

# Aircraft Noise: Time for a Rethink



Photo: Phil Weedon

Although aircraft have become less noisy over the past three decades, this gain has been overwhelmed by a huge increase in the number of planes in the skies. The Government's new aviation policy, which it has started to draw up, provides the opportunity to rethink and update policy to take account of this new reality.

## A Soaring Number of Complaints - Why?

*A record number of people across the country are disturbed by aircraft noise. The last major survey, in 2001, put it at 3.5 million (2).*

### Haven't people simply become less tolerant of aircraft noise as their standard of living has risen and prosperity increased?

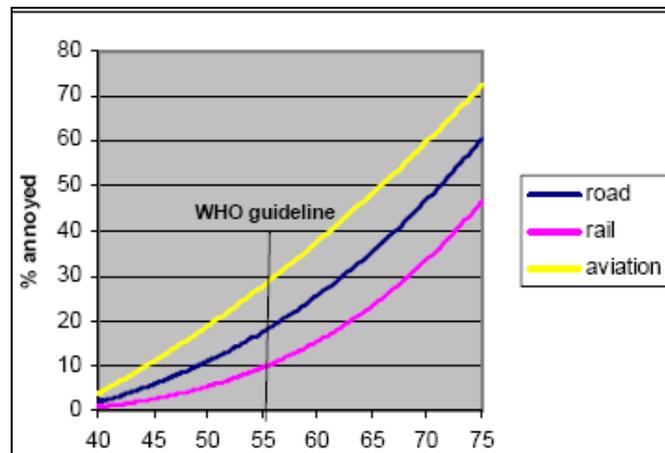
While some studies show that, as people become more prosperous, they do agitate more about environmental matters, the evidence suggests that the link between prosperity and noise may be somewhat different. There is a growing body of research which argues that our consumer society has made us *more* tolerant of noise. Many of the gadgets we acquire, or things we do, such as take cheap flights, produce a noise. At the most obvious level, this means that we can be growing up amongst a constant melee of mechanical noise which lessens our awareness of background noise. But it can go deeper than this. The noise is coming from gadgets or experiences we value. Far from being disturbing, it is associated with things which give us pleasure, increase our convenience, and help define our identity. Thus noise becomes something positive. This suggests a quite new attitude to mechanical noise is emerging. We are becoming more, not less tolerant of it. (For further reading on this: see ref 1).

There is evidence that our noisy, consumer society has made us more tolerant of noise

### Or is the rise in plane numbers the problem?

The message is the same whether from large airports like Heathrow or smaller ones like London City and Glasgow: the increase in flight numbers is the problem, particularly in the areas where aircraft noise had been negligible. There seems to be a 'tipping point' – different for each person – where a situation moves from tolerable to disturbing.

**There is evidence that people become disturbed more quickly by aircraft noise than by noise from traffic or railways.**



Percentage of people annoyed as a function of noise exposure of dwellings ( $L_{den}$  in dB(A)) (Miedema and Oudshoorn, 2001)

# An Out-of-Date Policy

## Policy is outdated in a number of ways:

- It is still largely based on studies carried out almost 30 years ago. Since then the number of aircraft using UK airports has more than doubled. The previous Government commissioned and then, at the very last minute, rejected the ANASE Study into noise annoyance. A new study needs to be commissioned.
- It doesn't take proper account of a wealth of recent research which indicates aircraft noise can damage people's health (3) and children's education (13).
- The indicators it uses to measure noise annoyance are not up to the job of reflecting the impact of the huge number of aircraft currently using airports.
- The indicators used also fail to capture the amount of low-frequency there is in aircraft noise (4). If the low-frequency noise – the deep roar of the plane which is so disturbing – was properly measured, the overall improvement in the noise from individual aircraft would be less than the industry claims.

