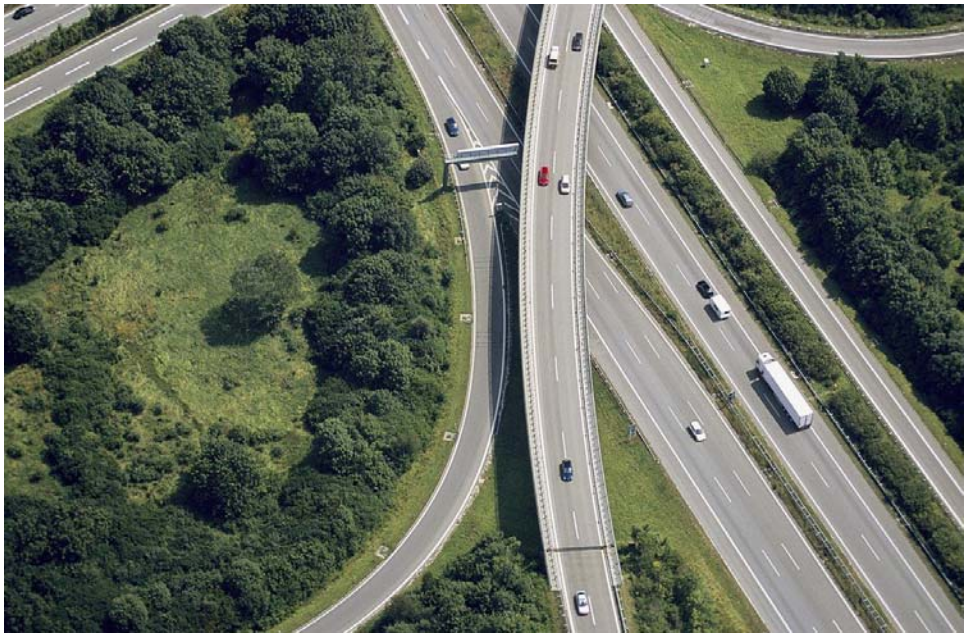
Improve Road Design and Construction Using 3D Models



Challenge: Deliver critical road, highway, and bridge infrastructure on time and under budget.

Solution: Use 3D modeling and design technology in the project design and review phases.

Benefit: Transportation designs delivered better, faster, and more sustainably and collaboratively.

The investments in our nation's transportation infrastructure will help create jobs, improve our economic competitiveness, and create lasting national assets. New infrastructure design technology provides the opportunity to deliver the critical highways, roads, and bridges that our nation needs—better, faster, more economically, and more sustainably than ever before.

Until 20 years ago, roads, highways, and bridges were designed using only pencil, paper, and a drafting board as tools. Design eventually shifted to PCs and became less laborious, but the 2D flat files produced were difficult to change and visualize in a real-world context. Today, 3D modeling and design technology offer the opportunity to notably improve the speed, accuracy, and quality of the design process.

Predictability

One of the inherent benefits of 3D design is the ability to more easily visualize the project in 3D at any time during the design process. As a result, engineers can spot errors and omissions earlier in the process, where they can be more quickly corrected. Visualizations generated from 3D designs also help engineers to explore a variety of design scenarios rapidly, and calculate the associated cost impacts of design options in real time. By catching and correcting design errors upstream, program budgets can be extended and more projects can be completed for the same investment.

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Sustainability

3D models can also be used to analyze design options for sustainability requirements, furthering green initiatives. For instance, 3D models can be a more effective way to evaluate route planning for environmental impact analysis. Finding the optimal alignment of roads in the landscape can minimize environment conflicts and the need for mitigation measures.

Safety

3D models can also help control earth moving equipment on-site by supplying GPS systems with more accurate data. This new capability to automate machine guidance can help to reduce costs, improve the quality of construction, and reduce potential for injury on transportation construction projects.

Transparency

Finally, 3D models assist agencies in visually sharing program information with all stakeholders—helping improve community relations and feedback, as well as increasing collaboration and accountability of the project team.

A major benefit of 3D systems is the ability to capture existing conditions more rapidly and completely and with a higher level of detail than most traditional methods.
—U.S. National Institute of Standards and Technology