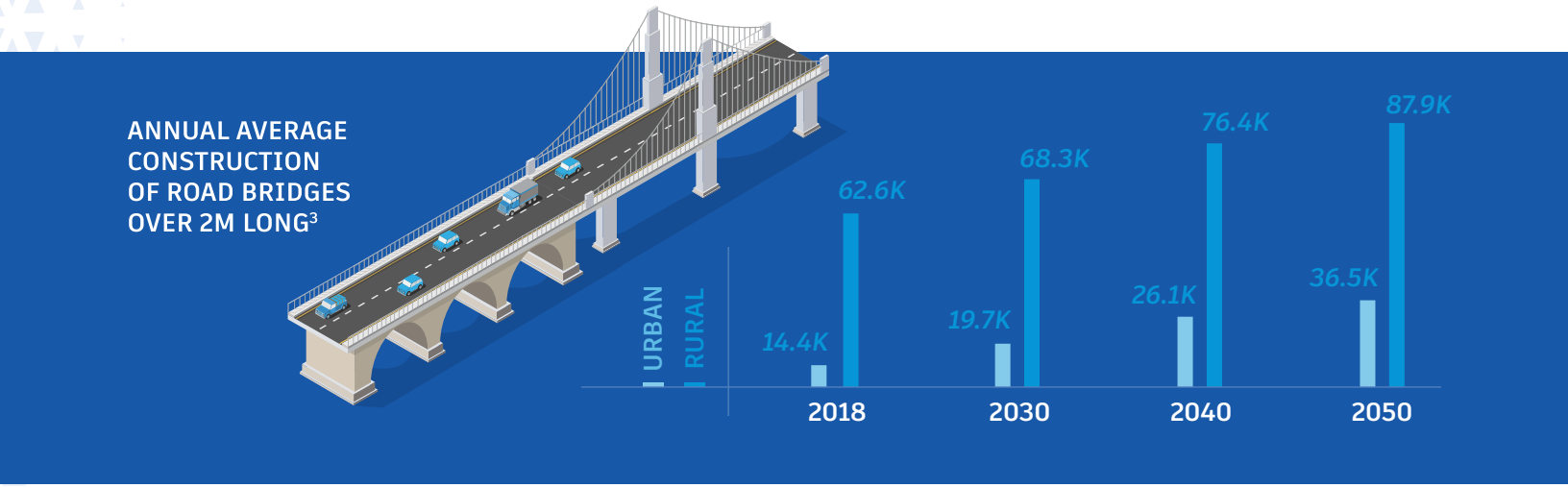
AUTODESK.

Expanding cities

The urgent need for bridge design & maintenance

In America alone, research by the American Society of Civil Engineers (ASCE)[2] revealed that many of the nation's bridges need replacing or repairing, with around 188 million trips being made each day across structurally deficient bridges, most of which are concrete and steel bridges that cross over highways and railways.

By Ara Ashikian



With so many bridges in need of building, upgrading, updating, or replacing, making the bridge design process more efficient, cost effective and collaborative is a priority for civil engineers everywhere.

Autodesk® helps businesses grow by boosting operational efficiency, reducing risk and helping improve project delivery. That is why we have focused on developing the software tools, and processes, that can help you achieve these goals.

Bridging the collaboration gap

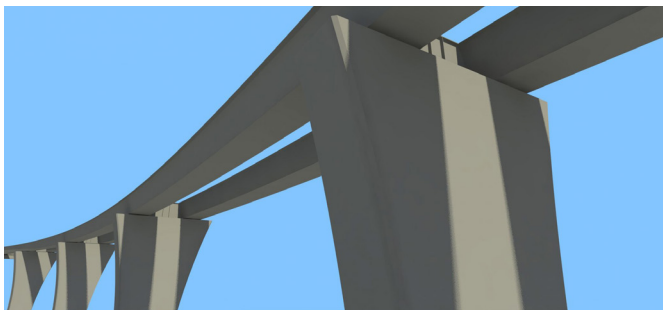
Traditionally, the bridge design process has been hampered by the lack of true collaboration options for the key members of the project – the road designers, bridge designers, and the documentation team – who haven't been able to easily share and amend their designs across platforms.

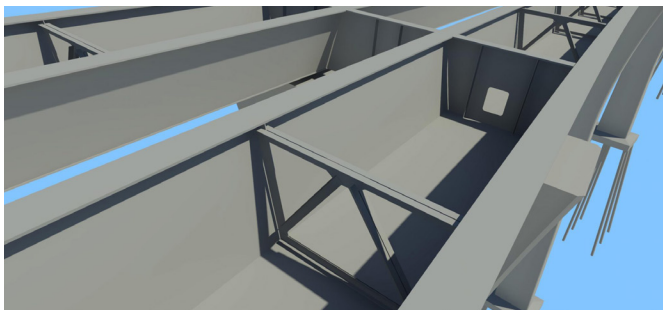
Work was done in silos, and each team then had to manually adapt their model when changes were made elsewhere, meaning that the design of projects was more prone to errors, took longer to complete, and delayed handover to the construction teams.

Autodesk's new bridge design workflow significantly improves the collaboration problem, as it allows these teams to work together on design projects using software supported by Autodesk's AEC Collection. The teams can share one design and make updates to it, which can be seen and easily applied by all.

The workflow currently supports common highway bridges and will be available for many other bridge types in the future, providing the same ease of use for more bridge design projects.

How does it work?





