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INTEGRATION

HOW BRINGING PEOPLE
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CREATES MORE VALUE
THAN EVER BEFORE

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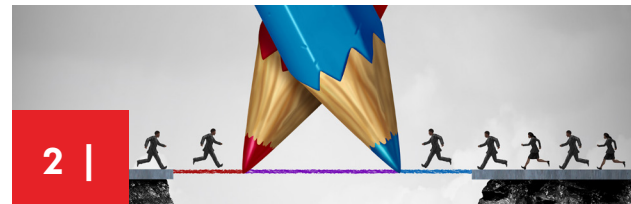
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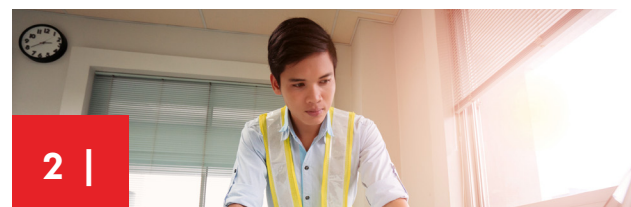
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EDITORS NOTE

THE ART OF INTEGRATION

Why deliberate, knowledge-driven integration matters now, more than ever.

BY OLFA HAMDI

We are living through an era of extraordinary consolidation in the global engineering and construction sector (E&C). In Q2 2017 alone, the market saw 49 mergers and acquisitions, with a deal value of over \$21.6 billion. There were four megadeals worth over \$1 billion in that period, including the transformational \$2.7B acquisition of Amec Foster Wheeler PLC by civil engineering giant John Wood Group PLC. That exceptional deal followed news that Jacobs Engineering Group Inc. had acquired CH2M HILL Companies Ltd. for \$3.27 billion. These are just two on a long and growing list.

Remarkable deals like these create global engineering, procurement and construction business powerhouses with the potential to deliver differentiated, end-to-end value propositions and comprehensive, highly efficient, unified solutions that minimize customer interfaces and maximize stakeholder value. But this is only possible if they successfully unite their operations, which are often complex, multi-faceted and widely dispersed across the global economy.

This unique market, characterized by mergers, acquisitions and the resulting complexities, is why leaders in the capital projects construction industry are focused on integration now, more than ever. In our ongoing effort to bring fresh perspectives to pressing industry discussions, we've explored key strategies for successful integration of newly acquired EPC operations in *Delivering On The Promise* (p.2).


Historically, integration efforts have been focused on detailed engineering work, while other aspects of integration were overlooked or neglected. Consider the importance of non-engineering contextual information, inter-organizational communication and stakeholder collaboration -- these are in fact foundational elements of integration that should be treated with the same diligence and focus as engineering work proper. In this issue of Velocity, we offer *Four Steps To Integrated Project Delivery* (p.4), which provides a powerful blueprint that ranges from early planning of construction sequences and standardization of work packages to alignment workshops and the adoption of scalable, configurable technology.

Integration can take many forms, of course, from the office to the field, across all phases of the project lifecycle, and among all of the disciplines involved in the execution of complex projects. Our exclusive interview with PG&E Sr. Work Resource Manager Todd Mintzer begins with a discussion about the importance of breaking down silos to improve collaboration and build high-performing, cross-functional teams that are fully aligned and effective. He discusses the power of alliance frameworks, the critical importance of engaged project sponsors and the need to find new leaders who can bridge the gap between organizational layers. He also offers a persuasive argument for the implementation of integrated change control systems that

can create the conditions for successful cross-functional collaboration across stakeholder groups.

These critical change control systems are the foundation for integration that takes place centrally, but leaders are also concerned with integration at the local, project level. Of course, the best strategies for local/project integration will be heavily dependent on context. In this edition, we've explored one of these contexts -- the use of Engineering Value Centers, or EVCs -- offering guidelines and best practices for integration on page xx, *Working with Remote Teams*.

In the final analysis, integration is about people, and so the business of integration is the leader's business. Who better to tell us what values to develop than an engineer who has led an organization of over 33,000 engineers? We're pleased to bring you an exclusive, wide-ranging interview with Thomas P. Bostick, the 53rd Chief of Engineers of the U.S. Army and Commanding General of the U.S. Army Corps of Engineers. He offers tremendous insight and tools for developing talent, achieving diversity, leading organization and learning from mistakes. It's a great read.

We're thrilled to share our passion for capital project integration in this second edition of Velocity magazine. We hope you learn as much as we did. 





DELIVERING ON THE PROMISE

STRATEGIES FOR SUCCESSFUL INTEGRATION OF A NEWLY ACQUIRED EPC OPERATION

BY OLFA HAMDI

A spate of multi-billion-dollar merger and acquisition deals are bringing leading American infrastructure companies together at a phenomenal rate.

It's a \$22 billion horse race, with these highly competitive firms wagering that U.S. President Donald Trump will make good on his proposed \$1 trillion infrastructure plan.

The latest announcement came in early August, with news that Jacobs Engineering Group Inc. will acquire CH2M HILL Companies Ltd. for \$3.27 billion. The deal made headlines in the trade press across the country and the globe. But what happens when the media frenzy dies down?

The next chapter is far less sexy. Two companies have to integrate beyond the purchase transaction. That means two sets of powerful leaders have to get in one boat and start rowing in the same direction. Two sets of entrenched middle managers have to find a way to see eye-to-eye on protocols and practices. Systems and processes will come under heavy strain as people from different corporate cultures find themselves face-to-face with erstwhile competitors who have vastly different strategies and attitudes. Front-line teams often find themselves speaking entirely different languages. Then delayering and layoffs begin.

Acquisitions often deliver less value than expected precisely because companies fail to integrate effectively. For EPC companies operating in capital construction markets, the demands on the integration team are even heavier because of the complex project environment.

