MICROSTATION FOR TRANSPORTATION

Paving the Way for Better Road and Bridge Design

Bentley

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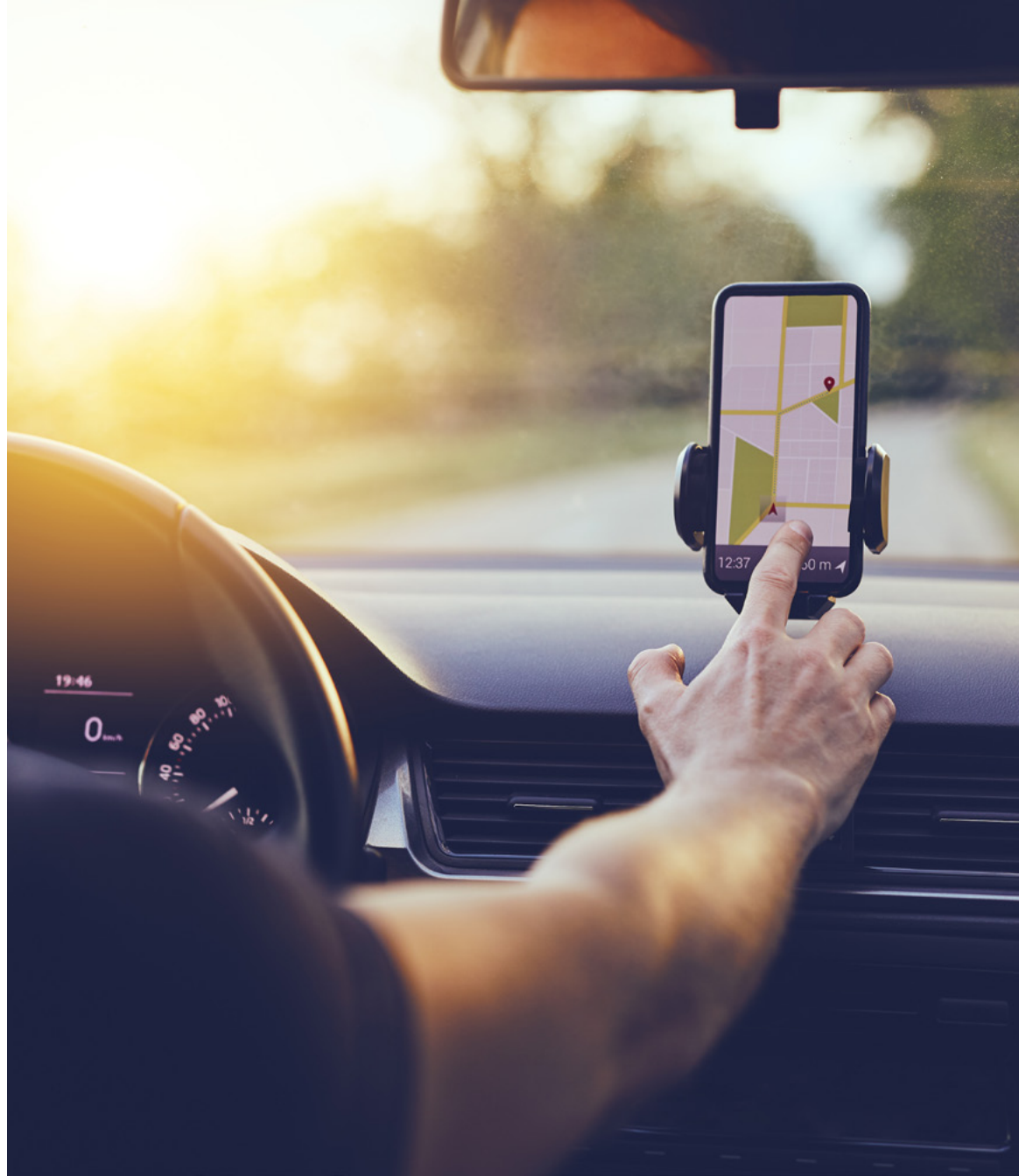


“WHEN PEOPLE WANT TRANSPORTATION, THEY WANT IT NOW.”

The way we design and deliver projects, and the way we plan our infrastructure, needs to change so that we can build the kind of modern, multimodal, and safe transportation systems our communities need.

With the increased volume of road & bridge projects, shorter duration requirements, and limited engineering workforce capacity, design efficiency and productivity are critical.

Now is the time for efficient and cost-effective technologies to plan, build, and repair roads, bridges, and other infrastructure.

