BAA Heathrow

Flight Evaluation Report 2004/05

CONTENTS

Chapter 1 - Introduction

This is the fourth report produced by the Heathrow Flight Evaluation Unit (FEU). BAA and BAA Heathrow also regularly report on their environmental performance, including on the impact of aircraft noise, in the Sustainability Annual Reports. Both Reports are available on the BAA Website (www.baa.com).

The purpose of this report is to provide more extensive information on aircraft operations and how their impact is regulated and managed. Wherever possible and where space permits, performance during 2004/05 has been compared with previous years. The report includes sections on the following core aspects of noise management at Heathrow:

- Communications
- Aircraft Movements
- Aircraft Flight Paths
- Aircraft Noise
- Night Flying Restrictions
- Complaint Handling

This chapter details the role of the FEU in the management of aircraft noise at Heathrow. However, before considering the noise management strategy at Heathrow and in particular the role of the FEU in its implementation, it is first necessary to understand the legislative controls under which the airport operates.

Government Role in Noise Management at Heathrow

The aim of successive UK Governments since the 1960s has been to strike "a balance between the needs of an efficient aviation industry, providing jobs and serving the local, regional and national economy, and the need to minimise the impact on the environment and communities around airports". With regard to tackling aircraft noise, there are essentially three strands to the Government's approach.

Seeking reductions in noise at source by encouraging developments in aircraft and engine technology is the first strand. Essentially this is a matter for international negotiation and agreement, through such bodies as the EU, ECAC and ultimately ICAO. Indeed the UK is one of the nations continuing to press within ICAO for tougher certification standards to reflect more recent improvements in technology. It is UK policy to incorporate all internationally agreed standards in domestic legislation.

The second strand is to provide a framework within which operational noise is controlled and its worst effects mitigated. Part of this framework utilises the powers available to the Secretary of State under sections 78-80 of the Civil Aviation Act 1982. The Secretary of State has designated Heathrow under section 80 for the purposes of sections 78 and 79. Heathrow's designated status means that the Secretary of State has direct responsibility for noise abatement measures. Under sections 78 and 79 of this Act, the Secretary of State has specified various measures for the "purposes of limiting or of mitigating the effect of noise and vibration connected with aircraft taking off or landing at Heathrow". These measures include among others:

- Night flying restrictions
- Noise limits
- Noise Preferential Routes (NPRs) and related requirements for departing aircraft
- Directions to airport managers to take measures to limit or mitigate noise from landing or departing aircraft
- Provision of noise monitors and the reporting of outputs
- Provision of track keeping equipment (under the Airports Act 1986)
- Continuous descent and low power – low drag approach procedures
- Policy on how Air Traffic Control directs landing aircraft
- Powers for airports to charge by reference to noise (section 38 of Civil Aviation Act 1982)
- Noise Insulation Schemes (NIS). Previous NIS were statutory but the current scheme was introduced voluntarily by BAA Heathrow.

In addition, there are a number of established procedures within the framework that could not be changed or abandoned without the approval of the Secretary of State. These are known as the Cranford Agreement (a verbal agreement dating from the 1950s), Runway Alternation (introduced in 1972) and the westerly preference (operating since 1962). These, like many of the noise amelioration measures, have been in place since the 1960s and 1970s, although it is only relatively recently that technology has enabled adherence to them, and subsequently their effectiveness, to be analysed.

Although not as significant as the first two, at least in its implementation, land use policy and associated planning guidance has for a long time formed the third strand to the Governments "balanced approach" to aircraft noise management. Full details and current guidance can be obtained from the DfT website at www.dft.gov.uk.

In 1987 the British Airports Authority was privatised to form BAA plc. Heathrow Airport is one of seven UK airports owned and operated by BAA. As already explained, responsibility for noise mitigation measures did not transfer with privatisation and the Secretary of State remains ultimately accountable for noise policy at Heathrow. However, BAA are responsible for the implementation, enforcement and administration of many aspects of this policy. In addition, BAA has exercised its powers to charge by reference to noise and has used its NTK system to actively improve the noise climate through promoting best practice.

Flight Evaluation Unit (FEU)

The FEU is a section within BAA Heathrow's Airside Safety and Security Department. The main functions of the FEU are:

- to monitor, evaluate and report on Air Traffic Control (ATC) and airline operating procedures. This includes detecting noise infringements and raising supplementary charges as applicable

- to promote best practice with regard to noise abatement at Heathrow by working closely with key airlines and ATC on joint industry initiatives

- receiving and responding to complaints and enquiries about aircraft operations at Heathrow

The FEU also plays a key part in communicating our noise management strategy to a range of audiences which includes airlines, local authorities, ATC, the Heathrow Airport Consultative Committee (HACC), the Noise and Track Keeping Working Group (NTKWG), the Flight Operations Performance Committee (FLOPC), local councillors, MPs and members of the local community.

There are two principal technological tools that the FEU use to monitor and report on aircraft operations at Heathrow. These are:

The Noise and Track Keeping Monitoring System (NTK)

The NTK system is a high specification computer system for monitoring noise and track keeping performance. It automatically receives data overnight from a series of permanent noise monitors located around the airport. The position of the permanent monitors and the noise limits (which apply to departing aircraft only) are matters for DfT. The positions are illustrated later in this report (Fig 21). BAA also has a number of mobile monitors shared between Heathrow, Gatwick and Stansted Airports. Some are located around Heathrows local area from time to time and used for various studies.

In conjunction with the noise data, the NTK system also receives radar data from the National Air Traffic Control (NATS) air traffic control system. In addition to giving information about the location (height and track) and speed of an aircraft at any particular point, the radar data also provides the specific callsign for the flight. By cross referencing the callsign with detailed air traffic logs, the track data is supplemented with information such as the aircraft operator, aircraft type and destination or origin. The system matches the aircraft track details with the relevant noise events recorded at the monitors.

The system currently monitors aircraft up to a height of 17000 feet and/or within a range of approximately 30 miles east and west of the airfield and 25 miles to the north and south.

An NTK system was first installed at Heathrow in 1992. Between then and 1999 the system was upgraded on several occasions. In order to meet Year 2000 compliance issues it was decided that the system should be replaced. A new system was installed during 1999 and became fully operational in December 1999.

The NTK system is provided and supported by an Australian company, Lochard, which has installed over 120 systems world-wide. The system is known as GEMS (Global Environment Management System).

The Complaints Handling System

In addition to the NTK system, the FEU also has a computer based system used to record, investigate and respond to complaints and enquiries about aircraft operations. This system is called Airviron and it utilises data from the main NTK system in a more simplified form. This software is supplied by MVA who are based in Woking, Surrey. Whilst it does not hold as much detailed information as the NTK system and therefore cannot be used for studies or enquiries needing large amounts of data, Airviron does have several unique features to assist the Flight Evaluation Unit's investigations. For example it allows the operator to map the postcode location of the enquiry and plot any aircraft operations within a selected time range and distance (Fig 45).

Chapter 2 - Communications

COMMUNICATIONS
Introduction

The FEU plays a key role in the communication of noise management activities between BAA Heathrow, the local community and their representatives and BAA's business partners. Understanding the concern of local communities and working with our business partners to address these are important elements of the work of the FEU. This chapter describes the main channels of communication for issues related to aircraft operations and their impact on the local community. BAA Heathrow has a comprehensive framework in place which allows local people to make their views known on a variety of issues. These include:

The Heathrow Airport Consultative Committee (HACC)

To ensure stakeholders are consulted on Heathrow's development and operational plans, meetings are held every six weeks with Heathrow's Airport Consultative Committee (HACC). This voluntary body was set up in 1948. It consists of 33 members from across the Heathrow area and includes representatives from the Local Authorities, TUC, London Chamber of Commerce and IATA.

A number of presentations and discussions take place throughout the year, ensuring members are informed about, and can comment on, issues connected to Heathrow. Further details about HACC are available on www.lhr-hacc.org.

The FEU provides reports directly to the HACC about noise complaints received, the management of the Night Flight Restrictions, compliance with Runway Alternation and the number of go-rounds.

Noise and Track Keeping Working Group

The Noise and Track Keeping Working Group (NTKWG) receives regular reports from BAA Heathrow, with data on noise infringements, complaints about ground noise, summary figures of night engine testing, the use of Continuous Descent Approach (CDA), noise studies and track keeping compliance.

The NTK Working Group is a BAA Heathrow Group, but reports of the meetings are sent to the HACC, bringing it into the public domain. Its members are drawn from BAA Heathrow, NATS, CAA, DfT, organisations represented on HACC, representation from one or more of the base airlines, and local authority technical officers responsible for noise issues.

FLOPC

FLOPC was established at the end of 2001, with the aim of improving noise and track keeping performance by sharing best practice amongst the airlines. The Committee is chaired by BAA Heathrow's Head of Airside Operations and is attended by members of the FEU, DfT, Aircraft Co- Ordination Ltd (ACL - the independent company which allocates slots at Heathrow) and NATS.

Visitor Centre

The Heathrow Visitor Centre has played are key part in the local community for the last 10 years and has welcomed over 762,000 visitors.

The Centre has excellent conferencing facilities and provides a small exhibition about how Heathrow operates. It has recently opened two new exhibits: a model of Terminal 5 and a display showing the history of the British Airways Concorde. It also has a small memorabilia section displaying loaned and donated artefacts about Heathrow Airport's history.

The Centre welcomes visits from a range of interested organisations from aircraft enthusiasts to local school groups, as well as individuals. The most popular attraction is the viewing area, which gives excellent views of the airport and the northern runway.

Annual events held at the Centre include the Rotary Club Family Day, Christmas Carol Concert, Open Site Tours of Terminal 5 and the Young Engineers Annual Awards.

The Centre also supports local community seminars, visits from MP's, local councillors and residents, environmental groups, schools and colleges. The FEU helps host some of these and provides demonstrations of the complaints handling system and presentations on noise issues.

The centre is open 7 days a week 10am to 5pm with free entry and a pay and display car park. For more information please contact the reception on 0208 745 6655 or see our web site www.baa.com.

Communicating with the FEU's Neighbours

The vast majority of contacts with the local community arise as a result of individuals contacting the FEU to complain about the disturbance caused by aircraft activity.

In order to help the local community understand some of the issues related to aircraft noise and track keeping and how BAA Heathrow monitors performance, members of the FEU team invite interested groups to the Visitor Centre.

Also, where it is thought to be helpful, individual complainants are invited to the FEU's offices at Heathrow to discuss their concerns personally and also to provide them with a demonstration of Airviron - the complaints handling system.

Commitment to the Community

BAA Heathrow is committed to improving the noise climate around Heathrow and, with extensive use of GEMS, continues to work with the airlines, Air Traffic Control and representatives from our local communities to explore further ways of facilitating improvements.

Other methods of communication

Local Focus Forum

As part of Heathrow's commitment to work in partnership with and support its local communities, meetings with over 10 residents associations and four local authorities take place every six weeks. These meetings provide an opportunity to discuss and consult on Heathrow's operations and future development plans.

Forthcoming Consultations

In the next few years the Government plans to consult on several key issues affecting aircraft operations at Heathrow, that is Night Restrictions, the Westerly Preference and the Cranford Agreement. They began the public Consultation on the Night Restrictions in 2004. The first stage has finished and the second stage Consultation Paper has been issued. Consultation on the other Measures has not yet begun. For further details please refer to the main DfT website -see useful contact details section.

Chapter 3 - Aircraft Operations at Heathrow

The majority of this report provides comment and statistics relating to aircraft noise, aircraft track keeping, other aspects of aircraft noise performance and complaints about aircraft operations at Heathrow. In order to set these statistics into context, this chapter sets out some more general statistical detail of Heathrow aircraft operations during 2004/05.

Within this chapter there is information on the following:

- Runway Configuration
- Annual Movement Statistics
- Go-rounds

Runway Configuration

Figure 1 illustrates the runway configuration at Heathrow, ie two main parallel runways which are commonly known as the northern and southern runways, with a smaller cross runway, which is used only during periods of exceptionally strong cross winds and for arrivals only.

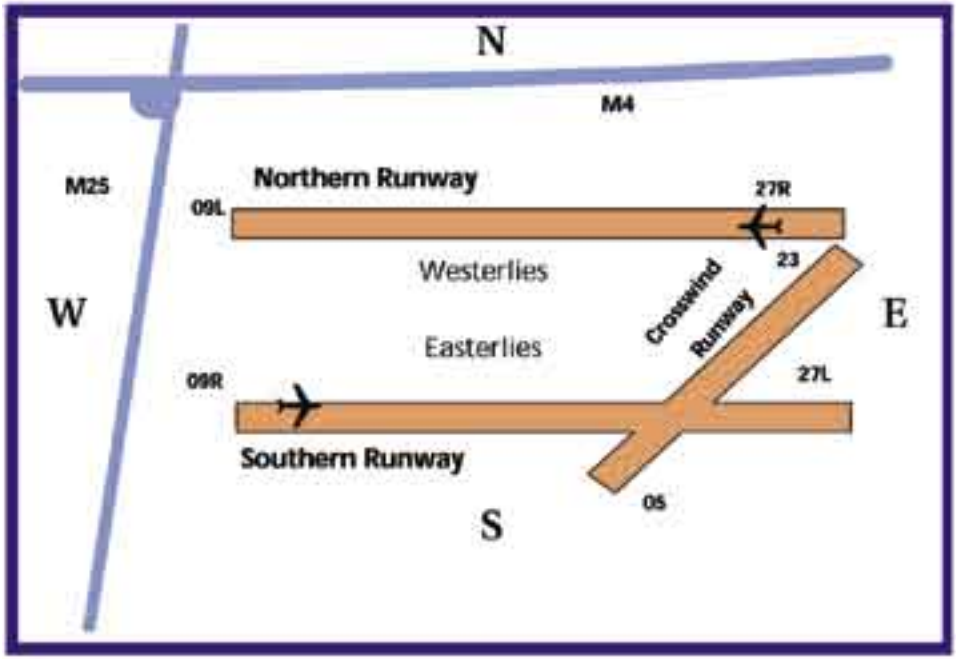
The direction in which aircraft operate at Heathrow depends upon wind speed and direction. Normally aircraft take off and land into the wind. When the wind is from the west, aircraft will depart to the west and approach from the east (over London). This is known as "westerly operations" and the runways are referred to as 27R (northern) and 27L(southern). When the wind is from the east, aircraft depart to the east and arrive from the west (over Windsor). This is known as "easterly operations" and the runways are then referred to as 09L (northern) and 09R (southern).

It is important to note that a westerly preference is in use during the day, whereby aircraft will continue to operate in a westerly direction with up to a 5 knot easterly tailwind. Many years ago, the noise emitted by aircraft on departure was considered by the Government to be the predominant issue, since it was much greater than that emitted by arriving aircraft. Areas to the east of the Airport, ie the London side, are more heavily populated than those to the west. The former are affected by easterly departures. Consequently the westerly preference was introduced to reduce the number of people exposed to high levels of noise emitted by departing aircraft, by minimising the number of departures on easterly operations. At that time, it operated throughout the 24 hours. Operation of the westerly preference is precluded in strong crosswinds or when the runways are wet.

Following consultation on the preference for the direction of operation of the Airport at night, the DfT decided that the then current westerly preference should be replaced, at night, by a weekly rotation between westerly and easterly operations, whenever weather conditions permit. The new arrangements were introduced on 26 March 2001. Over the long term, these arrangements are expected to produce a more even split between westerly and easterly operations, resulting in approximately 47% easterly/ 53% westerly approaches. Previously nearly 90% of early morning arrivals overflew London (i.e. landing in a westerly direction) in an average year at

Heathrow. However, the operation of a preference is dependent on a tailwind speed of less than 5 knots, dry runways and the absence of strong crosswinds, so the eventual split is dependent on weather.

Figure 1 - Runway Configuration



Annual Movement Statistics

The total annual air transport movements at Heathrow for 2004/05 are shown below.

Figure 2 - Annual Movements

Figure 3 shows the fluctuation in easterly and westerly operations. As explained earlier in this section, this is determined by wind speed and direction and therefore neither BAA Heathrow nor NATS can control or predict the direction of operation. On average over time Heathrow operates on westerlies for approximately 70% of the year and on easterlies for 30%. However, westerley operations in individual years has varied from between about 60% to 80%. It has been known for Heathrow to be on westerly operations for 100% of a month. However, the length of time spent

in either direction can vary from a few hours at a time to days or weeks and there is much greater variation between individual months. Nor is there any correlation between the same months in different years.