The bridge design workflow

Bringing together three of our design tools – **Autodesk® InfraWorks®**, **Autodesk® Civil 3D®** and **Autodesk® Revit®** – the bridge design workflow connects the road design, bridge design, and documentations team in one project model.

This applies to teams within one organization as well as in partner organizations. If your business often partners with others, you can still enjoy the collaboration benefits of the bridge design workflow.

When the road design team starts the project, for example, they create their design model in Civil 3D. Once they have a design they are happy with, they publish it to the workflow and the bridge design team can then get started on their part of the design process. They build their bridge on the road using InfraWorks, and once they have completed their initial design, they publish again, which means their colleagues in road design can access the latest version. Or this can be done the other way around, and the bridge design team can start off the process. The documentation team can also access and amend the project using Revit.

Whenever a change is made to the road or bridge design model, the software can automatically adapt the dimensions of the other steps, and team members can explain the changes they've made in a notes element. Plus, the designers can choose from a range of components in the catalog to find the best ones for each project. Because this is an "open" workflow, teams can also leverage **Autodesk® Inventor®** to extend the bridge components libraries with their own requirements.

Since users may easily adapt the components and dimensions in just a few clicks, teams can 'optioneer' or explore many bridge design options early in the initial concept design phase and find the best solution.

Efficient and collaborative workflow

The bridge design workflow can help your business deliver civil infrastructure projects more efficiently and collaboratively. Because all three teams can add their own input into a single project model, this is a big step forward in workflow management for bridge design projects.

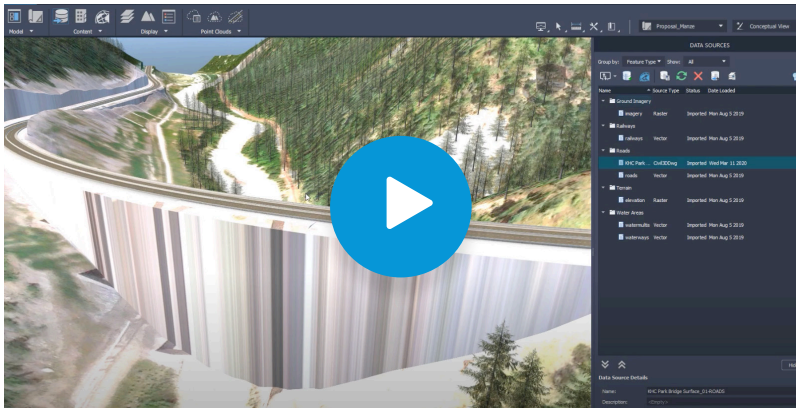
Construction documentation and detailing can now commence a lot sooner than previously, as it can be easily amended. The project can get started in Revit early on, and civil engineering professionals can complete their planning and cost assessments for the bridge project well in advance.

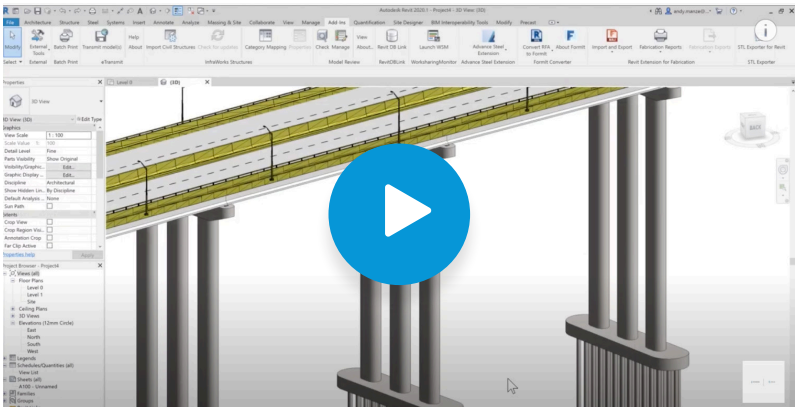
The workflow enables engineers to more easily manage bridge design projects from concept through preliminary design to detailed design, significantly cutting the time it takes to move through those stages and providing better project outcomes.

Learn about the new workflow

Bridge professionals can now rapidly develop multiple design options with powerful parametric modeling technology and automated documentation. Connect project data across InfraWorks, Civil 3D, and Revit.

Watch the video





Enhanced Civil Structures Workflow with InfraWorks

The enhanced civil structures workflow provides transparency and additional flexibility during the export process.

Watch the video

If you'd like to find out more about how the workflow can help your business improve efficiency and collaboration, you can get free 30-day trials of Civil 3D, Revit, InfraWorks, and many more essential BIM tools included in the Autodesk AEC Collection.

Ara Ashikian is the Industry Product Manager for Autodesk's Bridges and Civil Structures product development teams. Prior to joining Autodesk in 2013, he had over 20 years of experience as a bridge engineer and a software developer, working on a large number of bridge projects, including preliminary, detailed and construction engineering design aspects for a wide range of bridge types. These projects included the detailed construction engineering of the EG LNG suspension bridge in Africa, as well as for the New Bay Bridge (self-anchored suspension bridge in California), the detailed engineering for the launching of the Kicking Horse Canyon bridge in the Canadian Rockies as well as for the Coast Meridian cable stayed bridge in Vancouver.

References:

1. Autodesk infographic: Why infrastructure is critical to urban growth
2. ASCE Infrastructure Report Card 2017
3. Global Infrastructure Hub, *Global Infrastructure Outlook.*