A rash of spontaneous glass breakages at condos across Toronto this summer led the consumer press to point to the “dangers” of glass buildings. Skeptical glass suppliers, meanwhile, have pointed to the dangers of sourcing overseas materials.

Are Railing Breakages Giving Tempered Glass a Bad Name?

by Megan Headley
n August 17, Lanterra Developments issued a statement in reference to the glass breakage that had been plaguing its properties in Toronto throughout the summer. The statement came after a fifth lite of glass from a condominium balcony fell—this time from 29 stories up and hitting a pedestrian below.

The unfortunate woman on Bay Street suffered only a minor injury according to local news reports, but enough was enough for the developer and the city. “Because our first priority is the safety of the public and our residents, we have taken the following actions,” Lanterra wrote in a statement issued to the press. “Lanterra Developments has … stipulated that the tempered glass on these balconies will be replaced with a laminated glass…”

That’s three properties worth of glass balcony retrofits, with the decision made even before the engineering firm brought in to investigate the breakages could determine the problem.

In its statement, Lanterra noted: “The advantage of utilizing laminated glass is that in combination with using the latest available railing technologies, these laminated panels retain their structure in the event of a fracture and stay in place on the balcony should any breakage occur … Effective immediately all of our projects in development will make similar use of laminated glass designs.”

However, as one glass supplier commented to USGlass on the condition that they remain unidentified for fear of losing customers: “They are still dodging the key issues of the tempered failures. Was it heat soak-specified or not? Was it heat soak delivered or not? [In other words], was it a developer/architect failure or a supplier failure?”

As the consumer press has begun to report additional breakages—causing several developers to replace tempered lites with laminated glass in an effort to curb further negative publicity—the answer to that question has become increasingly more important to the North American glass industry.

SEARCHING THE SPECS

Three of Lanterra’s properties have been affected by glass breakages, according to local news reports. One Bedford at Bloor, a 32-story tower in Toronto designed by KPMB Architects, was completed in 2009. KPMB’s website notes that the north tower features projecting sandblasted glass horizontal balconies. KPMB also designed the TIFF Bell Lightbox, which has reported glass breakage from its condominium tower this summer as well.

Lanterra’s Murano condominium has towers located on 37 Grosvenor St. and 38 Grenville St., both of which were completed in 2009. The two-tower, glass-encased condo was designed by architectsAlliance. The complex was named after the island of Murano, in reference to the artwork on the podium curtainwall that portrays the glass artistry of that island.

Toro Aluminum Railings, an 11-year-old manufacturer of balcony guard railings, has handled the glass replacements for Lanterra. The company fabricated and installed the balcony on the Murano’s south tower, while another now out-of-business company handled the other towers’ balconies (Lanterra would not provide the name of that company). According to a statement Toro issued on August 19, the railing manufacturer “supports the installation of heat-treated laminated glass balcony railings.” According to the technical data listed in its website, the company mandates for its railings: “All glass to be 6 mm (1/4-inch) tempered in compliance with CAN/CGSB-12.1-M90.”

However, representatives of Toro Aluminum would not return USGlass’ requests for comment as to whether it has promoted heat-treating tempered glass in the past. And neither Toro, Lanterra nor the architects involved on these projects would answer the most asked question: who supplied the glass?

“It’s a sticky situation,” says one glass supplier who asked not to be named in connection with this article. “The developer and the contractors are in damage control. The developer is trying to avoid the perception that this is only a...

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-Bernard Lax, Pulp Studio Inc.

continued on page 34
symptom of other shoddy construction practices and that other parts of the building(s) are sub-standard.”

Without answers from the parties involved, the glass industry has drawn its own conclusions.

“CREATIVE PURCHASING”
The Toronto developer gained a publicity reprieve of sorts on September 1 when, for the third time, a glass balcony at the Four Seasons Hotel and Private Residences in Seattle shattered.

According to local news reports, that property is following the suit of other developers and removing the tempered glass from every balcony.

Neither the Four Seasons management nor the general contractor on the project, Lease Crutcher Lewis, would respond to USGlass’ requests for comment. However, in October 2008, a year before this hotel-condominium was completed, Business Excellence published profile of the general contractor, which referenced the Four Seasons Hotel. The profile offers insight into the contractor’s approach to materials: “Materials such as casework and curtain wall [sic] can be procured from China at 20-30 percent below what’s locally available,” it says. The article goes on to quote the company’s Jeff Cleator: “When the owner applies for construction financing, he wants to eliminate budget uncertainty, so we’ve gotten more creative with purchasing. In some cases we will purchase and store materials ourselves and then assign those contracts to the appropriate subcontractors after the traditional bidding period.”

It’s a perspective that has left many North American glass suppliers nodding knowingly.

