



EXPERTS TALK

Project Controls and Data-Informed Decisions with **Miloš Vasiljević**



How Automation, Visualization and Information Systems are Transforming the Management of Large Transportation Programs

Transportation infrastructure owners seek a comprehensive understanding of their projects' progress, potential future developments and strategies to maintain the projects on the right path. Project controls provide answers to these critical questions. With modern real-time data gathering, analysis and visualization technologies, project stakeholders can access unprecedented insights into project status while proactively mitigating risks before they materialize.

Principal Program Manager **Miloš Vasiljević** possesses extensive hands-on experience in applying project controls tools to major transportation programs. As a program manager for the \$1.7 billion Loop 202 South Mountain Freeway in Phoenix, Arizona, he leveraged project controls to enhance decision-making through real-time, data-driven information. Vasiljević continues to emphasize improved decision-making and project awareness on the \$2 billion Carolina Crossroads program in South Carolina, where he leads HDR's program management services. In this interview, he elaborates on how project controls tools have evolved in recent years, their role in enabling owners to be more proactive on their projects, and the exciting technologies to anticipate in the near future.

Q. How does HDR define project controls?

- A. Project controls vary slightly across organizations, but fundamentally, they encompass data management and analytical tools designed to monitor, predict and influence a project's schedule, quality and costs. At HDR, project controls span a range of services from early planning to post-construction, typically falling into six categories:
- Scheduling
 - Cost estimating
 - Cost management/engineering
 - Document control
 - Claims support
 - Project management information systems (PMIS)

We have observed that PMIS has become particularly valuable for infrastructure owners in recent years. PMIS involves a suite of software applications, collaborative cloud-based solutions and established processes that gather, document and report project information, streamlining project management tasks and enabling collaboration, sharing and reporting across stakeholders.

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Q. In what ways has project controls technology advanced recently?

A. Among the numerous advancements, two notable areas include automation and dashboard analytics. Automation has significantly improved data collection and information provision processes, allowing for real-time data aggregation, analysis and presentation from multiple sources. Consequently, project control teams can dedicate more time to extracting insights from the data and its implications for the project.

Dashboard analytics have revolutionized data utilization by displaying the most relevant information for specific audiences in an easily digestible format. Interactive reports, updated in real-time and accessible across devices, provide invaluable tools for maintaining project alignment and monitoring progress. An example of this is the **Bridge Formula Program in Utah**, where dashboards track various aspects, including schedule, cost, communications and scope, across all delivery phases, fostering a unified vision among all stakeholders and project team members.

Q. How do advanced project controls enable infrastructure owners to proactively plan and make informed decisions?

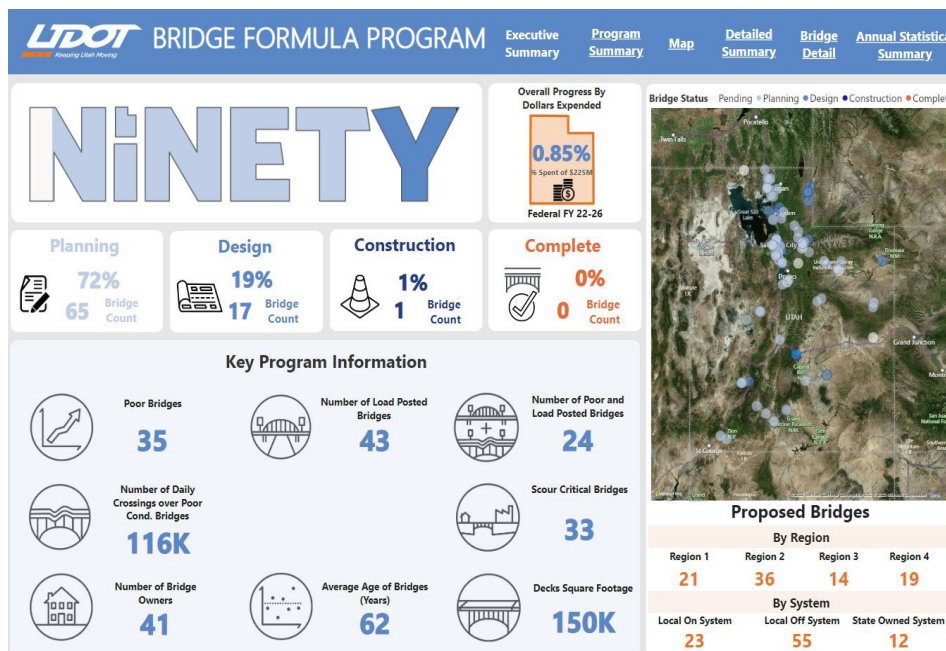
A. Many infrastructure owners possess a wealth of data but often struggle to extract actionable information from it. This is where advanced project controls, with their enhanced automation and analytical capabilities, come into play. Our expert analysts can process and forecast crucial project elements such as budget, schedule

