Final report for publication

Dublin airport bottom-up efficiency study

Dublin
25th May 2005

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The report states a number of assumptions made during our analysis. While we have no reason to believe any of these assumptions are unreasonable, we note that if any prove incorrect, actual results could vary from those we have projected.

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Introduction

- Background to the determination
- Scope of the review
- Methodology and underlying assumptions

The CAR is undertaking the second determination of maximum charges at Dublin Airport in the context of amendments to the Aviation Regulation Act and the break-up of the Aer Rianta Group

- The CAR has carried out a consultation on the implications of the amendments to the 2001 Act, and reported on its conclusions
- CAR concluded that
  - the changes to the legislation do not require any substantial changes to its approach to the regulation of airport charges
  - the CAR must enable DAA to operate and develop in a sustainable and financially viable manner, but that is not the same thing as making it certain
  - the emphasis on economic efficiency has been strengthened
  - the price cap and single till approach are still appropriate
- The CAR has contracted Booz Allen Hamilton (BAH) to perform a review of the operating efficiency of DAA
  - to identify the efficient cost which can be included in the CAR's determination

(1) the objectives of the Commission are as follows –

(a) to facilitate the efficient and economic development and operation of Dublin Airport which meet the requirements of current and prospective users of Dublin Airport,

(b) to protect the reasonable interests of current and prospective users of Dublin Airport in relation to Dublin Airport, and

(c) to enable Dublin Airport Authority to operate and develop Dublin Airport in a sustainable and financially viable manner

Learning lessons from the previous determination, a revised approach is being taken to set the maximum level of charges

- There are difficulties applying the high-level, or top-down, benchmarking metrics, e.g. cost per workload unit (WLU), to compare Dublin Airport with other airports:
  - airports have evolved different physical architectures which drive their reasonable costs of operation
  - the service portfolios included in recorded accounting costs vary significantly from airport-to-airport
  - airports legitimately provide different qualities of service tailored to their customer groups, which affect cost (e.g. comfort and spaciousness, operating capacity to minimise delays, etc.)
  - costs grow substantially less than proportionately to output in work load unit (WLU) (i.e. there are considerable economies of scale at airports)
  - selection of a suitable peer group for comparison is subjective and open to challenge

- This study is therefore looking in detail at the services provided by Dublin airport, and assessing whether those services are being provided efficiently *in an operational sense*, both:
  - in terms of the efficiency of the method of delivery of the service, and
  - in terms of the efficiency of the service actually delivered to the airport user

A number of airport-related functions are included in the determination whereas others are either regulated elsewhere or not regulated at all

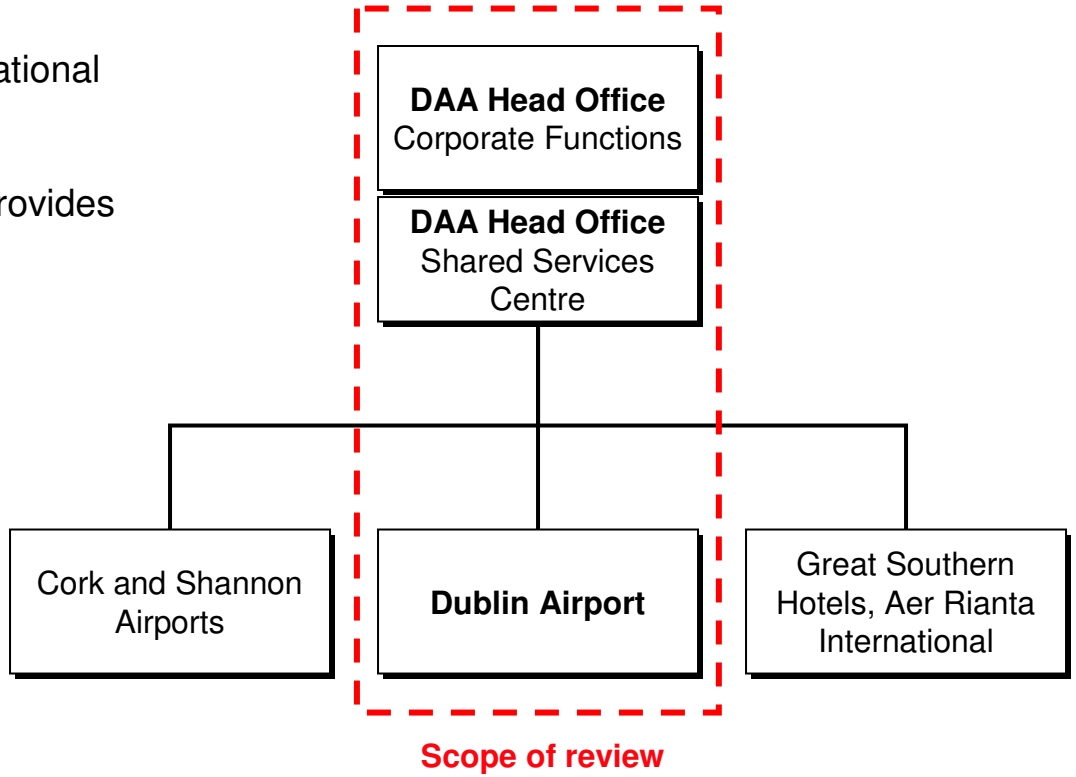
- Landing and passenger charges are included in the maximum price per passenger, which is directly regulated by the CAR
- Other services provided by the airport are not directly regulated, but indirectly taken account of through the “single till”: income from these is taken into account in setting the regulated charge. This covers:
  - check-in desk rental
  - rental of office space, operational space, hospitality lounges
  - charges to ground-handlers and other on-airport firms
  - income from car parks and retail concessions, etc.
- Charges by ground handling and apron services are not covered by the review; these are provided by a competitive market
- Aeronautical charges recovered by the Irish Aviation Authority (IAA) are not covered by this review

Introduction

- Background to the determination
- Scope of the review
- Methodology and underlying assumptions

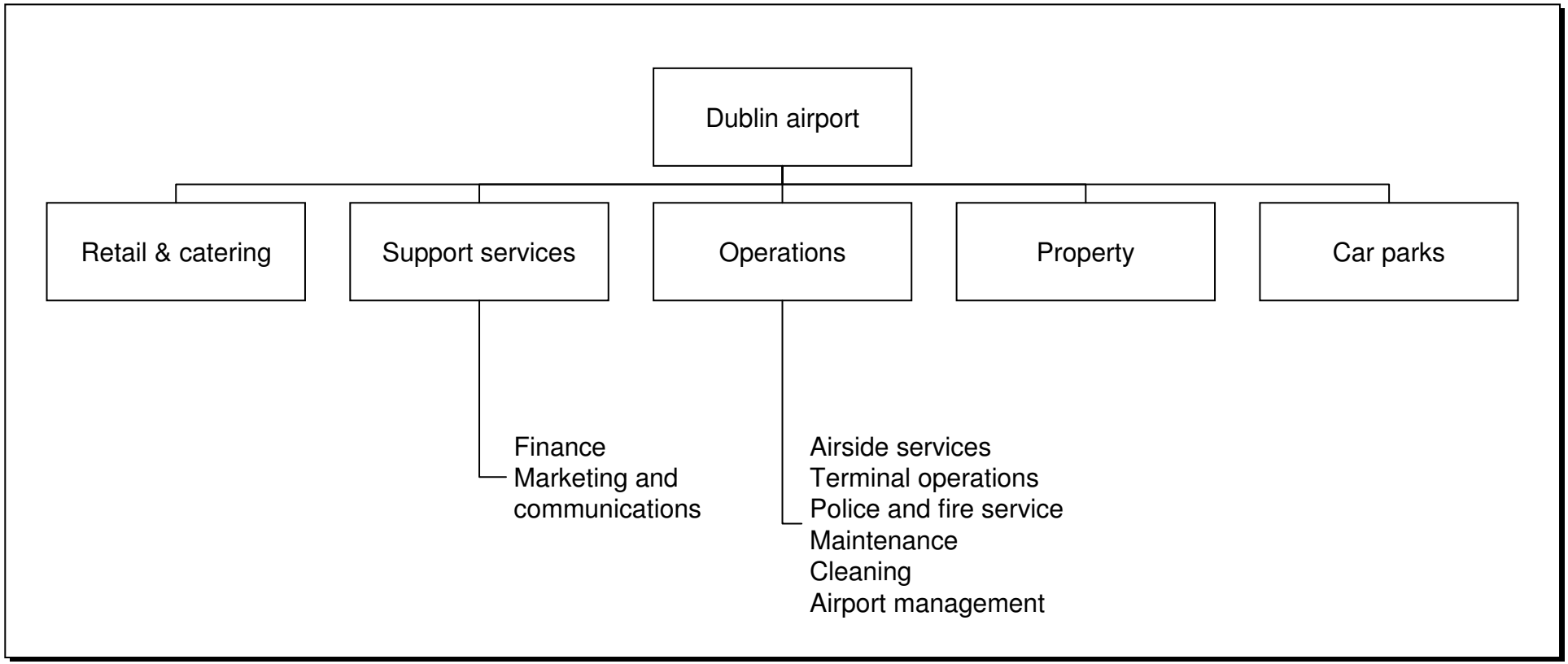
The project is focused specifically on operational cost efficiency at Dublin Airport, i.e. only operating expenditure (OPEX) has been analysed

- Cork, Shannon, GSH and Aer Rianta International (ARI) activities are excluded
- Dublin Airport Authority (DAA) head office provides shared services to its subsidiaries, a large proportion (approx 78%) of whose costs are allocated to Dublin Airport, comprising:
  - Corporate services
  - Finance
  - Human resources
  - Procurement
  - Group planning
  - Property
  - Aviation security
  - Operations and aviation standards
  - Retail contribution



Capacity and the impact of capital expenditure (CAPEX) are being addressed in a parallel study, to be completed later in 2005

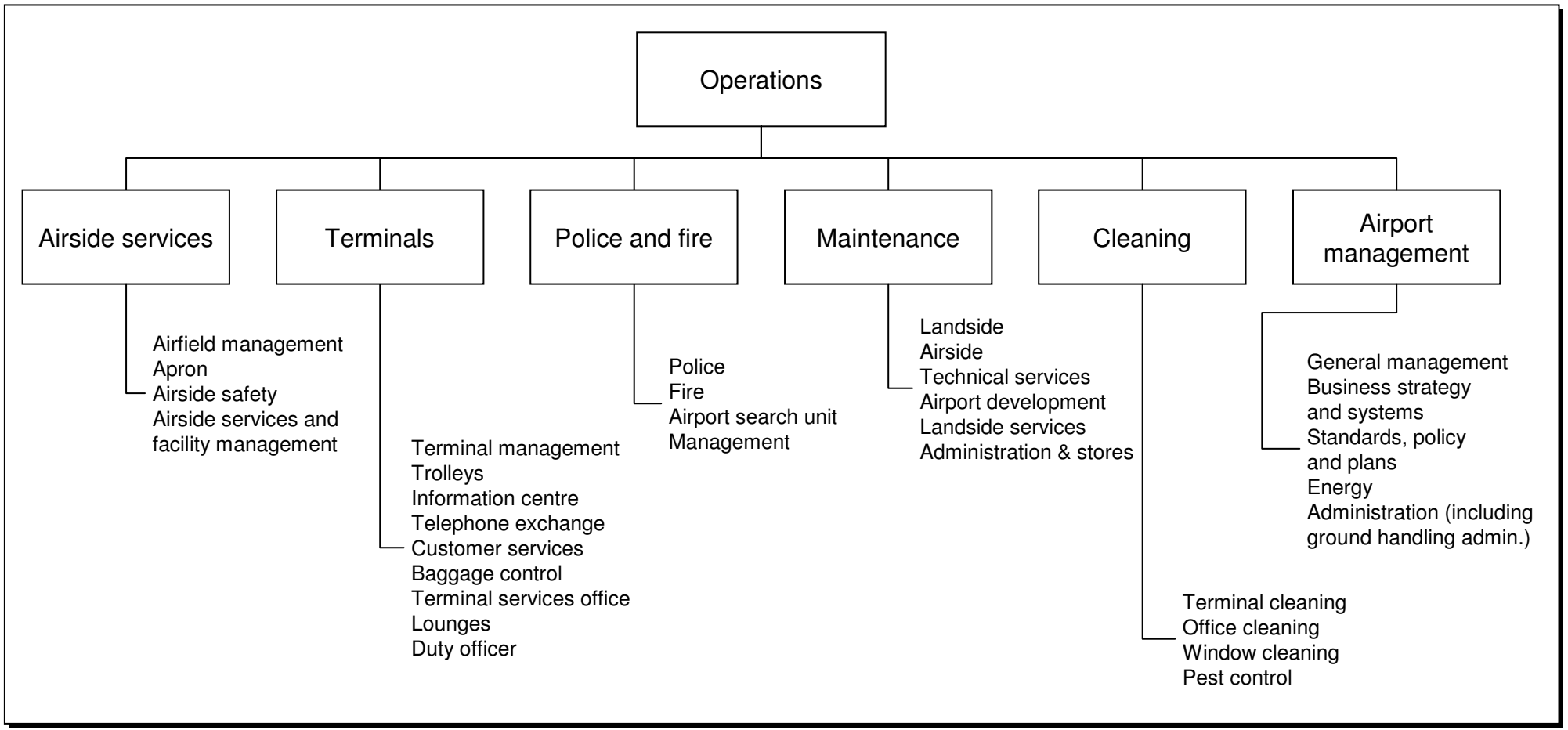
Operating expenditure is defined by the range of functions or activities undertaken by the airport



Source: DAA

Note: The above structure reflects the DAA financial models not necessarily the organisational structure of the company

As expected, operations make up around 75% of the airport's operating costs and activities



Source: DAA

Note: The above structure reflects the DAA financial models not necessarily the organisational structure of the company

In addition to its own activities, it is important to understand which functions the airport does not perform as these are outside its direct control – and also outside the scope of this study

- The airport does not provide any ground handling services
  - these are provided through airline self-handling or through third party handlers
  - the CAR gives approval for the handlers to operate
  - subsequently, the airport undertakes a series of checks on the handlers to ensure that they comply with requirements – there is a fee for this activity
- All air navigation services (ANS) are provided by the Irish Aviation Authority (IAA)
  - DAA holds the freehold on the control tower and the State Services Building at the airport
  - IAA leases the tower and ground for its other facilities, such as navigation aids, from DAA
  - DAA pays a fee to the IAA with respect to its aerodrome licence
  - terminal charges are paid to the IAA by the airlines and collected through the Eurocontrol mechanism
  - A portion of IAA charges are subject to CAR regulation

Introduction

- Background to the determination
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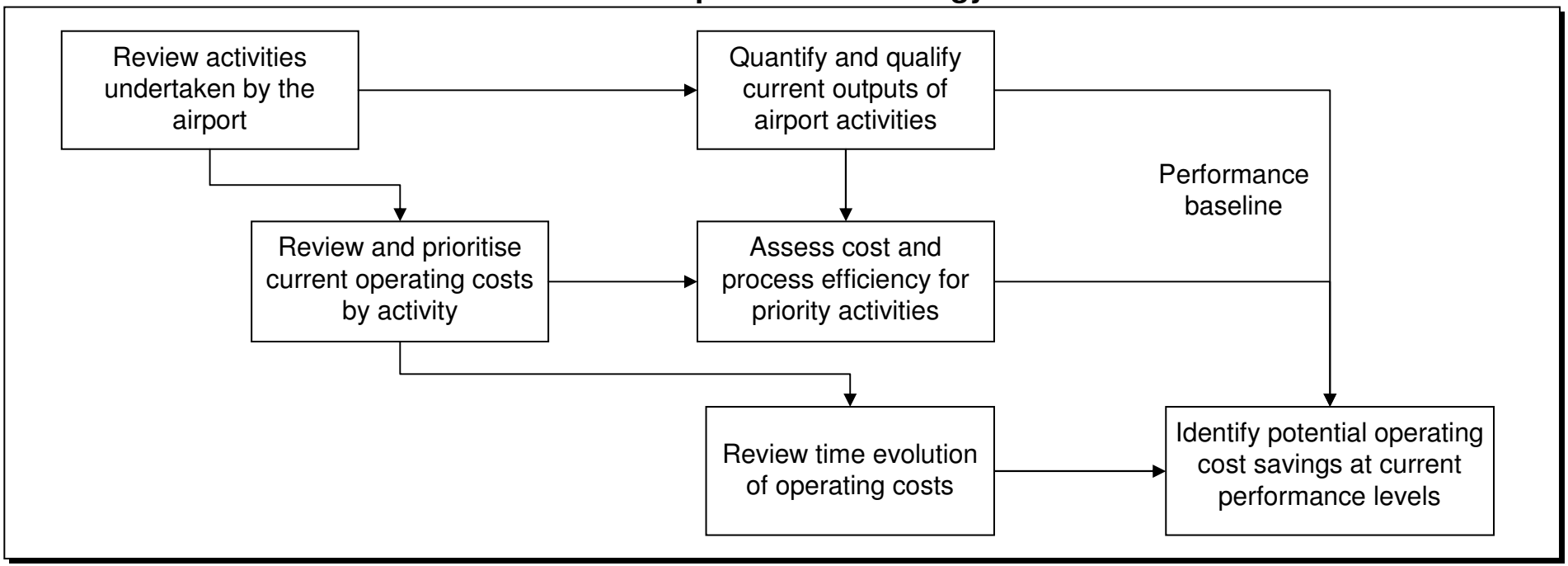
- Methodology and underlying assumption

The methodology requires an examination of OPEX and projecting future OPEX, at current performance levels, based on any cost efficiencies or additional cost requirements identified in the review

Simplified methodology



- The assessment was carried out based on the DAA projections provided to Booze Allen Hamilton in October 2004
- This assessment is based on the information available at the time i.e. the DAA model of costs which shows actual costs up to 2003, budget for 2004 and forecast beyond that
- Adjustments to the assessment to reflect subsequent information will need to be made for the purpose of the final determination
- While operational performance improvements may bring additional benefits, this study is only concerned with those efficiencies which lead to a reduction in OPEX for Dublin Airport

The operational efficiency assessment is based on the current facility

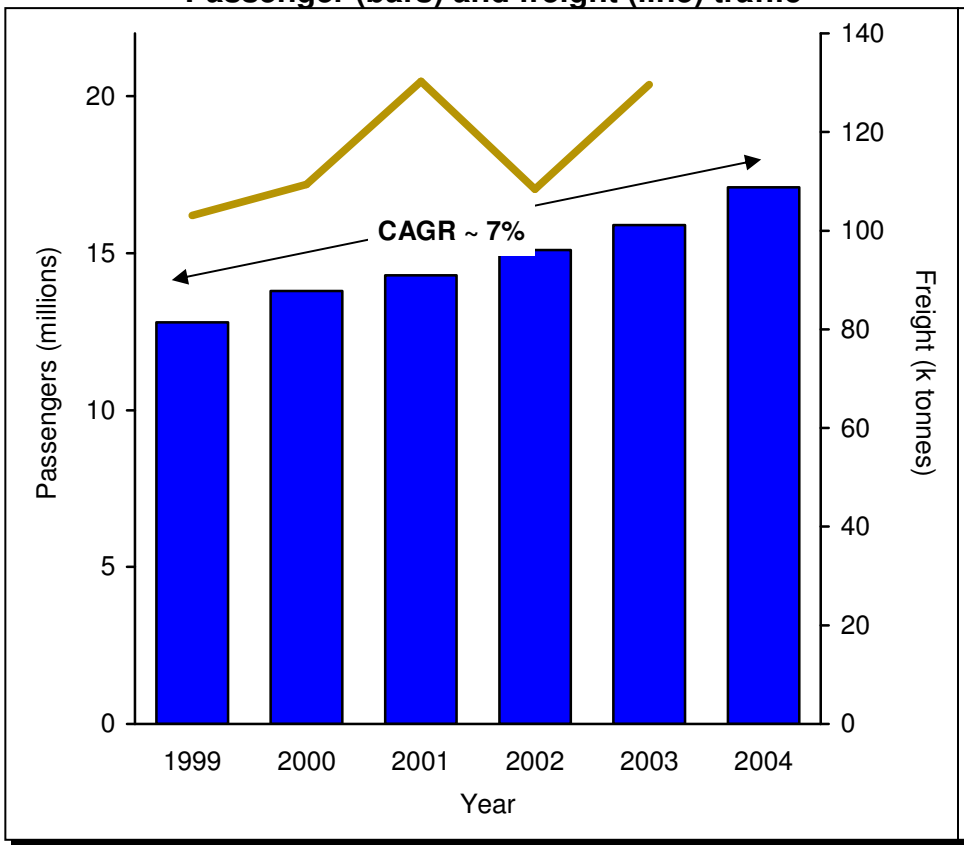
- At the time of the operational efficiency assessment, there were no committed capital investment proposals that would significantly increase the capacity of the airport within the period of the next determination, therefore our assessment is based on the current facility, i.e. on constant capacity
  - capital investment would alter the operating costs at the airport (e.g. more terminal space could require more cleaning) and therefore OPEX should be reassessed in the light of any CAPEX which is confirmed for the period of the next determination
- However, if airport patronage continues to grow and real operating costs remain constant, a reduction in service quality is inevitable
- The airport can take short term steps to mitigate the reduction in service quality arising from growth through operating measures (increasing operating cost) and/or minor capital schemes
  - in practice, the actual need for such cost developments depends on the quality of service provided/required
- Conversely, the airport can put in place cost saving measures which do not compromise capacity (in the sense of ability to process the passengers and flights presented), but reduce service quality
- For the purpose of this assessment, approach has been to assume that, within the limitations of the existing structure, quality will be maintained. Where DAA's operating cost projections has provided for cost increases which appear justified by the need to increase or maintain quality in the light of increased demand, we have not found those costs inefficient.

Analysis of existing operations

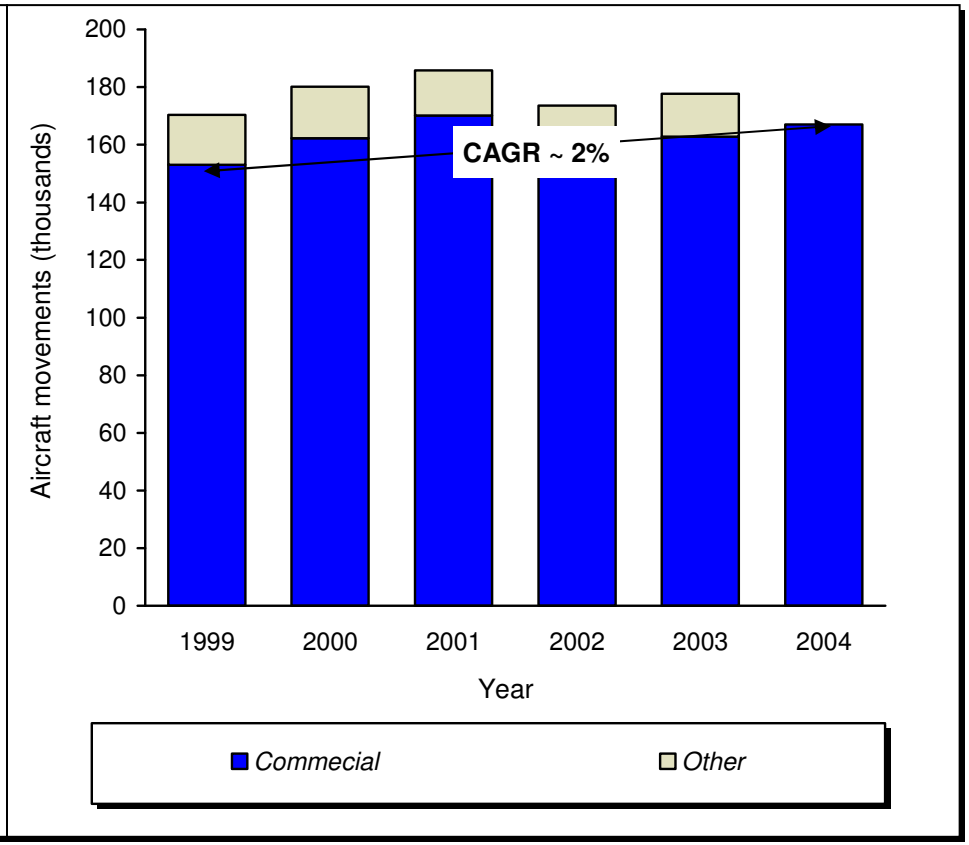
- Traffic
- Airfield
- Apron and stands
- The piers
- The arrivals hall
- The departures hall
- Other services

Traffic at Dublin has shown strong and consistent passenger growth over the past few years but with slower growth in air transport movements implying a trend to larger aircraft

Passenger (bars) and freight (line) traffic



Aircraft movements

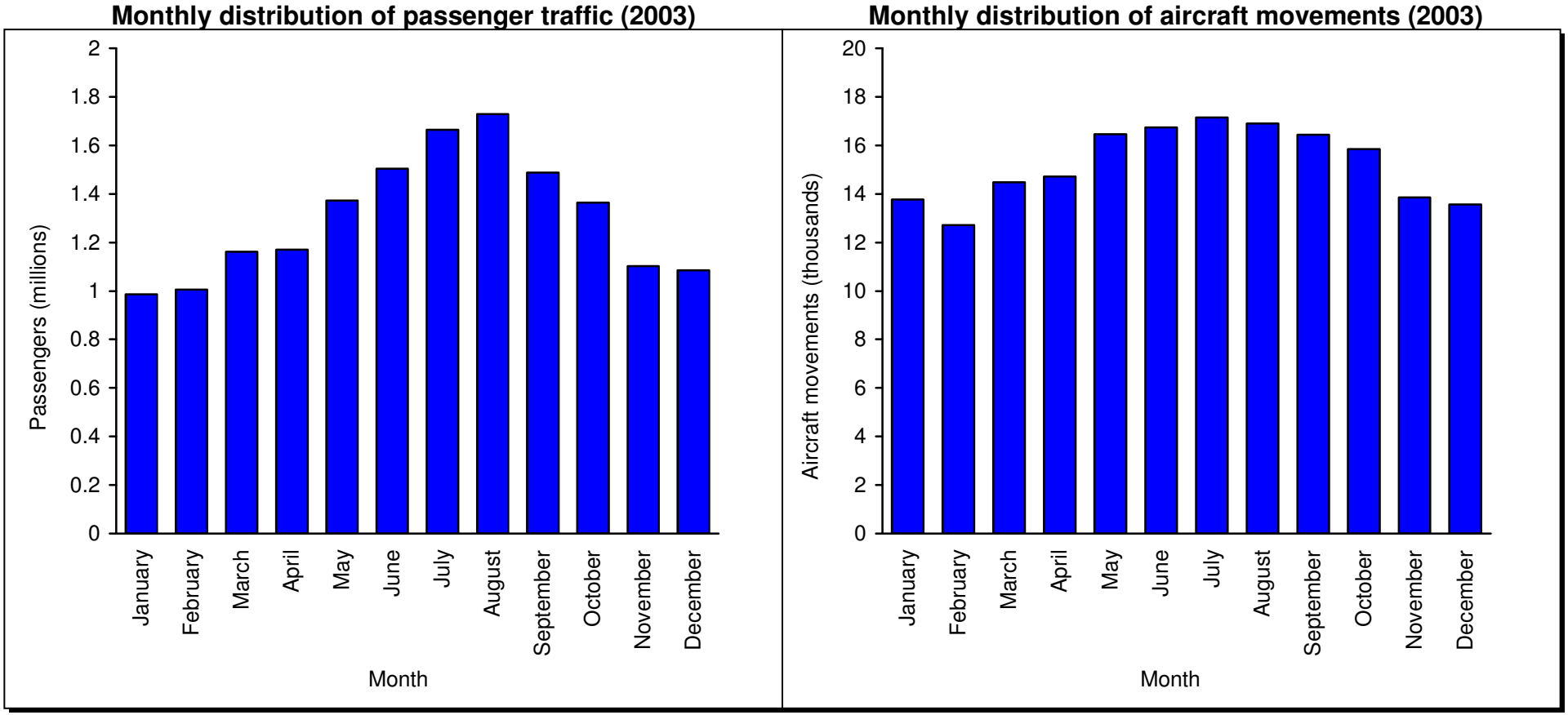


Source: DAA, ACI, ATI

Note: Freight traffic and non-commercial aircraft movements not yet available for 2004