Figure 3 - Annual Movements by Runway

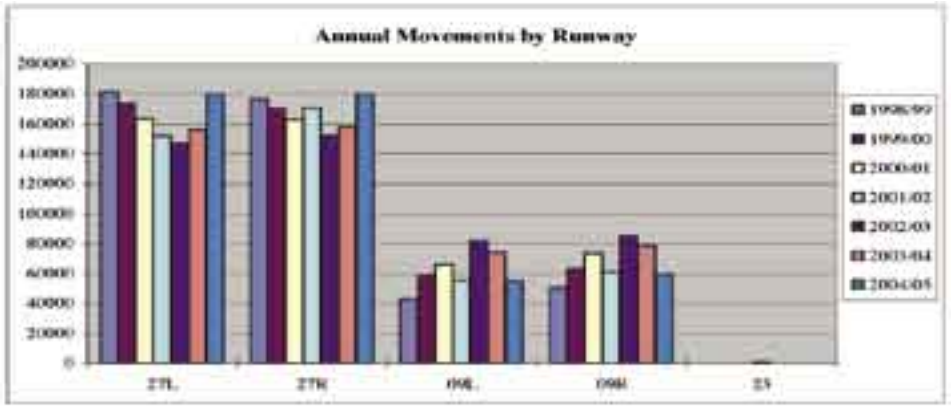
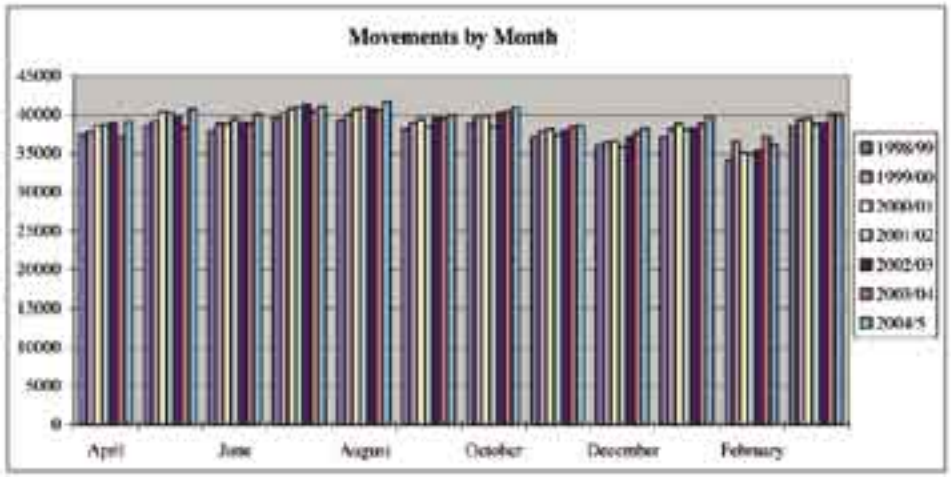


Figure 4 shows the total number of movements by month. It can be seen that there are no significant peaks or troughs in Heathrow's traffic distribution, although July and August are typically busier periods with December and February slightly less busy.

Figure 4 - Movements by month



Figures 5 and 6 break down the annual movements by runway into arrivals and departures respectively. These graphs help to illustrate the impact of Runway Alternation and the Cranford Agreement. It can be seen in Figure 5 that arrivals on westerly operations are very evenly split showing how Runway Alternation divides the impact. In contrast the runway split for easterly arrivals shows how the majority land on 09L as a consequence of the Cranford Agreement. This is further illustrated in Figure 6 which shows how easterly departures are normally all from 09R.

Figure 5 - Arrivals by Runway

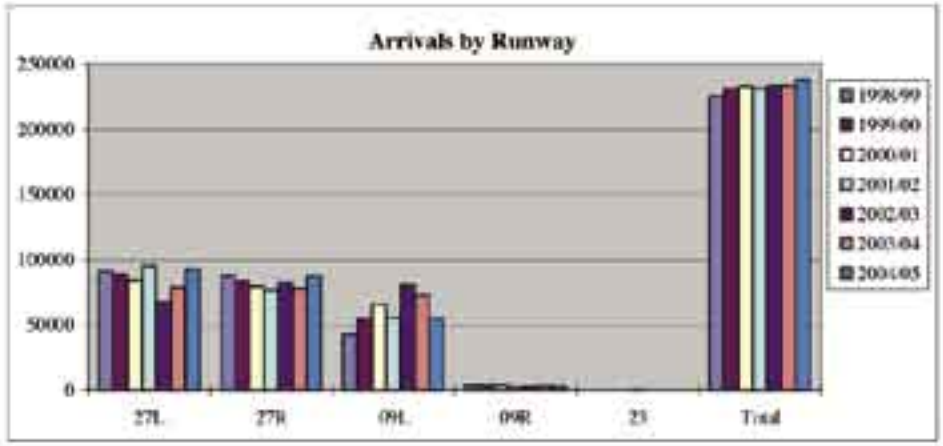


Figure 6 - Departures by Runway

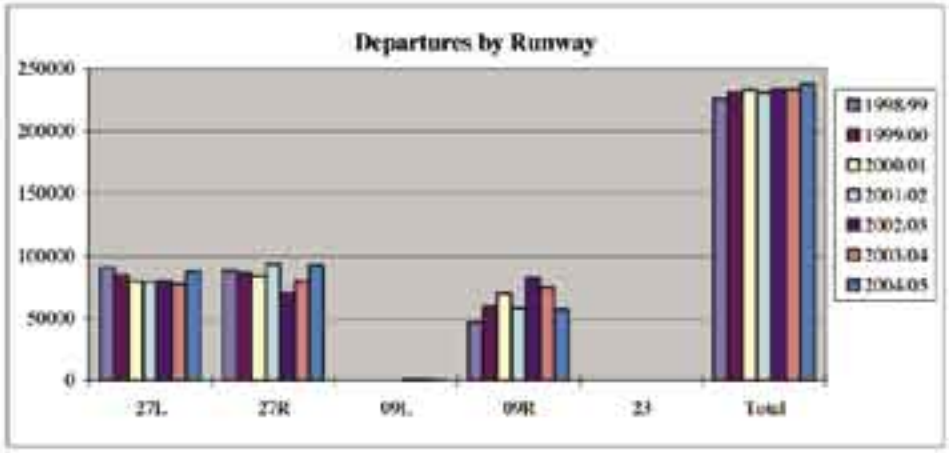
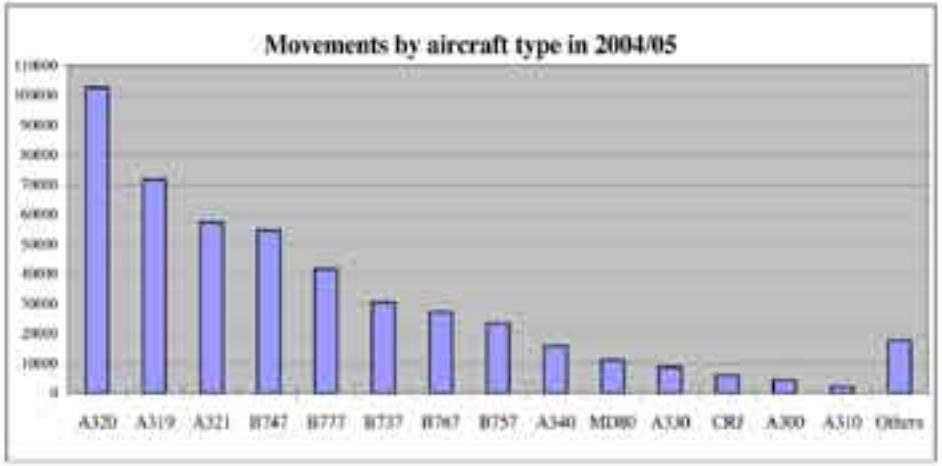


Figure 7 shows the annual number of movements by aircraft type. It is worth noting that this is the first full financial year in which Concorde (SSC) did not operate at all.

Figure 7 - Movements by Aircraft Type



There are occasions when, in order to ensure safety standards are maintained, aircraft are required to abort their approach and rejoin the landing pattern. These are known as go-rounds and there are well established procedures to enable these manoeuvres to be undertaken safely. Every effort is made to ensure that these procedures are rarely used as illustrated in Figure 8.

Figure 8 - Annual Total and Percentage of Go Rounds

Year	Total Number of Go-Rounds	Go-Rounds as a % of all Arrivals
1996/97	499	0.23
1997/98	541	0.24
1998/99	481	0.21
1999/00	460	0.2
2000/01	518	0.22
2001/02	563	0.24
2002/03	635	0.27
2003/04	493	0.21
2004/05	625	0.26

Chapter 4 - Aircraft Flight Paths

This chapter provides information on the noise mitigation measures employed at Heathrow to minimise the impact of its operations with regard to the path of aircraft. It deals with arrivals and departures separately. The noise characteristics of arriving and departing aircraft vary quite markedly with the contribution of airframe noise being much more significant on arrivals.

ARRIVALS

The noise generated by arriving aircraft is generally less than that generated by the same aircraft on departure. However the frequency of overflight, particularly close to the airport, and the fact that the majority of night flights at Heathrow are by arriving aircraft, mean that the impact on the local community is no less significant. This is fully recognised by BAA Heathrow and is illustrated by the amount of work undertaken by the FEU to help mitigate the effects of arriving aircraft. This section outlines the way arriving aircraft operate at Heathrow and the measures in place to help reduce their impact.

The approach aircraft take on arrival to Heathrow can be split into 3 distinct phases.

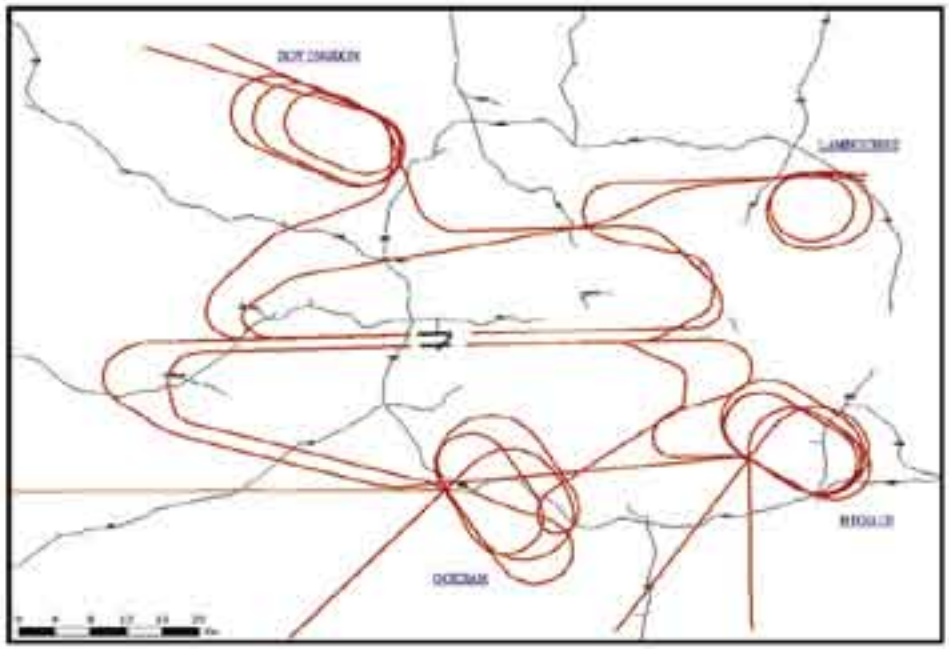
Airways to Holding Stack

Aircraft are directed by ATC from the airways to one of four holding stacks where they circle awaiting landing instructions. A stack is used to queue aircraft by circling them around a navigation beacon whilst separating them vertically at 1,000 feet intervals. They are used at all major airports during busy times. The minimum altitude of the stack may vary, but in South East England it is normally 7,000 feet.

For aircraft using Heathrow there are four stacks. These are centred around beacons at Ockham and Biggin to the south, and Lambourne and Bovingdon to the north. The four stacks are clearly illustrated by the red arrival tracks in Figure 9 below.

Figure 9 - Holding stacks

Stacks have to be at a sufficient distance from the final approach path to allow aircraft to reduce altitude, slow down and fit into the landing sequence.



The number and position of stacks depends on the amount of traffic using an airport and the direction from which most aircraft arrive. Stacks require a very large amount of airspace and have to be separated both from each other and from air traffic routes.

Stack to Finals

There are no fixed routes or heights for aircraft to follow from the stacks to the final approach. Fluctuations in the number of aircraft using Heathrow and the need to maintain a safe and efficient traffic flow, mean that it is not practical to specify the exact points at which aircraft join the final approach.

Therefore it is not possible to define fixed routes for aircraft to follow from the holding stacks; so the routes taken are a matter for the professional judgement of air traffic controllers. However, the Government has specified the minimum heights at which the aircraft must be "established on" (ie using) the final approach (see "Joining Point" below).

Consequently, many areas within the London area may experience some degree of overflight by aircraft landing at Heathrow.

However, for future reference, it should be noted that this situation may change in future, if more advanced navigation systems are introduced.

Final Approach

Aircraft on final approach use equipment known as the Instrument Landing Systems (ILS). These are essentially radio beams which guide aircraft along a straight line extension of the landing runway and descending at 3 degrees (a descent of approximately 300 feet per nautical mile). Aircraft join the final approach path at heights consistent with use of the ILS at that distance from the airport and they will then descend according to the 3 degree glideslope described above. Aircraft on arrival are required to be established on the ILS at certain heights and distances from the airfield. These points are known as the minimum joining points.

Joining Point

During the daytime the aircraft are required to be "established" on the ILS at 7.5nm from touchdown. This equates to approximately 2500ft aal. At night the distance is extended to 10nm which equates to approximately 3000ft aal.

As a result of this requirement the aircraft follow very consistent and narrow flight paths on the very final part of the approach to Heathrow. It is because of the consistency of this flight path and the frequency of arrivals, that a pattern of runway alternation is operated at Heathrow for arrivals.

Runway Alternation and Use of Directional Preferences at Night

Runway Alternation is a system introduced at Heathrow Airport to provide respite for local residents affected by arriving aircraft on the final approach to land. Originally Runway Alternation operated only during the day and only for westerly operations but, following consultation, in December 1999, the DfT introduced Runway Alternation at night for easterly as well as westerly operations.

During the day, the Cranford Agreement (explained below) prevents departures from the northern runway on easterly operations, which in turn prevents Runway Alternation. However, it is possible to use the System after the last departure at night and before the first departure the following morning without impacting the Cranford Agreement. This spreads in particular the early morning arrivals, which start before the departures, between the two final approach paths.

As explained earlier, following consultation on the preference for the direction of operation of the Airport at night, the DfT decided that the westerly preference should be replaced at night, after the last departure, by a weekly rotation between westerly and easterly operations whenever weather conditions permit.

The combination of Runway Alternation and the Westerly/Easterly Preference arrangements result in three distinct periods during which Alternation operates.

Day - Westerly operations

One runway is used for landings from 6am to 3pm (although see paragraph below on the 6am to 7am period) and the other from 3pm until after the last departure. This arrangement runs for a week from Monday to Sunday.

Day - Easterly operations

There is no Runway Alternation during the day on Easterly operations due to another noise measure in place - the Cranford Agreement.

The Cranford Agreement

The Cranford Agreement is a verbal agreement between the Government and the residents of Cranford dating from the 1950s. It was designed to protect the residents of Cranford, which is very near to the eastern end of the northern runway, from the high noise levels experienced on the ground from departing aircraft at low altitudes. The Agreement is that the Northern Runway will not be used for departures on Easterly operations except in exceptional circumstances. Consequently, during easterly operations, the northern runway is not normally used by departing aircraft. Departing aircraft therefore have to use the Southern Runway and the majority of arriving aircraft use the Northern Runway. The Cranford Agreement therefore prevents Runway Alternation on easterly operations during the time when departures are operating, which is the majority of the time. However, when there are no departures ie early in the morning, it is possible to use Runway Alternation, so its use at night for Easterly as well as Westerly operations was introduced by the DfT at the end of 1999.

Night - Westerly and Easterly operations

After the last departure there is a separate night period until 6am.

