

GFRP Rebar Workshop

2016



Design Training

Post-Expo

6/15/2016, 1:00pm - 4:00pm

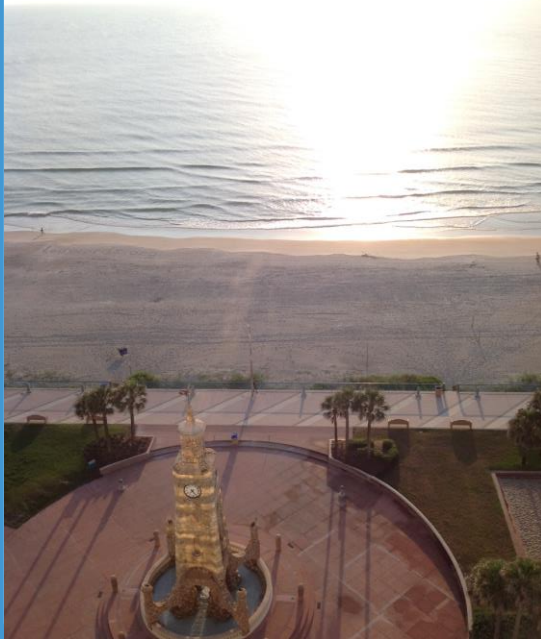
Hilton Daytona Beach Oceanfront Resort

St Johns Room

100 North Atlantic Avenue

Daytona Beach, Florida 32118, USA

Tel: 1-386-254-8200



Mission Critical Statement

- In support of FDOT's [Invitation to Innovation](#) initiative (Fiber Reinforced Polymer (FRP) Reinforcing Bars and Strands) a GFRP Rebar Workshop will be convened immediately following 2016 FDOT Design Training Expo, in Daytona Beach, Florida.
- The workshop is intended to identify: design; material; and construction criteria that could be refined so that FDOT might effectively leverage the most benefit from this non-traditional reinforcing materials. The workshop is aimed at building collaboration with the GFRP rebar industry, and identifying areas of improvement and economy with knowledgeable designers, researchers and manufacturers.
- **The workshop will provide stakeholders with the opportunity to improve GFRP rebar deployment in support of the Florida Department of Transportation's statewide initiative to improve road user safety and operations.**

FDOT's Fiber-Reinforced Polymer Deployment Train



Agenda

- **Welcome** (5 min.)
- **Part 1 - Presentations** (60 min.):
 - GFRP Industry perspective
 - ACMA-TSC (John Busel)
 - Owens Corning (Chris Skinner)
 - ACI Committee 440 perspective (Antonio Nanni)
 - AASHTO-T6 perspective (Will Potter – FDOT Rep.)
 - FDOT perspective
 - Materials (Chase Knight)
 - Design (Steve Nolan)

Break (15 min.)

- **Part 2 - Discussion on Needs** (60 min. – *Facilitated Discussion*):
 - Design Criteria
 - Durability Issues
 - Material Specifications & Vendor Approvals
 - Construction Specifications
 - Products in the marketplace (present and future)
 - Research Focus
- **Part 3 - Action Items & Next Step** (20 min.)

List of invited attendees:

FHWA:

- Florida - Jeffrey Ger Jeffrey.Ger@dot.gov
- Washington DC-Infravation - David Kuehe David.Kuehn@dot.gov; Katherine Petros Katherine.Petros@dot.gov
- Colorado (FRP Rep) Jamal Elkaissi jamal.elkaissi@dot.gov
- SCRP - Benjamin Graybeal Benjamin.Graybeal@dot.gov;
- TFHRC - Zach Haber zachary.haber.ctr@dot.gov

Universities:

- FAMU-FSU - Michelle Rodenberry mroddenberry@fsu.edu; Raphael Kampmann rk11h@my.fsu.edu
- UM & ACI 440 rep - Tony Nanni nanni@miami.edu
- UNF - Adel ElSafty adel.el-safty@unf.edu
- UF - Trey Hamilton hrh@ce.ufl.edu; Gary Consolazio grc@ce.ufl.edu
- USF - Rajan Sen sen@eng.usf.edu
- Embry-RiddleUniversity - Jeff Brown BROWJ112@erau.edu + student
- CRIB & UofSherbrooke - Brahim Benmokrane Brahim.Benmokrane@usherbrooke.ca

