

RANDOM GLASS EXPLOSIONS

PANE IN THE GLASS

Nickel sulphide failures in glass are the cause of random glass explosions around the country. **Simeon Barut** investigates the best way to minimise future incidents.

Spontaneous glass explosions across the country have led to a stern safety warning from the Window Film Association of Australia and New Zealand (WFAANZ).

Incidents in two separate Victorian apartment blocks saw balcony glass randomly 'explode' this year while a young boy in Perth was injured after glass shattered as he was in the shower. More horrifically, a three month old baby's face was cut after the shower screen exploded as her mother was bathing her.

Many other incidents have been reported across the country, particularly in shopping centres and office buildings, and it's no surprise that it has turned into a major public safety risk. One has to ask: 'what does it take for the issue to be addressed seriously?'

There are a few problems surfacing around these accidents and they are both avoidable and unavoidable. Firstly, while the media has brought attention to these major situations, there are still many not being reported and this is largely due to the fact that there is no mechanism for the public to formally report glass breakages. This can be avoided by putting in place procedures for the public to report similar incidents.

Secondly, an issue that is near unavoidable is the inclusion of nickel sulphide (NiS) during the manufacture of glass. WFAANZ vice president Rob Hamilton says that even though it's not visible to the naked eye, nickel sulphide contamination is the crux of the issue.

"Nickel sulphide particles in glass aren't detectable to the naked eye and this means particles may be present in any pane of glass but usually never cause an issue. Conversely, the particles can start to grow in size and form fissures inside the glass and then throw out the balance of the pane," says Rob.

Toughened glass is the culprit when talking about these random explosions



Safety film helps hold glass together in the event of breakage.

purely because of the processes it goes through to get 'toughened'. When it gets heated, the nickel sulphite particles significantly reduce in size but when it goes back to a normal temperature; their size goes back to normal over time or can even get bigger.

If the particle size increases too much during its expansion and exceeds the stress the glass pane can handle, then

that's where the breakage will happen. This could happen months or many years after manufacturing. Inspecting each piece of glass being made in factories isn't plausible; the next step is harm minimisation.

"I don't think we should mandate that all existing glass should have a safety film applied as it's not a solution that is feasible. Treating all toughened glass

with film is an enormous project and would be prohibitively expensive but I do think it should be addressed by risk analysis," says Rob.

"We will never completely mitigate the threat of NiS failure without safety filming all toughened glass - which again is near impossible - so the next best solution is to address individual glass applications and the level of risk.

"Something like a shower screen is of high risk because people are unclothed in a slippery area as well as being in close proximity to glass. On the other hand, a pool fence is low risk because the fence is usually at ground level and people aren't normally close to it. Between these two examples, shower screens would hold a higher priority of having film applied to ones already installed."

As an extra safety measure Standard AS2208:1996 Safety glazing materials in buildings outlines the requirement for glass to be 'Grade A' either through the use of toughened glass, laminate glass or applying a safety film.

However, Rob explains there have been ongoing discussions about getting the Standard revised so that when toughened glass does break, it breaks more safely to prevent the possibility of large chunks doing further damage.

"The revision of AS2208 has been in the works for 10 years and this is because the current specs needed to classify as 'toughened glass' aren't stringent enough. Toughened glass should break into small little particles minimising harm to anyone near it but in some cases, it can clump together in large chunks and/or form longer sharp splines which can do some serious damage - hence the reason for a revision," says Rob.

"There's no guarantee under the current Standard that toughened glass will break down into little particles if



PHOTO CREDIT: WFAANZ

Toughened glass is meant to segment into small pieces when broken

it does smash - or sometimes into little 'daggers' - so if the Standard can be revised we can heavily reduce the possibility of it happening."

For the builder, safety film is a retrofit product and is not cost effective for new construction where the builder can purchase suitable safety grade

glass upfront. Where safety film proves to be undoubtedly more cost effective long term is when the glass is already installed. In retrofit situations when comparing safety film to the other option of glass replacement, hundreds of dollars can be saved per square metre.

Rob outlines the fact that from a builder's perspective,

'designing out' the problem is the best way to mitigate the risk of any harm, regardless of how many years it's been installed.

"Nickel sulphide will always exist and it can't be identified in every single piece of glass so the best way is to out-design the issue. To minimise the risk that nickel sulphide poses, builders should be

looking at a laminate toughened glass or even just a plain laminate glass where applicable," Rob says.

"Laminate glass is basically two bits of glass sandwiched against a plastic film inside that holds together when it breaks. The inside layer is often made of a plastic material called polyvinyl butyral (PVB) and plays a similar role to a protective film.

"The general consensus, and a wide recommendation, is to use laminated glass for higher injury risk or elevated situations for new construction. In existing buildings the costs needed for re-glazing are too high so apply a safety film as a retrofit solution."

The likelihood of mitigating the risk of NiS within toughened glass without safety filming all toughened glass - or inspecting every single piece of glass that's ever made - is near zero so the next best solution is to address the most critical threats. By putting together a risk analysis, this will result in higher threat applications being prioritised and less injuries because of spontaneous breakages. ■

Window Film Association of Australia and New Zealand
www.wfaanz.org.au

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