



HEARING AUGMENTATION & SOUNDFIELD SYSTEMS IN CLASSROOMS

This article explains what is generally provided by Hearing Australia, and what is required by the National Construction Codes (NCC) and the Access to Premises Standard.

There is a common misconception in schools that Hearing Augmentation is not required because students bring their own devices.

It has become the practice of some installers to provide SoundField systems as an alternative to Hearing Augmentation in our schools, citing two main points:

Myth 1 All students with a hearing impairment have a Personal FM system supplied to them by Hearing Australia, and will therefore bring their own device to school.

Myth 2 SoundField is an alternative (Performance Solution) for all students with hearing loss.

Unfortunately, neither point is correct.

Definition

Hearing Augmentation can be a Hearing Loop System, Radio/FM system or Infrared System, and these systems typically connect to the output of an existing PA/Sound system/sound source. SoundField is a microphone and multiple speaker system designed for use in a classroom.

Purpose

Hearing Augmentation is installed to allow the user with a hearing loss to hear as if they are less than 1 metre from the sound source. This is achieved both by removing background noise and reverberation. By reducing both background noise and reverberation, the user receives the clearest possible sound to the user's ears, or to the user's hearing aid/s/cochlear implants processor/s.

A SoundField amplification system is used in classrooms to improve the signal-to-noise ratio, amplifying the teacher's voice above the ambient noise in the room through speakers. (Crandell and Smaldino, 2002). SoundField is: *"an intervention strategy by increasing the overall level of the of the teacher's speech, substantially improving the signal to noise ratio by approximately 10 dB, and producing a uniform speech level throughout the classroom."* (Rosenberg et al. 1999)

Although improving the signal to ratio, SoundField is not reducing background noise, and only reducing reverberation in part.

Beneficiaries

Hearing Augmentation Systems assists users with mild, moderate, severe and in many cases, profound hearing loss. Hearing augmentation is required by the NCC and the Access to Premises Standards where there is inbuilt amplification.

SoundField is not required, but assists:

- some children with mild hearing loss
- Central Auditory Processing Disorder
- the teacher's voice
- numerous behavioural disabilities
- the majority of children with no disability or hearing loss

Let's deal with the Myths!

Myth 1 *All students with a hearing impairment have a Personal FM system supplied to them by Hearing Australia, and will use their own device at school.*

Personal FM systems not supplied by Hearing Australian

- Hearing Australia does not provide receivers for all students with hearing loss.
- Teachers, teachers' aids, student teachers, volunteers, students over 26 and others, including parents, some grandparents, carers and visitors are not provided with any Personal FM receivers by Hearing Australia.
- If the premises are used by others e.g. night college etc, transmitters and receivers are not available.

Personal FM systems supplied by Hearing Australia for some Students

Hearing Australia does provide Personal FM systems for some hearing impaired students, however:

- Hearing Australia supplies "Personal FM Systems" which are classed as Assistive Listening Devices (ALDs) and are not Hearing Augmentation as specified by NCC/Access to Premises Standards.
- The Personal FM systems supplied by Hearing Australia are only for the student they are issued to, not for the general public.
- Hearing Australia only provides one Personal FM receiver (which attaches to one hearing aid or cochlear implant), not two, which means the child only receives the Hearing Augmentation in one ear, not both.
- Students do not always remember to bring their Personal FM receiver for a number of reasons, including dignity, which is supported by the Disability Discrimination Act.
- Student's Personal FMs break down, and they may be without a receiver for weeks or months at a time.

Myth 2 *SoundField is an alternative (Performance Solution) for all students with hearing loss.*

National Construction Codes/Access to Premises Standards

- Hearing Australia is not responsible for providing Hearing Augmentation for buildings, and never has, they are only responsible for providing Personal systems for some students with hearing loss.
- The venue operator is responsible for provision of hearing augmentation, not any other party.
- Hearing Australia does not meet the requirement in the NCC for Hearing Augmentation.
- The NCC does not allow for students or others to provide their own receivers, as this is discriminatory.

SoundField is NOT an Alternative Solution

The ABCB (Australian Building Code Board) has gone to great lengths to explain the criteria for a Performance Solution, and SoundField clearly does not meet these criteria in regard to Hearing Augmentation.

A Performance Solution is an alternative way of achieving the Performance Requirement, without using the Deemed to satisfy solution as per D3.7 of the National Construction Codes – NCC (formerly BCA).

The Performance Requirement that must be met is: Performance Solutions, to be compliant with the NCC/ Access to Premises Standards, must meet DP9, as well as comply with NCC Part A0.

DP9

An Inbuilt communication system for entry, information, entertainment, or for the provision of a service, must be suitable for occupants who are deaf or hearing impaired.

NCC 2019 Amendment 1, Part A2 states that

A2.2 Performance Solution

1. A Performance Solution is achieved by demonstrating —
 - (a) compliance with all relevant Performance Requirements; or
 - (b) the solution is at least equivalent to the Deemed-to -Satisfy Provisions.
2. A Performance Solution must be shown to comply with the relevant Performance Requirements through one or a combination of the following Assessment Methods:
...
3. Where a Performance Requirement is proposed to be satisfied by a Performance Solution, the following steps must be undertaken:
...

AS 1428.5 - 2010 states that SoundField systems are “not a replacement” for hearing augmentation systems. More information found [here](#).

The Solutions

1. Hearing Augmentation

Hearing Augmentation is required where there is an Inbuilt Amplification System (other than EWIS). Often there is a PA system installed covering whole blocks of the school, as well as an independent system in the assembly hall and under the COLA.