Between 6am and 7am

From 14 August 2000 the DfT commissioned an ongoing trial of Runway Alternation between 6am and 7am. However, this still allows National Air Traffic Services (NATS) the discretion to make use of the second runway for arrivals when arrival delays building up exceed a given duration. Weather conditions, both locally and encountered en-route by long haul aircraft, can contribute to the build-up of arrival delays. No decision has been announced by the DfT on how long the trial will run.

Example of the Runway Alternation and Preference pattern

Each rotation of the overall pattern, taking into account both Runway Alternation and the rotation of the Westerly/Easterly Preference at night, results in an overall 4 week pattern. This can be illustrated as follows:

NOTES:
Westerly operations - 27L = Southern Runway and 27R = Northern Runway
Easterly operations - 09R = Southern Runway and 09L = Northern Runway

The first column shows the runway to be used at night in accordance with the preference for that week with the alternate if the preference cannot be operated due to weather conditions.

	After last Departure-0600	0600-1500	1500-After last Departure
Week 1	27L (09R)	27L	27R
Week 2	09L (27R)	27R	27L
Week 3	27R (09L)	27L	27R
Week 4	09R (27L)	27R	27L

Runway Maintenance

Most routine checks and maintenance of runways, adjoining taxiways and associated equipment can be planned to coincide with the pattern of Runway Alternation. However, there will be occasions when Alternation has to be suspended, or the pattern modified, to allow maintenance or works of a longer duration such as resurfacing of runways, to be carried out, or urgent work to be undertaken which cannot comply with the pattern.

There are occasions when Runway Alternation needs to be suspended for extended periods, normally to enable maintenance work. This happens rarely and, where it is known in advance, Heathrow Airport informs the HACC and other interested organisations.

Arrivals out of Alternation

It may be helpful to emphasise that Runway Alternation applies only to arriving aircraft, although ATC endeavour to use the “other” runway for departures where possible.

Whilst every effort is made to ensure that Runway Alternation operates, there are occasions when, for short periods, unforeseen circumstances mean that changes in the procedure need to be made at short notice.

Occasionally for safety reasons it is necessary for aircraft to land on the runway not scheduled for landings. For example an aircraft landing on the correct runway may develop a problem which prevents it clearing the runway in time for susequent aircraft, which then will need to use the other runway.

Sometimes there may be a build up of air traffic being held in the stack, awaiting landing instructions. Where this leads to delays of more than 30 minutes, or there is a build-up of traffic generally within UK and neighbouring airspace, ATC may land aircraft out of alternation in order to maintain a safe and efficient traffic flow.

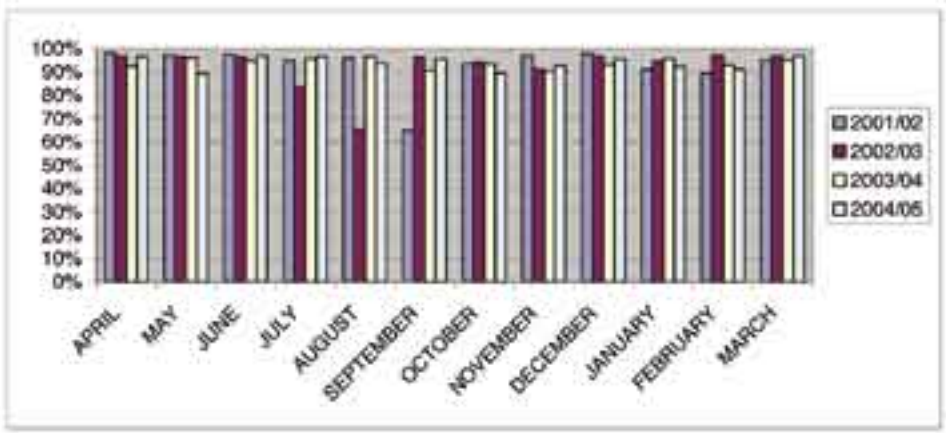
For a number of reasons aircraft cannot always arrive precisely to schedule since they are affected by weather, particularly winds. Holding delays usually arise when there is a mixture of early and late inbound flights converging on Heathrows airspace at the same time as aircraft arriving on schedule.

Weather can also affect the use of Alternation, for example occasionally strong south westerly winds can blow across the various buildings in Heathrow's maintenance area and affect aircraft landing on the northern runway on westerly operations. Also, if patchy fog is causing lower visibility on one runway compared with the other, ATC may decide to de-alternate for safety reasons. This is, however, relatively rare.

Monitoring of Alternation

BAA Heathrow recognises that adherence to Alternation is highly valued by the local community. Consequently we are keen to ensure that aircraft only land out of Alternation when absolutely necessary. There is a system of monitoring in place so that BAA Heathrow, DfT and the Heathrow Airport Consultative Committee can identify the extent of de-alternation. Figure 10 shows the percentage of aircraft landing within the alternation pattern. Please note adherence to runway alternation has been affected by runway resurfacing plus ad hoc problems eg with the ILS on the northern runway due to outside interference and geese migrations across the northern runway.

Figure 10 - Adherence to Runway Alternation by Month.



Arrivals Code of Practice

In 2000 the then Minister announced that, after a technical review carried out by a working group of ANMAC (Aircraft Noise Monitoring Advisory Committee), fixed noise limits for arriving aircraft would not be introduced at Heathrow, Gatwick and Stansted airports. It was also announced that the industry would compile a code of practice for arrivals noise. A group was established to complete this involving membership from BAA Heathrow, Gatwick and Stansted, National Air Traffic Services, DfT, CAA, British Airways and Airtours plc.

The Code of Practice was published in December 2001. The code includes:

- Background information including the conclusions of the technical review
- A definition of Continuous Descent Approach (CDA - see below)
- Guidance to air traffic controllers and flight crew for the achievement of CDA
- The importance of feedback from the airports' NTK system to airlines and ATC
- Charts to assist flight crew in managing their descent, consistent with ATC instructions

The Code has been widely circulated to airlines operating at Heathrow. By providing airlines with information on the average achievement of CDA at Heathrow and their own performance relative to this, we are establishing a benchmark against which to measure our success in raising awareness and increasing the proportion of arrivals following a CDA.

Continuous Descent Approach (CDA)

The stage of flight where the increased use of CDA can improve the noise climate is from the holding stack to the joining point. In its report "Noise from Arriving Aircraft" the ANMAC Technical Working Group state that "the purpose of CDA is to reduce the noise experienced at ground level through two effects: by reducing the overall thrust required during the initial descent; and by keeping the aircraft higher for longer, thus realising noise attenuation benefits".

Figure 11 - Model CDA and Non CDA Arrivals

Noise attenuation is not the only environmental benefit to be gained from aircraft following a CDA. Non CDA approaches are characterised by prolonged periods of level flight, often requiring additional engine power, which increases the emission of air quality pollutants because more fuel is used. Consequently there is also an economic benefit to encourage airlines to operate a CDA wherever practicable in order to reduce fuel consumption. Figure 11 illustrates the modelled differences between a CDA and non CDA arrival.

Following a Continuous Descent Approach (CDA) where practicable has long been a requirement in UK airspace. However it is only over recent years that the technology to analyse approach profiles has been available.

In June 2000 BAA Heathrow spent around £50,000 on pioneering software development for our Noise and Track Keeping system (NTK). The Aircraft Profile Analysis function allowed us to automatically assess an aircraft approach profile against set Continuous Descent Approach (CDA) criteria. Prior to the introduction of this software, monitoring compliance with CDA criteria was a very labour intensive task and was subject to the interpretation of the particular individual viewing the aircraft approach profile. This functionality allows quick and consistent measurement against CDA criteria across all BAA airports.

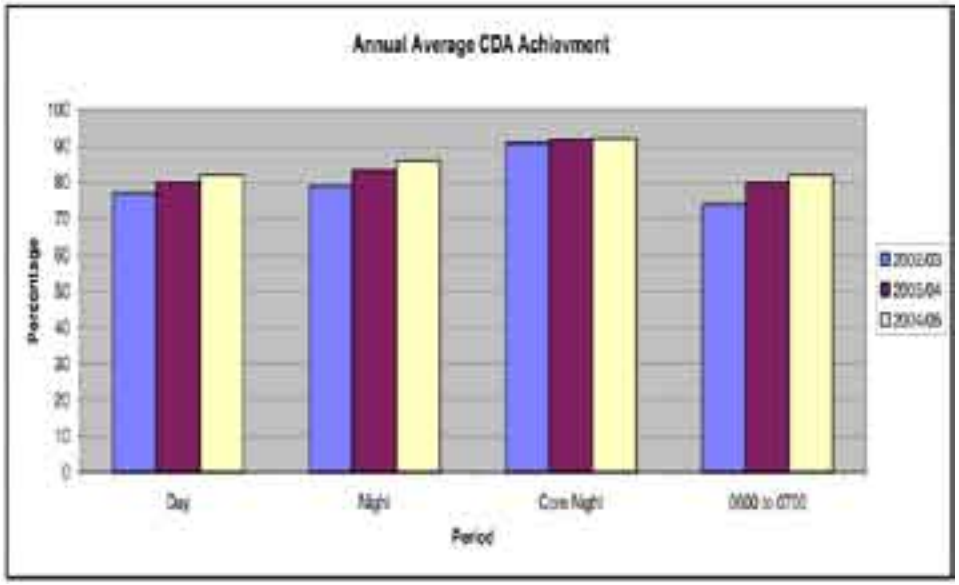
The criteria used to determine whether an approach should be classed as CDA or not has been broadly agreed across the key stakeholders:

"For monitoring purposes, a descent will be deemed to have been continuous provided that no segment of level flight longer than 2.5 nautical miles (nm) occurs below 6000ft QNH and "level flight" is interpreted as any segment of flight having a height change of not more than 50ft over a track distance of 2nm or more as recorded in the airport Noise and Track-keeping system."

Monitoring of CDA

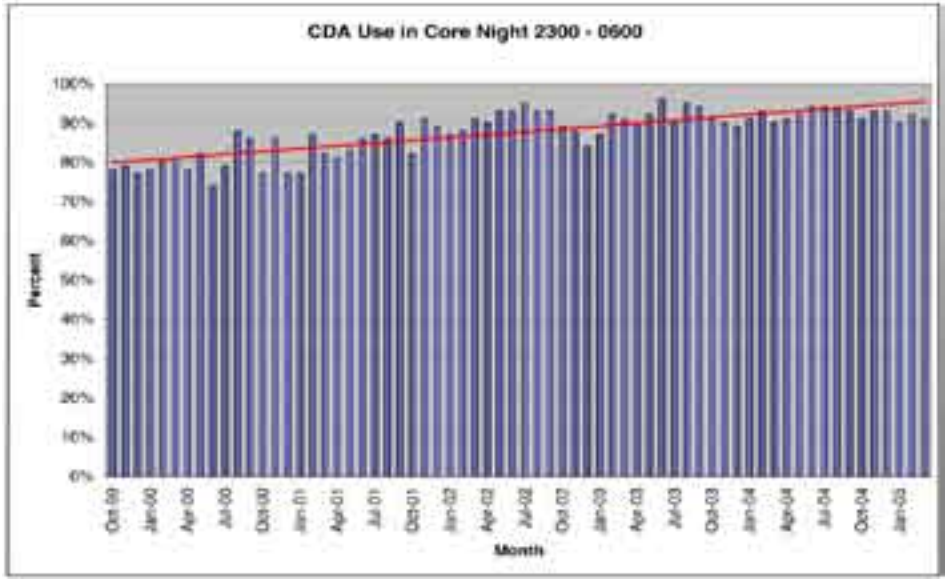
We have broken down each 24 hour time period into day and night. The daytime is defined as 0700 to 2259 and the night is defined as 2300 to 0659. The night period is then broken down further into the core night period which is 2300 to 0559 and finally the 0600 to 0659 hour. Figure 12 summarises Annual CDA usage over the past three years.

Figure 12 - Annual CDA use.



Our main focus has been on improving the use of CDA at night (2300 to 0600) as this is the most sensitive period of operation. Figure 13 shows the CDA achievement in this time period by quarter since October 1999.

Figure 13 - CDA 2300-0600



Seeking Further Improvements

We provide as much feedback and information regarding CDA as possible to both airlines and ATC, as we realise that improving the percentage use of CDA requires a joint industry approach. We have continued to provide detailed data analysis for both airlines and ATC over the past twelve months which we believe, together with the Arrivals Code of Practice, continues to raise awareness amongst controllers and pilots leading to the improvements we have observed. Airlines are keen to adopt a CDA wherever practicable as this has not only the environmental benefits of reducing noise and fuel burn emissions, it is also economically beneficial.

Our target for average CDA use during the core night period 2300 to 0600 for 2004/05 was 92%. The average achieved for the year was 92%.

DEPARTURES

AIRCRAFT TRACK KEEPING

This section explains: the procedures related to aircraft track keeping; the processes for monitoring adherence to these procedures; and presents a range of statistics on track keeping performance.

The Noise Preferential Routes (NPRs)

Aircraft departing from Heathrow are required to follow one of a number of Noise Preferential Routes (NPRs) which are overlaid on the Standard Instrument Departure Routes (SIDs). NPRs were designed to avoid, where possible, aircraft overflying built up areas. The DfT is responsible for policy and regulations relating to the NPRs. There are many factors that may affect an aircraft's course, including the wind speed and direction relative to the aircraft's path, the load and performance characteristics of the aircraft and tolerances in navigational equipment. Consequently, the NPRs are approximately 3 kilometres wide, one and a half kilometres either side of the nominal centreline of the SID/NPR. This is known as the swathe - see opposite.

All aircraft must follow an NPR unless instructed to do otherwise. NPRs lead from the take-off runway to the main UK air traffic routes and form the first part of the SIDs. Compliance with NPR procedures at Heathrow is required up to an altitude of 4,000 feet. Once this altitude has been reached, an aircraft may be redirected (vectored) off the NPR/SID by Air Traffic Control (ATC) to provide it with the most appropriate routing in the context of other flights in the area at that time and destination. ATC may also decide to leave the aircraft on the SID. Consequently residents will see aircraft on the NPR both above and below 4000ft.

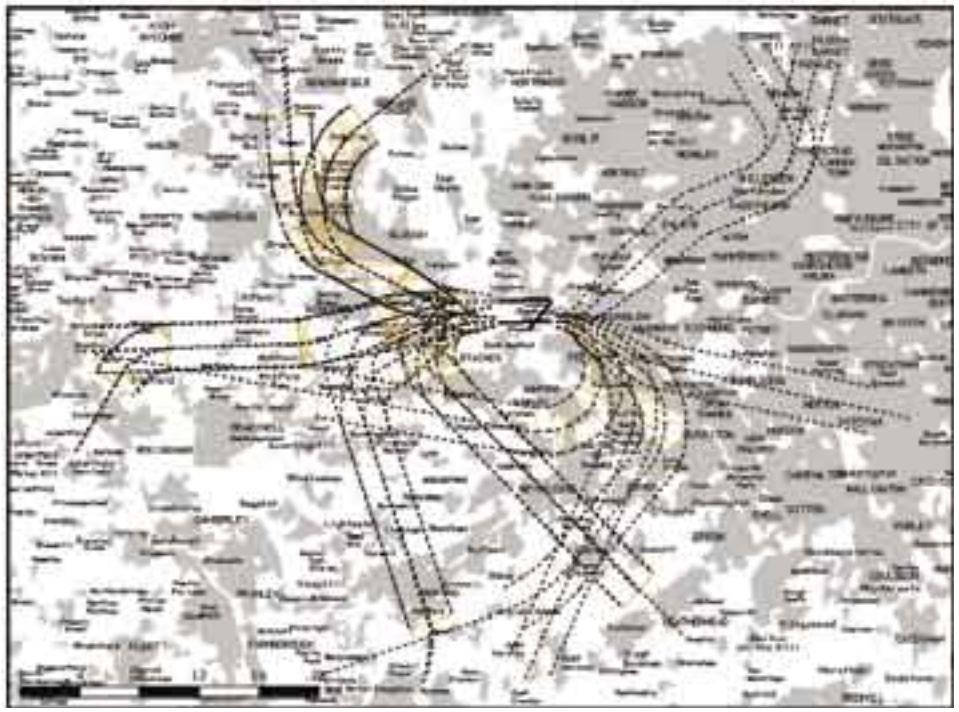
The day-to-day direction of air traffic, including the choice of NPR/SID, is the responsibility of ATC, but the latter is determined mainly by the destination of the flight.