The key is deliberate, conscious and effective alignment. To deliver on the promised synergies, preserve and expand value to shareholders, the parent and acquired companies have to function as one unit when serving Owner clients. Simply put: the deal is not done until successful integration is complete.

Here we look at five strategies to be taken into account to set the new, combined operation on a path to success.

1 | Remembering that a signed deal is the beginning, not the end.

After the merger is announced, the hard work of integration begins. Make sure you're doing everything you can to create continuity. How?

For starters, your due diligence team has developed a deep knowledge of the company you've acquired. Instead of dissolving the team after the merger, as many companies do, leverage team members' expertise. Make them a part

of the integration effort. Continuity like this ensures the integration team has a firm grasp of the intricacies involved in bringing the two companies together. It also protects against the loss of knowledge that often comes with a turnover in leadership.

2 | Find the right person to lead the integration team.

The integration leader will guide everyone through the uncharted territory that two organizations must cross before they can function as one. Guiding this kind of transition takes a leader with special skills. The person you choose must be at ease in complex situations, comfortable working with people at all levels and able to bring people together even when they come from different corporate cultures.

It is a challenging job, made even more difficult at Engineering, Procurement and Construction (EPC) firms where the complex project delivery system needs to be integrated as well. As a result, the integration leader needs strong project management skills and a deep understanding of both companies. When complex mergers involve industry giants like the Jacobs/CH2M pairing, the best integration managers rely on sophisticated technology platforms that help automate the integration of work

processes and requirements so that they can focus on driving accountability and establishing a strong operation.

3 | Make quick decisions about layoff and delayering.

Your top priority is to tell people in both organizations exactly what the acquisition means for them. Honest, meaningful communication and speedy decision-making show respect and help earn the faith and goodwill you'll need to carry you through the transition. People who are worried about their future won't be focused on the task at hand, and may even undermine your efforts to integrate and your ongoing project delivery operations.

For EPC companies, a critical first step is to open the lines of communication between the integration office and project leaders. In part, this is because the people who are at the helm of ongoing projects at both companies are best positioned to calm any fears about the consequences that will flow from the acquisition.

More importantly, however, these project managers, engineering leads, functional leads, project directors and gatekeepers need to know what role they'll play in the new organization. Delayering is inevitable, so the earlier you can establish effective alignment, the better. Things change.

4 | At the project level, align teams and create functional baselines by segment and owner-client.

Project delivery systems vary dramatically between teams – even teams who work at the same company. Execution processes and styles are different. Documentation, assurance and controls might be different, too. In the final analysis, you can't even assume that a team's documented processes are the same as the understood processes (the ones they actually follow, in practice). If these factors vary so

significantly inside a single company, imagine how different they might be between two different companies! During a merger or an acquisition, how do you get everyone on the same page? The good news is that the integration phase of an acquisition gives you a remarkable opportunity to take the best practices from each organization and align them across the new company. Managed well, this can become an inspiring educational process for those responsible for delivering projects. Consider taking a Process and Requirements Alignment Approach, piloted and championed by a select project leadership group.

Practically, this means the integration team begins by selecting group of project managers, project directors, project sponsors and functional leads from across the different sectors of operations. These people should come from both the parent company and the acquired company.

The team brings these leaders together in collaborative "project performance acceleration workshops™". The primary goal is to get seasoned input into the core project delivery process. The outcome will be a segment functional baseline.

A segment functional baseline is a pre-defined and configured project environment that has the support of decision makers in the context of a project, a client relationship or an organizational objective. This functional baseline enables fast project kick-off and stronger interface management for the rest of the workforce delivery projects.

In the case of an acquisition, a joint venture or simply a newly formed Owner-EPC team, these workshops could be completed on Concord's project performance acceleration platform™, Team-Concord™ (T-CON™), which supports a team in building out work processes for sub-

teams, functional groups, interfaces and third-party relationships (including relationships with owners). These same work processes are governed by a permission scheme that is driven by single-point accountability. Within few days – even a few hours, in some cases – a select group of project leaders could build an aligned functional baseline that is ready to go for the rest of the organization working on that specific segment.

5 | Understand the historical data from the acquired company and merge lessons learned to build common ground.

The acquired company comes with a wealth of project data and documentation. The people who work at the acquired company know what's there, but for the most part it sits in silent archives and databases that are different from the parent company. Tapping into these silent archives through the power of advanced search engines supports easy access to historical information about project delivery.

As an integral part of the the Concord Project Performance Acceleration Platform, we have built the most powerful knowledge search engine purpose built for historical project information allowing EPC and Owner companies to leverage this historical data as they embark on an integration protocol.

With these five strategies – and the enabling power of a technology and platform purpose built for our industry – integration work gets accelerated, the risk of performance loss is reduced significantly and the likelihood of success increases dramatically, thus enabling the best of our industry to deliver on their shareholder promise. 🌐

4 STEPS

to an Integrated Project Delivery System

BY OLFA HAMDI

Today, leading capital project managers understand that getting things done on-time and on-budget means keeping people and teams working together from start to finish. Like the myriad gears inside a Breitling pilot's watch, the many moving parts in your project need to be precisely aligned or the whole thing grinds to a halt. It's not easy.

In projects, the practice of achieving this precise alignment is called integration. It will look slightly different for each project. To start, you have to consider various interests, project operations and disciplines. Practically speaking, integration can cover the office and field operations, the flow of information, contracts, project controls and plain stakeholder business and technical interests.

In this article, we take a look at four key steps to building the kind of integration required for success on the kind complex, modern capital projects we run today.

1 | Connect the office and the field.

Office and field integration can take many forms, but these three key recommendations will create a strong foundation for an effective integrated project delivery system.

Plan your construction sequence as early as possible.

The first and most powerful way to ensure office and field integration is to make sure the construction sequence is considered as early as possible. When you start your scope discussion, consider starting your integrated front-end planning, too.