- Classrooms, lecture theatres, workshops, science labs and the like
- As most PA systems in schools send the same signal to multiple rooms, one Hearing Loop system can cover multiple classrooms at a time (max of 4 on average). This is the most cost-effective solution.
- If Personal Radio/ FM or infrared systems are provided, then 2 receivers must be provided for every room to be compliant.
- Where built in SoundField systems are installed, or individual classroom amplified sound systems, Hearing Augmentation must also be provided
- Assembly halls, performance areas, large area gatherings, outdoor assembly areas like COLAs etc.
- The best solution for these areas are Hearing Loop Systems, whether indoor or outdoor, and receivers are not required.

2. SoundField can be a Compliant Solution

SoundField can be used as a fully compliant system with NCC D3.7 and D3.6, provided that

- The SoundField system is capable of being used with receivers
- A minimum of two receivers are provided per room fitted with a SoundField, for spaces holding up to 50 people (as per NCC D3.7 requirements), and for rooms with over 50 people, that the formula in D3.7 is followed.
- Each receiver is provided with both neckloops and headsets

3. Assembly Areas

Having grown up with hearing loss, and being a parent of two hearing impaired children, Hearing Connections strongly recommends that only hearing loop systems be installed in assembly halls, under COLAs and in other assembly areas. Teachers have confirmed that many children are reluctant (as in absolutely refuse) to wear a receiver. Therefore, hearing loop systems are the only practical solution for assembly areas.

Conclusion

The vast majority of users with hearing loss require Hearing Augmentation to reduce not just the background noise, but the reverberation, while providing independent volume control via the Hearing Augmentation receiver and/or the user's hearing aid/cochlear implant processor.

Numerous research studies prove that SoundField systems are not a replacement for Hearing Augmentation, which is why children with moderate, severe and profound hearing loss continue to use Hearing Augmentation systems in conjunction with SoundField Systems. This in itself shows that SoundField is not a satisfactory alternative to Hearing Augmentation systems.

SoundField is clearly not an alternative to Hearing Augmentation for "occupants who are deaf or hearing impaired" as stated in DP9. However, if the SoundField system is capable of having receivers, and the minimum number of receivers are provided per room, then SoundField is hearing augmentation.

Hearing Connections supplies both hearing augmentation systems and SoundField systems.

References

National Construction Codes (previously called Building Code of Australia - BCA); and
Disability (Access to Premises - Buildings) Standards 2010

D3.7 – Deemed-to-Satisfy Solution

- (b) If a hearing augmentation system required by (a) is—
 - i. an induction loop, it must be provided to not less than 80% of the floor area of the room or space served by the inbuilt amplification system; or
 - ii. a system requiring the use of receivers or the like, it must be available to not less than 95% of the floor area of the room or space served by the inbuilt amplification system, and the number of receivers provided must not be less than—...(See NCC for details)
- (c) The number of persons accommodated in the room or space served by an inbuilt amplification system must be calculated according to D1.13

PART A2 APPLICATION

- A2.0 Compliance
- A2.1 Compliance with the Performance Requirements
- A2.2 Performance Solution
- A2.3 Deemed-to-Satisfy Solutions
- A2.4 A combination of solutions

AS 1428.5 – 2010 – *Communication for people who are deaf or hearing impaired*

Clauses 1.4.24, 4.1 and 4.7 deals with Sound Field systems.

Clause 4.1 states “... SFAS is not a replacement for an ALS.”

Clause 4.2 then defines ALS as Hearing Loops, FM and Infrared systems.

FURTHER INFORMATION

If you have any questions, email Andrew Stewart: Managing Director of Hearing Connections at andrew@hearconnect.com.au

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About the Author

Andrew Stewart is qualified in electronics and has been leading research into hearing augmentation systems for over 30 years – including designing, installing, testing and commissioning of Hearing Augmentation Systems. He and his team have conducted their own research of comparison methodologies of installing hearing loop systems and designed and constructed test equipment. He's been involved in installations at Sydney Opera House, First Class Qantas Club Singapore, art galleries, museums, theatres and many others.

Andrew was a key leader in the development of AS 1428.5 - 2010, the authoritative document on Hearing Augmentation in Australia. He is also a life member of Deafness Forum of Australia (the peak body for hearing impaired people in Australia) and continues to represent them, as he has on many committees for over 20 years. Andrew has been hearing impaired all his life, with a progressive loss, and now wears two cochlear implants. He has 9 other family members who wear hearing aids and/or cochlear implants.

Why choose Hearing Connections

Hearing Connections is built on experience of Andrew Stewart, who:

- Has been **wearing hearing aids** since age 7, and now wears two cochlear implants.
- Knows both sides of the story – the **lived experience**, and the **electronics qualifications**.
- Has been **specialising** in Hearing Augmentation Systems for over 33 years.
- Was **instrumental** in the writing of the definitive Australian Standard **AS 1428.5**.
- Has conducted **research and development** of Hearing Augmentation systems for improved outcomes.
- Has over **33 years of design, installation and commissioning** of Hearing Augmentation systems (loop systems, FM systems, sound field systems and public address systems) for a range of public access buildings, from small halls to significant buildings and venues, including Sydney Opera House and airports.
- **Lectures** in Hearing Augmentation for building professionals.
- Provides **training** in Hearing Augmentation for Access Consultants, Building certifiers and surveyors, and architects.
- Over 20 years of **advocating** for the needs of deaf and hearing impaired people.
- Is a **life member** of Deafness Forum of Australia.
- Has won **numerous awards** for service in advocating for the needs of deaf and hearing impaired people.

Legal

This document is not a legal interpretation of the NCC. It is the opinion of the principal of this company and is based on more than 30 years of experience with hearing augmentation. He himself is hearing impaired. The information provided is general advice only and does not take into account your building site objectives, building site design and or building materials used or other relevant factors and cannot be relied upon for your specific needs.

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