

Submission to the Transport and Industrial Relations Committee on The Injury Prevention,
Rehabilitation and Compensation Amendment Bill.

Professor Peter Thorne CNZM, PhD and Dr David Welch PhD, Department of Audiology,
University of Auckland.

This submission addresses the intention to redefine within the IPRC Act the definition of personal injury from noise exposure: Clause 6 (Personal Injury) of the IPRC Amendment Bill:

Section 264A: Personal injury does not include any degree of hearing loss that is less than 6% of binaural hearing loss.

This change would mean a person cannot get cover (and therefore no treatment or entitlement) for hearing loss that is less than 6%.

We seek the opportunity to appear before the committee to speak to this submission.

Authors

Professor Thorne and Dr Welch are members of a research group at the University of Auckland School of Population Health that is researching the epidemiology and interventions for Noise-induced Hearing Loss (NIHL).

Professor Thorne has over 25 years of experience as a hearing scientist with a major focus on the mechanisms of noise damage to the ear and the diagnosis, epidemiology and prevention of noise-induced hearing loss. He has published widely in the international literature on these subjects. He is also the President of the National Foundation for the Deaf and sits on the boards of the Deafness Research Foundation and the Auckland Medical Research Foundation. He has played a major role in advocating and facilitating the introduction of a programme of Newborn Hearing Screening and Early Intervention in New Zealand. He was made a Companion of the New Zealand Order of Merit in 2009 for services to auditory neuroscience.

Dr Welch has a background in epidemiology, psychology, and hearing science. He worked with the internationally acclaimed Dunedin Multidisciplinary Health and Development Study, following the effects of hearing and ear disease on the development of a cohort of 1000 people. He has published extensively on hearing outcomes and the impact of hearing and other factors on development. He is a Senior Lecturer in the Department of Audiology and also a member of the Ministry of Health Newborn Hearing Screening Implementation Advisory Group.

1 Executive Summary:

1.1 This submission addresses concerns about the validity of introducing an arbitrary quantitative threshold with no clinical rationale, and the potential impact this will have on efforts to prevent noise-induced hearing loss (NIHL) in the workplace.

1.2 A 6% hearing loss sounds insignificant but we contend that the scale being used does not adequately capture the effect of noise exposure on the ear. We believe that a 6% loss actually represents a substantial amount of injury to the ear. *To change the acceptable level of loss is the equivalent of raising the acceptable sound level for workplace noise exposure.*

1.3 NIHL is a *preventable* occupational injury and strategies are being developed nationally to combat it. Setting a new threshold purely for cost reasons, could undermine the efforts to prevent noise exposure in the workplace. We express the view that an approach directed at prevention of hearing loss in the workplace would benefit individuals and society as well as reducing the ongoing liability to ACC by reducing rehabilitation claims. We believe that this approach would better align with the ACC's Strategic Priority (5): 'Working to reduce injuries and occupational diseases'¹.

1.4 The rising number and cost of claims for NIHL has been known for some time and a suite of strategies have been put in place by ACC to address this. Work is in progress to develop stronger guidelines for assessment of claims. To understand more about the epidemiology and prevention of NIHL, ACC, the Department of Labour and the Health Research Council have funded a substantial programme of research at the University of Auckland and Massey University, which is due to be completed by the end of 2010. This research will provide an evidence base for policy development around rehabilitation claims and establishment of effective workplace prevention programmes to reduce the impact of noise on hearing in the workplace. We believe that any change to ACC legislation without this evidence base is premature.