The Challenges Are Real

Civil engineers, road and bridge designers, and CAD technicians working on transportation infrastructure projects are often presented with major design challenges. Challenges that result in time delays, safety risks, and costly rework.

- The inability to coordinate data in multiple formats results in errors, project delays, and a waste of time and money. With all the different applications used by the many different consultants that collaborate on today's design projects, a lack of interoperability between software products represents a huge risk.

- Delivering and using drawings and models that do not conform to standards introduces safety risks to field staff, causes errors, and leads to rework during construction. Using unstandardized drawings and models can result in losing future work and can damage the reputation of your organization.

Achieving a competitive advantage means delivering innovation - on time, on budget, and profitably. Read on.

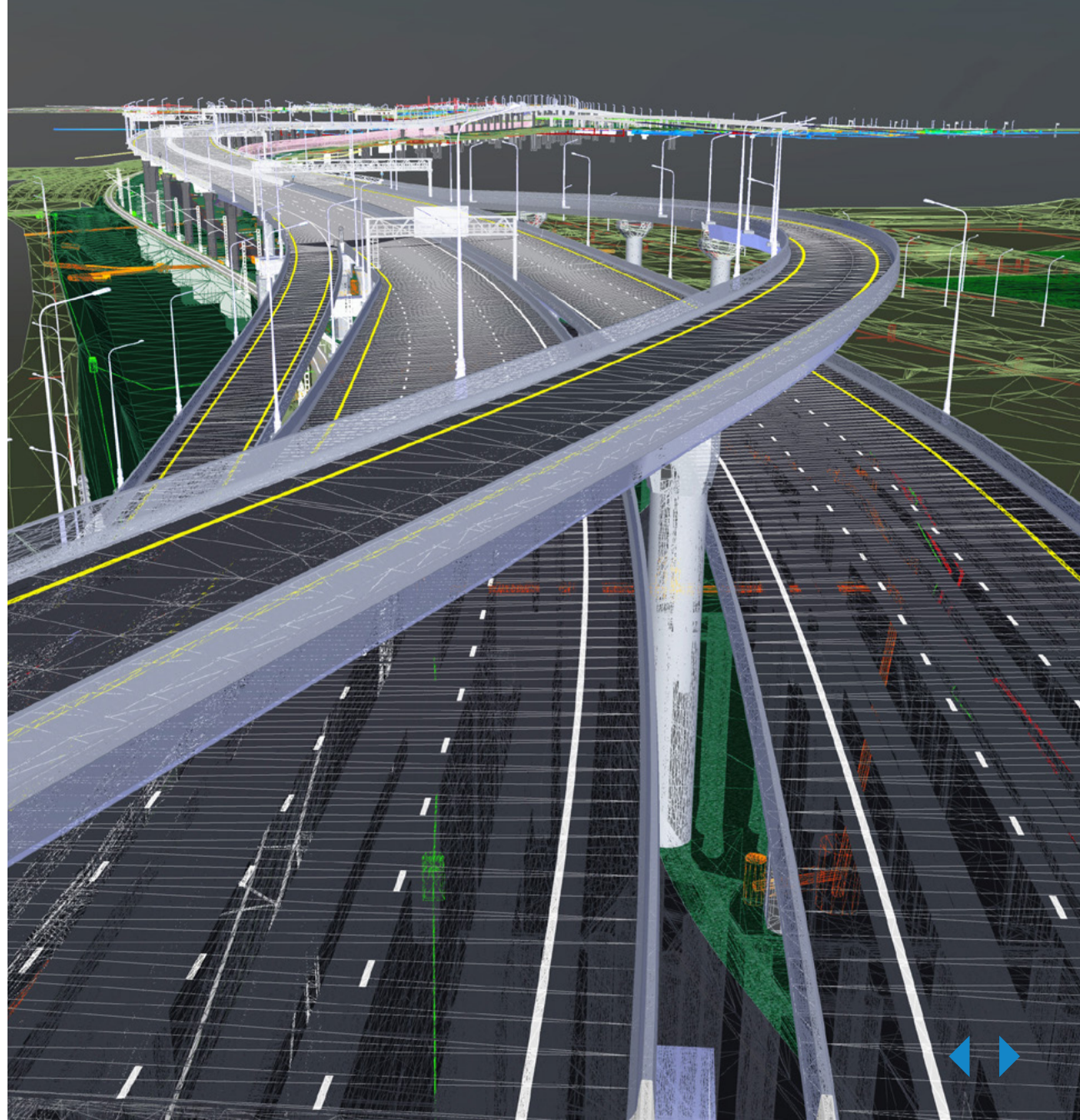
Bridging the Technology Gap

Purpose-built technology is addressing those challenges and creating a new path for success.