“The only reason there is a perception that tempered glass is getting a bad name is because the [consumer] press covering the current Toronto [and Seattle] story have yet to draw the distinction between domestically produced tempered glass, and those products that come from China (assuming this material came from there),” says Bernard Lax, chief executive officer of Pulp Studio Inc. in Los Angeles, who has no knowledge of the suppliers involved.

Many domestic suppliers are drawing that same conclusion.

A CRITICAL DISTINCTION
It’s a distinction that glass and railing suppliers unconnected with these specific projects are urging their customers to recognize.

“I believe there is a lot more scrutiny and consistency with ingredients that go into making glass by North American float glass manufacturers, so I feel far more comfortable with glass produced domestically,” says Bob Lawrence, president of Craftsman Fabricated Glass in Houston.

That’s one point on which most North American railing suppliers seem to agree.

“Make sure that your glass is coming from a source that can be trusted,” emphasizes Brant List, a sales consultant for Q-Railing USA.

“It’s all about the glass. It’s all about knowing your supplier and knowing what’s in your glass,” added another railing fabricator who asked not to be named for this article for fear of losing customers.

“[It] does have a lot to do with glass sourcing,” agrees Tony Leto, executive vice president of sales and marketing for The Wagner Companies in Butler, Wis. “Most domestic manufacturers of glass have become pretty good at making sure that their glass doesn’t have the nickel sulfide inclusions [impurities in glass that can cause spontaneous breakage], but if people are using imported glass, they have to be a little bit more aware and insist on that heat soaking to make sure there’s no imperfections in there.”

Andrew Chatfield, director of architectural glass systems for The Wagner Companies, points out that “there are regulations and standards for break testing on glass. If you talk to anybody who tempers glass, they will tell you that every so often they have to run a sample through and they have to break it and there’s a set criteria for how that glass breaks, how many pieces per
square inch of fractured pieces of glass there are.” He notes that customers need to be educated to ask for testing and certifications.

When the suppliers in these cases become public, perhaps these comments will change. But perhaps not. As Lax points out, glass breakages are not new. They’re just heavily reported at this time, possibly causing more consumers to view the material with a nervous eye.

“Chinese tempered glass has had numerous project failures around the country, and not just in exterior glass,” Lax says. “I can only assume that many of these are related to nickel sulfide inclusions. It took our domestic industry decades to remove this element from their production facilities and I imagine it will take decades before the Chinese industry can insure the same. In the meantime, if I were a building owner I would require all the glass I purchased from China be heat soaked in the United States to insure the quality before installing it.”

**THE LAMINATED SOLUTION**

Both the Toronto developer and the Four Seasons have remained mum on the glass supplier. But, when it comes to the tempered versus laminated railing debate, does it matter?

“Given recent publicity I have recently been recommending that laminated heat-strengthened glass be offered as the smart alternative for the [railing] applications,” Lawrence says. “Is replacing everything with laminated the right answer?” asks the unidentified glass supplier quoted earlier. He answers that question with another question: “Why is the developer running away from tempered, which is common enough and works

continued on page 36
What’s more important when my kids crash into that balcony glass: keeping my kids on the balcony or making sure the pieces of broken tempered glass pebbled up safely when they fall to their deaths?

– Rob Botman, Glassopolis

Preventing Breakages

In its September online survey, USGlass asked readers to select the solution they feel is the best way to prevent glass railing breakage. The results are pictured here. To take next month’s survey, visit www.usglassmag.com.
FROM THE REPORT

The W Austin Hotel, which opened December 2010, was designed by Andersson-Wise Architects. Featuring highly reflective windows, a press release on the architect’s website notes that the tower’s primary facades are oriented north-south, with differing apertures composed to control daylight, heat gain and energy use. It adds that the south façade features “generous, deeply-recessed balconies.”

A June 11 CDC preliminary investigation report shows an etched label on one glass panel had the name of China’s Xinyi Glass (XYG). The company has North American operations in Richmond, B.C. The logo notes that the glass was safety tempered in compliance with ANSI Z97 and CPSC 16 CFR. Representatives at XYG declined to comment.

U.S. Railing in Tampa, Fla., a subsidiary of Custom Components, served as the balcony railing system designer, fabricator and installer on the project. The company directed inquiries to Stratus, which released a statement from chief executive officer Beau Armstrong.

“An thorough investigation of this incident continues with numerous engineers and experts to ensure this work is done as safely as possible,” Armstrong stated.

CDC’s report on the initial incident stated: “In an effort to locate the initial source of possible falling debris, we have confirmed that a pattern of damage does exist emanating partially from the slab edge at level 27 directly above the failed units. Based on our initial observation of this area, it appears that high strength grout applied to the slab edge has been dislodged adjacent to a post tension cable head location. The high strength grout appears to have fallen onto the top edge of the glass unit at level 25. Cementicious debris collected on levels 25, 24 and the pool deck is consistent with the missing grout on level 27.”

continued on page 38
In its conclusions and recommendations, CDC’s report said, “due to the location of the point-supported glass in-fill panels any falling debris could likely damage the top edge of glass, causing catastrophic failure.”

