EXTRACT FROM SUBMISSION DATED 25 FEBRUARY 2008 FROM BRITISH AIRWAYS

2. Heathrow performance versus other airport hubs

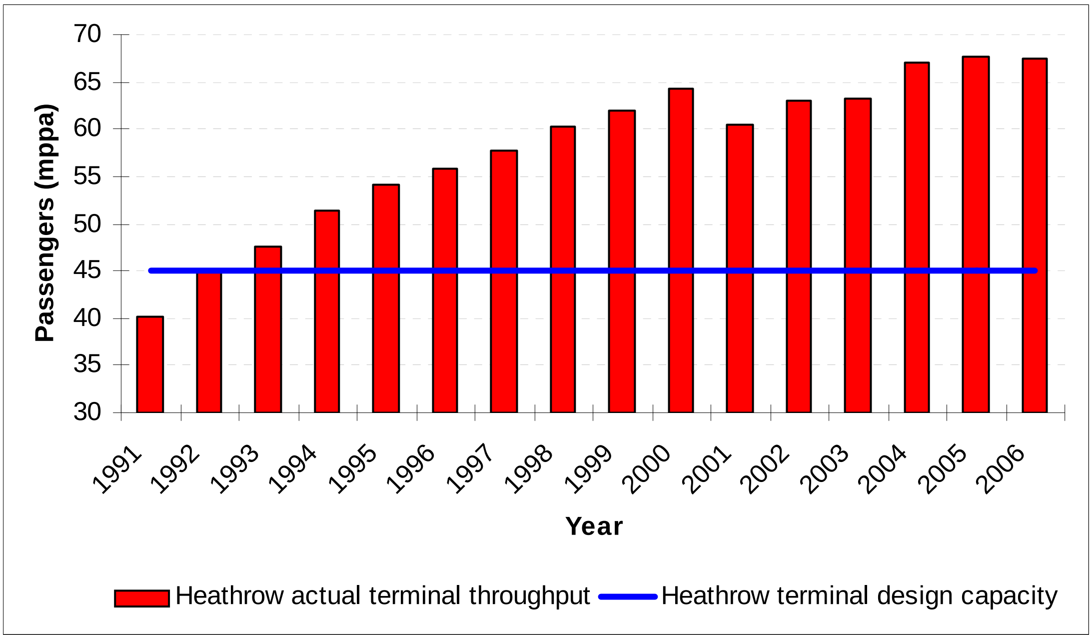
As a European hub airport Heathrow principally competes with Amsterdam, Frankfurt and Paris. However as a key part of Heathrow's market is for economically high-value transfer traffic it is also appropriate to compare Heathrow to other large worldwide hub airports such as Dubai, Hong Kong and Singapore. Areas in which these airports can be compared include infrastructure development, airport capacity, and delay management.

2.1 Infrastructure developments at airports since 1990

[✂] In this submission we add material on infrastructure developments undertaken by EU and worldwide hub airports during the period 1990–2007. This is to show the modest scale of historical investment at Heathrow compared with competitor airports.

In the period before Terminal 5 significant investment in Heathrow was not made whilst airports in the EU and worldwide embarked on large infrastructure developments as Table 2.1 shows. Excluding the overdue investment in Terminal 5 towards the end of the 1990-2007 period the infrastructure development at Heathrow was nowhere near the level of that at other European airports. Figure 2.1 shows how passenger numbers at Heathrow exceeded the 45mppa design capacity of the four terminals in 1992. Since 1992 there has been some investment to renew or upgrade infrastructure. However none of the infrastructure developments at Heathrow since 1992, added significantly to the terminal or runway capacity over the period preceding Terminal 5 (due to open on 27th March 2008). The increase in passenger volumes was met by increasing throughput in the already full and over-stretched terminals.

Figure 2.1
Heathrow's design capacity vs. actual terminal passengers 1991-2006



Source: BAA

Meanwhile Frankfurt and Paris both invested in new terminal capacity and Amsterdam substantially expanded its terminal capacity as well. Crucially though, bearing in mind the large increase in air traffic movements across Europe, both Paris and Amsterdam also invested in much-needed runway capacity, runways 4 and 5 respectively.

