



GLASS BEAUTIFUL

Celebrating Canada's
most amazing glazing
projects.

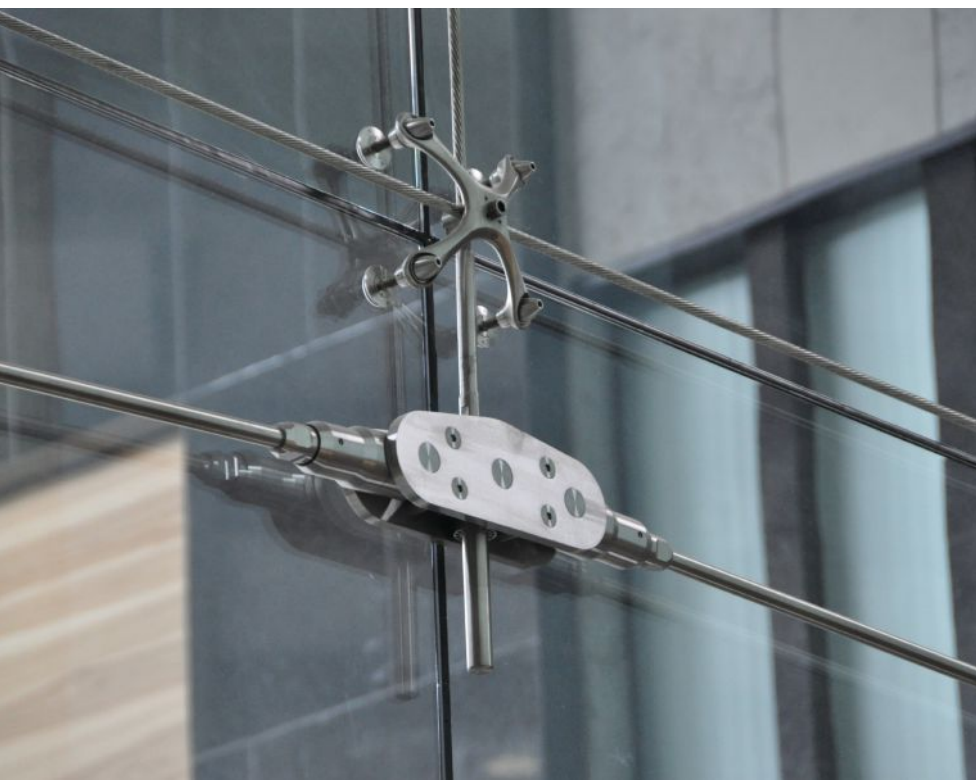
GLASS CANADA

Endorsed by the Canadian Glass Association

glasscanadamag.com | April 2015



HIGH-TECH MONOMERS • MATERIAL HANDLING SHOWCASE



CPA Structural Glass had to work backwards to arrive at the correct tensions that would achieve the geometry it needed to execute this suspended cable wall.

are the doors, so exposed aluminum on the exterior has been eliminated again. “It was done this way because architects like to have clean lines and the assembly concealed,” Cairo says.

**Cable net glass wall
Complexe Desjardins – Montreal,
Que.**

It was unconventional reverse engineering that garnered CPA Structural Glass the AVFQ’s 2014 Award of Excellence for “Innovative Project of the Year.” Presented with the challenge of conceiving a new glass wall of 60 by 60 feet to increase visibility and create a new entrance hall for the Montreal Head Office of Mouvement Desjardins, CPA crafted a self-contained cable wall designed to minimize load-ing transferred to the existing structure. Located in the Complexe Desjardins, comprising office towers and retail space covering two city blocks in downtown Montreal, the renovation project archi-tects gave CPA (a division of engineering firm SDK Associates) carte blanche to come up with something unique.

“Adding 20 tons of glass and steel to an existing structure is far from simple,” CPA’s president Benoit Cloutier says. “But we came up with the idea of creating a perimeter frame to take the compression loads from the tensile system composed

of catenaries and cables in both vertical and horizontal directions.”

The catenaries feature high strength stainless steel rods interconnected to nodes permitting the threaded swaged ends of the stainless steel cables to be anchored. “The main challenge was that we knew the final geometry that was needed for the placement of the cables and we performed reverse engineering to find the un-deformed geometry prior to tension-ing,” explains Cloutier. Hundreds of simulations later, a solution was found: some cables were stretched more than five inches to achieve tensions varying from 7,500 to 12,000 pounds; the top catenary carries loads of 90,000 lbs.