CAGR – Compound Annual Growth Rate

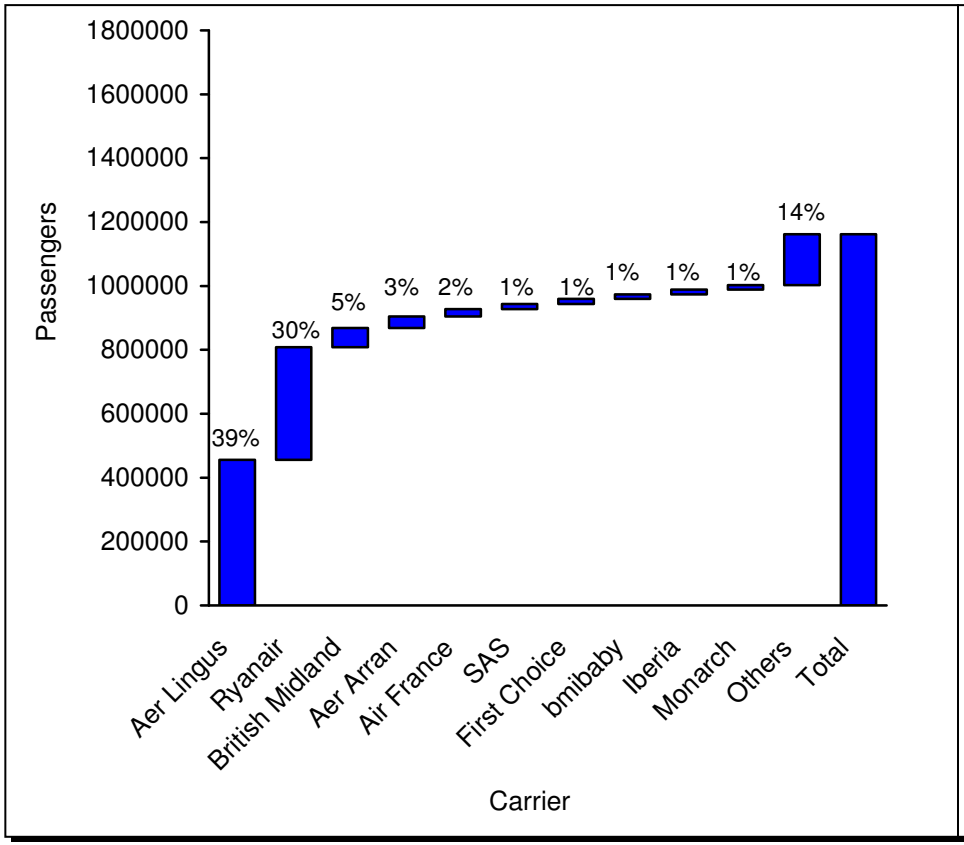
Both passenger traffic and movements show seasonal variation with peaks in the summer months



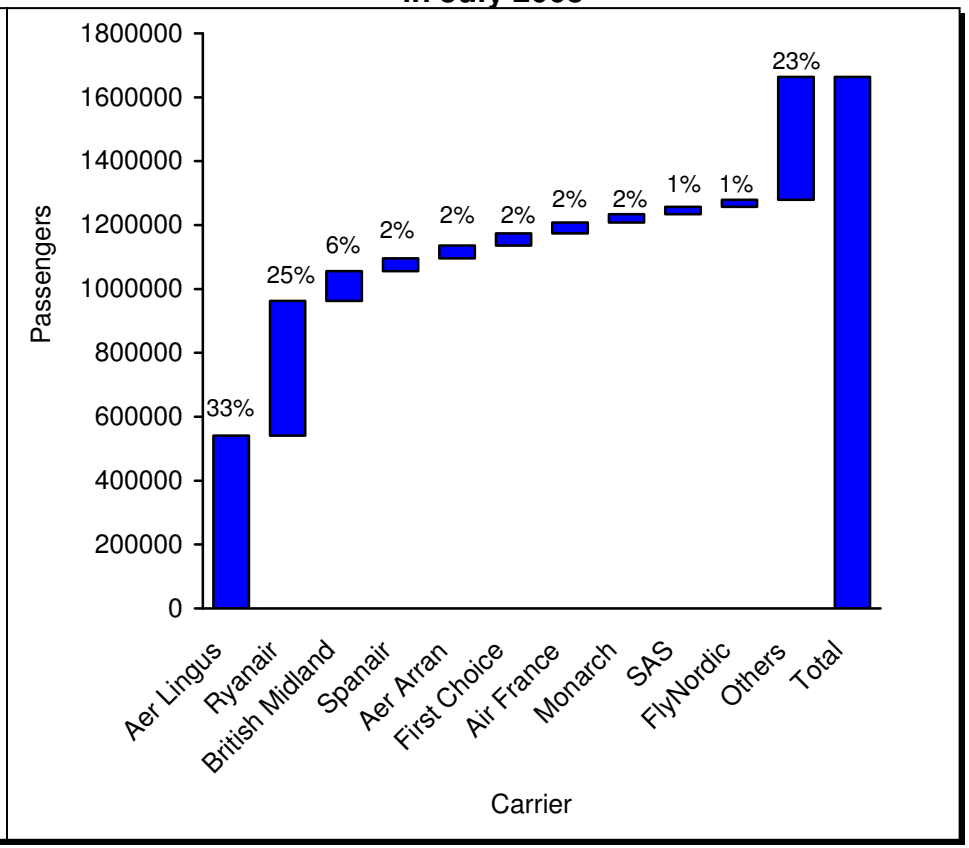
Source: DAA

Together, the two main carriers account for approximately 70% of the passenger traffic in winter and 55% in summer

Distribution of passengers by top ten carriers in March 2003



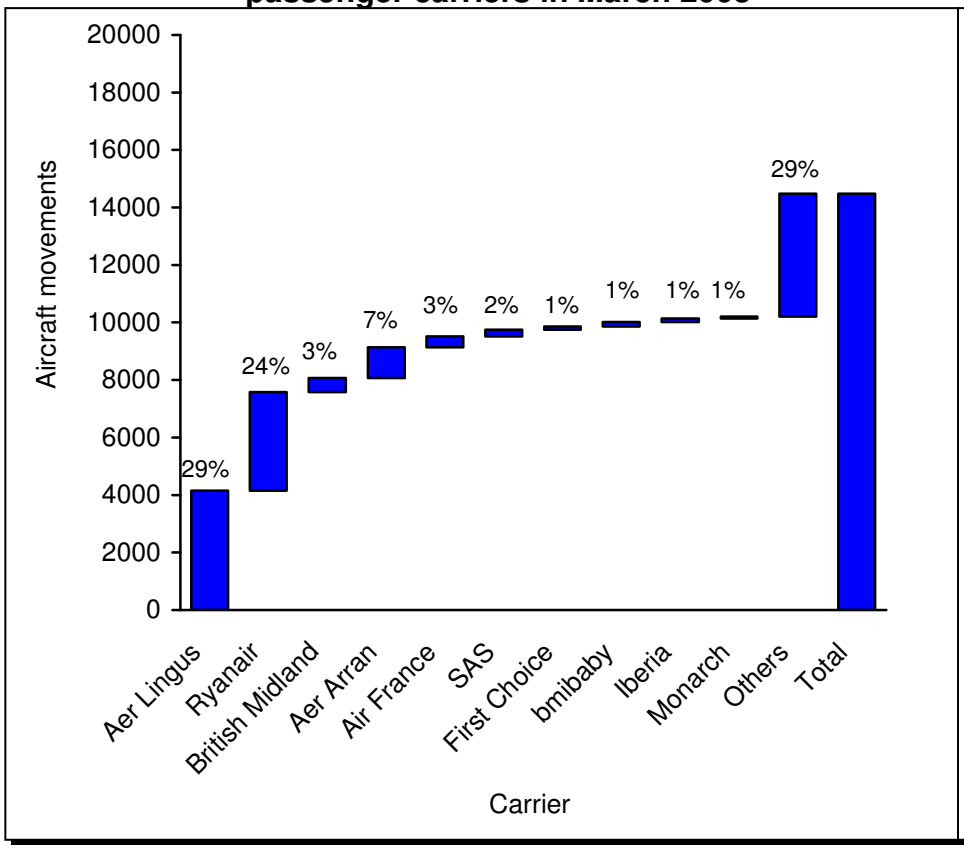
Distribution of passengers by top ten carriers in July 2003



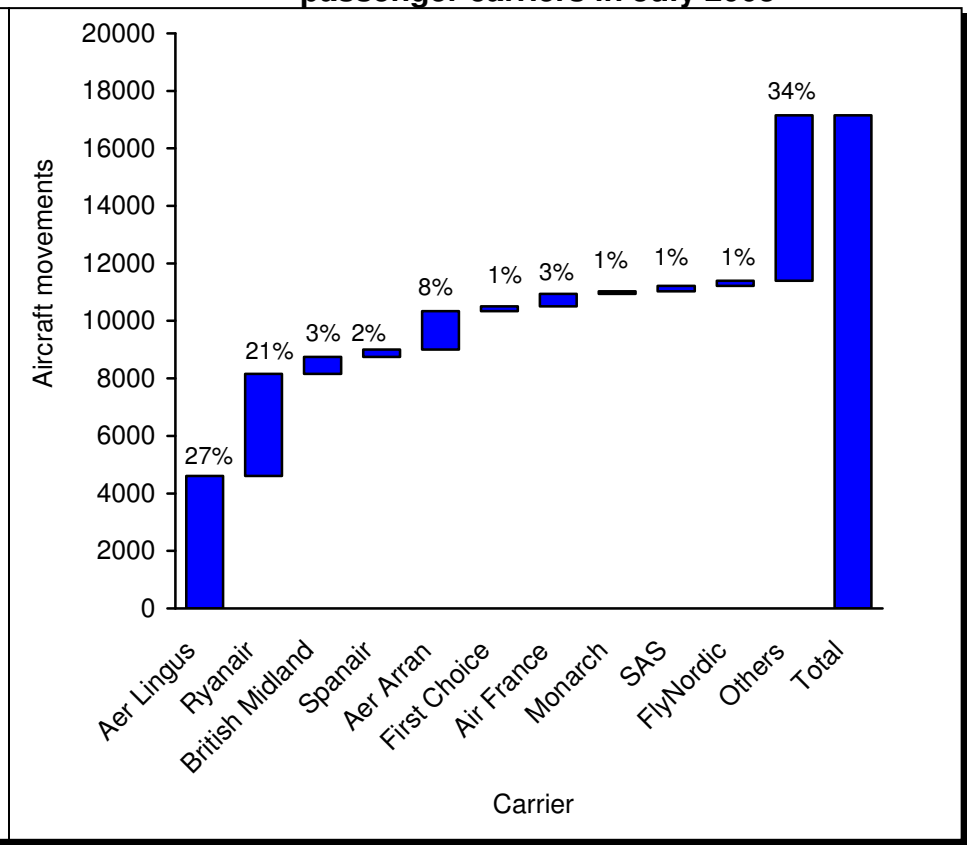
Source: DAA

The two main carriers combined also account for approximately 55% of aircraft movements in winter and 48% in summer

Distribution of aircraft movements by top ten passenger carriers in March 2003



Distribution of aircraft movements by top ten passenger carriers in July 2003



Source: DAA

Analysis of existing operations

- Traffic
- Airfield
- Apron and stands
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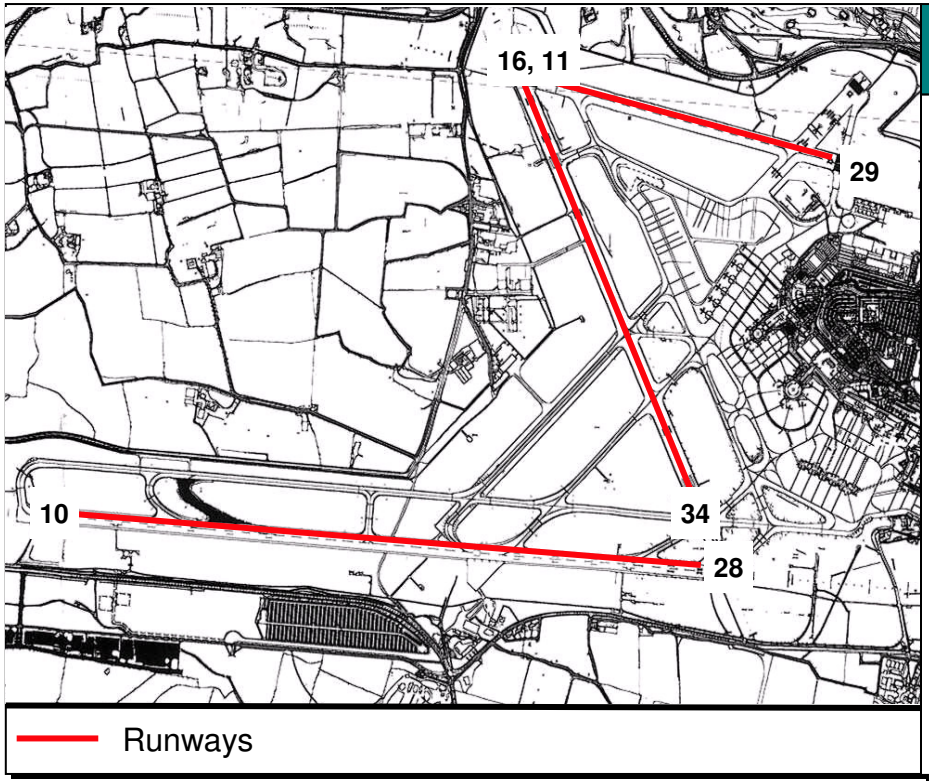
- The arrivals hall
- The departures hall
- Other services

The runway configuration, coupled with air traffic control procedures, means the airport mainly operates on a single runway basis

Runway configuration at Dublin Airport



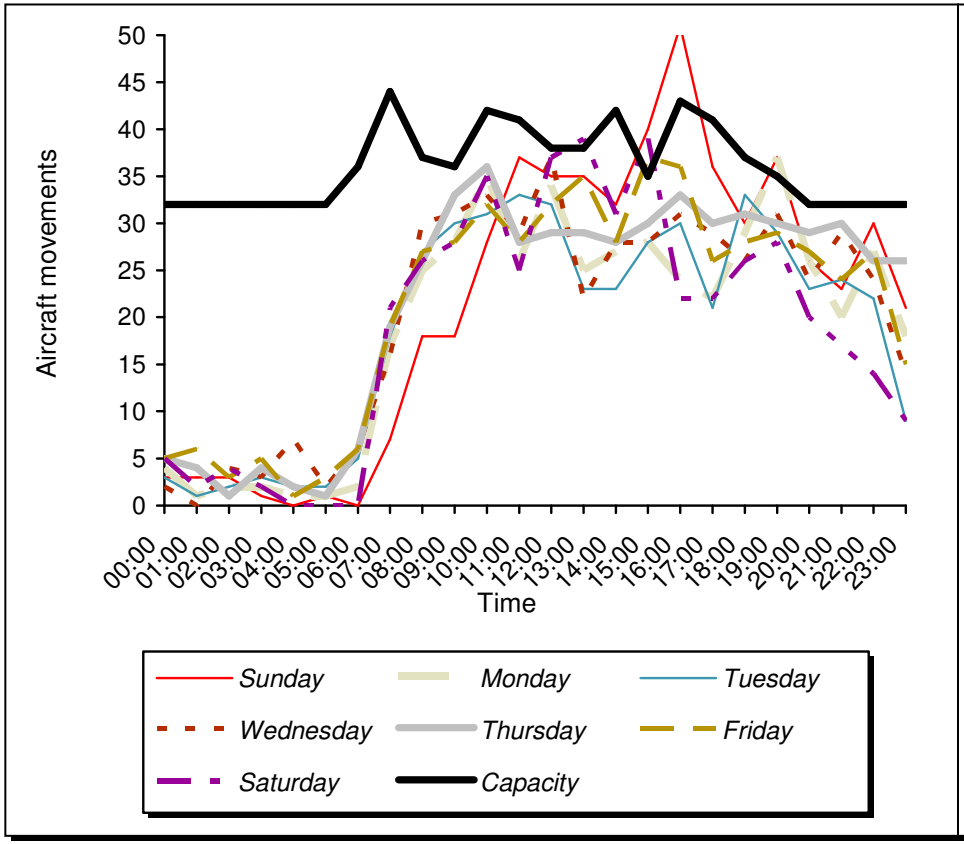
Source: DAA

Comments

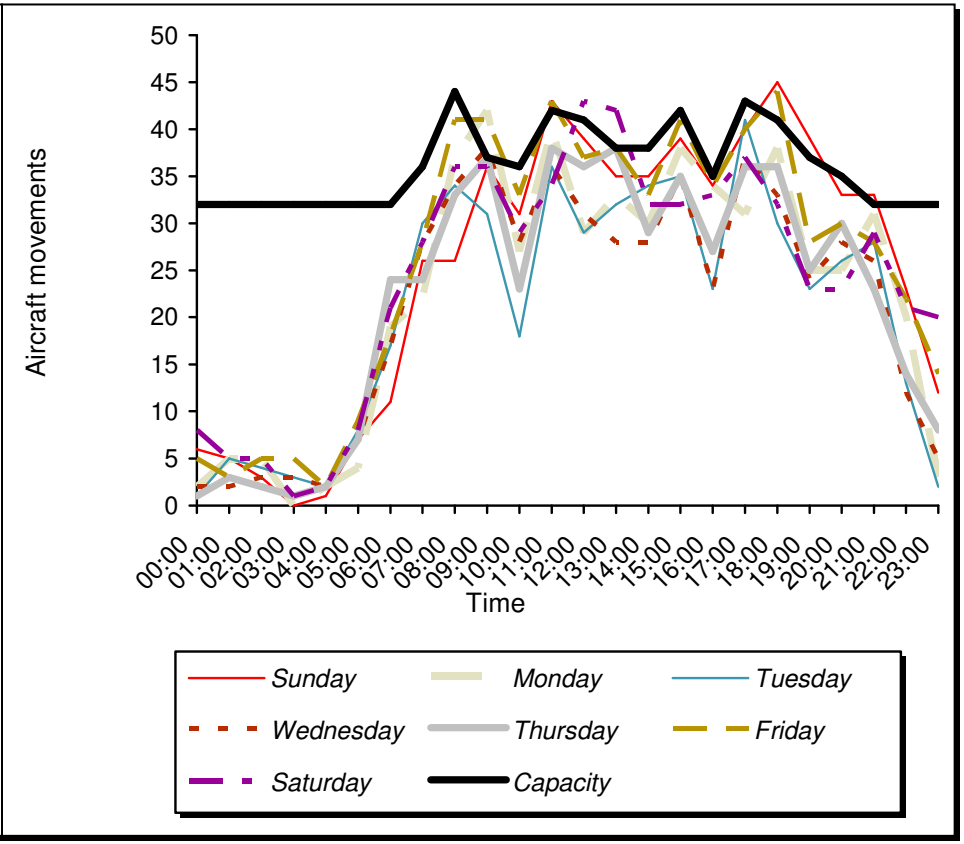
- Together runways 28 and 10 account for approximately 90% of movements at Dublin Airport
  - Runway 28 is the most commonly used runway (approximately 70% of total movements)
  - Runway 10 is used when the prevailing winds dictate (approximately 20% of total movements)
- Runway 16/34 is used as a cross-wind runway
- Runway 11/29 is a short runway that can only be utilised by smaller aircraft

Comparison of demand with capacity indicates that in single runway operation the airport is nearing saturation at some points

Hourly aircraft movements compared with capacity for one week in March 2003



Hourly aircraft movements compared with capacity for one week in July 2003



Source: DAA, NATS capacity study of Dublin Airport

Note: Capacity is taken as the weighted average hourly capacity for runways 10 and 28, assuming an allowable 8 minute delay (see NATS report)

The capacity of the runway system could be addressed through process and procedure improvements involving both DAA and IAA

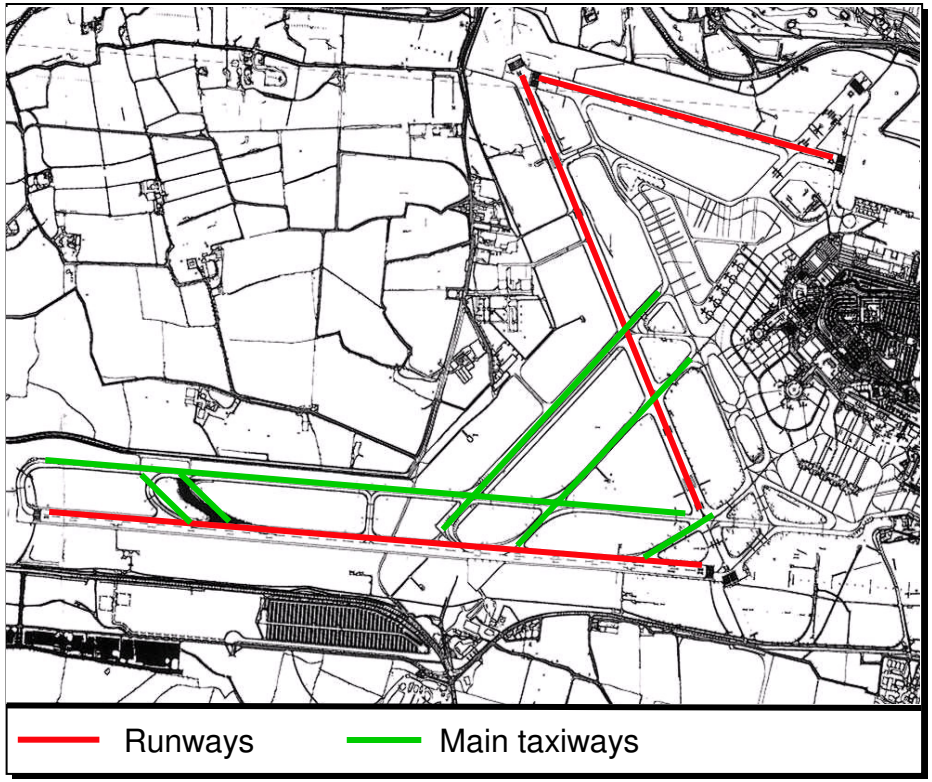
- The Runway Capacity Group, which comprises DAA, IAA and the airlines, is working to identify means of maximising the efficiency of the existing runway system
  - limited operations are already underway on runway 29 simultaneous to operations on runway 28
  - the Runway Capacity Group is considering an increase in the frequency of these parallel operations

- Dublin Airport Authority plc is currently forming a panel of suitably qualified service providers to tender for the undertaking of a Runway Capacity Study at Dublin Airport over three successive years, 2005 – 2007 inclusive. The study will follow on from the runway capacity study undertaken in 2003 by National Air Traffic Services (NATS) and is intended to deliver an assessment of the runway capacity at Dublin Airport and evaluate in capacity terms initiatives being developed to maximise runway capacity at Dublin Airport.