¹ ACC Annual Report 2009

2.0 What is Noise-induced Hearing Loss (NIHL)?

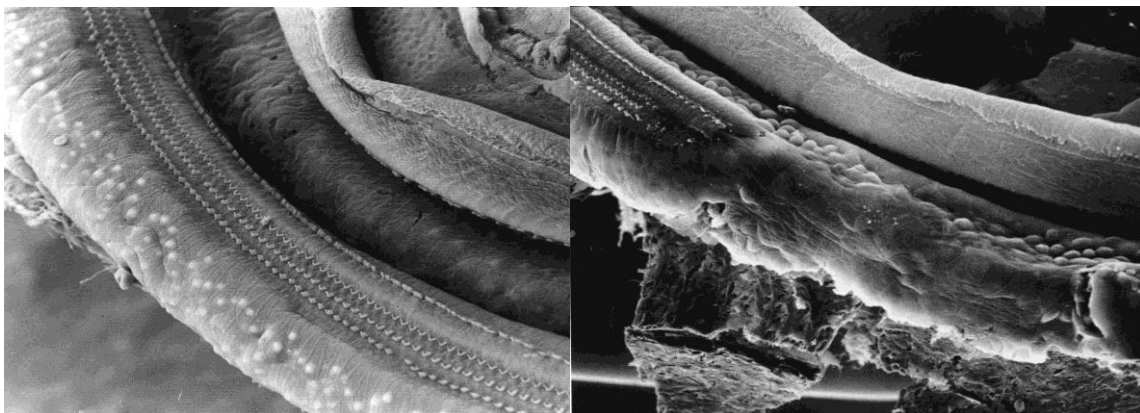
2.1 The introduction of a single numerical value to define the injury from noise exposure is a simplistic solution to a complex issue. There is little clinical or research basis for selecting this threshold, a fact acknowledged by ACC.

2.2 For context it is important to understand how noise injures the ear, the rules governing the relationship between noise exposure and hearing loss and how these have informed the current Occupational Safety and Health (OSH) regulations and management guidelines² to limit noise injury.

2.3 NIHL occurs because the ear is bombarded with too much sound. The delicate sensory structures and nerves in the ear are not designed for continuous high levels of sound exposure and become irreversibly injured. The cells of the inner ear are so sophisticated that they are unable to regenerate and have limited powers of repair. The loss is permanent and there is no known cure, so the only effective current approach is prevention; by reducing the noise exposure.

2.4 Although research into promoting regrowth of the sensory cells is advancing remarkably, to date the only means available to help someone already with hearing loss is the use of technology such as hearing aids and cochlear implants.

2.5 The ear injury from loud sound, as shown below, can occur suddenly, as in the case of a blast or a gunshot, or accumulate slowly over time as a person is exposed to noise, as for example in the workplace.



Normal hearing organ showing the orderly arrangement of sensory cells

The disordered noise-damaged hearing organ showing the injury that would cause deafness

² Department of Labour Approved Code of Practice for the Management of Noise in the Workplace, 2002

2.6 Identifying levels of sound that cause hearing loss is not precise because there is so much difference between individual susceptibility to noise injury. However, a good approximation based on substantial research literature over the past 50 years is that the amount of inner ear injury that occurs is correlated to the total energy of the noise (exposure level times its duration). Like other jurisdictions, New Zealand OSH regulations consider a level of 85 decibels (equivalent to the noise level in a busy city street or truck cab) for eight hours (Leq8hr) is the acceptable threshold for noise injury. Exposure to this level brings an 8% increased risk of developing hearing loss in those with at least ten years exposure³. However, this is an average; some people will sustain more injury, and others will sustain less. As in other developed countries, 85 decibels for an eight-hour exposure is regarded as conveying acceptable noise risk and is embedded in the New Zealand OSH regulations⁴.

2.7 The manifestation of this injury to the ear is a reduction of ability to hear. Hearing loss can be reflected in an “audiogram” which shows the sensitivity of our hearing to different pure tones in very quiet, artificial conditions, and is the basis for the calculation of the percentage hearing loss as the ACC proposes. But, the audiogram is a simple measure of sensitivity to sound and does not reflect how we hear in everyday environments such as the classroom, in meetings, or when socialising. It does not measure the sophisticated function of our hearing system, such as being able to detect complex sounds of speech and music, to hear in the clutter of background noise or to localise where the sound is coming from in the environment.