Table 2.1
Airport infrastructure developments since 1990
(Runway and terminal capacity increases shown in bold)

Airport	Infrastructure Developments
Europe	
Heathrow[1]	**1993 – T1 Pier 4A and Europier, shared with T2, open (stand increase)** 1994 – T1/2 Flight Connection Centre opens (no capacity increase) 2002 – New T1 Immigration Hall opens (no capacity increase) 2003 – T3 International Departures revamp (no capacity increase) **2008 – T5 opens (terminal capacity increases 30mppa)**
Amsterdam[2]	**1991 – Pier G opens** **1993 – West Wing of Schiphol Terminal opens** 2000 – Expanded Departure Lounge 2 opens **2003 – Runway 5 opens** 2004 – Extensions of Departure Lounge 1, Departure Hall 3 and Arrival Hall 4 completed **2005 – Pier H opens**
Frankfurt[3]	**1994 – T2 opens;** Sky-Line people mover opens **1997 – Pier D connecting T1 and T2 opens** **2000 – T1 Pier A extended by 500 metres**
Paris[4]	**1991 – T9 opens** **1993 – T2C opens** **1998 – Runway 4 opens** **2002 – T9 re-opens as T3 and doubles in size**
Worldwide	
Dubai[5]	**2000 – Sheikh Rashid Terminal opens** **2008 – T3 under construction and A380 runway enhancements underway**
Hong Kong[6]	**1998 – New international Hong Kong airport Kai-Tak opens** **1999 – North runway opens** **2007 – T2 opens**
Singapore[7]	1995 – T1 refurbishment completed **1996 – T2 expansion completed** **2006** – T2 refurbishment completed and **budget terminal opens** **2008 – T3 opens**

[1] See www.heathrowairport.com > Our business and community > Our history
[2] See www.schipholgroup.com/2006facts+figures.pdf
[3] See apps.fraport.de/fraportchronik/en/jsp/unt_chronik_banner.jsp
[4] See www.aeroportsdeparis.fr/adp/en-GB/groupe/presentation/histoire/de1982ANosJours
[5] See www.dubaiairport.com/dia/english/topmenu/about+dia/dia+and+history/
[6] See www.hongkongairport.com/eng/aboutus/key.html

It is runway capacity coupled with terminal infrastructure that crucially allows airlines to grow their businesses and to ensure that the airport runs smoothly and can operate robustly in times of disruption. Whilst BA welcomes the investment in T5 and in the proposed Heathrow East terminal this represents the airport playing “catch-up” with its EU competitor hubs. With Heathrow’s runways scheduled at 98.5% capacity[8] what is needed is more runway capacity. Frankfurt has just received planning permission to construct a fourth runway, which will be operational in 2011, and Paris is considering still further runway expansion.

It should be noted that Amsterdam, Frankfurt and Paris all face strong opposition against expansion from well organised environmental lobbyists which must be dealt with through the planning process. This is the same situation faced by BAA at the London airports, and claims that their slowness in expanding Heathrow due to planning and environmental difficulties, that are greater than at Amsterdam or Frankfurt, are not valid. BAA took eight years (1985-1993) to put in its Terminal 5 planning application after the 1985 White Paper identified the Perry Oaks site for urgent release to the airport for development.

Currently the Heathrow East terminal development is slipping back towards 2013 and the earliest that Runway 3 and the associated Terminal 6 could be built will by 2018, ten years from now.

Comparing Heathrow to other airports worldwide also shows up the lack of infrastructure investment at the airport. Hong Kong has opened a new airport and added terminal capacity to it; Singapore has similarly invested in terminal capacity. Both of these airports do not operate at full runway capacity as Heathrow does and so do not require runway investment at present. Dubai International has similarly expanded its terminal capacity with the Sheikh Rashid terminal. The proposed Dubai World Central airport at Jebel Ali will have 6 runways and be larger than Heathrow and Chicago O’Hare combined. World Central will represent a huge challenge to Heathrow transfer traffic between North America and South Asia and is due to be operational by 2016 - at least two years before Heathrow’s new runway could become operational.

2.2 Hub airport capacities today

Table 2.2 outlines the current capacities, networks and minimum connecting times of hub airports today.