- Simultaneous operation of runways 10 and 11 requires IAA to define the appropriate missed approach procedures

Taxiway configuration is not optimal

Map of Dublin Airport



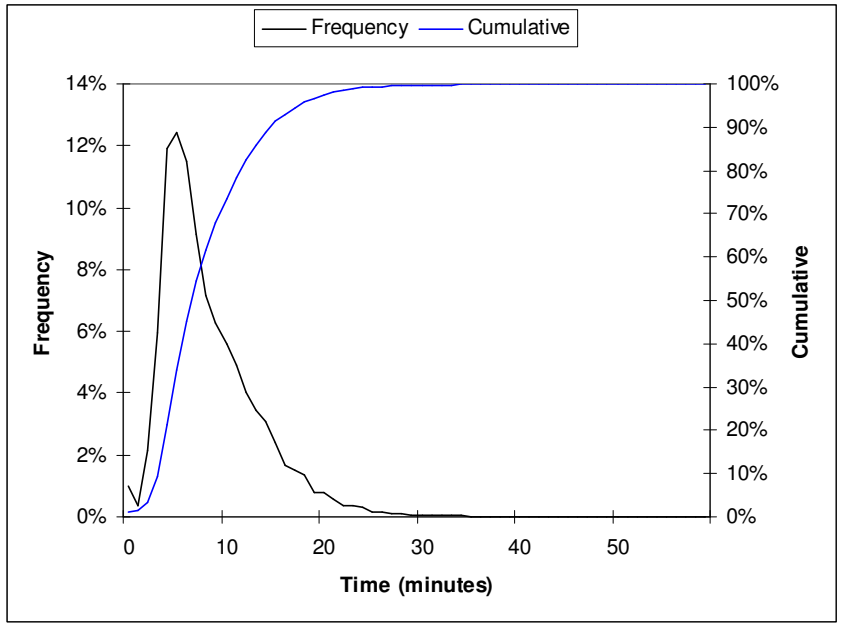
Source: DAA

Impacts

- There is only one rapid exit taxiway restricting the rate of movements that can be handled on the runways
- Long queues can form when runway 10 is in use
  - mitigating measures, including a passing point are currently under consideration
- There are no passing points on the parallel taxiway reducing flexibility to rearrange aircraft queues
- Essential taxiway maintenance performed during office hours can cause delays to taxi time
  - there is a cost impact to performing out of hours maintenance
- Apron maintenance can cause delays both to aircraft and handling vehicles

Taxi times are an important factor impacting on airline on-time performance and customer satisfaction – depending on air traffic control, as well as airport infrastructure

Taxi time distributions for July 2003 (all Piers)



Median taxi time = 7 minutes
Average taxi time = 8 minutes
95 percentile = 17 minutes

Source: DAA, BAH analysis

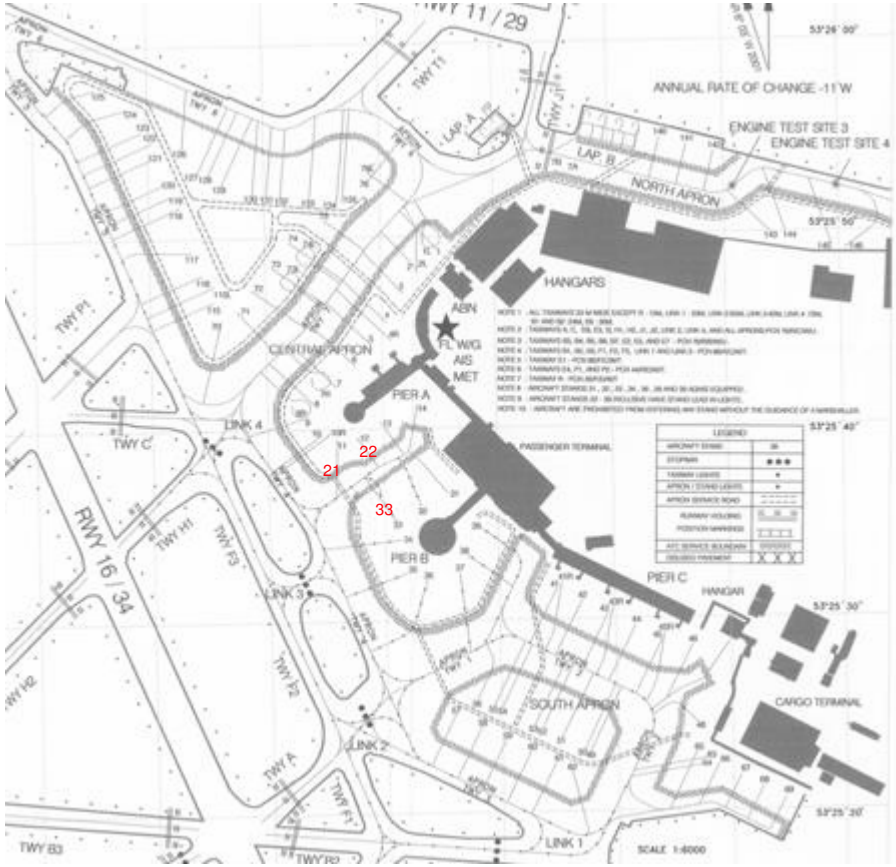
- DAA monitors and reports taxi times on a monthly basis although there is no specific target
  - average outbound taxi time to Runway 10 is 11 minutes
  - average outbound taxi time to Runway 28 is 7 minutes

Analysis of existing operations

- Traffic
- Airfield
- Apron and stands
- The piers
- The arrivals hall
- The departures hall
- Other services

Stands are classified as “contact”, positioned at the three piers, or “remote”, positioned throughout the apron area

Plan of the apron area at Dublin airport

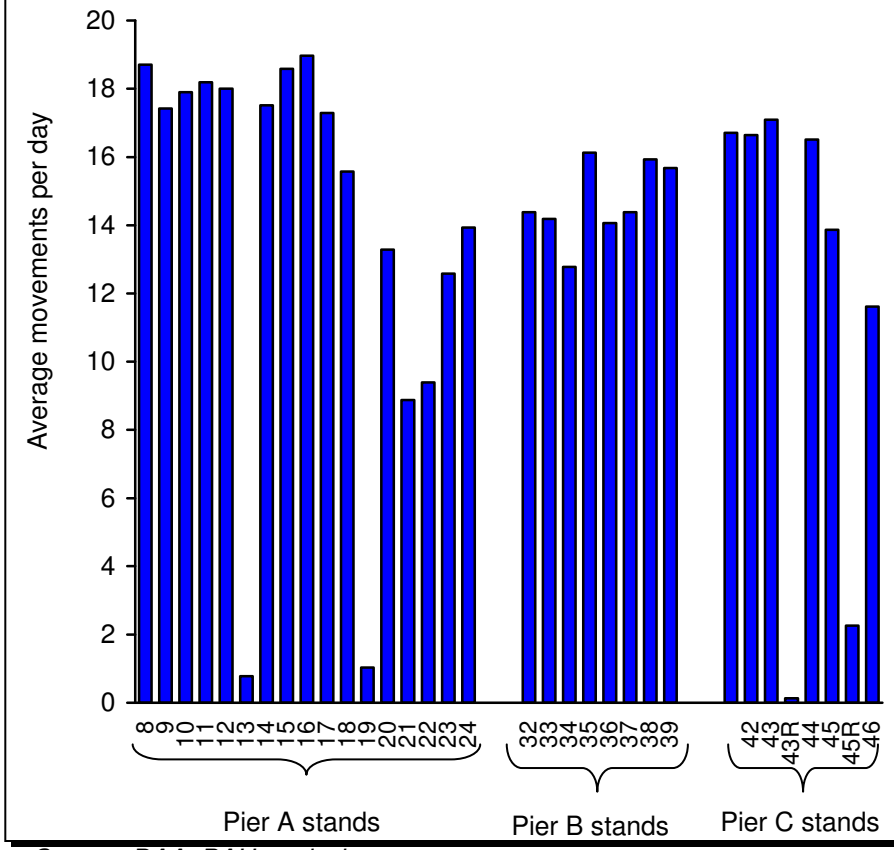


Comments

- Contact stands are served by an air-bridge or direct foot access from the terminal to the aircraft
- Remote stands require passengers to be bussed from the terminal to the aircraft
- The airport does not provide buses
  - these are provided by the airline, either directly or through a handling agent
- There is no operational fuel hydrant with all aircraft being refuelled by bowser
- In response to the decision by Ryanair and Aer Lingus to introduce larger aircraft during 2005, and following agreement between IAA and DAA, the standard for aircraft wing-tip separations on Pier A was reduced from 10m to 7.5m as of 17th March 2005
- The 7.5m minimum is required to ensure independent stand operations in the presence of refuelling bowsers (ICAO 4.5 m minimum plus the width of the bowser), facilitating the stand allocation process
  - the reduced standard in place for Pier A enables the operation of A321 and B737-800 aircraft

Contact stand utilisation is high and well-managed

Movements per day on contact stands in July 2003 (representative of a busy period)



Comments

- Some stands cannot be used when others are in use explaining apparent low utilisation:
  - Stand 13 cannot be used when either Stands 12 or 14 are in use
  - Stand 19 cannot be used when either Stands 18 or 20 are in use
  - Stands 21 and 22 must be kept free when wide-body operations are taking place on Stand 33 (highlighted on previous page)
  - 43 and 43R, and 45 and 45R are not independent of each other
- More detailed analysis shows that stand utilisation is distributed fairly evenly throughout the day (05:30 to 22:00) but with some slack periods
  - the fact that Dublin airport is not fully coordinated impedes spreading demand to off-peak periods
  - Dublin airport is offering incentives for airlines to operate non-EU services primarily because non-EU services would generate more retail/duty free income for the airport than EU services; however, these services may also fill off-peak periods

Source: DAA, BAH analysis

Note: A movement is defined as either an arrival or departure, under power or towed

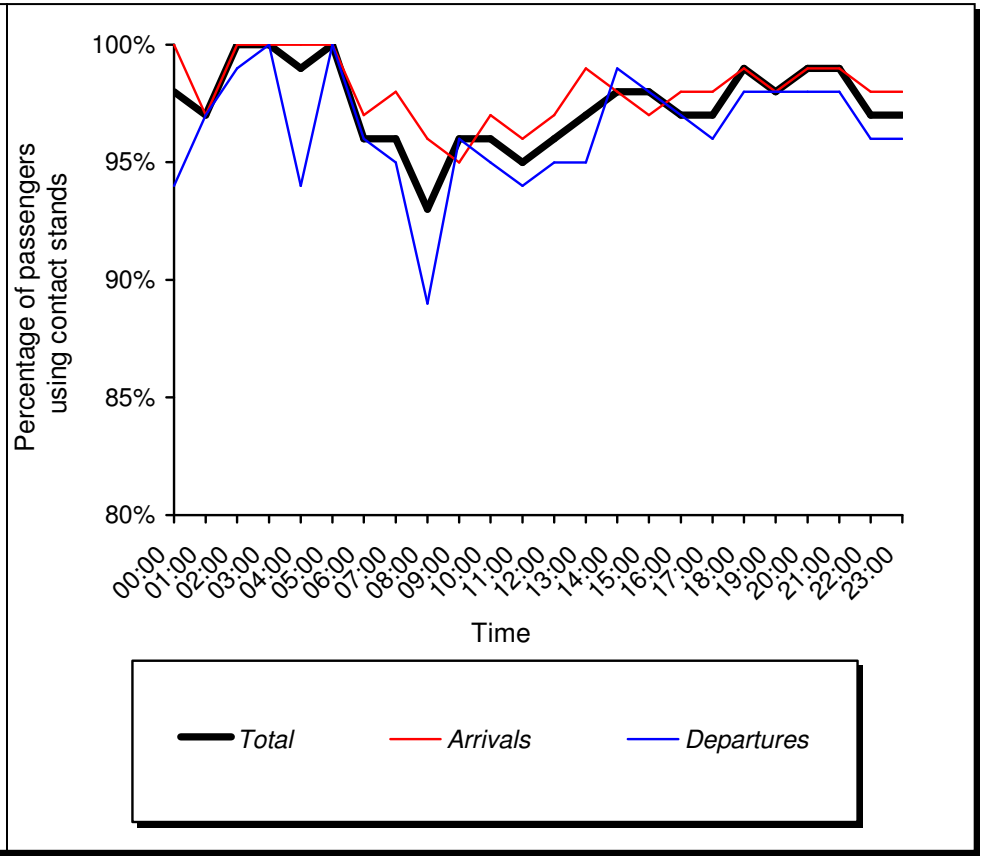
Considerable effort has been made to maximise the throughput of passengers via contact stands, achieving a high quality service

Priorities and weightings for allocation to contact stands

- Stand plans are generated for summer and winter schedules based on the Airport Coordination Limited (ACL) schedule
- Priority is given to large aircraft (>50 seats)
- Priority is given for some services
  - trans-Atlantic services using the Customs and Border Protection (CBP) facilities at Pier B
  - quick turnaround services at Pier A
- The passenger capacity of aircraft, as defined with the ACL schedule, is taken into consideration
- The year round operation of service is taken into account, as is the frequency of service
- Allocation complies with the general rules for stand planning
- Stand allocation is subject to daily operational requirements

Source: DAA – guidance material on stand allocation rules

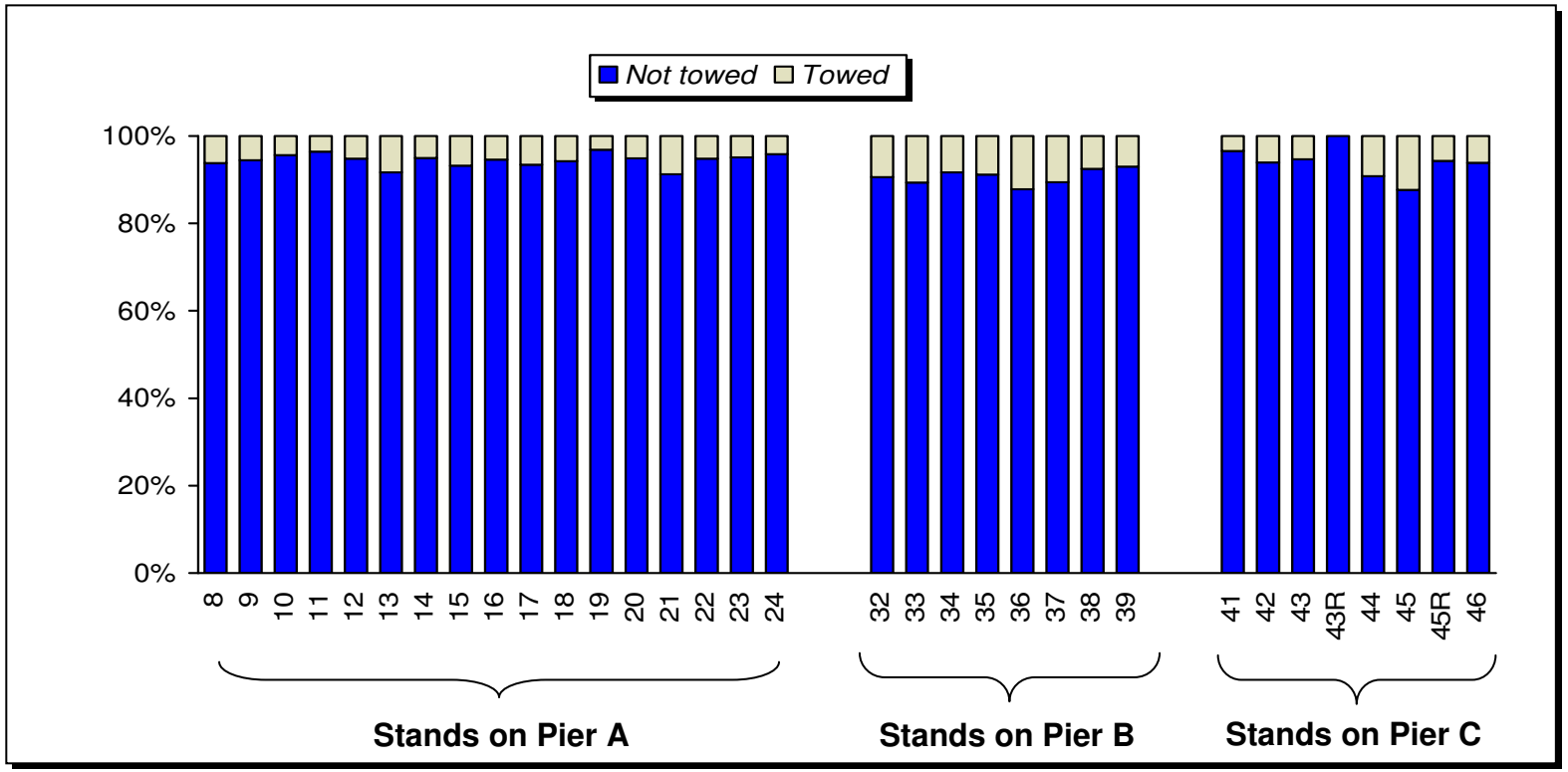
Proportion of passengers using contact stands in July 2003 (representative of a busy period)



Source: DAA, BAH analysis

To maximise the proportion of passengers using contact stands, it is necessary for aircraft to be towed on- and off-stand

Ratio of tows to total movements for contact stands in July 2003



Note: The proportion of towed movements indicated here includes aircraft towed for operational reasons, e.g. maintenance in a hangar, as well as those towed to maximise stand utilisation. DAA estimates that 70% of towed movements are associated with stand utilisation

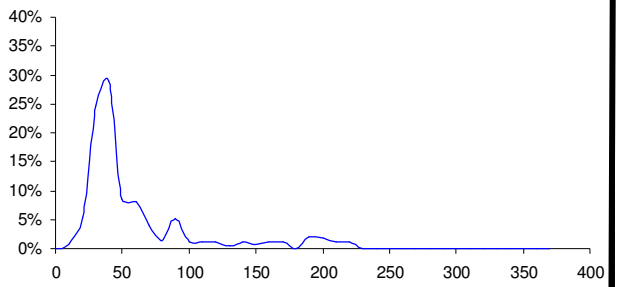
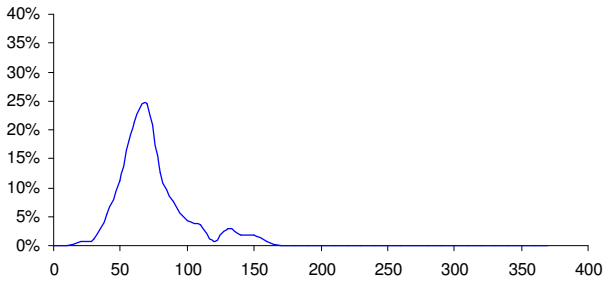
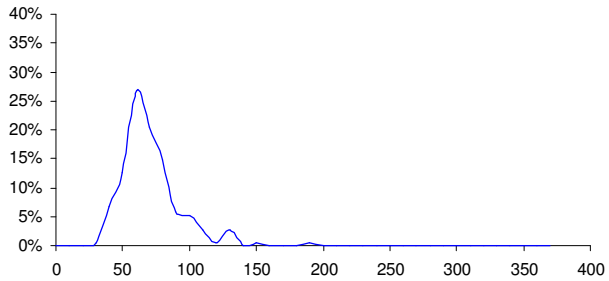
Source: DAA, BAH analysis

There are pros and cons to aircraft towing, which is the only method available to maximise stand utilisation and efficiency

Pros	Cons
▸ Towing is the only mechanism by which very high stand utilisation can be achieved - very important for operations incompatible with bussing of passengers: – Rapid turnarounds – High service airlines ▸ The decision of whether use of a contact stand and the resultant possibility of towing, as opposed to use of a remote stand, is made by the airline during the pre-season planning process ▸ Deferment of capital expenditure for new contact stands necessary to achieve the required number of passengers using contact stands	▸ Costs of towing are borne by the airline ▸ Towing can be operationally disruptive, especially at peak periods, e.g. during the first wave of early morning departures ▸ There is a perception amongst some of the airlines using the airport that the rules for stand allocation, and hence the impact of towing, are not applied uniformly ▸ Towing increases the risk of damage to aircraft

Turnaround times reflect the varying demands and schedules of the airlines operating at the different piers and are dependent on the performance of many actors

Example turnaround time distributions for Piers A, B and C for observed in July 2003

Pier A (Stand 12 example)	Pier B (Stand 32 example)	Pier C (Stand 44 example)
Stand 12 turnaround time (July 2003) 	Stand 32 turnaround time (July 2003) 	Stand 44 turnaround time (July 2003) 
Median turnaround = 36 minutes Average turnaround =54 minutes 95 percentile = 180 minutes	Median turnaround = 65 minutes Average turnaround =69 minutes 95 percentile = 125 minutes	Median turnaround = 62 minutes Average turnaround =66 minutes 95 percentile = 105 minutes

- Although the airport is not directly responsible for the turnaround performance, it provides the enabling infrastructure and services to the airlines and handling agents
- Turnaround times appear to be consistent with operational requirements, although there is no formal agreement between the actors defining these requirements

The investigation indicates that apron efficiency and infrastructure utilisation are high

- Stands are used efficiently with spare capacity generally being restricted to off-peak periods
  - peak demand is unlikely to be redistributed without coordination
  - Stands 13, 19, 21, 22, 43R and 45R are comparatively lightly used because of their interaction with other stands
- The proportion of passengers using contact stands is impressively high, consistently over 90%
  - close interaction, especially concerning the transparency of application of stand allocation rules, should be maintained with the airlines
- Turnaround time requirements, albeit not explicitly defined, appear to be satisfied
- Flexibility of stand use is being increased within safety constraints by the reduction of wing-tip separation standards on the apron
  - limits are imposed by the universal use of bowsers for refuelling
  - installation of a fuel hydrant, of most use to wide-body aircraft, would be a major capital project that would require buy-in from the airlines and a positive business case

Analysis of existing operations

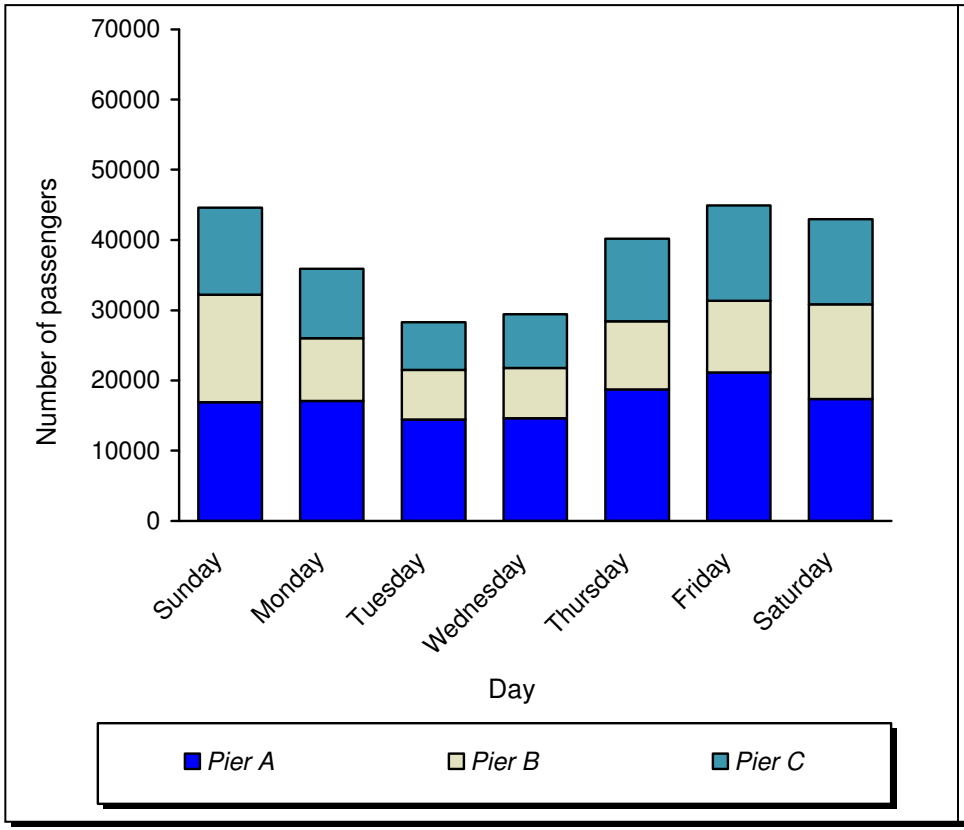
- Traffic
- Airfield
- Apron and stands
- The piers
- The arrivals hall
- The departures hall
- Other services

Passenger traffic is handled through the three piers in use at the airport

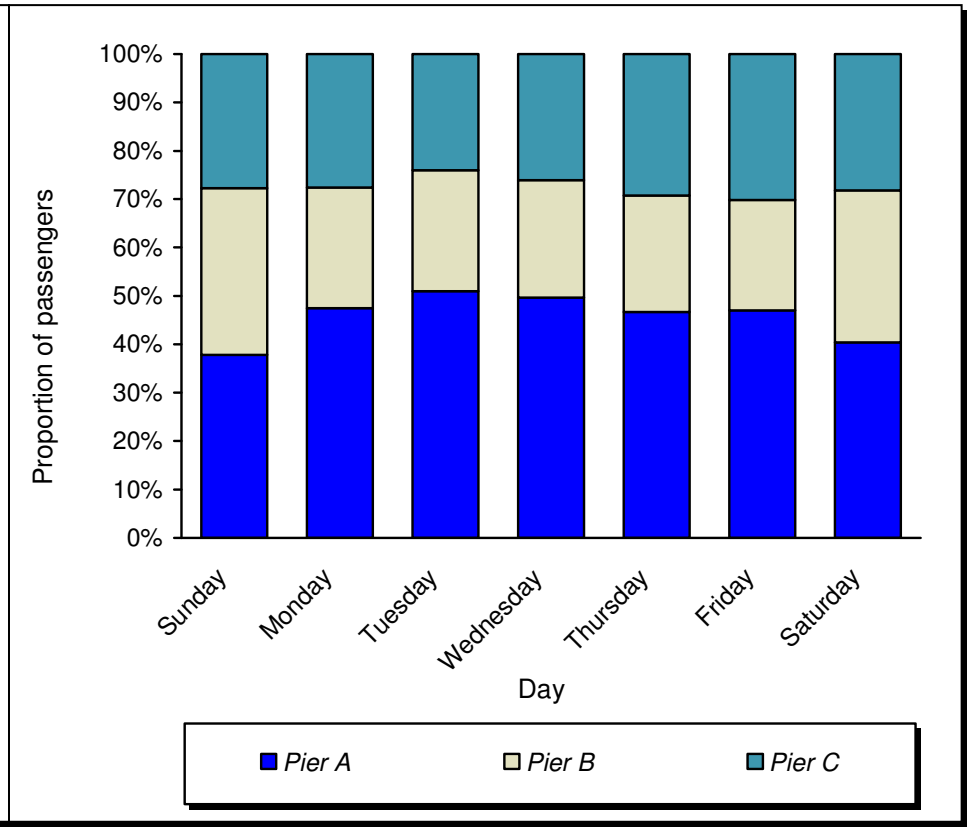
Pier A	Pier B	Pier C
• Served by Stands 8 to 24 • Principal users are Ryanair and Aer Lingus short haul operations • Serves approximately 35-50% of the airport's passenger traffic depending on day of week and season • Two passport control desks for inbound passengers • No separation of arriving and departing passengers • Reported by DAA, Ryanair and Aer Lingus as being extremely crowded during peak times	• Served by Stands 31 to 39 • Principal users are Aer Lingus other than services that operate from Pier A and US flights • Serves approximately 25-35% of the airport's passenger traffic depending on day of the week and season • Six passport control desks for inbound passengers • A US Customs and Border Protection (CBP) facility enabling passengers to clear US immigration before departure • Segregated inbound and outbound passengers	• Served by Stands 41 to 46 • Serves approximately 20-30% of the airport's passenger traffic depending on day of the week and season • Four passport control desks for inbound passengers • Segregated inbound and outbound passengers

During the *winter schedule* in 2003, traffic typically varied from around 30,000 to 45,000 passengers per day, distributed between Piers A, B and C in the approximate ratio 1.7:1.0:1.0

