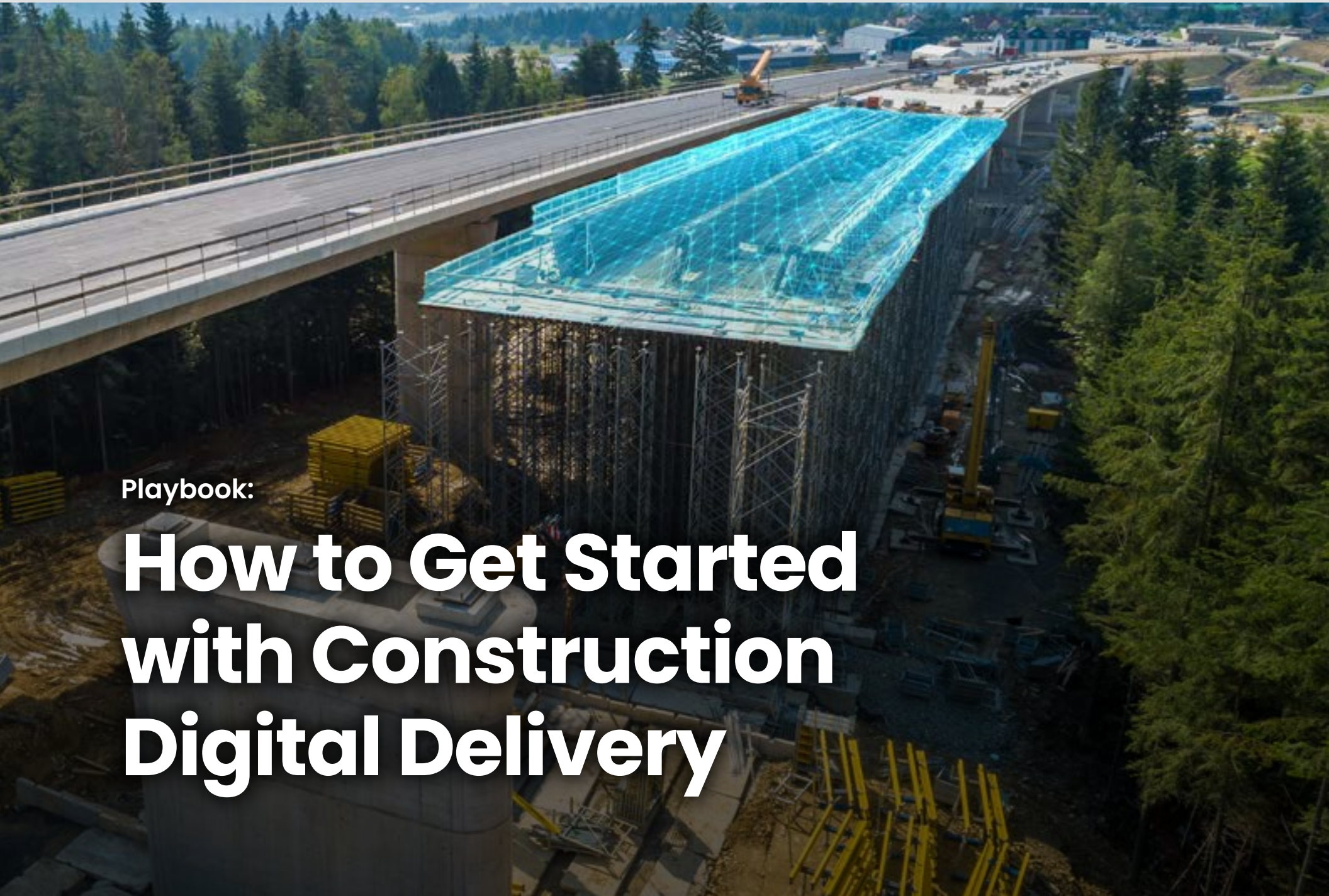


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SYNCHRO™ Will Meet You Where You Are

Construction Digital Delivery Overview

The roads and highways sector is at a critical juncture. With the Infrastructure Investment and Jobs Act (IIJA), not only is there an influx of new infrastructure projects, but funding is also becoming available. However, to take advantage of this opportunity, DOTs must overcome an increasing number of challenges including inflation, rising material costs, and workforce shortages.