Progressive installation of glass and deformations were closely monitored and compensated with pre-loading of the vertical system in order to achieve the final geometry. At each sequence, the support anchor points interconnecting the cables were added one level at a time, then the spiders and the glass. On the last pre-load release, a perfect equilibrium was reached with all the glass panels levelled. The glass (eight-millimetre clear heat strengthened; 1.52 mm SentryGlas; and eight mm clear heat strengthened supplied by Prelco) and glass hardware (SADEV S3000 Monti Spiders SS Type 316 brushed finish; SADEV V2001

countersunk fixed fitting supplied by CPA Structural Glass) were selected for strength and flexibility since the corner panels experience warping due to the deflected shape of the cable net.

“Our proposal exceeded by far their initial vision of what the wall could be,” boasts Benoit, who received the Excel-lence Award from the Quebec glazing association.

**Eden of Vancouver
Boedel Conservatory – Vancouver,
B.C.**

by Rich Porayko

Five years ago the City of Vancouver issued the Bloedel Conservatory a death sentence and ordered the building to be shut down. But the dome, located in Vancouver’s Queen Elizabeth Park, was home to 500 plants and 170 species of birds. So, concerned community and business leaders weren’t willing to let the ecosystem, which has been called a “horticultural, architectural, natural, green jewel at the pinnacle of Vancouver” die. They started the Friends of Bloedel Conservatory and not only successfully lobbied the city for a stay of execution, but also secured funding to rehabili-tate the aging façade of the 45-year-old landmark. Bloedel is very much alive and thriving today thanks to their efforts



Photo by Rich Porajko

Challenge: replace 1,488 acrylic panels without letting the tropical plants and birds on the other side get cold. And improve the thermal performance of the 45-year-old structure so the city can still afford to heat it.

and to Spectrum Skyworks, the company tasked with completing the job.

“The biggest challenge we had was at the beginning,” Spectrum’s managing partner Ken Boyce said. “The company that built the dome back in 1969 only constructed one other like it, so there was nothing to explain how Bloedel was going to be rehabilitated. We had to figure it out.”

Spectrum was familiar with the structure because it had been repairing the dome’s panels for up to 12 years before the decision was made to do a full-scale rehabilitation. “The panels would break because teens used to climb on them at night,” Boyce said. “Replacing one panel is a big deal. You need a lot of people. But nobody had ever taken the whole building apart.”

The Bloedel Conservatory is a geodesic dome that consists of 1,488 quarter-inch-thick, acrylic panels in 32 different sizes. Spectrum installed thermal breaks into all 866 of the original cast hubs, which were then reused. Daylitter Skylights, a division of Spectrum based in Langley, B.C., has its own thermal formers. So Spectrum was able to manage the supply chain and blow the dome panels itself.

Spectrum removed up to 30 old domes and asbestos and then installed 30 new domes in one 10-hour shift every day. Once each panel was installed, it had to be face sealed. To allow for the thermal expansion/contraction of the acrylic, Spectrum had Tremco – a supplier of sealant, weatherproofing and passive fire control solutions – design special gaskets to fit into the existing extrusions and also

to achieve improved thermal performance of the overall system.

Safety was Spectrum’s primary concern throughout the entire project and because Bloedel had low-grade asbestos in the old mastic, it had to take special measures. “First thing each morning, we’d suit up three guys in their Hazmat suits with full respirators and we’d do a clean with special vacuums approved for asbestos removal,” Boyce said. “We hired Proactive Hazmat and Environmental Ltd. to oversee everything and take away the waste material every day.” •

Glass Canada features online at
glasscanadamag.com >
 Past Issues

Gamechanger

New materials could allow low-temperature processes.

This 6.5-kg paint can is being suspended from a piece of glass that is adhered to another piece of glass using an adhesive based on Sirrus' new monomer. The set time was five minutes.



Silk screening without heat and laminating without an autoclave. Mind = Blown. According to Kousay Said, chief commercial officer for Sirrus Chemistry, the technology to do these things is in the early stages, however it exists and he is bringing it to a fabricator near you.

It's a story 130 years in the making. According to Said, Sirrus has been able to stabilize and figure out the initiation of a highly sought-after monomer because of its high reactivity. A monomer is a molecule that binds together with other molecules to form a polymer, a large organic chain of monomers making up the unique properties of the polymers. Still following? Keep up, it will be worth your time.

This particular monomer was first discovered in 1886 and had been highly sought after primarily because of its reactivity, however, until a recent breakthrough, there wasn't much chemical companies could do with it because it would either simply react with itself or its surroundings. It was Bernard Malofsky, a former senior leader at Loctite, and his son, Adam Malofsky, the former CEO of Sirrus, together with Jeffrey Sullivan who were able to figure out a way to stabilize and isolate this molecule at a yield and purity that would be commercially feasible.

