Aircraft noise control: efforts of International Civil Aviation Organization and the UK

Submitted By

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Introduction:

Aviation has developed a lot in this recent time especially in the 21st century, but this development has produced many problems in so far as environment is concerned. One of the features of environmental pollution is noise pollution.

In this paper I am going to try to treat the following problematic: Are the standards for keeping the rate of noise pollution I set by the Annex 16 of the 1944 Chicago Convention on International Civil Aviation Organization sufficient? What are the measures taken by the UK in that field?

1-Effects on aircraft noise on health:

Instead of focusing upon the definition of noise, we can say that the law has rather focused on the means to control noise. It is commonly accepted by people that the polluting nature of noise has both objective and subjective elements. The objective element provides some basic criteria for the measurement of noise. The problem really lies on the subjective element that is implied in
noise pollution is that the noise is unwanted. In fact, this unwanted element makes legal definition difficult.\(^{(1)}\)

Lots of researches have been conducted as to find out the effects that aircraft noise have on human’s health. Many were conducted in Germany and the UK. A reality is evident here that there is proved effect of noise on general health such as on heart or leading a person to a diabetic disease. There is another matter that comes into consideration here: it is the psychological belief of the person, he or she who believes that aircraft noise affects his/her health would not be at ease near that noise, opposite to those who do think noise aircrafts are important to them for different reasons.\(^{(2)}\)

For example, in the city of Zurich, it was found that on the airport area the consumption of sleeping pills correlated with aircraft noise and psychological performance was below the next days. Indeed, other effects of noise produced by aircrafts on sleep are pointed out in a paper that was published by the Civil Aviation Authority in the UK in June 1978.

2-Aircraft and airport noise:

The main control on aircraft noise is under emissions standards set under the framework of the 1944 Chicago conventions, in particular annex Annex 16. These standards have been tightened over the years and (in so far as they relate to subsonic planes) are included in EC directives 80/51, 83/206 and 89/629, implemented by the Air Navigation (Noise Certification)


Order 1990(SI 1990/1514, as amended by SI 1999/1452). This order prohibits any plane to which it applies from taking off or landing in the UK unless it has a noise certificate issued by the Civil Aviation Authority, or by the competent of countries deemed to operate equivalent standards, or issued in pursuance of the 1944 Chicago Convention. The process of acquiring a noise certificate is essentially a licensing procedure, and conditions may be set regulating things like maximum take off and landing weights. Certificates can be varied, suspended or revoked.

There was a policy in order to get control over using aircraft, not to make noise pollution. The first step in the UK was to make efforts in order not to add noisier aircrafts to national registers. For subsonic jets, they are done the same thing according to Directive 92/14, though we find exemptions for aircrafts which have been in service less than 25 years and that could operate until April 1st 2002 if they meet basic standards.

It is very important to state here that this directive was amended by Directive 98/20 on the limitation of operation so-called “Chapter 2” aircraft. Implementing measures are consolidated in Aeroplane Noise Regulations 1999(SI 1999/1452).

The method used by the British Government in order to control the noise of airports is to allow the department of the state to point out some airports so as to subject them to specific controls according to the frequency or time of aircraft movement. For that, airports of Heathrow, Gatwick, Stansted and Manchester were designated. This section has been used to fix the total allowable number of air flights although not without legal controversy (R v Secretary of State for Transport, ex parte Richmond upon Thames London Borough (1994) 1WRL74; (n2) (1995) 7ELM52; (N03) (1995) 7ELM127; (N4)(1996)(1996)8ELM77).
It is important to state here that those provisions give the power to central government not the courts, and only on the initiative of the secretary of the state, not those affected.

Other environmental and noise considerations are taken into account when air transport licences are granted, although not to the extent that there is a clash with British airlines competing effectively or with public demand (ss.4 and 68(1) and (3), Civil Aviation Act 1982).

For what concerns civil liability for trespass or for damage caused by nuisance from the flight of an aircraft over property, it is generally excluded so far as the conduct of the flight is reasonable.