Although Heathrow looks successful in terms of the number of passengers using the airport this is due to the airport being scheduled to 98.5% of its runway capacity. Also because of the capacity constraints at the airport the short haul operation has been squeezed out so a higher percentage of long haul aircraft have been operating, with higher passenger loads, than at other airports. Amsterdam, Frankfurt and Paris are at 70%, 73.5% and 74.2% capacity respectively.[9] This means that these airports are better equipped to deal with disruption (see section 2.3) and can offer a more robust operation for economically valuable transfer passengers.

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[7] See www.changiairport.com/changi/en/about_us/history_changi.html
[8] See figure 31 of the DfT’s “Improving the air passenger experience” dated November 2007.
[9] See figure 31 of the DfT’s “Improving the air passenger experience” dated November 2007.

Table 2.2
Hub airport capacities, networks and minimum connecting times

Airport	Term-inals	Run-ways	Passenger Numbers (2006)	ATM's (2006)	Network Dest-inations	Minimum Connecting Times
Europe						
Heathrow	4	2	67.5m	477,000	180	90 mins
Amsterdam	1	5	46.0m	423,000	222	50 mins
Frankfurt	2	3	52.8m	489,406	262	45 mins
Paris	3	4	56.8m	541,566	223	60 mins
Worldwide						
Dubai	2	1	28.7m	237,258	205	75 mins
Hong Kong	2	2	44.4m	295,580	150+	60 mins
Singapore	3	3	35.0m	214,000	185	60 mins

Source: DfT and airport websites

The minimum connecting time that hub airports offer to their transfer passengers is a reflection of the service quality offered to passengers. Amsterdam and Frankfurt can offer connection times of less than one hour, where Paris, Hong Kong and Singapore can offer 60-minute connection times. Currently Heathrow's under-invested infrastructure can only offer connection times of 90-minutes. Although the opening of Terminal 5 will allow for a 60-minute minimum connecting time for intra-terminal transfers there will be no airport-wide improvement to the inter-terminal minimum connecting times until after the automated inter-terminal transfer baggage system has linked Terminal 5 to Terminal 3 in 2011, and to Terminal 1, Heathrow East terminal and Terminal 4 in 2012/13. This demonstrates the direct correlation between infrastructure development and investment and the ability of airlines to compete with each other. Heathrow airlines are at a competitive disadvantage with Amsterdam, Frankfurt and Paris. This Heathrow investment has already been deferred by five years (from 2003 to 2008) and has been opposed at various stages by the Star Alliance airlines – whose main base is at Frankfurt where such infrastructure is already built.

2.4 Delays at Heathrow

Due to Heathrow being scheduled at 98.5% capacity the ability of the airport to deal with delays is severely compromised. When compared to the other major EU hub airports at Amsterdam, Frankfurt and Paris the performance of Heathrow on both departure and arrival delays is worse. Tables 2.3 and 2.4 give further background to Heathrow's delays versus other European airports [✂].

In both cases out of the four major EU hub airports Heathrow has the worst performance, coupled with Paris for departures. Heathrow's departure delays are 14% greater than Amsterdam and 28% greater than Frankfurt. Heathrow's arrivals delays are 24% greater than Amsterdam, 33% greater than Frankfurt and 35% greater than Paris.

