Rail Industry

The Fast Track to Data-centric Collaboration

Drivers for Change

The rail industry suffered greatly during the pandemic, but it is now offered an opportunity for growth and change triggered by two key drivers – significant regional investment programs and net zero targets.

Decarbonizing Transport

Currently, around 20% of worldwide carbon emissions originate from transport. This figure is expected to keep rising by another 16% until 2050, even with existing initiatives.[1] Increasing the use of the rail sector, one of the most carbon-efficient transportation modes, for passenger and freight travel is fundamental for achieving global climate targets.

The industry also needs to examine methods to reduce carbon output during the construction and maintenance of transportation networks.

Investment for Modernization

After many decades of underinvestment, our rail infrastructure needs modernization, not only to take advantage of technological advances, but also to increase capacity and make rail networks more resilient.

The huge amount of funding includes the European Green Deal, a wide-ranging stimulus package focused on sustainability, estimated to include EUR 87.5 billion in investment related to rail infrastructure. Likewise, in the United States, the Infrastructure Investment and Jobs Act (IIJA) allocates USD 66 billion in funding and grants towards corridor development, rail track modernization, and safety improvement.[2]

There are longer-term economic benefits to rail investment, though, as it is calculated that for every GBP 1 (USD 1.27) spent on the rail network, a value of GBP 2.20 (USD 2.79) is delivered in the wider economy.[3]

[1] Source: https://www.itf-oecd.org/itf-transport-outlook-2021
[2] Source: https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/boosting-passenger-preference-for-rail
[3] Source: https://www.riagb.org.uk/RIA/Newsroom/Publications%20Folder/10_reasons.aspx

Challenging Times

Rail network operators face unprecedented challenges from complex projects that often take years or even decades to deliver. Input is required from multiple technical disciplines working across dispersed teams, sometimes across vast regions with differing standards, construction specifications, and infrastructure operator requirements.

These challenges, combined with a critical need to incorporate sustainability goals and reduce carbon emissions throughout the infrastructure lifecycle, bring added levels of complexity to these projects for even the most experienced teams.

To add to the pressure, the large number of projects simulated by regional investment programs, together with experienced people leaving the industry, has created a workforce skills shortage, placing severe strain on firms and their ability to design, deliver, and manage rail infrastructure projects.

However, out of challenges come opportunities.

During the pandemic, many firms were forced to embrace new digital ways of working to keep projects on track. Teams had to work remotely, and even the most technologically averse had to adopt cloud-based digital collaboration to survive, which has accelerated innovation across the rail sector.

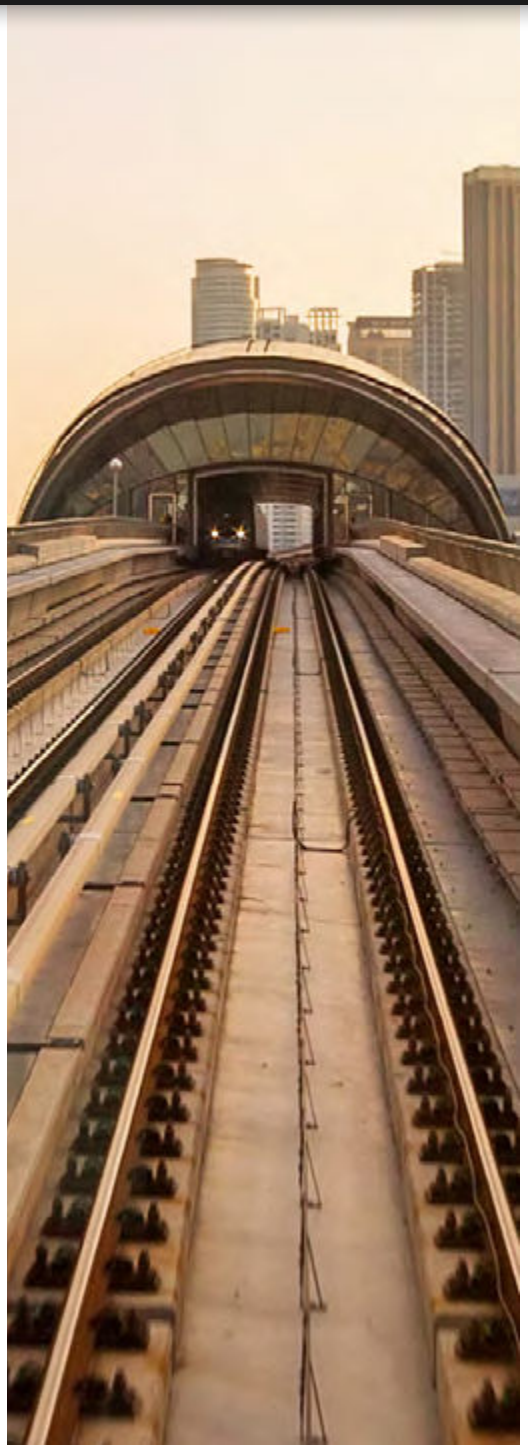
Now, firms who design, build, and operate our rail infrastructure are looking at how digital technologies can help them drive productivity and increase efficiencies even further.

