the chart, all active projects in the Gehrig field are stack ranked by size and color-coded based on the amount of dollars that project is over (red) or under budget (green).

Projects with any shade of red are candidates for supplemental appropriations.
Let’s take a quick look at the budgets in the Conner region. There appear to be some anomalies in ROD 11. With a quick phone call, you can determine if this is the result of slow invoicing by our suppliers or if we are at risk of having to pay unnecessary interest due to a delay in AP.

The time chart shows an overpayment in Q2.

And a refund in Q2.

The time chart also shows just a trickle of postings in Q2 and Q3.
Looking for spending trends across categories can also help uncover issues that need addressing.

In this case, a number of recent projects from the Utah district had cost overages due to higher than expected recompletion costs.

A quick review of the posted CAPEX vs budget for all projects in the Dimaggio and Ferral regions show that waste disposal across all projects in both regions are coming in about 10% higher than plan.

A few phone calls to the Regional Supervisor of the fields reveals that a recent landfill shortage in the state has resulted in a cost increase. Many budgets will need supplementals to account for this increase in waste disposal expense. Future project budgets will need to recognize the higher costs as well.
To fix your biggest problems, you need to first know what they are. This dashboard stack ranks your largest budget estimate overruns on the left, and identifies if that budget is an isolated problem or part of a larger trend, as well as the project manager.

Ideally, you want to see the majority of budgets on the red horizontal line or slightly below. Extremes in either direction indicate either poor budget planning and management.

**Finance & Accounting Scenario**

**FINANCE & ACCOUNTING DASHBOARD**

### 246 Budget Est Overrun

**Budget overruns**

<table>
<thead>
<tr>
<th>Name</th>
<th>Estimate OverR...</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIR 02</td>
<td>2.78</td>
</tr>
<tr>
<td>RAP 14</td>
<td>1.92</td>
</tr>
<tr>
<td>LOG 75</td>
<td>1.42</td>
</tr>
<tr>
<td>RAP 12</td>
<td>1.37</td>
</tr>
<tr>
<td>RAP 15</td>
<td>1.26</td>
</tr>
<tr>
<td>AOR 04</td>
<td>0.88</td>
</tr>
<tr>
<td>RCS 49</td>
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<tr>
<td>PLS 70</td>
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<tr>
<td>INU 234</td>
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<tr>
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<td>KUD 08</td>
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<tr>
<td>OOC 06</td>
<td>0.61</td>
</tr>
</tbody>
</table>

**Estimated Overrun of Budget vs. Regions**

- **Marking:**
  - S
- **Marker by**
  - Budget Name
- **Color by**
  - District
  - California
  - Colorado
  - Northern
  - Utah
  - Washington
  - Wyoming
Entrance’s custom dashboards for finance & accounting are a highly visual tool that ensures your budgets are current and accurate. These dashboards also help you answer the most pressing questions you have regarding financial risk management:

- What percent of projects are over budget and what is the value of dollars that have been spent?
- Where will I have cost overruns and need supplemental appropriations?
- Are we trending in the right direction regarding overspend requests?
- Are all costs allocated to the proper project?
- How much will we need to invest back into the business in the next two months to cover our expenses?
- Do I have the information needed for my financial period close analysis and month-end reporting?

Get a demo @ 1-888-343-5669
Cost Control Analytics for Regional Managers

You’re on the hook to manage costs and produce tangible results for all the projects you oversee in your area. With so many projects, where do you start?

The information you need is probably floating somewhere between the field and the office in a spreadsheet or report, so you don’t have full visibility into whether you’re managing costs as efficiently as possible. Timely information is crucial in decision making and being able to stay on budget.
Regional Manager Scenario

As a manager, you are responsible for the cost and performance of your regional assets. Therefore, it is essential that you have the data you need to monitor and correct the performance of the spend category managers in your region.

