

A Glass Journey

Attendees Travel to Finland to Learn How Glass Moves from Design to Installation

by Megan Headley

“Let the sun do the job’ is going to be the theme of this conference,” said Mika Seitovirta, president and chief executive officer (CEO) of Glaston at a press conference that opened the four days of Glass Performance Days (GPD) on June 12 in Tampere, Finland. The fact that the biannual technical conference would focus on the role of glass in the burgeoning solar market was more than clear, as each of the keynote speakers hailed from a company involved in some part of the solar market. The speakers stressed the importance of driving down costs and driving up demand for solar panels to keep this market segment growing around the world.

“The glass industry has a challenge, as we all do, to drive costs down . . .” commented Avi Brenmiller, president and CEO of Solel, a solar field installer headquartered in the U.S. in Irvine, Calif.

Eric Peeters, global executive director of Dow Corning’s solar business, called this the fundamental challenge of photovoltaic (PV) production: “How many kW hours a panel can make over its lifetime and how much will it cost?” Peeters added, “This challenge calls for strong collaboration down the value chain.”

Each of the speakers seemed confident that glass will remain the primary material, over competitive products, for encapsulating solar cells in PV modules. Leon Giesen, CEO of Scheuten, noted that glass is advantageous for this application in that it’s strong, durable and is able to “play” with light. “The more light you get through it the more effective it is.” He also noted, “The disadvantage is the weight—it’s too heavy.”

Giesen added that glass is the natural choice for solar applications as, “In the long run solar will be a building in-

tegrated product, a building-related product,” adding that glass is already an inherent part of buildings.

Brenmiller added, “We will have to do some [further] sophisticated processing of the glass that is used in buildings and automotive [applications] to turn it into an optical device.” Giesen suggested bringing together the fabrication of solar glass with the fabrication of the cells themselves, and in that way reducing the costs of the process.

The speakers also stressed that solar is just beginning to grow.

According to Brenmiller, “A wave of technological innovation will lead concentrating solar power (CSP) to grid parity in the 2014 timeframe.”

“By 2012 we will be very close to grid parity or already there in many countries,” said Peeters.

Dr. Johannes Segner, chief operating officer of Solibro GmbH, noted that the



More than 800 attendees from around the world traveled to Tampere, Finland for Glass Performance Days.

architects sitting in the crowd: “To the architects it’s necessary that solar is on your drawing boards ... we have to start planning for it today.”

Glass and Building Designers Find Common Ground

There were many designers in the crowd because this year, for the first time, GPD included an architects’ forum, bringing together every member of the chain from design to construction. The speakers highlighted case studies and presented their input on upcoming trends.

In his session titled “Architectural Trends: Through the Looking Glass,” Charles Bostick of Charles W. Bostick Consulting Architects cautioned the audience that innovations in glass capabilities are leading architects to more demanding designs than ever before.

“When you realize architects are making these types of decisions—complex or ‘complexer’—you have to start getting the tools to build this,” he commented. He pointed to “complexity” as a trend now among architects “because we now have the computers to draw it.” Programs such as building information modeling (BIM) can ease the process, too, of transferring files among contractors. In fact, the trend toward

using BIM was evident overseas. Richard Green of Front Inc. presented a session about how BIM greatly eased the complex coordination in working on Lincoln Square Synagogue in New York. BIM helped the designers on through the installers track the more than 2,500 unique components that made up the project’s skylight.

Bostick said another trend was toward curved structures. “The structural engineers are telling us we can do that, no problem,” he said. Modeling is helping fabricators follow through on this as well.

Niccolo Baldassini of RFR elaborated on this trend for curved structures in his discussion titled “New Trends in Free-Form Design.” He reported that “free-form” is “quite fashionable today,” but still has lots of challenges. He pointed out that even free-form designs follow a rational process and that architects are looking to achieve ever smoother and more unique designs. Architect Frank Gehry’s proposed design for a new Luis Vuitton building was referenced to by both Baldassini and Bostick as an example of where this is headed—Gehry is imitating the quintessential free-form design by basing the building on a cloud.

Bostick also noted among trends, “We’re getting large facades that have

global demand for glass in solar applications is now about 50 million square meters, but by 2012 is expected to be closer to 130-140 million square meters.

To meet this demand, several of the speakers at the opening ceremony encouraged devoting whole float lines to solar glass in the future.

“It’s actually a challenge for suppliers to produce these materials fast enough,” Peeters said of all of the raw materials used to produce these large panels.