Once the monomer was stabilized, Sirrus was able to do certain things with it. They have been able to expand and now

have stabilized 26 different monomers that provide a range of different properties including very high temperature resistance, solvent resistance and significant optical clarity.

The company claims the chemical platform that Sirrus was able to develop, known for Chemilan and Forza, provides fast cure speeds at ambient temperatures without input from energy: a process known as anionic polymerization. The Sirrus polymerization-on-demand technology is designed to significantly reduce cycle times, increase throughput, reduce energy costs, and enable new material selection in a broad range of customer and consumer applications, including auto, electronics, packaging and hygiene.

“All of this is exciting and this technology is looking for applications,” says Said. “So when we start looking for where can we apply this, one of the greatest areas of interest for us is glass as a substrate. Our technology has a tremendous affinity to glass. Glass as a substrate triggers the process anionic polymerization. The material is 100 per cent reactive and its viscosity is water-thin. You can apply this liquid to the glass surface and it becomes a solid polymer that is optically clear.

“Because polymerization is triggered by the glass, the technology also acts as a great adhesive for multiple layers of glass. We’ve bonded three and four layers of glass together and you cannot tell that there is a bond layer in there when you look through it. The optical clarity is incredible. We’ve measured light transmittance through it that is higher than anything else organic that we’ve seen. It’s inherent characteristics lend themselves to safety glass for both architectural and automotive applications.”

Another possibility is an organic alternative to ceramic frit. Imagine silk screening, rolling or digital printing a coating so it doesn’t need to be fired. According to Said, Sirrus has the technology to apply the properties to the glass surface without having to put the energy into it.

By curing at room temperature and taking heat and pressure out of the equation there are obvious savings on operating and capital expenditures. But possibly even more of a game changer is the elimination maximum size constraints, bottlenecks and restrictions on the manufacturing processes associated with tempering and autoclaves. This technology may open up an opportunity for North American fabricators to compete with imported oversized glass.

Said says the technology is also applicable to photovoltaics and dynamic glazing. “This is a perfect way to lower mass without compromising the panel or photovoltaic cell. It protects the glass from breakage and maintains the optical clarity. It is excellent for use in exterior applications and does not introduce a colour shift, which could also allow for warranties to be extended.”

“Our business model says that we work with partners,” says Said. “We are experts at the technology. Relative to the process or application, there are better folks out there that are already in business in their fields and our model says that we work with them and try to bring this technology to the marketplace. We’re in the early stages, however we’ve developed a lot of tests here to prove the concept and we’re looking for partnerships within the fabricating, decorative coating, insulation, laminating, fire resistance and BIPV fields. We’re looking at discussing this technology and its potential application with glass fabricators as well as other manufacturers globally.”

“Our preference is to have our first discussions with end users. It is not to serve them with direct business, but to learn what features and benefits they value the most to help direct our research

effort. For example, I’d love to work with a fabricator who was interested to find out how many colours they can put on a piece of glass.”

“It’s the total cost where we are competitive. If we are shutting off furnaces and reducing steps, that is going to be a significant advantage for us. Our feedstock has a competitive cost position and we are around 90 per cent yield so we will compete with the frits all day long but we also will be able to compete with acrylics fairly quickly.”

Lower the cost of goods sold significantly without lowering the performance while increasing size. Imagine fabricators lessening their reliance on films or on primary glass companies where the fabricators can now add decorative or other functionality almost on demand through silk screening, roll coating or digital printing. “For fabricators to invest in capital assets to bring simplicity to their processes and serve the market just in time, we could really change the game here.” •

About the author

Rich Porayko is a professional writer and founding partner of Construction Creative, a marketing and communications company located in Metro Vancouver, B.C. He can be reached at richp@constructioncreative.com

Find more articles on glass technology at glasscanadamag.com > Past Issues



reliability. quality. innovation

residential | commercial | new construction | renovation

High Performance Glazing Inc. is a leading glass manufacturer with over 25 years of experience, in architectural glass, storefronts, glass rail systems, entrance doors and skylights.

Our wide variety of products include:

- Insulating glass units
- Heat-strengthened
- Tempered glass
- Heat-Soaking
- Laminated glass
- Fire-rated glass
- Low-E glass
- Spandrel Opaci-Coat-300® applications
- Full range of patterned glass
- Super Spacer® Triseal™
- and many more.

Members of IGMAC/IGMA Certified Program

Visit our booth at the Top Glass Conference & Exhibits at the International Centre in Mississauga April 15, 2015

We are committed to customer service, quick turnaround time, and only the highest level of quality for our products.

177 Drumlin Circle, Concord, Ontario L4K 3E7
Phone: 905-482-2144 Fax: 905-482-2146 www.hpglazing.com