

A CURE FOR AGING INFRASTRUCTURE IN THE USA

TECHNOLOGY + INNOVATION

\$4.5 TRILLION

is needed by 2025 to fix the country's roads, bridges, dams, and other infrastructure.¹



STATES WITH THE MOST URGENT INFRASTRUCTURE NEEDS²

RHODE ISLAND
HAWAII
WEST VIRGINIA
PENNSYLVANIA
CALIFORNIA
ALASKA
NEW JERSEY
MASSACHUSETTS



ROADS + HIGHWAYS

1 IN 5 MILES OF ROAD IS IN POOR CONDITION



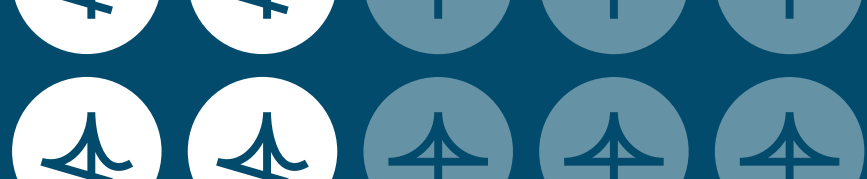
AMERICANS SPENT **6.9 BILLION HOURS** STUCK IN TRAFFIC IN 2014

TRAFFIC DELAYS COST **\$160 BILLION** IN WASTED TIME AND FUEL IN 2014



BRIDGES

4 IN 10 BRIDGES ARE 50 YEARS OR OLDER



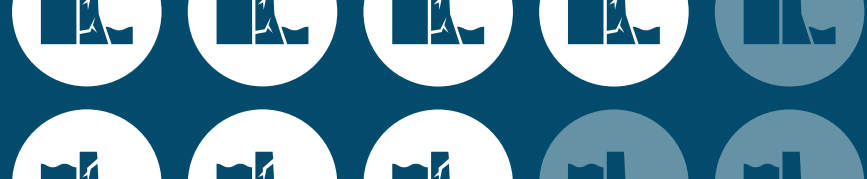
56,000 BRIDGES ARE STRUCTURALLY DEFICIENT

THE BACKLOG OF BRIDGE REHABILITATION NEEDS EQUALS **\$123 BILLION**



DAMS

7 IN 10 DAMS ARE 50 YEARS OR OLDER



NEARLY **15,000 DAMS** HAVE BEEN IDENTIFIED AS HIGH-HAZARD POTENTIAL

\$45 BILLION IN INVESTMENT IS NEEDED TO REPAIR THESE AGING, HIGH-HAZARD DAMS



RAIL

1/3 OF EXPORTS IS CARRIED BY RAIL



RAIL DELIVERS **5 MILLION TONS** OF FREIGHT AND APPROXIMATELY **85,000 PASSENGERS** EACH DAY

FEDERAL FORECASTS SHOW A **40% INCREASE** IN AMERICAN FREIGHT SHIPMENTS OVER THE NEXT 30 YEARS

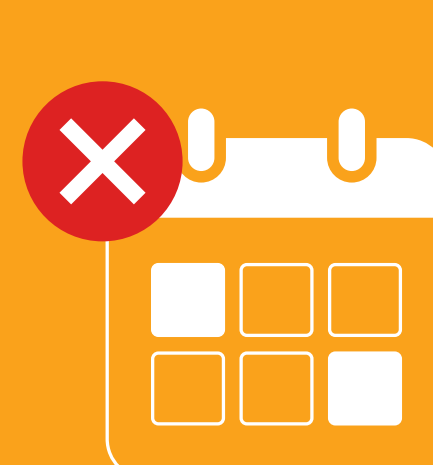
According to the ASCE Report Card¹



BUDGETARY

COMPLEX PROJECT PRESSURES

Aging infrastructure is often complex to maintain, modernize or replace. Traditional systems and outdated 2D processes add to the project complexity, while also exacerbating budgetary and schedule concerns.



SCHEDULE

ACHIEVING AN INFRASTRUCTURE SYSTEM FIT FOR THE 21ST CENTURY REQUIRES TECHNOLOGY + INNOVATION

BIM, big data, cloud computing and analytics are changing how infrastructure is planned, designed, built and managed.

THE BUSINESS VALUE OF BIM FOR INFRASTRUCTURE

Intelligent, connected BIM (Building Information Modeling) workflows improve project processes and outcomes. Using BIM for infrastructure helps to:



DELIVER PROJECTS ON SCHEDULE

- Accelerate project approvals
- Better predictability



DELIVER PROJECTS UNDER BUDGET

- Profitable outcomes
- Larger ROI



PROVIDE BETTER DESIGN RESULTS

- Lower project risk

87%

of users realize positive value from BIM use

88%

of BIM users list "repeatable project delivery process" as a leading BIM business benefit