Giesen said that five or six float lines would need to be dedicated to solar glass production by 2012. Segner estimated 20 complete float lines dedicated to solar glass by 2015.

To further encourage this growth, the speakers began encouraging building designers in the crowd to keep energy generation in mind for future buildings. During his talk, Giesen addressed the



GPD Attracts North Americans, First-Time Attendees

Mike Ondrus (left) of Glasstech, and this year's GANA president, was one of many North Americans attending GPD this year for the first time.

Glass Performance Days, which took place June 12-15, welcomed more than 800 attendees to Tampere, Finland.

Mika Seitovirta, president and chief executive officer of Glaston, the Finland-based machinery manufacturer that organizes the event, told USGlass, "I am very happy we chose the theme of solar. What you hear from the participants is they have learned a lot. We've heard a lot of 'aha' moments."

He added, "The keynote speakers communicated well to the participants what huge opportunities there are [in solar]."

Glaston has been taking advantage of a number of those opportunities, by adapting equipment for processing glass in the emerging market. "I entered [Glaston] at the very end of 2006 and [solar] wasn't very high on Glaston's agenda, however, we had some suppliers already working on that. It didn't take us very long into 2007 to put a plan into action," Seitovirta said.

He was pleased to note the high number of attendees that agreed this is an important trend. Seitovirta added, "I am personally first of all very happy that the overall recession hasn't actually influenced the amount of participants—

800 is a very good number."

A fair number of those attendees from North America were attending GPD for the first time, and there certainly was a great deal for them to take away from the event.

Bob Randall, vice president of business development for Viracon in Owatonna, Minn., was among those attending GPD for the first time.

Randall said he felt the event had the "same themes as at the U.S. shows," adding, "it's fun to connect the dots across continents."

He commented on how the trends in architecture in Europe seem to be ahead of the United States, before noting another trend, the rise of glass construction in the Middle East. As Randall pointed out, a number of speakers hailed from that region and provided a perspective on very different climate concerns from companies working on projects or materials in, for example, Finland. Randall said that Arthur Millwood of Emirates Glass LLC in Dubai, had specifically advised during his seminar "Beware: Transparency versus Reflectivity," "Don't just adopt the European standards."

The international perspective was particularly interesting for Randall as Viracon is now exploring sites for inter-

national fabrication facilities.

"One good thing about the recession is it allows you to explore things you've always wanted to try but might not [have time for] otherwise," he said.

Joe Erb, commercial products manager of Edgetech IG Inc. in Cambridge, Ohio, called the conference "a trip of firsts." For Erb, "It was not only my first time to attend GPD, but also my first time to chair a track and my first time to present."

Erb presented a seminar called "Challenges of Bent Insulating Glass" during the event. Chairing the IG processing track gave Erb a good opportunity to hear a range of presentations, although he noted he was drawn into a number of other tracks as well.

"There was everything from the very basic to the very general," he said of the topics, adding, "they all gave you a topic to talk about later at the networking opportunities."

Erb was one of many attendees for whom the networking was a highlight of the event.

"I always heard it was a great networking opportunity but when I got here and saw the list of who's who's ... it really had all the players."

Erb added with a smile, "I'm definitely planning on coming back."

The more than 200 presentations at Glass Performance Days covered all things glass, from design to fabrication to installation.



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little or no means of support.”

Rob Nijse of the Delft University of Technology had an interesting solution to an architect's request for such a large glass façade with little support.

“If I take a flat leaf of paper it's very weak,” he first explained, waving a sheet of paper in the air, “but if I put a few folds in it it's much stronger.” He applied the same essential concept to glass and detailed the results in his presentation on “Corrugated Glass as an Improvement to the Structural Resistance of Glass.” He presented some unique case studies. One couldn't help but wonder about the distortion when looking through these large windows, but Nijse explained, “the architect likes it because it makes the views of the city 'non-real.’” He also discussed some acoustic benefits when applied in a concert hall and its resistance to deflection.

Bostick also pointed to one interesting new technology that was the subject

of several seminars. “The technology that I think has the most potential ... is that many people in the industry are using bonded connectors,” he explained.

Several presenters discussed opportunities for bonding metal directly to a laminated glass interlayer as the newest trend for connecting lites with minimal visual interference. Bostick noted that with point-supported glass, the fabricator is in essence “wounding the glass [by drilling into it] and putting the most stress of the system on that wound. It has its limitations.”

According to Professor Jan Belis of Ghent University, who presented a case study on laminating metal to glass, this new alternative allows small metallic connection parts to be laminated directly on the glass surface or in between the different glass layers by means of a suitable interlayer foil that acts as an adhesive.