GFRP Industry:

- ACMA – John Busel (ACI 440 member) jbusel@acmanet.org
- Ashland - Joy Bennett LJBennett@ashland.com
- ATP srl – Luigi Giamundo l.giamundo@atp.sa.it
- BP Composites/TUF-BAR – Didier Hutchison didier@tuf-bar.com; or Randy Brandstrom randy@tuf-bar.com
- Composite Rebar Technology – Robert Gibson gibson2350@aol.com
- Hughes Brothers – Doug Gremel doug@hughesbros.com; Ryan Koch ryan.koch@hughesbros.com
- Interplastics Corp. – Damon Brown DBrown@interplastic.com
- Marshall Composite Technologies/ACMA FRP-RMC – Cam Crawford ccrawford@oregonbl.com
- Owens Corning – Mikhail Vorobiev <Mikhail.Vorobiev@owenscorning.com>; Chris Skinner <Christopher.Skinner@owenscorning.com>
- Pultrall/V-ROD – Mathieu Champagne mathieu.champagne@pultrall.com
- Raw Energy Materials Corp. – Don Smith <Don@rawenergytech.com>
- Sigma DG/Mateen – Ashley McWatters ashley@sigmadg.com; or Pultron – Dominique Pace dpace@mateenbar.com; Pete Renshaw pete@pultron.com

FDOT – Central Office:

- SDO - Robert Robertson Robert.Robertson2@dot.state.fl.us
- SDO - Rick Vallier Rick.Vallier@dot.state.fl.us
- SDO - Steve Nolan Steven.Nolan@dot.state.fl.us
- SRC - Will Potter William.Potter@dot.state.fl.us
- SRC - Christina Freeman Christina.Freeman@dot.state.fl.us
- SRC - Bruno Vasconcelos Bruno.Vasconcelos@dot.state.fl.us
- SRC - David Wagner David.Wagner@dot.state.fl.us
- SBM - Andrew DeVault, Andrew.DeVault@dot.state.fl.us

FDOT - State Materials Office:

- Chase Knight Chase.Knight@dot.state.fl.us
- Ivan Lasa Ivan.Lasa@dot.state.fl.us
- Paul Vinik Paul.Vinik@dot.state.fl.us

FDOT - Districts (Projects):

- D1 (Skyway Rest Area) - Andra Diggs Andra.Diggs@dot.state.fl.us; Quan-Yang Yao Quanyang.Yao@dot.state.fl.us; Ignacio Recio Ignacio.Recio@dot.state.fl.us
- D2 (??) - Rod Nelson (Cedar Key) Rod.Nelson@dot.state.fl.us
- D3 (??) - Keith Shores Keith.Shores@dot.state.fl.us
- D4 (??) - Ramon Otero Ramon.Otero@dot.state.fl.us
- D5 (??) - Neil Kenis Neil.Kenis@dot.state.fl.us
- D6 (Bakers Haulover Cut) - Hailing Zhang Hailing.Zhang@dot.state.fl.us
- Elisha Masseur Elisha.Masseur@dot.state.fl.us (Halls River);
- D7 (Halls River) - Mamun Siddiqui Mamunur.Siddiqui@dot.state.fl.us ; Gautom Dey Gautom.Dey@dot.state.fl.us
- FTE (??) - Russ Snyder Russ.Snyder@dot.state.fl.us

Attendees Sign In:



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DON @ RAW ENERGY TEC, COM

ROBERT @ NORUSTAREBAR.COM

BERNARD.DROVIA @ PULTRON.COM

Pete Renschau
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ZACH HABER
ZACHARY.HABER.CTR @ DOT.
ZHABER @ Genex systems. GOV
Adel ElSafy (UNF) COM
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GFRP REBAR WORKSHOP

