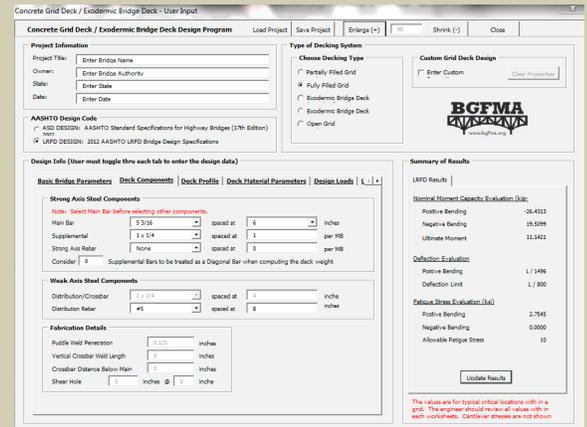


## New Design Program for Filled Grid and Exodermic® Bridge Decks Now Available

A main focus of the BGFMA is to ensure that bridge engineers and owners have the support and resources needed to properly design and detail grid reinforced concrete and Exodermic® bridge deck systems. In an effort to make the design process as quick and simple as possible, we recently completed development of a new comprehensive and user-friendly design program. This new program not only works for design of standard grid systems and configurations, but also custom grid decks in accordance with both AASHTO ASD and LRFD design provisions. Please contact the BGFMA the next time you are considering a grid reinforced concrete or Exodermic bridge deck so we can share this new program with you.



New BGFMA design program.

## National Student Steel Bridge Competition

The BGFMA was once again a proud sponsor of the ASCE / AISC National Student Steel Bridge Competition (NSSBC), hosted this year at the University of Washington. Forty-nine universities from across the United States and Canada participated in the competition, which took place on May 31st-June 1st. Only the top few teams from each regional conference were invited to take part in national competition, so great job to all those who qualified. And a special congratulations to the student team from the University of California, Berkeley, who were crowned the overall winners.



Students competing at the 2013 NSSBC.



Hec Edmundson Pavilion, site of the 2013 competition.

## Accelerated Bridge Construction (ABC) Used to Replace Allegheny County, PA Bridge

**The Montour Run Bridge No. 6** in North Fayette and Moon Townships, PA, carries Scott Road over the Montour Run just a few miles west of downtown Pittsburgh. The existing bridge was badly deteriorated and needed to be replaced.



*The new Montour Run Bridge #6, completed ahead of schedule.*

With Scott Road being the only means of access to several businesses on one side of Montour Run, the options for bridge closure were limited. Using conventional construction methods, it was estimated the bridge replacement would take 3.5 months, therefore this option was eliminated immediately. Staged construction was ruled out because wide permit vehicles regularly used the narrow bridge, and with restrictions on each side of the structure there was no place to install a temporary crossing. This required the Allegheny County Department of Public Works and structural engineers at HDR to demolish the old bridge and build a new one in only a few days utilizing prefabricated bridge elements and systems. The project team decided to take on this challenge last year over the long Thanksgiving weekend - which only provided a 4.5 day closure window.

After staged construction was ruled out, the plan, developed by the Allegheny County Department of Public Works and HDR Engineering, was to deliver the prefabricated rolled beam and deck sections in two halves and assemble the superstructure separately on the precast abutment caps. Once in place the two sections could be bolted together and the 7.188-in deep grid reinforced concrete deck (5.188-in steel grid deck with 2-in concrete overfill) finished with a concrete closure pour. The low bidding contractor, Joseph B. Fay, decided to utilize lightweight concrete in conjunction with the already light grid deck, and assemble the entire superstructure in one piece adjacent to the existing bridge before lifting it into place with a 550 ton super crane. The use of steel beams and a lightweight concrete filled grid deck allowed the contractor to keep the crane pick weights to a minimum. This option was welcomed by the owner and consultant because it also eliminated a closure joint down the middle of the bridge.



*Grid deck panels placed on the framed superstructure.*

The concrete filled steel grid deck was also selected for its known durability and is expected to last 75 years or more, which is critical considering the impact any future construction would have on local businesses. To the delight of the project team and local businesses, the project was completed in just 3 days, 1.5 days ahead of schedule!