Begin with sufficient construction planning, then lay out a preliminary sequence of construction. By following these steps, your construction plan can be communicated early and taken into account as the overall Project Execution Plan is being developed.

You'll be challenged to secure funding so that you can have sufficient construction resources in place before you start. Make sure that work completed by the early construction people supports the work your construction management team will undertake later on.

The best part: A construction-driven scoping discussion allows you to produce a series of Construction Work Packages and Construction Work Areas. You may know these as Scope Elements. Either way, you and your team will be happy to have them in hand.

Use your work packages to drive the project.

Planning discussions, bids, contracts, staffing, materials -- everything should be driven by the work packages. This is the best way to make sure that engineering, procurement and other aspects of the project support the overall construction plan, and vice-versa. Track your project's progress based on quantities installed and deliverables completed, and link this physical progress directly to the work packages.

Aim to standardize your Construction Work Packages.

The definition of Construction Work Packages (CWPs) has helped to establish shared nomenclatures between engineers and construction leaders. Today, we have also successfully established strong execution sequences. The entire purpose of this industry-level standardization is to support reasonably standardized formats for work packages, in association with size, requirements and constraints monitoring.

So get your CWP templates well-defined. Measure your CWPs' stability across your projects portfolio, and through the various phases of the project lifecycle. Adjust when needed. This simple process can help to bring even the the most complex projects under control.

2 | Make room for the maintenance and operations team.

Make sure you get the input of your operations and maintenance teams as early as possible. You can do this by making a place for a designated O&M representative at the planning table, and ensuring that he or she is involved not only in the project's early stages, but throughout the project lifecycle.

Implement Value Improving Practices.

Value Improving Practices, known as VIPs, are typically used in the Front-End Loading (FEL) phase to enhance project planning, delivery and operations. Common VIPs include technology selection, value engineering, design-to-capacity, classes of facility quality or waste minimization. For example, before the project breaks ground, a company might set up a team to study the best technology systems for the project. The right technology can help keep the project on time and on budget.

It's critical to involve O&M representatives in VIPs like the Classes of Facility Quality; make sure they have the freedom to provide meaningful input and the power to make decisions. Many large organizations have adopted different categories of

facility quality and performance targets. These categories are typically evaluated in a formal exercise called Classes of Facility Quality. This exercise includes the study of aspects such as reliability, product quality, process flexibility, operability, maintainability, life of plant and equipment, expandability. It's so important to involve O&M, you might even consider asking them to lead the exercise.

3 | Unite contracts with project services.

It is critically important for us to redefine productivity. Why do we still measure performance against cost codes?

Measure performance against the plan, not the cost code.

Historically, companies have measured performance by adding up the number of hours worked under a budget line item, or cost code. The result: People fudge the numbers. When one cost code "pot" is empty, they just charge time against a cost code pot that's still full. Project managers get a fuzzy picture of productivity, and are literally at a loss when designing future work packages.

Consider instead charging time against the work package, and let the system assign it to the cost codes. This means you're measuring performance against the plan, not the budget line item. Better data means better results - now, and in the future.

4 | Weave your data and historical knowledge into everything.

Too often, capital project managers are forced to reinvent the wheel every time they sit down to develop an execution plan, design a work package or develop a construction sequence. It doesn't have to be that way! Here are to tips for building on what you already know.

Run alignment workshops across project data sets.

Hold data alignment workshops and give your team an opportunity

to examine all of the project's core systems. Look at every kind of data you have: engineering data, materials data, construction data, contextual data, even human resources data. Look at every attribute, and try to identify commonalities. Look for opportunities to correlate the data so you can do more sophisticated analyses. Use what you learn to do better.

Seek out and use scalable, configurable technology to support your work.

Other industries have developed technology that can be easily customized and configured to support their businesses. Much of that technology is scalable, and can grow with you. Take advantage of platforms like T-CON™ that offer a scalable, configurable environment for capital projects and Advanced Work Packaging. T-CON™ doesn't just support individual projects, it allows you to leverage learnings from past projects to make your current project successful.

A work package that is ready to go doesn't just contain all of the goals and data required for this project, it contains all the learnings from the company's work packaging history. Build a library of work packages that work for your company, and deploy them again and again, fine-tuning each time, until you're coming in on budget and on schedule.

TAKING THE FIRST STEP

Achieving an integrated project delivery system requires a deliberate effort to revamp your company's project practices. The scope of such effort must cover various aspects of your projects, from people and processes to processes, data, materials and more.🔗

**PG&E Sr. Work & Resource Manager
Todd Mintzer on**

THE KEY COMPONENTS OF ULTRA-EFFICIENT PROJECT AND PORTFOLIO WORK AND RESOURCE MANAGEMENT

The Concord team recently sat down with Todd Mintzer, the Senior Manager of Electric Transmission Work & Resource Management at Pacific Gas & Electric (PG&E), one of the largest combined natural gas and electric companies in the United States.

After nearly a decade in the environmental and American integrated steel industries, Todd transitioned into the energy industry, where he is now part of a team that oversees and governs the management of a portfolio of thousands of capital projects at PG&E.

In our illuminating interview, Todd touched on eight important ideas for successful execution of work throughout the capital project lifecycle.

1 | Improve effectiveness by breaking down silos and building aligned, collaborative, cross-functional teams.

It's human nature to form silos, because interacting with people on the other side of the fence takes extra work and sometimes, productive confrontation to achieve a common goal. Nevertheless he encourages project teams to break down those silos, because it's the only way to be effective when there are a large number of stakeholders involved. If roles aren't coordinated, this can end up creating inefficient churn and a final work product that is not properly vetted and not fully effective.

