

# **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 will begin to draw up in 2011, provides the opportunity to rethink and update policy to take account of this new reality.**

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## **A Soaring Number of Complaints Why?**

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

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.

**A record number of people across the country are disturbed by aircraft noise. In 2001 a major survey put it at 3.5m (2).**

## **An Out-of-Date Policy**

### **Policy is outdated in a number of ways:**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.
- 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 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 is measured**

Noise is measured by its loudness (decibels) and its frequency (hz). An increase of 10 decibels represents a doubling in perceived noise levels. The average person, though, can pick up a 3 decibel change in noise levels. The range of human hearing extends from around 20-20,000 hz but a few people can hear lower frequencies. Regular exposure to low frequency noise can destabilise the human body (14). It is these physical symptoms, allied to the noise disturbance, that tend to mean noises containing high amounts of low-frequency can be much more stressful than standard noises. This is thought to be the reason why most people find aircraft noise worse than noise from traffic.

# 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 they start by tacking to tackle short-haul flights and night flights.

### 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 ever 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.

**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.

### **Target Night Flights**

The economic benefits of night flights are overstated. A recent report showed that banning night flights at Heathrow before 6am would 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 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.

### **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, 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 traditional method of measuring noise is flawed. Noise is averaged out over a 16 hour day. Then averaged out over a year or part of a year. This is known as Leq. 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 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!

There is another flaw. 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 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 other 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. 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 noise levy imposed on flights landing at airports.
3. 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.
4. 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.
5. 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.
6. 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