Your Starting Platform

Many of the firms involved in the rail sector are already familiar with digital capabilities such as common data environments (CDEs), having used them for decades for design and engineering work in progress (WIP).

These CDEs have mainly provided a single location to upload and share project documents, PDFs, and CAD files and models to improve collaboration on a project.

After realizing the benefits of CDEs, such as ProjectWise®, infrastructure engineering design firms and owner-operators are asking how to maximize their use to capitalize on the latest digital innovations without totally restructuring their tech stack.



Adding Value to Your Investment

In response, we have evolved ProjectWise to help you overcome the challenges facing the rail industry today and embrace the advantages of digital delivery by putting data at the heart of all your projects.

Thanks to our Bentley Infrastructure Cloud technology, ProjectWise, powered by iTwin®, augments existing file-based workflows and processes that rail engineers are familiar with and optimizes them with data-centric workflows using iTwin. By maintaining project standards within managed workspaces, change notifications are automatically synched across interdisciplinary teams so models and data can be updated, improving the quality of designs and enabling teams to be more efficient, helping to close the productivity gap.

By starting with a strong foundation of engineering WIP management, whether it is 2D, 3D, or BIM, you can then begin to explore how solutions, such as using digital twins to free data from files, will help deal with the increasing complexities that you are facing.

Building on Your Investments

If you are already benefitting from ProjectWise, the next step is to reuse the work that you are already doing so you can manage projects better and get to that next level of quality.

To reuse your work, you need to be able to easily find and manage trusted information. Ensuring that the right people have the right information at the right time to make the right decision is one of the challenges that many businesses face. ProjectWise provides a secure view of truth for your documents, models, project information, and data so they are always available, as well as intuitive searching to easily find what you are looking for. After all, you can only learn from and reuse what you can find. By adopting a data-centric approach, you can start leveraging knowledge that has been gained on previous projects across your portfolio, so you do not have to keep starting over.

For instance, users can search across ProjectWise's cloud-based digital component libraries for approved gantries, signal lights, and other assets to drive standardization and reduce design time from days to hours, freeing users from repetitive design tasks so they can focus on higher-value work.

Users can reuse approved components across the portfolio and know where they are employed, so you can track their use against carbon reduction strategies or plan for proactive maintenance, for example.

ProjectWise will enable you to unlock the potential of your data across the entire enterprise to do more with less, as well as open new business opportunities.

Making the Right Connections

Unfettered access to trusted information forms the foundation for the seamless transition to digital design delivery, allowing you to increase efficiencies and quality, as well as differentiate yourself from the competition.

Digital design delivery enables you to validate your designs using digital twins to produce higher-quality deliverables for your clients. You can connect, review, and analyze a myriad of engineering data from across multiple disciplines such as structural, reality mesh, and GIS within the digital twin. Using iTwin's unique ability to visually model the sequence of change, you can understand the changes that have been made. The advanced digital twin validation capabilities enable you to quickly identify issues and reduce project risk, helping to drive better decisions across the project ecosystems.

