

## **3M Transcript for the following interview: Ep-4-Hearing Selection Part 2**

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Welcome to the 3M Science of Safety podcast presented by 3M Australia and New Zealand Personal Safety Division. This is a podcast that is curious about the signs and systems of all things work, health and safety, that keep workers safe and protect their health. I am Mark Reggers, an occupational hygienist, who likes to ask the questions Why, How, and Please Explain. Whether you are a safety professional, occupational hygienist, or someone with any level of WHS responsibility in the workplace, maybe you are a user of safety products or maybe you are a bit of a safety nerd who finds this stuff interesting, then this is a podcast for you.

(R) Today, this is part 2 of our conversation with Luciana Macedo from 3M. If you haven't listen to part 1, I suggest you pause this podcast right now, go and download part 1, because part 2 will make a whole lot more sense as we flow on with that conversation. Here is part 2, enjoy.

So, there are lots of different types of hearing devices. There are earplugs, earmuffs, banded earplugs, special types, communications, what are the factors and what are the things that workplaces should be thinking about, talking to workers about when selecting the best or the most appropriate hearing protection device for them.

(M) There are several factors that should be considered when you are selecting the most suitable hearing protector. The first one and the top one would be comfort. If it is not comfortable, the wearers are not going to use it for the entire period of exposure.

(R) I think that is just a standard human thing, if something is not comfortable, whatever it is, whether it is a pair of shoes, what are you going to do? You are going to take them off.

(M) Exactly, so can you imagine yourself using, you know, two sizes smaller boot for eight hours a day. No.

(R) No, I don't want to. [laughter]

(M) No, that can be quite annoying and distracting and we will find a way to make it comfortable. So, the same story with the earplugs. If you are wearing an earplug that is too big for you or too heavy, an earmuff that is too heavy or too hot, or something that is not practical, not comfortable, the workers will find a way, or the wearers will find a way to make it comfortable for them.

(R) Or not wear it at all.

(M) Or not wear them at all.

(R) What are some other things they should be thinking about?

(M) So, comfort is the first one. Another factor that is quite important of course is the level of protection, so as we discussed previously, you need to find the adequate level of protection to the amount of noise that the workers are exposed to, otherwise we would select only a +5 for everyone, but then you can end up

creating new hazards by overprotecting the workers. So, horses for courses. You need to find the adequate level of protection for the specific exposures that you will find in the workplace.

(R) So that attenuation level, that rating, where does the workplace find that number?

(M) And you find the level of protection that your earplug or your earmuff provides you on the pack. So good quality products, they should have been tested by a national standard. In our case in Australia and New Zealand, 1270. So, you will find the Australia New Zealand 1270 attenuation information on the pack which is usually provided in a little table format, and with a final number called SLC80.

(R) And what does SLC80 stand for?

(M) Sound level conversion rating. And at 80 means that 80 percent of the population is supposed to achieve that level of protection that is on the pack.

(R) So, you're saying 20 percent won't get it?

(M) Yes, that is the limitation of the SLC80. So SLC80 is the level of protection that 80 percent of the workers are expected to achieve, at least what is in that.

(R) So, you're saying expected to achieve, so if I put that 24-dB rated earplug in I may not be getting 24 decibels, is that what you're saying?

(M) Exactly, you may be getting less, you may be getting more, but the number that is on the pack is an average that 80 percent of the population is expected to achieve, not everyone. And you will also find another information on the product pack called Class. And the class of the hearing protector goes from 1 to 5, 1 being

the least protective hearing protector, and 5 being the highest level of protection that (inaudible) any hearing protector can provide you.

(R) I've covered comfort, that is important, I want to make sure people continue wear it, and we've got the level of attenuation, so we want to be blocking the right amount of noise, the right amount of sound, what are some other things that should be being considered by a workplace?