Table 2.3
Top 50 most delayed departure airports

Rank	Airport	Average Delay per Movement	Compared with 2005	Rank	Airport	Average Delay per Movement	Compared with 2005
1	London LTN	17.8	26%	26	Las Palmas	13.1	4%
2	Warsaw	16.8	22%	27	Frankfurt	12.6	22%
3	Milan MXP	16.6	10%	28	Edinburgh	12.4	1%
4	London STN	16.6	30%	29	Glasgow	12.3	31%
5	London LGW	16.4	26%	30	Venice	12.1	-19%
6	Dublin	16.3	15%	31	Prague	12.0	-13%
7	Madrid	16.1	14%	32	Birmingham	11.8	5%
8	London LHR	16.1	19%	33	Bologna	11.8	9%
9	Paris CDG	15.8	12%	34	Valencia	11.6	14%
10	Istanbul	14.9	-22%	35	Geneva	11.5	-2%
11	Bristol	14.9	19%	36	Paris ORY	11.3	11%
12	Rome	14.8	-10%	37	Oslo	11.2	22%
13	Naples	14.4	-7%	38	Marseille	11.1	34%
14	Alicante	14.2	11%	39	Torino	11.0	-22%
15	Lisbon	14.1	43%	40	Budapest	10.9	-14%
16	Malaga	14.1	11%	41	Zurich	10.8	-3%
17	Amsterdam	14.1	0%	42	Brussels	10.5	5%
18	Barcelona	14.0	5%	43	Munich	10.3	0%
19	Belfast A'gve	13.4	-1%	44	Toulouse	10.2	33%
20	Palma	13.4	13%	45	Helsinki	10.1	31%
21	Manchester	13.3	7%	46	Milan LIN	10.1	-34%
22	Newcastle	13.2	8%	47	Gotenborg	9.8	16%
23	Copenhagen	13.2	45%	48	Vienna	9.7	-18%
24	Nice	13.2	12%	49	Athens	9.6	15%
25	London City	13.1	2%	50	Basle	9.5	43%

Source: Eurocontrol Central Office for Delay Analysis Annual report 2006

Table 2.4
Top 50 most delayed arrival airports

Rank	Airport	Average Delay per Movement	Compared with 2005	Rank	Airport	Average Delay per Movement	Compared with 2005
1	Istanbul	19.0	-21%	26	Frankfurt	12.1	20%
2	London LTN	18.0	34%	27	Amsterdam	12.0	-1%
3	London LGW	17.3	12%	28	Paris CDG	11.9	8%
4	Madrid	16.6	21%	29	Palma	11.7	26%
5	Torino	16.5	53%	30	Geneva	11.7	0%
6	Dublin	16.2	33%	31	Edinburgh	11.7	7%
7	London LHR	16.1	10%	32	Nice	11.7	14%
8	Las Palmas	15.4	14%	33	Prague	11.7	-12%
9	Manchester	15.1	18%	34	Milan LIN	11.5	19%
10	Warsaw	15.1	16%	35	Bilbao	11.4	22%
11	Bologna	14.7	29%	36	Marseille	11.4	44%
12	Lisbon	14.4	26%	37	Venice	11.2	7%
13	Newcastle	14.2	9%	38	Gotenborg	11.1	26%
14	Alicante	13.8	22%	39	Birmingham	10.9	-1%
15	London STN	13.8	22%	40	Brussels	10.8	5%
16	Rome	13.6	25%	41	Basle	10.8	35%
17	Milan MXP	13.5	18%	42	Athens	10.1	17%
18	Malaga	13.4	25%	43	Stockholm	9.9	29%
19	Belfast A'gve	13.1	20%	44	Paris ORY	9.7	30%
20	Barcelona	12.8	-2%	45	Hanover	9.7	6%
21	Glasgow	12.4	24%	46	Toulouse	9.7	23%
22	Bristol	12.4	12%	47	London City	9.5	20%
23	Naples	12.3	17%	48	Helsinki	9.3	20%
24	Copenhagen	12.3	23%	49	Budapest	9.3	-19%
25	Valencia	12.2	9%	50	Berlin TXL	9.3	13%

