

Transcript of Aural Diversity Workshop 3

Paper 10 - Jean Hewitt and Jana Guijarro (Buro Happold): "Developing standards for Neurodiversity and the Built Environment" Friday 27th May 2022 at 12.15 which will be followed by discussion with survey from approximately 12.45 (Discussion 4 Buro Happold: Designing Spaces).

Slide 1 – cover slide

This presentation looks at guidance under development by the British Standards Institute(BSI), in the form of a publicly available specification, PAS 6463.

Slide 2

My name is Jean Hewitt, I am a specialist in accessibility and inclusion working as a senior consultant for Buro Happold's Inclusive Design team. I am currently technical author for BSI's PAS 6463, with my time sponsored by Buro Happold.

I am delighted to be joined today by Jana Guijarro, a senior member of Buro Happold's acoustics team, who will talk specifically about the content of the PAS relating to acoustics.

There will be opportunities to ask us questions and for us to ask some of you during the workshop following our presentations.

Slide 3 Header – Background to PAS6463

Slides 3-5

Neurodiversity is basically the variation in neurocognitive profiles across the whole population;

As humans, we don't come in a one-size-fits-all physically, mentally or neurologically. There are natural and normal genetic variations. We vary in our we approach and think about things, we have different learning styles and we communicate with others in a range of ways. Our individual interpretation of the world around us varies, and we even find our way from A to B using a variety of senses differently to one another. The graph shows a horizontal dotted blue line indicating what would be a neurocognitive profile that is entirely consistently performance for everything, from numeracy, spatial awareness, spelling, art, sciences etc., of course in reality a person with such an even profile does not exist and we all have a variety of strengths and weaknesses (or challenges) – for a neurotypical person, considered the societal norm, the yellow line shows slight variation. a neurodivergent profile will have much bigger differences between their strengths and weaknesses, and this is shown as the green line which has deep zig zags indicating a much greater variation which is present, we believe, in perhaps 25 or 30% of the population.

There are three terms we use in the PAS and these are:

- **Neurodiversity** - everyone, the whole population;
- **Neurotypical** - not a spikey profile;
- **Neurodivergent** - not fitting the majority neurotypical model; and
- **Neurodegenerative** – having a progressive condition such as dementia

Slide 6

This diagram by Professor Amanda Kirby will be familiar to some of you – of course we do not fit nicely under neat labels of compartments are each unique, but labels can sometimes be helpful in getting people support in learning situations. In reality we are messy and neurodiverse and this is beginning to be more widely recognised as a very normal and common variation across society.

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One of the key differences of people who have a neurodivergent or neurodegenerative profile can be found in sensory processing and experience. Many will experience hypersensitivity and these can lead to extreme physical sensitivity and cause sensory overload.

- Sensory overload can affect **heart rate, breathing, blood pressure, confusion, anxiety, mental distress, and behaviour.**
- 70% of people with diagnosed neurodivergent conditions are believed to be hyper-sensitive.
- A small number will be under-sensitive, whereby additional sensory stimulation is sought compared to a neurotypical person. For example, someone may actively seek out noisy, bright environments.

Slide 8

Many people who experience challenges in the built environment do *not* have a formal diagnosis for a sensory processing condition or difference. This includes:

People who are undiagnosed but have traits suggesting they are

Neurotypical people generally but with “spikes in one or two areas”

People with other conditions who are often unaffected by elements of the built environment but have not recognised that this may be due to a different level of sensitivity. For example, we know that some migraine sufferers have attacks that are triggered by light and/or noise, and that people with vestibular conditions are affected by patterns, moving images and often noise.

Slide 9

Humans have hundreds of senses!

5 most relevant to the built environment and the sensitivity we are looking at are:

- Sound
- Vision
- Proprioception/vestibular
- Smell
- Touch

Slide 10-11

The gap in guidance around this has been known for many years, and has been raised and discussed on the BSI's B559 committee responsible for standards around accessibility and inclusion in the built environment. In 2016 BSI commissioned the Helen Hamlyn Society to undertake some qualitative research with people with neurodivergent or neurodegenerative conditions. The findings identified some key strands on the negative impacts that were taking place and their sources – including: lighting and acoustics as the biggest factors, alongside finishes and spatial considerations. These findings were the catalyst to BSI's quest to develop a standard in this area

and the search for sponsors began. In 2019, four sponsors had been secured: Transport for London, Buro Happold, Forbo Flooring and BBC workplace.