Daily traffic at Piers A, B and C for a week in March 2003

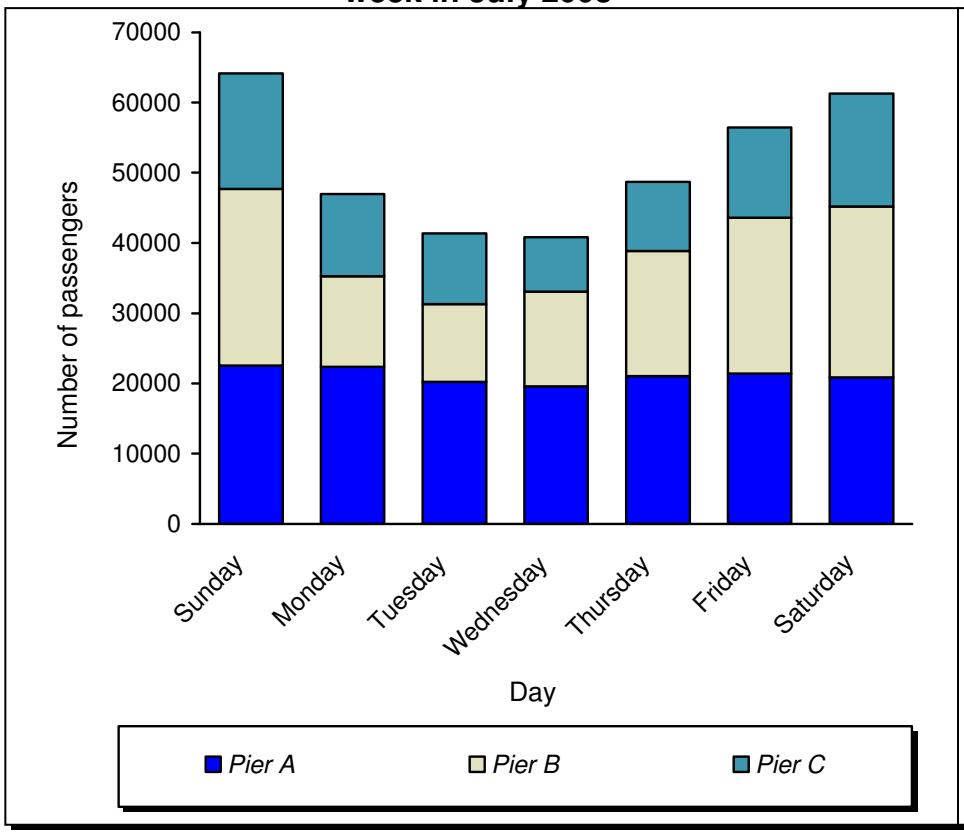


Distribution of traffic between Piers A, B and C for a week in March 2003

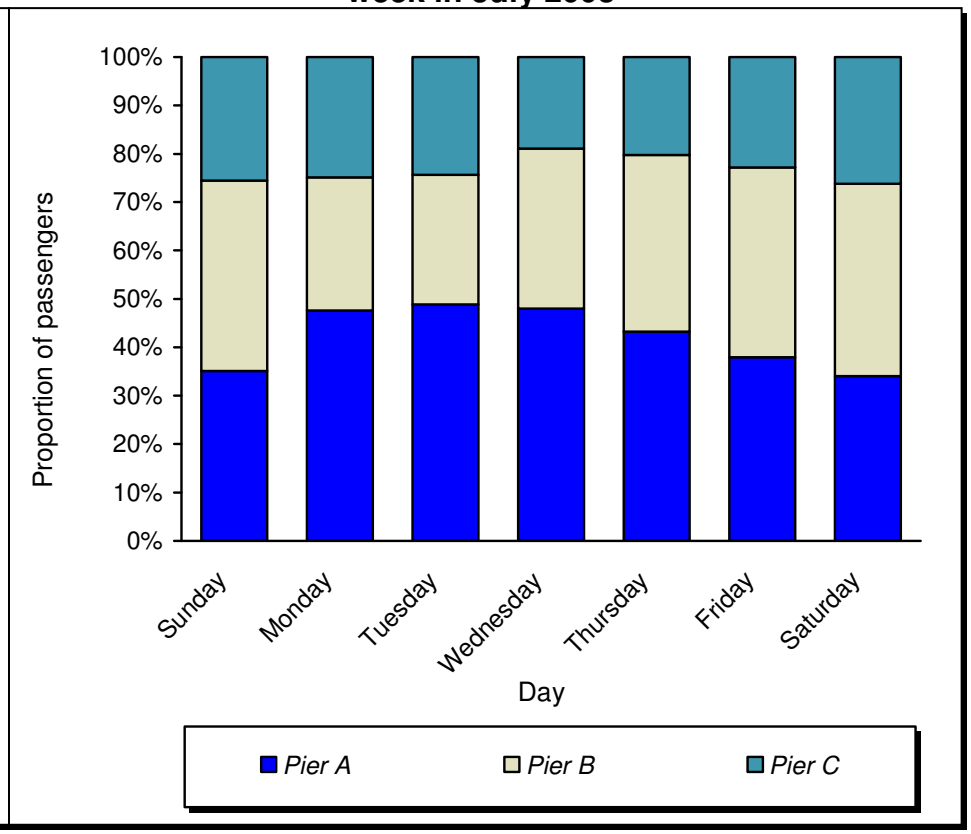


During the *summer schedule* in 2003, traffic typically varied from around 40,000 to 65,000 passengers per day, distributed between Piers A, B and C in the approximate ratio 1.2:1.0:0.7

Daily traffic at Piers A, B and C for a typical week in July 2003

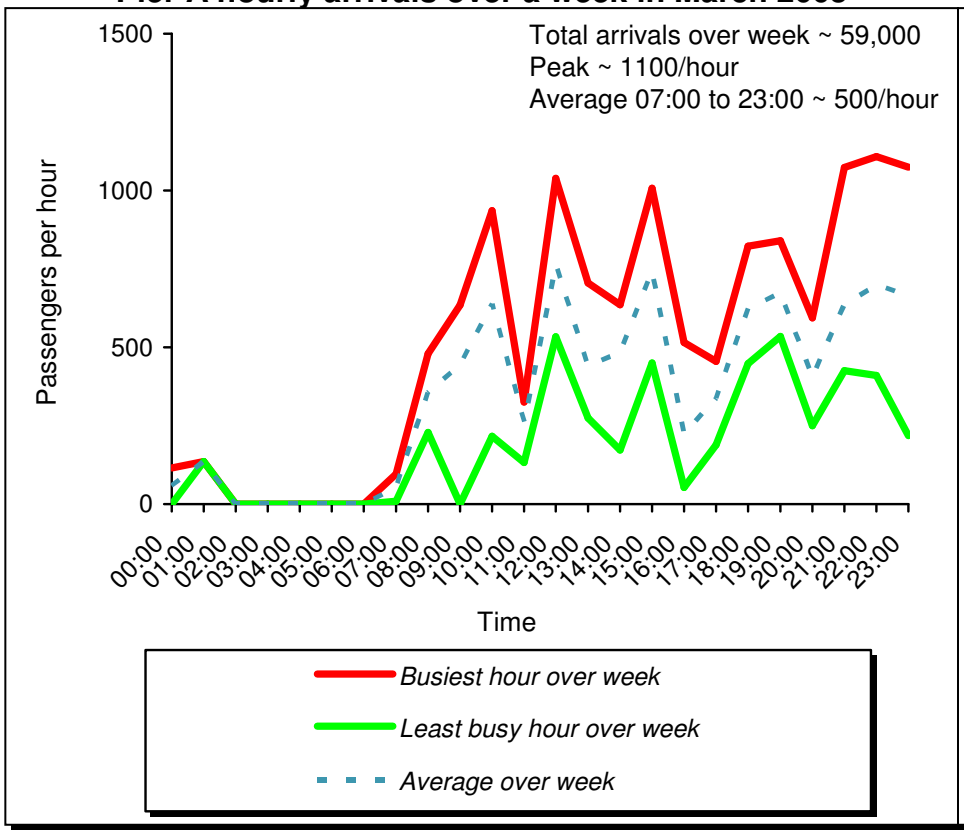


Distribution of traffic between Piers A, B and C for a week in July 2003

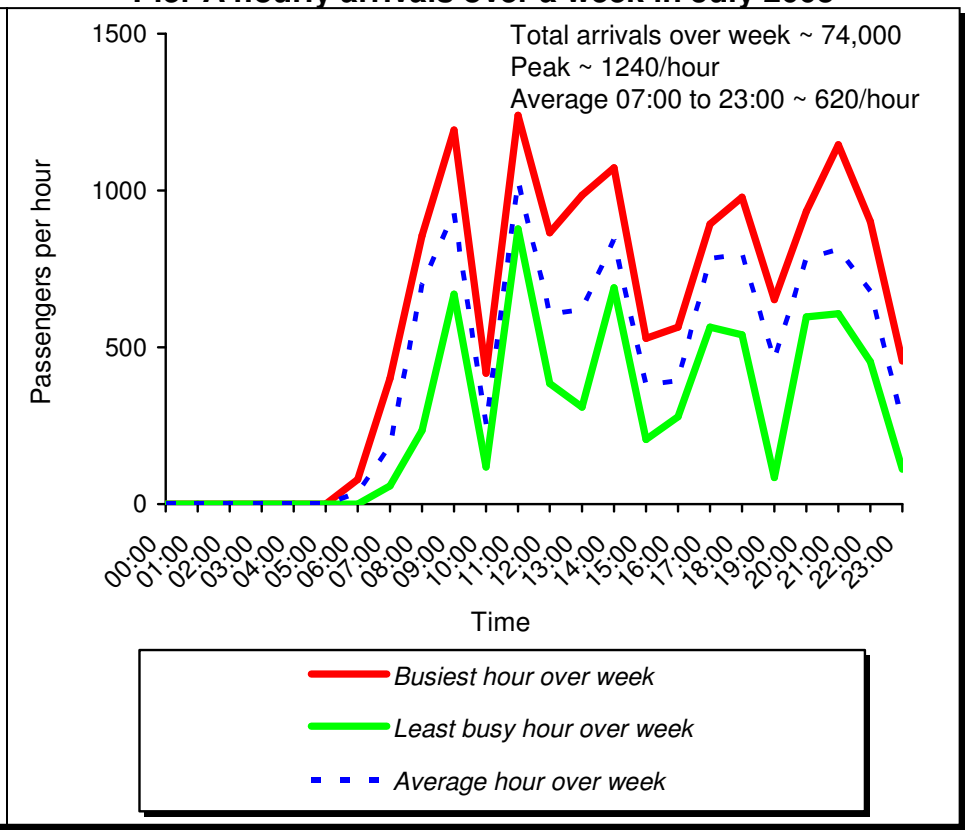


In terms of arrivals, Pier A is busy from around 06:00 onwards, sometimes reaching peak levels of over 1,200 passengers per hour

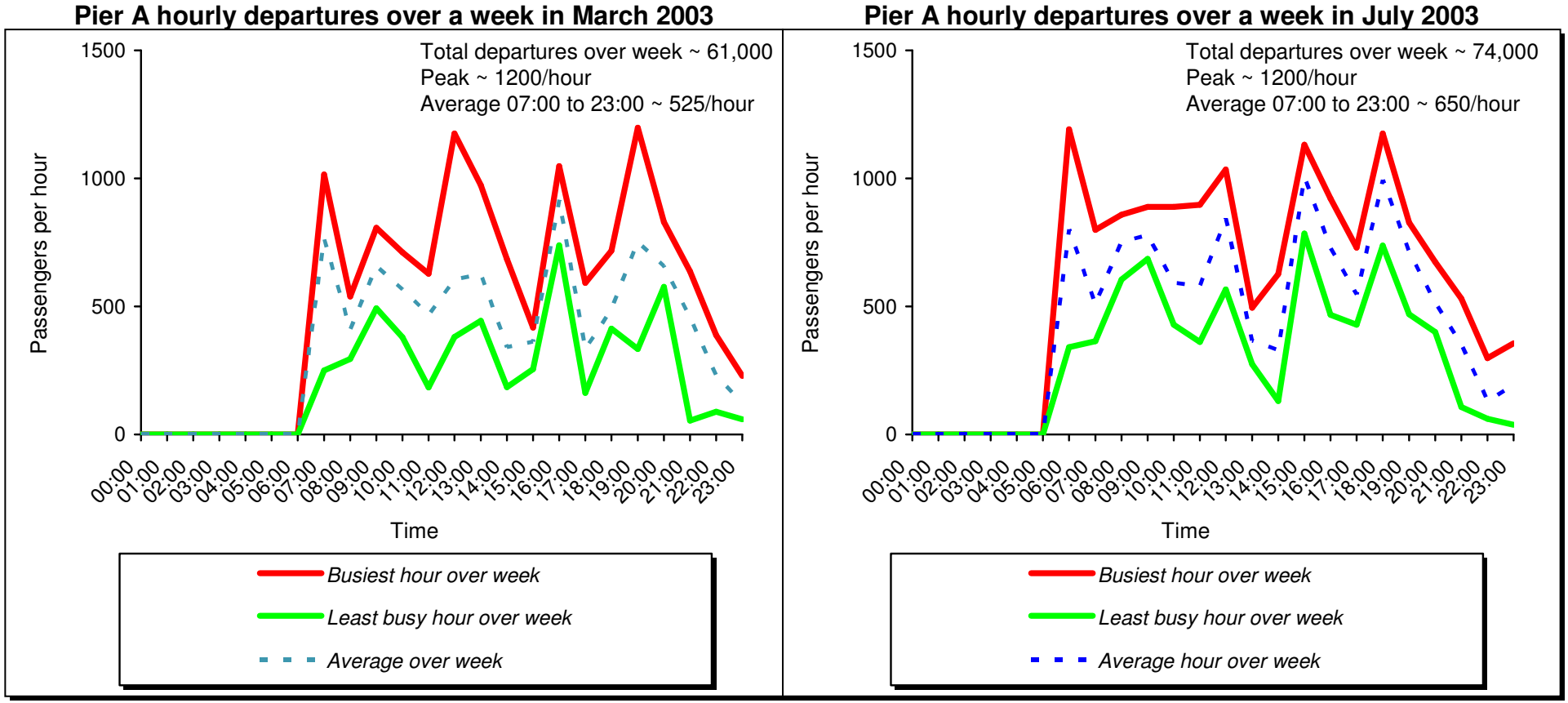
Pier A hourly arrivals over a week in March 2003



Pier A hourly arrivals over a week in July 2003

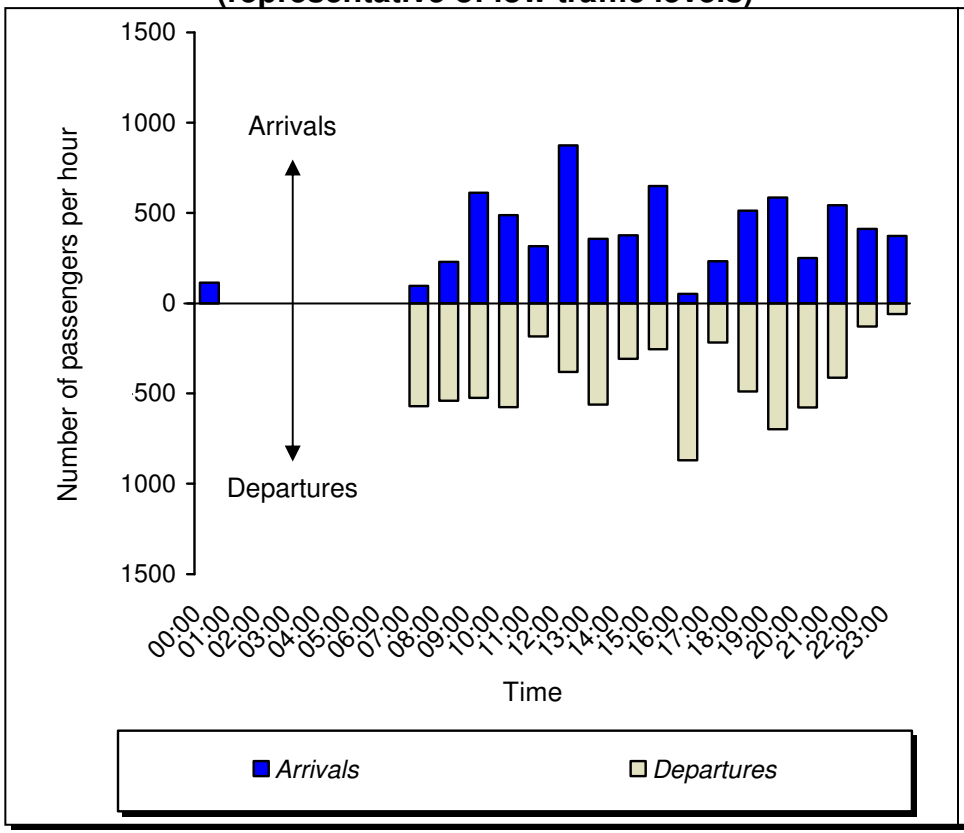


Departures from Pier A peak at around 1,200 passengers per hour and are, on average, generally greater than 500 passenger per hour between 07:00 and 24:00

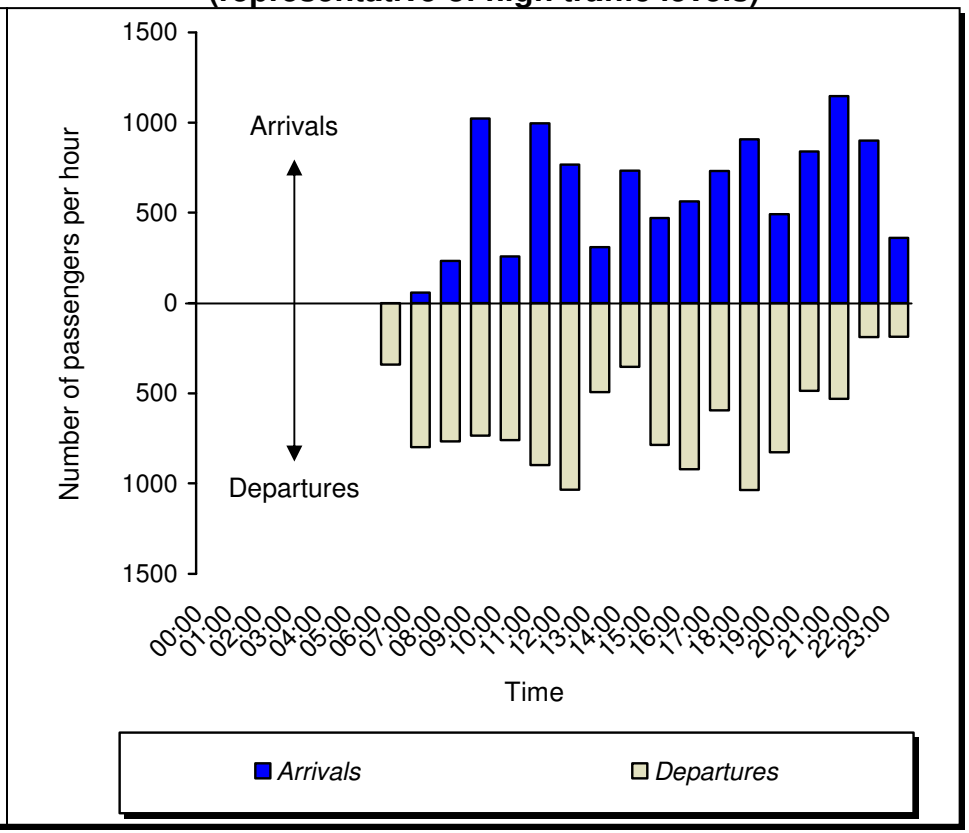


Counter-flowing, un-segregated arrivals and departures can add to congestion in Pier A at most times of the day

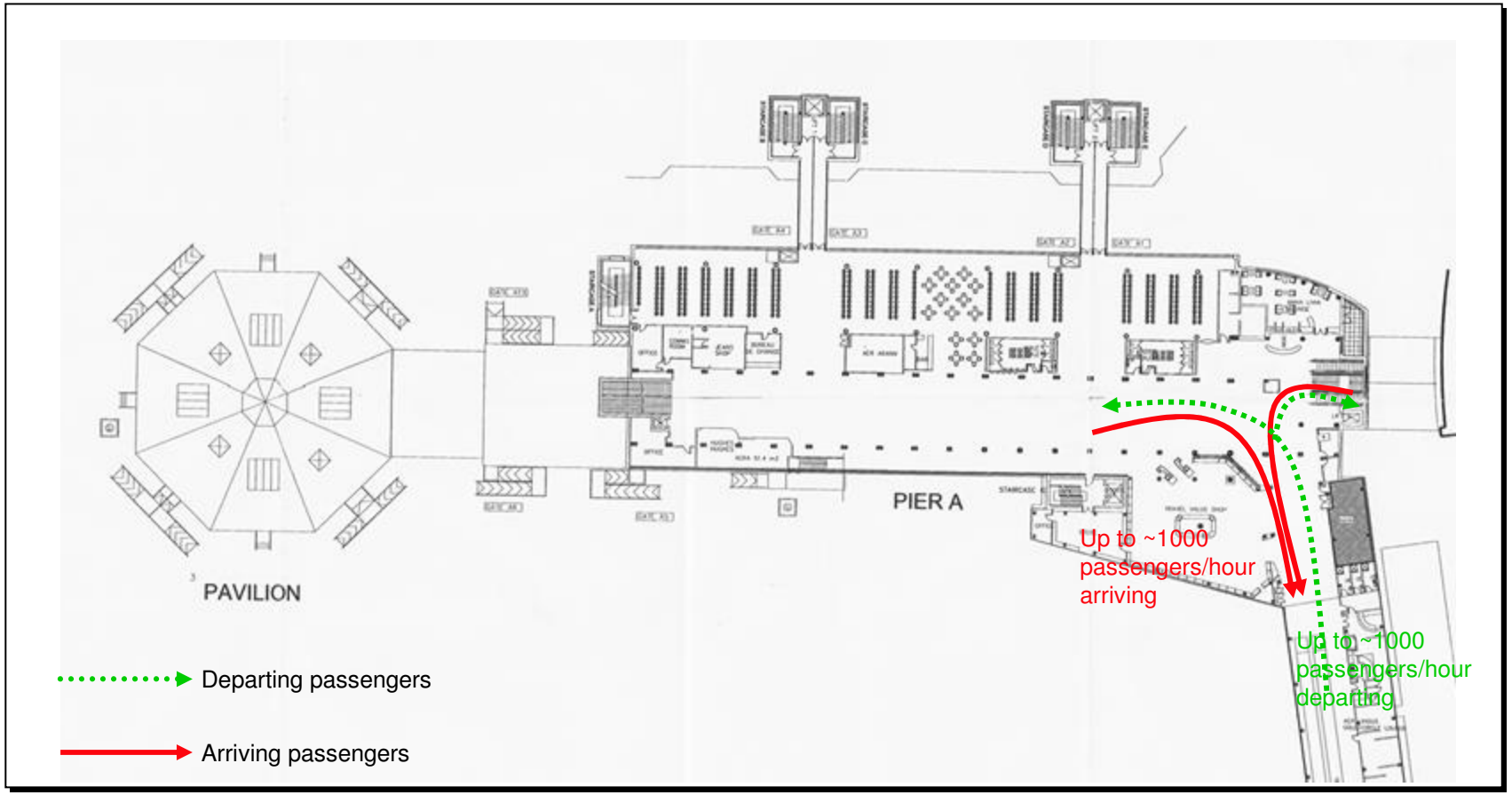
Arriving and departing traffic on a Tuesday in March 2004 (representative of low traffic levels)



Arriving and departing traffic on a Sunday in July (representative of high traffic levels)



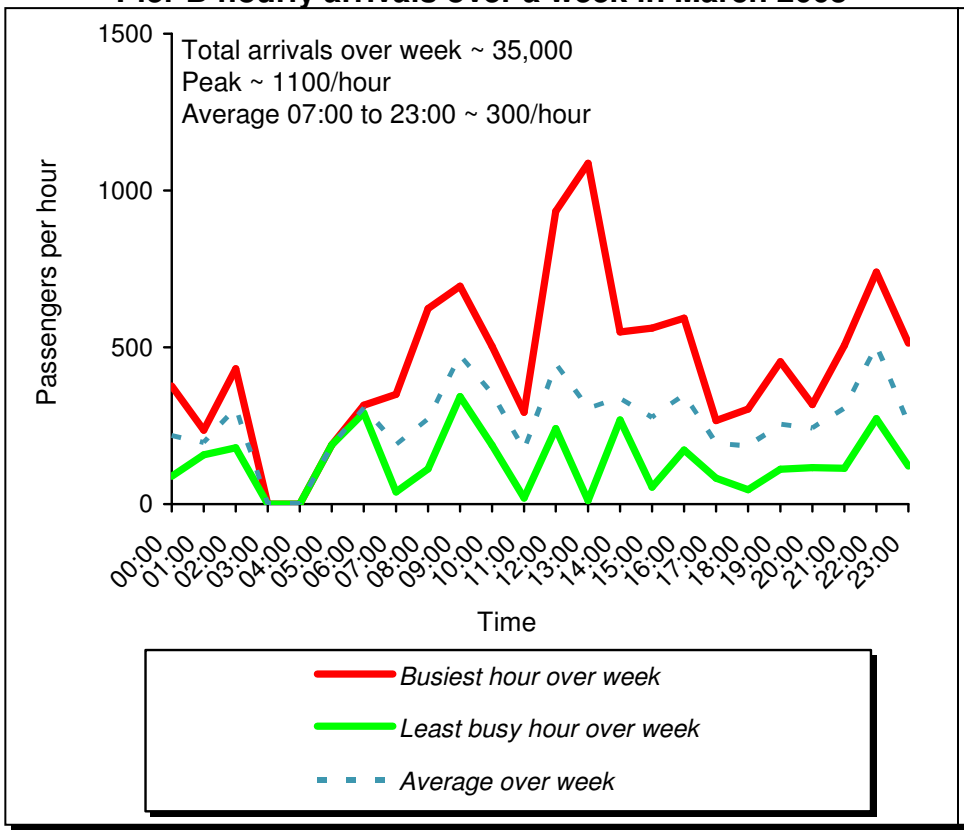
The entrance to Pier A can be extremely congested with up to 1,000 passengers per hour moving in opposite directions and potentially over 350 passengers interacting at gates serving B737-800 aircraft*