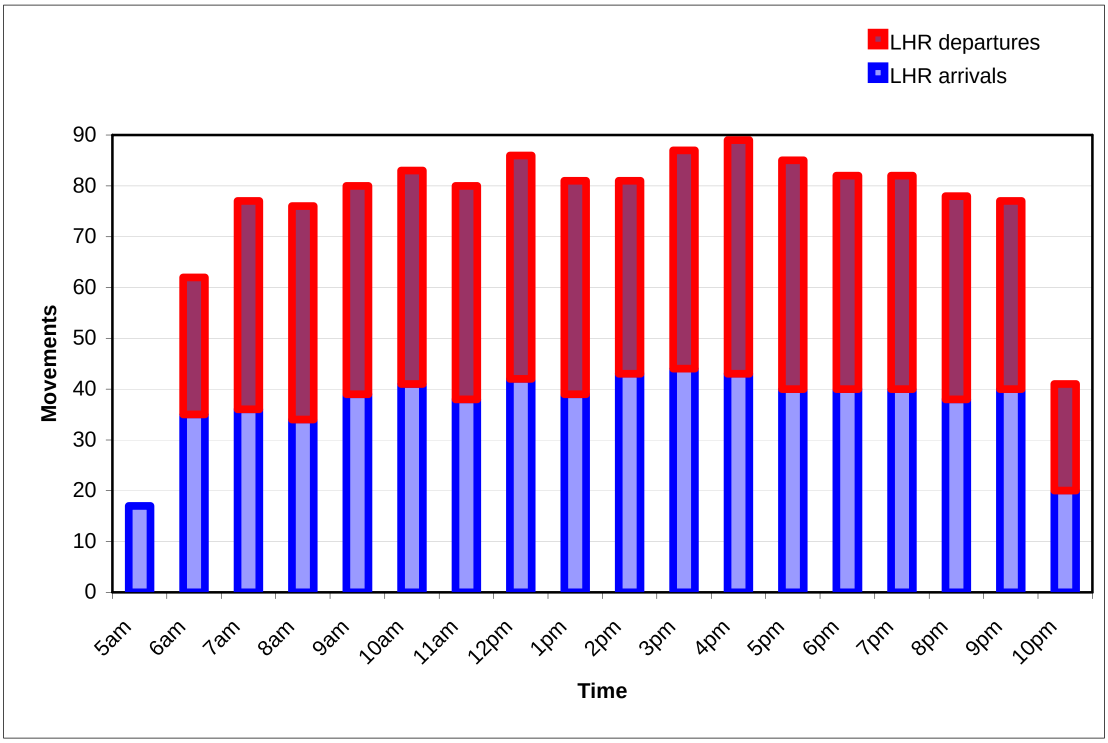
Source: Eurocontrol Central Office for Delay Analysis Annual report 2006

Both Paris and Frankfurt have more air traffic movements than Heathrow but they suffer less significant delays because with 4 and 3 runways respectively they have the capacity to deal with significant disruption. Heathrow on the other hand, with its two runways operating in segregated mode (i.e. one runway for departures and one runway for arrivals), struggles to cope with significant operational disruption.

Figures 2.2 – 2.5 show the extent to which Heathrow, Amsterdam, Frankfurt and Paris are scheduled for both arrivals and departures on a daily basis. The key to understanding how an airport deals with departure and arrival delays is how the airport is able to recover from disruption during the operational day. If delays are incurred the schedule needs to have periods of contingency built into it, or extra runway capacity, so that flights delayed can be recovered before the airport returns to full capacity operations. Figure 2.2 shows how Heathrow is scheduled to 98.5% capacity on a daily basis with a fairly even split of departures and arrivals, reflecting the segregated mode of operation the airport uses for its two runways. From 7am to 9pm there is nearly, or over, 80 movements per hour. As there is little or no contingency built into the schedule Heathrow struggles to deal effectively with operational disruption including high winds and fog. Once delays are incurred they inevitably spill over into the rest of the operational day with the knock-on effect leading to increased delays and cancellations.