In Powell and Rayners v United Kingdom (1990) 12EHRR 355 where it was claimed that s.76(1) violated Articles 6,8 and 13 of the European Convention on Human Rights since there could not be a fair hearing of possible nuisance claims and the noise interfered with the claimants home and private lives contrary to the Convention. That claim was rejected, the judges being based on the grounds that a private law claim could still be brought if the flight was outside the terms of the statutory exemption and because a proper balance was deemed to have been struck between the residents rights and wider community interests. This may be true in the case of Heathrow, the airport complained about in Powell and Rayner, but it may not be in relation to the majority of airports in Britain used for private flying.\(^{(3)}\)

3-Annex 16 of the Chicago Convention:

Annex 16 of the Convention effectively lays down standards for aircraft noise which are pop popd into EC directives that oblige

Member States to comply with these standards and the revisions to them that are made every few years. A softer example is provided by the World Health Organization’s standards for noise. Although these cannot be enforced directly, they play an important role in practice when, for example, common law or statutory nuisance actions are being brought. However, the mere fact that noise exceeds WHO levels may not in itself be sufficient to found a claim of nuisance, if the noise is judged reasonable in all the circumstances (Murdoch v Glacier Metal Co. Ltd (1998) Env LR 732).\(^4\)

The Organization began tackling environmental issues before it became “popular” to do so in the 1990’s amid public concerns about climate change. A first major step was the creation of the Committee on Aircraft Noise (CAN) in 1970, followed by the Committee on Aircraft Engine Emissions (CAEE) in 1977. These two committees were merged in 1983 to form the existing Committee on Aviation Environmental Protection (CAEP).

The environmental programme of ICAO grew larger in scope with the coming into force of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. This created a mechanism for ICAO to interact and cooperate with other UN bodies on greenhouse gas emissions issues, while continuing to deal with an expanding list of noise and local air quality issues.\(^5\)

The Committee on Aviation Environmental Protection (CAEP) is a technical committee of the ICAO Council, responsible for

\(^4\) Stuart Bell and Donald McGillivray, op cit., p 449.

\(^5\) ICAO Environmental Report 2010, Aviation and Climate Change, Produced by the Environment Branch of the International Civil Aviation Organization (ICAO) in collaboration with FCM Communications Inc., p 04.
conducting studies and recommending measures to minimize and reduce aviation’s impact on the environment, including setting certification Standards for aircraft noise and aircraft engine emissions.\(^{(6)}\)

It was declared in the Assembly Resolution of Force that that ICAO is conscious of and will continue to take into account the adverse environmental impacts that may be related to civil aviation activity and its responsibility and that of its Contracting States to achieve maximum compatibility between the safe and orderly development of civil aviation and the quality of the environment. In carrying out its responsibilities ICAO will strive to: limit or reduce the number of people affected by significant aircraft noise; limit or reduce the impact of aviation emissions on local air quality; and limit or reduce the impact of aviation greenhouse gas emissions on the global climate.\(^{(7)}\)

4-The role of the International Civil Aviation Organization:

In 2001, the ICAO Assembly endorsed the concept of a "balanced approach" to aircraft noise management (Appendix C of Assembly Resolution A35-5)). The Assembly in 2007, reaffirmed the "balanced approach" principle and called upon States to recognize ICAO’s role in dealing with the problems of aircraft noise (Appendix C of Assembly Resolution A36-22). This consists of identifying the noise problem at an airport and then analyzing the various measures available to reduce noise through the exploration of four

\(^{(7)}\) Assembly Resolutions in Force, Doc 9848, Published by authority of the Secretary General International Civil Aviation Organization (as of 8 October 2004), published by authority of the Secretary General, International Civil Aviation Organization, I 38.
principal elements, namely reduction at source (quieter aircraft), land-use planning and management, noise abatement operational procedures and operating restrictions, with the goal of addressing the noise problem in the most cost-effective manner. ICAO has developed policies on each of these elements, as well as on noise charges. The recommended practices for balanced approach are contained in Doc 9829 – *Guidance on the balanced approach to aircraft noise management*. (8)

5-Aircraft noise models established by the ICAO/CAEP Impacts Workshop:

The CAEP participants developed many models in order to estimate aircraft noise contours around airports. The models typically take as inputs the number of operations for each aircraft type at a given airport, and population data, and then use individual aircraft noise performance data (e.g. noise-power-distance curves) to estimate the number of people exposed to different levels of aircraft noise.