and more, providing owners with valuable insights into upcoming project developments and data-driven recommendations for influencing project outcomes.

The evolution of project controls and the new tools being used have allowed analysts to pivot and shift the focus from mostly recording past events to actively analyzing data to predict and influence a project's future trajectory. Cost estimating serves as a prime example of this shift. The increased speed of data collection and analysis enables us to improve cost certainty by closely monitoring project expenses, evaluating the accuracy of past estimates, comprehending the current construction status, and assessing remaining work.

By combining our in-depth understanding of the project with real-time and forecasted data on material and labor costs, we can provide infrastructure owners with a comprehensive outlook on upcoming expenses. This enhanced understanding allows us to offer strategic advice on mitigating unexpected cost increases or capitalizing on unforeseen opportunities.

For instance, if it becomes evident that the price of a specific material will significantly increase within the next year, owners can explore alternative materials or adjust construction sequencing to complete sections earlier, before costs rise. At the very least, we can inform owners about major cost fluctuations, enabling them to make informed decisions even if they choose not to alter design or schedule.



The dashboard created for the Bridge Formula Program in Utah track schedule, cost, communications, scope and more.

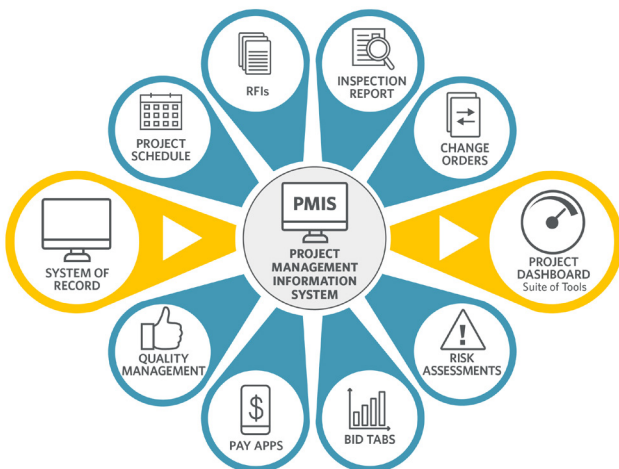
In essence, advanced project controls empower infrastructure owners to proactively plan and make data-driven decisions, leading to more efficient, cost-effective and successful projects.

Q. How can owners get the most out of project controls? What information should they be tracking and how should they set up their program?

A. With so much data available today and so many ways to organize it, it's critical that we focus our efforts where they make the most impact. We start by talking to the client at the beginning of project to establish the key information needed. One of the best ways to identify the most important metrics is through a formal cost and risk assessment process.

Defining the major risks of a project and the mitigation measures that will be used lets us understand where to focus our attention. We want to be monitoring and controlling the risks that are high probability, high occurrence and high impact, whether that's utility relocations, right of way acquisition, public sentiment or others. At the same time, we should not spend the same amount of effort on low-risk items. Every project is different, and therefore every project controls system should be different.