By creating and synchronizing digital twins in the design phase, they will be ready to use across the asset lifecycle, and you can integrate more data from other sources, including Internet of Things (IoT) sensors, artificial intelligence (AI), analytics, and machine learning, adding real-time context to your digital twin and delivering real value for your business.

Now, you do not have to start over for every project. You can build on what you are already doing, share the knowledge and best practices that you have gained across projects, and start taking advantage of the opportunities that data-centric enterprise collaboration offers.

Meeting the Needs of Everyone

ProjectWise, powered by iTwin, offers three licensing options to suit all your organization's needs, from your CEO to your project team members.

Manage
For project teams and partner ecosystem members needing collaboration on documents and insights.

Engineer
For engineers and designers who are collaboratively creating infrastructure models.

Validate
For leaders requiring the most advanced engineering validation and analysis capabilities.

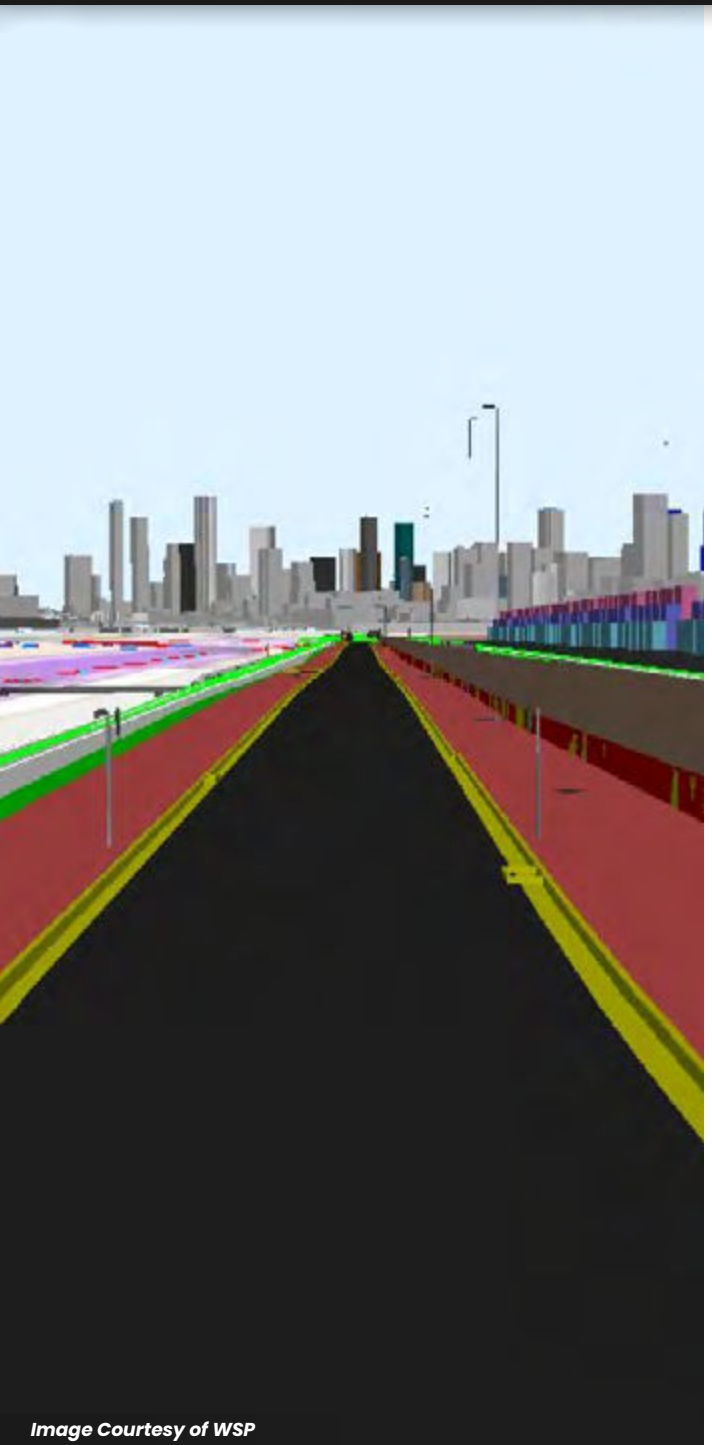


Image Courtesy of WSP

Meet Our Users Close Up

WSP - Melbourne's Port Rail Transformation Project, Australia

Project

As part of their 2050 Port Development Strategy to define critical infrastructure needs and support the economic growth of Victoria, the Port of Melbourne initiated the Port Rail Transformation Project (PRTP) to improve rail freight access across the Australian state. WSP was selected as part of an alliance to provide design consultancy services for the project.