Just as 2D drawings replaced hand drafting plans decades ago, digital delivery and 3D modeling is quickly becoming a new normal for infrastructure planning and design. Digital delivery can improve design accuracy coordination and help you find constructability issues earlier in the design process, which can avoid costly delays. By blending traditional engineering workflows for plan, profile, and cross-sections with 3D modeling and BIM workflows, the right technology solutions work the way you work making the transition easier than ever. In other words, you can start your design in a 2D environment and watch the 3D model auto generate.

Whether your company is working directly on a road or bridge project or you are partnering with another firm to get the job done, tailor-made software for the work you do is a game changer.

Digital delivery and 3D modeling is changing the landscape for road and bridge design projects. Let's find out how that works.



Changing the Landscape of Road and Bridge Design

Computer-aided design (CAD) technologies are a standard software for civil design and engineering professionals worldwide to plan, design, deliver, and manage their infrastructure projects.

Better planning from the start with real-world design sets you up for success

Multidiscipline Coordination

The ability to work in a connected environment allows all team members and collaborators to move as one in real time. Using the same set of assumptions and information during every stage of the project, means better coordination, collaboration, and design consistency between conceptual and detailed design, right into construction.

Many disciplines with one solution, one workspace, one set of information, produces one successful project.

Moving from 2D CAD to 3D BIM Workflows

Moving from 2D to 3D CAD is a decision that firms often push down the road. Many designers fear a big learning curve that will reduce their design efficiency. It does not have to be an all or nothing approach. The right 3D modeling software will offer an integrated approach to both 2D and 3D design. That means you can work using intuitive and traditional design methods while benefiting from the advantages of new technology.

Say goodbye to outdated paper plans and last-minute on-site change orders and hello to consistency, efficiency, and quality.

Minimize Errors and Costly On-site Changes

Traditionally, most design reviews were done with paper or PDFs, and clashes were detected by the manual process of overlaying 2D drawings. However, digital delivery can bring models from all the disciplines together and compare them to detect clashes before they are detected on the construction site. Automatic detection of clashes is an important approach to determining design errors or omissions. Working in a 3D environment allows you to see potential conflicts immediately.

Reduce risk and find potential conflicts earlier with automated clash detection.

Deliverables for Today and Tomorrow

The delivery of 2D plan sets remains key for civil projects today. Connecting design to documentation with automated drawing production means that once the drawing sheets are set up, engineers can concentrate on the model, without having to worry about the ripple effect that last-minute design changes might have on documentation. Whether you need to produce traditional 2D deliverables or advance to 3D modeling, having a complete digital replica of physical assets replaces the inefficient and inaccurate methods of record, or as-built drawings. Understanding the future needs of infrastructure and existing conditions for future updates ultimately saves time and eliminates guesswork.

Save time and money with automated accurate drawing production.

Taking advantage of these productivity gains is not as costly, difficult, or time consuming as you might think. In fact, the cost and risk of not being an industry innovator is far greater. Find out how.

Your Workflow, Your Way

As a road or bridge engineer, we know you wear many hats. Your scope of work includes an array of responsibilities, across many phases, and with a diverse group of stakeholders. Your digital solution needs to support an efficient, comprehensive, and collaborative workflow from start to finish. That is why Bentley created a complete set of road design and engineering solutions. MicroStation is the foundation for your transportation design projects.

Plan

- Conceptual and detailed model for any industry
- Consolidate project surveys and files

