New Bridge Material Design Options
What is TIG?

- Technology Implementation Group
- Identify and champion the implementation or deployment of a select few proven technologies, products or processes that are likely to yield significant economic or qualitative benefits to the users.
- TIG reports to the Standing Committee on Highways (SCOH)
The Lead States Team

- Kenneth Sweeney, Chief Engineer, MaineDOT
- Dale Peabody, Research Engineer, MaineDOT
- David Sherlock, Bridge Program Mgr, MaineDOT
- Dr. Tadeusz C. Alberski, NYSDOT
- Raja Jildeh, Michigan DOT
- Stacy McMillan, MissouriDOT
- Christine Mizioch, MassDOT
- Mansour Mike Mohseni, Colorado DOT
- Larry Parent, Adv. Structures and Composites Ctr, UMaine
- Lou Triandifilou, FHWA, Turner – Fairbank
- Stephen Von Vogt, Executive Director, Maine Composites Alliance, “Friend” of the Team
Support From:

► Keith Platte, AASHTO TIG Coordinator
► Andrew Wimsatt, TTI
► Paul Krugler, TTI
► Monica Worth, Worth Associates
Tentative Schedule

► April 12 - Initial Conference Call

► June 1 - Follow-up Conference Call

► June 21 to 23 - Initial Face to Face meeting in Maine to develop marketing plan
New Bridge Material Design Options

► Rigidified FRP Arch Bridges
  ► (Bridge in a Backpack)

► Hybrid Composite Beam

► tig.transportation.org
National Recognition for Bridge-in-a-Backpack

AASHTO Technology Implementation Group

AASHTO TIG - 2011 Focus Technology

American Society of Civil Engineers
2011 Charles Pankow Award for Innovation

2010 Award for Composites Excellence
Most Creative Application

American Composites Manufacturers Association
The Composites Connection

Engineering Excellence Award
Royal River Bridge, Auburn, ME
Kleinfelder|SEA Consultants & Maine DOT

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES
100 Years of Excellence

Also recently featured in: ENR, Concrete International, Popular Science, Popular Mechanics, NY Times...
Composite Arch “Bridge-in-a-Backpack” System

“Hybrid bridge system combining benefits of high-performance composites with cast-in-place concrete”

Image Credit – NY Times/University of Maine
Early Projects 2008-2009

• Neal Bridge, Maine DOT demonstration project in 2008
• First installation of a composite arch system
• 34’ Span, 23 arches (12” diameter)

• McGee Bridge, Anson, ME 2009
• First commercial installation by AIT
• First project awarded on a low-cost basis, competing against traditional materials
• Design-build project
• 28’ span, 12 arches (12” diameter)
Third Generation Bridges

- **Bradley, ME – Jenkins Bridge**
  - 28’ Span
  - Composite Panel Headwall
  - 14 Arches (12” Diameter)

- **Auburn, ME – Royal River Bridge**
  - 38’ Span
  - Precast T-Wall Headwall
  - 13 Arches (12” Diameter)

- **Belfast, ME – Perkins Bridge**
  - 48’ Span
  - Precast T-Wall Headwall
  - 16 Arches (15” Diameter)

- **Hermon, ME – Tom Frost Memorial Bridge**
  - 45’ Span
  - Snowmobile/Pedestrian
  - 3 Arches (12” Diameter)
2011 Projects – Expanding in New England

• **Fitchburg, MA**
  – Part of MASS DOT Accelerated Bridge Program
  – 38’ Span
  – Composite Panel Headwall
  – 15 Arches (12” Diameter)

• **Pinkham Notch, NH**
  – 24’ Span
  – Composite Panel Headwall
  – 6 Arches (12” Diameter)

• **Caribou, ME**
  – Largest Span Bridge to Date
  – 54’ Span
  – Precast Panel Headwall
  – 22 Arches (15” Diameter)
Future Prospects
National and International

► U.S. Interest
  - Proposals submitted for “Bridge-in-a-Backpack™” in 11 States
  - AIT has begun dialogue with over 20 states about potential future projects

► International Interest
  - Working on proposals, and/or in discussion on future work in the following countries:
    - United Arab Emirates
    - Trinidad
    - Russia
    - Nigeria
    - Panama
    - Mexico
    - Canada
Hybrid Composite Beams
Building Better

Overview & Status Update
May, 2011

www.hcbridge.com
What is the HCB?

“Tied Arch in A Fiberglass Box”

A structural member using several different building materials resulting in a cost effective composite beam designed to be stronger, lighter, and more corrosion resistant.

- Compression Arch - SCC Concrete
- Tension Reinforcement - Galvanized P/S Strand - Fiberglass Cloth
- FRP Shell
- Galvanized Shear Connectors
Benefits of the HCB

- **Sustainability**: (100+ year service life)
- **Congestion Relief**: (perfectly suited for modular bridge installation “ABC”)
- **Lightweight**: (10% of Concrete)
- **Reduced Carbon Footprint**:
  - Uses 80% less cement than concrete structure
  - Number of trucks for delivery greatly reduced
Projects Completed/Under Contract

- Nov 2007 (30’) Railroad Bridge at TTCI in CO
- Aug 2008 (57’) High Road Bridge in IL
- Oct 2009 (31’) Route 23 Bridge in NJ
- Mar 2011 (42’) Railroad Span for BNSF
- Jun 2011 (540’) Knickerbocker Bridge in ME
- Jul 2011 (100’) Research Pier in Machias, ME
- Jun 2011 (180’) Safe & Sound Bridge B0439, MO
- Aug 2011 (120’) Safe & Sound Bridge B0482, MO
- Fall 2011 (106’) Safe & Sound Bridge B0410, MO
Anticipated Projects – 2011-2012

- Overpass in UTAH ($1M FHWA – HfL Grant)
- 4,000 foot Boardwalk – Ocean City, NJ
- 3,000 foot Potash Berth – Prince Rupert Sound
- 4 Bridges for Korean Expressway Corporation