As Leto says, “I think people need to be reminded that glass edges are extremely susceptible to damage from impact.”

This case certainly provides a vivid reminder. Leto continues, “We’re very big on pushing the idea of having a top rail on glass if that’s the glass balustrade railing. Now, that might have simply been an in-fill panel with an exposed edge, but exposed edges are very susceptible to breakage, even under minor contact.”

It’s a caution that may come too late, as frameless railings that allow for an unobstructed view only continue to grow in popularity.

“A lot of people are going for the ¾-inch glass without a cap rail, so they don’t have anything obstructing their view; it’s just a glass panel,” List says. He continues, “A lot of people are telling me, ‘well we’re going to use ½-inch and we don’t want to use a cap rail.’” List notes that building codes differ by locality, but, “the rule of thumb is anything over ¾-inch glass with soft
edges does not require a cap rail.”

“We are seeing a greater demand for glass railings in general, mainly because of this desire in residential as well as commercial to have this unrestricted view. So there’s a lot of push to include glass wherever they can so they can have an invisible railing,” Leto agrees. “Our warning as always, though, is that there are a lot of misconceptions that you can do that without a top rail, and doing without a top rail is very risky for many reasons.”

WATCHING THE EDGE

But there are other delicate points of contact that can lead to spontaneous breakage such as seen at the W Austin. “They were dealing with a building that was southern exposure in Austin, Texas, in the summer. So more than likely everything expanded and eventually, as the glass edges hit some metal somewhere, it would have just exploded,” Leto suggests.

He continues, “You have to be aware of where the edges of that glass are going to possibly contact metals. There are a couple of places where that could have happened: the holes through the glass where the clips attach, if that material moved and there wasn’t a proper buffer in there, it could have broken. Or if the outside edges of the glass expanded enough to hit a post or other solid contact, that could have caused fracturing.”

It’s an installation factor that is occasionally overlooked, Chatfield agrees. “If you’re drilling a hole through the glass then you want to make sure that obviously … the metal screw or whatever is going through the hole is isolated from the inside edge of the hole. A lot of people tend to forget that little piece of plastic grommet that goes in the hole, and wonder what that is and throw it away. Then of course as all the glass expands, there’s differential expansion between the metal and the glass,” Chatfield says.

He adds, “Everyone knows the building site is never exactly correctly to drawing as far as dimensions are concerned. Tolerances are unbelievably important and the consideration of tolerances when you actually fabricate something is important. We realize it with railings, the way we do things, because we now have products that allow for thermal expansion, mechanical movement within the system. That’s unbelievably important, because obviously metal moves, and if it’s on the south face it’s going to move a lot more than it’s going to move if it’s on the north face or on the east face.”

continued on page 40
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BROKEN GLASS
continued from page 39

AN OPPORTUNITY

During the summer, as consumer newspapers reported on glass falling from the skies, glass suppliers and railing manufacturers looked on nervously. But with the negative publicity comes an opportunity for the glass industry to educate designers and developers that they don’t have to give up those sweeping views—but they have to embrace those glass railings wisely.

As Chatfield points out, “There seems to be more instances [of breakages] in Canada and I think that’s probably because they’ve had an explosion in condo construction certainly in the Toronto vicinity.”

“It is not uncommon for a builder and developer to hire an architect for his expertise and then ignore his advice and conventional wisdom in an effort to save money. Now that the truth comes out they have to spend a lot more to fix a problem they helped create,” Lax adds. “Developers who buy exterior glass from offshore and do nothing to test and guarantee its quality should all be shaking in their boots … They should always remember it was the low bid that built the Titanic and be proactive about the money they spend when it comes to issues of public safety.”

Being able to lay these instances before designers, and explain the importance of using a knowledgeable supplier and certified products to prevent problems, could help savvy railing and glass suppliers.

Chatfield, who hails from the United Kingdom, says that glass use is embraced more slowly in the United States than in Europe. “I think we’re moving faster now, but certainly where we use glass in the building is still far removed from where we use it in Europe,” he says. “I think some of it has to do with logistics in the United States but also it’s a matter of people feeling comfortable with using the material.”

Obviously, increasing the use of glass in a multitude of applications is the industry’s collective goal, and educating specifiers on glass’ safety properties may help in realizing that goal.

“That’s what makes these recent cases critical,” Leto adds, “because that only breeds the fear that glass isn’t an appropriate option. It’s not that it isn’t an appropriate option; you just have to take proper precautions and engineer properly to make it work.”

the author

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