Design

- 2D and 3D drawings and models
- Geo-referencing

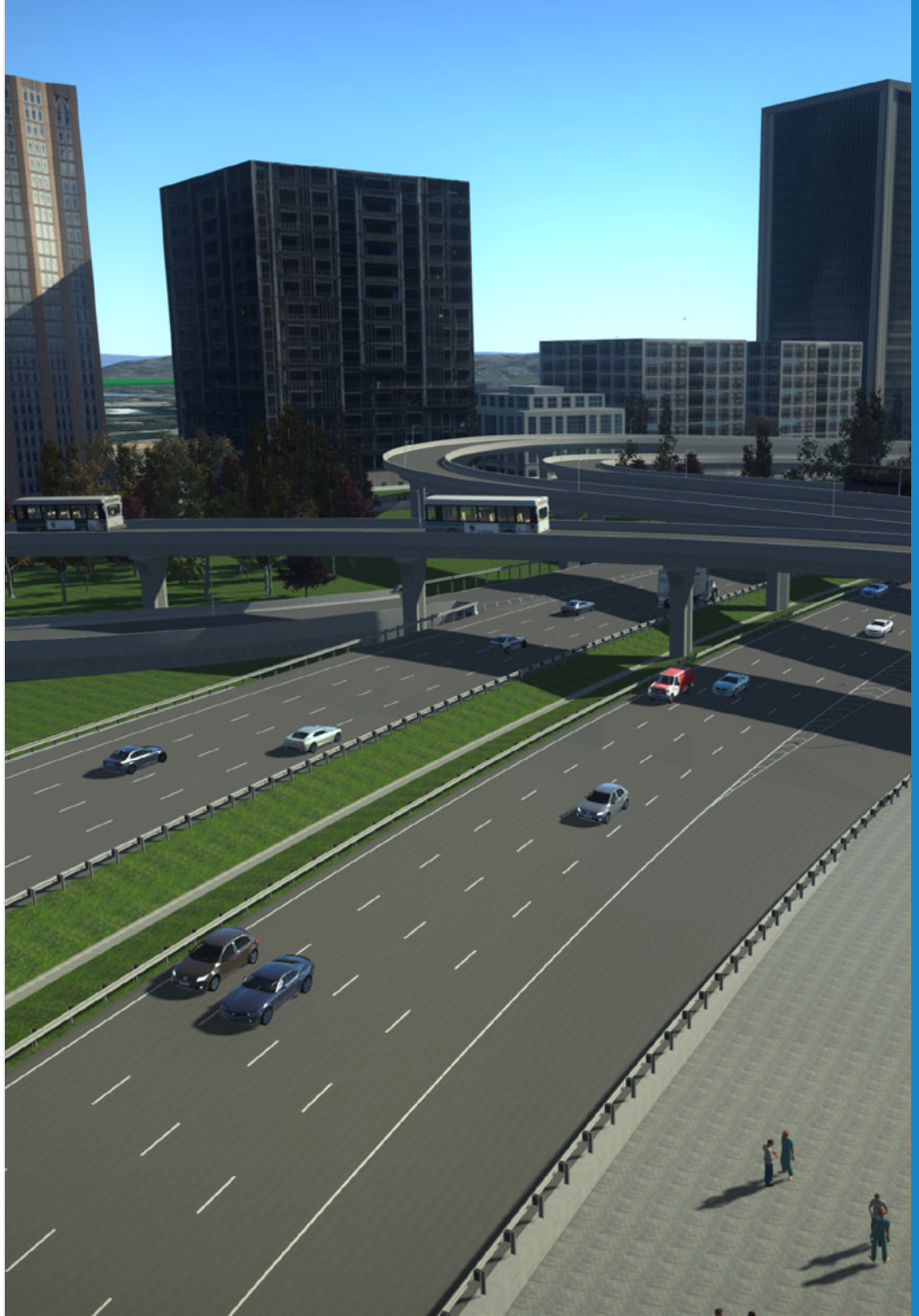
Communicate

- Data integration
- Performance for large files
- Standards/ compliance management

Deliver

- Consolidation of models and deliverables creation
- Generate reports
- Annotation
- Creation of sections, plans, and profiles sheets
- Drawing production

Software built to address the way you work and compatible for who you work with is what you need. We are going to tell you exactly what that means.



MicroStation for Road and Bridge Design

Transportation agencies around the world are turning to innovative, purpose-built technology solutions to help them overcome common civil design challenges. They trust MicroStation to produce high-quality drawings and 3D models, serve as a data integration tool, and to provide construction-ready deliverables for their transportation infrastructure projects every day.

Access and share data regardless of file format without data conversions. Users can incorporate legacy client data and a variety of natively supported file formats, like DWG, SHP, point cloud data, and more, so workflows are accelerated.

Incorporate multiple disciplines and easily integrate models, drawings, documents, and data from other sources to significantly improve the design process by eliminating errors prior to construction.

Scale to meet the needs of all projects—large or small. MicroStation's robust modeling capabilities allow users to rapidly model projects of any scale and complexity while confidently maintaining design intent.

Design within real-world context by integrating representations of existing conditions into designs to generate accurate 3D models. Leverage raster images, point clouds, reality meshes, GIS, and more.

Develop complex models more easily with a comprehensive set of mesh, solid, surface, and feature modeling tools, so users can more easily develop demanding civil engineering designs.

Output designs as plan sets or 3D videos—and everything in between—in one application.

