

Reimagine Your Project Controls Journey through Al

"Too often in our industry, AI is viewed as too complex, too abstract, or only suitable for data scientists," says Lance Stephenson, AECOM's Director of Operations. "That perception is a flawed narrative, one that restrains our profession from realizing AI's true potential. The reality is that AI can transform the data we already collect into actionable insights, accelerate decision-making, and help prevent risks before they become costly problems. We need to reimagine AI not as a threat, but as today's best value-add for project delivery. The opportunity is already here; the only question is whether we are ready to seize it."

Read more of Lance's insights below:

1. Can you tell me a bit about yourself? How did you get into advanced data analytics and AI?

My journey into capital project delivery began over 40 years ago when I apprenticed as a pipefitter for a construction company. I enjoyed the work immensely, but I wanted to do more. That desire led me back to school, first to earn a diploma in Mechanical Engineering Technology, and later a bachelor's degree in management studies. These experiences propelled me into cost engineering, project controls, project management, and eventually operations and leadership.

My approach to advanced analytics, and particularly AI, was neither planned nor structured. It began more than seven years ago, but I still remember the conversation I had with a colleague one evening at a conference in Houston. That exchange became a defining moment. The possibilities of this emerging technology

were not abstract concepts; they were a vision of the future taking shape before my eyes. The idea resonated with me, fueling both conviction and excitement. It was clear to me then, just as it is now, that AI would not simply be another tool, but a catalyst for change throughout our profession and beyond.

Since then, I have immersed myself in learning everything I could about Al. I attended seminars, bootcamps, and workshops, some of which were excellent, while others were less so. I partnered with organizations and subject matter experts, eager to learn from their perspectives. What I've come to realize is that you are constantly drinking from a fire hose. Al moves at lightning speed. It comes at you fast. What you master today may feel outdated in just six months, yes... six months!

Fortunately, my background provided me with a solid foundation. Skills in estimating, scheduling, cost control, risk management,



and benchmarking prepared me to explore predictive analytics, machine learning, and even Python. My goal was never to become a data scientist but to enhance my expertise and broaden my impact. For a while, the path felt steady and clear until generative Al entered the conversation. Quite literally, ChatGPT and the rise of large language models elevated Al to an entirely new level.

The good news is that along the way, I have gained more than just technical knowledge. AI has provided me with new ways to see the data. Numbers are no longer just figures on a page; they tell stories, reveal hidden patterns, and unlock decisions when interpreted with greater clarity and purpose.

Yet this journey has also shown me that progress does not come without challenges. From my perspective, four issues continue to echo throughout this renaissance. First, **fear of the unknown!** Many professionals hesitate to adopt AI because it feels abstract, risky, or overwhelming. Second, **skills and literacy gaps**. Without a grounding in mathematics, statistics, and data, the potential of AI cannot be fully realized. Third, **data barriers**, such as siloed or incomplete data, undermine even the most advanced models. And fourth, **cultural resistance**, because change is as much about people as it is about technology.

What started as a spark has grown into a transformation and a call to action. I hope that my journey and this conversation resonate with you and perhaps ignite a spark within you as well.

2. How would you describe the current maturity of Al adoption in project controls today?

From my perspective and the issues I currently see, the maturity of AI adoption in project controls could best be described as exploratory. While sectors such as finance, healthcare, and logistics have integrated AI into their core processes, project controls remain anchored in more traditional methods. Most professionals still rely on deterministic models, historical benchmarks, and spreadsheet-based tools. Forecasts are often driven by judgment, not dynamic models. To some extent, this exploratory phase isn't due to a lack of interest, but rather a lack of exposure, training, and access to tools specifically designed for capital projects.

Unlike manufacturing or finance, capital projects are inherently complex and highly variable. They encompass multiple data sources, changing scopes, complex stakeholder environments, and human decision-making, which makes standardization and automation difficult. Additionally, many project teams work in silos, making data integration across cost, schedule, risk, and earned value challenging. This lack of cohesion poses a challenge for AI, which relies on clean, connected, and consistent datasets. AI thrives on integrated and connected datasets; without that, it's hard to train models or apply standard AI workflows without significant customization.

