

To: Members of the IACMI Infrastructure & Construction (I&C) Working Group
From: John Unser
Subject: Summary of I&C Working Group meeting held 5/29/24

The fifteenth meeting of the Infrastructure & Construction (I&C) working group was held virtually via Microsoft Teams on May 29th. Joe Fox and John Unser co-facilitated the meeting, which lasted 2 hours. There were 32 attendees.

This summary is accompanied by a pdf file that contains all the slides shown during the meeting. Slide 2 shows the agenda and the slide numbers for each topic. The entire slide deck can also be accessed in the folder for the I&C working group on Microsoft Teams in the folder "Meeting 15 05-29-24." Here is a link to a recording of the meeting:

[I&C Working Group meeting 5-29-24 recording](#)

Joe Fox opened the meeting by reviewing the objectives of the working group and tying them to the agenda. He then described recent information about infrastructure spending based on data from Construction Dive showing significant increases in spending in several sectors (slides 6-7). Then Joe gave a quick update on the two year progress of the IJIA from Brookings showing \$0.5T still to come (slide 8). Joe presented a great tool to show where the spending is occurring in your state and how to find details on the projects (slides 9-11). The last update presented was the ASCE's *Bridging the Gap* Report that predicts \$15T in infrastructure investment is needed in 2024-2043 (slide 13-14).

Decarbonization continues to be a "hot topic". DOE issued a blueprint for decarbonization of buildings in April. Joe presented two newsworthy cases citing the use of composites in I&C: the Harker's Island Bridge and the use of C_GRID CFRP in Data Centers (slides 17-18). ASCE and ACMA continue to provide standards for composite usage with the announcement of an LRFD for pultruded FRP structures (slides 19-20).

Joe described two recent conferences and webinars. The Fiber Reinforced Polymer Reinforcement for Concrete Structures (FRPRCS) was held in New Orleans. It was organized by the ACI Committee 440. Key takeaways were international audience and lots of modelling (slide 23-26). The FHWA held a webinar on low carbon transportation materials 4/8/24. This is a \$2B grant program for state DOTs to utilize materials and products that "substantially lower levels of embodied greenhouse gas emissions. Unfortunately, at this time FRP are not eligible materials (slides 27-28).

Uday Vaidya gave a presentation on the Energy Efficient Modular Composite Cladding Panels. UTK is working on retrofitting several buildings in the Knoxville area with cladding panels. Uday's presentation is not available at this time.

Masa Sugimoto from Tokyo Rope International gave a presentation on carbon fiber composite cables (CFCC). Sugimoto described several uses of CFCC including pre-tensioning in concrete structures, post tensioning, cable stayed bridges, and ground anchor. He also presented a CO₂ emission reduction case study for a multi-directional PC slab (CFCC) vs a traditional PC slab. (slides 35-65).

Joe Fox gave an update on the activities of the Decarbonization subcommittee. He noted that the Carbon Leadership Forum (CLF) issued its 2023 database, which contains embodied carbon data for competitive building materials, including steel and concrete. He showed how this data and new LCI data from ACMA is being used to update calculations comparing Cradle-to-Gate greenhouse gas emissions for FRP and steel in applications like gratings, girders, and utility poles. Joe also showed several examples where FRP can be used in conjunction with concrete to lower emissions of CO₂. The examples included the Hillman Composite Beam, Carbon Prestressed Concrete (CPC) for bridges, and CarbonCast insulated panels and architectural panels, which use C-GRID from Chomarat to reduce the amount of concrete needed. (slides 67-80). Joe presented on Holcim's Carbon Prestressed Concrete (CPC), specifically on the reduction of CO₂ emissions by using carbon fiber-reinforced concrete to make the panels thinner. (Slides 81-86). Joe will be spreading the word about decarbonization with FRP at the TIDC annual conference in Maine in August. He is also writing an article for *Composites Manufacturing Magazine*. Joe reiterated if you want to join the Decarbonization subcommittee, please let us know.

Joe presented on the R&D projects for I&C. The FR testing of Trimer Resin for I&C Applications is complete and was highlighted at SAMPE '24. (slide 93) The Lifetime Prediction for GBeam Girders project is on indefinite hold (slide 94-96) The FRP for Off-Shore Wind project has been approved for resource pool funding and is being headed up by U Maine to look at the use of GFRP rebar and CFRP strands in the floating foundations (slides 97-99). Joe also stated that there could be potential funding from DOE's Wind Energy Technology Office through a NOFO that came out April 24, 2024 (Slide 100). The last project "Reuse of End-of-Life Emd Turbine Blades in I&C" is in the definition state. John Unser presented the work being done by GreenTex Solutions funded by their recent awarded DOE Wind Turbine Materials Recycling Prize (slides 104-107). At the next joint meeting between the I&C and Recycling/Circular Economy working group at the IACMI Members Meeting, the team will attempt to define a "Blades to Buildings" IACMI 2.0 Project (slides 108-110).

John Unser gave a quick presentation on the open and future funding opportunities highlighting programs found through the USDOT Discretionary Grants Dashboard. John emphasized that there is a lot of funding going to infrastructure, but you need to be partnered with eligible agencies such as state DOTs or local governments (slides 112-114) Joe gave an update on the Transportation Resilience and Adaption Center of Excellence (TRACE), which is a great fit with IACMI. The challenge is that it has been authorized but it has not been appropriated. Good news was that University of Maine did get \$8M set aside for research on durability, resiliency and sustainability of bridge and other infrastructure. (Slides 116-120) Joe talked about the EPA grant proposal that ACMA and IACMI collaborated on titled "Reducing GHG Emissions with Composites: ACMA-IACMI CIRCLE Partnership" (slides 122-125). We are awaiting news from the EPA.

Joe announced the Project Impact effort led by the team of Mark Morrison, Margaret Slattery, and Joe. IACMI will celebrate its 10th anniversary in 2025. The team is collecting information in four categories: Commercialization of New Products, Workforce Development & Job Creation, Leveraging IACMI's Resources, and Connections, Partnerships & Supply Chain Creation. Be ready to respond! (Slide 127)

The next I&C working Group Meeting will be during the IACMI annual meeting in Indianapolis Tuesday, August 13th from 8:00 to 9:30 am EDT. The "Palooza" with the Recycling/Circular Economy/Wind Energy working groups will be targeted towards defining an IACMI 2.0 "blades to buildings" project for end-of-life turbine blades. (slide 128)

Action items:

- Continue to evolve and strengthen the Decarbonization message for FRP
- Move I&C-related R&D projects forward:
 - Launch the off-shore wind project
 - Define "Blades to Buildings" project at the annual meeting
- Send ideas for new projects to: Joe Fox foxconsulting147@gmail.com or John Unser john@compositeapplicationsgroup.com
- Collect Project Impact input from working group members

Comments/questions/suggestions can be directed to Joe Fox (foxconsulting147@gmail.com) or John Unser (john@compositeapplicationsgroup.com).