Challenge

With approximately 250 multidiscipline project team members spread across three organizations, the project presented information management and coordination challenges, compounded by a tight submission timeline for preliminary and final designs. Previously, the use of multiple design platforms created incompatibility, IT security, and licensing issues, limiting access and resulting in teams reverting to paper-based workflows.

Solution

Leveraging ProjectWise and the iTwin Platform, they established an integrated digital environment, streamlining workflows and automating the federation of 3D models and design information to enable virtual design reviews and issues resolution, as well as optimize deliverables management.

Benefits

Bentley's cloud-based platform provided an easily accessible single source of truth, reducing waste and rework and saving 475 hours to stay on schedule. The digital technology solution realized a return on investment of 67.31%, saving AUD 43,500.

Learn More

Meet Our Users Close Up

Arcadis - Carstairs Rail Junction, United Kingdom

Project

All United Kingdom rail passengers that use the West Coast Main Line from England into Scotland travel through the Carstairs railway station in southern Scotland, which is located close to the key rail junction that divides northbound trains between Glasgow and Edinburgh. To improve passenger service and accommodate high-speed, low-emission electric trains, Arcadis was hired as part of an alliance with Network Rail and Babcock, known as Rail Systems Alliance Scotland (RSAS), to design an updated electrification system.

Challenge

They discovered that the new design elements were difficult to integrate into their previous modeling applications.

Solution

Arcadis determined that they could unify all design work with Bentley's open and integrated applications. Using the iTwin Platform, they created a digital twin of the project that enabled improved communication between RSAS members, as well as early detection and resolution of clashes in the design.

Benefits

Keeping project information up to date in ProjectWise enabled web-based interdisciplinary project reviews. Arcadis met all client requirements and optimized the design while reducing the modeling time by 35%.

Learn More

Image Courtesy of Arcadis

Image Courtesy of Oriental Consultants Global

Meet Our Users Close Up

Oriental Consultants Global - Metro Manila Subway Project (MMSP) – Phase 1, Malaysia

Project

The Philippines Department of Transportation initiated the Metro Manila Subway Project (MMSP) to ease traffic congestion and provide safe, reliable transportation for the National Capital Region, also known as Metropolitan Manila. Phase 1 of the MMSP traverses six cities and includes 13 underground stations and a train depot covering 28.8 hectares aboveground.

Challenge

The scale of the project presented communication and coordination challenges that current applications failed to address. Therefore, the project team realized that the implementation of collaborative BIM workflows, proactive risk management, and cost monitoring would require a connected data environment.

Solution

Leveraging ProjectWise and iTwin, OCG developed a common digital engineering system and a single source of truth, enabling real-time data sharing that optimized collaboration to save 5,000 resource hours within the project's first six months.

Benefits

Combined with SYNCHRO™ for construction simulation, Bentley's integrated technology solution identified and resolved 50 clashes, eliminating rework, shortening the project schedule, and saving costs. The successful BIM implementation has already achieved an ROI of over USD 600,000.

Learn More

Meet Our Users

More major rail and transit projects using ProjectWise include:

- HS2, United Kingdom
- TransPennine Route Upgrade, United Kingdom
- Napoli-Bari Route, Italy
- Shaoxing Urban Rail Transit Line 1, China
- MRT Jakarta, Indonesia
- The Klang Valley Mass Rapid Transit - Sungai Buloh-Serdang-Putrajaya Line, Malaysia

Are You Ready to Start Your Journey?

Talk to one of our consultants today and let us show you how ProjectWise can help you make the most of your data to improve your rail infrastructure projects for you, your clients, and the environment.

Speak to an Expert Today