(M) So, communication. Communication is another very important factor as we discussed, if you have overprotected workers and they end up interfering with communication, speech intelligibility, and the ability to work in a team, in a group. So nowadays, the electronic headsets, I think one of the biggest benefits over electronic headsets in general is improved communication. So basically, regardless of the technology involved in a headset, (inaudible) hearing protector, the objective of those electronic headsets is to allow you to hear normally when you are not exposed to excessive noise, but in the event of an excessive noise or an impulse noise, or a high impact noise, those active hearing protectors have the ability to suppress and to compress the excess of noise or cancel them.

(R) So, a lot of workers on worksites, and I have been too, they will have a respirator or have safety glasses, they will have a hardhat, they may have a beanie, does all that other PPE affect the hearing protector and what is happening there?

(M) Yes, that is a very good point. I think PPE compatibility in general is more often than not, there is only so much that you can put over your face, right, so if you have all the PPEs that are used in combination with your hearing protector, compatibility should be taken into account. So, for instance, if you are wearing earmuffs and you have to use safety glasses underneath your earmuffs, you need to take into account the arms of your safety glasses will be breaking the seal of your earmuff and allowing sound to leak into your earmuff. Same story with respirators, for instance.

The straps of respirators may sit just underneath your earmuff, again breaking the seal of the earmuffs, and the earmuffs rely on a good seal to provide you the acceptable level of protection.

(R) Any other things for a workplace to consider?

(M) Yes, absolutely, like practicality. If you are in and out of noisy areas all the time and you are wearing a passive type of hearing protector, you may be more inclined to use earmuffs or banded earplugs which are much easier and more practical to put in and out as opposed to insertion ear plugs that you need to mould, whether you need to pull your ears for proper insertion or to do the proper fitting. If the hearing protector is not practical to be fitted, it is likely that the workers are going to simply forget to put them on when they are exposed an excessive noise or simply it is not practical to put on and off. Yeah, in the food industry, for instance, metal detectable is mandatory for hearing protectors so you don't want to find an earplug, a piece of the earplug, or even half of a piece of the earplug in your food. So, metal detectable hearing protectors are mandatory in the food industry and probably in the blue colour as well as just a few are bluish colour.

(R) There certainly are quite a few things for a workplace to consider, and I am going to make it even more complex, but what if I have a worker who already has existing hearing loss, how is that impacted by wearing hearing protectors?

(M) That is actually a very complex question because there is not a rule of thumb for people wearing hearing aids. In some instances, some people may simply remove their hearing aids and use active hearing protectors as a hearing aid as well as a hearing protector, but for others they may not be good enough, so there is not a rule of thumb that fits all, fits everyone, there is not one product, one type of product that is suitable for everyone, it is really a one by one case.

(R) I guess every worker is going to have a different level of hearing loss which is going to mean what you've got to do is going to be different as well, so I appreciate when you say it is quite a complex issue, there is probably not the time to go into it right now. I have covered quite a bit there, probably a few people probably hadn't considered all those factors, now price always comes into everything, we can't get away from price. Where should price sit in that whole scheme of factors and considerations of selecting hearing protection?

(M) In my personal opinion, price shouldn't be in the top of the priorities when you consider hearing protectors because regardless of how much technology you have put in a hearing protector, regardless of the price of the hearing protector, if it is not adequate, if it is not suitable, practical, comfortable for the worker, for the individual worker, chances are that they are not going to use it, or they are not going to use it properly, they are not going to use it for the entire period of exposure. Or compatibility, for instance, so sometimes workplaces invest a good amount of money and very goodwill to buy class 5 earmuffs or very good quality of hearing protectors which is good, but the compatibility between the earmuffs and the other PPEs used in combination with the earmuffs is not considered, and all of a sudden instead of having a class 5 now you drop down your protection to a class 2. So even though you invested a lot of money in providing good quality earmuffs to the workplace, they are actually not providing the expected level of protection. So, in my personal opinion, my personal point of view, price should not be in the top priority when you are selecting hearing protectors.

(R) I absolutely agree with you, and I think it is the same sort of factor when selecting any safety equipment, that look, nobody's got an unlimited budget, but if it is not going to be suitable, or if it is not going to be worn, then you are spending your money and it not actually going to be protecting your workers which is the point of the whole thing, so look, I absolutely agree with you, and I think that is the

same case for all PPE equipment, it's got to be fit for purpose and it's got to be used to be effective.

