

## London tower inferno a case study in systemic failure

by Ian Harvey Jul 7, 2017

Polyethylene-insulated aluminum panels speculated to be a major factor in the spread of London's Grenfell Tower inferno could never be deployed under Ontario's building and fire codes, says RESCON director of building science and innovation Paul De Berardis.

After the June 14 London Grenfell Tower blaze killed at least 80 people, the British government decided to check hundreds of highrise structures across the country where similar cladding panels may have been used. The polyethylene-insulated aluminum panels used as cladding on the highrise are speculated to be a major factor in the spread of the fire.

With the death toll climbing to at least 80 following the June 14 fire, the British government is scrambling to check hundreds of highrise structures across the country where similar cladding panels may have been used.

According to various media reports, more than 120 buildings were found with combustible cladding and residents are being evacuated during removal. Costs to remove the cladding could reach over £600 million.

While the investigation into the fire itself and the systemic failure to prevent combustible cladding being installed in a 24-storey building that was also without sprinklers continues, there's a sigh of relief across Canada.

National and provincial building codes as well as fire codes severely restrict the panels' usage precisely because of the fire risk, says De Berardis, who is also a civil engineer.

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**Paul De Berardis**  
RESCON

"Under the Ontario code a building is either made of combustible-rated materials or non-combustible materials and the rules are applied accordingly," he says. "In this case, from what I have read, the building is concrete which is non-combustible but they retrofitted the panels, which are combustible, over the top for esthetic reasons."

Ontario's code, which is similar across Canada, would limit the cladding to a six-storey non-combustible structure.

"It's based on how long it would take to evacuate the building in an event," he says. "In the Grenfell Tower situation you had ladders which only reached to the 12th floor. People were trapped."

Once the heat from the blaze that started in a fridge inside a fourth floor apartment burst through the adjacent exterior window, it took seconds for the polyethylene to ignite.

With no mechanical fire breaks between the vertical stacked panels, flames rushed upwards, consuming the sandwiched material and lighting the 24-storey building up.

If the searing heat wasn't fatal, the toxic smoke would have been.

Exacerbating the situation was that the building had no sprinkler system, De Berardis said.

Despite the high standard code requirements around cladding, Ontario only demands sprinklers on new construction and buildings housing "vulnerable persons," says Toronto Fire Services Deputy Chief Jim Jessop.

"There's no requirement to retrofit commercial and residential multi-storey buildings with sprinklers, just those such as homes for the elderly or special needs," he says. "And we're not seeing a lot of people retrofitting older multi-storey buildings with sprinklers in downtown Toronto."

De Berardis says Ontario highrise apartment buildings must be designed as contained cells to limit the spread of fire and that typically, according to the Canada Mortgage and Housing Corporation, 94 per cent of apartment fires are contained in the originating unit.

He says while there were recent rumblings about relaxing the building code requirements around cladding, the Grenfell Tower fire has all but extinguished further pressure.

Meanwhile, the U.S. manufacturer Arconic announced it will stop selling the composite Reynobond PE panels for highrises.

Reuters reported it made and sold three types of panels: the PE with a polyethylene, which the company advertised as suitable up to only 10 metres in height; the FR which is good up to 30 metres and rated as fire resistant; and the AR, which is non-combustible and is supposed to be applied in highrises above 20 metres.

Reuters reports emails between company officials and the London contractor clearly raised alarms over the use of the combustible PE panels on a 60-metre building. However, Arconic said later it didn't pursue the matter because it was a local building code issue overseen by the renovation contractor.

Also subject to the official inquiry is whether local agencies who signed off on the installations were aware of the combustibility of the PE panels compared to the FR and whether the contractor improperly substituted the PE panels if in fact there was a building code requirement.

Ironically, the panels are esthetic in nature, not providing anything in the way of substantial insulation or even existing building envelope protection, explains De Berardis.

"Essentially it's aluminum with styrene in between," he says. "Also, the building only had one stairwell (and one elevator shaft) and it's not clear whether the stairwell was pressurized to defeat smoke penetration. With no sprinklers and people told to stay put in the event of fire, they had no chance."