



# Sound of silence

Hearing on the flight deck is vital throughout your aviation career. Dr Chris King looks at the causes of hearing loss and how to help prevent it.



Flight decks are now much quieter in modern aircraft than post-war times and therefore noise is less of a problem. However, many current commercial pilots have been in the military where it is still a problem. External noise when undertaking aircraft checks is still a hazard and consideration for hearing should be undertaken at all times in the aviation arena.

Hearing is assessed at all examinations. The applicant should be able to understand correctly ordinary conversational speech at a distance of two metres from, and with his back towards, the aviation medical examiner (AME).

With an instrument rating, the hearing is assessed by way of a pure tone audiogram at the initial examination and then every five years until the 40th birthday, and thereafter every two years. The audiogram measures the hearing at certain frequencies (hertz/Hz) and at certain volumes (decibels/dB). There should be no hearing loss in either ear tested separately of more than 35dB at the frequencies 500,100 and 2,000Hz or more than 50dB at 3000Hz.

## The effects of noise and age

The two main hearing problems in pilots are related to noise and age, and the hearing loss due to both causes can be compounded. Age related hearing loss (presbycusis) is apparent as one gets older with no other identifiable cause and it tends to affect the higher frequencies. There are three categories of noise induced hearing loss: blast trauma, impulse noise and steady state noise.

- Blast trauma is due to explosions and affects the ear through both pressure change and noise injury. This tends to cause initial hearing loss with subsequent near full recovery.
- Impulse noise such as shooting is difficult to quantify but can cause damage which is less likely to recover.
- Steady state noise loss is constant background of noise at varying frequencies, time span and volume. This can be quantified as the degree of damage can be proportional to the sound volume (decibels/dB) and length of time exposure. This allows safe limits to be worked out and exposure risks can be calculated and ear protection provided to be effective,

Noise induced hearing loss can be identified on the audiogram with a so-called 'noise dip' on the audiogram at 4,000-6,000Hz.



If the audiogram is outside limits, all is not lost. The Civil Aviation Authority (CAA) has introduced a 'functional hearing assessment' to be completed in the cockpit or simulator by an examiner or instructor within three months of each medical renewal and replaces the need for an annual audiogram. In some cases, where this is required a new limitation, 'Special restriction as specified – functional hearing assessment required within three months of renewal/revalidation medical', will appear on your medical certificate.

### Noise control

The functional hearing assessment simply involves a form answering the following questions and sent off to the CAA (with a copy to your AME).

1. Can the subject hear adequately in aircraft/simulator/other during all phases of flight?
2. Does hearing loss interfere with ability to communicate with ATC and/or other flight crew members during all phases of flight?
3. Can non-routine r/t phraseology be accurately identified?
4. Can navigation beacons be accurately identified from their signals?
5. Does hearing loss interfere with flight safety?
6. Any other observations or comments?

The advent of active noise reduction (ANR) headsets has helped reduce the need for RT to be at a high volume to compensate for the background cockpit noise and also reduces the risk of further noise damage.

The Control of Noise at Work regulations 2005 spell out the actions incumbent on employers regarding their duty of care. This is not covered in this article. The commonest cause of medical rejection for young adults wishing to join the armed forces is hearing damage in the speech range from personal stereos.

Once a pilot gets airside, he/she is inevitably going to be exposed to noise not only on the flight deck but also externally when undertaking external checks. It is therefore important that all aircrew are aware of the noise risks involved, especially if there has been any previous exposure to noise in the past in heavy industry or the armed forces.



Photo: www.istockphotos.com