"The most effective project managers are the ones that have a good aligned cross-functional team. To get a project executed here, we utilize integrated teams with cross-functional members including construction, grid operations, engineering, environmental, and of course a project sponsor.

"If we're going to get projects done the way they were intended, it requires constant real-time collaboration within the integrated team. The projects that often do the best are the ones that are the most successful at routinely working across the boundaries."

2 | Leverage individuals with technical and/or operational experience, and interests in leadership roles, to help routinely bridge the gap between organizational layers.

Todd originally trained as an environmental engineer, and later obtained his MBA. Leveraging individuals with a technical background for business operations leadership type roles is a wise strategy for helping to bridge the gap between operational leadership and executing organizations.

"Some of the most successful people in business management leadership roles are those that have a fundamental understanding and interest in the underlying work. If there's a desire on the part of the individual with a technical background to become more focused on business management, their existing skillset can be combined with new business management skills, acquired when returning back to school. This combination enables successful leadership with the technical foundation as a base for great decision making."



Todd Mintzer is the Senior Manager of Electric Transmission Work & Resource Management at Pacific Gas & Electric.

3 | Invest in early collaboration and planning to ensure a better final work product.

Some organizations resist multi-stakeholder collaboration early in the project lifecycle because it can be time-consuming and costly to get everyone to the table, taking precious time away from the work they are actively engaged in. Early collaboration is imperative because it ensures that the scope, cost, and schedule are realistic given real world constraints. In the end it significantly increases the chances of having final deliverable that meets everyone's expectations.

"When you invest more time in up-front project planning with all of the different people that will be impacted by or required to execute the project, it results in a better, more executable work plan downstream. When this step is bypassed, or minimized, you end up with high levels of volatility in costs and schedules, and outcomes that don't look like what was originally anticipated. This is because real-world constraints have not been fully considered. Along the way you end up having to deal with a lot of downstream re-work and execution issues. The costs to accommodate the downstream churn end up being much more than what would have been the incremental cost invested in the up-front collaboration."

4 | Implement an integrated change control system to ensure cross-functional collaboration across stakeholder groups.

PG&E's adoption of an integrated change control program helps project teams, when faced with a potential change, to

collectively understand the implications of a given decision by involving all of the correct stakeholders. This ultimately results in the right move for both the project and the company.

"Prior to integrated change control, the change processes that existed were not integrated and had varying levels of enforcement. We often found that schedule changes, scope changes, and cost changes were considered separately. As a project leader approving a change in cost, it's also critical to understand the impacts on scope and schedule to make the correct decision. If your processes do not drive that sort of decision making then each change decision has significant potential to be suboptimal. One of the other benefits of moving to an integrated change control program is that it enables, collectively, the project teams and the leaders to understand the changes that occur, and weigh in on whether or not all three pieces of the puzzle -- scope, cost and schedule -- are still aligned with the intentions of the company by forcing involvement and input from all of the relevant stakeholders in the approval process."

5 | Ensure that the project sponsor is engaged through the capital project's entire life cycle.

The project manager's job is to efficiently execute the scope, on time and on budget. However, they often don't have great visibility around why the scope and timing are important. Because the person with that visibility is the project sponsor, it's imperative that all changes are routed through them, so they can ensure the change is aligned with business priorities.

"Often times we found that changes were occurring on projects that weren't necessarily something the sponsor would have envisioned because the project had been "handed off" from the sponsor to the executing organization, and the sponsor had moved on to establish newer projects. Down the road, we would find out that the sponsor's expectations were not met as a result of a change or series of changes that occurred throughout the project's lifecycle. That's why it's important to keep the sponsor involved in each and every change. This is one of the things that we accomplish with the integrated change control program."

6 | Utilize a two-layer process for resource group management.

When the demand for labor increases or decreases on a given project, changes to the corresponding plans are made as required, at the "micro", or project-by-project level, leveraging an enterprise project management scheduling toolset. This information then funnels up to the "macro", or portfolio level, where resource managers assess the collective impact of all resource changes on the portfolio, by resource group. The ongoing labor supply for each resource group must be continuously balanced with the ongoing collective demand from the projects to both maintain efficient levels of overtime and ensure contracts are in place to pick up the rest.

"The goal is to continuously understand the monthly and yearly demand for a given resource group, resulting from individual project by project demands and changes in those demands. That labor balancing role is one of the key roles that we play. However, when it

comes down to the day-to-day execution of the actual project itself, if there's a change on a project, and to a resource crew or group that's engaged on that specific project, then there is no replacement for direct, real time communication with the resource owner to ensure that resources are not stranded or over utilized."

7 | Leverage the power of an alliance framework for contracting relationships.

PG&E finds that, for certain resource groups, it can be more difficult to find the right workforce. Todd said that the company looks at multi-year demand to get a handle on the right amount of work to contract, and to signal that demand to contractors. Moving to alliance frameworks with contractors has been a preferred strategy.

"We've been moving in the direction to have an alliance with a set of contractors, so we can give those contractors steady work, and then work directly with them throughout the projects. When you do that, you're able to realize efficiencies,

as opposed to last minute project-by-project procurements. This strategy helps contractors to get insight as to the timing of demand for their own resources. It also enables contractors to bundle work together. If a contractor sees all of the work that's in front of them for the next three years, they can, given their own constraints, figure out the most efficient way to execute that work."

8 | Evaluate contracting opportunities by breaking the portfolio of work need into categories, each with its own contracting strategy.

PG&E assessed its work portfolio, broke it down into about 50 categories, and then designed an appropriate contracting strategy for each category. In designing the contracting strategies, they considered what would be the most efficient approach for each work category, along with what was in the best interests of the company.