At Heathrow, there are 6 routes each for both westerly and easterly operations.

Swathes

Although the NPRs are represented as lines on a map, it is accepted that aircraft cannot navigate precisely along such lines like a train on a track. Each NPR has therefore been allocated a swathe width of 3 km (1.5 km either side of the nominal centreline). Figure 14 is taken from the GEMS NTK system and shows the noise preferential routes and their swathes. Any aircraft which deviates from these swathes below an altitude of 4,000 feet is reported by the Noise and Track monitoring system. Data on such deviations is presented later in this section.

Figure 14 - Location of NPRs



Chapter 1 gave a description of the Noise and Track Keeping (NTK) system and explained that a new system had been installed during 1999.

Figure 15 shows a typical display from the system. It shows the tracks of all aircraft on a typical period of westerly operations. Figure 16 shows a typical period of easterly operations. The green tracks represent departing aircraft and the red tracks represent arriving aircraft. There are no routes for arriving aircraft. When looking at the tracks of the departing aircraft in relation to the NPRs it should be remembered that they are only required to stay within the swathe up to an altitude of 4,000 feet. Many of the modern twin-engined aircraft reach this height relatively quickly. ATC then may decide to then give the aircraft a more direct heading depending on its destination and other airspace management considerations. This explains the dispersion of the departure tracks.

Figure 15 - typical westerly operations

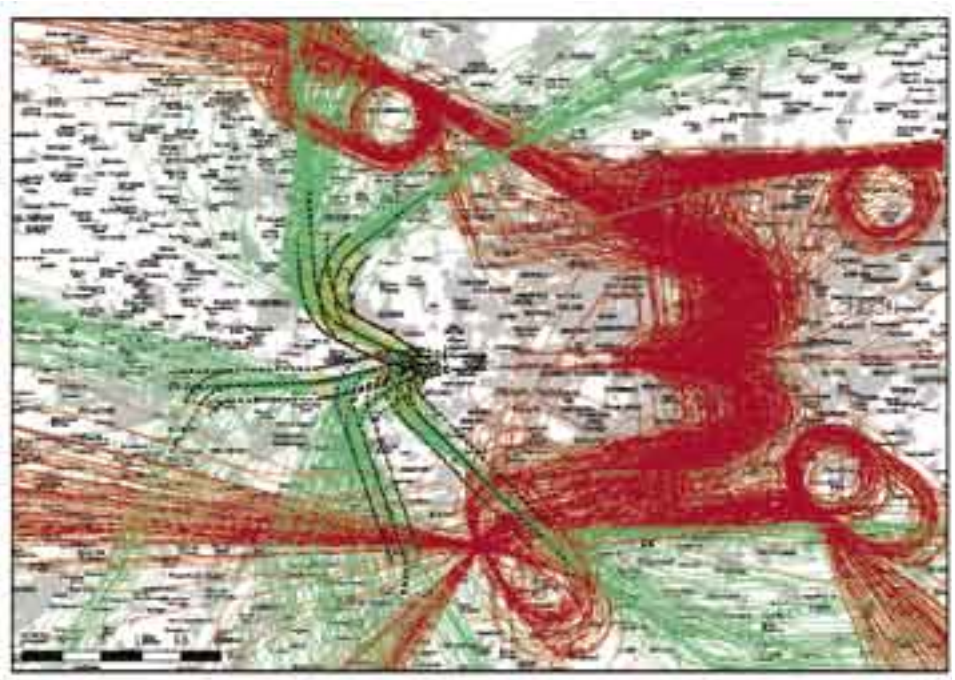


Figure 16 - typical easterly operations

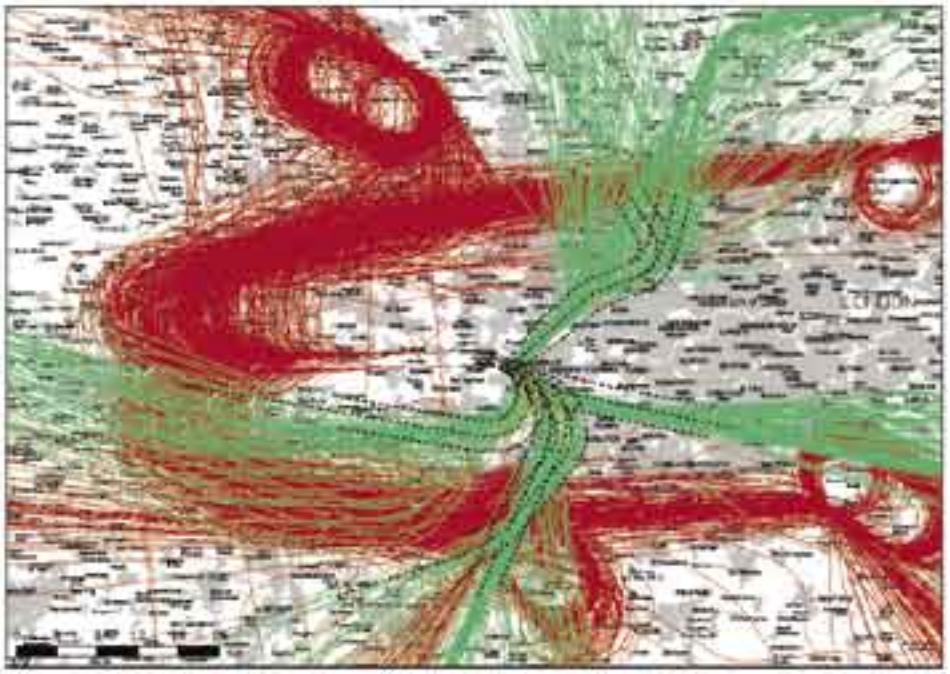
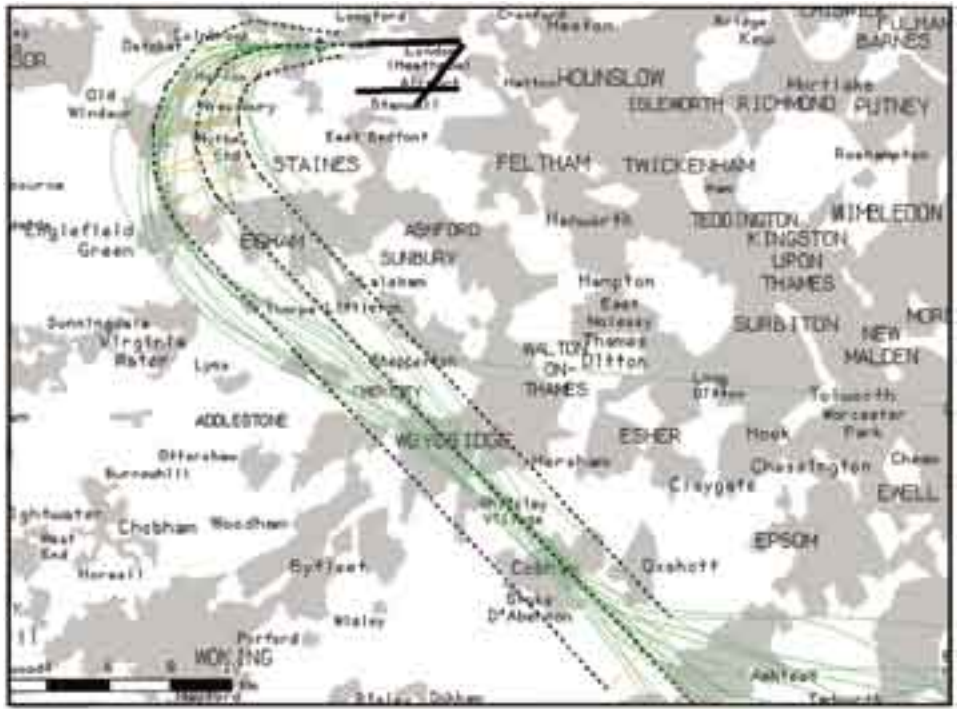


Figure 17 - typical track deviations on 27R Dover NPR



The GEMS NTK system is set up to automatically detect any aircraft track which deviates outside the NPR swathes below 4,000 feet. Figure 17 shows a number of typical track deviations on the 27R Dover NPR.

Details of the airline, aircraft type and the height at which it deviated from the route can be shown. The information on track deviations is sent to the airline concerned and statistics showing track keeping performance and the total number of deviations is also sent to many airlines.

There are a number of factors that can affect an aircraft's ability to fly accurately within the NPR swathe, particularly in relation to the NPRs which include a significant turn, such as the westerly Dover and easterly Compton departures.

These factors include:

- the accuracy of navigation systems on board aircraft
- the response time of the pilot and aircraft systems once a turn is required
- aircraft speed
- aircraft altitude
- aircraft configuration (weight, flap settings etc)
- weather (temperature, pressure, wind speed and direction)

Through monitoring performance over a period of time, it has become apparent that the speed of aircraft during the turns is one of the most critical factors in determining track keeping performance. The weight of the aircraft is also significant and the largest aircraft types, flying the longest routes, have the most difficulty in staying within the swathes during the turns. Many airlines have used the information provided by the FEU to good effect by reviewing and amending their procedures in order to improve their track keeping performance.

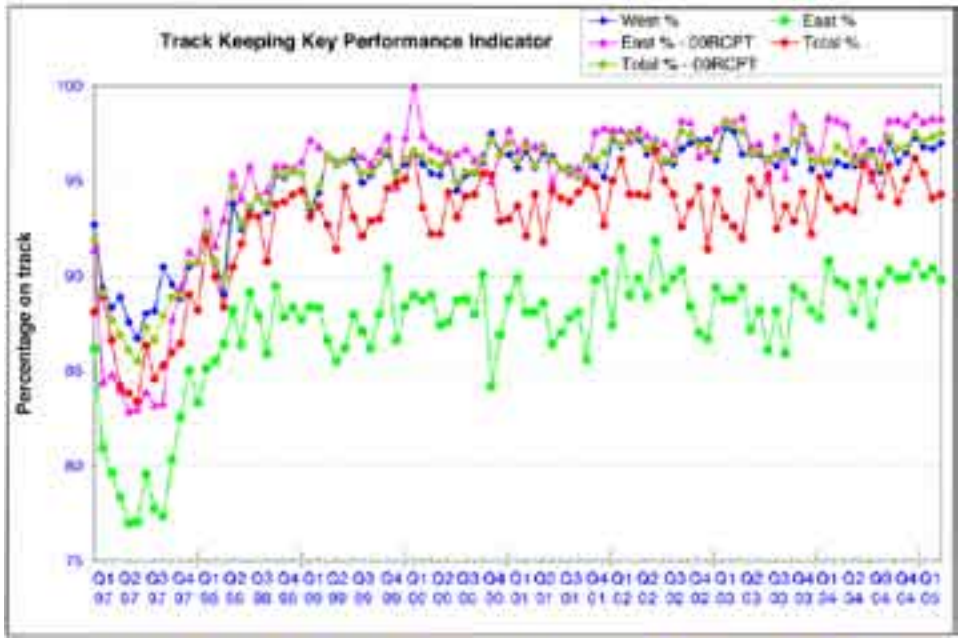
Track keeping performance continues to remain high, and although monthly figures may fluctuate, the overall trend remains positive.

However there are known problems with navigating the CPT 09R route (ie the Compton route on easterly operations). Firstly it involves a sharp 180 degree turn which is extremely difficult to maintain for many aircraft. In addition departing traffic on this route has to be directed by ATC around the arriving traffic travelling from the southern stacks and turning towards the east to join the Instrument Landing Systems.

Therefore figures are also calculated to exclude this route. The unique difficulties associated with flying this route are recognised by the DfT and are referred to in their notes accompanying their NPR maps.

Track keeping performance is also reported at the regular meetings with the Heathrow Noise and Track Keeping Working Group and the Flight Operations Performance Committee. A monthly Track Keeping Key Performance Indicator is also produced and reported to BAA Heathrow management.

Figure 18 - Monthly Track Keeping Performance since January 1997



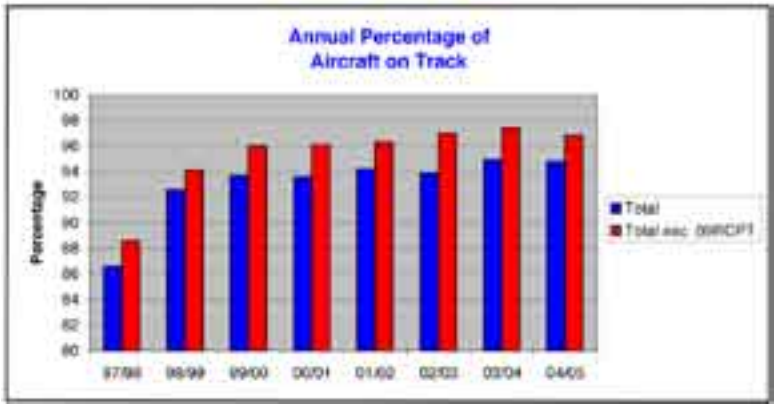
Track-Keeping by Noise Preferential Route

Figures 19 and 20 show track keeping performance by NPR and by year.

Figure 19 - Track Keeping Performance by NPR.

2004/05	TOTAL % ON TRACK-ALL AIRLINES												
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	AVERAGE
27LBPK	97	97.1	97.5	97.6	96.6	96.8	95.2	98	98	98.3	98.4	97.6	97.3
27RBPK	96.5	97.5	96.9	97.2	94.7	97.7	95.6	98.5	98.6	98	99	95.2	97.4
27LCPT	97.5	98.8	99	97.8	98.6	99.2	97.2	99.5	99	98.9	99.8	99.3	98.4
27RCPT	99.9	99.6	99.4	99.6	94.7	99.9	99.7	99.9	99.6	99.9	100	99.6	99.3
27LDVR	90.8	91.9	91.3	93.8	94.2	94.7	93.5	92	93.4	88.7	91.3	93.1	92.4
27RDVR	92.7	91.4	94.4	94	94.2	95.1	95.2	91.6	94.9	95	90.8	92.7	93.5
27LMID	95.1	95.2	90.6	95.8	96.3	96.3	95	95	96.9	95.5	95.7	96.4	95.7
27RMID	94.6	93.7	94.3	95.2	95.3	96.3	97.3	94.4	95.9	97.1	95.4	95.6	95.3
27LSAM	96.6	96.2	97.9	97.6	94.9	99.1	96.2	98.5	99.5	99.1	99.7	99.1	98.0
27RSAM	99.4	99.1	99	99.2	97.8	99.6	96.5	99.6	100	99.8	100	100	99.4
27LWOB	98.7	99	98.1	98.2	95.5	99.1	97	99.3	98.9	99.2	98.9	99.1	98.3
27RWOB	97.3	97.2	97.5	97.6	94.8	98.3	96.7	98.9	98.7	99.5	99.6	99.1	97.9
TOTAL WESTERLY	95.8	95.8	96.2	96.6	95.5	97.1	96	96.8	97.3	96.8	96.7	97	96.4
09RBPK	96.2	95.6	96.5	94.9	97.9	96.2	97.9	96.5	99.1	99.1	96.2	97.4	97.5
09RBUZ	97.7	94.5	96.2	93.1	93.9	96.5	97.9	97.1	97.5	96.3	96.1	97.7	96.9
09RCPT	33.8	31.6	14.8	24.8	21.2	29.1	21.8	23.5	29.4	35.5	35.7	29	27.4
09RDVR	99.6	99.2	98.8	98.5	98.7	99.6	99.4	99.9	99.5	98.8	98.7	99.3	99.2
09RMID	96	95.5	94.2	93.6	93.7	96.3	96.9	96.3	97.5	96	97.8	98.1	96.0
09RSAM	96.7	96.3	100	97.2	96.3	99	99.7	98.9	99.4	98.8	99.5	99.8	99.0
TOTAL EASTERLY	99.2	98.1	99.7	97.4	99.8	99.3	99.6	99.6	99.7	99	99.4	99.8	99.6
GRAND TOTAL	97.7	97.4	98.8	96.4	94.3	98.8	97.9	98.1	98.2	97.4	94.1	94.2	94.8
EASTERLY - 09RCPT	98	96.3	97.2	95.1	96.7	98.2	96.2	98	98.5	98.1	98.2	96.3	97.6
TOTAL - 09RCPT	96.5	94	96.3	96.4	96.7	97.2	96.7	96.6	97.6	97.1	97.3	97.5	96.8

Figure 20 - Track Keeping Performance by Financial Year



It is important to note that, as we approach the optimum number of departures on-track, the year on year improvements will become more difficult to achieve. Nonetheless track keeping will continue to be a major priority for the FEU.

