Students and workers on UVic's campus are raising their heads to a new tone coming from reversing vehicles.

Broadband reversing alarms have some employers singing a new tune

By Don Hauka

At the University of Victoria, every department tries to live in harmony with the environment. But the raucous "beep-beep-beep" from the backing up tonal alarms used by the university's fleet of service vehicles was sounding a sour note in the residential neighborhoods bordering the campus.

UVic's Facilities Management department started working with the community to find a way to cut down on the noise level but still meet safety standards to keep both employees and students safe.

"We wanted a solution that met our sustainability standards and addressed our neighbours' concerns by reducing noise levels," says Leigh Andersen, UVic's director of Customer Service and Program Integration.

"We also wanted to make it more pleasant for the staff and faculty. Can you imagine teaching a class on a hot summer day with the window open and suddenly all you can hear is the beep-beep of a service vehicle going down the side of the building?"

The UVic safety team and community representatives soon focused their attention on broadband alarms as an alternative. Sometimes called "white-noise signal" or "shush-shush" alarms, broadband alarms use pulsed

acoustic signals across a frequency range, rather than a single frequency, to produce a hissing sound.

Broadband alarms are popular in Australia, where a number of studies found they have several advantages over their tonal counterparts. Here in Canada, that research was built upon by scientists at the University of Ottawa and Montreal's *Institut de recherche Robert-Sauvé en santé et en sécurité du travail*. Their paper, published in 2013 in *Noise and Health*, found that "compared with the conventional tonal alarm, the broadband alarm generates a much more uniform sound field behind vehicles, is easier to localize in space, and is judged slightly louder at representative alarm levels."

WorkSafeBC occupational audiologist Sasha Brown says that "broadband sounds are theoretically easier to localize as they offer a greater number of cues compared with sounds with a limited frequency spectrum, such as conventional ambulance sirens and tonal backup alarms." This is due to the human ear's difficulty in locating pure tones in the frequency range of 1,000 and 4,000 Hz.

"Our brain analyzes information that comes from each ear, compares it, and notices the differences in timing, loudness, and phases of the sound waves. It then uses this to figure out where the source of a sound is located. Essentially the more information we give it, the better it can figure this out. It makes sense that broadband sounds, which have lots of different frequencies, would be easier to localize."

After confirming with WorkSafeBC that broadband alarms met the OHS standards and complied with health and safety regulations, UVic started retrofitting their vehicle fleet in early 2015. So far, about 20 of the 28 maintenance vehicles that require reverse alarms have been switched to broadband alarms.

The changeover was complemented by an employee and public education program to bring workers and residents up to speed on the new system. Employees were given crew talks and Facilities held demonstrations of the broadband alarms on campus.

After some initial reservations, people soon began to appreciate the new alarm system's features, says Darryl Huculak, UVic's environmental health and safety coordinator.

"One of the advantages of the broadband alarm system is the uniqueness of the sound: It's not something people are used to hearing, so they tend to take more

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> —**Justin Andiel**, Central Services manager, municipality of Whistler

notice of it," said Huculak. "The other main advantage is the localization of the sound. It makes it much easier to determine where its coming from, and therefore directs you to the immediate hazard at hand."

Now, instead of discord, campus and community are singing from the same broadband song sheet. Says Andersen, "It's been an overwhelmingly positive experience for us."

Backing vehicles pose a significant safety risk on work sites. WorkSafeBC statistics show 10 workers were killed between 2003 and 2012 when backing vehicles or mobile equipment crushed them against an object and/or struck or rolled over them.

Whistler on board with broadband alarms

Operating vehicles in confined environments with heavy pedestrian traffic presents considerable safety challenges. The busy resort municipality of Whistler has a fleet of 150 vehicles — including trucks, snow removal vehicles, and backhoes — that have to negotiate through crowds of skiers and tourists in the congested central village.

Noise complaints about tonal alarms prompted the municipality to begin a switch to broadband alarms six years ago. Central Services manager Justin Andiel says, so far, so good.

"They're less invasive for the hotel guests in and around the village. It's really a lot easier to hear where the sound is coming from as well," says Andiel.

"We're really happy with the results, especially in a crowded central village like we have. I even get asked questions about them by contractors who are up here on vacation."

Of Whistler's 150 vehicles, 40 now have broadband alarms. Andiel said there have been no accidents involving backing up vehicles since the changeover began and "as far as we're concerned these alarms are just as effective as the beeper alarms."

But using broadband alarms requires some worker education to acquaint them with the distinctive sound of the devices.

"What we don't know is the real-world reaction," says Sasha Brown. "When people hear the broadband sound, do they know to get out of the way? This is the next question to be answered, and it is one that WorkSafeBC will be addressing. For now, it's important that businesses implementing these alarms make sure their workers and staff are kept well-informed about changes to their safety procedures." ⓦ

Broadband alarm survey

Broadband alarms have not been evaluated in the context of the workplace. As such, WorkSafeBC is looking to understand the effect broadband alarm signals may have on worker safety and to understand perceptions workers have about the broadband signal.

You can help by completing this survey: https://na1se.voxco.com/SE/102/BroadbandAlarmSurvey/.

The survey will only take a few minutes to complete, and your feedback will be invaluable to WorkSafeBC's evaluation of this issue. If you have any questions about the survey, please e-mail humanfactors@worksafebc.com.

Did you know?

Falls are a leading cause of workplace injury.