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FDOT Resources

- [Invitation to Innovation – FRP Reinforcing](#) (website)
- [Developmental Design Standards](#)
- [Structures Manual](#), Volume 4 Fiber Reinforced Polymer Guidelines.
- [Materials Manual](#) (Chapter 12) and [FRP Producer QC Program](#) requirements
- [FDOT/FHWA Corrosion-Resistant Rebar \(CRRB\) Seminar](#) (July 17, 2012)
- [FHWA/NCHRP 20-68A U.S. Domestic Scan 13-03](#) meeting with FDOT (June 4-5, 2015)
- [2014 FDOT Design Expo](#) (June 10-12):
 - [Fiber Reinforced Polymer \(FRP\) Composites](#)
- [2015 FDOT Design Expo](#) (June 9-11, 2015):
 - [Composites and FDOT Direction](#)
 - [Design of First FRP Reinforced Concrete Bridge in Florida](#)
- 2016 Design Expo
 - 6/13/16 [Corrosion Resistant Piling & Precast Bent Cap Standards](#)
 - 6/14/16 [High-Strength and Fiber-Reinforced Concrete Design](#)
 - 6/14/16 [Halls River Composite Bridge Update](#)
- [FDOT-GFRP Rebar Workshop](#) (June 15, 2016) – following 2015 Design Expo
- District 7 - Halls River Bridge Replacement FRP Demonstration Project Workshop (*proposed May 2017*)
 - following SEACON/FHWA - GFRP Seminar including European participation.



Part 1 - Presentations

1. GFRP Industry perspective
 - i. ACMA-TSC (John Busel)
 - ii. Owens Corning (Chris Skinner)
2. AASHTO-T6 perspective (Will Potter)
3. ACI Committee 440 perspective (Antonio Nanni)
4. FDOT perspective
 - i. Materials (Chase Knight)
 - ii. Design (Steve Nolan)
 - iii. Construction (future workshops)
 - iv. Maintenance (future workshops)

GFRP Industry Perspective

- ACMA (John Busel)



Transportation Structures Council

The mission of the Transportation Structures Council (TSC) is to coordinate the development and promotion of composites technology and products used in the repair or replacement of transportation structures. The Council partners with trade, technical and professional organizations to identify and reduce barriers to market acceptance, promotes education and awareness of composites technology and provides leadership in the development of codes and standards. Council members also engage government agencies and legislators to identify programs and solicit funding to facilitate the specification of composites technology and demonstration projects.

- Owens Corning
(Chris Skinner)