70%

of engineers use BIM for authoring models

60%

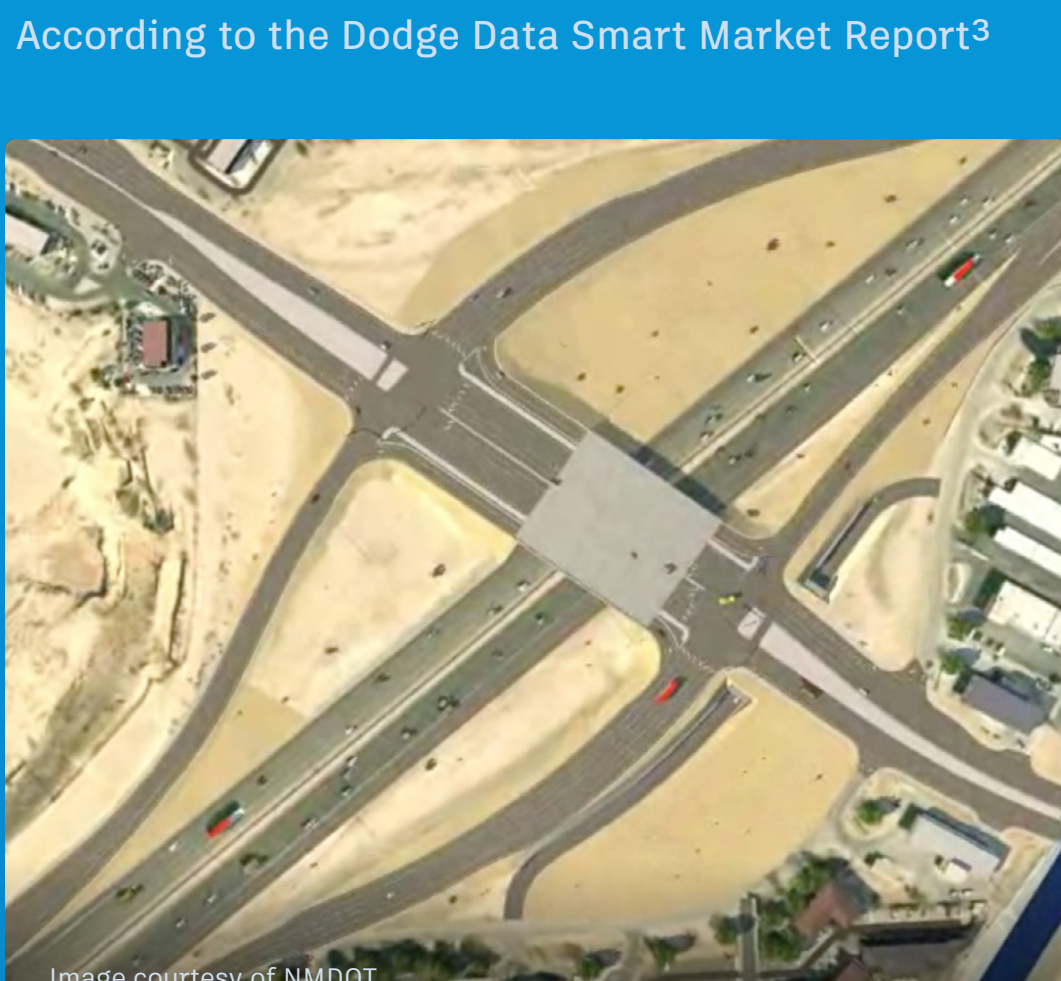
of engineers and contractors use BIM to improve team collaboration, stakeholder communication, and project outcomes

80%

of engineers and contractors report owner requests for BIM on at least some of their projects

64%

of BIM non-users express a future intent to use BIM for transportation infrastructure projects



Multi-Phased Reconstruction of I-25 Interchanges

MONTGOMERY I-25 INTERCHANGE

Albuquerque, NM
Originally built in 1961, Estimated start of construction in 2021

I-25 through Albuquerque is one of the busiest and most congested freeways in the state. Current traffic volumes overwhelm the existing corridor at Montgomery. The NMDOT plans to increase capacity with additional lanes, larger bridges, and reconfigure on and off ramps to a braided type condition. Due to these major changes, the NMDOT has integrated an InfraWorks model into a workflow process to track major quantities, investigate utility conflicts, evaluate design alternatives, and help communicate improvements to the public.



Communicating the Replacement of a Local Landmark

SIXTH STREET VIADUCT

Los Angeles, CA
Built in 1932, Replacement expected to be completed by 2020

Spanning the Los Angeles River, the Sixth Street Viaduct is one of America's most iconic bridges. The bridge was determined vulnerable to earthquakes and needed to be replaced. The team used a model-based workflow and a BIM process from the earliest stages of the project to control and understand the bridge's parameters. The model helped communicate that the replacement infrastructure was not only equal to the existing landmark, but that it would exceed in its ability to serve the public.