6-Aviation Environmental Design Tool/Integrated Noise Model (AEDT/INM):

Part of the US Federal Aviation Administration (FAA)/National Aeronautics and Space Administration (NASA) and Transport Canada suite of environmental assessment tools, AEDT/INM is a computer program developed to assess changes in noise impacts resulting from: 1) new or extended runways or runway configurations; 2) new traffic demand and fleet mix; 3) revised routings and airspace structures; 4) alternative flight profiles; and 5) modifications to other operational procedures.

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(8) [http://www.icao.int/environmental-protection/Pages/noise.aspx](http://www.icao.int/environmental-protection/Pages/noise.aspx) seen on 16/02/2012 at 22:00.
7-Aviation Environmental Design Tool/Model for Assessing Global Exposure to the Noise of Transport Aircraft (AEDT/MAGENTA):

Part of the US FAA/NASA/Transport Canada suite of environmental assessment tools, AEDT/MAGENTA is a model developed, within the ICAO/CAEP framework, to estimate global noise exposure caused by civil aircraft operations. The model computes, under any specified noise certification and fleet transition scenario, the noise exposure contours around a large number of civil airports and counts the number of people exposed. Input data include aircraft noise and performance characteristics and aircraft traffic forecasts. Outputs include noise-exposed population estimates by airport together with regional summaries.\(^{(9)}\)

8-Quantifying Aircraft Noise:

The level of noise that emanates from aircraft operations in and around an airport depends upon a number of factors including: types of aircraft using the airport, overall number of daily take-offs and landings, general operating conditions, time of day that the aircraft operations occur, runways that are used, weather conditions, topography, and airport-specific flight procedures. The noise effect caused by aircraft operations is somewhat subjective and can depend on a number of factors related to the individual listener’s cultural and socio-economic background as well as their

psychological and physical situation. Reactions may vary from no effect, to severe annoyance, to potential health concerns.\(^{(10)}\)

**9-Aircraft noise in the UK:**

A survey of 14000 households published in 1990 and carried out between 1985 and 1987 showed that the UK some 7% of people are bothered by aircraft noise in comparison to 11% bothered by traffic noise. Though the number of people that are bothered by aircraft noise is smaller, we find that people living close to airports are exposed to much higher noise levels than the traffic noise levels to which people living beside busy roads are exposed. It is a matter of fact that people find aircraft noise more annoying than traffic road noise. A scientific explanation to this is very simple: much more of the frequency content of aircraft noise is in the range of frequencies to which the ear is most sensitive.

Noise levels from individual aircraft are governed by the noise certification requirements for civil aircraft given in the Federal Aviation Regulations (FAR) Part 36(USA) and Convention on International Civil Aviation (ICAO) Annex 16. The UK noise regulations, British Civil Airworthiness Requirements (BCAR) Section N, are generally accepted as being equivalent to ICAO Annex 16.

Before 1977 the FAR regulations in the USA differed from the ICAO regulations. However, the latest requirements are basically the same and are referred to as Stage 3 noise requirements in the USA and Chapter 3 requirements within the ICAO.

\(^{(10)}\) ICAO Environmental Report 2010 , Aviation and Climate Change , Produced by the Environment Branch of the International Civil Aviation Organization (ICAO ) in collaboration with FCM Communications Inc , p 23.
We have to notice here that measurement of aircraft noise for certification purposes is a very sophisticated and specialized process that can be carried out only under specific test environments. Furthermore, those tests are valid only if they are taken under a range of meteorological conditions of wind velocity, relative humidity, sound attenuation rates and with no precipitation. There must be no obstructions such as buildings and earth banks between the aircraft and the microphone position. It is to point out here that Chapter 1 which is the noisiest group have been banned in the UK airports since 1988 unless they have been modified in order to get them making less noise, to bring them to the less noisy Chapter 2 category. All the new aircrafts are to meet chapter 3 conditions. We have to notice here that Chapter 3 is not based only on noise level but on fuel-efficiency, passenger capacity and operating cost as well. (11)

Heathrow and Gatwick are two of the busiest airports. In 1993, over 47 million people used Heathrow and 20 million used Gatwick. Those and other airports in the UK are expanding their activities to cope with the increasing demand for passenger and commercial air travel. Around 7000 British registered aircraft, mostly used for private flying now operate from about 280 airfields. Air traffic movements are expected to double by the end of the century.

There are several ways of deducing noise coming from airports: the first method is to make aircrafts quieter, the second one is to operate the aircrafts in a way that reduces the noise heard at ground level, and the third one is to provide the noise insulation in appropriate cases and impose local restrictions on types of aircraft or their activities or on hours of operation.