CASE STUDY

Downtown Pedestrian Improvement Project

JMC2 CIVIL ENGINEERING
TORRANCE, CALIFORNIA, UNITED STATES

When JMC2 Civil Engineering worked on a pedestrian improvement project for the city of Torrance, California, they had to provide a safer, more attractive pedestrian environment along Cravens Avenue, adding streetlights, Americans with Disabilities Act-compliant sidewalks, roadway pavement, and new curbs and gutters. They also had to move the water system from underneath the sidewalks to beneath the roadway, cutting cross sections of the design and preparing roadway and water piping profiles. Additionally, the city of Torrance wanted them to create a digital twin so the city could review the design and construction.

Having used Bentley products on other projects, JMC2 Civil Engineering was familiar with the software and knew the interoperable solutions with an open format would work with other software when the municipality required design files in a third-party CAD format. A full site survey and model of existing conditions gave them full control of roadway design and analysis.

MicroStation was used for the core drafting tasks, including civil CAD basemap development, file referencing, and plan sheet creation. MicroStation was essential to delivering plans that met the city of Torrance's stringent CAD standards. JMC2 Civil Engineering decreased design time by at least 20% and saved approximately USD 50,000 compared to using previous design methods.

Image courtesy of JMC2

CASE STUDY

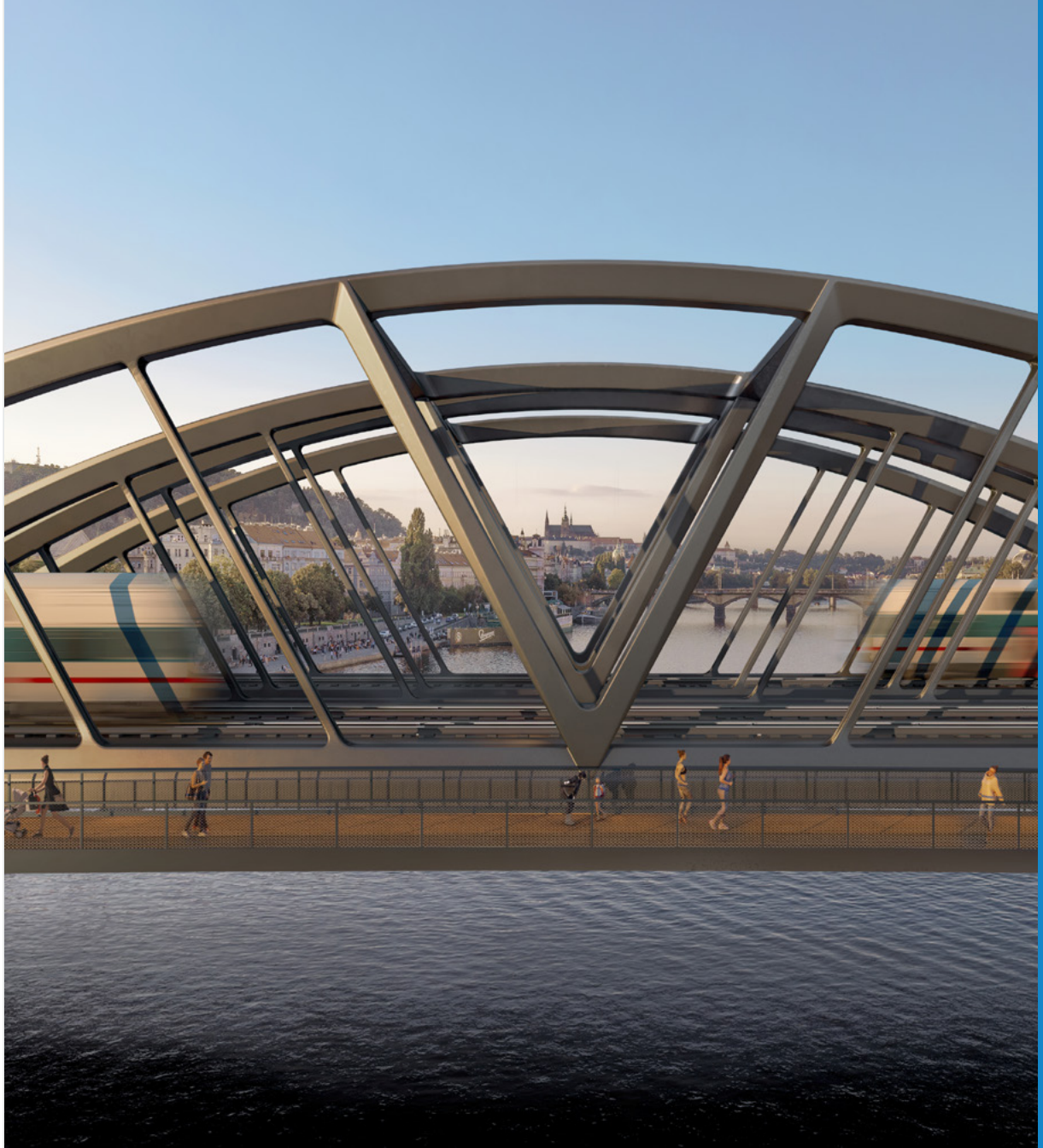
Huangmaohai Cross-sea Channel

CCCC ROAD & BRIDGE INTERNATIONAL CO., CHINA

The Huangmaohai Cross-sea Channel T3 Section is a key benchmark transportation infrastructure project that promoted integrated regional economic development in the Gunagdong-Hong Kong-Macao Greater Bay Area. Spanning just over 4 kilometers, the project presents complex technology, high construction requirements, and numerous cross operations. CCCC Road & Bridge, the lead contractor on the project, wanted to implement BIM methodologies and intelligent construction management. Faced with the challenge of coordinating multiple participants and various technologies, they decided they needed to establish an integrated digital platform.