As a project progresses, risks also shift. The risks we track and mitigate at the beginning of a project aren't the same as the ones in the middle or near completion. And so these risk assessments should be repeated. On the Carolina Crossroads project I'm currently working on, we do quarterly risk updates, and then larger full-scale risk assessments once a year, to help us understand if we're still focusing on the most important parts of the project. And our project controls system and dashboards adjust accordingly.



Q. In what innovative ways are project controls integrating with other services?

A. Recent advancements have facilitated collaboration between project controls and other services that may not have been traditionally linked. One such example is strategic communications. On a major program I recently worked on, public sentiment was identified as a key risk. To address this, we collaborated with our public outreach team to consolidate community data, public comments and official communications into a single, comprehensive dashboard. This provided a snapshot of the community's perspective on the project, including prevalent keywords, reactions to specific news and overall sentiment. Armed with this information, we could fine-tune our communication strategies or even modify construction plans to better align with the community's needs.

Today, we're taking it a step further by developing industry-specific language models that enable us to automatically classify public comments with greater precision and extract major themes for in-depth analysis. I'm genuinely excited about the potential to enhance our understanding of community discussions surrounding projects.

Similarly, we're increasingly collaborating with community analytics and GIS experts to integrate detailed demographic information and local mapping. This integration empowers us to offer new insights on projects and their impacts on specific population groups. For instance, we can determine if a particular construction sequence will disrupt students walking to school and make

necessary adjustments, like waiting until summer.

Mapping and GIS tools have also significantly improved right-of-way tracking and utilities tracking. Instead of deciphering spreadsheets filled with addresses, we can now access color-coded, interactive maps that display all relevant data for a parcel, including construction sequencing or other pertinent information. This enhancement greatly aids our ability to communicate work progress and identify potential issues by visualizing data overlaps.

Q. What are some exciting developments in project controls that will add even more value for owners?

A. Future developments in project controls include the continued integration of project controls and digital delivery, as well as improved surveying technology that captures data automatically, whether from drones

or stationary cameras. As these technologies mature, we anticipate increased automation and more robust data insights to track projects and their progress more effectively. Advancements in digital twins, Building Information Modeling (BIM), and the Internet of Things (IoT) are further advancing our ability to monitor and control project cost and schedule performance, providing added value and certainty for owners.

Another development is the role of project controls in enabling innovative delivery methods, such as progressive design-build and integrated project delivery. Proper schedule management, cost estimating, and cost management are crucial to the success of these methods, making effective project controls essential. Improving collaboration on the mega-projects of the future will depend on integrating all parties' technologies and systems into a common data environment.



Inspiration & Advice

Q. What sparked your interest in project controls?

A. My career journey began as a bridge engineer at HDR, where I spent several years designing bridges. Over time, I noticed that many project challenges were less about technical aspects and more about schedule, cost or political factors. As I increasingly found myself addressing these issues, I realized that I genuinely enjoyed the problem-solving. I discovered that I had a knack for managing schedules and understanding project risks, which led me to focus more on program management and commercial management. Through my experience in various engineering fields and different project aspects, I recognized that the common thread that excited me was tackling a wide variety of complex problems. The bigger and more challenging the problem, the more I felt motivated and engaged in finding solutions. That's when I knew project controls and later program management were the right fit for my interests and skills.

Q. What advice would you give to those considering a career in project controls?

A. For those who want to gain a comprehensive understanding of project dynamics and the factors that contribute to their success or failure, project controls are an excellent choice. When I first delved into project controls, my mentor emphasized that they are crucial for anyone aspiring to lead a program. A solid foundation in project controls offers invaluable insights into cost, schedule and risk management, as well as how these elements intertwine. This knowledge will greatly benefit you in the long run, setting you up to become an effective program manager with a deep understanding of project operations.

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