That said, we're beginning to see real use cases emerge across the capital project lifecycle that are moving us beyond the exploratory phase. Organizations are reimagining their approaches by enhancing project delivery using advanced analytics and AI. For example:

- In the estimating phase, some firms use natural language processing to extract quantities and scope descriptions from engineering drawings and specs, automating parts of the takeoff process.
- During execution, machine learning models are trained to predict cost at completion by analyzing past trends in change orders, productivity reports, and invoice flows.
- In risk management, some organizations are using unsupervised learning, like clustering, to segment projects based on their historical performance and exposure profiles, resulting in more customized contingency planning.
- One major infrastructure agency recently piloted an Al model that analyzes schedule delays, scope creep indicators, and productivity data to provide a weekly project forecast, enabling earlier intervention instead of relying on end-ofmonth reports.

We are clearly at a pivotal moment in project delivery. The methodologies and tools are getting there. The data exists, though it may need cleaning and unifying. What's missing is a structured approach: education, proof-of-concept projects, and leadership support. That's why this bootcamp is so essential. It's not about selling hype, it's about bridging the gap between today's manual practices and tomorrow's intelligent workflows. By demystifying Al and giving people hands-on experience, we aim to transform interest into capability.

3. What are the biggest misconceptions you've seen about applying AI in project controls?

One of the biggest misconceptions is that AI is too complex or only for PhDs. When people hear terms like neural networks or machine learning, they assume it's inaccessible. In reality, many of the most useful applications, like regression analysis, clustering, and decision trees, are well within reach using tools like Excel, Power BI, and Python. You don't need to become a data scientist to benefit from AI; you just need to understand how to ask better questions of your data.

Another misconception is that AI will replace cost engineers. That idea causes fear and resistance. But the truth is that AI is a force multiplier when applied correctly and used responsibly. It doesn't replace experience; it enhances it. For instance, a model might flag a particular combination of tasks that causes a schedule delay or a specific craft inefficiency that typically precedes a cost overrun. While AI can analyze complex relationships within the dataset and highlight which predictors most influence the target variable, the project controls specialist is still needed to interpret, validate, and act on that insight. It simply reduces the time spent chasing data and increases the time spent making decisions.

A third misconception is that AI must be implemented all at once. Many teams believe it's an enterprise-wide transformation or nothing. But in reality, you can start with a single use case, maybe automating contingency calculation or anomaly detection in



timesheets. These small wins build momentum and generate trust in the process.

These misconceptions often hinder progress. But once they are removed, the path forward becomes clear. Al is not an inaccessible science reserved for experts, nor is it a threat to the role of the cost engineer, nor does it demand sweeping transformation from day one. Instead, it is a practical, incremental toolset that amplifies our capabilities and strengthens our decisions. With that mindset, here's how I believe organizations can start putting Al to work right now.

- Educate stakeholders across all levels leaders don't need to know the code, but they should understand what Al can and can not do. Likewise, practitioners should feel empowered rather than threatened by Al's role in enhancing their work.
- Treat AI as a capability, not just a product AI isn't something you simply install. It's a skillset and mindset you develop. Frame it as an enhancement to existing workflows, not a replacement for them.
- Prioritize data readiness poor data kills good AI. Invest time in standardizing and cleaning your existing cost, schedule, change management, and risk data. Even simple improvements in data structure can greatly enhance AI performance.
- Start small and focused choose one high-impact use case, like early cost overrun prediction or change order classification. Develop a proof of concept, validate the results, and then scale up from there.
- 5. **Celebrate early wins** share success stories, no matter how small, to build momentum. If anomaly detection in timesheet entries saved two weeks of manual work, that's a win worth promoting.

By reframing AI as a practical, incremental journey, rather than an all-or-nothing leap, we can demystify the process, reduce resistance, and deliver real value.

4. Which areas of project controls are seeing the most immediate impact from AI?

Al is already beginning to reshape key areas of project controls, especially where there's enough historical data and repetitive patterns to learn from. Historical data and benchmarks have long been foundational to project controls, and for good reason, as they offer stability and a sense of reference. However, these benchmarks assume that tomorrow looks like yesterday. Al offers a way to evolve those benchmarks in real-time, adjusting for global supply chains, inflation, shifting labor markets, and even geopolitical disruption. What this means for the project controls specialist is added depth and greater insight. Al doesn't invalidate historical knowledge; it enhances it. It allows us to account for complexity that traditional benchmarks often overlook. In many ways, it enables a shift from "best guess" to "data-backed forecast."