Chapter 5 - Aircraft Noise

Noise Limits

Aircraft departing from Heathrow are subject to departure noise limits set by the DfT. Limits have been in place for many years and from 1995 were the subject of a protracted review, including public consultation, which resulted in new limits being introduced early in 2001.

Departure Noise Limits

The main differences between the old and new regimes at Heathrow include:

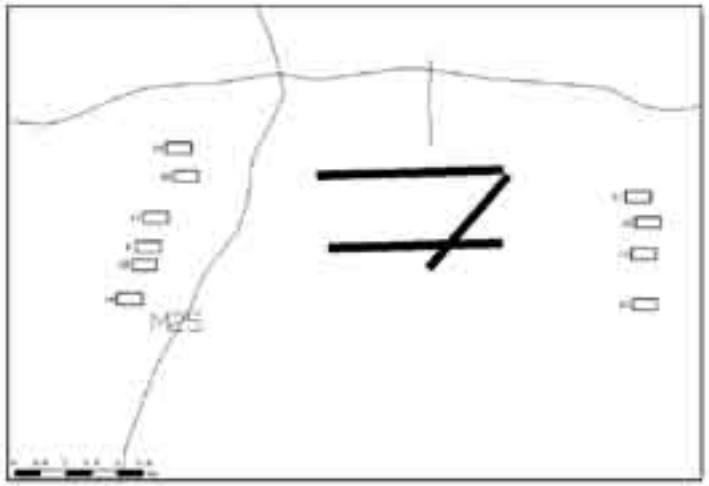
- from 25 February 2001, the daytime (0700 to 2300) noise limit was reduced by 3dBA from 97dBA to 94dBA (LMax)
- from 25 March 2001, the former night time period (2300-0700) was redefined as being 2330 to 0600, in line with the night quota period under the night restrictions regime
- the night time limit was reduced by 2dBA from 89dBA to 87dBA
- from 25 March 2001, the former night noise limit of 89dBA was applied to the "shoulder" periods either side of the new night period ie 2300 to 2330 and 0600 to 0700

Full details of these arrangements are available on the DfT website (www.dft.gov.uk). They have also been published as a Supplement to the UK AIP (S3/2001) which amends AD2-EGLL-1-16 to 19 (dated 19 Apr 01).

The monitor locations

Figure 21 below shows the monitor locations in relation to the runways at Heathrow.

Figure 21- Location of Permanent Noise Monitors



The noise limits apply at a distance of 6.5km from a position on the runway where the aircraft start their take off roll and at an elevation equal to that of the runway. Since it is not possible to site monitors exactly in these positions, minor positional adjustments are applied to the limit at each individual monitor to account for the differences in elevation or distance from take off roll.

Figure 22 - Noise Monitor Limits and adjustments

FEU Site Number	Elevation above aerodrome	Positional Adjustment	Daytime limit	Shoulder Period Limit (2300-2329 & 0001 and 0700)	Night Limit (2330 - 0600)
0	-6m	-0.3	94.4	89.4	87.4
19	-4m	2.3	97	92	90
18	-4m	4.8	99.5	94.5	92.5
17	-6m	-0.3	94.4	89.4	87.4
15	-7m	-0.6	94.1	89.1	87.1
14	-7m	-1	93.7	88.7	86.7
11	-3m	0.9	95.6	90.6	88.6
12	-3m	-0.1	94.6	89.6	87.6
10	-3m	1.2	95.9	90.9	88.9
13	-4m	-0.3	94.4	89.4	87.4

Each monitor in Figure 22 has an additional calibration allowance of 0.7dBA added to the limit in line with the microphone manufacturers guarantee.

An aircraft is deemed to have infringed the limits if it exceeds the limit for that time period at any of the above monitors.

Tailwind Adjustments

For the purpose of determining an infringement of the limits, if the aircraft was required to take off with a tailwind, an amount of up to 2dBA of the noise recorded at the noise monitor should be disregarded. The amount to be disregarded shall be:

0.4dB for a tailwind of up to 1 knot.
0.8dB for a tailwind exceeding 1 knot but not exceeding 2 knots.
1.2dB for a tailwind exceeding 2 knots but not exceeding 3 knots.
1.6dB for a tailwind exceeding 3 knots but not exceeding 4 knots.
2.0dB for a tailwind exceeding 4 knots.

For this purpose, the tailwind is to be calculated from the wind data measured at the airfield anemometers and wind vanes according to the formula: (windspeed x cosine (runway heading minus wind direction)) x -1

Noise Infringements

Figures 23 and 24 show the number of infringements by month during the day and night respectively.

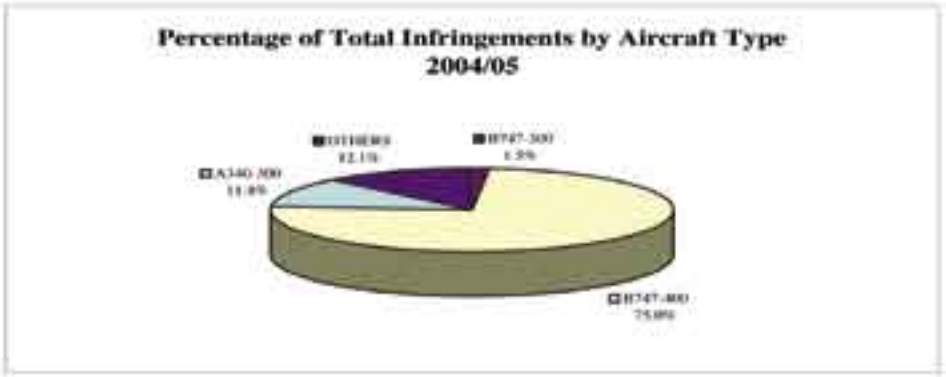
Figure 23 - Monthly Totals of Daytime Noise Infringements

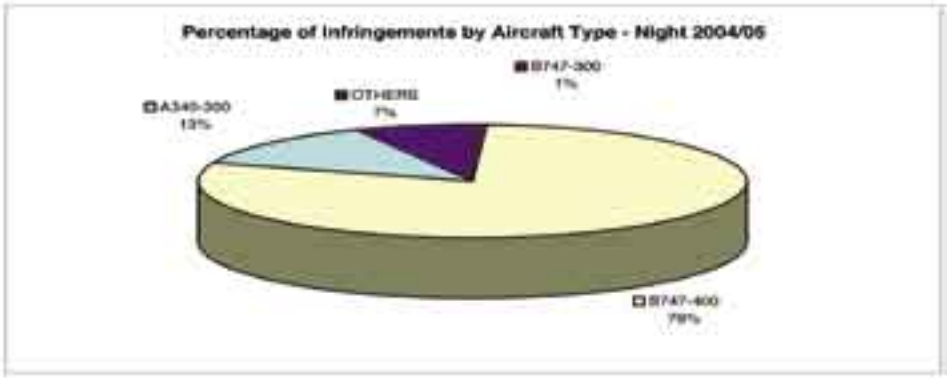
2004/05					Infringements expressed as			
MONTH	Total Departures		Total Infringements		% of total Departures		Total fines (£)	
	Current	Previous	Current	Previous	Current	Previous	Current	Previous
APR	19015	18146	1	3	0.01	0.03	300	1500
MAY	19781	18570	1	1	0.01	0.01	300	300
JUN	19095	18503	2	7	0.01	0.04	1000	4000
JUL	20119	19409	3	5	0.01	0.03	1500	3000
AUG	19653	19036	4	14	0.02	0.07	2000	6500
SEP	19310	19159	0	6	0.00	0.03	0	3000
OCT	19706	19559	2	2	0.01	0.01	1000	1000
NOV	18834	18690	0	23	0.00	0.12	0	10000
DEC	18604	18369	1	23	0.01	0.13	300	12000
JAN	19352	18872	0	3	0.00	0.02	0	1500
FEB	17582	18239	0	2	0.00	0.01	0	1000
MAR	19403	19312	1	1	0.01	0.01	1000	300
TOTALS	230894	227188	15	92	0.09	0.49	8000	45500

Figure 24 - Monthly Totals of Night Time Noise Infringements

2004/05					Infringements expressed as			
MONTH	Total Departures		Total Infringements		% of total Departures		Total fines (£)	
	Current	Previous	Current	Previous	Current	Previous	Current	Previous
APR	509	475	18	2	3.5	0.4	12000	1000
MAY	496	498	2	3	0.4	0.6	1000	2000
JUN	596	577	2	13	0.3	2.3	1000	6500
JUL	500	718	14	17	2.8	2.4	7000	10000
AUG	800	820	29	12	3.6	1.5	19000	9300
SEP	634	549	14	27	2.2	4.9	7500	18000
OCT	909	555	11	9	1.8	1.6	6000	4500
NOV	440	411	3	9	0.7	2.2	1500	8000
DEC	410	412	3	9	0.7	2.2	1500	2500
JAN	504	407	4	7	1.4	1.4	2000	5000
FEB	485	369	10	3	0.6	0.8	6000	1500
MAR	516	480	7	1	0.2	0.4	3500	500
TOTALS	6649	6151	117	112	1.75	1.82	67000	82000

Figure 25 - Percentage of Infringements by Aircraft Type





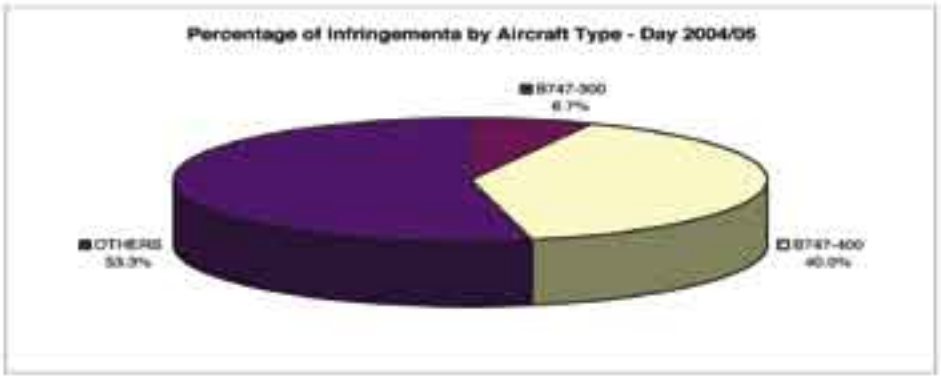
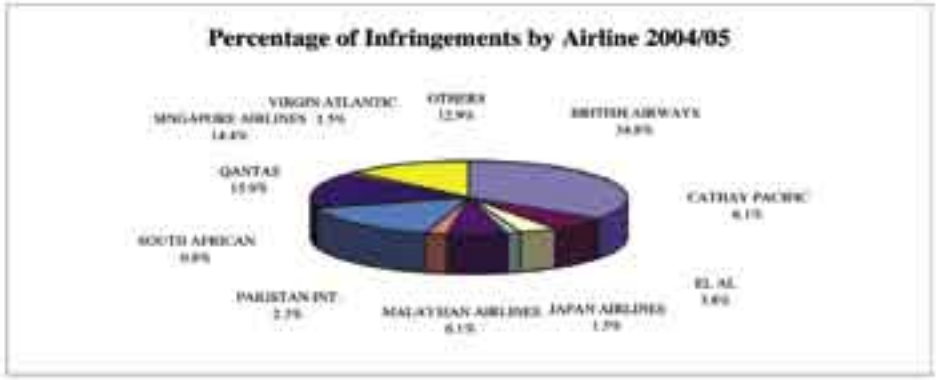
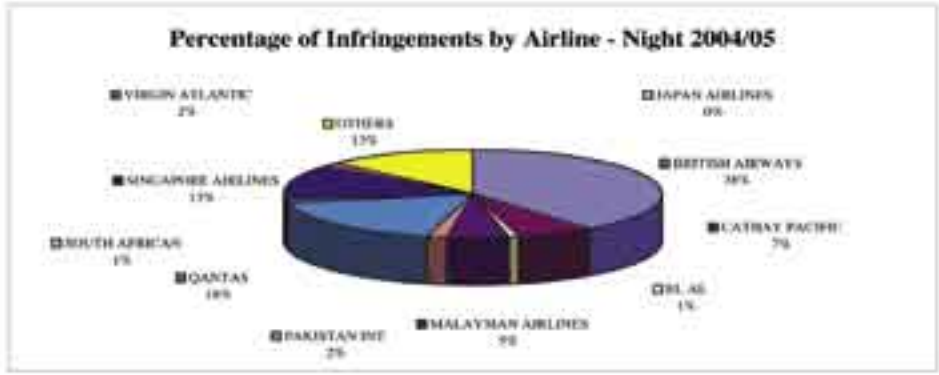
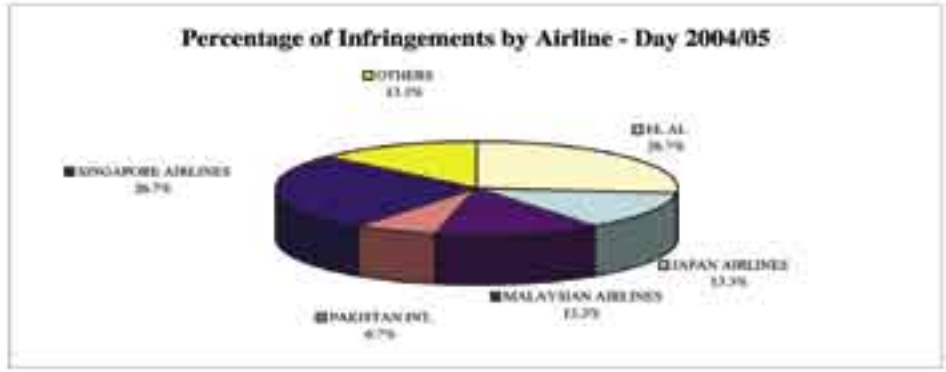


Figure 26 - Percentage of Infringements by Airline







Figures 25 and 26 show the percentage of infringements by aircraft type and airline. It can be clearly seen that the larger aircraft such as the Boeing 747 series are most likely to infringe the limits. Consequently the airlines which regularly operate these aircraft types have recorded the most infringements. Approximately 90% of all infringements were within 3dBA of the limit.

SUPPLEMENTS

BAA Heathrow imposes surcharges, in the form of a "noise supplement", on airlines whose departing aircraft infringe the noise limits. These provide an incentive to airlines to adopt departure procedures that minimise the possibility of infringements.

Taking account of the positional adjustments, supplements detailed in Figure 27 will be made if the infringement is in excess of the noise limits (ie 94dBA by day, 89dBA during the shoulder periods and 87dBA by night).

Figure 27 - Summary of Supplements

For all 3 time periods
0.1 to 3.0dBA excess = £500
More than 3.0 excess = £1000

Noise Fines Fund

The BAA Heathrow Noise Fines Fund has been operating successfully for over 5 years now. It is a key component in BAA Heathrow's community relations programme. It was set up to assist with noise mitigation measures within the local community, including schools and community halls.

Income for the fund is generated from fines imposed on airlines whose aircraft breach Department for Transport noise limits on departure. In this respect, it functions as a tool to encourage airlines to take responsibility for their environmental impact. To date, the fund has been, or is being, used to provide noise insulation for a number of local schools and community halls. One such beneficiary is Lampton School. The school is a thriving multi-cultural comprehensive with over 1,300 pupils. It has previously benefited from noise insulation, fitted with proceeds from the Noise Fines Fund. This summer BAA intends to undertake further noise insulation of learning areas.

With the development of noise mitigation schemes in line with the White Paper recommendations, it is likely that schools and other noise sensitive buildings within the 63 decibel noise contour will become eligible for noise insulation. This has prompted a review of the Noise Fines Fund which is likely to result in changes to the way the fund is distributed, given that the needs of schools and other noise-sensitive buildings should now be met by the new scheme.

