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TORONTO: PROPANE EXPLOSION

## THE PERILS OF PROPANE

JOSH WINGROVE

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Propane is a volatile gas that is stored and transported in a compressed liquid form, vaporizing only when pressure is released.

At their fullest, propane tanks hold 80 per cent liquid and 20 per cent gas, said Richard Hawrelak, 75, a University of Western Ontario lecturer and former Dow Chemical plant design engineer. While the liquid can absorb heat when exposed to a fire, the gas heats up quickly and increases the pressure inside the tank.

For that reason, the tanks have safety valves, which should release and allow the pressure to be vented out safely. Storage areas also have sprinklers, which are meant to put out fires threatening tanks.

When the valves and sprinklers fail to subdue a fire, tanks explode, sending out both a shockwave of pressure, "like TNT," Mr. Hawrelak said, and a fireball of vaporizing gas that follows soon after. This is called a Boiling Liquid Expanding Vapour Explosion, or a BLEVE ("Blev-ie"), Mr. Hawrelak said. When that happens, the tanks can also become rockets, setting off a "domino" effect as they hit and rupture other tanks.

"Sometimes the tank just rockets like a rocket going to the moon," said Mr. Hawrelak, who spent two months in intensive care in 1973 after getting caught in a propane explosion himself. "You've got to have an awful lot of respect for propane storage."

To describe a BLEVE to students, Mr. Hawrelak holds a large balloon at the front of his classroom, and lets it go. The balloon shoots around the room, before landing near a student.

"I say, 'You're dead. You just got hit by a propane BLEVE,' " Mr. Hawrelak said.

Once released, the gas is both highly flammable and toxic. The gas is an asphyxiant, meaning it cuts off oxygen to the body and can cause suffocation. Exposure to high levels of propane can cause a number of health problems, including frostbite if it touches skin. Propane is also heavier than air, and can therefore pool in low-lying areas.

Mr. Hawrelak believes the Ontario Ministry of Labour is responsible for checking the safety of such tanks.

While the United States and countries in Europe have strict guidelines for such propane-storage sites - for instance, they have to be two kilometres from the nearest home - Canada doesn't, using instead an outline set up by our Major Industrial Accident Coordinating Committee. It pales in comparison to U.S. regulations, which require Qualitative Risk Analyses, Mr. Hawrelak said.

"In Canada, the MIACC system was a very poor cousin [of the American system]," he said. "All we came up with were loosey-goosey guidelines."

In 1979, a train carrying propane derailed in Mississauga, causing a series of BLEVE

explosions and sending train cars flying off the track. It prompted the evacuation of 200,000 people. At the time, it was the largest peacetime evacuation ever in Canada. No one was killed.