With this said, forecasting remains the most accessible and impactful starting point. Organizations are using machine

learning models to predict the estimate at completion, anticipate schedule overruns, and detect margin erosion well before traditional indicators show problems. These models ingest variables like the volume of change orders, procurement lead times, earned value trends, or labor inefficiency and convert them into high-confidence projections. For example, a global EPC firm developed a cost forecasting model using historical data from over 4000 projects. It was discovered that when productivity dropped below 0.85 for more than two reporting periods and the change order values exceeded 10% of the baseline, the probability of exceeding the EAC increased to 87%. The model flagged those conditions in near real-time, providing project teams with a 6-week head start to implement corrective actions.

Risk management is another area experiencing rapid change. Traditionally, risk identification and scoring are performed in facilitated workshops using expert judgment and qualitative scales (e.g., high/medium/low). Al can now analyze project characteristics, environmental conditions, contract structures, and early performance signals to create dynamic, data-driven risk profiles. This enables teams to anticipate emerging risks based on how similar past projects behaved, not just what's been manually entered into a risk register. Organizations can now deploy Al models that continuously adjust risk exposure based on updated schedule slippage, design change frequency, and field productivity. These models can generate weekly "risk heat indices" and offer automated recommendations for mitigation and contingency allocation. This can shift the team's risk posture from reactive to proactive.

Beyond forecasting and risk, Al is now being applied in areas often overlooked:

- Claims and dispute analysis: Al tools can scan thousands of documents, RFIs, and schedules to identify patterns, delays, and entitlement triggers, cutting down legal review time dramatically.
- Change order analysis: NLP models are being trained to classify change orders by root cause, which helps with trend identification and prevention strategies.
- Workforce optimization: Clustering models can evaluate subcontractor or crew performance across various work areas, identify outliers, and recommend improved resourcing strategies.

I recently completed a study using clustering techniques to compare labor crew performance across multiple high-rise projects. The study found that crews working under supervisors with more than three concurrent work areas experienced lower productivity and more safety incidents. Based on these findings, supervision was realigned to improve field outcomes.

5. You also indicated that Generative AI is elevating the field of project controls as well. How will this impact this domain?

While some argue that using AI for predictive capabilities with structured quantitative data already improves project outcomes, GenAI takes this a step further. In parallel, companies are experimenting with GenAI and LLMs to reduce the time spent on



repetitive documentation, insight generation, and stakeholder communication. These tools don't replace data models; they add language intelligence on top of both structured and unstructured data sources.

Companies are now adopting GenAl to automate reporting, review contracts and legal terms, and draft claims narratives. With the emergence of agentic Al and Al agents, organizations can also automate cost reports and prepare delay justifications by summarizing data from progress reports, change logs, and field notes. These tools have significantly reduced the time and effort required for monthly reporting while providing initial documentation for review, saving project teams days of manual work each month.

These applications demonstrate that GenAl is more than just for chatbots; it's becoming a significant productivity boost in project settings. It allows project professionals to:

- Quickly analyze large amounts of data and documentation.
- Translate project controls output into a language that stakeholders can easily understand.
- Support decision-making without needing extensive technical interaction.

What's important is that these use cases aren't just hypothetical; they are being put into practice today. They don't require a full Al transformation. Many are being tested through small pilot projects that use off-the-shelf tools and data the organization already has. It begins with a solid business question, a clean dataset, and a willingness to learn.

From traditional forecasting to advanced NLP and GenAl applications, the project controls field is rapidly expanding its Al footprint. The key is not to apply Al everywhere, but to target the areas where data quality, business value, and user readiness align. That's where immediate returns are possible, and sustainable progress begins.

6. What skills do cost professionals need to stay relevant in this emerging landscape?

This is the million-dollar question, and I don't think anyone has the answer because the future remains uncertain. Right now, it seems that the possibilities are endless. While AI is reshaping how all industries operate, the success of project controls will depend on organizations and individuals being able to bridge domain knowledge with analytical reasoning. That means knowing how to apply your expertise in estimating, budgeting, scheduling, risk management, earned value, claim management, and so on while understanding enough about how AI works to use it confidently and critically.