In 2002, we reviewed our voluntary residential noise insulation scheme and consequently extended it to include primary schools within the 69 LAeq contour boundary. Actual work started in early 2003. To date 8.5 schools have been

completed: Cranford Infants School, Cranford Junior School, Bedfont Infants School, Bedfont Junior School, Grove Road School, Hounslow Heath Infants School, Marjory Kinnon School, Pippins School and we are just completing Beavers School. The majority of the work was undertaken during school holidays to minimise disruption.

Additionally, approximately 200 homes received noise insulation during 04/05. This was in the form of loft insulation, ventilation and double/ secondary glazing to windows.

Noise Insulation Scheme

This scheme began in 1996 and is designed to protect homes in areas exposed to the highest level of noise disturbance.

All 8,500 homes eligible for noise insulation under the scheme have now been invited to take part of which 4,300 took advantage of the scheme.

BAA now is re-offering the scheme to those properties where previously none of the options available were taken up. There are approximately 4,200 homes eligible for the re-offer. The scheme has also been extended to include the 10 primary schools within the schemes boundary.

Those eligible to apply for the Noise Insulation Scheme can select free secondary glazing, a 50 per cent contribution towards standard or high specification replacement windows, or a combination of these. Free ventilation and loft insulation is also offered as part of the scheme.

BAA has spent around £12 million on the scheme since it began.

Ground Noise

Ground noise is a term used to describe noise from aircraft and aircraft servicing activities on the ground and any other noise generated on the ground as a result of the Airport's operation. The responsibility for noise control is divided between the Department for Transport (DfT) for airborne noise, and BAA Heathrow for all other sources.

The principal sources of ground noise are aircraft taxiing, engine testing, aircraft auxiliary power units (APUs) and other mobile equipment including ground power units (GPUs). Noise generated by the use of reverse thrust on landing is also included within the definition, although the Civil Aviation Authority (CAA) air noise contours also take account of reverse thrust.

As a condition for the approval of Terminal 4, restrictions were placed on the use of APUs, engine ground running and taxiing on certain areas around Terminal 4 at night. This is due to the Terminal's close proximity to some residential areas.

Reverse Thrust

Reverse thrust is one of the methods used by pilots to slow down an aircraft once it has landed and involves putting the power from the engines into reverse. For safety reasons pilots must be allowed to use their professional judgement when landing aircraft and there will be times when it is necessary to use reverse thrust, for example to increase the efficiency of braking, particularly in damp conditions, and to clear the runway as quickly as possible.

DfT instructions to pilots request that they avoid the use of reverse thrust between 11.30pm and 6.00am except for safety reasons. BAA Heathrow monitored the use of reverse thrust at night and concluded that these instructions were being followed.

Auxiliary Power Units (APUs)

Aircraft are equipped with an Auxiliary Power Unit known as the APU which is an electrical generator. The APU provides power on the ground for aircraft systems such as lighting, compressed air for engine starting, heating and air conditioning systems. The use of APUs not only generates exhaust emissions as they are fuelled by aviation fuel, but also creates ground noise. BAA Heathrow has agreed with airlines a set of durations that APUs are permitted to be used before departure and after arrival.

A management regime to ensure the use of FEGP has been introduced, which includes regular patrols and liaison with airlines.

Pre-Conditioned Air (PCA)

Whilst aircraft are parked on the ground they may need the air conditioning to continue operating, particularly during hot weather. In this case the APU needs to be kept running to supply the air conditioning. BAA Heathrow has trialled a system of Pre-Conditioned Air (PCA) supply which means that cooled air is piped directly onto the aircraft without the need to run the APU. Further research is being carried out into the various systems available and, where possible, PCA will be introduced on the stands adjacent to the terminals.

During the night period aircraft are requested not to use their APUs as they should not need air conditioning until shortly before their departure. The Noise & Track Keeping Working Group, which includes representatives from local authorities, receives reports of engine tests at night and discusses a wide range of noise issues including ground noise.

Ground Power Units (GPUs)

Ground Power Units are diesel fuelled generators which can be used to supply electrical power to aircraft whilst they are parked at the airport. They provide the electricity necessary to the aircraft whilst on the ground in order to eliminate the need for running the APU, particularly during the night period (11pm until 7am). Although this eliminates the noise caused by the APU, GPUs have been associated with ground noise in the past and still generate some exhaust emission.

Fixed Electrical Ground Power (FEGP)

To reduce the use of GPUs, Fixed Electrical Ground Power (FEGP) has been installed at Heathrow to provide power to aircraft whilst they are parked on stand at the terminals. FEGP can be compared to plugging into the mains and therefore removes the need for APUs or GPUs. Over 90% of passenger related stands now have FEGP available.

There may be times when it is not possible to use the FEGP as certain tests carried out on aircraft whilst on stand require the use of an APU. In the event that FEGP is not available then airlines must use the modern, quieter GPUs at night. However, if an airline continues to use a GPU when FEGP is available then the airline is liable to a fine.

Engine Testing

Engine testing is carried out by airlines after maintenance to comply with safety regulations. Some engine testing, associated with unplanned maintenance to remedy faults, is permitted at night.

During any one night, engine running is limited to 150 minutes in total with an additional limit of 60 minutes on the amount of high power testing. (Please note that the term "high power testing" is used to describe any engine testing where the engine power setting is above idle. Special enclosures, called ground run pens, are used to reduce the noise emissions and, at night (between 11pm and 7am), all tests in the maintenance area must take place in the pens. All engine runs at night, and high power engine runs during the day, must be approved by BAA Heathrow. The details of approved tests are recorded and the accuracy of the information is audited from time to time using microphones located in the maintenance area. Data is recorded and presented to the NTKWG and a summary of this information is illustrated in figures 28 and 29.

Figure 28 - Total Number of Night Time Engine Ground Runs

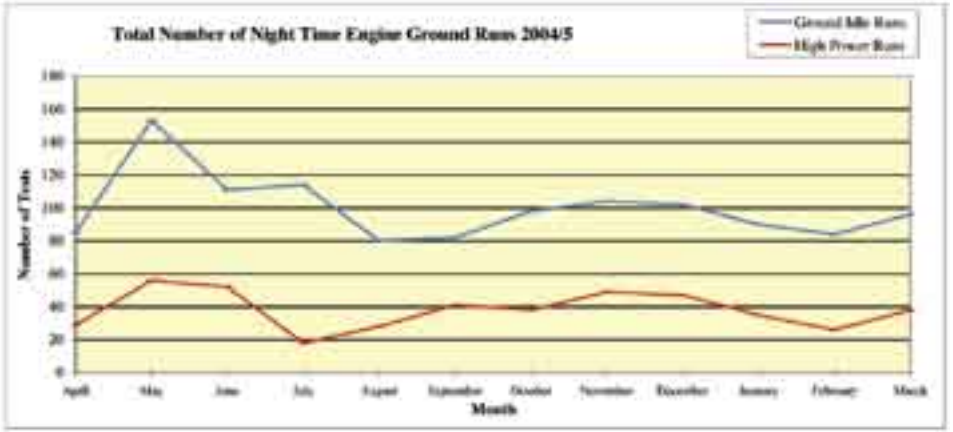
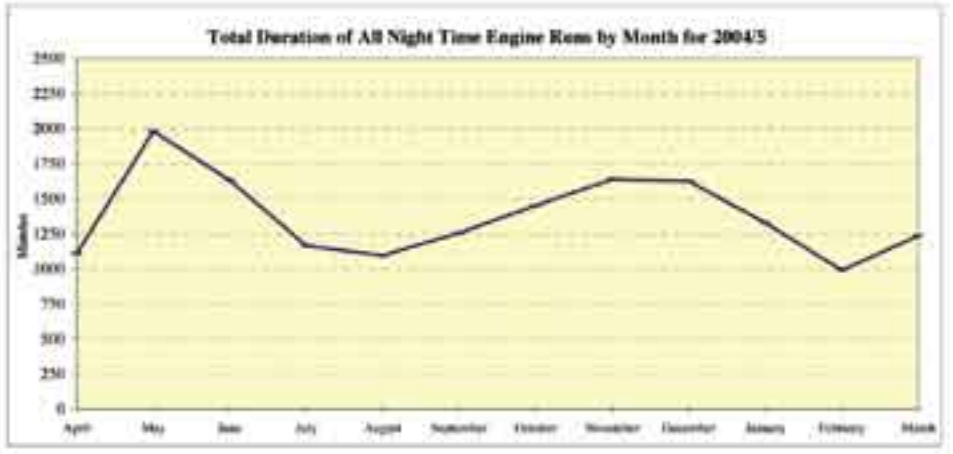


Figure 29 - Total Duration of All Night Time Engine Runs by Month



Chapter 6 - Night Flying Restrictions

The DfT is responsible for setting restrictions on the number and type of aircraft that are permitted to operate at Heathrow at night. This chapter explains the restrictions that are currently in force, and reports on how the restrictions have been utilised over this period.

The current night restrictions

There has never been a ban on night flights at Heathrow but since 1962 various restrictions have been imposed. In 1993 a scheme was introduced which took into consideration both the numbers of aircraft movements and the noise generated by each individual aircraft. The scheme was set for a period of 5 years, but in fact continued until the end of the Summer season 1999 due to an extended consultation process on the scheme which was to replace it.

The current regime applied from Winter 1999/00 through to the end of the summer 2004 season but, following consultation, was extended until 30 October 2005. In 2004/05 DfT is conducting a full review. Further details may be obtained from the DfT website. The limits are shown in Figure 30 (excluding any carry over or overrun):

Figure 30 - Night Flight Movement and Quota Limits by Season.

Season Limit	Movement Limit	Quota Points
Winter	2550	4140
Summer	3250	5610

The regime applies to a night period (2300 - 0700 hours) during which the noisiest types of aircraft (QC8 and QC16) may not be scheduled to land or take off.

In addition, between 2330 - 0600 hours (the night quota period) there are further restrictions - the number of aircraft movements are restricted by a movements limit and additionally there is a limit of noise quota points. These limits are set for each summer and winter season. Neither of these limits may be exceeded, ie if the movements limit were to be reached, no further movements would be able to take place even if quota points were still available, and vice versa.

The DfT restrictions allow aircraft up to and including QC4 to be scheduled to operate in the night quota period but Heathrow has a voluntary ban in place which does not allow QC4 aircraft to be scheduled during the night quota period.

The Quota Count system

Introduced in 1993 for the purpose of administering the night restrictions scheme, this was a unique system of aircraft noise classification. Since then it has been used in Madrid and Brussels. It is based on aircraft noise certification data. Aircraft are classified separately for landing and take-off. Each aircraft type is classified and awarded a quota count (QC) value depending on the amount of noise it generated under controlled certification conditions. The quieter the aircraft the smaller the QC value.

For the purposes of take-off, where the aircraft is certificated to the standards of Chapter 3, the noise classification is based on half the sum of the flyover and the sideline noise levels measured in EPNdB during the certification process at the aircraft's maximum take-off weight. Where the aircraft is certificated to Chapter 2 standards an additional 1.75 EPNdB is added.

For the purpose of landing, the noise classification of aircraft of both Chapter 2 and 3 standards is deemed to be the certificated approach noise level of the aircraft at its maximum certificated landing weight minus 9 EPNdB.

However, the phasing-out of Chapter 2 aircraft was completed in April 2002 and none are now scheduled to operate at Heathrow.

Aircraft are divided into six QC bands as shown in Figure 31.

Figure 31 - Quota Count EPNdB Bands

Certificated noise level EPNdB	Quota count
less than 90	0.5
90 to 92.9	1
93 to 95.9	2
96 to 98.9	4
99 to 101.9	8
greater than 101.9	16

QC8 and QC16 aircraft are not permitted to be scheduled between the hours of 23:00 and 07:00.

Exempt aircraft

Jet aircraft with a maximum certified weight less than 11,600 kg and propeller aircraft are exempt from both the movements limit and QC restrictions if their noise data is classified at less than 87 EPNdB.

Movement and noise quota limits

Movement and noise quota (QC) limits are set for each summer and winter season. Figures 32 and 33 show these limits including carry over (explained in more detail later in the paragraph headed end of season flexibility).

Figure 32 - Winter Season Movement and QC Limits (including carry over)

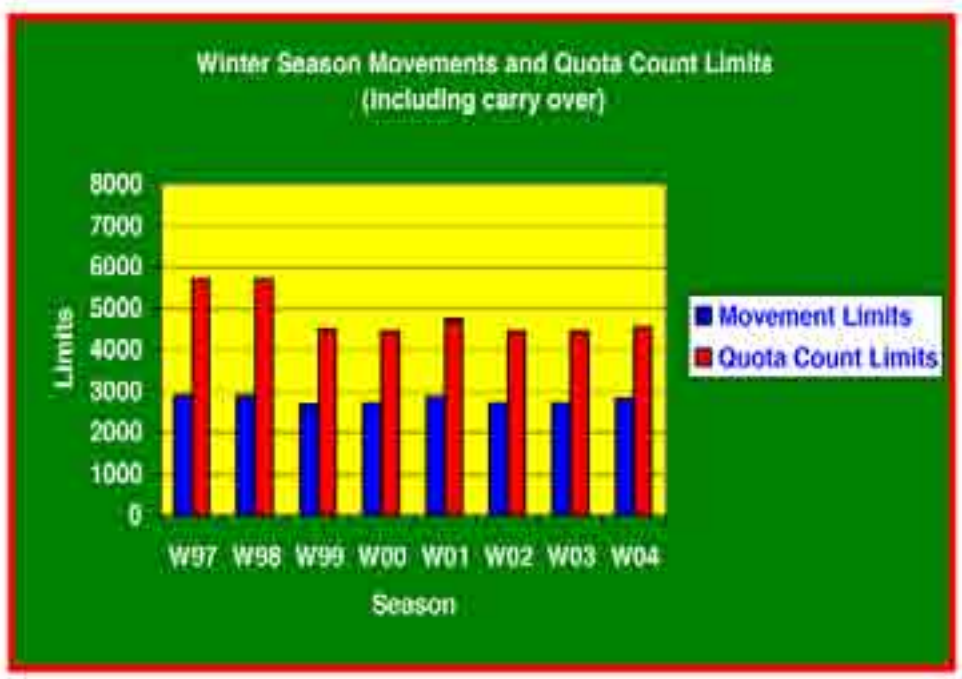


Figure 33 - Summer Season Movement and QC Limits (including carry over)

Dispensations

The Secretary of State for Transport has power to specify circumstances in which movements may be disregarded. Disregarded movements include emergencies, delays which are likely to lead to serious congestion at the airport or serious hardship or suffering to passengers or animals. There may also be delays which result from widespread and prolonged disruption of air traffic.

End of season flexibility

Night restrictions are set on a seasonal basis. In the previous scheme up to 10% of a seasons unused quota could be carried forward (known as "carry over") to the next season and up to 10% of a following season's quota could be anticipated if there was likely to be an overrun. At Heathrow there is often "carry over" from the summer season to the following winter season but rarely from the winter to the summer.

In the new scheme which has applied since the start of the winter season 1999/2000 the end of season flexibility has been reduced to 5%. However, where there are calendar reasons a higher rate of up to 10% is allowed. This may be the case when the increased number of flights associated with Easter falls within the winter season, or where the summer season lasts for longer than the normal 30 weeks.

Monitoring the use of the movement and noise quota limits

The monitoring and administration of aircraft operations at night is undertaken by the FEU. BAA Heathrow provides DfT, the Airport Consultative Committee, Airport Co-ordination Limited and selected airlines with information on night movements and quota usage on a regular basis.

Statistics

Figure 34 shows the number of night time movements in the winter seasons in relation to the movement limit for each of the individual seasons.

