Conseil Départemental de l’Ain Reduces Congestion and Optimizes Safety on Pont-de-Veyle Bypass

Bentley Solutions Help Create a Digital Production Chain Incorporating a Virtual Mockup

New Technologies Drive Projects

Conseil Départemental de l’Ain roadworks department in the Rhône-Alpes region of France was established to complete the region’s motorway network. Its latest project was to design a bypass for the town of Pont-de-Veyle to reduce the number of vehicles that passed through it from 9,000 to 4,000 per day. In addition, the design had to maintain the economic viability of the town and alleviate its flooding issues.

Yves Genevois, planner for Conseil Départemental de l’Ain, has been providing cities with expert advice for more than 30 years, and has always been passionate about implementing new technologies on projects. The council has frequently used Bentley’s 3D modeling software including MicroStation®, MXROAD, and PowerCivil for France. “Bentley software has become indispensable to our projects in view of today’s much tighter budgets and completion times,” he said.

The Pont-de-Veyle Bypass

The project team studied the proposed roadway geometry and environmental constraints for the Pont-de-Veyle bypass. They used Bentley products to manage the digital production chain from end to end and collaborate with surveyors, hydraulic engineers, town planners, environmental technicians, and elected officials.

Among the challenges the team faced included obtaining information from all stakeholders, incorporating LiDAR data, interacting with various participants, designing the road, positioning it in its environment, and redesigning where necessary. The team also needed to present a virtual 3D mockup with as many details, animations, and videos as possible to gain project approval from a wide audience.

For this project, the team opted for the use of high-definition color point clouds (172 million points for 500 hectares of terrain). This process provided an almost photo-realistic rendering, more detailed than a conventional virtual mockup, but also more manageable because it could be infinitely and dynamically modified.

The Various Phases

Using MXROAD and PowerCivil for France the dynamic links between the project’s different objects allowed operators to make changes quickly without losing information or converting data. The software also integrated the various formats, which facilitated data exchange with other participants.

The innovative aspect of this project was its integration of the 3D environment in the form of a high-resolution colored point cloud, which was a new approach for a motorway project. The team produced a virtual mockup that was nearly an exact replica of the actual environment.

“Previously, we had to use an outside design office to produce our digital mockups, which cost us about EUR 20,000 per mockup for 5 to 6 kilometers of road. Today, we are fully autonomous with our Bentley software. We manage our own projects from the initial survey through to solution delivery.”

— Yves Genevois, planner for Conseil Départemental de l’Ain

Fast Facts

- With Bentley software, the Conseil Départemental de l’Ain managed the entire road design and project visualization process from start to finish.
- The project team used high-definition point-cloud data (over 100 million points) to create a model of the environment.

ROI

- Bringing digital visualizations in-house saved approximately EUR 20,000 for each 5 to 6 kilometers of road.

Project Summary

Organization: Conseil Départemental de l’Ain, France
Solution: Roads
Location: Bourg-en-Bresse, Ain, France

Project Objective:
- Design a bypass for the town of Pont-de-Veyle
- Present the project to a team of elected officials, technicians, and experts, using an animated digital model
- Become more autonomous to optimize costs

Products used:
- MXROAD
- PowerCivil for France
- MicroStation
- Bentley Descartes
- Bentley Pointools

ROI

- Bringing digital visualizations in-house saved approximately EUR 20,000 for each 5 to 6 kilometers of road.

“Previously, we had to use an outside design office to produce our digital mockups, which cost us about EUR 20,000 per mockup for 5 to 6 kilometers of road. Today, we are fully autonomous with our Bentley software. We manage our own projects from the initial survey through to solution delivery.”

— Yves Genevois, planner for Conseil Départemental de l’Ain

The Pont-de-Veyle Bypass

The project team studied the proposed roadway geometry and environmental constraints for the Pont-de-Veyle bypass. They used Bentley products to manage the digital production chain from end to end and collaborate with surveyors, hydraulic engineers, town planners, environmental technicians, and elected officials.

Among the challenges the team faced included obtaining information from all stakeholders, incorporating LiDAR data, interacting with various participants, designing the road, positioning it in its environment, and redesigning where necessary. The team also needed to present a virtual 3D mockup with as many details, animations, and videos as possible to gain project approval from a wide audience.

For this project, the team opted for the use of high-definition color point clouds (172 million points for 500 hectares of terrain). This process provided an almost photo-realistic rendering, more detailed than a conventional virtual mockup, but also more manageable because it could be infinitely and dynamically modified.

The Various Phases

Using MXROAD and PowerCivil for France the dynamic links between the project’s different objects allowed operators to make changes quickly without losing information or converting data. The software also integrated the various formats, which facilitated data exchange with other participants.

The innovative aspect of this project was its integration of the 3D environment in the form of a high-resolution colored point cloud, which was a new approach for a motorway project. The team produced a virtual mockup that was nearly an exact replica of the actual environment.

One of the main concerns on the project was the size of the LiDAR point-cloud file that was imported into Bentley Descartes and Bentley Pointools. Using both software applications, the team was able to not only import the file, but also manipulate, modify, and export the file with ease. Using Bentley Pointools, the design team easily prepared the point clouds for use in MXROAD. Bentley Descartes increased the point-cloud handling and processing capabilities in MXROAD and PowerCivil for France, enhancing the work of the design teams. The resulting consistency and ease of collaboration were real time savers.

“This was a new approach for us,” Genevois said. “This method was enormously helpful from all points of view, particularly in terms of speed of design, reliability of modifications, and cost optimization. Previously, we had to use an outside design office to produce our digital mockup. Now, we can produce our own virtual mockup in-house at a fraction of the cost.”

— Yves Genevois, planner for Conseil Départemental de l’Ain
“In my mind, the Pont-de-Veyle project was a real turning point for us. It changed our ideas about the profession completely, bringing them perfectly in line with the latest technological developments.”

— Yves Genevois, planner for Conseil Départemental de l’Ain

Presenting the model within its environmental context enables project teams to visualize specific areas and mitigate concerns or objections.

mockups, which cost us about EUR 20,000 per mockup for 5 to 6 kilometers of road. Today, we are fully autonomous with our Bentley software. We manage our own projects from the initial survey through to solution delivery. In my mind, the Pont-de-Veyle project was a real turning point for us. It changed our ideas about the profession completely, bringing them perfectly in line with the latest technological developments.”

Bentley’s solutions helped the General Council’s road department demonstrate its expertise and the quality of its public service work, and even helped to exceed original project goals. The road department presented not just the bypass project, but all the hydraulics aspects as well, to account for flooding risks, through visualizations of rising water levels and various means to evacuate the floodwater.