Al can detect patterns, but it cannot replace the understanding of project delivery and contract structures, constructability constraints, or the political context surrounding stakeholder engagement and management. What's needed is a shift in

mindset: instead of fearing the machine, professionals should be asking, "How can I use AI to enhance my judgment?"

But here's the catch: even without diving into machine learning code, math skills like linear algebra, statistics, and probability still matter a lot. Many professionals today are not even applying basic tools like linear regression or correlation analysis. These are core methods in predictive analytics and are the building blocks of machine learning. If you don't understand how a model draws a line through a cloud of data points, it's harder to trust what it tells you when predicting cost or schedule performance.

The key message is that we should apply augmented intelligence, not artificial replacement. Al should not eliminate the need for human thinking; it should elevate the standard of analytical intelligence. Project controls specialists and project professionals who understand the fundamentals of math and probability won't just use models; they'll scrutinize them, interpret them, and apply them with context. And when AI fails, as it sometimes will, those individuals will recognize why and how to fix it. We simply cannot leave the responsibility to AI to ensure success; humans must also up their game. In other words, we don't need more coders in project controls; we need more critical thinkers with quantitative literacy and deep domain knowledge. Success will come from individuals who understand cost behavior, ask tough questions of the data, and communicate predictions and outcomes with clarity. That's the sweet spot where AI truly becomes transformative in project controls.

7. We often talk about AI improving outcomes and productivity, but what about trust and explainability in those predictions?

This is a great question. I think we can break it down into two discrete levels of trust. One involves the relationship between the buyer and seller of AI, while the other pertains to the internal process of enabling data to become predictors.

With executives experiencing Al fatigue, fear of missing out, and over 10,000 tools entering the market, it's difficult to distinguish real capability from marketing hype. Too often, companies claim to "use AI" by simply adding a CoPilot feature, or vendors offer black-box solutions with little transparency. Unfortunately, there is really no reliable way to accurately gauge the competence, capability, and capacity of a firm or vendor that claims to understand and apply AI. This reminds me of a colleague I once worked with who proudly said he was a programmer. I was eager to leverage his expertise, only to find out that his "programming" experience was limited to writing basic Excel formulas, not even VBA, macros, or functions, just basic addition and subtraction between cells. The same pattern plays out in AI today: many are selling the label, but not necessarily the competency, capability, or capacity to deliver it. Without clarity about what the tool actually does, organizations end up buying into a promise rather than a proven capability.

Companies are not simply purchasing a cost management system with customized security rights, workflows, formulas, and



reports tailored for their organization; rather, they are investing in the idea that these AI products will be game changers that could give them a competitive advantage.

The second level of trust is within the organization itself. How do we apply AI to our own datasets for actionable insights? In project controls, decisions can shift millions of dollars. Predictions, no matter how accurate, won't be trusted unless they're explainable. If a model indicates an 85% chance of a cost overrun, I need to determine whether this risk is due to excessive change orders, subcontractor inefficiencies, or overly aggressive timelines. Without that context, the number is meaningless.

Explainability is also crucial. In regulated industries or publicly funded projects, decisions must be auditable and defensible. That means we can't just optimize for performance; we also need to optimize for trust. Transparent models, reproducible workflows, and human-in-the-loop processes ensure that Al functions as an aid to judgment rather than a replacement. With this in mind, here's how I believe organizations can prioritize trust and explainability effectively.

- Transparency by Design require vendors and internal teams to disclose how the model functions, what data it uses, and its limitations. Organizations should prefer models and tools that provide explainability features rather than black box solutions.
- Human-in-the-Loop Oversight ensure cost engineers, project managers, or analysts are actively involved in reviewing outputs before making any decisions. Al should assist judgment, not substitute it.
- 3. **Data Governance and Quality Standards** Develop processes to guarantee the accuracy, completeness, and traceability of data feeding the models. Transparent data pipelines foster confidence in the predictions.
- Auditability and Reproducibility Require that models and outputs are well documented, repeatable, and auditable. This promotes accountability and strengthens the defensibility of decisions.
- Ethical and Responsible Al Guidelines Develop policies for reducing bias, protecting privacy, and ensuring fairness in data use. Demonstrate to stakeholders that Al is both powerful and responsible.