(M) Absolutely. So, another factor we should take into consideration are when we are selecting ear protectors are the personal characteristics, so for instance, the bones and the size of the ear canals, so for some people depending on the facial characteristics it could be quite challenging to achieve a good fit and a good seal with earmuffs. And also, the size of the ear canals, we are all different, even our right ear canal and our left ear canal might have differences, considerable differences. So, it is really important that you have the correct size of earplugs, or the appropriate size of earplug for that particular person.

(R) So, we've been talking about earmuffs and earplugs, earplugs go in the ear, earmuffs go outside the ear, what is the effect if we wear an earplug and an earmuff at the same time?

(M) In some instances, the standards recommend what we call a double hearing protection, especially when you exceed the 140 dB-C, our peak limit, right?

(R) Very noisy stuff.

(M) Exactly. And that limit can be easily exceeded, for instance when you are shooting. Even a small pistol can exceed 140 dB. So, in a shooting academy, for instance, it is likely that you are going to be wearing, or you should be wearing double hearing protection. In the military area as well, it is a common practice to use double hearing protection, especially with cadets in the academy when they are training. So in these instances, you may use a foam earplug underneath your earmuff, but we cannot simply add the level of protection of the earplug and the level of protection of the earmuff, you can't assume that if you have a 20 dB out of your earplug and 20 dB out of your earmuff you are going to have a 40 dB as your

overall protection. An acceptable rule of thumb is to add in average 5 dB on top of the highest attenuating hearing protector. Let's say if you have an earmuff that provides you 30 dB of attenuation, and you have an earplug that provides you 25 dB of attenuation, if you combine them both your overall protection is going to be only 35. So that is generally an acceptable approach to calculate the overall protection of double hearing protectors.

(R) So, I have been through the process at the workplace, we have selected the appropriate hearing protection, we have selected an earplug, and then I give it to the worker. It is just a case of just roll it up and stick it in my ear, as simple as that? Seems fairly logical?

(M) Unfortunately, not. The implementation of hearing protectors in a workplace should always been part of a comprehensive hearing conservation program. So as we were discussing, regardless of how good a hearing protector can be, or regardless of how much technology is involved in a product, if the workers don't know how to use them properly or are not willing to use them for the entire period of exposure, or they are not aware about the hazards they are exposed to, all these technologies, all the benefits and all the quality of those products are not going to be effective or they are not going to get the expected performance out of those hearing protectors. So, training is a vital, critical element of a hearing conservation program. Fifty percent of the effectiveness of any PPE relies on the awareness, on the behaviour, awareness, and willingness of the workers to wear them correctly, and that is no different with hearing protectors.

(R) Once again, I am going to have to agree with you, Luciana, it doesn't matter how good the hearing protector is, or any type of safety product, if it is not being worn, it is not going to be providing any protection. So are there ways, Luciana, to check the fit of an earplug or earmuff that is non-subjective, so we are not relying



on the worker to tell you or we are not relying on that visual, another way to go yes, we are achieving the required levels of protection.

(M) Yes, absolutely. With the development of technology there are a few symptoms that became available in the market in the last five, or between five and 10 years. Those symptoms, they can measure the level of protection of the hearing protectors for a person, so they can measure the personal attenuation rating, what we call a personal attenuation rating. So that is the most accurate way to assess and measure the fit of the earplug for the individual. Because as we discussed, the number that comes on the pack is just an average, is just what 80 percent of the population is expected to achieve if they are well trained. But what about the other 20 percent? We don't know, and the only way to measure the level of protection for the individuals is to conduct hearing protector fit testing.

(R) That is a pretty important point there, that yes, we have selected the most appropriate hearing selection but if after all that it just doesn't fit, or it is not possible to fit that individual, they are not going to be protected, and so it defeats the whole purpose of the whole process that you have been through, so I guess that verification, that assessment part right at the end is such a key, crucial step to make sure that your whole program is going to be effective, because you put these workers out into these noisy environments, yep, they've got their earplugs in, I can see the earplug, but are they actually getting the right attenuation.