Figure 34 - Winter Seasons Movements Usage (including carry over)

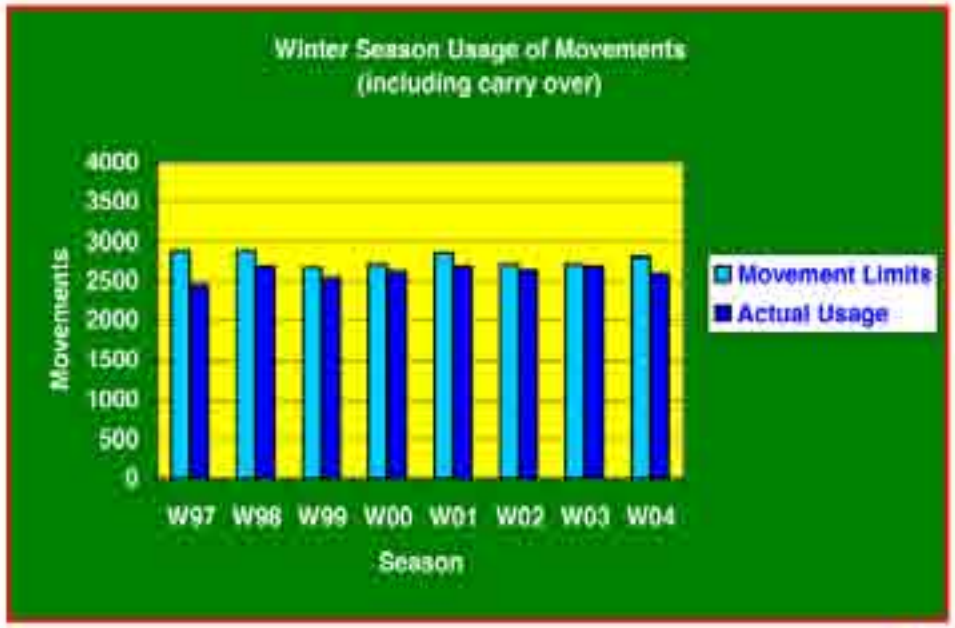


Figure 35 - Summer Seasons Movements Usage (including carry over)

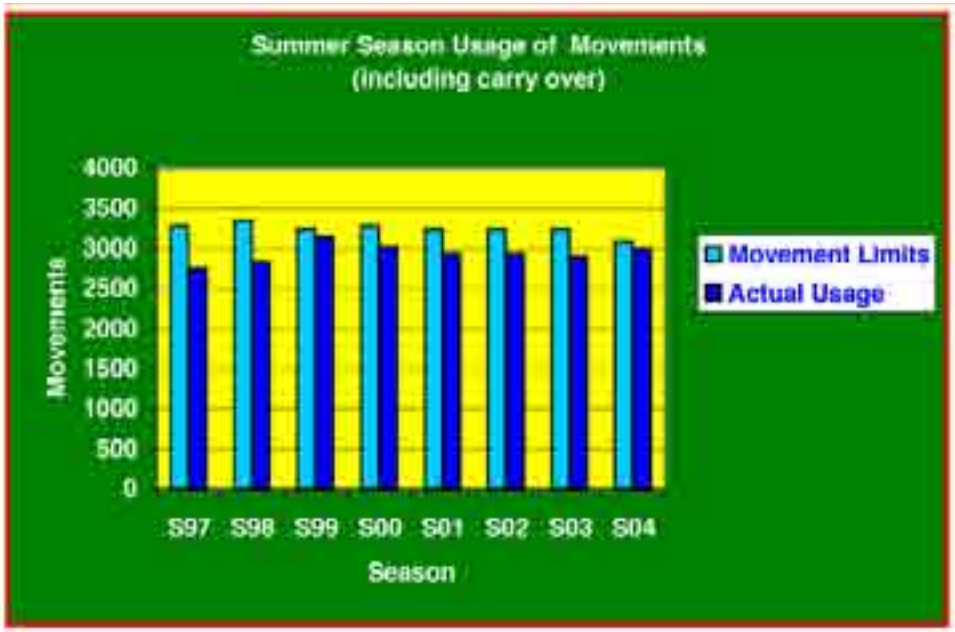


Figure 35 shows the number of night time movements in the summer seasons in relation to the movement limit for each of the individual seasons.

Figure 36 - Winter Seasons Points Usage (including carry over)

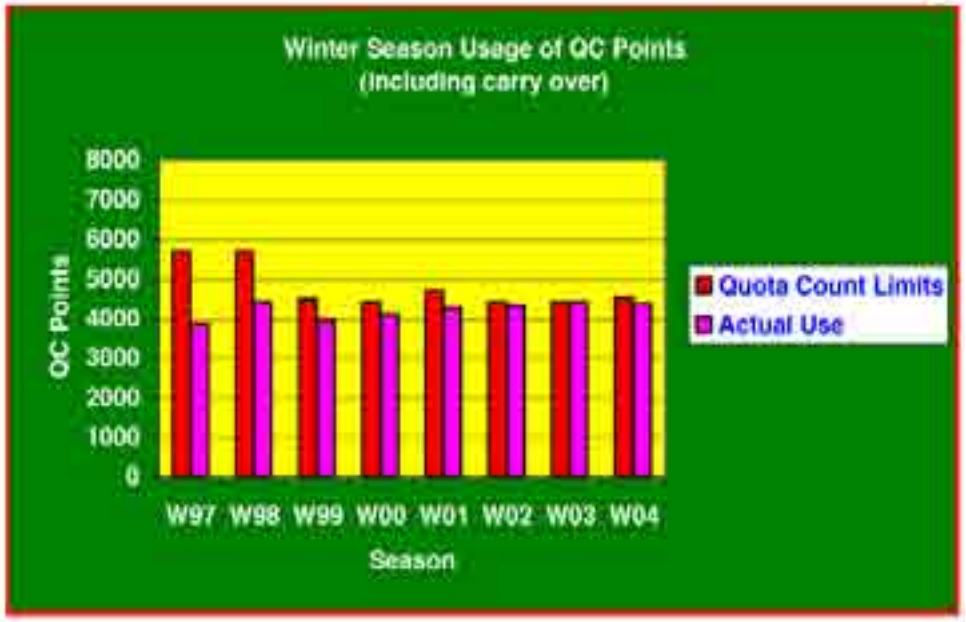


Figure 36 shows the number of QC points used in the winter seasons compared to the QC limit. It can be seen from this that since the DfT amended the quota point limit in winter 1999 the limit and usage have become much more closely aligned. This is also evident in Figure 37 since summer 2000.

Figure 37 - Summer Seasons Points Usage (including carry over)

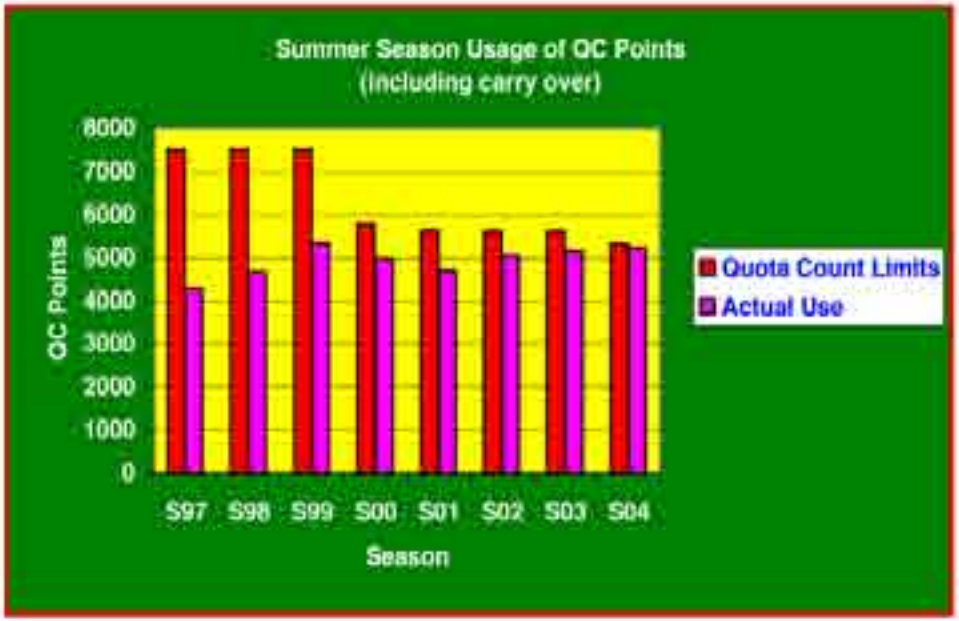


Figure 37 shows the number of QC points used in the summer seasons compared to the QC limit.

Figure 38 - Arrivals and Departures in the Night Restrictions Period

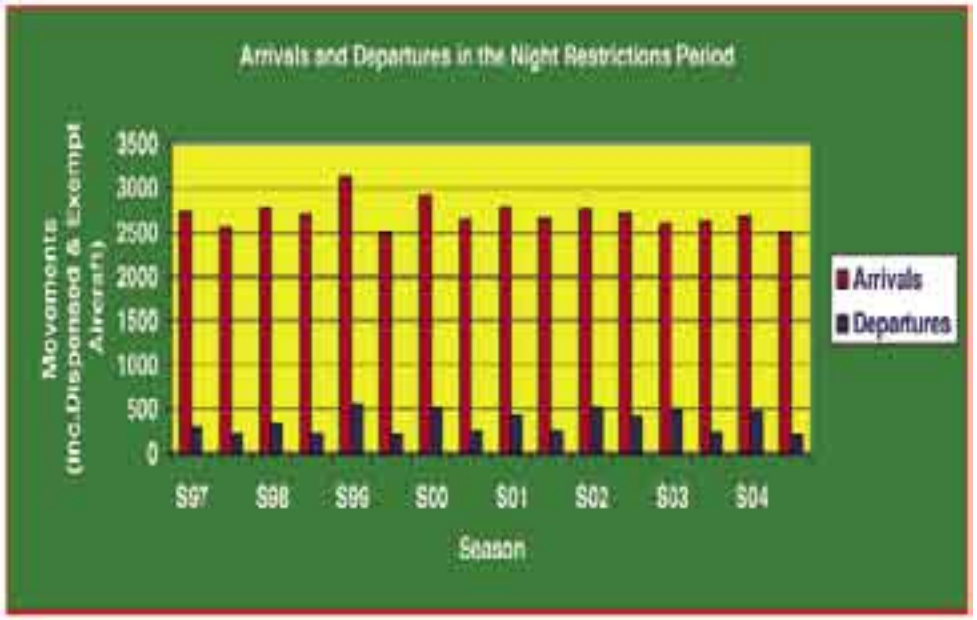


Figure 38 shows the number of arrivals and departures during the night restrictions period. On average, arrivals account for around 90% of the night time movements. Whilst there are fewer total movements in the winter than in the summer, the proportion of arrivals shows little variation from year to year or between the seasons.

Figures 39 and 40 show the number of QC points used by each of the QC categories of aircraft for the summer and winter seasons.

Figure 39 - Winter Points Usage by QC Category

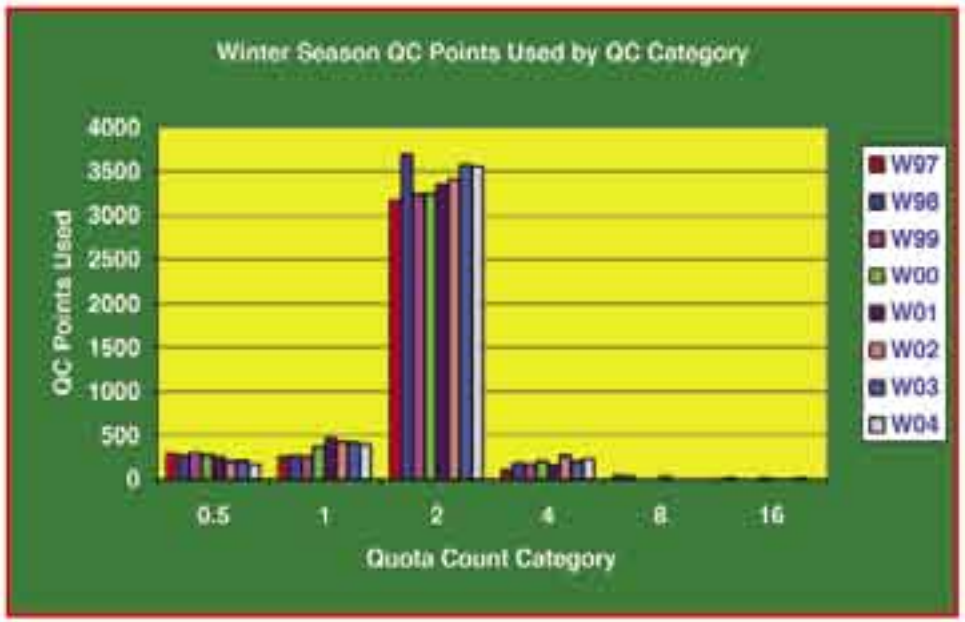


Figure 40 - Summer Points Usage by QC Category

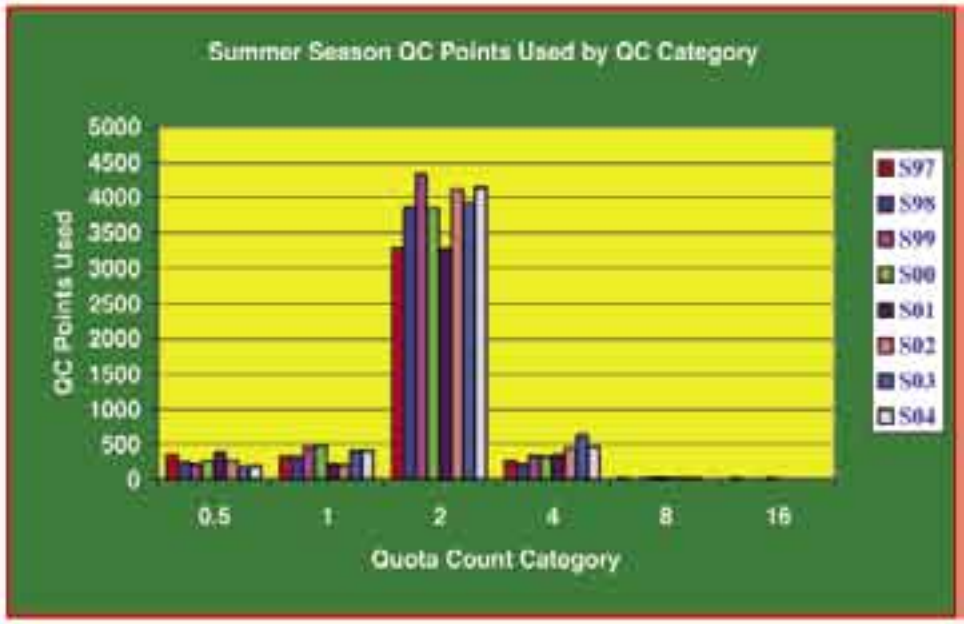
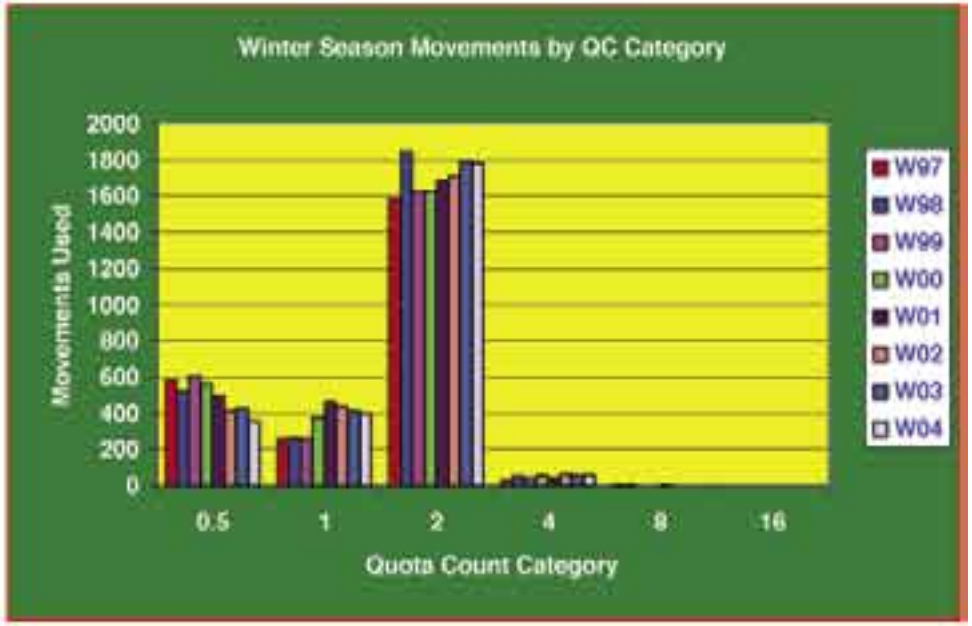


Figure 41 - Winter Movements Usage by QC Category



Figures 41 and 42 show the number of movements by each of the QC categories of aircraft for the summer and winter seasons.