## How Noise Levels can be Reduced

### 1. Cut aircraft numbers

Since aircraft numbers are the real problem, the logical step is to cut them. That is challenging for any government. Of course it *can* be done. We know the measures which can be taken: impose VAT and a tax on aviation fuel; invest in fast, affordable rail alternatives; cap flight numbers at airports (such as already exists at places like Heathrow and London City); and auction slots. **If government feels some of these measures are unattainable, we suggest it starts by tackling short-haul flights and night flights.**

#### a. Target short-haul flights

Without the growth in short-haul flights over the past 15 years, aircraft noise would not have become a problem across whole swathes of the country. It is as simple as that. In the mid-1990s aircraft noise was not a widespread problem at most UK airports. John Lennon Airport is typical. The Merseyside Noise Study (5), one of the most comprehensive noise surveys carried out, showed that 44% of people felt aircraft noise had got worse between 1999 and 2004, which coincided with the explosion of short-haul flights. Even at larger airports like Heathrow short-haul flights make up over 20% of flights (6). Long-haul flights present a big emissions problem but for noise it is the sheer number of flights landing and taking off that is the problem. And they are mostly short-haul. Most short-haul flights are packed with British people flying off to spend their money abroad. Reducing them would not harm the economy.

**Without the growth in short-haul flights, aircraft noise would not be the problem it is today. As simple as that.**

#### To reduce short-haul flights, we suggest:

- Investment in fast, affordable rail so it becomes an attractive alternative to air travel;
- A noise levy is imposed on flights landing at airports;
- The fiscal system generally, including slot auctioning, is specifically aimed at cutting the number of short-haul flights.

### **b. Target Night Flights**

The economic benefits of night flights are overstated. A recent report showed that banning night flights at Heathrow before 6am might actually *save* money because the reduction in costs of noise and health would exceed the benefits they bring to the wider economy (7). Many of the night flights using the smaller airports are freight and charter flights. Many of these do not need to fly at night.

#### **We suggest the Government:**

- carries out research into the economic value of night flights so that policy is based on sound evidence;
- uses market measures, such as a night flight levy, to limit night flights;
- imposes restrictions or bans at the airports it regulates (Heathrow, Gatwick, Stansted) and at East Midlands, now one of the busiest night airports in Europe;
- works internationally for an international agreement to restrict night flights.

## **2. Introduce quieter aircraft**

A lot of research is currently being undertaken into ways of cutting the noise from individual planes but the aviation industry admits ‘there are no ‘silver bullets’ on the horizon in terms of new technology (8).

## **3. Use improved operational procedures**

Currently there is work being done at a European level (9) and the by the Civil Aviation Authority (10) on future airspace strategy. It shows that advanced technology will allow aircraft to be guided with much more accuracy, opening up new opportunities to cut noise. To take full advantage of this, the Government needs to be more flexible about whether flight paths should be concentrated (its current preference) or more dispersed. There is probably no golden rule. What is right for one airport would not work at another. New technology might also permit steeper approach paths, allowing planes to be higher for longer, and faster and steeper take-offs.

## **4. Use more accurate indicators**

The usual method of measuring noise annoyance is flawed as it relies on averaging out noise. But it doesn’t show what matters to people: the *actual* noise they hear as a plane passes over. Nor does it give enough weight to the *number* of planes passing overhead. Using the usual Leq, 4 hours worth of non-stop noise from Boeing 757s at a rate of one every two minutes is the same as two minutes of one very loud Concorde followed by 3 hours 58 minutes of relief (4). Clearly, not the reality! Lden, required by the European Union, appears to tally more closely with people’s experiences because it takes account of the lower background levels in the evening at night but its flaw is that it too relies on averages.

There is another flaw in these methods. The UK has traditionally argued that aircraft noise only begins to disturb people when it averages out at 57 decibels – known as 57db Leq. The World Health Organisation (WHO) disagrees. Its research shows that people start to get moderately annoyed when the noise averages out at 50 decibels, and severely annoyed at 55 decibels (11). A recent guide from the European Environment Agency backs this up (12). In its guidance the agency very specifically highlights that authorities should use up-to-date annoyance thresholds – these suggest the public are more annoyed about aircraft noise now than they were in the pre-1990 studies which the UK still relies on.