"That combination looks different for each category of work, depending upon a number of factors. How much compliance risk is associated with the work? Are the resources needed to execute the work specialized? Does PG&E have that capability? Do contractors? Who can do the work most efficiently? Those are all the types of factors that go into the decision around the contract strategy that we apply to a given category of work. Once the strategy is determined for each category, we then apply it to each project, within that category. Once that has been completed, we then utilize macro level resource balancing to modify the internal/external disposition of that strategy, based upon available resources. Where there are imbalances, or other real world conditions that need to be factored in, much like with integrated change control, we also have a governance process to modify the application of the contract strategy."



“

If we're going to get projects done the way they were intended, it requires constant real-time collaboration within the integrated team. The projects that often do the best are the ones that are the most successful at routinely working across the boundaries.”

INTERFACE **GLOBALLY** DELIVER **LOCALLY!**

7 STRATEGIES FOR WORKING WITH ENGINEERING VALUE CENTERS (EVCS)

T-CON RESEARCH TEAM

Capital project managers are working with Engineering Value Centers* (EVC) now more than ever. How can you build a solid relationship that supports high-quality work and good communication with people thousands of miles away?

This is a pressing question for Owner and EPC companies embarking on capital construction projects. Some studies suggest as much as 30 per cent of all engineering on these projects will be completed by foreign-trained engineers working at value centers in developing countries like Indonesia, Mexico, Ukraine, Morocco and India. This is partly because the demand for trained engineers far outpaces availability in developed countries.

Engineering Value Centers, also called High-Value Engineering Centers, also help bring project costs under control, and not just because the cost of doing business in developing countries is lower. According to a 2015 study from Independent Project Analysis' Industry Benchmarking Consortium*, using EVCs consistently makes a project more cost effective.

"The research shows that projects using EVCs generally have better drivers and therefore perform better than those that don't," study authors Dean Findley and Kate Rohrbaugh found. "When project teams have more cause to be wary, their due diligence improves."

Still, the work is challenging. Project managers need to be diligent in setting up and documenting work plans, and in

establishing communication strategies that support remote teams.

When our start-up team embarked on a multi-million dollar project building the world's first Project Performance Acceleration Platform™, designed and developed to purposely serve the specific needs of highly engineered and complex capital projects, staffing quickly ramped up during our detailed engineering phase with various team members located remotely. A geographically distributed team, with different backgrounds, working cultures and time zones needed to be managed and handled in a more conscious and specific way.

First, once we got through our FEED, during which we froze our development scope, design after industry expert validation, we needed to well-define our development work packages. Our leadership team quickly realized that our design work packages needed to incorporate the specificities and constraints dictated by the location of our staff, their competencies and background.

As we continue to deploy our platform in diverse capital project environments, we are learning on a daily basis the importance of building in any project team the capability to work and collaborate remotely as a default functioning mechanism. Here are seven key steps to success that we learned from our own experience as well as the experience of those brilliant teams and organizations we have had the chance to work with.



1 | Make communication skills and interface management a core competency.

A project interface is the boundary between two parties working on a project; you might also think of it as the point at which one person, team or contractor hands responsibility to another. In many cases the interface exists at the point of connection between two physical systems that were developed separately - like an airplane fuselage and the electrical harnesses that connect it to the aircraft - but it can also be a key deliverable based on the combined work of separate teams.

It is imperative to manage these interfaces in a structured, accountable way. Develop a clear set of interface management techniques and principles, then train every project professional on using them. Teams working on complex projects need to communicate consistently and effectively.

For example, a remote team could benefit from focusing on the critical points of contact between their component design, planning and assurance teams, to ensure that everyone knows when and with whom they should share information. Most integration teams focus on milestone planning and resource allocation, paying little attention to the quality of communication between teams. That needs to change.

2 | Establish a single point of accountability in cross-functional project teams.

Deliverables and associated requirements are more likely to fall through the cracks when remote teams are working together in an unorganized way. Making one person accountable for every deliverable - large or small - helps solve this problem. Adopting the single-accountability rule improved clarity around roles and responsibilities.

3 | Find non-intrusive ways to oversee remote teams and audit interfaces.

Establish systems of continuous, non-intrusive monitoring and control. Leadership and management teams must be able to easily identify where there is a risk of miscommunication between the design, planning and execution teams working on the project. Consider the case of the Airbus A380, where development teams working separately in Germany and France failed to recognize that the plane's fuselage was incompatible with the electrical harnesses. The failure to communicate cost the company millions of dollars in rework.

4 | Identify each risk, and make one person responsible for mitigating that risk.

Identify specific risks associated with the remote work, record it in the project's risk register, and assign a single person to oversee and mitigate the risk. For example, if foreign-trained engineers work to a different standard, assign one team member to review the work to ensure it meets the appropriate standard.

5 | Build bulletproof, automated work processes.

First, strengthen your work processes around key deliverables. Then, keep your team on track by mandating the use of automated systems to move work through the established process. Instead of bringing the document down the hall for review, a remote team member will select "ready for review" in your automated system. Problem solved.

6 | Don't assume that remote team members have a common understanding of the project objectives and requirements.

Document the project scope, objectives, guidelines, communications and reporting protocols, corporate culture and any other key drivers. Distribute these documents to everyone on the team and follow up with alignment conversations. Make sure office engineering, planning and execution leads have the same understanding of these requirements. Get - and keep - everyone on the same page. Adopt and enforce the single source of truth rule.

7 | Create a positive association with issue reporting.

You need to know where the system is breaking down. Find an incentive that works for your team, and use it to encourage team members to report issues they encounter in their work. Alternatively, penalize the failure to report.

These simple strategies can dramatically improve performance.

If you are a capital project manager working in an asset-intensive industry, you are probably already working with a High-Value Engineering Centers or other remote teams (and if you're not, you likely will be soon). These seven simple strategies can help you to keep your teams in alignment, and ward off critical project failures that drive up costs and necessitate time-consuming rework. Start now and reap the rewards in the months and years to come.