Bostick commented, “Once it becomes known in the architectural world that you can do this and the costs are down, it's going to explode.”

Despite the strong theme of solar energy at this year's event, Bostick did note one “non-trend” of sorts: “Solar cells are not really big on any architect's mind ... I think it's also too expensive still,” he said. He added candidly, “I don't think the architects are quite that interested in energy efficiency yet.”

Glass Processing Days Live On

There were a number of tracks devoted to glass fabrication (or processing, as it's known in Europe), harkening back to the conference's former name, Glass Processing Days. Trends and technologies for producing laminated, tempered and insulating units all were covered.

James O'Callaghan of Eckersley O'Callaghan gave a presentation entitled “Thinking Big with Structural Glass,” citing the Apple Cube at the Fifth Avenue Apple Store in New York as a notable example of “jumbo” glass. It's a trend that more glass processors are noting (see April 2009 *USGlass*, page 38), this use of increasingly larger glass, and one that O'Callaghan indicated more fabricators would need to be able to meet.

“Fabricators and installers don't typically have the equipment to deal with [large-scale glass] so you have to think laterally about how to develop that,” O'Callaghan said.

The glazing contractor on this par-



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GPD held several workshops that provided attendees with in-depth and hands-on learning opportunities.

ticular project worked closely with the design firm to help the fabricator develop the technology needed to make this project happen. According to O'Callaghan, there simply wasn't an autoclave available in the glass industry for laminating lites larger than ten feet—the size of the glass for the NYC Cube—and so the contractor adapted one based on an autoclave used by a German company to make airplane wings.

O'Callaghan encouraged primaries and fabricators—and more notably, the equipment manufacturers for those companies—to consider ways to increase the sizes of the glass they are able to handle. He did conclude, however, that this trend may be somewhat curtailed by the high cost of these large-glass projects and the trends toward energy-efficiency.

In addition to larger-than-ever laminated glass, attendees heard about thinner-than-ever tempered glass. Prem Boaz of Glass Products Consulting LLC presented what he referred to as “A Significant Breakthrough in the Process for Tempering Very Thin Glass.” By using radio wave energy Boaz said fabricators could easily temper glass thinner than 3.0 mm without distorting the glass. He explained that, with conventional tempering, the lite is heated and then passed to the quench area whereas with

the radio wave process the glass is heated within the quench area.

According to Boaz, this type of technology already is being used successfully in other industries and easily can be added to most existing glass tempering equipment. He also noted that being able to produce tempered glass of 2.0 mm or less could lessen the use of energy and consumption of raw materials, as well as help to lighten the load of glass used for PV applications, the problem Giesen had mentioned earlier.

Since curved and free-form glasses were among the upcoming trends at this conference, presenters also addressed how to process glass to meet these new stylistic demands while meeting stringent performance requirements. For example, Joe Erb, commercial product manager for Edgetech I.G. in Cambridge, Ohio, made a presentation on the “Challenges of Bent Insulating Glass.”

Bending glass can be a challenge on its own, but, Erb noted, “One of the challenges with this versus flat glass is getting the two lites to match exactly.” He added that if they don't match that puts undue pressure on seals. Because of this challenge he also stressed the importance of specifying appropriate edge seals.

To help the lites line up he ad-

vised matching the curved glass at one end of the unit and rolling it to the other end. He also noted that in many cases it is impractical to keep horizontal the lite onto which the spacer is applied, meaning glass matching and spacer application would need to be done in a vertical orientation, as would the application of the secondary seal.

Coatings also were covered. Pilkington North America's technical services director Chris Barry noted this in his session on “Innovative Applications for High Transmission Coated Glass.” “Having been in the business for 40 years I think I've finally realized I don't see the object I work with anymore,” he said. With that comment Barry launched into an overview of how images are reflected by and transmitted through glass and how coatings affect that.

His explanation of how antireflective coatings reduce the visibility of reflected images as well as increasing the magnitude of transmitted light in a variety of application, including display cases, store windows, sports boxes and other areas where a clear view is important, made a strong case for the use of these coatings.

Barry reminded the architects in the crowd that the first step is to “control the angles of the glass, what is being reflected in the glass and then we'll come in with the coatings.”

He also noted, “The coating as it exists today wouldn't be good for your PV panels, but tell me what wavelengths you want,” explaining that the layers of the coatings can be adapted to reflect certain wavelengths but allow in those wavelengths of light and energy that are critical to product performance. ■

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