A more meaningful method has been pioneered in Sydney. It is based on treating aircraft noise as a series of single events rather than a calculated average. It shows the number of flights that can be expected over any given period, the number of hours with no planes, and the likely noise of each plane.

The third major flaw in the way the UK measures noise is its failure to properly capture the low-frequency content in aircraft noise because it uses 'A' weighted measurements. The World Health Organisation recommends that if the difference between 'A' weighted and 'C' weighted readings is around 10 decibels or more, 'C' weighting should be used (11). This is the case, certainly at Heathrow (4).

## **Recommendations**

1. The new aviation noise policy is based on the recognition that it is the huge increase in the number of planes that has resulted in record levels of noise disturbance.
2. Assessment of levels of noise disturbance is no longer based on evidence gathered 30 years ago but on up-to-date evidence. A new assessment of noise disturbance is urgently required.
3. Short-haul flights – the main cause of the increase in flights – are targeted through investment in fast, affordable rail (so it becomes an attractive alternative to air travel) and a fiscal system, including a noise levy on flights landing at airports, which aims to cut their numbers.
4. Night flights are also targeted. An independent assessment is made of the economic case for night flights. A night levy is imposed as a lever to cut non-essential night trips. Tough restrictions or bans are imposed at the regulated airports - Heathrow, Gatwick and Stansted. And at East Midlands Airport, now one of the busiest night airports in Europe. An international agreement is sought to restrict night flights internationally.
5. Market mechanisms are used to hasten the introduction of quieter aircraft but with an understanding that for the foreseeable future new technology does not provide the 'silver bullet' solution to aircraft noise.
6. Full advantage is taken of improved operational procedures to cut noise; to include allowing more local flexibility on whether concentration or dispersal of flight paths is the best way to cut noise at individual airports.
7. More accurate and meaningful ways of measuring aircraft noise are used.

### **References and further reading:**

1 Further reading includes *Affluenza*, James O. 2007; 'The unexamined rewards for excessive loudness.' Blesser, B. and Slater, L. 2008; *The Unwanted Sound of Everything We Want* Keizer, G. 2010 and *Sounding out the City*, Bull, M. 2000

2 *The UK National Noise Attitude Survey*, Building Research Establishment, 2001

3 There are a number of studies: *Hypertension and exposure to noise near airports*, Jarup et al, 2008; *Aircraft noise and incidence of hypertension*, Eriksson et al, 2007; *Night Noise Guidelines for Europe*, World Health Organisation, 2009; Centre for Time Use Research: [www.timeuse.org/access/](http://www.timeuse.org/access/); *Community Noise and blood pressure*, Bluhm and Nording, *Internoise Review* 2006

For a good summary of these studies and others, *Health Consequences of Aircraft Noise*, Kalternback et al

4 *The Quiet Con*, Hendin, R., HACAN, 2002

- 5 *The Merseyside Noise Study*, 2004
- 6 *Short-Haul Flights: Clogging up Heathrow's Runways*, HACAN, 2006
- 7 *Costs and Benefits of a Night Flight Ban at London Heathrow*, CE Delft, 2011
- 8 'Computer model highlights the various noise reduction', *ICAO Journal*, Number 4, Ollerhead, J. and Sharp, B., 2001
- 9 SESAR (Single European Sky ATM Research (ongoing))
- 10 *Future Airspace Strategy for the UK*, CAA, 2010
- 11 *Guidelines for Community Noise*, Berglund, B. et al, World Health Organisation, 2000
- 12 [www.eea.europa.eu/publications/good-practice-guide-on-noise](http://www.eea.europa.eu/publications/good-practice-guide-on-noise)
- 13 *Aircraft and road traffic noise and children's cognition and health: a cross-national study*, Stansfeld, S. et al, RANCH, 2005
- 14 G Rasmussen 1982