

States Across the Country Implement Accelerated Bridge Construction

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FACT SHEET
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Forty percent of U.S. bridges were built over 40 years ago, with a design life of 50 years.¹ With increased traffic volumes on our nation's aging roadways and bridges, there is a growing need to repair the most vital bridges in the highway system in an accelerated fashion to limit safety and mobility impacts. Because of this, accelerated bridge construction (ABC) is growing in popularity across the country.

ABC involves using various methods during project planning, design, contracting, and construction to significantly reduce the time to construct/replace a bridge, as compared to traditional cast-in-place methods. With ABC, a bridge can be removed and replaced in a matter of days rather than months or even years. ABC includes a range of methods, used individually or in combination. The primary methods for ABC are using pre-fabricated components that are built off-site and can be quickly put in place once on-site, or building the entire structure off-site and moving it into place using a self-propelled modular transporter (SPMT). Other ABC methods include working with stakeholders to innovate during planning; doing certain activities (e.g., right-of-way acquisition, utility relocation, materials procurement) sooner, before project advertisement; and accelerating schedules to reduce project delivery time.

ABC can improve safety, productivity, and quality, while reducing impacts to traffic and the environment. With ABC, traffic disruptions to motorists are significantly reduced, as roadwork is done in a fraction of the time and long-term work zones can be avoided. Because exposure to work zones is reduced, safety for the traveling public and construction workers is improved. Safety and efficiency can also increase because traffic control installation and removal happen less frequently. By limiting the time spent at the site reconstructing the bridge, construction impacts to the surrounding environment are reduced. Because ABC often involves building part or all of a bridge in a controlled environment away from live traffic, the end product is generally of higher quality and productivity is often greater as workers can focus on their work with less distractions from traffic. These benefits are particularly evident when a bridge is built off-site and moved into place using a SPMT, since the existing bridge can remain open until the new bridge section is transported into position and the existing bridge is replaced.

Utah DOT's ABC Approach

The Utah Department of Transportation (UDOT) is one of the forerunners in embracing ABC techniques. In Utah, ABC is considered for inclusion on all projects involving structures. UDOT started using ABC elements in 1997 and has now employed ABC methods and elements in over 200 settings. UDOT strives to accelerate project delivery by minimizing impacts to the public and encouraging innovation. By accelerating project delivery, UDOT has gained trust from political representatives and praise from the community. For Utah, ABC is a means to meet the goal of providing the best value to both roadway users and the general public.

Some examples of ABC techniques in Utah:

Use of SPMTs: On I-80 at Mountain Dell and Lambs Canyon near Salt Lake City, UDOT replaced four bridge superstructures in 37 hours over two weekends. The bridges were built adjacent to the existing structures in the median of I-80 over a four month period. They were then transported using SPMTs to their final location. This project was the first in the country to demolish, move, and replace two bridge superstructures in 16 hours, and was the first total closure (except for emergency access) of a major interstate trucking route for

¹ http://www.infrastructurereportcard.org/sites/default/files/RC2009_bridges.pdf

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bridge replacement. By implementing public outreach strategies, coordinating with local media for construction updates, meeting with the local community early and often throughout the construction process, and posting information in common areas that travelers frequent, UDOT was able to mitigate construction impacts and meet the needs of the local community with regard to mobility and safety. Using off-site construction and SPMTs, UDOT estimated that motorist delay was decreased by 180,000 hours, equating to a savings of over \$2.5 million.

Use of Pre-Fabricated Elements: The Riverdale Road over I-84 bridge was Utah's first "lego" bridge constructed in 2008. To reduce the construction impact to the area, UDOT implemented ABC. Several innovative solutions were employed. The bridge was constructed in phases using almost all pre-fabricated elements and non-composite concrete deck panels. The non-composite precast deck panels were placed on neoprene foam strips on the outside of the top flanges of the girders. There are no shear studs connecting the panels to the girders, which greatly accelerated the installation of the deck panels since shear studs did not have to be installed and grout pockets did not have to be filled. With this technique, the road closures and detours due to the bridge construction were reduced by several months, equating to a road user cost savings of over \$2 million.

What Are Other States Doing?

Florida: The Florida Department of Transportation used SPMTs to remove an old bridge and install a new one in a matter of minutes. The old Graves Avenue Bridge was moved from its current position across I-4 to the side of the road for demolition in 22 minutes in 2006. This was the first use of SPMTs in the United States to replace a bridge across an Interstate. Then SPMTs were used to move the new spans from their fabrication site along I-4 to the bridge location, limiting the impact on motorists to *only two weekend nights of detours/closures* along the corridor.

New York: The New York State Department of Transportation used pre-fabricated components to replace the Belt Parkway Bridge in Brooklyn *without impacting traffic during rush-hour*. Using traditional construction techniques, this replacement was scheduled to take 3-4 years to complete. Using ABC techniques, the entire project was completed in 14 months at a final cost of eight percent less than originally estimated.

Virginia: The Virginia Department of Transportation replaced the Coleman Bridge along Highway 17 *over a period of nine days*. The truss and swing spans were constructed off-site at a nearby manufacturing facility down the river from the bridge then floated to the construction site on barges. Originally, the contractor estimated the entire process to take 12 days, but finished three days earlier than anticipated.

Washington State: The Washington State Department of Transportation reduced the construction time for the replacement of the deck of the Lewis and Clark Bridge across the Columbia River from *four years to four months* of nighttime closures and three weekend closures by using SPMTs to bring in pre-fabricated elements for the deck replacement project. More than 3,900 feet of concrete deck paneling was installed using the SPMTs.

² <http://financecommission.dot.gov/Documents/Interim%20Report%20-%20The%20Path%20Forward.pdf>



Courtesy of Utah Department of Transportation.

Bridge Construction at Lambs Canyon in Salt Lake City, UT.

The Need for ABC

Between 1980 and 2008:

- Vehicle miles traveled increased by 94 percent.
- Number of licensed drivers grew by 34 percent.
- Lane miles available for travel increased by 7.1 percent.²

Points of Contact:

Carmen Swanwick

Utah Department of Transportation
801-965-4981
Email: cswanwick@udot.gov

Amy Scales

Florida Department of Transportation
386-943-5729
Email: amy.scales@dot.state.fl.us

Tracy Scriba

Federal Highway Administration
Work Zone Mobility & Safety Team
202-366-0855
Email: tracy.scriba@dot.gov



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