(M) Yes, correct, so the hearing protector fit test would be your most accurate way or method to evaluate and measure the individual protection.

(R) Is there much training that workers need to be put through, for fitting earplugs, or fitting earmuffs, is that hard to educate people on that stuff?

(M) I wouldn't say it's hard to educate them in any correct use and care of hearing protectors, it is not difficult at all. It is probably just something that you need to remind them because as we said, hearing loss is painless. You don't know that you are starting to develop a hearing loss until it is too late, until you've already have it so we need to remind the workers, really, and develop the awareness and remind them about the hazards of excessive noise all the time so that they are keen and willing to do the proper fitting and use the hearing protectors correctly. But fitting and wearing them and looking after the hearing protectors is not difficult at all, it is actually quite simple.

(R) So that hearing protector selection, as you said Luciana, is part of that whole entire program. How do I know if my program is actually being effective? How do I verify that my workers aren't losing their hearing?

(M) So as part of the hearing conservation program, audiometric tests, or hearing tests, are a key element in the whole program, and the audiometric tests, you will be able to understand if all the controls that you implemented, all the controls in place, are being effective including PPE, including hearing protectors. However, there is a limitation to that. If your audiometric tests indicate hearing loss or hearing threshold shifts, it will probably be too late, right? So in my opinion, the best way to validate the controls, the assess your whole program, and work in a preventive way, is still to conduct hearing protector fit tests, because if there is an issue with the fitting of your hearing protectors, either by size or by lack of training or by lack of motivation to use them correctly, etc, you are going to be identifying the issue before the workers are exposed to excessive noise. Or you can also target specific critical groups when you are doing hearing protector fit tests, the ones who need more training, the ones who need to be refitted with new products, so you can identify those issues before you assign the hearing protectors for that particular worker. So, in my opinion hearing protector fit tests should be part of the hearing conservation program to validate your controls with a preventive approach.

(R) It is like any control measure, what can we do before the exposure rather than trying to fix it after the exposure or the damage has already been done, the exposures have already occurred, so it is pretty good stuff there, Luciana.

(M) That is absolutely right. And hearing protector fit tests, regardless of what method and technology is used, but hearing protectors fit tests in general have been recognised as the best practice and a powerful training tool by other countries like Canada, for instance, in the national standards, as well as in the UK. So, there is a trend in the globe to recognise the value of hearing protector fit tests in the hearing conservation program.

(R) I guess with a lot of things that are happening globally, it will probably work its way into the Australian standards down the track, if that is the trend globally that is happening.

(M) Hopefully.

(R) Hopefully. Really appreciate your time today, Luciana. I think we have had some great information, certainly a lot more than I think a lot of people realise when you start to look at the hearing selection process, it is not just as straightforward as sort of alluded to at the start, it is not just about the best attenuation and off you go, all those factors. At the end of the day it is about protecting the worker, it's got to be effective.

(M) Correct.

(R) If you need any help with your hearing protector selection, 3M can certainly help you. You can easily get in contact with our show, you can shoot us an email at [scienceofsafetyanz@mmm.com](mailto:scienceofsafetyanz@mmm.com). Drop us an email and we will get in contact and

see if we can come out to your workplace and give you a hand. If you have any other questions, comments, queries, or you think there may be a topic you would love us to cover or a guest you think it would be great to get into the studio, we would love to hear from you. Shoot us an email again at [scienceofsafetyanz@mmm.com](mailto:scienceofsafetyanz@mmm.com). Be sure to subscribe to our podcast, wherever you get your podcast from, I would hate for you to miss any future podcasts. If you enjoyed this podcast, you found it informative, we would really appreciate if you could take a couple of minutes and leave a review, that really helps other people find podcasts as well. And, as James A Garfield once said, “Man cannot live by bread alone, he must also have peanut butter.” Thanks for listening, have a safe day.