Slide 12

The anticipated beneficiaries to the PAS guidance could be everyone, and we believe the guidance should not make environments worse for anyone; a lot of care has gone into ensuring we do not compromise existing accessibility standards. We have avoided using labels of diagnosis throughout the document, as it is often impossible to say with certainty that only one or more groups is affected by a particular feature – therefore where an example is given, it is intended to be illustrative but not imply that people with a particular condition will be the only ones affected.

Slide 13

PAS stands for Publicly available specification; which is a first step towards a formal standard. A PAS is usually produced very quickly, often within nine months, and has a technical author, (in this case me) who works with a steering group of experts and a wider invited review panel. The steering group for PAS6463 includes many people with lived and professional experience of a range of neurodivergent or neurodegenerative conditions and high sensitivity to elements of the built environment as well as representatives of each sponsor organisation.

Slide 14

The first draft was 73 pages, against a targeted maximum of 40 – the additional pages were felt to be critical to covering the topic sufficiently even at this first step into formal guidance. It has 16 sections, many of which signpost to other standards & guidance. Rather than repeat information, there is also quite a lot of cross referencing, as some information could fall under many potential headings.

A PAS is intended to be voluntary guidance for designers or managers to apply and evaluate. The content format gives recommendations (normative text), with further detail provided as informative text shown in italics. Quite often this informative text explains who might be affected or gives examples to support the recommendations.

Slide 15

We commenced in 2020 in the midst of COVID, and finally went to public consultation with our first draft in November 2021. There was a great deal of interest and we were fortunate to have over 1600 detailed comments, with suggestions for additions or fine tuning, or references to look at. The success of this public consultation has meant that it has taken longer than anticipated to develop the final copy but this will be published before the Autumn. Once released, a PAS usually has a shelf life of two years, during which it is evaluated in use. Content that is considered beneficial is then typically absorbed into an existing standard or a new standard created.

Slide 16

The scope covers Design and Management and we believe target audience will be many people working in the built environment sector, as well as employers and decision makers. The content is relevant to most building types, although we have stopped short of covering specialist provision for deep care, such as a dementia care home or some of the facilities that might be found in a SEN environment.

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There are a couple of points before I hand over to Jana to talk specifically about noise and acoustics, the first is that some people may only be affected by a single type of sensory input, e.g., sound, visuals, smell or touch. However, for many people with hypersensitivity, it applies to more than one sense and the impact can therefore be much greater.

Some people will feel that the senses are bombarded with stimulation from multiple sources. So today, we are focusing just on sound, but in reality, for many people it will be much more than that.

Slide 18-20

These final three slides illustrate the proposed structure of the PAS.

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So, there are many elements to consider when designing for neurodiversity, but there are three umbrella terms that I feel captures the essence of this guidance, and I call these the three C's:

- **Clarity** of the environment –layout, appearance, noise level, and so on,
- Giving some **Control** back to individuals – this could be through a choice of different environments to suit their needs, or adjusting a personal space for their preferences, and finally and very importantly,
- a place of **Calm** where someone can go when it becomes too much.

Jana will now present insights into the acoustics section.

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The PAS 6463 document draws upon the SEN section of Building Bulletin 93, which is a standard that provides guidelines for Acoustics in Schools. However, it needs to be noted that the guidelines for SEN spaces provided within this standard were defined to suit the needs of hard-of-hearing or hearing-impaired students and does not consider any other needs.

The PAS also had input from Ecophon and Buro Happold steering groups and Public Consultation feedback received in November 2021.

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Noise can have one of the biggest influences on someone's wellbeing, as it can have a negative physiological and psychological impact.

Neurotypical people can adjust to variation in noise levels with relative easiness; however, for those with hypersensitivity it can be much harder, leading to increased levels in stress, anxiety or even reaching sensory overload.

Slide 25

For example, variations of what people can be sensitive to are:

- continuous noise – an extractor fan
- intermittent noise -
- unexpected noise – a slamming door
- high volume noise, or
- specific frequencies of noise

For some, it is softer sounds, such as a continuous hum, ticking clock or dripping tap.

Slide 26

In the next slides we are going to touch on how we can use acoustics and noise management in our advantage to help make spaces more inviting to neurodiverse users.

