

# ACCELERATED BRIDGE CONSTRUCTION

Accelerated Bridge Construction (ABC) technologies are changing the ways State Departments of Transportation (DOTs) do business. Mobility impacts on bridge construction projects can be reduced to as a little as 48 to 72 hours and the project life-cycle from planning through construction can be trimmed by years. The accelerated project times significantly reduce traffic delays and road closures and could potentially reduce project costs. State-of-the-art ABC planning and construction methods, designs and materials produce safer, more durable bridges with longer service lives than conventional bridges. These timely innovations come when approximately 25 percent of our Nation's aging bridges need repair or replacement and our highways are already congested without the added strain of maintenance-related road closures.



Photo credit: Horrocks Engineers

Accelerated Bridge Construction uses safe and cost-effective planning, design, materials and construction methods to reduce the onsite construction time

involved in building new bridges or replacing and rehabilitating existing bridges. There are many ways to accelerate bridge construction. The FHWA Every Day Counts initiative focuses on three ABC technologies — including Slide-in Bridge Construction, Prefabricated Bridge Elements and Systems (PBES) and Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS).

- ▶ **Slide-in Bridge Construction** is a cost-effective technique for deploying PBES, or quickly replacing an existing bridge. A new bridge is built on temporary supports parallel to an existing bridge. Once construction is complete, the road is closed and the existing bridge structure is demolished or removed. The new bridge is positioned into place, tied into the approaches and paved within 72 hours.
- ▶ **Prefabricated Bridge Elements and Systems (PBES)** are structural components of a bridge that are built offsite or adjacent to the alignment. This practice

reduces the onsite construction time and congestion that occurs using conventional construction methods.

- ▶ **Geosynthetic Reinforced Soil – Integrated Bridge System (GRS-IBS)** is a construction method combining closely spaced geosynthetic reinforcement and granular soils into a new composite material. The GRS-IBS is easy to build and maintain. It is also 25 to 60 percent more cost-effective than conventional construction methods.

## BENEFITS

Benefits to employing ABC technology include:

- ▶ **Mobility impacts on bridge construction or replacement projects can be reduced to 48 to 72 hours with planning and bridge construction reduced by years.** Decreasing construction time directly benefits the public by significantly reducing traffic delays and road closures.
- ▶ **Reduced agency costs.** ABC can be the most cost-effective means of construction, especially when total project costs, including right-of-way acquisition, project administration, maintenance of traffic, environmental mitigation utility relocation, escalation or railroad flagging costs are considered.



BENEFITS	Slide-in Construction	PBES	GRS-IBS
Enhances Safety	✓	✓	✓
Can Lower Construction Costs	✓	✓	✓
Reduces Mobility Impacts	✓	✓	✓
Shortens Onsite Construction Time	✓	✓	✓
Reduces Environment Impact	✓	✓	✓
Can Improve Quality	✓	✓	✓
Increases Constructability	✓	✓	✓
Eliminates "Bump at the Bridge"			✓
Accommodates On-Site Modifications			✓

- ▶ **Reduced user costs.** ABC dramatically reduces work zone road user costs associated with bridge construction projects on existing roadways.
- ▶ **Improved motorist and worker safety.** Each year 2,000 fatal crashes occur in work zones. Forty-four percent of bridge construction worker injuries involve a vehicle traveling through a work zone and two-thirds of these injuries are fatal. Limiting the duration of traffic impacts reduces the exposure to work zone crashes, increasing safety for both the construction worker and the traveling public.
- ▶ **More durable, longer-lasting bridges.** As our Nation faces the prospect of crumbling infrastructure, this innovation is not only effective, but also incredibly important to addressing this serious, time-sensitive challenge.
- ▶ **An effective solution to environmentally sensitive areas.** ABC technologies may also be an effective solution or alternative in areas where construction may be constrained or delayed by environmental considerations or limitations.

- ▶ **Public support.** Post-construction surveys of residents and businesses indicate high levels of customer satisfaction for ABC projects.

## CURRENT STATE OF THE PRACTICE

Implementation of innovative ABC techniques continues to gain traction and use. Over 800 bridges have been designed or constructed using PBES since October 2010. Using GRS-IBS, almost eight GRS-IBS bridges have been designed or constructed on the National Highway System (NHS) with another 75 GRS-IBS bridges off the National Highway System since October 2010. Several states have successfully completed bridges using slide-in bridge construction, which is emerging as a cost-effective means of rapidly moving a bridge into position.

## SUPPORT AND AVAILABLE TOOLS

- ▶ Every Day Counts Accelerated Bridge Construction Website, <http://www.fhwa.dot.gov/everydaycounts/edctwo/2012/abc.cfm>
- ▶ FHWA Accelerated Bridge Construction Website, <http://www.fhwa.dot.gov/bridge/abc/index.cfm>
- ▶ *Accelerated Bridge Construction—Experience in Design, Fabrication and Erection of Prefabricated Bridge Elements and Systems Final Manual*. November 1, 2011, [www.fhwa.dot.gov/bridge/abc/docs/abcmanual.pdf](http://www.fhwa.dot.gov/bridge/abc/docs/abcmanual.pdf)

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*Every Day Counts (EDC), a State-based initiative of FHWA's Center for Accelerating Innovation, works with State, local and private sector partners to encourage the adoption of proven technologies and innovations aimed at shortening and enhancing project delivery*