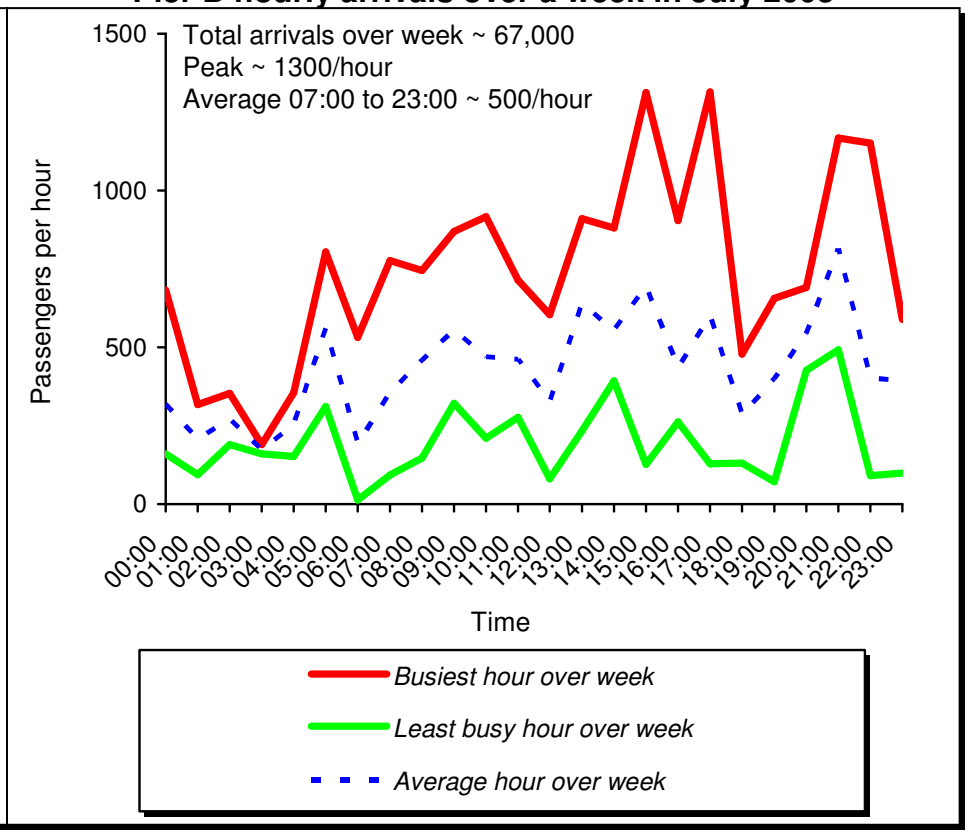
* Arriving passengers coming through the gate interact with departing passengers waiting to board the newly arrived aircraft. B737-800s have a capacity of 189 passengers meaning potentially 378 people using the same gate

There is considerably more arrivals traffic at Pier B during the summer schedule than the winter, with peaks of over 1,300 passengers per hour at busy times

Pier B hourly arrivals over a week in March 2003

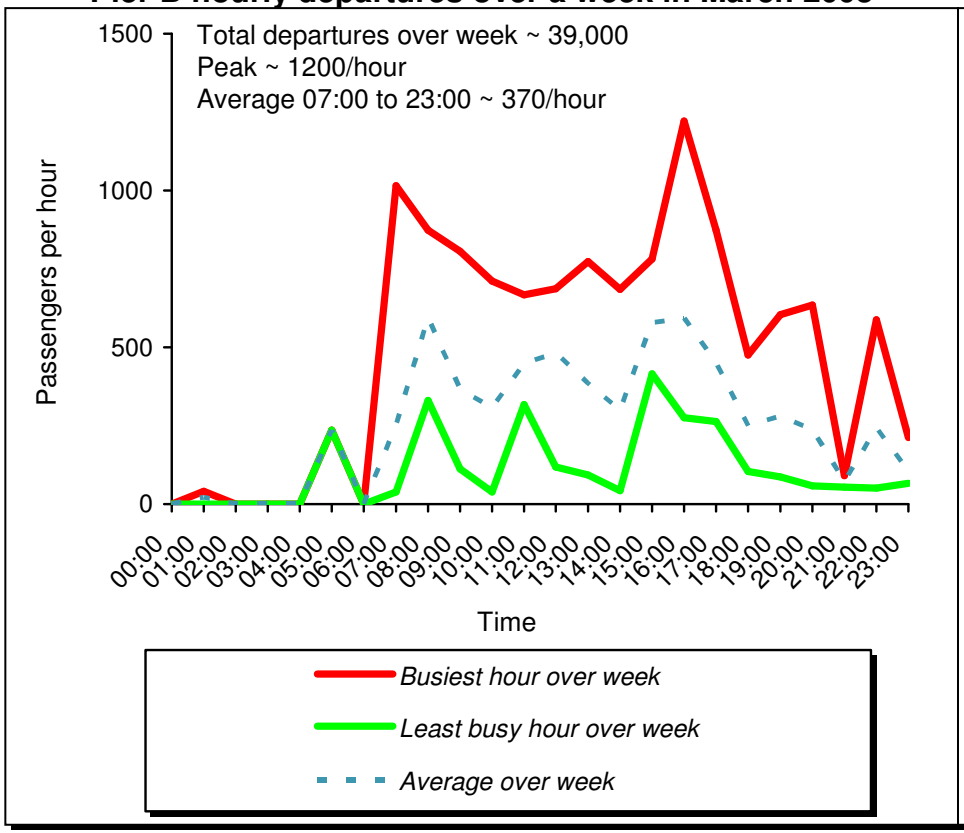


Pier B hourly arrivals over a week in July 2003

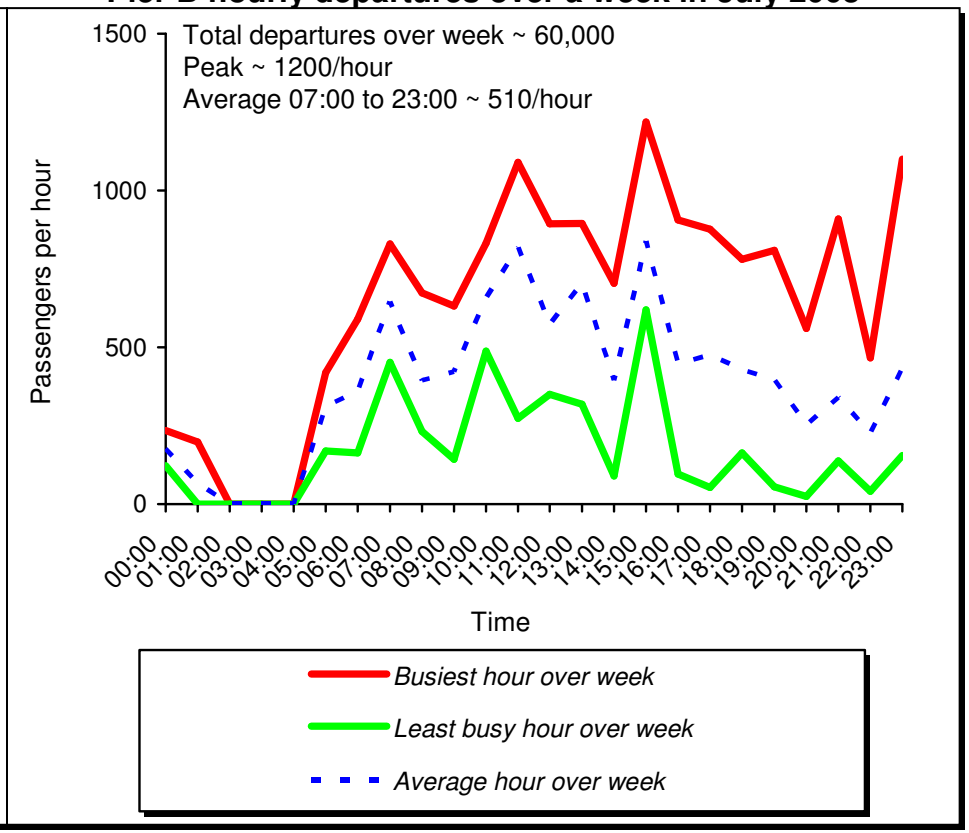


Departures from Pier B are also significantly higher during the summer schedule with peaks of around 1,200 passengers in a busy hour

Pier B hourly departures over a week in March 2003

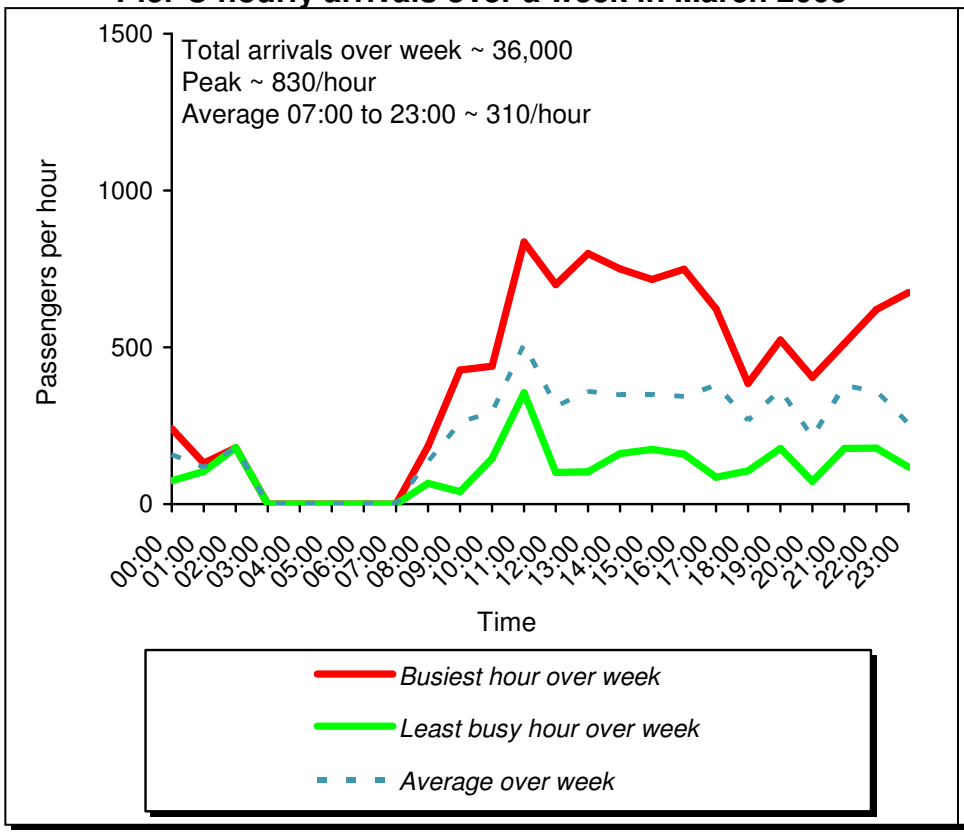


Pier B hourly departures over a week in July 2003

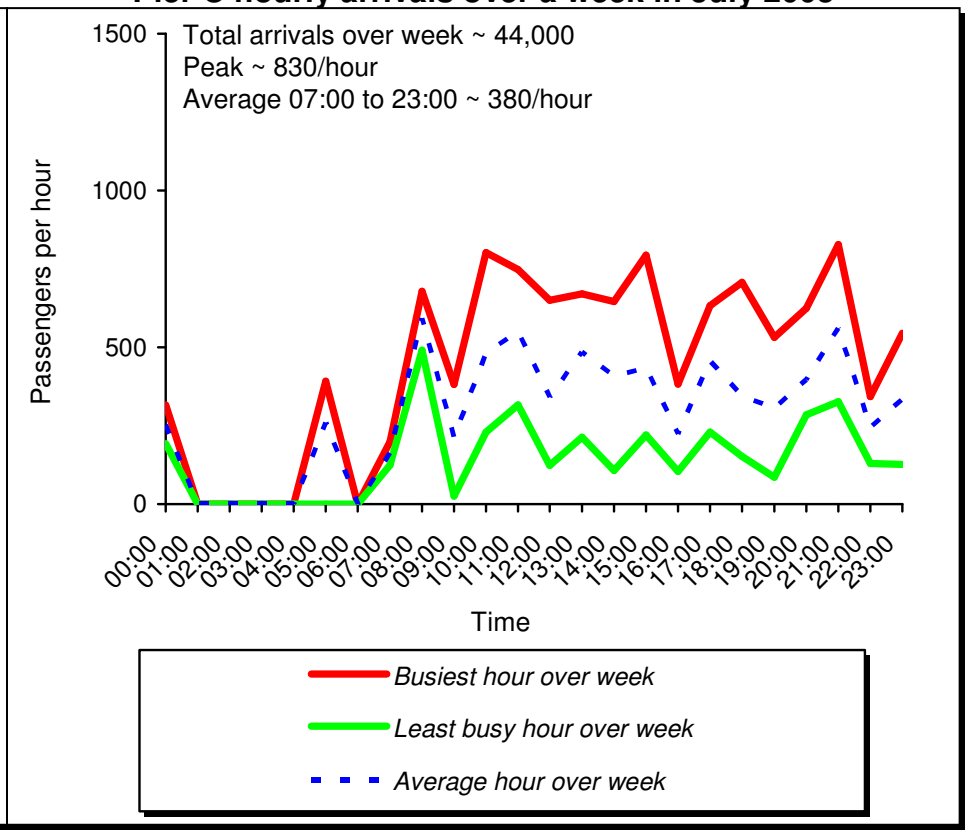


Arrivals traffic at Pier C is not highly peaked with relatively little traffic differences between winter and summer schedules

Pier C hourly arrivals over a week in March 2003

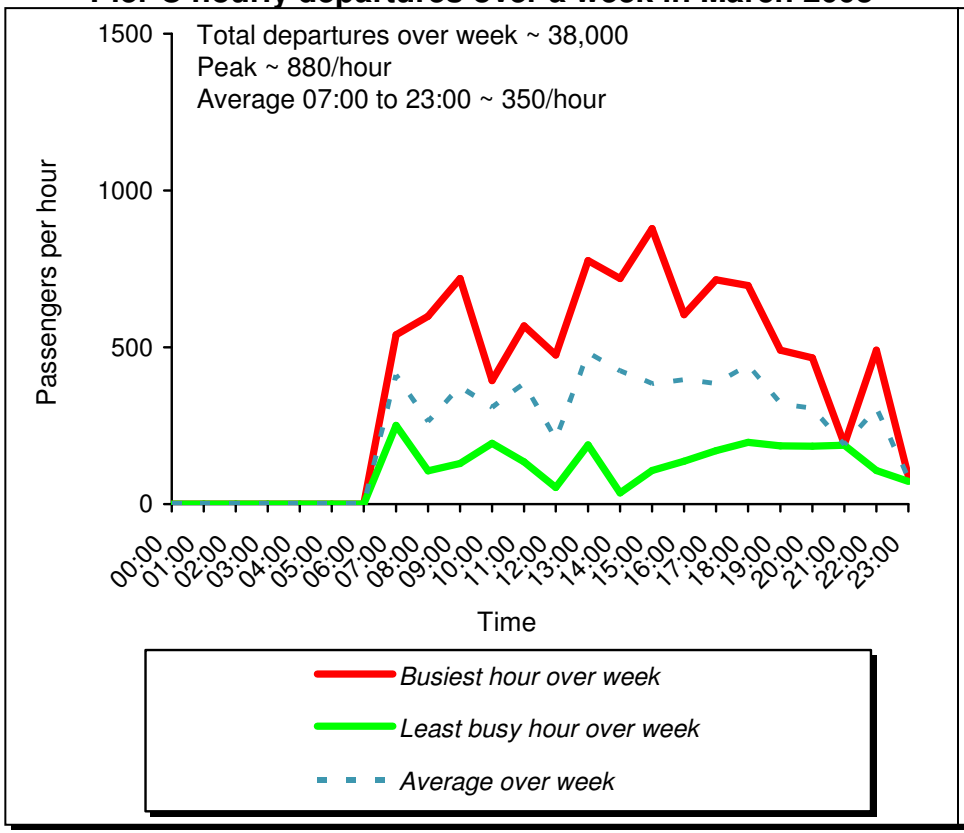


Pier C hourly arrivals over a week in July 2003

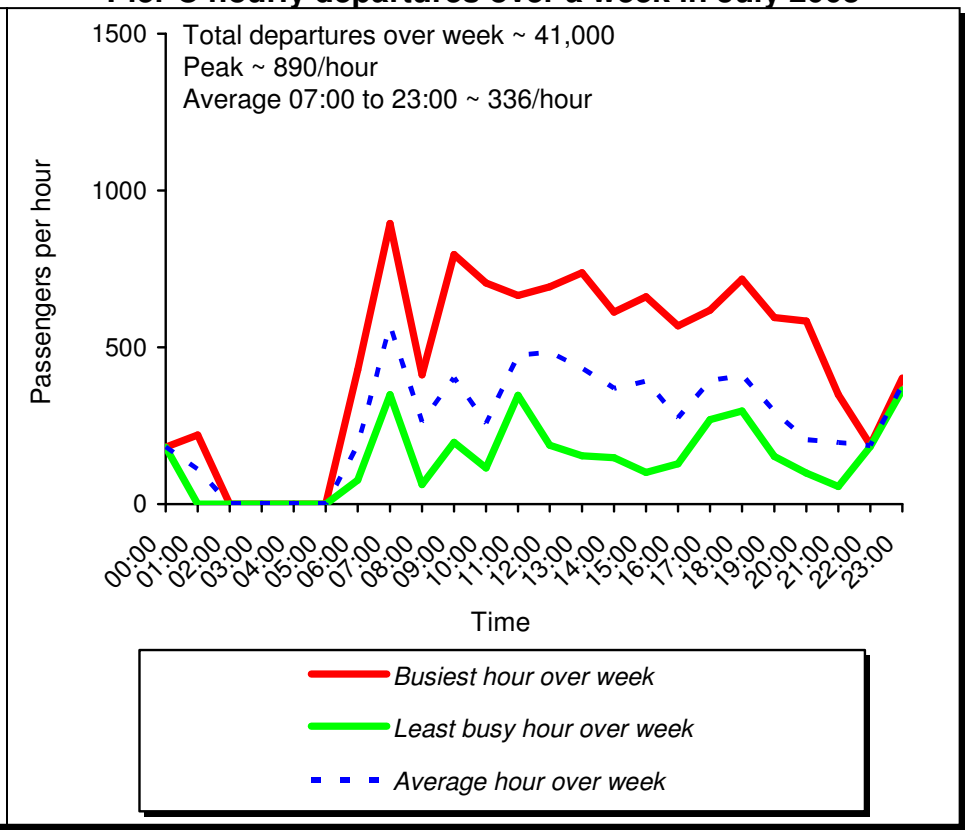


Similarly, Pier C departures are evenly distributed across the day, after around 07:00, with similar traffic levels in winter and summer

Pier C hourly departures over a week in March 2003

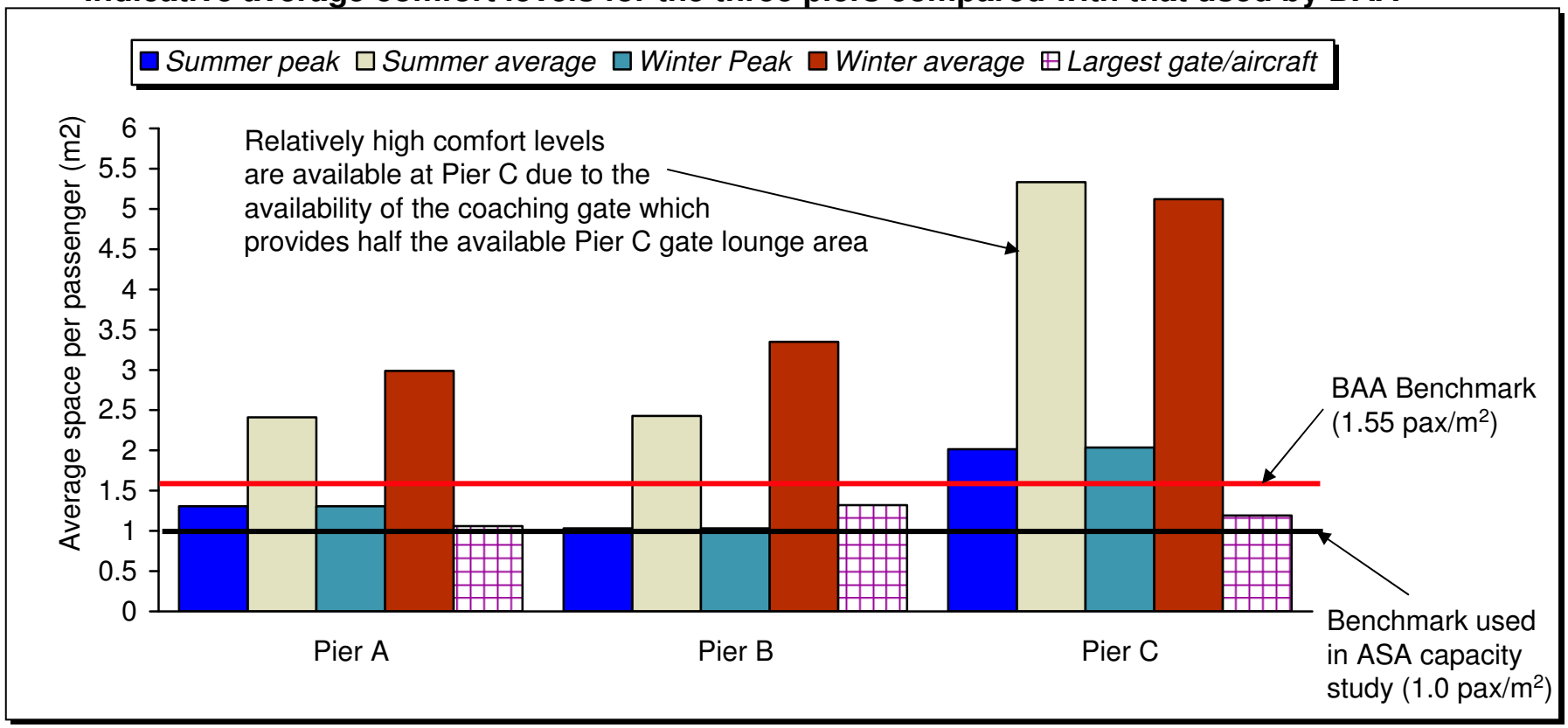


Pier C hourly departures over a week in July 2003



Comfort metrics, in terms of the space available to passengers, indicate that the gate lounges at Piers A and B are crowded at peak times

Indicative average comfort levels for the three piers compared with that used by BAA



Source: DAA, ASA capacity study

Note: Comfort levels indicated above can only be viewed as indicative as they represent an average, assuming uniform spread of passengers across the available space. In reality, bunching will occur, decreasing the comfort level

Analysis of existing operations

- Traffic
- Airfield
- Apron and stands
- The piers
- The arrivals hall
- The departures hall
- Other services

Inbound passengers from the three piers converge on the arrivals hall to collect their baggage and to exit through one of two customs gates

- Inbound passengers from Pier A enter at one end of the baggage hall and inbound passengers from Pier C enter at the other end
- Inbound passengers from Pier B enter at the centre of the baggage hall
- All inbound passengers exit the baggage halls through one of two customs gates which are located at the centre of the baggage hall, on the opposite side to the Pier B arrivals point
- If passengers did not need to collect baggage, movement through the baggage hall would be straightforward; however, as described on the next page, the configuration of the baggage system creates a significant amount of cross-movement

The configuration of the baggage system in relation to the entrances and exits of the arrivals hall can lead to congestion

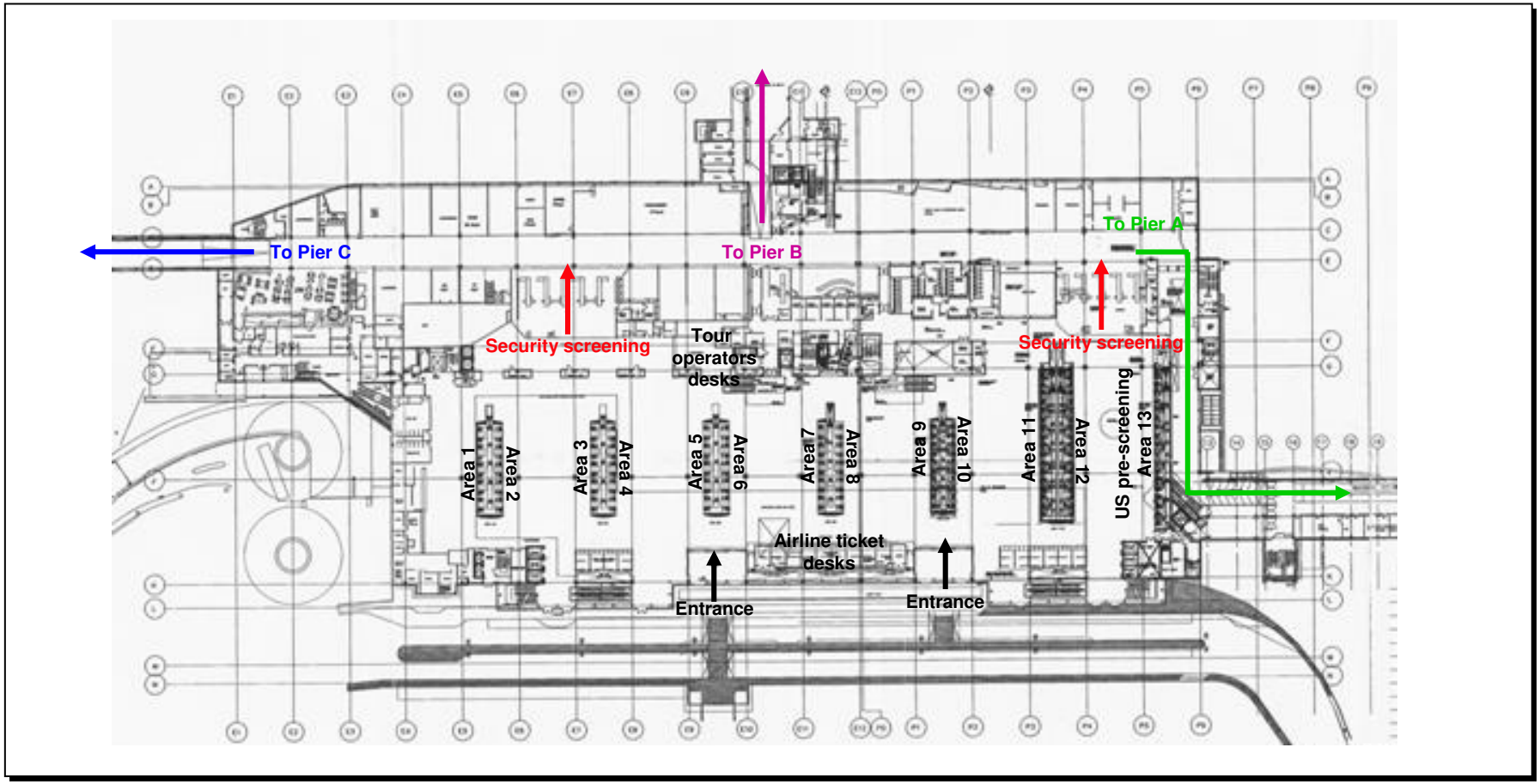
- The majority of passengers arriving at Pier A collect baggage from belts 1 to 5 at the opposite end of the baggage hall from their entry point
  - this passenger flow is in conflict with passengers arriving at Pier C and to a lesser extent passengers from Pier B collecting baggage from Belts 6 to 10
  - the situation may be relieved to some extent by Aer Lingus Pier A passengers collecting baggage from Belt 10A (the over sized baggage belt at the wall next to Belt 10)
- Some belts have insufficient capacity for the amount of baggage carried on larger aircraft and even those now used for short-haul such as the A321 and B737-800
- At times, the level of use of belts in the arrivals hall is unbalanced
  - belts 1 to 5 are normally most heavily used
  - at peaks in charter operations, the situation is reversed with the balance of usage shifted to Belts 6 to 10
- The two customs points are designed to facilitate passenger exit from Belts 1 to 5 and 6 to10 respectively
  - often only one exit is open, due to customs resource constraints beyond the control of the airport leading to additional congestion
  - combination of the two customs posts into a central, single exit is under consideration