Slide 27

Acoustic layout and zoning: It would be beneficial to provide different areas with clear rules for their usage. For example, offer quiet spaces where only lone working is acceptable. Calls are not permitted, and photocopiers are not to be installed in these spaces. On the other hand, collaborative spaces: this is where group work is permitted and encouraged, and calls can be answered to. It should not be expected this space to be quiet. A good idea would be to provide acoustic booths throughout so that users can enjoy some respite or quietness, if needed.

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A good example on how to offer different zones in a building is the one depicted in the image. Lower floors invite collaborative work, but as the users move up in the building, the spaces must become quieter. Likewise, if there is a central atrium or hallway where the lift cores are located, collaborative work can be held near these spaces on the lower floors, or low-level conversations can be had in the case of the upper floors; however, as the users move towards the edges of the floors, they need to understand that a quieter atmosphere is expected. Users can be reminded of this by the usage of signs upon entering a floor or zone.

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Lastly, with regards to acoustic layout and zoning: it is worth considering the possibility of offering quiet dining areas, besides group dining areas, as some users will need them; and quiet spaces for reset.

Slide 30

Moving on to the next point of Acoustics and Noise Management would be the reduction of background noise. However, reducing the background noise has two possible outcomes:

The space is quieter, which might be good for some. This is especially good in reset spaces or lone working areas where no conversations are allowed. However, when we reduce the background noise of a space, nearby conversations become more audible and intelligible from further away as there is nothing masking them. Therefore, conversations might distract, disturb, and distress some people. This is especially bad in open plan offices or collaboration spaces.

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Our next point is Room Acoustics. Many consultants believe that the quieter a space is, the better; and they tend to over-reduce the noise levels and reverberance in spaces. However, for some neurodivergent users, walking into a very quiet and dry space... by "dry" I mean, with no "echo" at all... walking into a very quiet and dry space can trigger their senses, instead of calming them down, as these spaces don't feel natural.

This leads to the question... where should we, as designers, draw the line? How quiet is *too* quiet?

Then how should we design SEN specific schools which cater for so many different types of special needs? There are no clear guidelines out there which can help us make the user experience more pleasant.

Slide 32

In terms of control, we believe that everyone should be able to choose a suitable space to work from depending on one's needs.

There are conversations on the usage of sound sensors to measure the noise levels in certain spaces; but as designers we are not convinced that the data provided by these sensors would be good enough to justify their cost. These sensors do not measure frequency bands, so it might be that a space is quiet, but the ventilation system is slightly tonal. This would not be picked up by the sensor, but would be distressing to most. Also, if a sensor is installed near an open window, it might give false readings by picking up noise levels from other sources such as traffic or a chirping bird.

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Easy ways to improve the acoustics of a space is installing absorptive soft finishes such as carpets where practicable to reduce to some extent the reverberance of a space, and reduce the sound transmission to the space below. However, it needs to be noted that deep pile carpets increase the effort required to propel a wheelchair.

For areas where vinyl floors are preferred, its acoustic performance should be taken into account. Some vinyl flooring includes a backing that reduces the sound transmission to the floor below.

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Quiet and restorative spaces should be calming, both visually and acoustically to provide an environment that is gentle on the senses. Where practicable, it should be considered acoustic properties that can be adjusted by users.

Some people are particularly sensitive to reverberance. Adding absorptive finishes can help reduce the reverberance within the space. Examples of these are carpets, acoustic curtains, cushions...

A choice of therapeutic recorded sounds of nature or slow instrumental music with volume control should be beneficial to some people, while a silent environment should be better suited to others.

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Annex B of PAS provides a support checklist table on how to design quiet or restorative spaces for hyper or hypo sensitivity.

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Our neuro profile can be a significant factor for our mental wellbeing, and as such, we should pay attention to how the sensory impact of spaces can improve wellbeing by eliminating key features which cause sensory overload. We should always bear in mind that:

- Noise is a primary source of sensory over stimulation.
- Biophilic design incorporates nature in a deep and fundamental way and can support better wellbeing for everyone.
- Quiet /Restorative spaces can help with recovery from sensory overload, anxiety or distress.

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Other things to bear in mind when designing a space:

When acquiring new equipment, noise levels and operational sounds should be considered. Low noise or silent devices should be purchased where possible, or an alternative provided (such as recycled paper towels as an alternative to noisy hand dryers).

An acoustic specialist should be consulted before introducing white/masking noise, background music or other masking techniques.

Many environments can have regular low-level sounds, such as the hum of a light fitting or a fridge, a ticking clock, whirring fan or fast boil kettle. Product specification often provide information on the noise levels produced so a quieter model can be purchased.