2.8 The ACC proposes to adopt a criterion for injury based on handicap as measured by percentage scale⁵. This assesses the hearing handicap by applying a percentage handicap to the amount of hearing loss in each frequency (pitch) of the hearing spectrum. It weights the frequencies according to their importance and is heavily dominated by loss in the lower tones (1000 and 2000 Hz). However, noise damages parts of the ear which detect the higher pitch tones (3000-6000 Hz particularly), which are important for detection of sounds in background noise and sound localisation.

³Prince, M. M., Stayner, L. T., Smith, R. J., & Gilbert, S. J. (1997). A re-examination of risk estimates from the NIOSH occupational noise and hearing survey (ONHS). *Journal of the Acoustical Society of America*, 101(2), 950-963.

⁴Health and Safety in Employment Regulations, SR 1995/167, (1995).

⁵ NAL percentage binaural hearing handicap

2.9 Because of the way the percentage is calculated noise damage has to be very extensive before it registers as a handicap on the scale. The range of hearing loss for the population is shown in simulated audiograms below using the criteria from the International Standard⁶ for calculating the contribution from noise exposure. As can be seen (Figure A) a 6% threshold is not reached until there is substantial injury to the ear, and the associated average hearing loss for a 6% handicap is approximately 30 dB (Figure B).

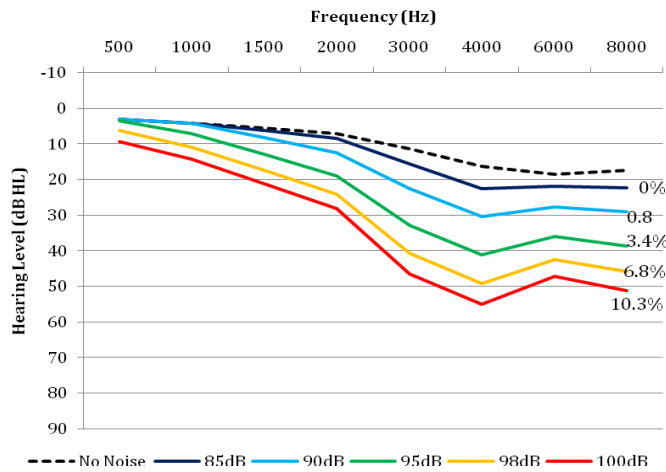


Figure A: Median hearing levels for men aged 50 years with thirty years of noise exposure for eight hours per day at the five noise levels indicated. The broken line represents the median hearing level for non noise-exposed men aged 50. Calculated percentage hearing loss is indicated beside each line.

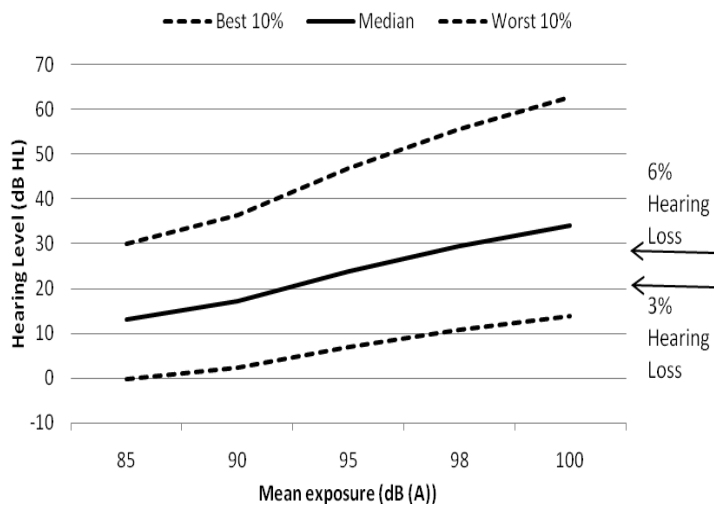


Figure B: Median, best 10%, and worst 10% average hearing level (average of 8 frequencies) for 50 year old men after 30 years of noise exposure at the indicated levels. Calculated percent hearing loss indicated by the arrows

2.10 Increasing the percentage threshold for personal injury from noise is equivalent to raising the level of noise that is acceptable in the workplace. Considering the data for normally hearing men aged fifty years with differing levels of noise exposure (Figure A), moving from a 3% handicap (the green line) to a 6% handicap (the yellow line) is equivalent to an increase of 3 decibels: a *doubling* of the sound energy exposure.