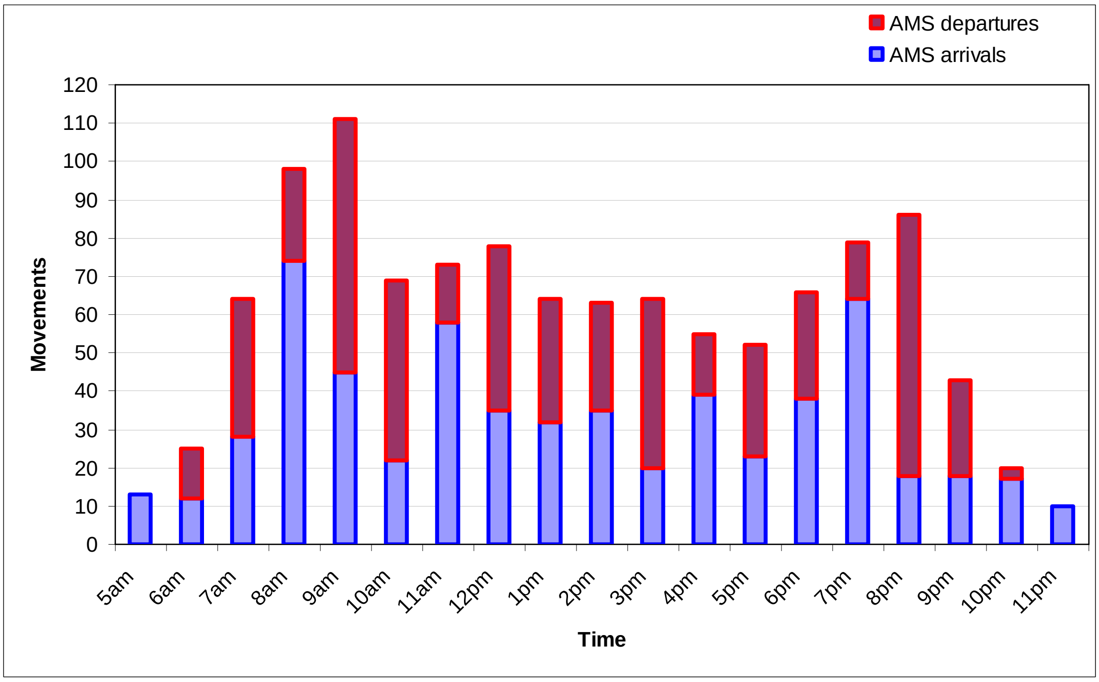
This demonstrates the urgent and long overdue need for additional runway capacity. At many other airports, including Manchester in the UK, capacity is expanded in time to meet the demand. At Amsterdam, Frankfurt and Paris CDG there is wide variation in the split of arrivals and departures per hour and in the number of movements per hour. This gives them an opportunity for growth and an ability to recover from operational disruption.

Figure 2.2
Heathrow runway movement capacity – arrivals & departures
Winter Season 2007



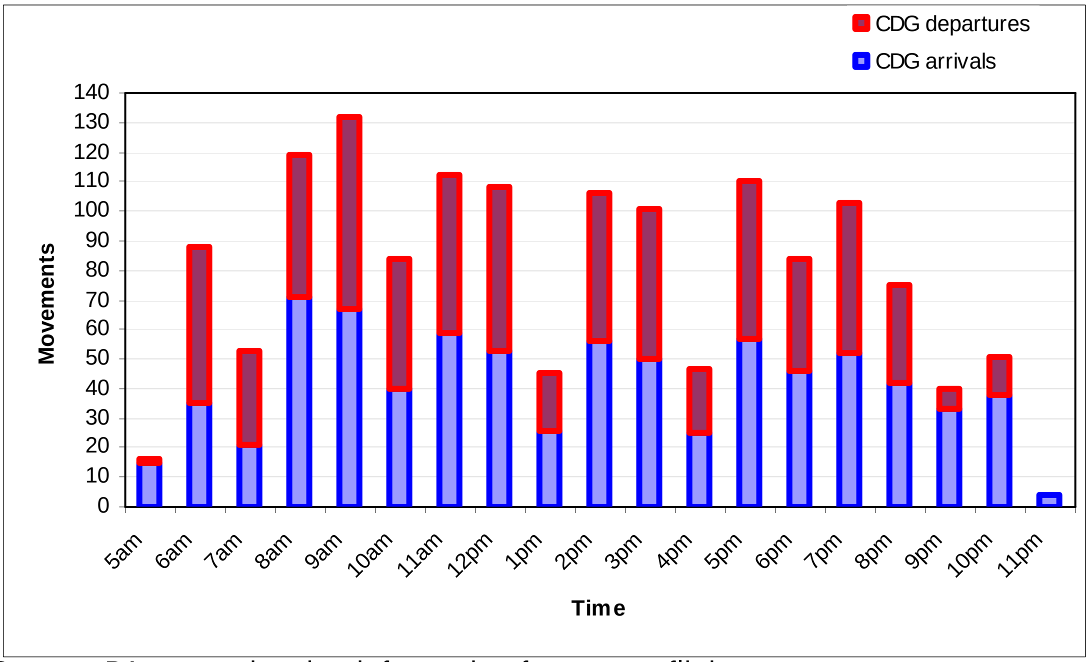
Source: DfT "Improving the Air Passenger Experience" (November 2007)