*Engineering Value Centers EVCs are engineering offices with hourly rates that are significantly lower than more developed regions. EVCs are used either independently as a subcontractor, within an Alliance agreement or in other cases acquired by the EPC company and integrated within its offer.

* <http://www.ipaglobal.com/ibc-2015-highlights-new-research-industry-trends>

HOW TO PREPARE FOR ADVANCED WORK PACKAGING

BY OLFA HAMDI

Advanced Work Packaging (AWP) has the power to fundamentally transform the capital project delivery process.

Early evidence suggests incredible benefits, including the ability to boost field productivity by a staggering 25 percent. Projects and organizations who have implemented AWP have also been able to bring down the total installed cost of a project by up to 10 per cent, with increased savings for owners and increased profitability for contractors. They've also been able to:

- **Deliver projects on schedule, with improved schedule performance;**
- **Improve safety performance, with zero lost time accident reports;**
- **Get better quality construction, with less rework; and**
- **Enjoy increased predictability, in terms of cost and schedule estimates.**

These findings came out of the Construction Industry Institute's Research Team 272. That team was the industry coalition that first proposed a recommended practice model for advanced work packaging. Full disclosure: I was a member of the team while I was writing my master's thesis on the same subject. As I documented the benefits of AWP implementation and its potential, I went on to found the AWP Institute and, most recently, to develop T-CON Platform to facilitate AWP-based collaboration during the capital projects lifecycle.

The fact is that when AWP is implemented properly, it drives remarkable improvements in the industrial construction sector.

BUT HOW DO YOU GET STARTED?



AWP is still in its industry early stages, but we already have a good idea of what needs to be in place in order for it to be successful. A subsequent Construction Industry Institute report published by RT319, suggests that AWP implementation depends heavily on three pre-requisites – we’ll go over them one-by-one and show how T-CON supports these practices through enabling technology.

1 | Make sure your process adheres to prescribed AWP guidelines.

If you want to succeed, start by clearly defining procedures and guidelines to regulate every stage of the project, from preliminary planning to commissioning and start-up. Use the recommended AWP flowcharts to establish specific execution procedures, and make sure all of it lines up with the contract.

You need two things to meaningfully define these procedures and guidelines: the ability to ensure consistent implementation, and the ability to collect feedback. T-CON helps you do both.

Using T-CON, an organization can specify a work process, assign project and organization permissions to various team members, and then implement the same process in a standard fashion across the entire organization. When a project has a unique context requiring a modified version of the work packaging process, T-CON allows you to set up a custom process. Once the custom process is used in a project, you can easily see whether it was effective or not. Take that feedback and roll it out to the entire organization.

With T-CON technology, more than 30 percent of the recommend AWP process steps are eliminated. This saves time, improves the accuracy of your information and helps you to manage complex projects.

You need two things to meaningfully define these procedures and guidelines: the ability to ensure consistent implementation, and the ability to collect feedback. T-CON helps you do both.

2 | Make sure the project management team is aligned on AWP deliverables.

It is critical to get people working together from the outset. Alignment across project discipline requirements – particularly among engineering, procurement, and construction teams – is a fundamental driver of successful AWP implementation.

Start by defining how information will flow between disciplines throughout the different project phases. Define a coordinated and integrated plan and ensure that all team members understand how it works. You will also want to define and implement both formal and informal dispute resolution processes, so you always know when and where things are breaking down.

IR 272 recommends that the following should be finalized during Stage 1 of the project:

- Engineering Work Packages (EWP), Construction Work Packages (CWP) and Installation Work Packages (IWP) Table of Contents
- Formats
- Issuing process
- Sign-offs, and
- Distribution

These should be as standard as possible across the project and the organization. In fact, it is a good practice to hold an alignment workshop between the owner and general contractor to align deliverables and communication requirements.

On the T-CON Platform, you’ll define all these requirements at the beginning of the project, and you’ll be able to easily reference historical project information as you do so. The platform serves as a tool to support the alignment workshop, as well as the immediate kick-off of the project.


Deliverables management through T-CON plays a critical role in the success of the AWP program. Having a clear and efficient process for these packages to route through the systems is important to the implementation process.

This involves discipline-specific leads whose job it is to develop, understand and take ownership of timely generation of complete EWPs. Such responsibilities are powered across the project team in an automatic fashion.

3 | Make sure contracts integrate AWP procedures between key project participants.

Begin by identifying who is responsible for what, not only at the company level, but also at the individual level. This should be done as early as possible in your preliminary planning, so these responsibilities can be included in key participants’ contracts.

Then, define your payment schedules and control processes in such a way that they line up with your AWP deliverables. Project planning and completion should be monitored by Installation Work Packages, which provides a focus on tracking the project through physical progress, rather than through accounting metrics. Finally, develop an ad hoc project responsibility matrix for AWP implementation, so you can effectively prevent responsibility and skill gaps.

The journey to adopting Advanced Work Packaging can be daunting. T-CON was purpose-built to help companies like yours make the transition. The software will help you manage real-time collaboration in a fast, reliable and incredibly accurate fashion. We’re looking for ambitious companies that want to lead, grow fast and smart – contact us today. 

PEOPLE

ARE THE HEART OF ALL GREAT PROJECT ORGANIZATIONS:

A conversation with recently retired U.S. Army Chief of Engineers Thomas Bostick

The Concord team recently sat down with Thomas Bostick, the 53rd Chief of Engineers of the United States Army and Commanding General of the U.S. Army Corps of Engineers.

Bostick's extraordinary list of accomplishments includes multiple science and engineering degrees from the U.S. Military Academy, Stanford University, and George Washington University, along with an extensive military education and more than three decades of exemplary service including time on the ground in Bosnia and Herzegovina, Iraq and within the Pentagon after 9/11. He is highly decorated, with more than a dozen honors to his name.