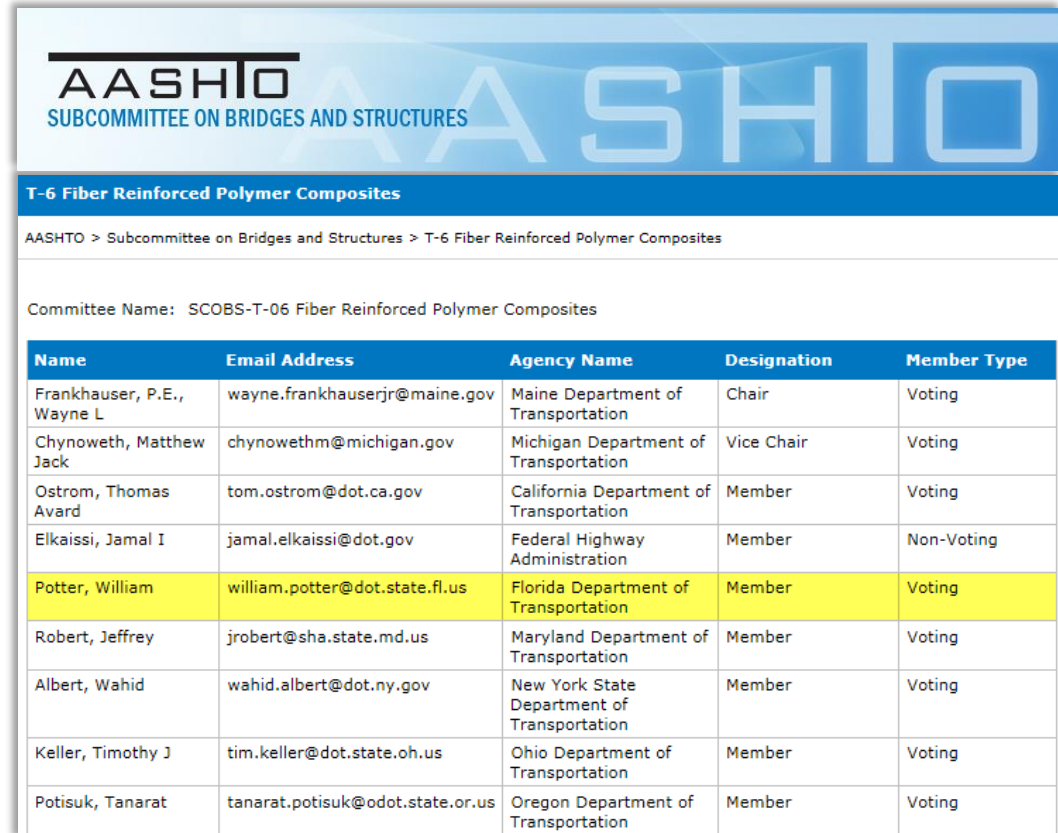


FDOT's Fiber-Reinforced Polymer Deployment Train



AASHTO-T6 Perspective

- Will Potter
(FDOT Representative)



AASHTO
SUBCOMMITTEE ON BRIDGES AND STRUCTURES

T-6 Fiber Reinforced Polymer Composites

AASHTO > Subcommittee on Bridges and Structures > T-6 Fiber Reinforced Polymer Composites

Committee Name: SCOBST-T-06 Fiber Reinforced Polymer Composites

Name	Email Address	Agency Name	Designation	Member Type
Frankhauser, P.E., Wayne L	wayne.frankhauserjr@maine.gov	Maine Department of Transportation	Chair	Voting
Chynoweth, Matthew Jack	chynowethm@michigan.gov	Michigan Department of Transportation	Vice Chair	Voting
Ostrom, Thomas Avard	tom.ostrom@dot.ca.gov	California Department of Transportation	Member	Voting
Elkaissi, Jamal I	jamal.elkaissi@dot.gov	Federal Highway Administration	Member	Non-Voting
Potter, William	william.potter@dot.state.fl.us	Florida Department of Transportation	Member	Voting
Robert, Jeffrey	jrobert@sha.state.md.us	Maryland Department of Transportation	Member	Voting
Albert, Wahid	wahid.albert@dot.ny.gov	New York State Department of Transportation	Member	Voting
Keller, Timothy J	tim.keller@dot.state.oh.us	Ohio Department of Transportation	Member	Voting
Potisuk, Tanarat	tanarat.potisuk@odot.state.or.us	Oregon Department of Transportation	Member	Voting

<http://bridges.transportation.org/Pages/T-6FiberReinforcedPolymerComposites.aspx>

AASHTO-T6 Perspective

- NCHRP Research
 - NCHRP 20-68A Domestic Scan 13-03 – Best Practices in FRP Composites (O'Connor, University of Buffalo)
 - NCHRP 47-12 (Synthesis) – Use of FRP in Transportation Infrastructure (Dr. Kim, University of Colorado)
 - NCHRP 12-97 – Guide Specification for the Design of Concrete Bridge Beams Prestressed with CFRP Systems (Dr. Hanna – University of Houston)
- AASHTO Innovative Initiative (AI)
 - Method of Promoting Innovation/Usage
 - CFRP pre- and post-tensioning currently listed
- AASHTO Documents (GFRP Rebar)
 - Guide Specification for GFRP-Reinforced Concrete Bridge Decks and Traffic Railings, 1st edition.

ACI 440 Committee Perspective



- Antonio Nanni

AGENDA

Issued: Mar 31, 2016

ACI COMMITTEE 440 – FRP REINFORCEMENT

Main Committee Meeting
Tuesday, April 19, 2016 – 8:00 am – 11:00 am
Wisconsin Center – Room 102 C
Milwaukee, WI

Chair: William Gold Secretary: Maria Lopez de Murphy

Item	Subject	Discussion Leader
1.	Call to order – Welcome	Gold
2.	Attendees self-introduction (name, affiliation)	Group
3.	Approval of the agenda	Gold
4.	Approval of meeting minutes (Fall 2015, Denver)	Gold
5.	Chair's report	Gold
6.	440 Membership Overview	Gold
7.	Ballot Results for Response to TAC Review of 440.2R a) Resolution of one negative vote	Harries/Gold
8.	Ballot Results for New 440.7R	Tumialan/Gold
9.	440 Activities Overview a) 440-M – Masonry b) 440-F – FRP Repair c) 440-F/TG 2 – Construction Spec d) 440-H – FRP Reinforced Concrete e) 440-K – FRP Material Characteristics f) 440-J – Structural Stay-in-Place Forms g) 440-I – Prestressed Concrete h) 440-E – Professional Education i) 440-G – Student Education j) ISO TC71 SC 6	Tumialan Harries/Witt Witt Brown/Shield Bakis Fam/Busel Kim Bouadi/Belarbi Gross Gold
10.	New Business a) Liaison Reports – ACI Committees	Open
11.	Next Meeting and Wrap-up	Gold
12.	Adjourn	Gold