Analysis of existing operations

- Traffic
- Airfield
- Apron and stands
- The piers
- The arrivals hall
- The departures hall
- Other services

There are 142 conventional check-in desks in the departures hall, distributed between 13 check-in areas and 37 self-service kiosks

Layout and passenger flows in the departure hall



Source: DAA, BAH analysis

Bye-laws and voluntary service level agreements are in place to limit queue lengths and control congestion in the check-in area

Bye-laws and service level agreements

- Check-in desks must open at least 2 hours before the scheduled departure time of the flight
- The number of desks depends on the number of seats offered on the flight:
  - Flights with <50 seats must have >1 desk operational
  - Flights with >51 but <200 seats must >2 desks operational
  - Flights with >201 seats must have >3 desks operational
- Airlines must manage their queues to remain within specified boundaries within the environs of their check-in desks for 90% of the time

Source: DAA

Observations

- The bye-law assumes check-in desks are dedicated to specific flights (most cases at DUB), but is not valid where flights are combined across check-in desks
- Congestion occurs due to insufficient space between the check-in islands and over-spill of queues beyond their restricted areas
- Other queues, e.g. at ticketing desks, can spill out into the concourse and traffic flows, e.g. tour operators desks can conflict with queues
- Check-in times vary depending on the procedure used, typically on average (with wide variation):
  - 20 seconds for a self-service desk (a)
  - 2 additional minutes for baggage drop for self-service check-in (a)
  - around 1.5 minutes for a CUTE check-in with baggage (a), (b)
  - around 1 minute for a CUTE check-in, hand-baggage only (b)
  - 50 seconds for a manual check-in, hand baggage only (b)
  - around 2 minutes for a charter check-in (b)
  - around 4 to 5 minutes for a US check-in (a)

Sources: (a) Aer Lingus, (b) ASA report on Dublin airport capacity, Ryanair, bmi

The causes of congestion in the check-in hall are multifarious with many beyond the direct control of the DAA

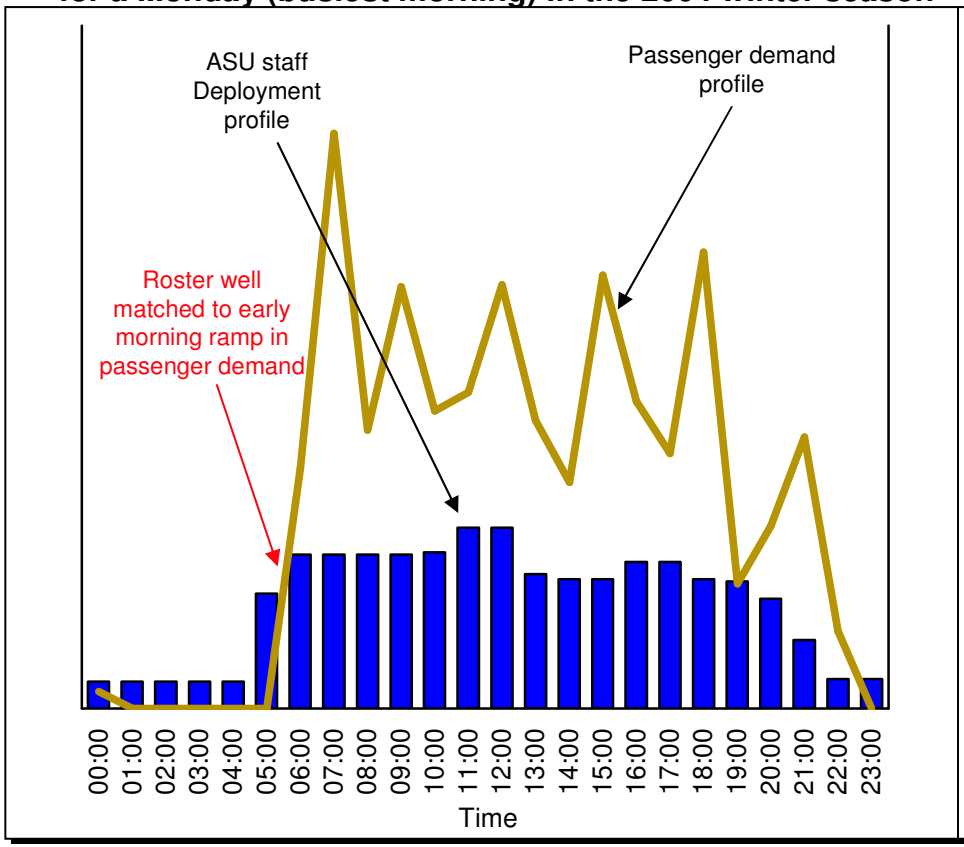
- Service level agreements are voluntary and not enforceable
  - these would need to be made mandatory and uniform to be effective, but may be complex and difficult to monitor and enforce
- Different airlines and handling agents have very different levels of check-in performance, ranging from less than one minute per passenger to over four minutes for trans-Atlantic passengers
- Demand is not distributed evenly across the check-in islands
  - Ryanair carries approximately 30% of the airport's traffic but only occupies one island in check-in areas 7 and 8, equating to 14% of the check-in desks
- Despite the high usage of self-service check-in terminals for some flights, this has not led to reduction in the allocation of manual check-in positions
- Some capital works are likely to be required, in addition to process improvements, to restructure the check-in hall to ameliorate the congestion problems

Passengers transit airside through either of two security screening areas

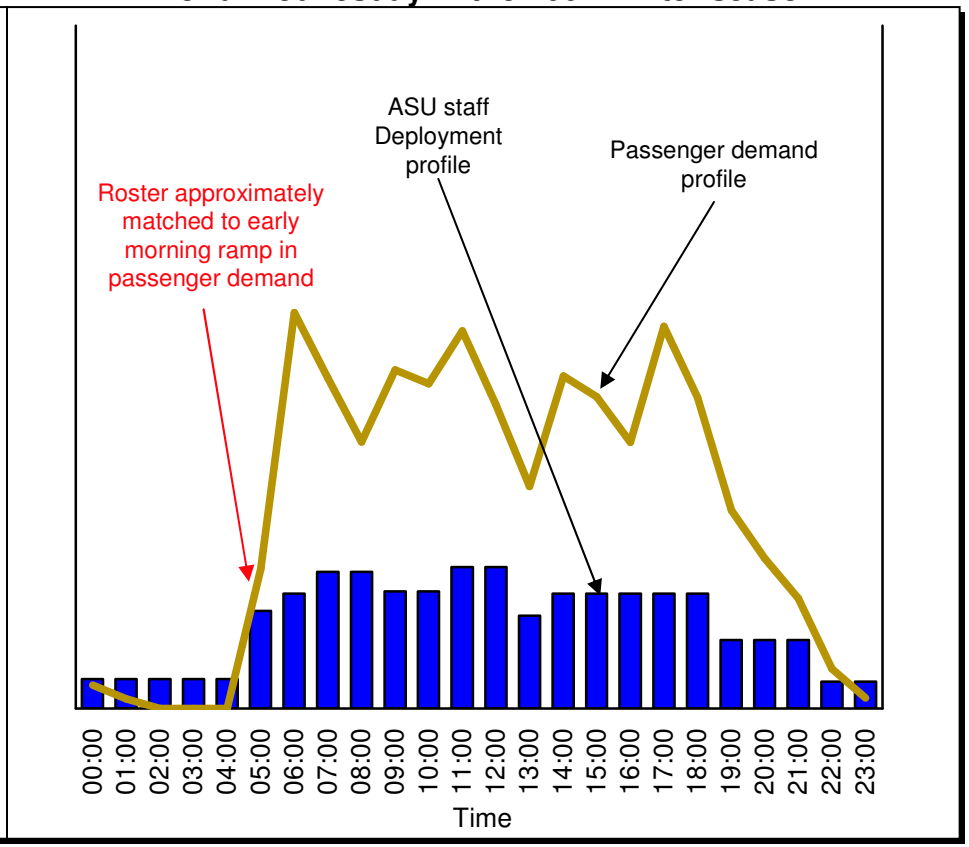
- The security screening area at the Pier A end of the check-in hall has five X-ray machines, and the one at the other end has six X-ray machines
- There is a statutory requirement for five staff to be allocated to each operational X-ray machine
- The throughput target, which is achieved, is for the maximum queuing time from a certain point in the security queue to be less than seven minutes, 95% of the time
  - Airport Search Unit (ASU) staffing levels at the X-ray machines are adjusted to meet the target
  - however, the target, as a service quality indicator, is difficult to interpret as it does not take into account queuing times when the extent of the queue is greater than the marker point
- Anecdotal evidence from airlines suggest that the ASU roster is not matched to passenger demand during the early morning peak
  - comparison of demand profiles and ASU rosters for winter and summer 2004 (see following two pages) indicates this may be the case in the summer season, but is generally not the case in the winter season, unless absence of staff through sickness is the problem
  - the figures on the following two pages only compare supply and demand profiles, not efficiency – this is assessed later in the report
- As an interim mitigating measure in busy periods, and in well-defined circumstances when queues become long, airlines could be permitted to advance passengers through security queues in order to meet their on-time departure performance requirements

Passenger traffic profiles and ASU rosters are reasonably well-aligned in winter 2004

Comparison of ASU roster and passenger demand profile for a Monday (busiest morning) in the 2004 winter season



Comparison of ASU roster and passenger demand profile for a Wednesday in the 2004 winter season

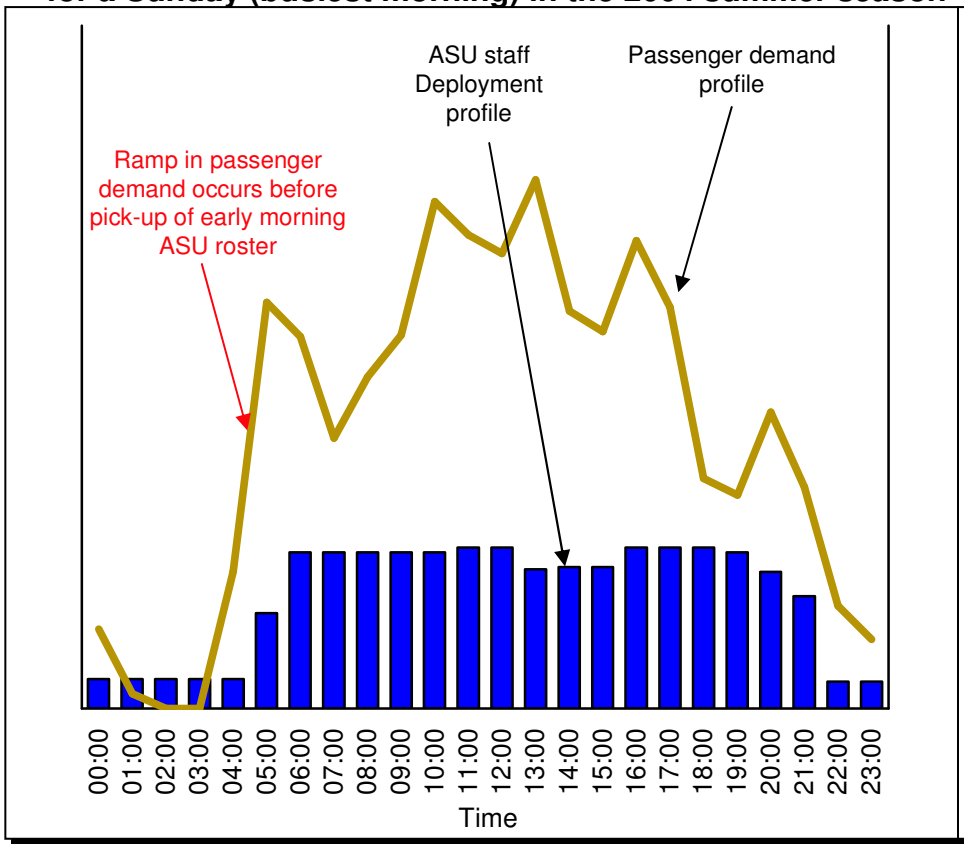


Source: DAA, BAH analysis

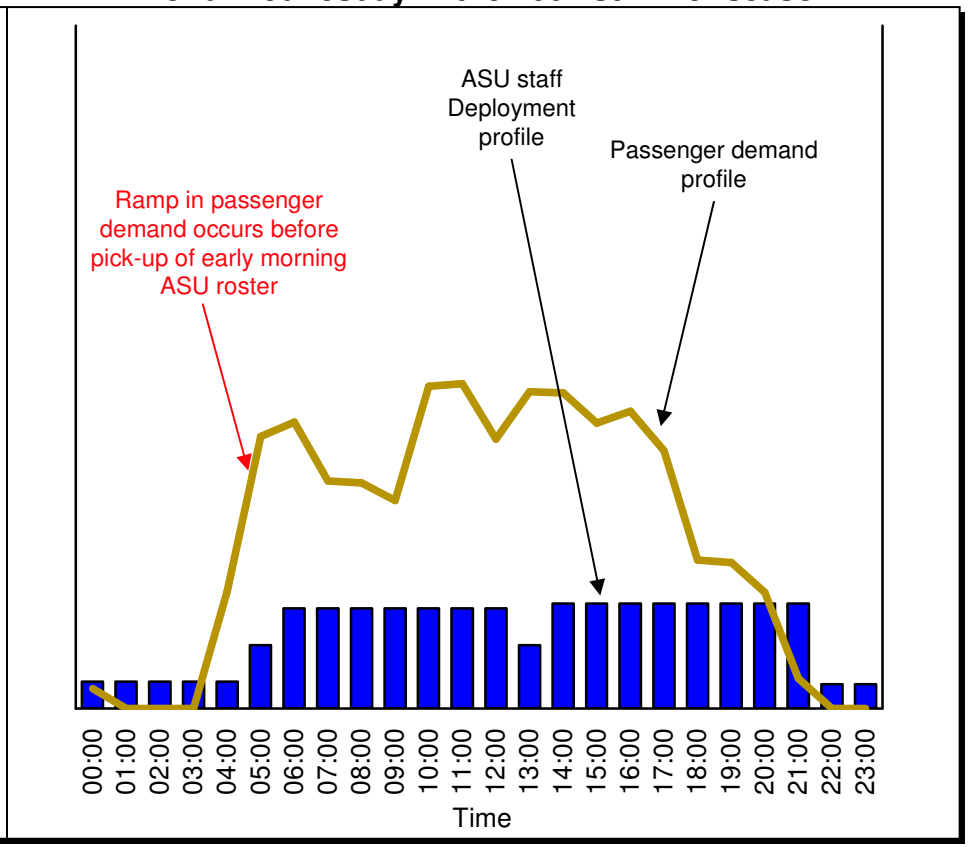
Note: Passenger demand profile assumes that 60%of passengers arrive at the airport between 1 and 2 hours prior to departure with the remainder arriving less than 1 hour before actual departure.

However, the first traffic peak appears to occur slightly before the full deployment of staff in the summer 2004 ASU roster

Comparison of ASU roster and passenger demand profile for a Sunday (busiest morning) in the 2004 summer season



Comparison of ASU roster and passenger demand profile for a Wednesday in the 2004 summer season



Source: DAA, BAH analysis

Note: Passenger demand profile assumes that 60%of passengers arrive at the airport between 1 and 2 hours prior to departure with the remainder arriving less than 1 hour before actual departure

Analysis of existing operations

- Traffic
- Airfield
- Apron and stands
- The piers
- The arrivals hall
- The departures hall
- Other services

The DAA provides a number of other services comprising a wide range of activities

- Roads and traffic management
- Car parking
- Maintenance
- Operation of the baggage handling system
- Provision and management of baggage trolleys
- Customer services and passenger handling
- Cleaning

With respect to roads and kerbside traffic management, DAA performs a number of functions

- Maintenance and upkeep of the airport roads, including some out-of-perimeter roads as well as those accessing the terminal
  - these responsibilities are defined under the Road Traffic Act
  - maintenance is outsourced
  - DAA would prefer responsibility for out-or-perimeter roads to be transferred to the Local Authority, in line with normal practice elsewhere, and is involved in discussions to this end
- Licensing of taxis and management of taxi pick-up points outside the arrivals hall
  - all applications from Dublin taxis are currently granted a licence
  - a fee of 75c is collected manually from each taxi at the holding zone
  - automation of processes and a taxi concession scheme are under consideration
- Access to the departures terminal can be very congested during peak periods especially during the early morning peak comprising a variety of traffic:
  - private cars (accounting for 42% of traffic)
  - taxis
  - buses
  - hire cars being returned to car rental companies located at the terminal building
- Work to improve traffic flows has commenced

The DAA also operates both short- and long-term car parks

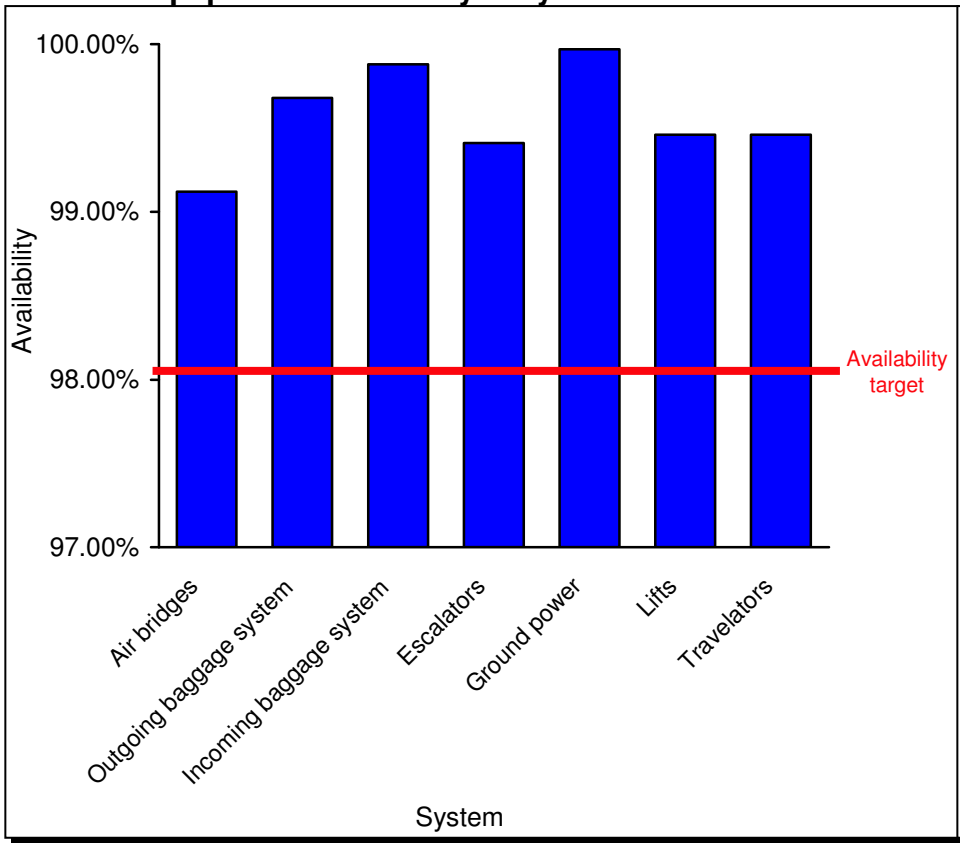
- Around 4,000 short-term parking spaces are provided near to the terminal in a multi-storey and a surface car park
  - prices are benchmarked against mid-range city centre prices
- Short-term car parking capacity is inadequate during peak times, although overall capacity is predicted to be adequate until around 2007
- DAA reports that it is investigating schemes to manage demand for short-term car parking during peak periods, including
  - premium pricing
  - pre-booked guaranteed spaces
- DAA operates around 14,000 long term car parking spaces. With the introduction in December 2003 of "Quick Park" (3500 spaces), competition for long-term car parking is increasing.
- Staff car parking accounts for a significant proportion of car parking at the airport
  - *Dublin Airport Internal Road Network Review* (Arup, 2002) indicated some 5,360 spaces which was forecast to decline to 4,065 spaces by 2018
  - the report also indicated some 1,850 other non-passenger spaces
- Revenue generated by car parking is being addressed as part of the *Review of Commercial Revenue Forecasts* being undertaken on behalf of the CAR as a separate study

Maintenance activities cover both airside and ground-side

- Maintenance policy is in-line with accepted practice that airport-specific activities are performed in-house specifically: airside, the baggage system and communications
  - a mix of condition- and time-based maintenance is applied
  - contractor support is used when additional resources are needed from time-to-time
  - currently most maintenance is performed in-house but it is intended to withdraw from basic maintenance of areas of the airport not occupied by DAA
  - some market-testing has been performed for specific areas, e.g. groundside lighting, with the result that in-house maintenance proved to be cheaper
  - the availability of local specialist maintenance contractors is very limited
- Maintenance covers mechanical services, electrical services, baggage systems, communications, carpenters, sign-writer, painting contracts manager (large painting jobs are contracted out) and plumbing
- Industrial relations have been good over the past few years
  - staff numbers relative to traffic levels have been reduced
  - multi-skilling is used to overcome demarcation issues

Equipment availability is monitored and measured against a 98% target – this target has been met and exceeded

Equipment availability for year to October 2004



Comments

- The availability of 170 assets in six categories – air bridges, outgoing baggage system, incoming baggage system, escalators, ground power, lifts and travelators – is monitored
- Baggage system performance is published monthly
- Customer views on availability are surveyed annually
- The monitored systems all met the 98% and exceed the availability target over the period January to October 2004 as indicated in the chart
- More detailed analysis indicates that a few systems within each category failed to meet the target over this period
  - air bridge AB2 (out of 15 in total)
  - lifts CP5, PT18 and PT31 (out of 66 in total)

There are two independent baggage handling systems

Original system	New system

• Serves check in islands 1 to 8
• Serves inbound baggage carousels 1 to 5
• Manual system
• Outbound and inbound baggage sorted on the same level
• Used predominantly by Pier A traffic (at the opposite end of the terminal)
• Level 3 security screened baggage dumped on Aer Lingus carousel
• Concern around health and safety issues concerning the out-of-gauge belt
	• Serves check-in islands 9 to 13
	• Serves inbound baggage carousels 6 to 10
	• Fully automated system using bar code readers to select bags to be dumped into the correct chute
	  • unread baggage is sent to a dump chute for manual repatriation (reported to be 30%)
	  • not usable by airlines using manual procedures
	• Baggage system is split across two floors
	  • inbound baggage is taken to the lower floor
	  • outbound baggage is dispatched from the upper floor
	  • difficult for a baggage train to deposit inbound and pick-up outbound baggage on the same trip
	  • issues concerning turning circles for baggage trains
	• Used predominantly by Pier B and Pier C (at the opposite end of the terminal)

The configuration and associated usage of the systems has a major impact

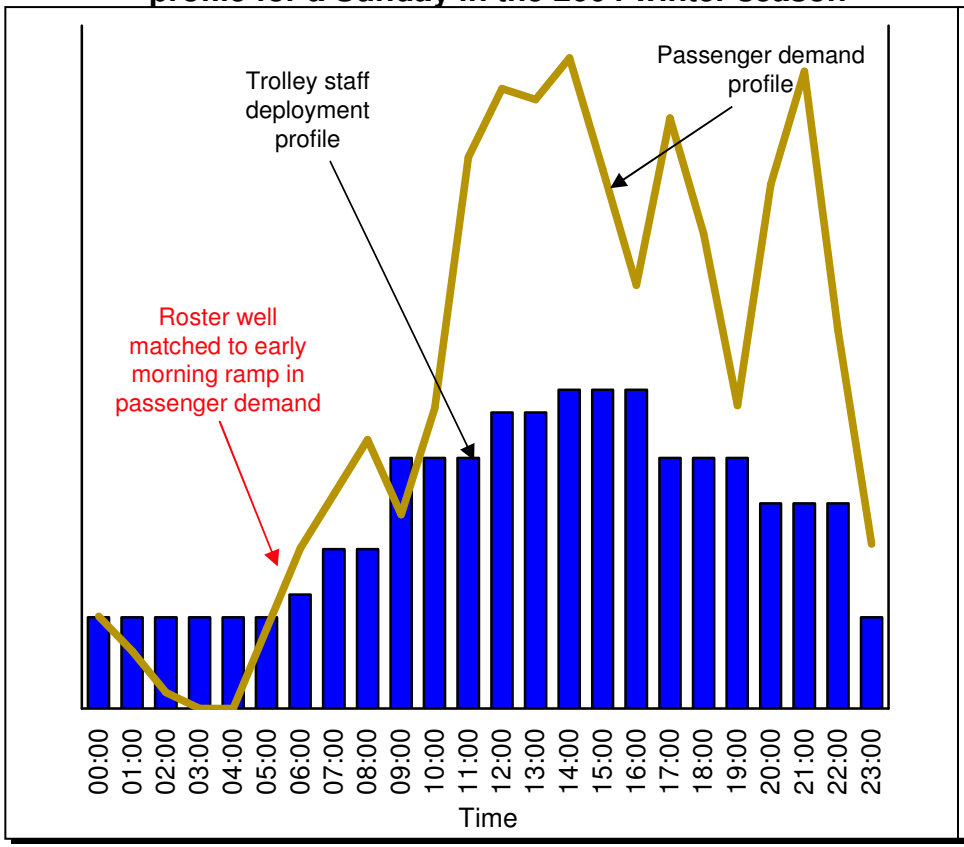
- Pier A users choose, or are restricted to using, the old baggage system
  - the new system is not compatible with manual check-in processes
  - the new system does not facilitate the optimisation of baggage handling processes
- Pier A is thus served by outbound and inbound baggage facilities at the opposite end of the terminal
- Pier C users are forced to use the new system also at the opposite end of the terminal
- This has a number of consequences
  - passenger traffic is forced to cross in the baggage hall
  - the distance that handling agents must travel to/from aircraft from/to the baggage hall cannot be optimised
  - flexibility in allocating check-in desks is restricted

In response to demand from passengers, the coin-operated trolley system was abandoned in December 2004