One of the best solutions to aircraft noise is to build new airport far away from living areas but that cannot be practised in countries with high population densities where is almost certain that aircraft flight paths will produce some interference. \(^{(12)}\)

**10-General control of aircraft noise:**

Most of earlier enactments that have relation with aircraft noise in the UK were repealed and replaced by the Civil Aviation Act 1982. There are many requirements in these act that are taken from international law.

According to this act, the secretary of the state can –under Section 2- require the Civil Aviation Authority to consider environmental matters ,including noise and vibration attributable to the use of aircraft for civil aviation , when licensing or re-licensing an aerodrome. It is here important to notice that this power given by law has never been used. Section 6 of the Act states out that the Secretary of the State , after consultation with the Civil Aviation Authority , to direct the Authority where it already has power to act , to take action to prevent or deal with noise or vibration attributable to aircraft use of the purpose of civil aviation. It is to notice here that this power was used to end Heathrow-Gatwick helicopter link on environmental bases.\(^{(13)}\) This link was introduced in 1978 , but after public inquiries in 1978 , 1979 , 1983 and 1985 , the Secretary of State for Transport gave directions in June 1986 for the operator’s licence to be revoked for environmental reasons.

**11-ISO standard Addresses Airport noise:**


\(^{(12)}\)Melville S Adams and Francis McManus, op cit, p 207.  
\(^{(13)}\) Melville S Adams and Francis McManus,op cit,p212.
regulators, professionals and researchers in their effort to reduce noise in the vicinity of airports. The standard provides requirements for reliable measurement of aircraft sound. It describes a threshold system of sound event recognition in a complex sound environment with multiple aircraft and other sound sources. ISO 20906:2009 specifies:

1/ The typical application for a permanently installed sound-monitoring system around an airport;

2/ Performance specifications for instruments and requirements for their unattended installation and operation, in order to determine continuously monitored sound pressure levels of aircraft sound at selected locations;

3/ Requirements for monitoring the sound of aircraft operations at an airport;

4/ Requirements for the quantities to be determined in order to describe the sound of aircraft operations.

5/ Requirements for data to be reported and frequency of publication of reports.

5/ A procedure for determining the expanded uncertainty of the reported data in accordance with ISO/IEC Guide 98-3, Uncertainty of Measurement—Part.\(^{14}\)

It is noticed that countries often take into consideration many factors when trying to have a legislation that can affect other countries interests. That has always been the case between the United States and the European Union. Indeed the American

Congress worked on making a law banning the famous Concorde aircraft used by the two European companies: Air France and British Airways from landing in its airports. This ban was based upon the fact that this airplane made much noise. The EU responded by preparing for a law to ban older aircrafts using hush kits to land in European airports, something that would affect American airplane industry. That would lead to a huge dispute between the US and the EU. The European Union is very clear here. That decision was made according to reason related with the protection of environment. There is no place to discrimination related to the origin of the product.\(^{(15)}\)

**12-Noise abatement measures:**

The main forum for international cooperation seeking to make aircraft quieter is the International Civil Aviation Organisation (ICAO). The broad thrust of ICAO’s work has been towards developing a series of standards, leading to the phasing out of aircraft unable to meet them. These standards are not operative within the ICAO member States unless and until they are given effect in national legislation. In the United Kingdom, effect is given to them by means of an Air Navigation (Noise Certification) Order.

Aircrafts taking off from Heathrow Airport are statutorily required to remain on a small number of specified routes, known as noise preferential routes. These routes are designed to avoid as far as possible the major built-up areas.\(^{(16)}\)

\(^{(15)}\) Professional Engineering, EBESCO publishing 2002, p32.
Conclusion:

After dealing with some matters of protecting the environment against noise pollution caused by aircrafts set the International Civil Aviation Organization, knowing that there is much emphasis on environment protection nowadays than ever before, we saw the measures taken by the British government in that sense, given that British airports are amongst the most active airports in the world.

Here we have to notice out that protecting the environment from noise pollution is no longer a luxury. It is a must. If measures needed to protect the environment are not respected. There may be appeal to justice in order to get the damage caused by such a pollution repaired.

Indeed, there are more effort to take in less developed countries so as to better their abilities in reducing noise produced by aircrafts.