One way you can close this gap is by leveraging digital delivery workflows. For DOTs, this means using 3D models and the data contained in a digital twin for a paperless, streamlined process, enabling collaboration across the supply chain.

Digital delivery also means replacing 2D plans as the contractual deliverable for construction with an all-digital delivery

method that utilizes data-rich 3D/4D models and digital twin technology to improve project quality and cost certainty while expediting overall delivery.

Establishing digital delivery might sound great, right? But maybe a little overwhelming?

That is why we have created this digital delivery playbook.



Play 1

Transition from 2D Plan Sets to 3D Models for Construction

As construction teams adopt digital technology, 3D design models are becoming more valuable. Traditionally, design teams flatten their 3D design models to 2D PDFs for construction, losing much of the design intent. But with 3D models, design and construction teams can capture additional project data, providing a more comprehensive overview of the project, increasing the design intent and quality, and streamlining review processes.

For example, in design, components that are placed solely for the PDF plan, such as notes and dimensions, might not be needed in a 3D/4D model because they are already represented. With a data-driven model, design applications have capabilities to replace these traditional methods of conveying intent, standards, or instructions. For example,

Bentley's OpenRoads™ Designer uses Item Types that allow designers to place data on an element or component of the 2D/3D model. Placing data allows information, such as pay items, dimensions, and material specifications, to be viewed by field teams through the model's component properties. Within the 3D model, teams can take measurements for distance, location, and area. Additional capabilities for viewing cross sections, profiles, and station/offset can further reduce the need for static PDF sheets and facilitate teams' ability to interrogate the model at any location.

To begin the transition from 2D to 3D, start by analyzing the data needs of the end user. How does a project manager, supervisor, inspector, or contractor currently do their job? What are the most critical data needs? Generally,

most organizations can begin by looking at the pay items and the associated work. Contractors base most of their work on methods of measurement and payments. Providing this data set is a critical part of digital delivery workflows. Then, you can understand the processes needed to produce these data sets within the model, including adjustments to current design practices.

Benefits

3D design models will enhance collaboration between design and construction teams, ultimately improving the design quality and the ability to share design intent, enabling you to expedite your design or construction review processes by 30% or more.

Play 2

Provide Contractors with 3D Models for Preconstruction Planning

A key part of any project is preconstruction planning, including the development of schedules, construction sequencing, and cost estimates. By flattening 3D designs into 2D plan sets, preconstruction activities become difficult to execute with the level of accuracy needed to be successful.

When contractors have access to 3D design models, they can turn them into 4D construction models, enabling them to:



- ◆ **Generate hyper-accurate estimates and reduce project costs.** Utilizing 4D construction models for model-based quantity take-offs (QTO) will automatically estimate what labor and material is needed to construct the project.
- ◆ **Reduce risk and increase safety before construction even begins** by simulating construction projects in 3D/4D models. Project simulation allows DOTs and their partners to anticipate the impacts of construction on things such as the environment, traffic flows, and the local economy.
- ◆ **Optimize project plans, schedules, and resources** by splitting up road and bridge models into constructible components, depicting how they will be built.

For example, roads are often designed as miles-long model objects. However, contractors will build that road in multiple phases and steps.

- ◆ **Increase collaboration and mitigate risk** by sharing 3D/4D construction sequences with the field crew, enabling them to fully understand the project. These sequences enhance stakeholder visibility into project performance and allow teams to make improved, real-time decisions, keeping projects in control, on time and on budget.

Play 3

Electronic Data Capture and Automation in the Field

Digital delivery enables seamless construction workflows, including quality and safety inspections, as well as progress tracking. These workflows can be enhanced by leveraging 4D models as context for data access and capture. For example, the construction field crew can access and navigate the 4D model on a mobile device to ensure they are doing the correct work at the right time. They can also update the status of construction activities by selecting the asset, such as bridge piers, in the model and changing the status, or simply capturing issues in real time based on their location by using GPS. Seeing the location in the model on the job site ensures accurate information is captured. All of these capabilities add up to significant improvements in project delivery efficiencies, including a boost in quality, accelerated schedules, and reduced risk, cost, and rework.