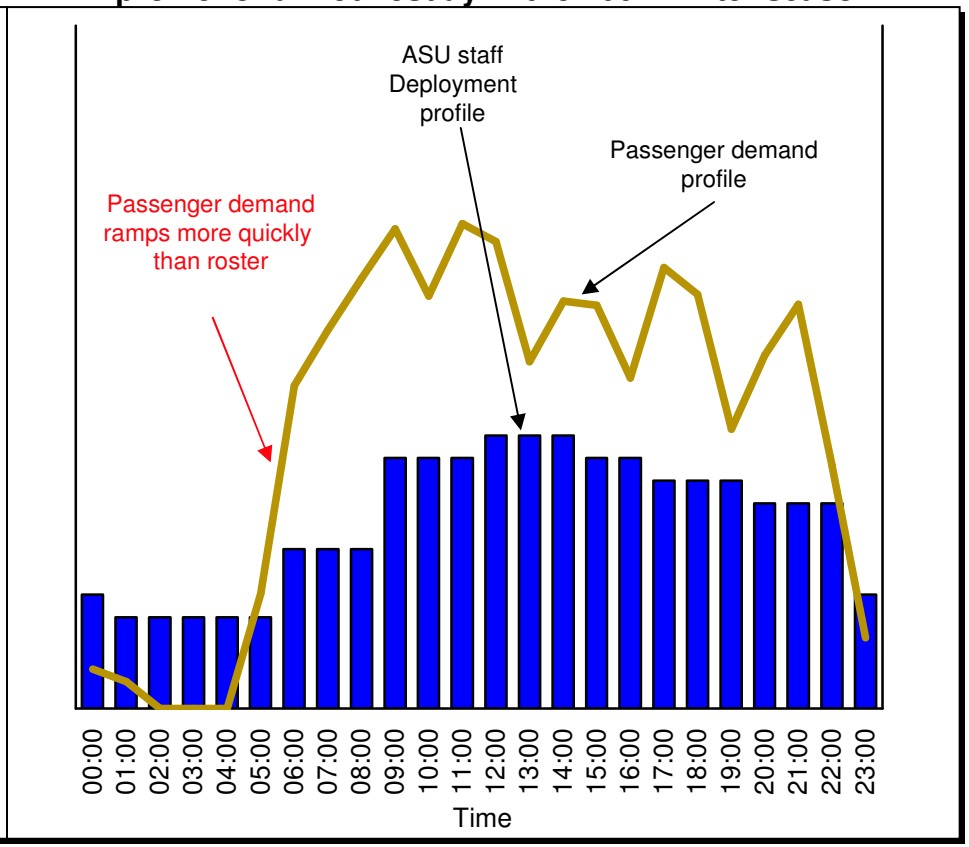
- Management of the complement of 3,500 trolleys is carried out in-house by DAA
- Removing the coin-operation mechanism has improved the quality of service to passengers, but increased costs as more staff are now needed to return trolleys to holding bays
- Advertising on trolleys is a potential source of revenue, actively pursued by DAA
  - space is currently sold on 1,000 trolleys
- Trolley staff resource deployment appears to be slightly mismatched with workload at the morning peak period (see the following two pages)
  - assuming that workload is directly related to passenger traffic, both arriving and departing

Passenger traffic profiles and trolley staff rosters are better aligned in winter

Comparison of trolley staff roster and passenger demand profile for a Sunday in the 2004 winter season



Comparison of trolley staff roster and passenger demand profile for a Wednesday in the 2004 winter season

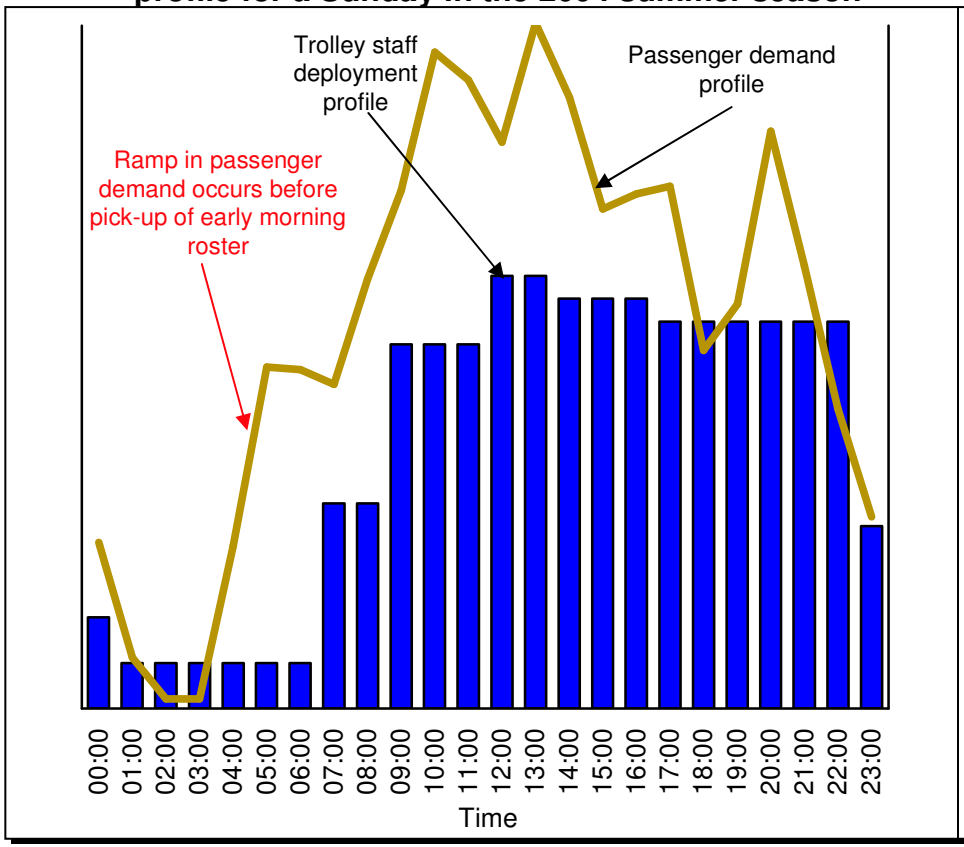


Source: DAA, BAH analysis

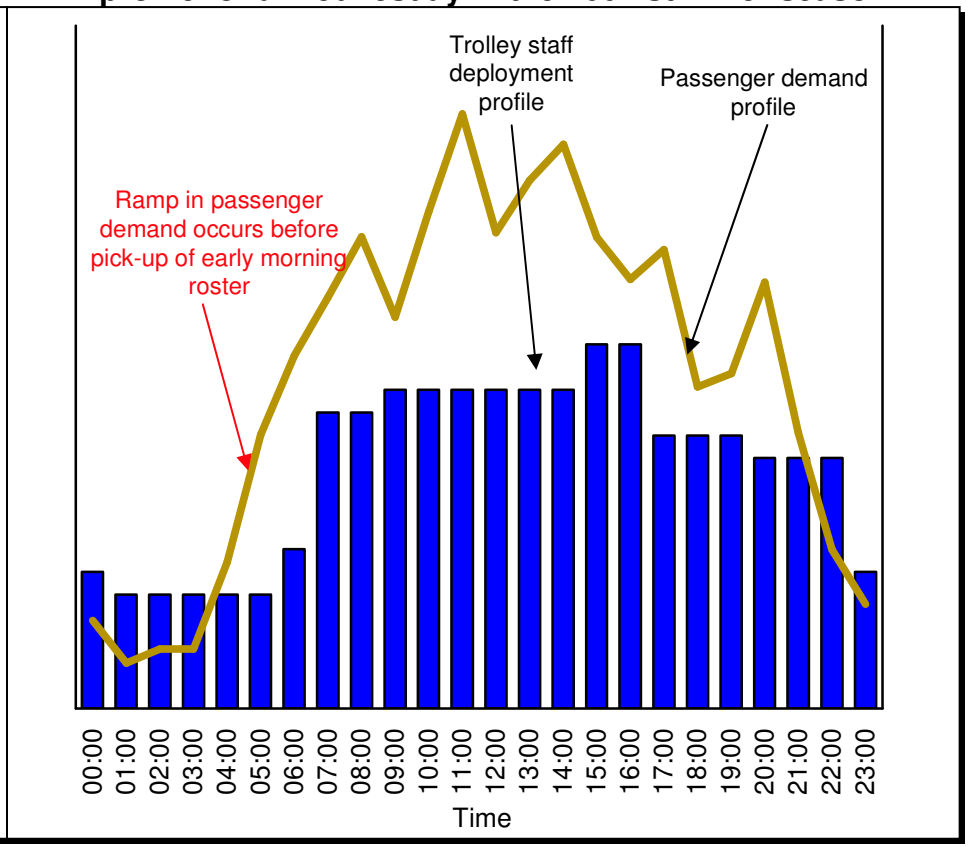
Note: Passenger demand profile assumes that 60%of passengers arrive at the airport between 1 and 2 hours prior to departure with the remainder arriving less than 1 hour before actual departure. 50% of arriving passengers are assumed to leave the airport within 1 hour of arrival with the remainder leaving within two hours of arrival

Traffic profiles and trolley staff rosters are not so well aligned in summer concerning the first morning peak

Comparison of trolley staff roster and passenger demand profile for a Sunday in the 2004 summer season



Comparison of trolley staff roster and passenger demand profile for a Wednesday in the 2004 summer season



Source: DAA, BAH analysis

Note: Passenger demand profile assumes that 60%of passengers arrive at the airport between 1 and 2 hours prior to departure with the remainder arriving less than 1 hour before actual departure. 50% of arriving passengers are assumed to leave the airport within 1 hour of arrival with the remainder leaving within two hours of arrival

DAA provides a number of passenger-related services in the terminal building

- Currently, passengers entering the check-in area have to refer to small screens at the side of the entrance for check-in and gate information
  - a large state-of-the-art display screen is planned for the check-in concourse and is due for implementation by May 2005
- Further passenger information is relayed though a number of flight information display systems (FIDS)
  - eight page layouts are used, depending on the particular application, as is normal practice
  - the positioning and orientation of the FIDS is not always optimal
- DAA has a new unit specifically focused on passenger operations management
  - this unit deals with the smooth running of the terminal and is a combination of existing roles with some new functions
  - the objective is "*to reconnect the airport to the passenger*"
- Passengers with reduced mobility are a special case needing dedicated handling
  - this specialist handling is provided by two agents
  - the infrastructure to support this handling is sometimes inadequate, e.g. lack of holding areas

During the summer of 2004, the airport put temporary passenger handling processes in place

- Head office staff participated as voluntary customer service agents in the terminal building
  - these staff provided information and passenger management services
  - the move was made in response to severe congestion and dissatisfaction on the part of passengers using the airport
  - this was viewed as a temporary measure to ameliorate an acute problem
  - in addition, the airport added temporary floor markings to create passage-ways through check-in areas to assist passengers in negotiating their way through the heavy congestion
- Although this initiative was successful, in the longer term, it is the airport's view that airlines and handling agents should manage passenger flows and congestion, in line with enforceable service level agreements

DAA provides a range of in-house cleaning services, both for its own and for some third party facilities

- The services provided are terminal and office cleaning, window cleaning and pest control
- In-house cleaning staff clean DAA facilities and third-party front-of-house facilities
  - third party back-office cleaning is the responsibility of the lessees
  - cleaning of the mezzanine level is outsourced
- Cleaning resource requirements are not driven directly by passenger numbers
  - certain cleaning activities are best performed when the terminal is not busy and are driven by the size of the area to be cleaned
  - other cleaning activities are associated with passengers, e.g. emptying litter bins, and are driven by both passenger numbers and the size of the area to be cleaned
  - further analysis of cleaning is presented later in this report

Airport quality of service

- Introduction
- Passenger handling and throughput
- Aircraft handling and throughput

Going forward, definition of the outputs generated by the airport is required to ensure cost efficiency measures do not degrade quality of service

- At present, some key performance indicators are defined in an ad-hoc way focusing on individual, but nonetheless important, factors
- In a complex, interactive environment, such as an airport, the interplay between the actors is extremely important and it is necessary that all actors involved in a particular process fulfil their obligations to ensure the overall quality of the process is maintained
- Currently, there are no mechanisms for enforcing informal service level agreements
- The definition of quality standards must account for the requirements and concerns of all players involved, noting that in some cases these requirements may be in conflict
- A pragmatic approach is likely to be needed, balancing the needs of all to define quality factors for the common good
  - this will need considerable consensus building
- Many aspects of quality of service at an airport are created by capital rather than operating decisions
  - in principle, the CAR approach to capital investment ought to encourage DAA to make investments consistent with the desired quality of service
  - recently DAA has invested little at Dublin Airport and capacity is becoming strained reducing some aspects of quality of service
  - DAA has been taking operating decisions consistent with the aim to increase service quality

It is recommended that the definition of quality of service indicators is addressed during the determination

Experience in a wide range of regulated industries shows that incentive and penalty schemes must be carefully designed

- In principle, incentive regimes (if used) should be designed to incentivise economically efficient outcomes…
- …but perverse behaviour should not be incentivised
  - an example of perverse behaviour here would be the excessive delay of a particular flight, enabling other flights to leave on time to meet the overall punctuality target whereas distributing the delay over a number of flights would result in failure to meet punctuality targets
- Penalties should be set at levels whereby it is more attractive to meet the quality of service level rather than paying the fine for non-compliance
- Incentives and penalties should reflect the part played by the various actors in the process and should be apportioned accordingly
- Incentives and penalties must be transparent and non-discriminatory
  - they should be based on published performance indicators

At airports, the need for direct regulation of quality is less than in other regulated industries

In the short-term, a pragmatic approach would be to quantify and publish certain key aspects of service quality

- This falls short of full performance regulation and associated costs and pitfalls, but does highlight quality as a key performance indicator
- Many relevant performance indicators are already measured but not necessarily published
- Visibility will be given of the evolution of service quality, including the impact of cost regulation as well as traffic evolution
- Could be used as a “trigger” for investigation of capacity-related issues once service quality starts to degrade
  - determine when CAPEX may be necessary
  - quantify the effect of operational mitigation

Airport quality of service

- Introduction
- Passenger handling and throughput
- Aircraft handling and throughput

At present, passenger issues are generally only defined in terms of quantity – i.e. passenger numbers

- Metrics that could be used to qualify and characterise passenger throughput include:
  - time – e.g. how long it takes to move through the airport, broken down to the individual process level (check-in, security, boarding, baggage return, immigration, etc.)
  - space – e.g. how crowded are the various parts of the airport (check-in area, retail area (“the Street”), the piers, the individual gates, etc.)
  - comfort – e.g. what is the ratio of seating to passengers, what proportion of passengers use contact stands, etc.

- It must be noted that contributions to some metrics, e.g. those relating to check-in, baggage return, etc. are dependent on the contribution of (multiple) actors with more dominant roles than DAA
  - the interaction of the actors must be properly defined and agreed, including incentives and penalties (carrots and sticks), to encourage all actors to play their part

- Furthermore, there is likely to be disagreement over acceptable quality levels between some actors, e.g. seating is likely to be more important for high service rather than no frills carriers
  - service quality is likely to be subject to agreement by consensus across the parties, including CAR, DAA, the airlines, the handling agents, etc.
  - it may be appropriate to define different levels of service for different parts of the airport but this should be reflected in the charges levied
  - for some services, there is likely to be a uniform quality of service applicable to all actors (e.g. road access)

Other potential metrics are more difficult to measure or apportion between the players involved

- Cleanliness
  - difficult to measure
- Time for baggage return
  - depends on contributions from several different actors, including the airlines, airport and handling agents

The analysis of current airport operations in the previous section emphasises the importance of defining the correct metrics to avoid misleading conclusions

ILLUSTRATIVE

Metric	Comment	Suggestion
• Average space per passenger (assessed in previous capacity studies)	• Does not adequately deal with local effects such as bunching or of counter-directional passenger flow, • Current metrics give misleading results e.g. does not reflect high level of local congestion at Pier A or in the baggage hall • Does not cater for short-term peaks, which may be acceptable as long as they are transitory	• Define and monitor at a more local level accounting for peaks and average demand • Account for short-term peaks • Consider pinch points where passenger flows converge
• Queuing time (defined for security queues)	• Definition references a specific point in space for security queues • Not defined for other queues	• Define in terms of maximum acceptable time in queue for all relevant queues
• Proportion of passengers using contact stands	• No target currently defined, although performance is very good • Potential conflict with other quality measures, e.g. number of aircraft using contact stands	• Define as a quality metric, acknowledging potential interaction with other metrics
• Availability of passenger facilities (e.g. lifts, escalators, travelators, toilets, etc.)	• Some availability statistics are currently collected (performance is high)	• Define facilities to be assessed and target levels of availability
• Availability of airport provided airline services (e.g. baggage systems)	• No target currently defined but baggage system availability, for example, is poor but a CAPEX issue	• Define facilities to be assessed and target levels of availability

Increases in traffic will further degrade passenger comfort levels and increase congestion

- Mitigating processes can be put in place as a short-term palliative including:
  - queue management, e.g. more temporary barriers at pinch points
  - deployment of additional customer service staff as in summer 2004
  - accelerating near-time passengers through security queues
- In the longer-term, infrastructure developments are likely to be needed as capital projects
  - redevelopment of parts of Pier A is underway
  - utilisation of parts of the Old Terminal Building are being considered, subject to planning approvals

Airport quality of service

- Quality introduction
- Passenger handling and throughput
- Aircraft handling and throughput

The airport does not get directly involved in aircraft handling or ground handling

- The airport has created an environment, through application of the Council Directive 96/67/EC on access to the ground handling market at Community airports (implemented in Ireland under Statutory Instrument No. 505 of 1998) whereby market conditions have been created for ground and cargo handling
  - access is allowed to all suitably qualified handling agents
  - the airlines are then free to use their own criteria to decide whether to self-handle or which third party agents to use
- The airport does, however, provide some infrastructure necessary for handling to be performed, including:
  - the baggage hall and baggage system
  - the fuel farm
  - ground power
  - air bridges (noting that some airlines prefer not to use air bridges at contact stands to enable both forward and rear doors to be used for boarding and disembarking)
  - the availability of infrastructure and systems could be considered as a quality metric
- The quality of service provided by the airport could also be a driver for future investment, for example:
  - the fuel farm has only capacity for one day's supply of fuel
  - there is debate concerning the need for and benefits of a fuel hydrant

Other more direct measures could be used to qualify and characterise aircraft throughput, noting that this is often a combined responsibility between DAA and IAA

- Taxi times, from gate to take-off and from touchdown to gate, are an indicator of the availability of infrastructure (e.g. taxiways) as well as the efficiency of air traffic control
  - no target is currently defined for taxi times
  - any target must reflect the impact of weather conditions, especially low visibility
- Turnaround time is a critical factor for some airlines but not others and is dependent on multiple actors
- Stand availability reflects the degree to which aircraft are allocated and achieve their desired stand
  - there may be a conflict with the objective of maximising the proportion of passengers using contact stands
  - stand utilisation must also be taken into account to avoid the over-provision of infrastructure
- Runway throughput for the given infrastructure is principally a function of air traffic procedures, acceptable delay and weather conditions
  - DAA and IAA are investigating measures to increase runway throughput

In terms of aircraft handling and throughput, the airport generally appears to be performing well

ILLUSTRATIVE

Metric	Performance	Comment
• Runway throughput	• Up to 45 movements per hour with 8 minute delay from NATS capacity study	• Work is ongoing to increase this to 50 movements per hour and to enable simultaneous use of near-parallel runways
• Taxi time	• Currently taxi time (arriving and departing, all Piers, all runways) is 17 minutes (95%) and 8 minutes (average) • DAA measures 11 minutes outbound average for runway 10 and 7 minutes outbound for runway 28	• Targets could be set for taxi performance, including for low visibility conditions • IAA must be included in the process
• Turnaround time	• Better than around 35 minutes for Pier A where it is a critical operational factor	• Turnaround time is only important for some airlines and could be a factor in agreements between the airport and those airlines accounting for all interactions
• Stand availability	• In 2003, DAA reports 94% of aircraft departed from contact stands	• Targets could be set for departing and arriving aircraft, noting potential conflict with similar target for passengers
• Air bridge technical availability • Ground power availability	• Average of 99.1% for air bridge and 99.8% for ground power achieved in October 2004	• Targets could be set and reported against

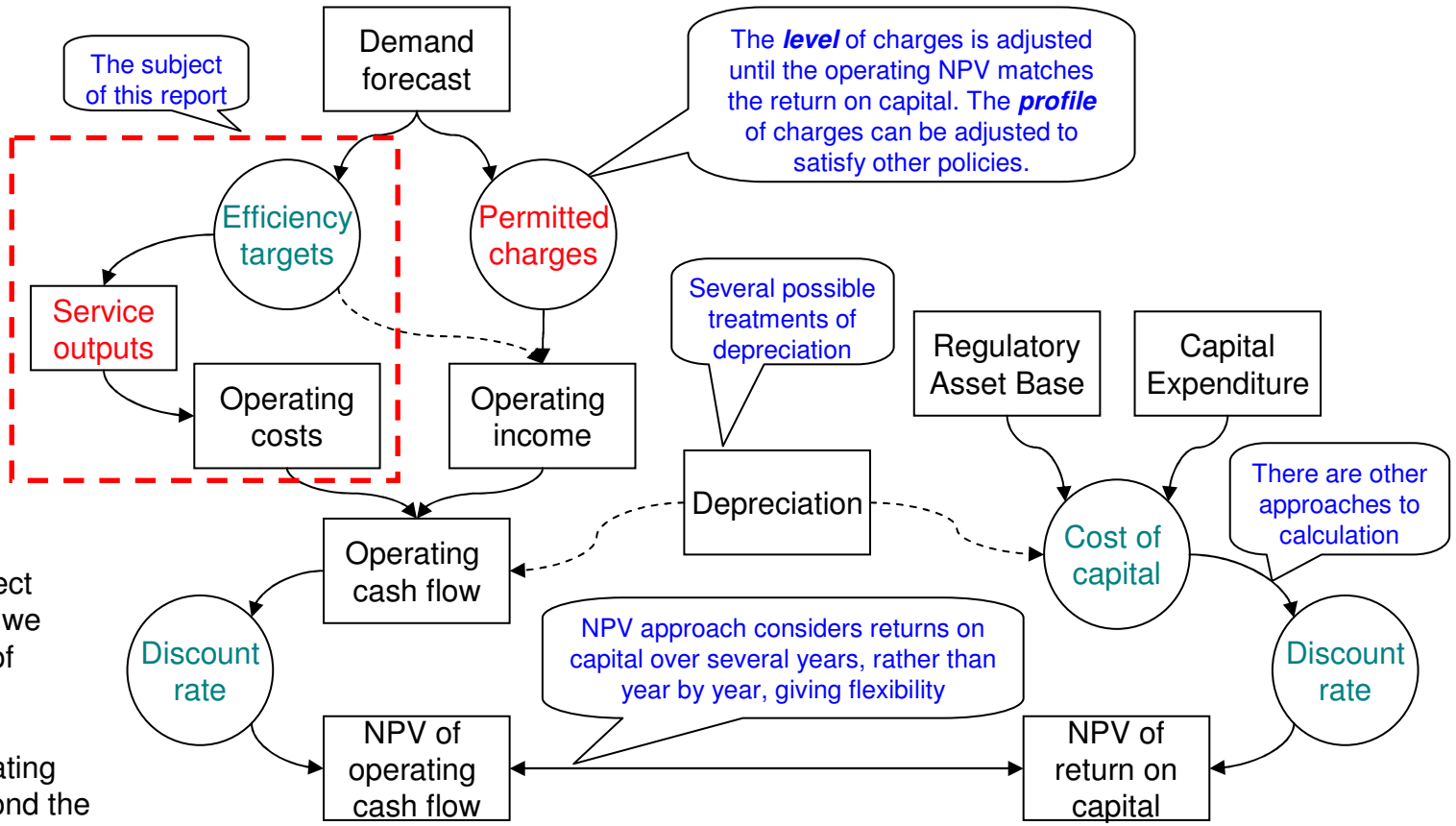
Cost Assessment

- Framework for analysis
- Cost trends
- Non-payroll cost assessment
- Payroll cost assessment
- Conclusions

This efficiency study contributes to the regulatory price setting process by assessing efficiency prospect for the operating cost stream

- In a standard regulatory price setting process, the efficiency targets modify the operating cost stream
- In this report, we have also discussed the efficiency of the service outputs, although a change in service outputs may change operating cost
- Capital expenditure decisions will also affect operating cost, which we cannot take account of
- Efficiency is also a consideration in operating income, which is beyond the scope of this study

Example of a standard regulatory price setting process



The starting point for our assessment of cost efficiency targets is the present actual cost

- Our starting (reference) point for the operating cost assessment is the current situation
- This approach is consistent with present standard regulatory practice in the UK
- Any starting point will need to be analysed for appropriateness in changing circumstances

X profile in CPI-X and NPV approach

- We will present a cost stream, before and after efficiencies, showing the savings we believe can be achieved
- In practice, the appropriate value(s) of X will also depend upon
  - demand forecasts (economies of scale) and
  - capital expenditure (additional costs)
- An NPV approach can produce a constant value for X, or alternatively, a varying profile for X taking into account policy factors such as:
  - financial feasibility in alternative scenarios (e.g., debt cover, banking covenants)
  - the avoidance of possible future large price adjustments
  - whether planned major new facilities should enjoy any pre-funding

Cost Assessment

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The DAA model of costs, supplemented by detailed information on labour use, was the basis for much of our cost assessment

- The DAA cost model is developed in nominal prices with an assumption for the level of underlying CPI cost inflation
- The model shows actual costs up to 2003, budget for 2004 and forecast beyond that
- The model shows a large capital budget, but provides increments to operating costs only for new Pier D (to open mid-2006), but not for any other new facilities
- We adjusted the cost projections to remove costs increments related to Pier D
  - it is now unlikely that Pier D will open at the time indicated
  - it is unlikely that this is the only significant capital expenditure with operating cost increments in the next five years - CAR is carrying out a capacity study
  - therefore to remove it sets a suitably neutral basis for evaluation, recognising new capital expenditure will generate operating cost increments not currently provided for
- Payroll and non-payroll costs are analysed and forecast separately
  - this creates a lack of transparency when costs are transferred from direct labour to out-sourcing, but enables a reasonably clear association between modelled accounting categories and cost drivers
  - the model expresses employees as full time equivalents (FTE). Overtime is expressed as increased wages, not additional FTE
  - we obtained detailed additional information on labour use in areas where we considered it significant

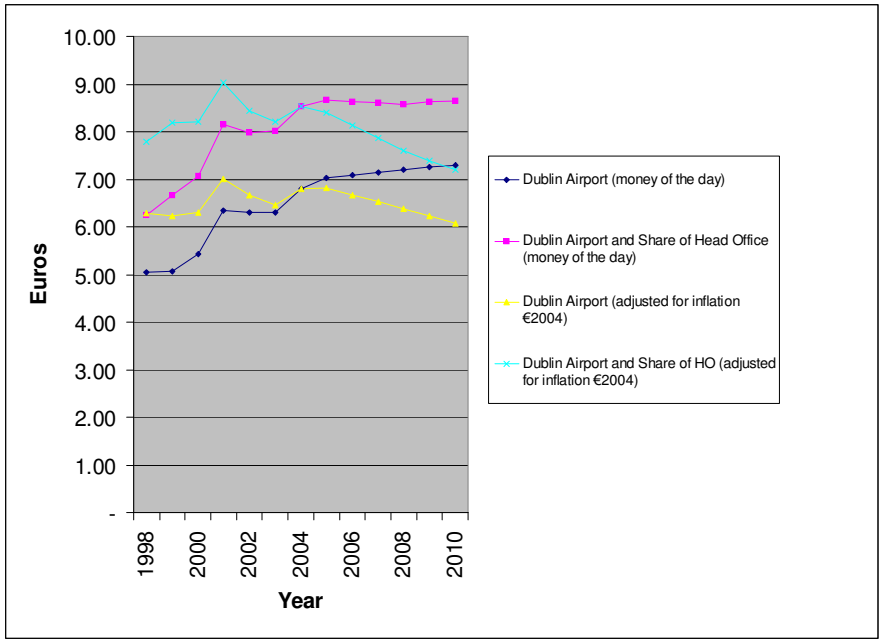
Head Office Costs

- The present regulatory rule is that Head Office (HO) costs are allocated to each airport pro rata to passengers
  - for its own purposes, DAA allocates some non-payroll (only) HO costs to the airports where they can be clearly attributed, shown in the model as "allocation of materials and services". This allocation is removed for this assessment.
  - the DAA cost model correctly does not take into consideration "excess charges surrendered", shown as a cost in DAA accounts, as this is really an inter-year transfer of revenue.
  - in 2001, 78% of HO costs were allocated to Dublin Airport. Traffic forecasts from 2005 suggest the proportion varies by little more than one percentage point from this level, so for the purpose of this assessment is it sufficient to assume the proportion is constant at 78%.