⁶ ISO 1999-1990

2.11 To look at it another way, it would mean that it was acceptable to work in the same noise level for twice as long before damage would achieve a level regarded as a personal injury. In other words, the proposed change would, *de facto*, accept that New Zealanders may be exposed to higher levels of workplace noise and consequent injury.

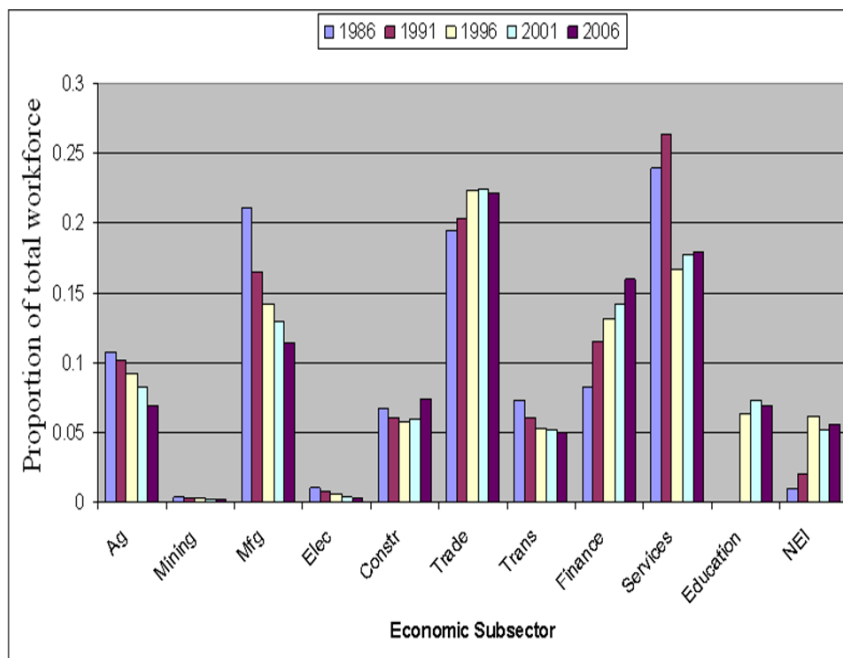
3 What is the Epidemiology of NIHL in New Zealand?

3.1 General Features

3.1.1 The epidemiology of NIHL in New Zealand is not well established and is the subject of a concerted effort by research groups in New Zealand funded by ACC and the HRC.

3.1.2 Using a modelling approach, our data indicate that the prevalence of hearing loss from noise exposure is about 16-20% of the total number of hearing impaired people in NZ, probably less than has been predicted. This would convert to about 60,000-80,000 people. This prevalence is consistent with several recent international studies⁷.

3.1.3 Using census data, our modelling suggests that the incidence (the rate of new cases) is declining and will continue to decline, if for no other reason than the participation rates in noisy industries are declining.



The proportion of the workforce in noisy industries (agriculture, construction and manufacturing) has generally declined over the last 20 years

3.1.4 In contrast claims to ACC have increased over the last decade. This may represent historical claims and, with time, the number of claimants should naturally decline in line with

⁷ Dobie, R. A. (2008). The burdens of age-related and occupational noise-induced hearing loss in the United States. *Ear and Hearing*, 29(4), 565-577.

the projected decreasing incidence. It is therefore very questionable whether the rate of claims to ACC is a true reflection of the extent of the current problem.