With estimates exceeding his budget by $12.31M, Mark Warner is responsible for the majority of the Lasorda estimates overage. Michael Bennet and Al Franken are also contributing $4.03M to the problem.
Regional Manager Scenario:

In this scatter chart, all active projects in California’s Lasorda Field are segmented based on how much their estimates are exceeding their budgets (X-axis) and how much their posted CAPEX totals are exceeding their estimates (Y-axis). In this one simple view, the Regional Manager can quickly determine which projects are in the most trouble and which project managers are responsible for those projects.

Looks like Mark Warner has three projects exceeding estimates by >$3MM each. A number of Al Franken’s projects are also exceeding their estimates on average by >$1MM.

1. Top Left: Posting Exceed the Submitted Estimates, but the Estimates are below the budget.

2. Lower Right: Estimates are exceeding the budget, but CAPEX are lagging estimates.

3. Upper Right: Estimates are over the budget and Postings are Over the Estimates.

4. Bottom Left: Estimates are under budget and Postings are lagging the estimates—you want the majority of your projects in this segment.
Regional Manager Scenario

Estimates are nearly 2x the posted CAPEX, most likely due to double entry.

Posted CAPEX is under budget, so the Mark’s projects actually came in under budget!

No activity. Projects were completed in Q3.

False alarm! Visualizing Mark Warner’s activity history in the Lasorda region instantly reveals that the problem is not with the budget or posted CAPEX, but probably due to improper or misplaced estimates, which is an easy thing to fix.
A quick look at Project Manager Al Franken’s activity history in the Lasorda region, highlights a more immediate concern.

Al’s projects are active with estimates (blue line) exceeding both the posted CAPEX (red line) and the budget (black line).

It might be time for an update from Al on his projects.
Our custom Budget dashboards for Regional Managers provide useful insight that alleviates many of your most common challenges, including:

- A Regional view to instantly see how efficiently projects are being managed.
- Are any projects exceeding their allocated costs – if so, which ones and why?
- Which project managers are the best and worst at budgeting? Where are their strengths and weaknesses? Can the poor performers be trained to boost their budget performance?

- Easy-to-use analytics that direct attention to spending against budgets and project managers.
- Drill down into problem areas and fix them, or highlight successes that can be replicated elsewhere.

Get a demo @ 1-888-343-5669
Cost Control Analytics for Project Managers

You’re responsible for creating and managing the budget, a manual job with a lot of moving parts.

Proper project budget management is made more difficult by the fact that most supplier bills come in weeks, and even months, after the work was completed. With so many moving pieces and costs to track for each project, creating an accurate cost estimate can require as much “engineering” work as the project itself.
Project Manager Scenario

Project manager dashboards provide a snapshot view of the current performance of a manager’s entire portfolio and how that manager’s projects are performing against his/her peers.

By selecting himself, Al Franken opens his own portfolio view which shows that he has overrun issues with all of his projects, not just in Lasorda. In fact, estimates for his Lyons projects are running a staggering $14.81MM over the budget.
A quick look at the activity history for Lyons shows that the estimates surpassed his budget in late 2Q.

Given the amount of overage, Al is wondering if this might be an accounting issue, but needs to drill down into the budget line-items to be sure...
Project Manager Scenario

... Sure enough, there is $13.22M that is posted to an “Empty” account. Al is fairly certain that these were misapplied to his project.

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<table>
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<th>P&gt;E</th>
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```
Next, Al opens up a chart that provides him with estimates, posted CAPEX and budgeted spend by major category in the Bench region. In this region, his posted CAPEX for cement are exceeding the estimates by nearly $10M.

Ah-hah! The empty estimate in Lyons most likely belongs to the Bench budget. Fixing that would bring the posted CAPEX total in line with the estimates.
Al can call accounting and together they look at an even more granular view of the budget line items.

Al confirms that he is missing some budget line items for cement for the Bench region and can ask accounting to investigate that “empty” category on the Lyons project.
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• How accurate are they versus my peers?
• Which categories drive the need for supplemental spend on my projects?
• Can they be reduced and by how much?
• Which suppliers are delivering on schedule and on budget?
• Should I consider giving more business to a smaller group of vendors?
• What information from my existing projects will improve accuracy in the future?

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