

Welcome!

Welcome to the first edition of the BGFMA's newsletter named *GRIDLINE*. We hope to publish *GRIDLINE* on a regular basis to keep bridge design engineers and owners informed about new developments related to grid deck systems.

The **Bridge Grid Flooring Manufacturers Association (BGFMA)** is an industry trade group comprised of companies who fabricate steel grid deck systems for bridges and other companies with an interest in this market. Building on the 70-year service history of filled grid systems, BGFMA is focused on the reliable development and application of open grid, grid reinforced concrete, and Exodermic™ bridge decks to meet the demands of the engineering community and the traveling public.

Current member companies include **Bailey Bridges, Inc., The D.S. Brown Company, Interlocking Deck Systems International (IDSI), and L.B. Foster**. Associate member companies include **American Bridge, Gautier Steel and McDonald Steel**. BGFMA membership is open to all companies and individuals with involvement or an interest in the steel grid bridge deck market. Please contact us if you are interested in becoming a member or if you have specific questions about steel grid deck systems.

Mark Kaczinski, P.E.



Information on Recently Completed Projects:

I-285 in Atlanta, Georgia

The **Georgia DOT (GDOT)** recently teamed up with the Atlanta-based design firm **J.B. Trimble (JBT)** and contractor **L.C. Whitford (LCW)** to replace the decks of two major bridges on I-285. Both bridges cross major commercial links and with traffic volumes at nearly 300,000 vehicles per day, you can bet the GDOT Office of Maintenance wanted a rapid method of replacement that would prevent gridlock in Metro Atlanta.

GDOT considers using prefabricated deck systems when the costs of the traffic impact outweigh the additional material costs. Anyone who commutes on I-285 in rush-hour traffic understands the impact when lanes are shut down. You must also consider the potential accidents in construction zones and the loss of revenue to companies who ship goods on these roadways. Because of the condition of the deck, JBT recommended a prefabricated deck system using a steel grid deck composite with a full-depth, overfilled precast slab. Although GDOT was unfamiliar with this type of construction, the ability to reconstruct the deck on weekends and therefore minimize any disruption to traffic flow, justified the selection of a prefabricated grid deck system. *(continued, next page)*



I-285 - Steel Grid Deck
(Photo Courtesy of LB Foster)

BGFMA member **LB Foster** supplied the 4¼” interlock steel grid panels to the prime contractor — The L. C. Whitford Co., Inc. (LCW) Georgia Division. LCW specializes in accelerated bridge construction projects on the congested interstate system around Atlanta and is no stranger to the stringent demands of this type of work. Panels were then precast by LCW employees at their Alpharetta yard. Weekend work was confined to 56 hours — 9:00 pm on Friday to 5:00 am on Monday, and the contract limited the number of available weekends to 16; LCW was able to complete the 25,720 sq. ft. deck replacement in 11 weekends. From GDOT’s perspective, this project was considered a success largely due to the significant reduction in traffic impact. Because of this success, GDOT, JBT, and LCW have since completed two other similar projects on I-75. GDOT will continue to examine other sites for potential use of prefabricated grid deck systems.



*I-75 - Grid Deck Construction
(Photo Courtesy of L.C. Whitford)*

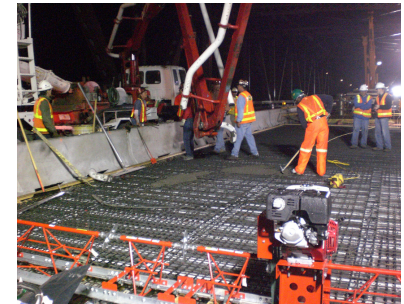
Mathews Bridge in Jacksonville, Florida

Exodermic™ decks are often selected for their lightweight, design efficiency and the speed at which they can be placed and completed. When **Reynolds, Smith & Hills, Inc. (RS&H)** was given the task to replace the open grid deck on the channel span of the heavily traveled Mathews Bridge in Jacksonville, Florida, they had another reason to select an Exodermic™ deck — Ride Quality.



Mathews Bridge

In 2006, **FDOT** awarded RS&H the contract to design a new closed-deck system; FDOT also limited construction to 90 days. In addition to the required rapid replacement, the new deck had to be weight-conscious to replace the existing open grid deck. The total weight of this Load and Resistance Factor Design (LRFD) compliant cast-in-place Exodermic™ deck was 48.8 lbs/sf. Cost savings occurred because this weight required minimal strengthening of the truss system and the existing floor beams.