Benefits

- ◆ Increase collaboration, quality, and project safety.
- ◆ Accelerate construction time by 20% or more.
- ◆ Provide 15% or more reduction in change orders 1 – a significant financial benefit.
- ◆ Improve risk mitigation with the ability to share model sequences in the field.



Play 4

Implement Digital Delivery on Your Projects

When it comes to implementing new technology and changing your workflows, there are different approaches. Some firms want to tackle everything all at once. Others are too overwhelmed to know where to even begin, so they do not. And then there's a few who take on just a little at a time.

We suggest the latter approach, so here are a few tips to get started.

- ◆ **Gain buy in from your leadership** by leveraging industry success stories, like this [Minnesota DOT \(MnDOT\) Highway 169 \(TH 169\) 2.8-mile roadway expansion project](#) to illustrate the value and ROI of digital delivery.
- ◆ **Partner with consultants** such as WSB, which offers their new [digital construction management solution and advisory service](#), built to help the civil sector overcome the challenges of adopting
- ◆ **Work with industry groups** such as your [local AGC](#), [FHWA](#), [ARTBA](#), [AASHTO](#), [HEEP](#), and others that will be able to guide you on your first digital delivery project.
- ◆ **Determine a technology vendor** with solutions that will help you achieve your digital delivery goals, such as [SYNCHRO](#), which includes mobile field solutions and 3D/4D workflows designed for heavy civil infrastructure.
- ◆ **Create a digital delivery committee** to implement and prioritize digital delivery workflows, including goals and timelines, on a project that has enough monetary value but is not overly complicated.

model-based digital workflows and leveraging the power of construction digital twins.



Play 5

Learn from Other DOT Digital Delivery Experiences

According to *Roads & Bridges Magazine*, about a third of state DOTs already require a for-information-only BIM model on projects. And some states have gone further, making the model the primary contractual document, in many cases eliminating selected 2D plan sheets. Nine states have completed, or are in the middle of, pilot projects that use a model as the signed and sealed legal document.

With so many DOTs already starting to implement digital delivery workflows on their projects, there are many lessons learned and success stories of which you can take advantage. Here are a few.

- ♦ **Manage the pace of change.** Implementing new digital workflows does not happen overnight. Take it step by step, be patient, and trust the process.

- ♦ **Training, training, and more training.** Because digital delivery involves new workflows for your entire supply chain, look to your technology vendor and/or consultant to provide training – early and often.
- ♦ **Communicate as often as possible.** Conduct weekly coordination meetings with your contractors and designers to share tips and tricks and lessons learned to encourage collaboration.
- ♦ **Gain stakeholder alignment and consistency.** Because digital delivery involves new terminology and workflows, it is important to identify and use consistent deliverables, file formats, naming conventions, and saved views that all stakeholders agree upon.

- ♦ **Advance technology incrementally over time.** Look for opportunities to actively upskill your digital delivery teams and choose technology vendors that can future-proof your operation.
- ♦ **Document lessons learned.** Digital delivery is a marathon, not a sprint, so document as many lessons learned as possible so you can continually improve as the journey progresses.

Change management is not always easy, so be sure to encourage your teams to experiment with the technology and celebrate progress along the way, no matter how small.

SYNCHRO Will Meet You Where You Are

The benefits of digital delivery are many and proven – lower project costs, saved time, improved constructability, enhanced visualization, boosted communication of design intent, and enhanced construction efficiency – resulting in projects you are proud of.

All these benefits mean that DOTs can help close the productivity gap by working more efficiently and doing more with less, ensuring that their state’s roadways and bridges are the best that they can be for the communities that they serve.

No matter where you are on your digital delivery advancement, SYNCHRO’s digital construction management platform can help.

SYNCHRO helps you to:

- ◆ Expedite design review efficiency and processes by 30%.
- ◆ Increase collaboration, quality, and safety of projects.
- ◆ Accelerate construction time by 20% or more.
- ◆ Provide 15% or more reduction in change orders.
- ◆ Offer improved asset operation and management with digital-as-built records.

[Let us help you begin your digital delivery with confidence.](#)

