ASSET OPERABILITY:
The Missing Link In Capital Project Performance

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Major capital projects present unique challenges for owners and investors. Growing size and complexity, combined with unforeseen environmental, cultural and economic factors, contribute to countless issues in project start-up every year. More broadly, these issues can accumulate to reduce the anticipated value of capital intensive assets. While project managers are so often dedicated to the mantra of on-time and on-budget delivery, it is asset operability over the long-term that serves as the missing link in measuring true, sustainable capital project performance.

Near Misses: Understanding The Human Element

According to industry expert Ed Merrow, 65 percent of all global mega-projects (over $1 billion) can be classified as failures. Even more sobering, this figure rises again for sectors such as oil and gas, where 70 percent of large-scale projects tend to fail. Tremendous time, effort and resources are expended every day in planning and delivering complex capital projects. Yet a key factor influencing their successful execution continues to be overlooked or undervalued, namely asset operability. Asset operability is an asset’s ability to perform a desired function to the capacity for which it was intended over its entire usable life. Any deviation from the expected output performance immediately reduces the net present value of the asset. Only 11 percent of companies surveyed by the Economist Intelligence Unit in October 2010 report delivering the expected return on investment (ROI) on major capital projects 90-100 percent of the time. The common basis for these failures is often poor, uninformed decision making, combined with what Tinsley, Dillon and Madsen characterize as, “ignoring the near misses.”

One can point to numerous cases of unheeded near misses, which eventually led to major project failures. From the Columbia Space Shuttle explosion over Texas and Louisiana in 2003, to the antenna troubles that emerged following the much-anticipated launch of the iPhone 4 in 2010; the results were very different, but root causes aligned. Most significant failures stem from the lack of an appropriate response to observable signals. As Tinsley, Dillon and Madsen go on to explain, “These seemingly innocuous events are often harbingers; if conditions shift slightly, or if luck does not intervene, a crisis erupts.”

Crucially, it is the “human element” that influences our interpretation of near misses and therefore represents an underlying danger. Standard operating procedures dictate how to handle conventional preparations or take remedial action in the event of an incident. Near misses, however, do not have easily measurable impacts and therefore frequently only register as potentially significant or catastrophic issues that were luckily avoided.

Problems relating to the responsibility of acting on near-misses often begin when the mandate handed down from senior management contains vague or contradictory language. That forces project leaders to determine major priorities and drivers independently. Given the nature of their position, they will inevitably focus on cost and schedule, while the objectives of business leaders will encompass the start-up, production and long-term operability of major assets.

The strategic disconnect that emerges is often one of the first in a series of near misses and incremental failures that compound to drive project risk to unmanageable levels. Project monitoring and evaluation tools and systems frequently ignore the effects of near misses, instead placing a strict focus on cost and schedule metrics. However, as previously highlighted, global data collected across all industries suggests the operability metrics of a given asset trump cost and
schedule from a value perspective. According to Independent Project Analysis, schedule – which is often prioritized as the most important driver in project execution – actually comes third on the list of business impact behind both operability and cost.

Jim Porter, former vice president of DuPont Engineering, once said, when referring to large capital investments, that “it’s not about projects, it’s about business!” His point was that while a project must be implemented carefully according to an established set of processes and guidelines, the true value of the asset in question will never be realized without excellence in operability. Ultimately, the only asset of value is one that operates as planned.

The Decision-Making Illusion

It is rare in today’s market for any capital project of scale to be completed without the significant use of contractors. Yet this reliance on an external workforce to complete large and complex tasks is not getting the attention it needs. Contractor management is one of the highest risk – and least understood – areas for any project. Figure 1 illustrates the impact on project success in the absence of an owner playing a lead contracting role. The marked difference in outcomes is a direct result of the inherent decision-making gap between owners and engineering procurement companies or project management companies. It is impossible for a contractor to possess the understanding and perspective necessary to make decisions consistently factoring in an owner’s long-term best interests. This is compounded by the contractor’s natural focus on short-term project execution, rather than the long-term operability of the asset. That difference in emphasis increases the risk of near misses, of which the owner may not even be aware.

Owners therefore face substantially greater risks and are likely to fail to spot the near-miss signals if they do not play an active role in the early phases of a project. They assume risks and responsibilities are transferred to contractors. This is only partially true. Even if a contractor is responsible for a specific failure, it is ultimately the owner who has to deal with the loss of asset value caused by schedule slippages, unforeseen costs, litigation and subsequent corrective action. It is far better to limit such damage by ensuring clarity of scope with contractors, and with the owner maintaining an informed decision-making role throughout a project’s lifecycle.

But the roots of project failure lie deeper still. If decision making is the most influential factor for success or failure, then individuals are at the center of project outcomes. All decisions stem from someone, somewhere.
This reality leaves major capital projects susceptible to common management missteps. Figure 2A is a graphical representation of what we refer to as ‘The Decision-Making Illusion.’ The model reflects the (perceived) steps leading to effective decision making. That is, capable and knowledgeable people enjoying access to necessary information, engaging in critical thinking to evaluate options and make timely decisions leading to positive action. The theory starts to break down, however, when one thinks about the enduring near misses and small failures of the real world. Indeed, the model usually looks a lot more like Figure 2B.