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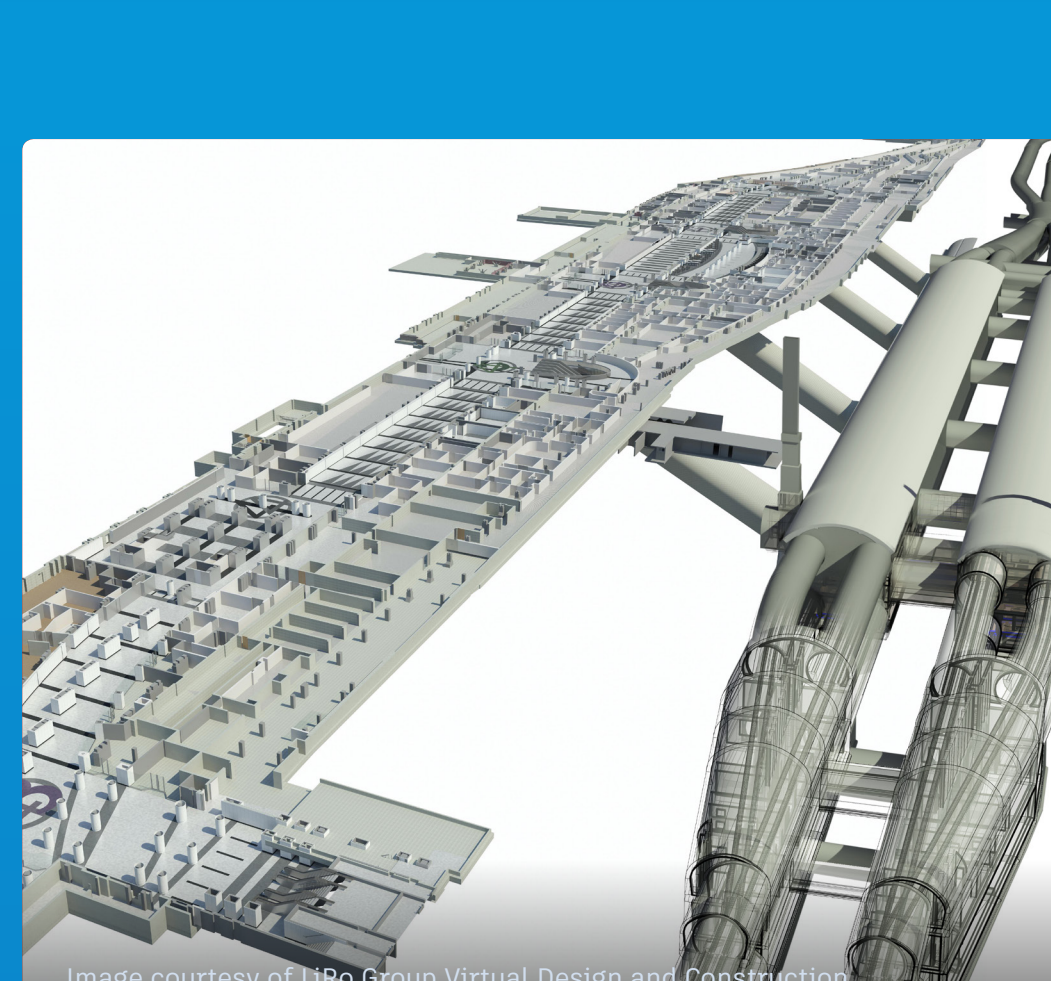
Scanning a Critical Existing Infrastructure Asset for the Future

GLEN CANYON DAM

Page, AZ
Built in 1964, 3D model completed in 2016

The second tallest concrete-arch dam in the United States, the Glen Canyon Dam, will serve as a pilot project for the benefit of creating unified, intelligent models of existing assets to support operational efforts. The model will make it easier for Reclamation to observe trends and forecast the impact of climate change. The resulting earlier and better maintenance will help ensure a lasting water supply for the western states, while preventing the kind of crisis unfolding at Oroville Dam.

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Implementing BIM Mid-Stream in a Long-Term Mega-Project

EAST SIDE ACCESS

New York City, NY
Completion expected by 2022
Project first discussed in the 1950s, initiated in the 1990s

One of the largest and most complex infrastructure projects currently underway in the United States, the East Side Access is a new train station connected to Grand Central Station. The long-term mega-project has had to adapt to the ever-changing city, requiring a dynamic planning structure to match. The team implemented BIM in the middle of construction to analyze, visualize, and communicate project geometry, data and workflows.

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GET THE MOST OUT OF BIM

Explore BIM workflows to drive efficiencies across your infrastructure project.

As part of the Architecture, Engineering, and Construction (AEC) Collection, BIM tools for Civil Infrastructure combine Civil 3D, InfraWorks, Revit, ReCap, and AutoCAD with other specialized tools to help you improve decision quality, project outcomes, and delivery.

LEARN MORE:

[HTTPS://WWW.AUTODESK.COM/SOLUTIONS/BIM/INFRASTRUCTURE/CONTACT-ME](https://www.autodesk.com/solutions/bim/infrastructure/contact-me)

SOURCES

¹ASCE (2018). 2017 Infrastructure Report Card. www.infrastructurereportcard.org

²USA Today (August, 2018). Infrastructure spending: Which state is falling apart the worst? www.usatoday.com/story/money/economy/2018/08/13/infrastructure-spending-states-that-are-falling-apart/37270513/

³Dodge Data & Analytics (2017). Smart Market Report: The Business Value of BIM for Infrastructure 2017. www.infrastructure-reimagined.com/smart-market