

Audio alarm seeks a way through hazard of smoke-filled areas

THE integrity of safety systems aboard even the most luxurious of cruise vessels is under attack because the available sophisticated fire detection and evacuation enabling technology lacks the ability to guide passengers to safety through dense smoke.

The criticism comes from Michael Lunch, managing director of Sound Alert Technology, the British supplier of a new type of audio alarm.

Mr Lunch believes that the company's Localizer provides the missing piece in the ship evacuation jigsaw and has been lobbying Britain's Maritime and Coastguard Agency energetically to stimulate interest at IMO level.

Sound Alert Technology is a company established to market an invention produced by Professor Deborah Withington and her colleagues at the School of Biomedical Sciences' Auditory Neuroscience Department in the University of Leeds.

State-of-the-art analogue addressable fire detection systems are able to analyse information from sensors all over the ship, comparing carbon dioxide levels, temperature and other factors.

In the event of a change in conditions in a local area

these systems can "decide" that other areas remain safe.

However, aboard the modern cruise vessel, the decision to send passengers to particular locations remains predominantly manually triggered, even though the technology exists to automate the procedure, and potentially save time and thus lives.

There are good reasons why the operation is not at present automated. Significant steps have been taken to enhance the evacuation process, not least through the installation of strip lighting, featuring arrows that guide passengers to safety.

However, such systems are not ideal when vision is impaired. The need to get down on one's hands and knees to see the guiding light could lose the time it takes to save a life.

One and a half minutes in a heavily smoky environment is about as much as the body can stand.

Traditional audio alarms succeed in agitating the public but are difficult or impossible to locate using audio information alone.

The reason is that most alarms tend to sound a tone in the narrow band of human

speech between 1-3 kHz. Professor Withington says that from a neurophysiological point of view these signals are impossible to locate using sound information only.

She explained that any single frequency noise created its own "cone of confusion", a spatially ambiguous tone which the brain would not be able to pinpoint beyond noting that the sound was louder in one or other of the ears.

While this would be enough information for the brain to prompt the eyes, say, to search out the source of the sound, in the smoke-filled environment such computations became irrelevant.

The kind of noise our distant ancestors might have found it imperative to locate — the crack of a twig or the sound of running water — are to be found in the broader range of 20 Hz-20 kHz.

Professor Withington's Localizer emits a broadband pulsed noise which is reminiscent of a slow rattle.

In combination with a standard agitating alarm, the noise can be used as a "clue", guiding passengers to the nearest emergency exit.

Professor Withington indicated that trials aboard an

unspecified drydocked passenger vessel using theatrical smoke had confirmed that if only one emergency exit was available the sounding of a traditional alarm caused untrained volunteers to emerge from their cabins and choose left or right at random.

This simulation led some volunteers to a dead end, a scenario likened to the circumstances surrounding the *Scandinavia Star* disaster of 1990, when 158 people died, largely due to smoke inhalation.

Some of the dead were found 2 m from an exit.

In trials, a second control group faced the same smoke-filled conditions but this time with the Localizer in use.

In this case the volunteers were told that they would hear a new sound and that they should find the source to find safety.

Without exception, the control group headed for the exit once the alarm had sounded.

It is now up to Mr Lunch to push forward with the Localizer in the commercial context.

He is realistic enough to know that shipowners are most likely to act only

when they are required to do so by amendments made to Solas.

Having approached the Maritime and Coastguard Agency, he has subsequently looked to garner interest from the main British shipowners with a view to creating a groundswell of opinion which will transform into a proposal from the United Kingdom to the IMO.

Such a process, and the subsequent entering into statute of any amendment to Solas could, of course, take up to five years.

Scandinavian Star, it should be said was notable for other deficiencies than its lack of a Localizer.

The ship had been hurriedly refurbished, lacked key firefighting equipment and had confusing signs in her corridors, while crew training was also called into question following the disaster.

Even so, while cruiseship owners and their travel agents may prefer to emphasise the exquisite gastronomy, luxurious theatres and top entertainment aboard, it is to be hoped that they may not come to regret any reluctance to exceed as well as abide by existing safety regulations.