

Hearing loss at call centres

Hearing loss at call centres is a major issue all around the world. Exposure to excessive and continuous high levels of noise can result in both temporary and permanent hearing damage. Professor Setsuo Maeda of Kinki University, Japan, has unique experience and expertise in this area, and has carried out research at a small call centre on the Japanese island of Okinawa. Using the latest technology, Dr Maeda has compared the noise exposure risks and speech intelligibility of traditional headsets with the latest bone-conducting devices available.



Introduction

One of the main causes of hearing loss in call centres is acoustic shock – a sudden and unexpected burst of high-frequency noise

Noise-induced hearing loss is the second most common occupational disease, reducing the quality of life for millions of people who suffer from it. Loud machinery, equipment or vehicles have always been considered the main culprits for noise-induced hearing loss, but these are, to a great extent, controlled by rules, regulations and careful monitoring. However, we sometimes expose ourselves to excessive noise levels without even realising it and in the least expected of places. A call centre environment can be loud – periodically or consistently – causing concerns for the health of their workers.

For years it was believed that being a call centre operator was a low-risk occupation, but personal injury claims by call centre workers are increasing. These include repetitive strain injury, eyesight and posture problems, transient balance disorder, tinnitus and noise-induced hearing loss. One of the main causes of hearing damage in a call centre is acoustic shock, which occurs when a sudden and unexpected burst of high-frequency noise is transmitted through the operator's headset.



Research at the Okinawa call centre

The Okinawa call centre is also a teaching call centre where operators learn how to be courteous. Here, the call centre operator is wearing a conventional headset.

Dr Setsuo Maeda, Dr.Eng., Dr.Med.Sci. is Professor of Human Vibration at Kinki University, Osaka, Japan. Dr Maeda conducted research to compare the use of conventional headsets with bone-conducting devices, and to evaluate whether newly available bone-conducting devices reduce the risk of temporary or permanent hearing loss.

The Okinawa call centre where the tests were carried out employs ten people – eight women and two men. Call centres such as this one mostly use headsets with only one earphone so that users can still communicate with other workers.



Test setup

The HATS was used in parallel with workers making real calls, so the incoming call signal from the telephone was divided between two headsets



The testing took six days, using a Head and Torso Simulator (HATS) in parallel with the actual workers making calls, so the incoming call signal from the telephone was divided between two headsets.

A PULSE data acquisition system, a monaural headset, and a Personal Noise Dose Meter Type 4448 were also used.

Time, frequency and sound level were measured in dB(A).

Dr Maeda measured the hearing sensitivity of the staff eight hours before the test and eight hours afterwards.

Results

- Dr Maeda found that there was some reduction in hearing sensitivity between the two times that he measured
- The normal frequency range of the noise to which a call centre operator is exposed is between 300 Hz and 4 kHz
- The results ranged between 61.7 dB(A) and 77.6 dB(A)
- Average background noise was measured at 58 dB(A)

“The call centre where we carried out the tests is small and noticeably quieter than the large, international call centres that employ hundreds of people,” says Dr Maeda. In fact, the largest call centre in Okinawa employs 3000 people, making these workplaces potentially much louder than the test call centre. “My conclusion is that hearing damage could occur at levels above 90 dB(A),” says Dr Maeda.

Bone-conducting headsets

A bone-conducting headset in use at the Okinawa call centre



“From my interviews with the test subjects it is clear that hearing loss is a concern, but the management and workers at this call centre were pleased with the results because the levels recorded were significantly below danger levels,” says Dr Maeda.

Dr Maeda has also conducted laboratory experiments using HATS and PULSE in which he compared normal headphones with bone-conducting headsets using white noise, finding that, “bone-conducting devices help to prevent hearing loss.” This has also been confirmed by studies carried out at the University of Southampton in the UK.

In January 2013, Dr Maeda carried out further research at the call centre regarding speech intelligibility, where he compared speech intelligibility between a normal headphone and a bone-conducting device using RASTI (Room Acoustical Speech Transmission Index) signals. He found that the bone-conducting device did not adversely affect speech intelligibility, confirming his hypothesis.

“Bone-conducting devices help to prevent hearing loss”

Dr Setsuo Maeda

Acoustic shock

“Acoustic shock is a major concern as each operator has individual control of the sound level, but there is no automatic maximum limit. Therefore my recommendation would be to use a filter or shut off to limit the maximum noise level exposure,” continues Dr Maeda.

Conclusion

Dr Setsuo Maeda, Dr.Eng., Dr.Med.Sci. spends 70% of his time teaching undergraduate and graduate students and the other 30% conducting research with a special focus on issues that connect his scientific and medical expertise.

"I can categorically state that high background noise levels in call centres do cause hearing loss," says Dr Maeda, "some call centres, especially those dealing with customer complaints, are exposed to hearing loss as well as one other important issue – stress. A factor in the working practices of call centres is the exposure window – in other words those workers exposed to higher noise levels should work for a shorter time."

Another conclusion was that speech intelligibility is apparently not an issue when background noise is low, but becomes a more obvious issue when background noise levels increase.

The EU has published a Directive but this has not been implemented globally, so there is a very high number of court cases and claims for compensation. "In Japan," says Dr Maeda, "guidelines exist but there are no laws." A paper on this subject was presented at the Japan Hygiene Association Conference in November 2012. "In my opinion," continues Dr Maeda, "employers should provide noise prevention measures to protect call centre workers."



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Brüel & Kjær equipment

"PULSE was so easy and quick to set up and it was a simple matter to make a PULSE template," explains Dr Maeda. "I saved all the test data on the hard drive of my PC. Software used included Time Data Recording Type 7708 and PULSE LabShop Type 7700. I displayed CPB and overall levels. I also used Brüel & Kjær's Sound Quality Software Type 7698 for further analysis."