FDOT Perspective

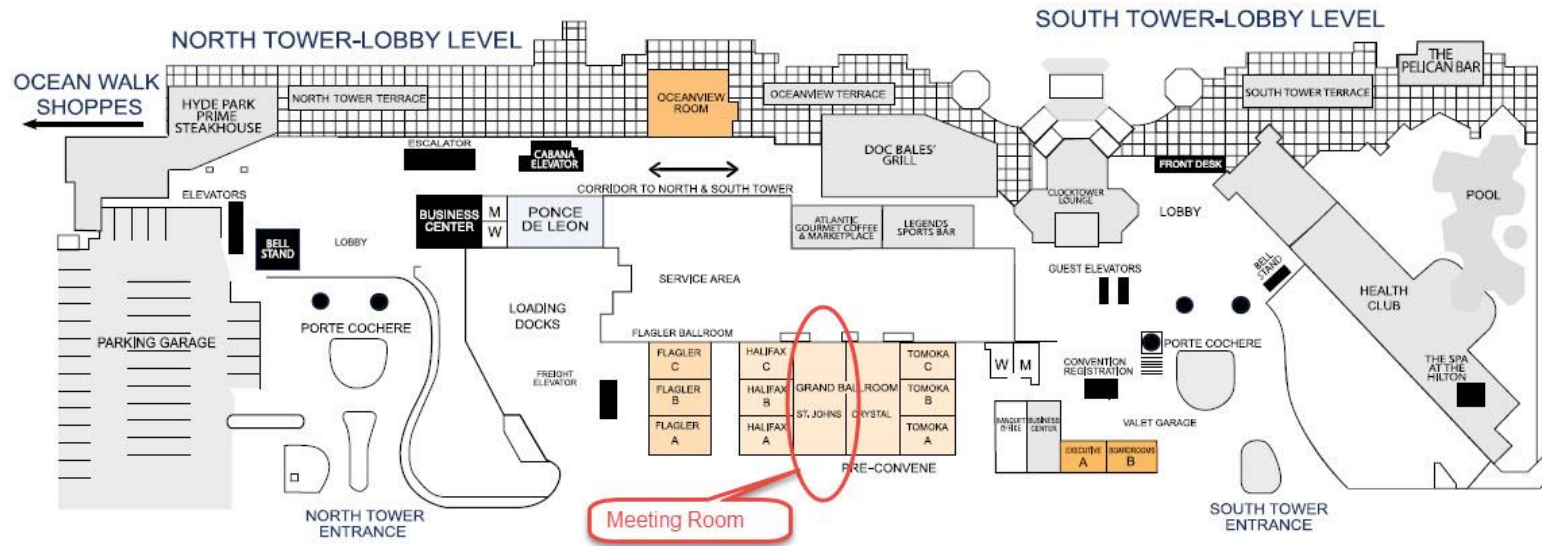
- Materials (Chase C. Knight)
- Design (Nolan)

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Break



Part 2 - Discussion on Needs (6 x 15 min. – Facilitated Discussion):

1. Design Criteria
2. Durability Issues
3. Material Specifications & Vendor Approvals
4. Construction Specifications
5. Products in the marketplace (present and future)
6. Research Focus

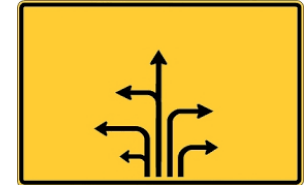
Part 2 - Discussion on Needs



1. Design Criteria
2. Durability Issues
3. Material Specifications & Vendor Approvals
4. Construction Specifications
5. Products in the marketplace (present and future)
6. Research Focus

Part 3 - Action Items & Next Step

1. Action Items



2. Next Step (s)

Adjourn - Thanks for Coming !!



Safe Travels Home...