CCCC selected MicroStation as their collaborative modeling platform, which supported model and data integration in multiple formats and helped the team develop a comprehensive BIM model to guide construction. Bentley's interoperable application enabled them to visualize construction processes digitally, which helped to provide real-time access to information and facilitate smart construction management. The solution improved overall construction efficiencies by 12%, leading to a shortened construction period and a savings of CNY 1.8 million.

Image courtesy of CCCC Road & Bridge International Co.



CASE STUDY

Vltava Waterway Lift Bridges Project

SUDOP PRAHA A.S., CZECH REPUBLIC

Located along the Vltava waterway, the bridge structures crossing the Vranany-Horin Canal were built between 1903 and 1905, making these bridges too old to meet current requirements for road and shipping traffic. To modernize the bridge structures, SUDOP PRAHA a.s. was hired to perform design work, increasing the underpass height from 4.5 meters to 7 meters. The project required meeting the investor's BIM data, design, and modeling specifications, including enabling the use of nongraphical digital data for subsequent facilities management. Therefore, SUDOP realized that they needed to establish a connected data environment.

SUDOP selected MicroStation to develop the 3D bridge models and ProjectWise as a collaborative platform to manage and share data and models with the investor and contractors. Using Bentley's applications, they optimized coordination and accelerated modeling time. Working in a digitally integrated environment, they used 3D BIM models during construction and for the facilities management, verifying the use of BIM methodologies in the future.

Image courtesy of SUDOP PRAHA a.s.