In this incisive interview, Bostick emphasizes the need to build organizations around people, by finding, recruiting and developing the most talented professionals in the field.

1 | To build leaders, first recognize the importance of people.

Bostick said the first step to building an exceptional team is simple: Recognize the importance of people. Work hard to bring the right people in, and then work even harder to educate, train and develop them. Don't leave people on their own after they've been recruited-- you must guide, help and support them. This is the best way to prepare the next generation to lead, he said.

"I spent a year as a White House Fellow, and I worked in the Department of Veterans Affairs. It could make sense that you would have a doctor running veterans' hospitals, because of their technical skills. But we never trained many of these doctors to be the leaders and the managers that they needed to be, in order to run these big organizations.

"So they had medical skills, but not necessarily the skills of leadership and

motivation, teamwork, achieving success, mentoring and developing those kinds of skills in others; skills needed in military Doctors. But even there, I found it very challenging, and a conscious effort was required to support the development of these skills."

2 | Use an aspirational survey to identify and develop future leaders.

The best way to keep top people in your organization is through a conscious, deliberate effort to develop their talent, Bostick says. This means providing education and challenging job opportunities that help develop new skills.

Consider circulating an aspirational survey to identify your most ambitious and talented team members. This is the most effective way to find out who wants to be mentored, Bostick says. The highly detailed aspirational



Retired U.S. Army Chief of Engineers Thomas Bostick

survey seeks to discover who your people are, and how high they're aiming in their careers. Once you've identified those who are aspiring for training and opportunity, then assign a senior team member to help them get the education and work experience they need to succeed and advance.

"We sent our first civilians, ever, to work on the Hill, as a Congressional liaison. This is a scholarship program that is typically reserved mostly for the military, at the Captain level.

"Very junior people were selected, and we let them work on the Hill. As a result, they came to understand the way government works very early on. They understand authorizations and appropriations. They developed an understanding of how a big part of our country works. This is important because a third of our GDP

is from the federal government. This understanding of government should start early. Unless you focus on that at an early age, it becomes very difficult to teach later on."

3 | Make sure everyone is managing for diversity and inclusion.

One of Bostick's main passions is managing for diversity and inclusion. The key, he said, is to ensure that people at all levels of the organization are working to identify and keep strong female and minority candidates. "It doesn't happen by accident," he said. "It's a conscious, specific effort. If you don't do it, you will lose them." In one example, a friend from Harvard called him to say the Army Corps of Engineers was about to lose a highly educated young woman because someone felt that she had no future in the Corps because she missed a gate in her professional development which could have been easily addressed. Bostick asked him to explain:

"My friend told me that this young woman was a combat engineer, a Harvard graduate and a Rhodes Scholar. You know, the Rhodes Scholarship is probably the most exclusive, prestigious academic scholarship in the world. And yet someone at the lower level told her that she has no future in the Corp of Engineers.

"I called our head of personnel, but it was too late. She had transferred into another branch of service, and we lost her. That's why I believe the intermediate leaders need to be trained on talent management and understand the importance of managing the small and talented minority members on their teams. They need no special favor, but they do need to be managed with the understanding that they are key to the team's success. Even if senior leaders make their intentions clear on diversity,

inclusion and talent management, there are intermediate leaders that don't have your experience and will not go out of their way to invest the time that is necessary in working these individual cases."

The Army Corps of Engineers lost that young Rhodes Scholar, and in a similar situation, very nearly lost a young black engineer who had been offered a full scholarship to MIT. In some cases the Army will pay for continued education, but the young engineer had missed the cut by two points. At that point, Bostick got called in:

“That’s why I believe the intermediate leaders need to be trained on talent management and understand the importance of managing the small and talented minority members on their teams. They need no special favor, but they do need to be managed with the understanding that they are key to the team’s success.”

"I said: 'You're telling me this officer cannot go to school?' It turns out there were a couple of people in front of him, and the rule book said no. But these other officers didn't have full scholarships to MIT. In cases like this, we need to step outside rigid rules take the most appropriate actions.

"So we sent that officer to MIT. He had a 4.0 average, and he came later to work for me, in the Corps of Engineers. We would have lost him, just like we lost the female Rhodes Scholar.

"That's why your vision has to be clear, throughout the organization. And people have to be willing to pick up the phone and say 'Hey, we've got something that doesn't fit exactly. What do we do, to try to retain this person?' He would have walked. And now, he's in the Corps of Engineers and he's doing great work serving our country."

4 | Be ready to dig deep to achieve diversity.

In your attempt to make your organization more diverse and inclusive, you may have to dig deep. The problems sometimes go down to the most junior levels of the organization. Bostick discovered this the hard way when he was asked to improve diversity in the Corps of Engineers:

"I went back and looked at all of the Generals. There was one female and one African American -- me. No diversity there. So I went to the next level, to the Colonels.

There were forty highly selected Colonels, and they were all white males. So I went down another level, to the Lieutenant Colonels. There was one African American female -- that's it.

"How did this happen? I went back to my yearbook, at West Point. I started flipping through the 100 guys in my class. There were no women, when I graduated. And just me.

"So we started aggressively recruiting women and African Americans. If you want some top talent, you cannot just wait for them to show up at your door. You have to aggressively recruit, and then you have to educate, train, and retain that talent. They must all feel like they've got a future in this organization because they see people like them at the top."

5 | Find the right leader for major projects, regardless of rank.

Bostick recommends that the leader be directly involved in selecting the person that will run difficult, challenging projects. The best candidate should be selected, regardless of his or her position in the organizational hierarchy. Once that person has been chosen, the next job is to ensure that they have the best team around them.

“There was a hospital that the VA was responsible for, in Colorado. Congress authorized \$700 million for this project, and it wasn’t going well. Congress ultimately decided that this project was to be managed under the Corps of Engineers. When we took over the project, it was already \$1 billion over budget. A \$700 million project was now \$1.7 billion.

