

## Silano Lecture

# Recent Research in FRP Reinforcement and Stay-in-Place Formwork for Bridge Decks

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**InterSchool Lab, 750**

### *Abstract*

This presentation will review recent research studies conducted at the University of Wisconsin-Madison related to the analysis, design and construction of four full-size concrete bridge decks reinforced with FRP reinforcements and/or utilizing FRP stay-in-place formwork. The bridges were constructed on conventional narrow-flange precast concrete girders, wide flange bulb-T precast concrete girders or steel beams. The FRP reinforcements for the concrete deck consisted of single or double layer pultruded FRP grating mats or discrete pultruded FRP reinforcing bars. The FRP stay-in-place forms consisted of a heavy pultruded FRP form capable of spanning 3 m and acting simultaneously as the positive moment reinforcement for the deck, or a light weight pultruded FRP plank that acted as non-structural form and served to control flexural cracks. One of the decks was a reinforcement-free deck which contained no continuous reinforcing bars in the deck and relies on arching action in the deck and lateral restraint by the girders to prevent punching failure of the deck. The use of the FRP materials was intended to explore the advantages of FRP for both long-term durability and accelerated construction technologies for future bridge decks.



### *Biography*

Lawrence Bank is a Professor in the Department of Civil and Environmental Engineering at the University of Wisconsin-Madison and a Program Director at the National Science Foundation. His research interests are in composite materials for infrastructure applications, and design of buildings for security and sustainability. He is the author of numerous technical publications on composite materials and structures and the textbook *Composites for Construction: Structural Design with FRP Materials* (Wiley, 2006). Dr. Bank received his BSc degree from the Technion in Israel in 1980, and his MS and PhD degrees from Columbia University in 1982 and 1985. He is a registered Professional Engineer in Wisconsin and the District of Columbia, and a Fellow of the *American Society of Civil Engineers (ASCE)* and the *International Institute for FRP Composites in Construction (IIFC)*.