## Deck Replacement on the Walt Whitman Bridge Nears Completion

Designed by renowned civil engineer Othmar Ammann and constructed by the legendary American Bridge Company, the **Walt Whitman Bridge** was first opened to traffic back in 1957 and utilized a concrete filled steel grid deck. The seven-lane 3,540' long suspension bridge is owned and operated by the Delaware River Port Authority (DRPA) and currently carries roughly 120,000 vehicles per day on I-76 over the Delaware River between Philadelphia and New Jersey. To accommodate peak traffic during morning and afternoon rush hours, the DRPA utilizes a movable barrier on the structure to reverse traffic in the middle lane in or out of Philadelphia. The "Walt" is also the primary route for sports fans and vacationers, giving access to the Sports Complex in South Philadelphia for sporting events and the Jersey Shore during summer travel months.

After more than a half-century of heavy use the Walt Whitman Bridge was in need of repairs, so in 2010 the DRPA awarded a \$128 million deck replacement contract to American Bridge, the same company that originally built the bridge in the mid 1950's. Deck replacement did not actually begin until late 2011, as American Bridge used the first year to install a temporary work platform below the existing deck, as well as design and assemble three overhead gantry cranes (one for each span). This work platform and gantry system was necessary to overcome lane closure and work zone restrictions imposed by the DRPA and keep traffic flowing on this important crossing. Construction staging allowed a fulltime single lane closure for deck replacement throughout all phases of the project, with additional access lane closures being permitted during off-peak hours.



*Pouring concrete in grid deck panels on the Walt Whitman Bridge.*

The new, modern steel grid deck filled with lightweight concrete is not only being used to save weight over the existing grid, but is also designed by AECOM & Weidlinger Associates to be a "floating deck" system which significantly reduces the number of expansion joints required. Originally located every 120 feet in the deck, 26 expansion joints have been eliminated with the new design and the only joints currently required are at the towers and anchorages. Elastomeric bearings of varying type between new stringers and existing floorbeams were used to achieve this floating deck system.



*Grid deck stage line.*

Currently in the seventh and final stage, American Bridge is well ahead of schedule and expects to wrap-up the 271,000 square foot redecking project this fall - months ahead of the early completion date set for January 2014. Bill Batzel, Field Engineer for American Bridge said "the project is going very well and we are completing one stage (one lane) about every 3 months. We have not encountered any significant issues installing the deck panels, however bolting the trim bars and welding the distribution bars has been a little time consuming - but is still much faster than installing a conventional CIP concrete deck." Since one lane is roughly 39,000 square feet, American Bridge is averaging nearly 13,000 square feet per month.

Additional information on the evaluation process used to select the grid deck system can be found in the recently published paper "[\*Walt Whitman Bridge Suspended Spans Redecking\*](#)" from The 8th International Cable Supported Bridge Operators' Conference, held in Edinburg, Scotland.

## Grid Facts

The BGFMA is often asked about maximum fabricated panel dimensions when considering panel layout, staging, handling, etc. In general the maximum permissible width, whether a bare steel grid or precast grid deck panel, is 8'-6" as this dimension coincides with the width of a standard tractor trailer. Although wider sections can be fabricated they will require extra care (and trucking permits) during shipping and handling. The maximum permissible length of a panel is approximately 40 to 45 feet which is dictated by the available length of galvanization kettles.

When evaluating panel layout, it is also important to consider panel tolerances. The BGFMA fabricators manufacture with tight quality controls however if panel proximity is close (i.e. bolted panels, etc.), allowable tolerances for plan dimensions and sweep must be considered. Panel tolerances should be included or referenced in the contract documents. The BGFMA fabrication tolerances for grid decks, TS-01, is available online at [www.bgfma.org](http://www.bgfma.org).

## More Information

If you would like to receive more information about the features and benefits of grid deck systems, please contact us at **1-877-257-5499** or [bgfma@bgfma.org](mailto:bgfma@bgfma.org). We are also available to make presentations at your office and can offer continuing education credits for professional engineers as a registered provider in New York and Florida.

## BGFMA Tradeshow Schedule

Please visit BGFMA members at our exhibit booth during the following upcoming bridge engineering conferences:

<b>New York City Bridge Conference</b>	<b>August 26-27</b>	<b>New York, NY</b>
<b>Western Bridge Engineers' Seminar</b>	<b>September 3-6</b>	<b>Bellevue, WA</b>
<b>Western NY ABCD Fall Conference</b>	<b>November 15</b>	<b>Buffalo, NY</b>

