

Accelerated Construction of Railroad Bridges

by Kevin Eisenbeis, Burns & McDonnell



Precast concrete subcaps, caps, and double-cell box beams at Barstow, Ill. Replacement took place during a 16-hour track closure. Photo: BNSF Railway.

Accelerated bridge construction (ABC) practices have been used in the rail industry for many years. Most railroads are privately owned and revenue generation depends on efficient train operations. Design procedures and innovative construction techniques that minimize disruption to rail traffic have been developed, implemented, and refined to ensure rapid replacement of railroad bridges.

Besides reducing impacts to revenue generation, the rail industry faces other unique challenges that make ABC a necessity. The rail network is clearly defined and limited to specific track locations. Detours can add rail traffic to already-congested routes and may involve using a competitor's track, where access may not be a priority. Amtrak passenger trains also share many routes throughout the country. Speed restrictions or track outages can affect the entire rail system. In addition, many railroad bridges are located in remote locations where access by conventional roadway is not available. In many instances, the terrain is also unsuitable or right-

of-way is not available for a temporary bypass.

Railroad bridge construction typically takes place under live rail traffic conditions, within track windows (defined times between scheduled trains) or during track closures (defined shutdowns), or a combination thereof. Techniques to accomplish construction rapidly during track windows or short closures include using precast concrete elements, building substructures below existing bridges prior to superstructure removal, staged construction change-outs, simplified connections between elements, lateral slide-ins, float-out/float-ins, and others.

Barstow, Ill.: 16-Hour Closure

An example of typical rail system bridge replacement using precast concrete elements and ABC techniques occurred in Barstow, Ill.

The single-track bridge replacement used a unique system of precast concrete subcaps and full-width pier caps to accomplish the bridge replacement during a 16-hour track closure.

Piling was driven at new pier locations outside the limits of the existing bridge. Small precast concrete subcaps were attached by welding piles to embedded plates. Once all subcaps were installed, the existing concrete bridge was removed, allowing rapid installation of new full-width caps to the subcaps, then subsequent setting of the precast concrete double-cell box beams.

ABC Push

Economic factors drive the use of ABC techniques in the rail industry. Revenue generation is paramount and disruption to rail traffic must be minimized. ABC techniques, including the use of precast concrete elements, provide a means to accomplish rapid replacement of railroad bridges and minimize disruption to rail traffic. 

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