Figure 2.3
Amsterdam movement rate per hour – 12th February 2008



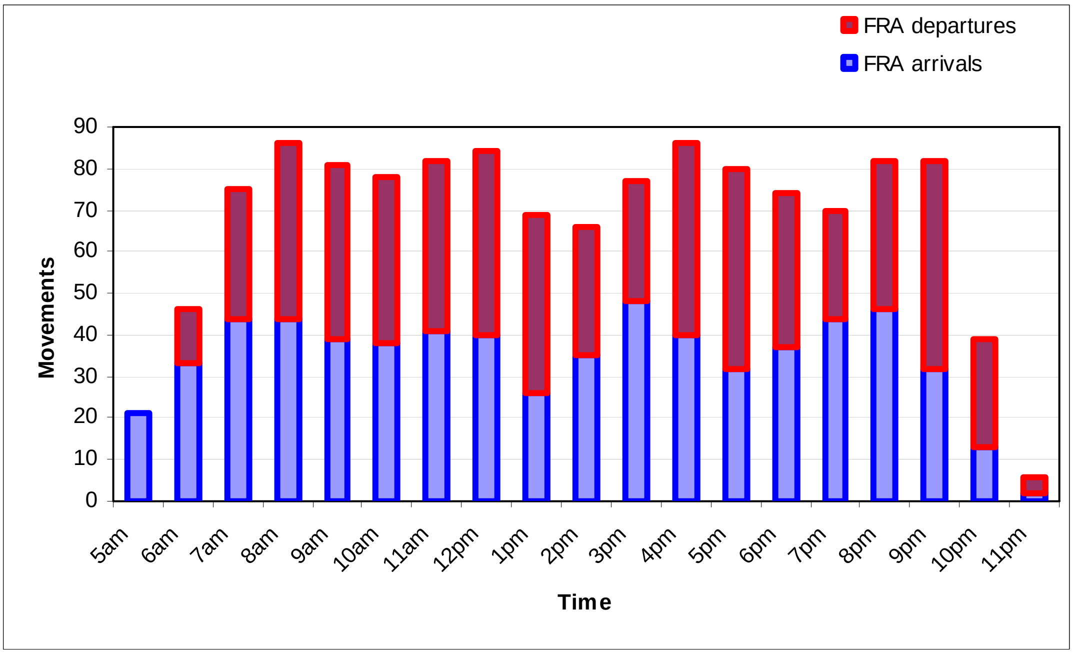
Source: BA research using information from www.flightstats.com

Figure 2.4
Paris CDG movement rate per hour – 12th February 2008



Source: BA research using information from www.flightstats.com

Figure 2.5
Frankfurt movement rate per hour – 12th February 2008



Source: BA research using information from www.flightstats.com

Figure 2.3 shows that Amsterdam peaks at over 100 ATM's between 9-10am and for the rest of the day operates significantly below this limit. With 5 runways the airport is well placed to deal with any operational disruption and this is reflected in the low minimum connecting time in Table 2.2 of 50 minutes.

Likewise Figure 2.4 shows a similar situation to Amsterdam at Paris CDG. The airport's 4 runways give it plenty of capacity to deal with disruption and so allows the flexibility for aircraft to arrive late and for operational disruption to be recovered more quickly.

Figure 2.5 shows the situation at Frankfurt that is more akin in the morning to that of Heathrow. However the ability of the airport to flex the sequence of arrivals and departures on its three runways has allowed them to deliberately build in contingency to the scheduled operation of the airport. The first peak wave of movements takes place from 8am to mid-day. Then from mid-day to 3pm there is a quieter period allowing time for any disruption to be recovered. Then there is a second, shorter, peak wave from 3pm to 6pm with another break until 8pm leading to the final peak wave of movements from 8pm to 10pm. This system of waves followed by breaks to enable operational recovery allows Frankfurt to offer a much more robust operation than Heathrow can, being scheduled to 98.5% of its capacity every day. In addition to this Frankfurt has applied for and received planning permission for a fourth runway which will be operational by 2011, further increasing their runway capacity and operational resilience.