ISCE

The Institute of Sound and Communications Engineers

Engineering Note 37

Where do I put my induction loop?

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"It depends", of course, but that is no help. There are three sides to this question, making it nine times as difficult:

- How do I cover the required 'useful volume' (for an area coverage loop, this is basically a volume based on the area of, for example, seating, and extending from 1.2 m to 1.7 m above floor level)?
- How do I reduce the overspill into adjacent areas (side-to-side and up-and-down)?
- How do I install the loop at an acceptable cost while respecting the constraints posed by existing materials (such as floor coverings) and architectural considerations?

Very often, this appears like 'good, quick, cheap - pick any two', but it need not be.

The MOST IMPORTANT PRINCIPLE is that a trial loop is ALWAYS justified, either by the trouble it discloses or the confidence it adduces.

Covering the volume

The first thing is not to try to cover *more area* than required, which a loop round the floor where it meets the walls may well do. The larger the loop, the more overspill it causes - sometimes this doesn't matter, other times it's crucial. Unless you are using floor-level loops with a dimension less than 5 m (for reasons that will appear below) you do not need to worry about the variation of field strength with listening height (height of ears above the loop), and the same applies if you have such a loop mounted at 3 m to 4 m above the floor, because the ears are approximately the same distances below it as they are above the floor.

The BIG problem with floor-level loops is metal in the floor - reinforcement bars in concrete. These 'suck out' the magnetic field towards the centre of a loop. At floor level, the initial solution is to split the loop into two or four (in the 'Windows' format) adjacent loops, thus making many more places close to a loop conductor. If that doesn't work, you need specialist advice. Don’t be afraid to ask.

But don't forget walls and ceilings. At 3 m or above, the metal in the floor has absolutely no effect (it doesn't have much effect half a metre above the floor, but a loop at that height is a trip-wire!). And it may be much easier to install a loop on walls or ceiling rather than at floor level if there is fixed floor covering.

Also, don’t totally rule out that 0.5 m above the floor. You can cope with doorways either by dropping the loop to floor level (preferred) or going up and over. But with up and over there is the risk that someone will put their hearing aid very close to the vertical conductor and experience an unexpected loud sound.

Sometimes, you have to install the loop a long way above (or even below) the ear level (e.g. if there is raked seating). In that case you must take into account the variation of field strength with height.

Reducing overspill

The principle here is REDUCE THE LOOP SIZE. This means using more than one loop to cover the base area , and their fields can interact to produce undesirable nulls (areas of weak field). Some nulls are of such small area that they hardly matter, but when people find them they tend to be annoyed by them, so they are best avoided. This may involve using two amplifiers and a phase-shifter, which may be built in to a dual amplifier.

Reducing the loop size works both side-to-side and up-and-down. More dramatic overspill reduction side-to-side can be obtained with more complicated loop layouts, but efficient solutions for up-and-down are more elusive.

Reducing installation cost

You may have to 'think out of the box'. But before you pull up the carpet, think about the walls, especially if there is a dado rail at 3 m to 4 m height. If the ceiling does not contain a lot of metal, and there is no problem with upward overspill, it is another possible site.