CASE STUDY

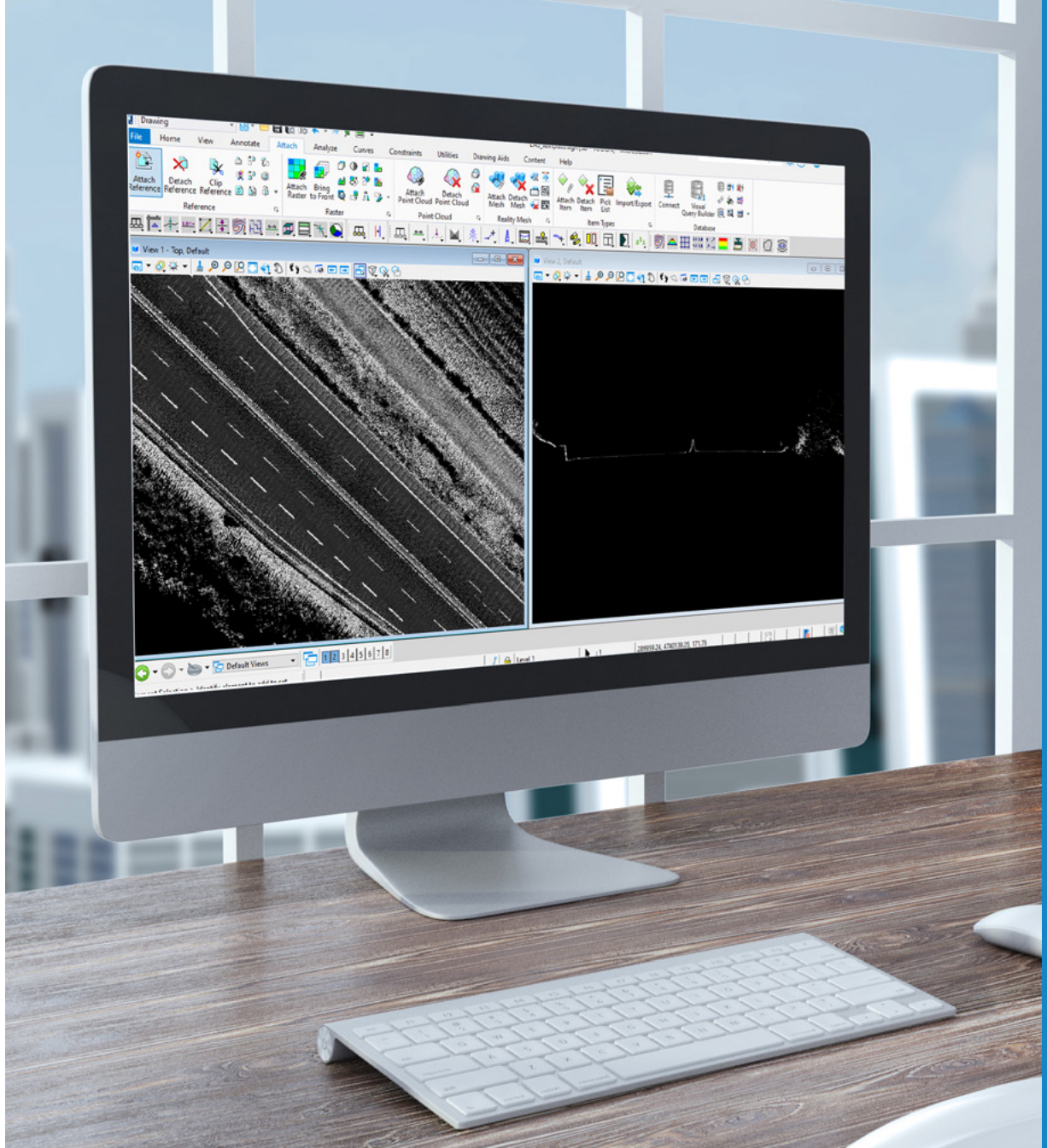
Georgia Highway E60 F3 Standard Project

CHINA ROAD & BRIDGE CORPORATION, GEORGIA

To alleviate traffic on Georgia's only transportation link across the country's east and west regions, a 13.04-kilometer expressway will connect the capital city of Tbilisi and port city of Batumi. Located in a mountainous region featuring a variety of engineering disciplines and structures, the project presented complex site conditions and coordination difficulties amid a short construction period. The project team sought to digitize data and workflows, establishing collaborative BIM standards.

They selected MicroStation, ProjectWise, OpenRoads, and OpenBridge to establish an open, connected data environment and design the roadway in a unified platform. Linking the BIM model with the construction schedule, they achieved digital construction management that saved over EUR 300,000. They shortened the project cycle by 5%, as well as minimized errors, material waste, and rework to save 5% in total engineering costs. It is the country's first integrated highway project supporting full lifecycle BIM application.

Image courtesy of China Road & Bridge Corp.



CASE STUDY

Road Survey with LiDAR on Movable Support

CONSULCAD, ITALY

For this project, the client required a topographical survey along a 21-kilometer roadway, comprising 434 sections, to highlight the embankment size, slope geometry, and position of the road curb to replace and install barrier protectors. ConsulCAD was invited to submit a tender but faced survey challenges due to the dense vegetation at the roadside and near the underpass, compounded by a tight schedule. They needed an integrated solution to model a large volume of captured data quickly and accurately, then present it to the client.

After considering their options, ConsulCAD used MicroStation to process mobile, LiDAR-captured point clouds totaling 40 gigabytes, within a 3-centimeter accuracy. Using Bentley's 3D modeling application simplified and accelerated management of the voluminous point cloud data and 3D elements, saving time and delivery costs. MicroStation provided a viable digital solution that sets a benchmark for the continued future use of the modeling technology.

Image courtesy of ConsulCAD

The Bentley Ecosystem

MicroStation — and all Bentley BIM applications — are built on the same comprehensive modeling platform so that users can easily progress MicroStation work into discipline-specific BIM workflows. It enables every civil engineer and designer to:

Create better designs, faster

With MicroStation, users can model, document, and visualize infrastructure projects of any type, scale, and complexity using a comprehensive set of design and documentation capabilities. Reliably integrate any existing design content and work with any-size team using virtually any mix of design applications. MicroStation enables users to develop and document better designs in less time by better connecting tools, data, and the team.

Better integrated project teams

MicroStation provides a common environment for comprehensive project delivery and connects users, projects, and the enterprise. With MicroStation, users have a personal portal to access learning, communities, and project information.

