Bentley
Advancing Infrastructure

CASE STUDY

VHB Advances Civil Engineering and Digital Design Delivery with Model-based Design Coaches Program

Bentley's Open Digital Twin Technology Facilitates Training to Improve Quality of Design Time by 50% and Reduce Late-stage Design Changes by 90%

KEEPING UP WITH TECHNOLOGY

Since the introduction of the personal computer, technology continues to advance and reshape how daily tasks are performed in all aspects of life. Engineering is no exception to this evolution. The personal computer revolutionized the rate engineering drawing production, networks have fundamentally changed the way that people and organizations store and share information, and the amount of information that engineers generate to bid for a project has steadily increased. Keeping pace in this age of information and digitization is forcing engineering design firms and infrastructure organizations to rethink their processes. They are moving to full 3D model-based delivery, eliminating the use of traditional 2D engineering plans. However, engineers are struggling to keep up with the technology and using it to its fullest potential, as well as facing lagging digital standardization processes.

The transportation design industry is a perfect example. In recent years, state transportation departments have been adopting Bentley's cloud-based connected digital platform and are starting to prepare digital delivery policies. However, civil engineering design firms still need to catch their people up and provide them with the support to be able to forgo "drafted" engineering plans and embrace a model-based design (MBD) approach. "The workforce of engineers, designers, and project managers that deliver work in these markets have not progressed meaningfully with design technology," said Kyle Rosenmeyer, model-based design leader at VHB. To better align its workforce with the core values of building sustainable infrastructure in a digital age, VHB initiated a training program to recalibrate engineering practices through digital model-based workflows.

ACCELERATING THE LEARNING CURVE

Transportation engineers have increasingly relied on 3D models to accelerate plan production; however, they still have largely maintained a traditional control of engineering intent. MBD is the transition to controlling engineering intent through 3D models, which is different than just using a model to accelerate production plans. As the future of digital delivery is imminent, using an MBD approach will flourish in a fully digital environment. "An accelerated learning curve is required to catch up with other infrastructure markets around the continent, and around the world," said Rosenmeyer.

Traditional training methods have lagged to help civil engineers transition from 2D paper plans to 3D design intent. To close that gap, VHB realized that civil engineers require additional skills to successfully navigate in a connected dynamic digital project environment that is driven by engineering intent and programmed automation. "The current training out on the market is somewhat fragmented in this regard (requiring users to receive the full picture from multiple sources), and often miss many important principles of MBD, leaving teams unprepared for the realities of competing in a world without 2D drawings," said Rosenmeyer. Recognizing that the future of civil engineering is model-based and that the answer lies with educating the people, the users, and the engineers, VHB developed their model-based coaches program. The program targets a sufficient percentage of CAD users to become innovators and early adopters of 3D digital design delivery, advocating for changing the way that engineering is practiced in the digital age. VHB required integrated, user-friendly design technology to effectively launch the industry's first MBD advanced training program.

PROJECT SUMMARY

ORGANIZATION
VHB

SOLUTION
Roads and Highways

LOCATION
Watertown, Massachusetts, United States

PROJECT OBJECTIVES
- To help the civil engineering industry transition to full 3D model-based digital design delivery.
- To educate civil engineers and help advocate for advancing project delivery in the digital age.

PROJECT PLAYBOOK
iTwin®, LumenRT™, MicroStation®, OpenBridge®, OpenRoads™, ProjectWise®

FAST FACTS

- VHB invested in a firm-wide model-based design (MBD) training program to help civil engineers transition to full 3D digital project delivery.
- They leveraged ProjectWise and Bentley Open applications to deliver the training.
- The program helps better align people and processes with new technologies and modern infrastructure project requirements.

ROI

- In just 100 hours, program attendees gained a solid foundation for the future, which enabled them to simplify troubleshooting and save design time.
- Leveraging fully connected project data, and MBD is estimated to improve the quality of design time by 50% and reduce late-stage design changes by 90%.

"VHB's MBD team is revolutionizing the way we are advancing digital design delivery and the differentiating services we provide to our clients. Their leadership and contributions have positioned VHB as an industry leader in digital project delivery."

– Dave Mulholland, Chief Technology Officer, VHB

LEVERAGING A CONNECTED DIGITAL ENVIRONMENT AND DIGITAL TWINS

VHB selected ProjectWise, iTwin, and Bentley Open applications to establish a connected digital environment for educating engineers in MBD and digital twins using active roadway projects. Their 12-week MBD coaches program included intense technical training and practice sessions, including topics on teaching, communication, and community building. "Our MBD coaches program is initially targeting 10% of our CAD user base to receive 100 hours of focused training in design software, such as OpenRoads Designer; technology platforms, such as ProjectWise; and communication applications, such as LumenRT," said Rosenmeyer. Working in an integrated digital platform with a completely connected set of project data, the trainees can experience an interactive, immersive project environment where every aspect of the roadway project is performed using the 3D model. The training model automates and facilitates design changes, clash detection, safety reviews, and quality reviews.

VHB invested in a firm-wide MBD training program to help civil engineers transition to full 3D digital project delivery.

The 3D model also serves as a digital twin of the project, enabling the trainees to communicate complex design challenges in a 3D visual format for better understanding. The digital twin allows for quick comprehension and timely feedback, allowing the community and stakeholders to see the impact of a project on their neighborhoods and businesses. "Engaging with digital twins during the model-based coaches program was paramount," said Rosenmeyer. VHB is teaching a generation of engineers to transition design intent from 2D to 3D, as well as to review projects through digital twins from the ground up.

SETTING A NEW CORPORATE STANDARD FOR PROJECT DELIVERY

As an organization, VHB is embracing MBD and recognizes that, for large-scale change to happen, education is critical to success. Attendees of the first training rollout reported that digital workflows were easier to execute, simplifying troubleshooting and saving design time. Before the first cohort of the program even concluded, clients began viewing VHB's capabilities differently, offering new opportunities to partner on their path to digital delivery. "In just 100 hours, we invigorated careers, inspired hope for the future, implanted powerful knowledge of MBD, and, most of all, reminded people why they became engineers in the first place," said Rosenmeyer. Compared to traditional 2D-based design teams, it is expected that by leveraging fully connected project data, design teams will improve the quality of their time by more than 50% and reduce late-stage design changes by 90%.

VHB's training program empowers and enables their engineers to better meet the increasing pace of the design process and address client needs, advancing MBD as the company's standard for project delivery and integrating technology concepts across all projects. As the industry continues to pick up the pace of the design process, clients also want a more detailed analysis earlier in the process. Recognizing that the future of the industry is digital delivery, VHB remains committed to this collaborative design experience and is invested in firmwide model-based training for CAD users as well as next level training for advanced MBD users and future trainers. "VHB has used [Bentley applications] to build a world-class training program for civil engineers to master amazing new abilities, increase value provided to our clients, and elevate our industry for going digital," said Rosenmeyer.

In just 100 hours, program attendees were able to simplify troubleshooting and save design time.