Steps 1 thru 3 are critical to enabling asset operability, but do not alone ensure success. The most difficult component for leadership is step 4, driving the effective decision making, accountability and actions of people. This burden is reduced by breaking step 4 into parts by small batching decisions and immediately addressing near misses.

Too often, decision making, accountability and action powers are exercised by – or transferred to – inappropriate parties. Or more problematically, no clear ownership exists at all. There are many reasons for this, including lack of access to information, unqualified personnel, poor basic data, and transparency and trust issues.
What Can We Do About It?
Given what is known about capital projects, how can we avoid getting caught in a situation where an asset is produced with a high likelihood of failure? DuPont's global consulting business, DuPont Sustainable Solutions (DSS), helps companies from many industries to address seven critical success factors: (1) front-end loading versus the business goal; (2) proactive management of environmental health and safety; (3) contracting strategy and contractor management; (4) staffing and managing teams for success; (5) technology confirmation; (6) integrated execution with “no changes”; and (7) minimizing non-value adding investment. The value is not in the “what to do” – it is in the “how” and “why” to do it. Daniel Grollo, CEO of Australian construction giant Grocon and a DSS client, has said, “Safety for us is not just an indicator of how we are performing from the perspective of not hurting people, but also of how the business is running. Our safest sites are safe because they are run efficiently.” The Grocon experience suggests a symbiotic relationship between success factors. Indeed, the safest projects often turn out to be the most successful.

The interdependence of project factors cannot be overstated. Having robust processes, procedures and systems in place is not enough. For an asset to be a success, the what, how and why need to be translated to fit the reality. The seven success factors outlined make this possible and highlight the areas requiring leadership attention to achieve sustainable asset operability. Focusing on project management in this way takes into account the innumerable factors that influence real-time decision making throughout major projects (for instance, labor, supply chains and government relations). Such an approach also includes methods to identify and act on near misses and small failures, and helps to drive home the message that catastrophic failures can be prevented by careful tracking and remedial action.

Small-Batch Decisions
But how can senior management adopt and instill these principles organization wide? The answer is through the “small-batching” of decisions and actions. “Doing things in smaller batches may require more labor, but it gives project teams tremendous flexibility,” said John Sun, managing director of the Shanghai-based operations of Albemarle, a global chemical company. Originally conceived as part of the Toyota Production System, the approach has significant merits when applied to capital projects, often providing the necessary counterbalance to a common cause of project failure – speed. Merrow has eloquently captured the dangers of tempo in execution: “because we’re trying to make these projects at breakneck speed, we end up breaking our necks!” By dividing timelines and deliverables into more manageable, self-contained modules, small-batching offers project teams the flexibility to deal with unexpected changes without ramping up cost and losing control of the ultimate goal: asset operability.

Using the small-batch approach in our ‘Readiness-to-Operate’ (RTO) preparation of an asset for initial operations is crucial to long-term operability. From our experience, we know this method ensures project decisions remain consistent with the end business goal.

In 2012, a DSS client with assets in the mid and upstream oil and gas sector, was constructing a multi-year, multi-billion USD extraction and upgrading facility. The facility, remotely located in a region known for its harsh climate, was experiencing significant schedule delays, safety concerns and cost overruns; mainly from contractor activities. DSS was hired to assess the owner’s and prime contractor’s project systems and processes, and to provide recommendations that could get the project back on track. The location dynamics, combined with a suboptimal decision making and near miss process, were determined to have been a root cause of much of the organization’s troubles. DSS helped the owner immediately identify and implement more rigorous permitting, incident investigation and leadership governance procedures to help stop inefficient decision making processes at all levels. These modifications led to project execution processes that better fit the day-to-day realities faced by both the owner and the contractors. As a result of the recommendations, and hands-on implementation support with all parties, DSS helped the project experience measurable improvements in overall schedule, efficiency, and safety performance, while keeping budgets under control.
Conclusion

In essence, DuPont has managed to better the generally high failure rate of large capital projects by addressing near misses and by small-batching decisions. Today, they form part of well-vetted, integrated systems. These systems are based on our unique owner-operator perspective gained from running manufacturing facilities for products as diverse as industrial petrochemicals, protective materials, fibers and plastics. This transparent and inclusive mode of execution allows decision makers to tackle concerns immediately, often in response to near misses, and empowers project teams to address issues in an effective and timely manner.

The DuPont capital projects management system, the real-world basis for the capital project consulting methodology DSS uses, looks beyond simple measures of on-time and on-budget delivery and focuses on the critical issue of creating an asset that will sustainably meet or exceed operability objectives throughout its full asset lifecycle.

As partner to management teams that own and invest in complex capital projects, DuPont Sustainable Solutions uses the 211 years of DuPont experience as an owner-operator across a wide range of industries and its unique strategies to reduce the high failure rates of large projects. With proven methodologies and best practices, DSS can help companies mitigate risks and improve performance with a practical, hands-on approach to implementation across the asset lifecycle.

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For more information, visit our website at: www.sustainablesolutions.dupont.co.uk

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