*Mathews Bridge - Concrete Pour
(Photos Courtesy of RS&H)*

Tampa-based **PCL Civil Constructors, Inc.** was awarded the contract, and BGFMA member **Interlocking Deck Systems International (IDSI)** supplied the Exodermic™ grid panels. The phased project was scheduled to be completed by the end of July, 2007. However, because the prefabricated panels act as their own formwork, PCL completed the project two weeks early — much to the relief of Jacksonville residents.

Profile of New Projects:

Walt Whitman Bridge between Philadelphia and New Jersey



In another testament to the longevity of concrete reinforced grid decks, the Walt Whitman deck recently celebrated its 50th birthday. Throughout the life of the deck, there has been a 2.5” overlay of asphalt concrete that has been replaced, as needed, over the years. The total weight of the grid reinforced concrete deck is roughly 66 lbs/sf plus an additional 31 lbs/sf for the bituminous overlay. The total deck weight is 97 lbs/sf.

The **DMJM Harris Philadelphia** office was selected to conduct a feasibility study to determine what type of replacement deck would be the most cost-effective solution considering the following criteria: *(continued, next page)*

Profile of New Projects - Walt Whitman Bridge between Philadelphia and New Jersey

- The deck dead load must be reduced.
- To prevent gridlock, maintenance and protection of traffic (MPT) plans require that no less than four of the seven lanes remain operational at all times during construction.

Two deck types made the final selection list for consideration:

- Grid Reinforced Concrete Deck with Lightweight Concrete
- Orthotropic Steel Plate Deck

Although the orthotropic deck is one of the lightest decks, the cost to construct and install it is daunting because of the MPT requirements. The reasonably- priced, fully filled grid was recently selected because of its modular nature that allows for a faster staged construction. The project is currently in the final design phase.

Research Efforts:

Prior to the introduction of the AASHTO LRFD Bridge Design Specification in 1994, fully filled and partially filled grid decks were designed considering only allowable stresses using defined moment equations. Many of these decks were placed in service over 30 years ago, are still functioning as designed, and have experienced average daily truck traffic volumes greater than 5000 trucks per day!

In the release of the 2003 Interims to the 1998 2nd Edition AASHTO LRFD Design Specification, the live load moment equations in Section 4.6.2.1.8 were revised to be more conservative and account for relevant factored load combinations including truck and tandem loads. New requirements to evaluate fatigue and equations to evaluate mid-span deflection under service load were also added. However, when the same in-service decks designed for allowable stress are evaluated under these requirements, the resulting maximum permissible span is significantly less than span lengths that have provided trouble-free performance for many years.

Recently, the BGFMA sent deck and traffic data for 26 in-service structures, whose design predates the current AASHTO criteria, to Oregon State University Professor Christopher Higgins, PhD, P.E. Dr. Higgins has been evaluating the potential for discrepancy between the current design code and the historical performance of these decks. The BGFMA will disseminate information about the study to calibrate AASHTO LRFD as that information is received.

Attention Designers:

Do you hold an electronic copy of the **Standard Exodermic™ Bridge Deck Design Spreadsheet**? If so, please note that the following improvements have been incorporated in to this helpful design tool.

- The distribution bar height has been increased from 1½” to 2” for all 5” WT deck systems.
- The deck cantilever section has been updated to reflect the requirements of the AASHTO LRFD Bridge Design Specifications, Section 13. The program is set up for the PennDOT Typical 42” TL-5 Concrete Parapet but could be modified for other barrier types.
- A Shallow Exodermic™ bridge deck design sheet has been developed for 4” WT decks and has replaced the dropped distribution bar design.

Call or email to receive an updated version of the design spreadsheet.

Grid Facts:

For the determination of the effective flange width for composite construction, **AASHTO LRFD, Section 4.6.2.6.1**, specifies for filled grids, partially filled grids, and unfilled grids composite with reinforced concrete slab (Exodermic™ deck), the “slab depth” used should be the full depth of grid and concrete slab, less a sacrificial depth for grinding, grooving, and wear (typically 0.5”).

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. 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.

2009 BGFMA Tradeshow Schedule:

Please visit BGFMA members at our exhibit booth during the following bridge engineering conferences in 2009:

The International Bridge Conference	June 14-17	Pittsburgh, PA
New York City Bridge Conference	August 17-18	NYC, NY
Western Bridge Engineers Seminar	September 21-23	Sacramento, CA
Ohio Transportation Engineering Conference	October 27-28	Columbus, OH
World Steel Bridge Symposium	November 17-20	San Antonio, TX



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