Flexibility and compatibility

MicroStation offers the flexibility you need to work the way you want — with several customizable user interfaces, including a dark mode. There is also native support for RealDWG to ensure 100% compatibility and confidence in your data.

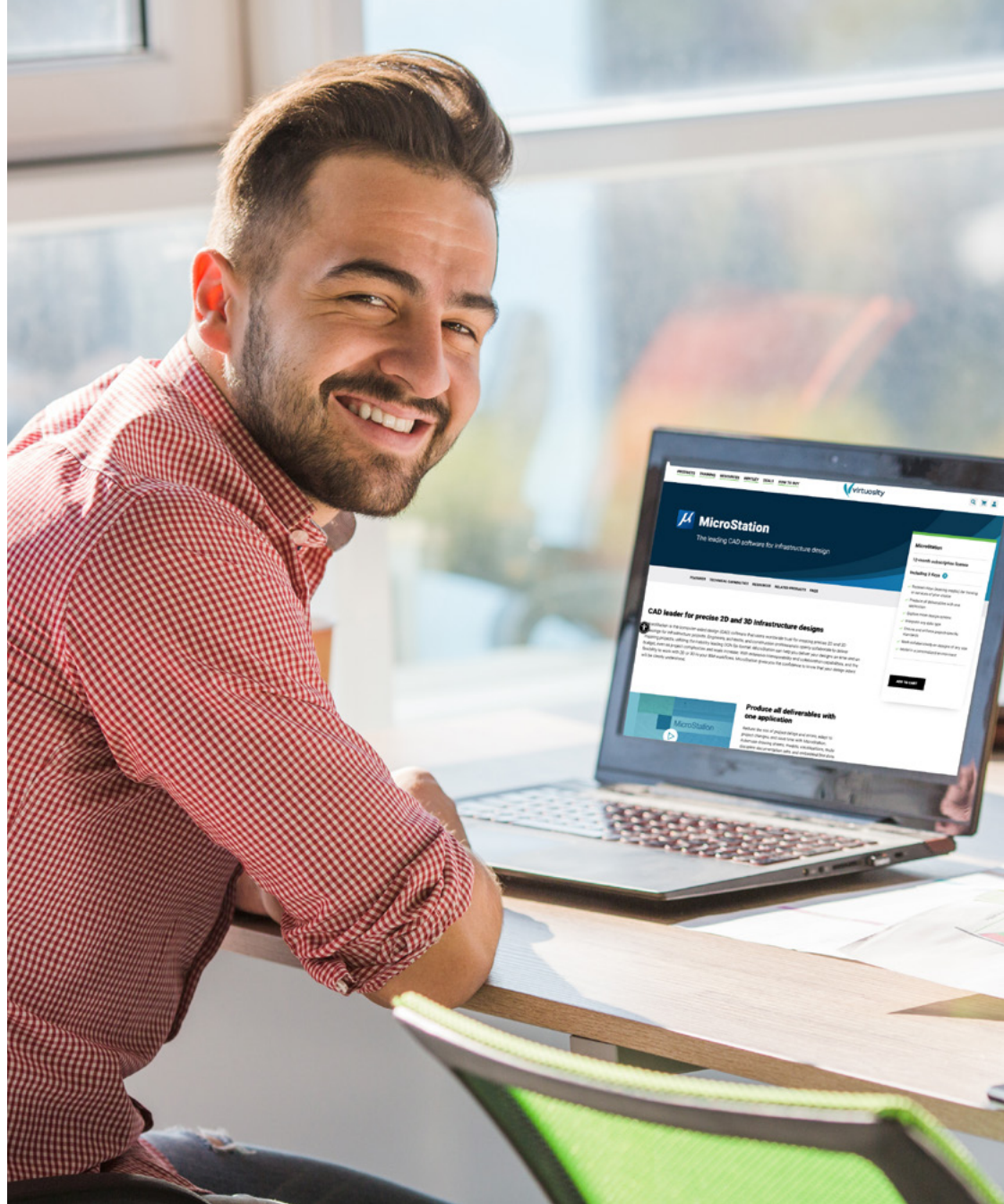
Getting Started

Bentley makes it easy for organizations to find the product license that offers the best options, affordable price, and the training you need to be successful – through Virtuosity, Bentley's eStore for practitioner licenses.

Whatever subscription is right for you, you will get access to our expert services, and the ability to leverage one-to-one mentoring by Bentley project experts, personalized training for your team, and on-demand learning. We call this bundle Virtuosity's **Virtuoso Subscription**, and it ensures your workforce can quickly learn the latest technology and workflows while minimizing downtime and project costs.

Shop MicroStation Now

Chat with an Expert



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