

# CIVIL ENGINEERING FORUM

WEDNESDAY, MARCH 25 2009

10:30 AM – 1:30 PM

## THE MASSIVE BOOM OF COMPOSITE APPLICATIONS IN CIVIL ENGINEERING



### Moderator

● **Laboratoire Central des Ponts et Chaussées. Monsef DRISSI-HABTI, Director of Research.**

Presently head of the Cable Behaviour and Metal Consultancy Unit at the Division for Metals Reinforcements and Cables in Structures at LCPC in Nantes. Senior researcher for the Japanese Ministry of International Trade and Industry (MITI, 1995-1998). Visiting professor at the University of Tokyo (1999-2000) and at the Brown University of Engineering (2001-2003). PhD in 1994 and Habilitation to Manage Research in 1999.

### Smart Composite Structures in Civil Engineering-LCPC Projects

- Smart composite structures to provide higher human and good safety
- Embedding sensors in composite structures to get accurate views on overstressed areas
- The COMPOSI-GeC long-term research program recently launched by the LCPC



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● **National Institute of Standards & Technology (NIST), MD USA.**  
**Dr. Joannie W. Chin, Materials Research Engineer Materials and Construction Research Division Building and Fire Research Laboratory**
  - Overview of NIST research (present and future) on FRP composite materials
  - Issues involved in use of composite materials in civil infrastructure
  - Processing and environmental exposure factors impacting FRP composite material performance in civil infrastructure
  - Load and resistance factor design (LRFD) approach to FRP composites
- 2 Multifunctional Sandwiches for Sustainable Infrastructure** 33  
● **Ecole Polytechnique Fédérale de Lausanne EPFL. Prof. Dr. Thomas Keller**
  - Prefabrication of lightweight, single-layer and function-integrated components with rapid on-site installation
  - Structural, building physics, architectural functions and energy supply (encapsulated solar cells) all integrated into single components
  - Low-energy standards easily met while lightweight construction maintained

### SUCCESSES IN COMPOSITES FOR BRIDGE APPLICATIONS

- 3 Economics of Composite Bridge Decks** 45  
● **Martin Marietta Composites, Inc. Grant Godwin, Vice President and General Manager**
  - Overview of successes in composites for bridge deck applications since the mid-1990's
  - Life cycle costing methodology as a decision tool with examples and comparison between European and American decision processes and construction alternatives
  - Recommendations for the continued development of advanced composites in bridge and civil applications
- 4 FRP Composite Bridges: 10 Years of Experience and Getting Stronger** 63  
● **National Composite Center in the US, Lou Luedtke, CEO**  
● **Composite Advantage, Scott Reeve**
  - Ten year' experience from installing fifteen composite bridge decks and monitoring performance
  - Key benefits of composites for civil engineering community: durability, corrosion resistance, low maintenance, light weight and quick installation
  - Bridge types where composites provide the most value
  - The newest product: a full composite superstructure for short spans

### CARBON FIBRE CABLES UNDER CONSTRAINTS

- 5 Composite Cables Under Constraints** 79  
● **Freyssinet Carbon Composite Cables anchorages system, Christian Tourneur**  
● **Freyssinet Carbon Composite Cables anchorages system, Ivica Zivanovic**
  - Carbon fibres rods used by Freyssinet as cables with specific anchorages specially developed and patented allowing to take advantages of the material as lightweight, high-fatigue properties and no corrosion sensitive.
  - Remarkables examples using this technology as stay cable footbridge constructed in France, carbon fibres cable for offshore application and reinforcement of tubular steel structures in order to increase its load capacity.
- 6 CFRP Tendons for Cable-Supported Bridges** 97  
● **EMPA, Swiss Federal Laboratories for Materials Testing and Research., Prof. Dr. h. c. Urs Meier, Dipl. Ing. ETH/SIA**
  - Long-term experience
  - Visions for future applications

### REPAIRING CIVIL ENGINEERING STRUCTURES WITH CARBON FIBRES

- 7 Repairing Building and Civil Engineering Structures with Carbon Fibres** 159  
● **Sika France SA. Yvon Gicquel, Product Manager Repair Reinforcement - Rigid bonding**
  - Composites for civil engineering
  - Product characteristics and benefits
  - Some examples of applications and references