

Composites in Architecture

Composites in Architecture Conference

Composites use in building and construction applications is moving beyond the long used role in kitchen and bath applications. For many years builders and homeowners have relied on composites for tub-shower and countertop applications as a way to provide more design flexibility and ease installation labor.

In more recent years, composites have found their way into window and door applications and are now beginning to find use in exterior cladding applications.

With specific allowances in the building code for the use of composites and the ever growing needs of builders to produce more durable and energy efficient buildings, composites use in architectural applications is destined to grow. The awareness of this trend was clear in the first ever Composites in Architecture track at the ACMA's CMIA conference.

Conference Location & Attendees

The architecture track of the Corrosion, Mining, Infrastructure & Architecture (CMIA) conference was held May 16, 2013 at the Denver CO Marriott Tech Center. This conference, held every two years, has historically focused on mining and corrosion applications. The addition of the architecture track to this years conference brought in a new set of interested professionals and students from the composites and architectural communities.



Composite History & Resources

The architectural track began with an introduction to the group by ACMA Architectural Division chair, Bill Kreysler, of Kreysler and Associates. Mr. Kreysler's welcome and track description was followed by an overview on the use of composites in other industries by Bob Moffit, Product Manager of Ashland Performance Materials. Moffit provided history of composites growth in industries such as marine, automotive and aerospace and helped attendees understand how the features of composites that led to growth in these industries were of value to the building industry. The use of composites to address sustainable building needs was also introduced, as were two resources for the architectural and building communities. Moffit provided an overview of the CompositeBuild.com site that allows users to find case studies of composites in building applications, to identify composite building products, and to connect with fabricators that build these products. The CompositesandArchitecture.com site was featured as an inspirational overview of composites in architecture. This site provides a global look at the use of composites in unique building and art applications around the world.

REGISTER NOW

Keynote Speaker:
Greg Lynn

ACMA Corrosion, Mining and Infrastructure Conference
Denver Marriott Tech Center | Denver, CO

COMPOSITES IN ARCHITECTURE MAY 15-16 2013

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After Moffit's introduction to Composites, Mr. Kreysler provided a history on the use of composites in architectural applications, starting with Neolithic hut builders which used straw and mud composite bricks. Early polymer composite structures, such as the 1957 Disney attraction composite house billed as "The House of the Future"; the pavilions at the 1964 world fair in New York; and the use of composites in large exterior cladding applications were highlighted during Kreysler's presentation.

Composites & Building Code Concerns

The conference moved from the historical perspective to practical applications and challenges with the introduction of Mr. Doug Evans, a fire protection engineer from the Clark County Building office in Las Vegas. Mr. Evans provided a unique perspective on the use of polymer composites in both internal and external building applications and provided insight into the fire safety requirements and other code interpretations. Many of Evan's examples exposed failures related to poor interpretation of the codes or failure to adhere to the code, including the Monte Carlo fire of Feb 2008, that was partially fueled by a composite panel (although not a polymer matrix composite panel).

Composite Panel Fire Testing

With fire safety a hot topic following Mr. Evan's discussion, the audience couldn't have asked for a more fitting follow up presentation than that provided by Dr. Nick Dembsy, a professor of fire protection engineering from Worcester Polytechnic Institute.



Composite Panel Fire Testing (Continued)

Dr. Dembsy is a regular attendee to the ACMA conferences and co chairs the Architectural Division with Kreysler. The composites industry is extremely fortunate to have such an excellent resource to help us better understand our opportunities and limitations in the area of fire protection.

During his presentation Dr. Dembsy discussed the 2012 version of the building code which specifically allows for the use of composites in exterior cladding applications. Dembsy's presentation included several video presentations of fire tested materials, showcasing the danger of improper material selection. Dembsy also shared a video showing the successful testing of a composite panel to be used under building code section 2612. Dembsy reviewed a screening method and model that provides a good indicator of a material's ability to pass the NFPA 285 fire test requirement.

Composites in Architecture

Connecting Composites to Other Materials

Following a group lunch, the architecture track resumed with a discussion on joining composites and other materials of construction, by Scott Reeves, President of Composites Advantage. The challenges of connecting composite construction to traditional materials was reviewed covering key items such as material compatibility and thermal expansion differences between materials. Mr. Reeves offered the advice of using mechanical fasteners in the field whenever possible and leaving chemical bonding and adhesion operations to the composite fabrication shops.

Composites in Structural Applications

While connecting composites to traditional materials is a challenge that has some readily available answers as presented by Reeves presentation, the attendees were soon discussing the structural design challenges faced by architects and the solutions that composites offer.

Shane McCormick, a structural engineer with Martin and Martin Engineers spoke of his work with composites in applications where low weight and complex design drove composite material selection. One such work featured was the 'Big Blue Bear', a Denver area landmark on which McCormick had oversight. The Bear, which stands 40 feet high and appears to be looking into the Denver Convention Center, is a composite clad structure that cantilevers off the ground. I can 'bearly' imagine this possible if not for composites!



The Keynote

The formal program for the architectural track finished with a real treat for the attendees. World renowned architect Greg Lynn, named by Time Magazine as one of the most innovative people of the 21st century and by Forbes as one of the ten most influential living architects, addressed the group in a vibrant key note presentation. Mr. Lynn presented his work that has used composites significantly, from ultra light carbon fiber furniture with no external framing to unique forward looking rotatable housing solutions. Mr. Lynn's approach to solving architectural problems with unique designs made possible through the use of composites provides a look into the future of composites in architectural applications.