3.2 Maori and Pacific NIHL Epidemiology

3.2.1 Māori and Pacific people have the lowest number of ACC claims^{8,9}. Even after accounting for demographic differences the rate of claims from Māori are about half the rate of non-Māori. However, our analysis shows that Māori participate more in industries with high noise levels and should have a higher level of claims.

3.2.2 Research is needed to understand why Māori do not seek ACC assistance for hearing rehabilitation, and strategies to redress this imbalance should be implemented.

3.2.3 Since Māori also have a higher incidence of hearing loss from other causes (eg middle ear disease), the proposal to make arbitrary and clinically unfounded subtractions from the calculated hearing losses in such cases will even further increase the number of Māori who will be excluded by the proposed 6% threshold.

3.2.4 Raising the hearing injury threshold for a successful claim may exacerbate the existing inequalities.

4 Noise-induced hearing loss is a preventable condition and applying a percentage has the potential to undermine campaigns to eliminate NIHL.

4.1 The introduction of a percentage handicap threshold for NIHL appears to be a reaction to the cost of claims and is apparently not based on an understanding of the real NIHL situation in NZ.

4.2 There is a risk that introducing an arbitrary cut-off could undermine efforts to eliminate this preventable occupational injury. In an environment where limited data are being collected on the level of NIHL in industry, data on successful claims to ACC becomes

⁸ Thorne, PR, Reid N, Ameratunga SN, Williams W, Dodd, G, Purdy SC and Wallaart J (2008). The epidemiology of noise-induced hearing loss in New Zealand. NZ Medical Journal, 121(1280), 33-44

⁹ ACC website

a surrogate measure of NIHL incidence. A reduction in the number of claims by raising the injury threshold, could be interpreted as a decline in industry noise injury rates.

4.3 *Noise-induced hearing loss is essentially a preventable condition.* Turn down the noise and the potential for injury is reduced. A combined approach from ACC and Department of Labour towards addressing the **prevention** of noise-induced hearing loss will have a more significant impact on claims and the liability to ACC as the extent of the condition declines. Furthermore, such an approach would be aligned with the ACC's Strategic Priorities.

4.4 Is it possible to reduce noise induced hearing loss? The international evidence supports the view that attention to the principles of injury prevention with a concerted effort to eliminate the hazard and minimise the harm can reduce the impact of noise on hearing.

4.5 Preliminary evidence from our own research¹⁰ shows that attention to management of workplace noise can be effective in reducing the extent of hearing loss. In this longitudinal study of approximately 250 workers in a high-noise company with very good work practices, there have been virtually no new cases of NIHL over a ten year period since 1997. This shows that attention to principles of noise management; reduction of noise at the source, hearing monitoring and effective hearing protection practice, can be effective in reducing ear injury and hearing loss.

4.6 Preliminary research by Dr Ian Laird at Massey University indicates that there is relatively poor compliance with the New Zealand OSH regulations around noise in the workplace. Ensuring compliance with the noise regulations is the way to reduce the incidence of NIHL, not to penalise employees who have develop noise-induced injury at the workplace by raising the threshold for treatment.

¹⁰ Walker, J, Management of hearing loss prevention in the workplace. MHS dissertation (2009) (personal communication)

5 **Conclusion**

5.1 A 6% hearing loss for ACC claims from noise exposure represents a large noise injury to the ear and does not reflect the true extent of the handicap. Adopting this approach may damage noise prevention programmes by seeming to minimise the harm noise can cause. There is some indication that the prevalence of NIHL is declining and the current joint approach between ACC and DoL to investigate and prevent NIHL should reduce ACC's liabilities without the need to move the goalposts for acceptance of claims. ACC has a laudable policy of 'working to reduce injuries and occupational diseases', and it is important for the health of New Zealanders that this line be held. We advocate strongly that ACC maintain the *status quo* for claims relating to NIHL.