At the end of the day, transparency fosters explainability, which builds credibility. Credibility leads to trust, and without trust, AI will never move beyond hype into genuine adoption. That's why my recommendations emphasize that explainability isn't optional; it's essential.

8. What does the future of a project controls team look like when AI is fully embedded in their daily workflow?

Imagine a future where your forecasting dashboard not only updates automatically each night with real-time project data but also generates a narrative that explains trends in plain language. Risks are flagged dynamically, not just during monthly reviews, and the system drafts a preliminary risk report for the team to validate and refine. Schedule variance isn't just highlighted; it's

explained through root-cause analysis, complete with recommended mitigation strategies drawn from lessons learned across past projects.

GenAI adds a new dimension. Beyond predictive analytics and machine learning models built on structured, quantitative datasets, GenAI unlocks fresh possibilities with unstructured information. It can analyze contracts, extract insights from progress reports, or draft claims narratives and SOPs. It can even summarize stakeholder communications or lessons learned using natural language processing. When you combine GenAI's language capabilities with traditional AI's focus on numbers, you create a powerful synergy that reshapes how cost engineers deliver value. Compare this to the traditional approach, where disconnected systems with mismatched data are patched together at the last minute to meet reporting needs. AI replaces that with a seamless, integrated flow of insights.

In this world, the cost engineer becomes a strategic analyst. They spend less time collecting and formatting data and more time interpreting trends and advising leadership. They're no longer reactive; they're anticipatory. They guide mitigation plans, evaluate scenarios, and optimize resource allocation. The use of AI will reshape how cost engineers are deployed. Team structures will also change. We'll see closer integration between project controls, IT, and data science. There will be more hybrid roles, people who understand cost data and algorithms. And leadership will need to support ongoing learning and cross-disciplinary collaboration. This isn't just a tech upgrade; it's a cultural one.

Looking further ahead, the horizon will expand beyond today's narrow AI. If Artificial General Intelligence ever moves from theory to reality, it could offer human-level cognitive abilities: learning, reasoning, and problem-solving across various domains with the flexibility of humans rather than the limited focus of machines. While that remains speculative, it highlights the path we are on. One thing is certain: AI will transform project controls not by replacing professionals but by enhancing their expertise, speeding up their decisions, and unlocking new levels of strategic influence.

9. You have given a lot to think about and consider. If someone wants to take the first step today, beyond just learning, what would you recommend they do?"

My suggestion is to begin with a real-world problem you care about. For me, I started by analyzing profit loss. For you, it might be forecasting the final cost, assessing vendor performance, or visualizing risk exposure. Gather the relevant data from your systems, even if it's messy, and explore it using Excel or Power BI. Try to create a simple model or dashboard that provides new insights. Don't worry about perfection; focus on learning.

Next, bring in a colleague into the process. Share your findings, ask for their feedback, and invite them to help improve it. Collaboration accelerates learning, builds credibility within your organization, and demonstrates what's possible when AI or advanced analytics are used in practice.



Third, document what you've done. Even if it's just a one-page write-up or a screenshot with a few notes, recording your process helps you improve your thinking and provides others with a tangible starting point to build on. It also establishes a baseline for tracking progress over time. In my own experience, I wrote technical articles to capture what I was learning and to document my growth.

Fourth, connect your small experiment to a larger business outcome. Don't just show that you can create a new dashboard; demonstrate how it reduces reporting time, flags risks earlier, or helps make better vendor decisions. Linking analytics to real impact turns curiosity into credibility.

Finally, I recommend that you make a personal commitment to continuous learning. Sign up for a bootcamp, follow a data science or AI channel, or set aside 30 minutes to an hour each week to explore a new tool or method. The crucial point is consistency. AI isn't a one-time change; it's a professional journey. And you don't need to wait for budget approval or an executive mandate to get started. All you really need is curiosity, persistence, and the courage to take that first step.

And here's the best part: once you do it once, momentum starts to build. Small wins add up, confidence increases, and soon you're not just learning about AI, you're influencing how it changes the way your team and organization function. Remember my earlier comparison of my journey to drinking from a fire hose? Through education and hands-on experience, I've figured out how to throttle the flow of that hose, taking in knowledge at a pace that aligns with my goals. That's the journey I encourage everyone to start today.