“I personally flew to the project site. I personally selected the person that was going to oversee the project, who was not the person that would normally come out of the organization that was overseeing that particular part of the country. And we brought the best people from all over the Corps.”

6 | Ensure that you have a backup leadership plan in place.

Bostick insists on having a “backup leader” for each of the key positions on a project. The backup leader should be a person that you’re working to train and develop for future leadership positions. Don’t listen to those who say it’s too expensive -- it’s the only way to ensure that you’ll have the leaders you need in the future.

“The people we are bringing in now to manage very difficult projects are your old, crusty experts. The best in the business. And we’re going to keep doing that, on the most critical projects. But if you keep doing that, you’re not growing the next generation.

“I went to a project, a half a billion-dollar project. We’re building the new secure facility for one of our four-star commands. It’s full of cyber, it’s full of classified, it’s full of protected facilities. I met the Project Manager. I asked him: ‘What is the biggest project you’ve worked on?’ Not even \$50 million. We built four of these command centers, and he hadn’t visited any of them, because he wasn’t allowed. It was an expense that leaders were not willing to pay for.

That project was a real challenge for us. And it wasn’t the fault of the project manager. It’s just that the talent hadn’t been properly developed. That’s another example of why developing leaders and investing in their training is critical.”

7 | Have a robust plan for staffing transitions.

Talent management is built on high-quality knowledge management, Bostick says. That means capturing the knowledge that older and more experienced professionals have accumulated, and ensuring that it can easily be shared with those who are just climbing the organizational ranks:

“In addition to talent management, knowledge management is very important. That’s the explicit knowledge, and the tacit knowledge. Knowledge that you can write down (explicit), or knowledge that you ‘just know’ through experience (tacit).

So, when someone ‘just kind of knows what needs to be done,’ you need to capture it. For explicit knowledge, you can just write it down, but for tacit knowledge, one needs to be more creative in how to capture it. How? Perhaps put experienced leaders on videotape. Let them explain. These are the type of things that you just know, because you’ve been there before.”

The Army typically puts together a “transition book” when one person or organization is leaving an area and another is coming in. This book helps ensure that all of the most critical information is passed from one team or person to another.

“You should always be developing and documenting for the transition. Transition of ideas, transition of contacts, transition of important information, because we’re all going to walk out the door one day. Some are going to walk out the door on a scheduled time frame, and some changes will be on short notice. Having a transition book in constant development is very important for the individual and the organization.”

8 | Conduct meaningful “after-action reviews” (AARs), and learn from them.

In the late 80s, at the National Training Center in the deserts of California, the U.S. Army pioneered a practice called the “after-action” review. Bostick defines it as “an honest, open dialog about what happened, why did it happen, and how are we going to fix it so that it does not happen again.”

During an after-action review, you may find dozens of things that went wrong. Bostick said it’s important to focus on just a few areas to fix, and to vow not to make those same mistakes again. At the very least, write these three learnings in a binder -- “a kind of precursor to knowledge management,” he said -- and make sure all new members of the team read the binder.

The value of this kind of binder was brought home to him after a young sergeant was shot and killed during training exercises. A review revealed the on-site leaders had failed to read the manual - a process that would have taken just five minutes.

“We’re all going to go down to the soldier’s wife, and we’re going to tell

her we didn't have five minutes to do our job, as leaders, and we shot somebody in the back. Her husband is now dead. She's got a baby, and a baby on the way.

This is unacceptable. It took us five minutes to figure it out, after the fact. Had we done what we were supposed to do, this Soldier, husband and father would still be alive.

So, these AARs are real, they're serious business. Even in training, you can lose people. AARs need to be done all the time, even as engineers. We conduct After-Action Reviews. We sit, and nobody is going to get beat up because they made a mistake. You're trying to find out what happened, why it happened and how we ensure that it does not happen again. Nobody should lose their job, because of it.

And then, you can't fix everything. You just focus on the top two or three things. We'll make a whole bunch of mistakes, but we're not re-making those several that we committed not to make again at the last AAR."

9 | Bring the contractors in early.

Get contractors involved as early as possible. Bostick implemented early contractor involvement to avoid situations in which projects are scoped and costed, then constrained by small congressional budgets. Teams need to go back to the drawing board if the "customer is asking for the Taj Mahal on a cottage budget".

"You have architects that are working on these designs. They throw them over the fence. The engineers plan and work them, and develop the budget. However, they get forced into some budget that Congress has authorized. And at times organizations do not go back and say, 'We can't afford the Taj Mahal, so let's completely redesign.'



LTG Bostick (left) with Olfa Hamdi (right)
 Many thanks to LTG (Retired) Bostick for his continuous support.

"There are limits to what you can do with a contractor, before you bring him completely onboard. But you need some of their insights early in the process. You need some of that involvement, and education for your team. And then, as soon as you have them on board, they must participate and be involved from the very beginning, including in the design.

"The design-build started working better for us, compared to the design-bid-build, because in the latter, one couldn't involve the contractor team early on in the design process."

10 | Have changes approved at the highest levels.

Give projects a reasonable contingency, but ensure that major changes are sent right up to the top of the organization. Bostick said that high-level change management is the most powerful tool for managing scope creep and cost inflation:

"What I've learned about change is this: Take it to the highest authority. In the Army, change orders go to

the Assistant Secretary of the Army (Installations, Energy and Environment). I did not even make those decisions.. The Installation Commanders should not make those decisions.

I was able to show the Air Force that they had a challenge in this area -- they had a number of projects that had cost overruns -- and their change orders were quadruple that of the Army. I explained that we insist that change orders flow through the highest levels. This helps to minimize expensive change orders."

In the competitive project management field, organizations must focus on developing top talent.

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