Figure 42 - Summer Movements Usage by QC Category

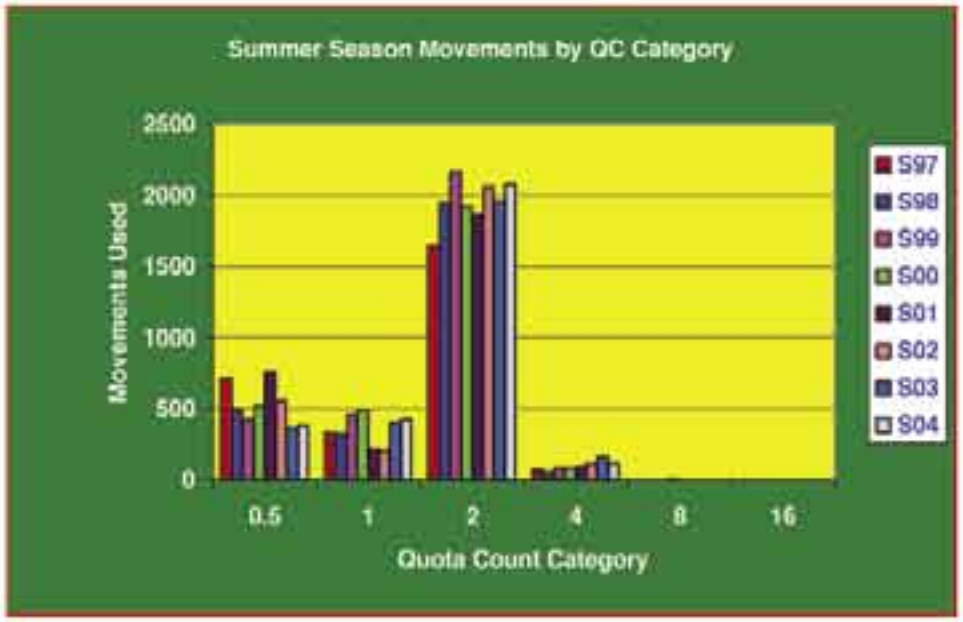
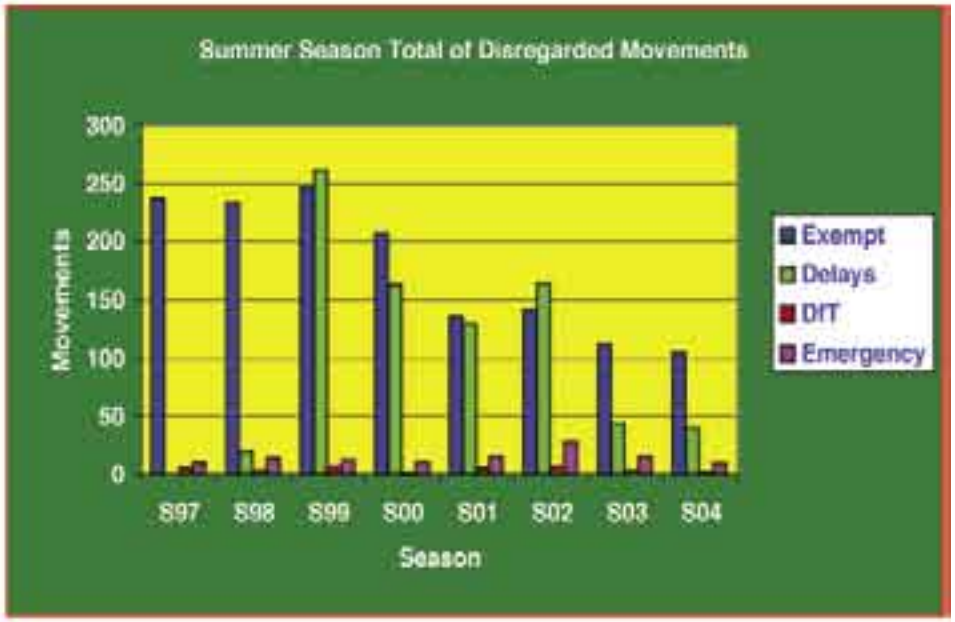


Figure 43 - Winter Disregarded Movements by Dispensation Category

Disregarded Movements

Figures 43 and 44 show the number of disregarded movements for the winter and summer seasons. These figures include movements by exempt aircraft (QC0) and those movements that were dispensed by the DfT under the terms previously explained.

Figure 44 - Summer Disregarded Movements by Dispensation Category



Chapter 7 - Complaint Handling

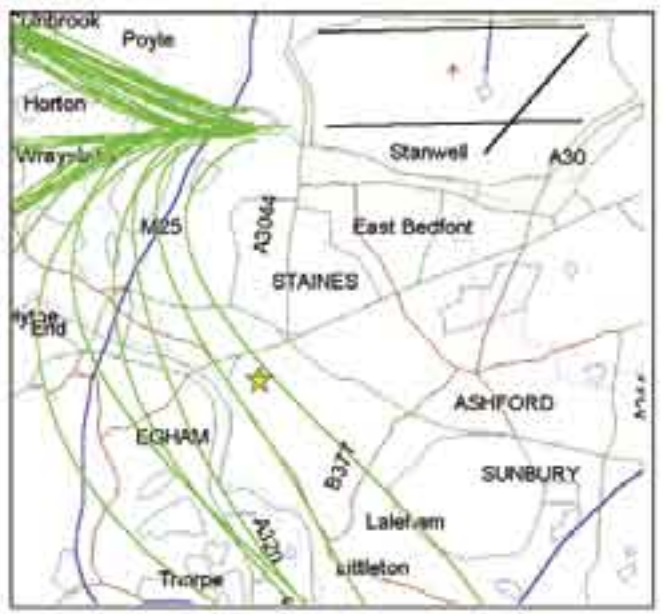
CONSULTATION AND COMMUNICATION

Complaint handling

BAA Heathrow took over responsibility for noise complaint handling in 1994. Prior to that, the DfT dealt with all complaints relating to aircraft noise. Since taking over this service, we have invested in, and regularly upgrade, state of the art equipment and resources to enable us to develop a high quality comprehensive information and complaint handling service to the public, offering:

- A specially trained team of Flight Evaluation Officers
- 24 hour 'freephone' line - 0800 344844 - answered by the FEU between 8.30am and 4.30pm Monday to Friday, with an answerphone service outside those times
- Individual complaint investigations using a dedicated complaints and enquiries handling system which receives data from a 'State of the art' Noise and Track Keeping (NTK) system known as GEMS
- To improve understanding, free demonstrations of the complaint and enquiry handling system which includes graphical displays of flight track details in relation to specific post code areas (see figure 45)
- Flightpath information for people moving into the Heathrow area
- A range of information sheets on Heathrow's operations

Figure 45 - Map illustrating Airviron postcode investigation capability.



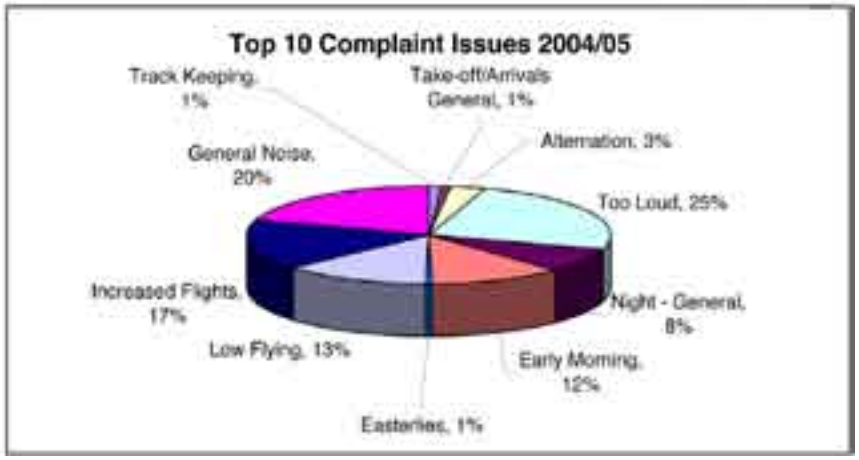
The Flight Evaluation Unit share their time between managing the freephone service, responding to complaints and enquiries, and working directly with airlines on a range of operational issues, such as monitoring track keeping performance, noise infringements and night quota usage.

All contacts, by whatever means, receive a response unless the person making contact specifically requests otherwise or the contact details are missing or indecipherable.

Issues and Concerns

Aircraft noise generally, particularly from night flights and concerns about increased numbers of flights, remains the top issue of concern for our neighbours. These, together with other areas of concern, are shown in Figure 46.

Fig 46 – Most Frequent Reported Complaint Issues



Complaint Trends

We report numbers and categories of complaints on the basis of what is reported to us, not on the results of subsequent investigations, since complainers have clearly been disturbed, regardless of whether the aircraft concerned is complying with the rules and regulations. For example, a resident may be disturbed by a departing aircraft which is correctly following the departure route (known as a Noise Preferential Route-NPR), or which has been directed off the NPR because it is no longer required to follow it, having reached 4000ft.

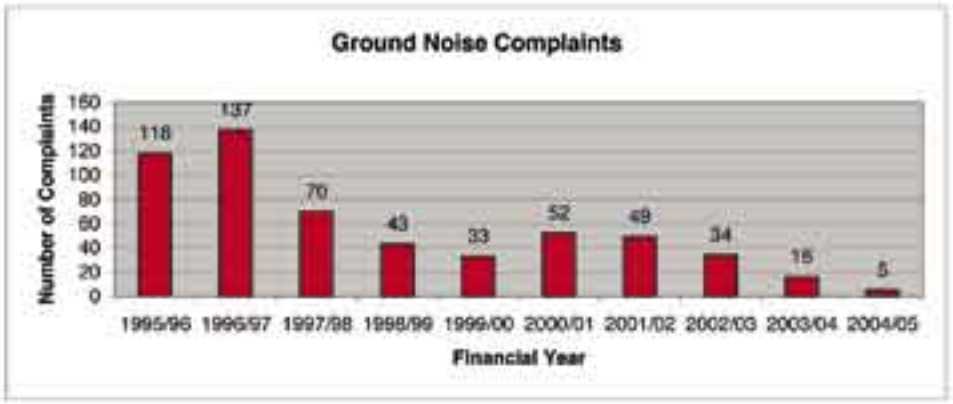
The number of complaints per year varies depending on a range of factors. There is no direct correlation between, for example, the number of movements and the number of complaints, particularly where any increase or decrease in movements is relatively small in percentage terms.

Factors affecting complaints include the direction of operation and increased awareness. The latter could be as a result of external factors such as public consultations involving airports, or specific Heathrow factors involving changes in the operation.

The direction of operation is determined by wind speed and direction. The length of time spent on easterly or westerly operations varies considerably particularly from month to month. On average it is 30-35% on easterly operations per year but has been between 20% and 40% in recent years.

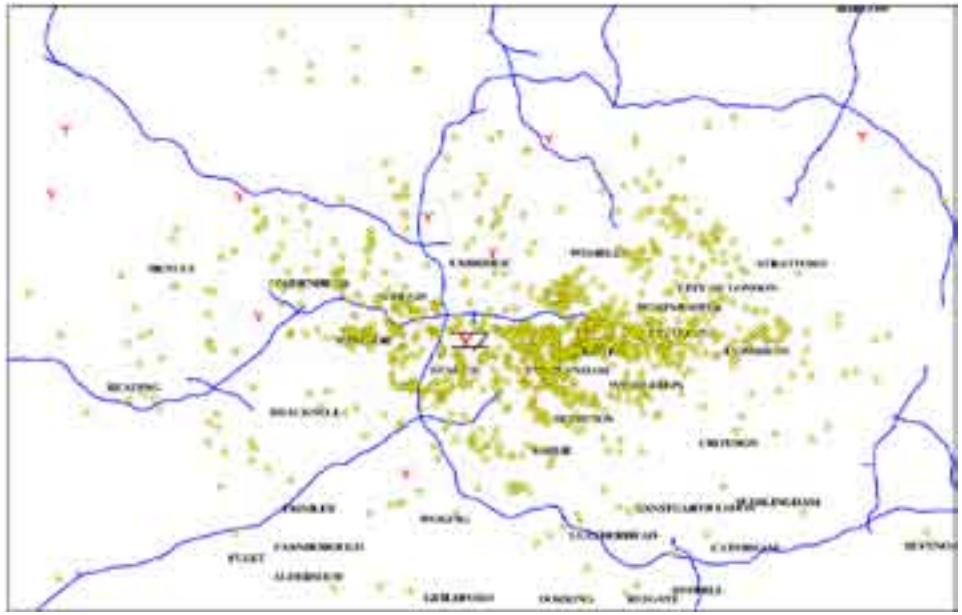
Complaint numbers overall have been declining over the last few years although there was an increase during the periods covered by the report for 2001/02 and 2002/03, as residents were experiencing some disruption to normal operating procedures. This was as a result of Heathrow's necessary work to resurface both runways and the Civil Aviation Authority's continuing programme to replace all the Instrument Landing Systems (ILS) and install Microwave Landing Systems (MLS) between 2001 and 2004. These works caused disruption in particular to Runway Alternation and the Cranford Agreement. As with the last Report (2003/04), this year the numbers have reduced again.

Figure 47 - Ground Noise Complaints



As normal, the majority of complaints from the local areas were received from residents living in the Richmond and Hounslow areas and concerned arriving aircraft on westerly operations. Figure 48 shows the post code location of complainants in 2004/05. Some complaints are received from outside the area covered by our noise and track keeping system and hence are not represented here.

Figure 48 - Complaint Post Codes Locations



We welcome enquiries from all members of the public. In 2004/05 1332 people contacted us to complain about a range of operational issues. The total number of complaints was 4077. The majority of these enquiries came from regular users of the service. This is illustrated by the fact that 33% of all complaints received this year came from just 5 people and 45% from 20 people. In addition to complainants, a further 511 people contacted us for information eg for studies or in connection with moving house.

Most of the measures to control noise have been in place at Heathrow for many years. Detailed information on these, and on how Heathrow operates, may be obtained from the Public Affairs Noise Complaints Freephone (0800 344 844) or by email: noise_complaints@baa.com.

ADDITIONAL INFORMATION

Websites

http:\\www.dft.gov.uk for information on Government policies in relation to Heathrow aircraft movements, i.e. night flights; changes to night-time use of Heathrows runways, etc.

noise_complaints@baa.com to raise any queries regarding Heathrow aircraft noise issues.

Useful Telephone Numbers

Public Affairs Noise Complaints Freephone - 0800 344 844
DfT - 0207 944 3536

Further Reading

Aircraft Operations Information - available from Public Affairs - Freephone 0800 344 844. E-Mail noise_complaints@baa.com

Sustainability Reports - This and other reports are available on the BAA Website -http:\\www.baa.com

BAA Website Noise Pages - www.baa.com/heathrowfeu
www.heathrowairport.com/noiseenquiries

Glossary of Terms

AAL	Above Aerodrome Level
Airviron	BAA Heathrow's system for receiving, recording and analysing air noise and track complaints.
ANMAC	Aircraft Noise Monitoring Advisory Committee
APU	Auxiliary Power Unit
ATC	Air Traffic Control
CAA	Civil Aviation Authority
CDA	Continuous Descent Approach
Chapter 2	Date of application for the certificate of airworthiness for the prototype is pre 6 October 1977
Chapter 3	Date of application for the certificate of airworthiness for the prototype is post 6 October 1977
dBA	A-weighted decibels
DfT	Department for Transport
ECAC	European Civil Aviation Conference
EMS	Environmental Management System
EPNdB	Effective Perceived Noise decibels
EU	European Union
FEGP	Fixed Electrical Ground Power
FEU	Flight Evaluation Unit
FLOPC	Flight Operations Performance Committee
GEMS	Global Environmental Management System
GIS	Geographical Information Systems
GPU	Ground Power Unit
HACC	Heathrow Airport Consultative Committee
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
LATCC	London Air Traffic Control Centre
Leq	Continuous equivalent noise level
nm	Nautical Miles
NATS	National Air Traffic Services
NPRs	Noise Preferential Routes
NTK	Noise and Track Keeping system
NTKWG	Noise and Track Keeping Working Group
PSSC	Passenger Services Sub Committee
PCA	Pre-conditioned Air.
QC	Quota Count
QNH	The barometic pressure at sea level (QFE is the barometic pressure at the areodrome)
SID	Standard Instrument Departure route

List of Figures