10. You're leading a bootcamp on AI in project controls. What mindset shift are you hoping attendees will walk away with?

The most important shift I want attendees to make is moving from a reporting mindset to a predictive mindset. Many professionals in project controls are caught in the cycle of historical reporting, updating monthly dashboards, and validating past performance. That's important, but it's not enough. Al allows us to shift to a "what's next?" way of thinking. What early signals are we seeing? What might go wrong two months from now? That's the strategic layer we need.

Another mindset shift is to see themselves as builders, not just consumers. Many project controls specialists view data science as something done by others. I want to change that. You can create a simple model. You can develop an early warning system. And with that empowerment, you gain influence. Once you learn how to build, you can lead transformation.

Lastly, I want them to embrace experimentation. AI is not perfect. Models will fail. Predictions will be off. But every time you test an idea, you learn more about your data and your systems. That culture of curiosity will be what sets high-performing teams apart in the future.

10. Do you have any final thoughts?

As we wrap up, I want to leave a clear message: adopting AI in project controls isn't just about technology, it's about capability and culture. There are three critical actions we need to take.

First and foremost, **data literacy** is essential. Every professional must understand how data is structured, how to interpret it, and how to recognize when it's misleading or incomplete. You don't need to write code, but you do need to understand concepts like correlation versus causation, normalization, and what makes a good input for a model. Without this knowledge, no tool will provide reliable insights.

Second is tool fluency. Cost professionals should be comfortable using Power BI, Excel's Analysis ToolPak, and even beginner-friendly Python. These aren't just specialist tools anymore; they're the new language of our profession. Familiarity enables project controls specialists not only to contribute to AI initiatives but also to lead them.

Third is **strategic thinking**. As I mentioned before, AI should not replace human judgment but enhance it. The professionals who will succeed are those who can frame meaningful business questions, translate domain expertise into model features, and communicate outputs in a way that drives action. Think of AI as a partner. The future cost engineer is the one who knows how to lead that partnership.

For organizations, this involves investing in training, fostering experimentation, and establishing governance frameworks that prioritize trust and transparency. It also entails creating opportunities for cross-disciplinary collaboration among project controls, IT, and data science teams. Additionally, it means rewarding curiosity rather than just enforcing compliance.

If we do this, the reward is remarkable. We will get quicker and better decisions, smarter use of resources, and a profession that is not just prepared for the future but shaping it. The sooner we accept that change, the sooner we unlock the true potential of our teams, projects, and organizations.

In closing, I'd like to thank **Project Controls Expo** for the opportunity to share my thoughts in this interview and, more importantly, to lead the upcoming "Roadmap to Mastering Al in Total Cost Management" bootcamp. It's a privilege to contribute to the conversation on how Al can transform project controls. I'm excited to engage with participants, explore practical applications, and help reimagine the way we deliver projects in this new era. I hope to see everyone at one of the conferences offered by PCE!

Lance Stephenson is a Senior Management Consultant with over 40 years of professional experience, providing his clients with expertise in the areas of operational, portfolio, program, and project excellence in the asset and project lifecycle domain. Lance is a dynamic, articulate, analytical, and results-oriented individual who enjoys a good challenge. Lance is a self-motivated and resourceful senior leader with a proven ability to develop and



strengthen teams in order to maximize effectiveness and efficiency while providing proven results in the areas of corporate strategy, governance, portfolio, program, and project technology, methodology, and delivery.

Lance's data analytics journey began when he entered the profession, where he has continually honed his skills and knowledge in statistical and probabilistic analysis, causal and system dynamic evaluations, and advanced techniques. Lance has completed numerous benchmarking studies, audits, and maturity assessments over the course of his career, leading to an advanced understanding of project delivery attributes. The basis for this experience was enhanced by complementing existing practices with advanced data analytics and artificial intelligence methodologies and techniques. Over the last seven years, Lance has embarked on an intense and exhaustive journey in this new renaissance of Al.

Lance is currently the Director of Operations for AECOM, where he provides corporate oversight in capital and operational strategy and delivery.

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