DAA's projections show operating cost per passenger reducing in real terms, following recent increases

- DAA is projecting that operating costs will fall in real terms (i.e., after adjusting for inflation)
- In essence this is a corollary of using a 35% cost increase in relation to passengers for many (not all) costs. Staff increases are similar. This outweighs wage growth higher than inflation
- However, this projection excludes operating cost increments for any new facilities, which are likely to be needed to achieve the DAA's desired level of service
- The reasons behind recent cost increases are discussed on the next slides
- It remains possible that DAA will suffer unpredictable upward cost shocks beyond its control in future.

Operating Cost Per Passenger (Real and Nominal)



Source: BAH calculations on DAA Model data

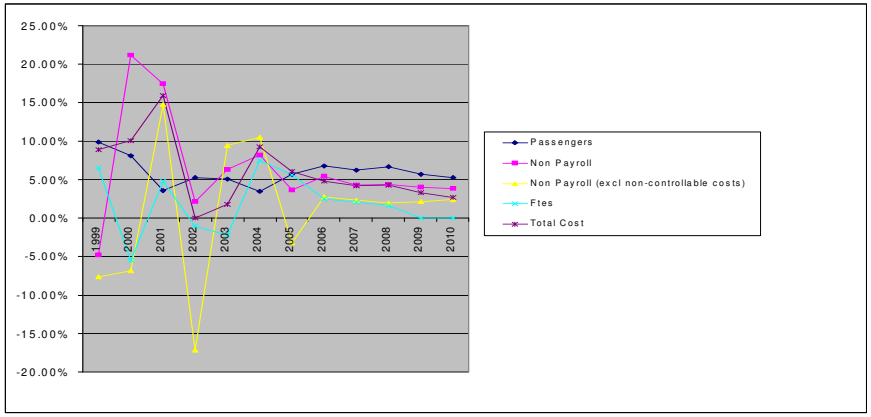
Note: Excludes identifiable Pier D operating costs

The evolution of Dublin Airport's costs in recent years and into the near future shows volatility, even allowing for some centralisation of costs to Head Office…

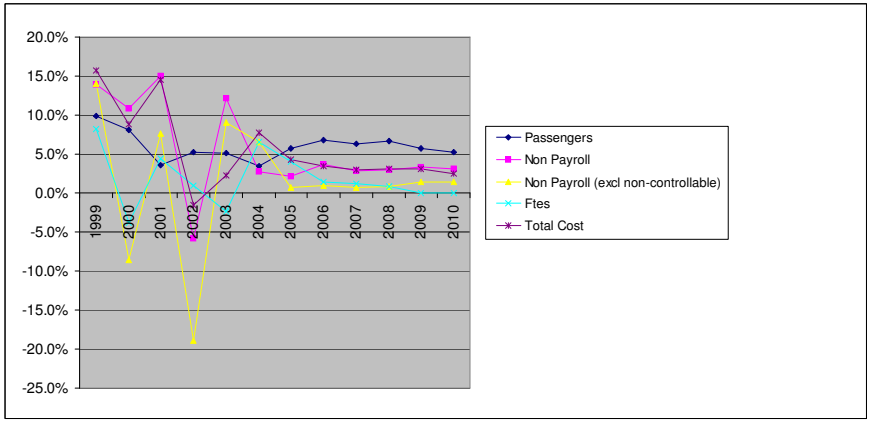
Reasons for Cost Growth Patterns

- There has been some reallocation of activities between Airport and Head Office, but the pattern of cost volatility is still present if the Head Office cost share is included
- High growth in non-payroll costs in the years around 2000 includes important growth in insurance, rates and regulatory levy which are non-controllable
- Some contracting out has moved costs from payroll to non-payroll
- Technology operating costs account for part of the growth in non-payroll costs, but have enabled staff reductions
- A large reduction in costs for 2003 was associated with a reduction in marketing
- Large increase in FTEs in 2004 and 2005 are mainly due to a large increase in police and security resourcing
- Payroll cost inflation has been high, but has been in line with national pay agreements, with the addition of a productivity agreement in 2001, and is very similar to Aer Lingus
- Even excluding non-controllable costs, non-payroll cost growth seems high some years, especially 1999, 2001, 2004. 2005. But some of this is in substitution for payroll costs

Real growth in cost for Dublin Airport (excl Head Office)



Real growth in cost for Dublin Airport and share of Head Office



Source: DAA OPEX Model

Notes:

(i) Inflation deducted, (ii) Non-controllable costs defined as rent, rates, insurance, energy and regulatory levy, (iii) Costs are based on the DAA OPEX model which shows actual costs up to 2003, budget for 2004 and forecast beyond that.

…but some important efficiencies have been achieved, and further efficiencies are included in cost projections

Efficiencies achieved*	Efficiencies projected*
▸ Expenditure on IT has reduced staff in administrative positions. Dublin + share HO achieved a reduction in 22 FTEs from 2001 to 2003, despite increases in operational staff ▸ Negotiations with cleaning staff, amongst other categories, has changed the pay-scale to market rates for new recruits ▸ Extensive use of part-time staff is used to cover peaks ▸ Reductions in marketing expenditure ▸ Reductions in travel and subsistence ▸ Reductions in fees and professional services	▸ Reductions in staff numbers in some areas ▸ Wage increases for some staff increasing at below the general rate of wage growth ▸ Economics in non-payroll costs

** These are efficiencies which are directly visible in the cost model. Other actions taken by DAA to improve the efficiency of the airport are not directly visible in the costs.*

- The underlying cost growth mechanisms would, alone, result in cost reductions per passenger:
  - non-payroll costs are forecast to grow at 35% of the rate of growth of passengers, although some (cleaning and maintenance) are at 50%, but some are less
  - payroll costs per FTE are generally forecast to grow at 3.0 to 3.5% ahead of inflation
- This assumes no significant new facilities, so quality of service would be likely to fall, or capacity restrictions apply

Cost Assessment

- Framework for analysis
- Cost trends
- Non-payroll cost assessment
- Payroll cost assessment
- Conclusions

Payroll costs account for 60% of total costs for 2004, and non-payroll for 40%

- Among non-payroll costs, the following costs have been classified as “non-controllable” as they are not easily controlled by management:
  - insurance
  - rent and rates
  - energy
  - regulatory levy
- These “non-controllable” costs amount to about 37% of the non-payroll costs

Breakdown of DAA Costs in DAA Model (2004)		
	2004 ('000)	Cost as % Total
Total Payroll	€85,131	63%
Total Non-Payroll, including share of Head Office	€50,349	37%
Total Operating Costs	**€135,480**	**100%**

Cost analysis alone does not provide a full picture of DAA's financial efficiency for those activities which generate income or have the potential to generate income

- **Property**-related costs (rent and rates) account for a significant proportion of non-payroll costs:
  - the great majority of this is rates, and therefore uncontrollable
  - DAA may have opportunities to obtain further income by letting out more of its property at Dublin Airport
- Although there are costs associated with the **car parking**, car parking also generates an income. Reducing car parking costs, for example, by contracting out car parking operations, may reduce income as well as costs. Again, the net effect should be considered.
- **Retail** activity is another example of where DAA could save costs through reorganisation, but where the effect on income would also need to be taken into account before assessing the overall efficiency
- Income generating activities are the subject of a separate study, and these are not taken into account here

Analysis of the DAA's non-payroll cost growth factors shows that the long-run marginal cost of the airport, even for non-payroll costs, will be sensitive to airport development to cater for growth

- The general assumptions used by DAA in modelling non-payroll costs:
  - in the absence of airport developments, most non-payroll costs will rise at the rate of 35% in relation to an increase in passenger numbers plus inflation
  - it is notable that employment levels are also rising at about the same rate, so where costs are driven by staff numbers then this is an appropriate rate of increase
  - when there is an airport development, new and specific assumptions are made about the cost increase
  - some costs, notably non-payroll cleaning and maintenance costs, are predicted to rise at 50% of the rate of increase of passenger numbers
  - some other non-payroll costs are set to rise at lower rates
  - most Head Office non-payroll costs are being held constant in nominal terms, i.e., in real terms costs were falling away at roughly RPI-3%, given a 3% inflation assumption
  - cost projection methodology is evaluated in detail below
- The DAA model made specific provision for additional operating costs related to the proposed Pier D, shown in the model to open mid-2006:
  - these costs are immediately incurred on opening the facility, an example of the "lumpy" cost growth typical of airports
  - incremental operating costs are likely in any plan where capacity is enhanced. This requires provision once a capacity enhancement programme is capable of being scheduled
  - for reasons given on page 91, we have adjusted the cost modelling to remove Pier D costs

Many of the categories of non-payroll costs are either uncontrollable or relatively small, and therefore do not merit detailed consideration

Summary of Conclusions regarding Non-payroll Cost		
Non-payroll item	**Dublin Airport**	**Head Office**
Insurance	Large item but generally non-controllable due to the nature of airport operations and the size of the insurance market	Small item
Aviation Customer Support	Smaller item, recently variable. Marketing expenditure in relation to new routes, in addition to aviation charge rebates. Forecast to grow at 35% of passenger growth. Our view is that this is no longer necessary at a congested airport at Dublin's state of development. Recommend it should instead be phased out .	n/a
Car Park Direct Overheads	Medium item. Efficiencies may be possible through contracting out long term car parking, but such efficiencies would not be transparent as costs need to be considered with the income side.	n/a
Cleaning contracts and materials	Smaller item. Underlying growth rate of 50% of passenger growth seems reasonable for this item given aim to increase contracting out.	Small item
CUTE Operating Lease Costs	Forecast to grow at 35% of passenger growth, but has actually grown at less than inflation in recent years. Our view is that the current tendering cost is likely to reduce CUTE costs by 10% through competition and that since the number of CUTE terminals is not growing, cost will not grow.	n/a
Employee related overheads	Medium item. Forecast to grow at 35% of passenger growth which seems reasonable	Budgeted to remain constant in nominal terms. Given staff reductions, a more reasonable assumption would be to fall slightly.
Energy Costs	Medium item. Forecast to grow at 5% for two years and then 3% which seems reasonable, but should be capable of ex post review if the energy market proves to be soft.	Small item, held constant in nominal terms, a volunteered efficiency
Fees and Professional Services	Large item. Recently volatile. Forecast to grow at 35% of passenger growth which seems reasonable.	Large item. Held constant in nominal terms, a volunteered efficiency.

… however, small revisions to non-payroll cost growth assumptions could reduce non-payroll costs, excluding any benefit which may arise from concessioning long term car parks

Summary of Conclusions regarding Non-payroll Costs		
Non-payroll item	**Dublin Airport**	**Head Office**
Marketing and Promotional	Mostly retail marketing. Forecast to grow at 35% of passenger growth which seems reasonable	Forecast to stay constant in nominal terms, a volunteered efficiency. Mostly corporate PR.
Other overheads	Forecast to grow at 35% of passenger growth (recently not growing). Main items are retail wrappings and bad debts. Recent improvement due to improved bad debt control. Forecast seems reasonable.	Forecast to stay constant in nominal terms, a volunteered efficiency
Regulatory levy, rent and rates	Non-controllable. We have not been able to adjust this for Pier D, etc. **Rates budget will require revisiting once CAPEX levels are firmed up**	Forecast to stay constant in nominal terms, a volunteered efficiency. We suggest a reduction of about 30% from 2006 as rent for temporary staff accommodation Cork becomes unnecessary.
Repairs and maintenance	Forecast to grow at 50% of passenger growth which seems a reasonable underlying rate of increase. There are some specific costs based upon Pier D we have been unable to adjust for. **This budget will require revisiting once capacity plans are firm**.	Forecast to stay constant in nominal terms, a volunteered efficiency
Technology operating costs	Large item. Forecast to grow at 35% of passenger growth (slower than recently) which seems reasonable.	Forecast to stay constant in nominal terms, a volunteered efficiency
Telephone, print and stationery	Forecast to grow at 35% of passenger growth (slower than recently) which seems reasonable	Forecast to stay constant in nominal terms, a volunteered efficiency
Travel and subsistence	Forecast to grow at 35% of passenger growth which seems reasonable (related to general staff growth)	Forecast to stay constant in nominal terms, a volunteered efficiency

Cost Assessment

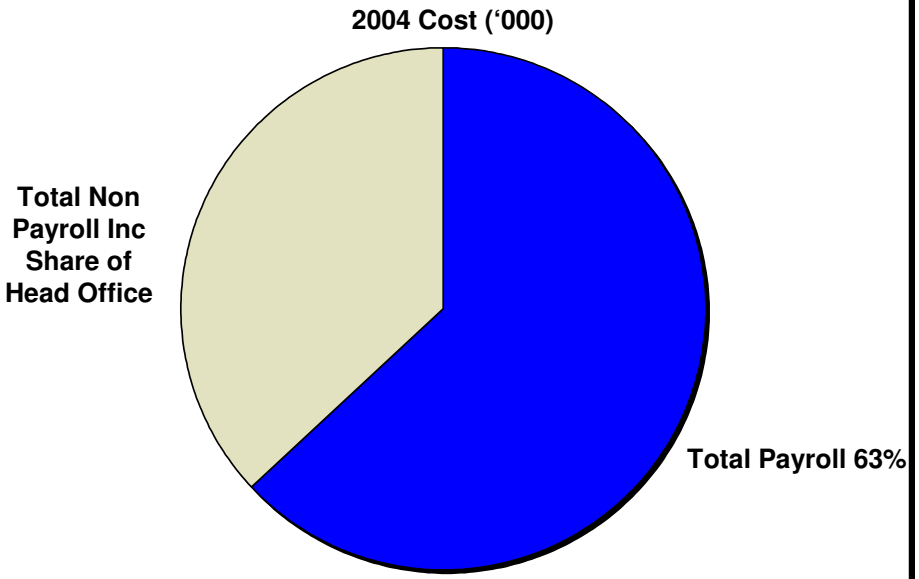
- Framework for analysis
- Cost trends
- Non-payroll cost assessment
- Payroll cost assessment
- Conclusions

The largest payroll costs are in Police/Fire, Head Office, Maintenance, Cleaning, Retail and Terminals

Comment on DAA Wage Growth Assumptions

- In the DAA model, payroll costs are subject to two mechanisms of cost growth/adjustment
  - wage inflation
  - identified recruitment requirements
- Payroll cost inflation:
  - for the first two years of the forecast is based upon the current wage increase as agreed with unions, the agreement is implemented midway through a year so it is modelled as two increments
  - for the following two years, payroll cost inflation is assumed to be ahead of general price inflation; retail wages are assumed to increase less than other wages
  - this is a slower rate than recent payroll cost inflation.
- Detailed discussion of certain classes of staff (cleaning, security) follows

Breakdown of DAA Costs in DAA Model (2004)



Source: DAA model for 2004

Outsourcing or concessioning can be used as a benchmark for efficiency of direct employment of staff

- Outsourcing is subject to a well-defined legal framework including employment protection and may not be straightforward to implement itself
  - DAA employees have considerable protection for their terms and conditions under both Transfer of Undertakings and State Airports Act 2004 legislation
- However, it is not for the regulator to direct methods of working, merely to observe that efficiencies are achievable, and leave it to the regulated company to achieve efficiencies by whatever method it chooses
- In certain areas, our benchmark for efficient provision is best practice as revealed by out-sourcing
- Outsourcing is an appropriate benchmark for efficient provision in areas where the type of pay, terms and conditions traditionally associated with public sector or civil service type organisations would appear unnecessary to attract an adequate work force
- The benefits of outsourcing in these areas may not only be in the terms and conditions of staff, but also obtaining management skills from best practice honed in the competitive market-place
- There are costs in managing out-source contracts
  - should it be difficult to specify the contract, or the contract requires micro-management, then the contract overhead may exceed the savings. However outsourcing and concessioned services have become common in some sectors, because the contractual conditions are generally resolvable at reasonable cost
- In some cases the outsource would also include the collection of revenue, in which case there is a choice whether the outsource or the airport is best placed to take the commercial risk on that revenue
  - where the outsourcer takes that commercial risk, the structure is a concession
- Outsourced services can in principle be retendered from time to time, so that the contractors are encouraged to continue to supply the service to best practice, and can be replaced if they do not

Gradual migration facilitated by expansion or natural wastage seems the most reasonable assumption for potential outsourcing

Possible ways of outsourcing	Likely implications in DAA context
▸ Outsourcing or concessioning blocks of service as facilitated by expansion and natural wastage of staff	▸ Airport expansion and staff turnover provide opportunities for letting blocks of service to contractors where the use of temporary staff is low. Since it appears that the median length of service in the relevant areas is about five years, this suggests that such an approach could result in achieving a substantial penetration of contracted services over the course of a decade. We would observe that the gradual use of contracted services in some areas of maintenance, and the use of temporary staff in various areas of work, has been achieved without provoking industrial action, although this does not guarantee that this follows in all cases
▸ Tendering for a management company to take over an existing workforce and provide the service on contracted basis	▸ The potential advantage of this approach is that to the extent there is excess capacity in the existing labour force, a new manager could in principle redeploy some workers to other sites where it provides service. The disadvantage is that a single large contract with a company taking over the existing workforce might result in a degree of control by the new manager. New managers might also be unwilling to take such a contract on, except on generous terms, because of their need to retain existing staff on no worse terms, and the possibility that many of the staff are not those they would choose to employ. Also the possibility of transferring a large block of staff to another employer has provoked industrial unrest at other airports in Ireland
▸ Tendering for outsourced supply, with redundancy for those not employed	▸ Examination of the costs of redundancy suggest that this is unlikely to be a cost-effective plan, unless there were strong evidence that the activity was currently considerably over-staffed as well as over-paid. We shall see that there is some evidence of over-staffing in one area, but otherwise our estimates of possible efficiencies are not large enough to justify such high costs

Cleaning, trolley operations, some maintenance services, retail and long term car parking were identified as areas where outsourcing or concessioning could be a benchmark

- Detailed information on **cleaning** staff numbers, rostering and pay scales was obtained to investigate the scope for inefficiencies which could be addressed through outsourcing
  - this analysis is presented in the following pages
- A similar analysis was undertaken for **trolley operations**
- The amount of **maintenance** is exceedingly difficult to benchmark as it varies considerably from building to building, as discussed later in this section
- Costs of DAA's **retail** operation at Dublin Airport are not transparent, as discussed later in this section
- Concessioning **long term car parking** would provide a market test of the commercial value of this service, noting that:
  - commercial operators have now entered this market at Dublin Airport
  - we understand that DAA's long term car parking is a marginal operation
  - it is to be hoped that long term car parking on DAA's sites could provide it with a modest net income

Maintenance policy is already in line with accepted practice that airport-specific activities are performed in-house specifically airside, the baggage system and communications

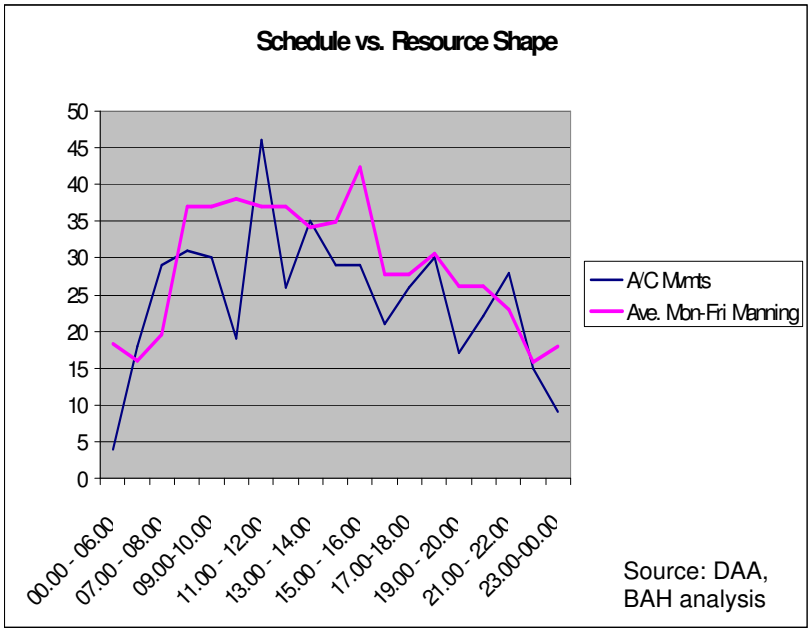
- DAA is increasingly contracting out maintenance on a project basis, but retains
  - specialist staff in areas where the Irish market is insufficient to provide a contracting base (e.g. travelators), and
  - a permanent team of staff for reactive maintenance on service critical equipment
- Benchmarking maintenance costs is impractical because complex structures have individual requirements
  - market testing does not usually provide a benchmark, as contract maintenance will tend to be done on a "jobbing" basis (i.e. a rate for a job), because future maintenance needs are hard to predict and contracts intended to specify and enforce maintenance standards are problematic
  - information for a detailed assessment (a full asset inventory and past maintenance logs) is not available, and subject to the difficulty of predicting future maintenance needs
- The recent increase in maintenance costs is substantial (80% in five years), yet this is not surprising:
  - maintenance is labour intensive and labour costs are rising rapidly
  - the equipment is getting older and needs more maintenance
  - passenger throughput is growing, increasing wear and tear on the equipment
  - more equipment is being installed partly in response to passenger growth, but also in response to regulatory and commercial requirements
- DAA's maintenance policies are achieving high equipment availability
- DAA's methods of extending contracting out in appropriate areas are an efficient approach to its maintenance needs

There is some evidence that cleaning resources are imperfectly matched to demand and that there is scope to reduce FTEs

Summary of Cleaning Analysis

- 34% of complement of cleaning operatives is for holiday/sickness cover (2003 data), substantially in excess of normal levels
- Shift coverage is generally balanced with the operation
- Employment of full cleaning complement at 9am, prior to the main peak, appears excessive
- Maintaining a constant staff level throughout the night is inconsistent with normal practice
- Natural growth and staff turnover presents an opportunity for increased use of outside contractors without redundancies/renegotiation
- As new recruits enter on the new scales replacing staff wastage from the old pay scales, savings will accrue to DAA but not in the short term (over 5 – 10 years)
- Our benchmarking suggests that there are up to 20 FTEs in excess of optimum, if used efficiently. A phased implementation may be appropriate, spread over three years

Cleaning Schedules



- Shift coverage appears well tuned to the schedule shape with peak manning slightly lagging the operational peaks for aircraft movements (and therefore passenger occupancy in the terminal). The resource level caused by the overlap of early, day and late shifts in the 1400-1600 period allows staff availability for cleaning when passenger numbers are lower in the terminal, providing opportunity for cleaning activity.

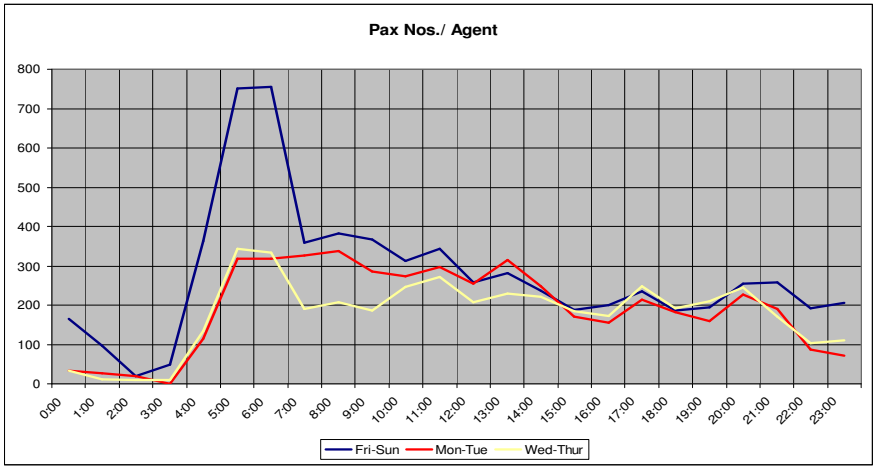
There are indications that pay scales and staffing levels for trolley operations are inefficiently structured…

Pay Scales

- An analysis of trolley operations at DAA suggests that pay rates may be in the region of 14 – 20% above the market rate for pay increments at the top of scale
- The Operative A rate is an 18 point increment scale, which applies to both full time and seasonal staff – the first eight increments of which appear market competitive
- It is unlikely that a private service provider would pay rates equivalent to the top 7-8 increments for employees engaged in trolley operations
- 40% of FTE's are casual/seasonal employees
- Temporary staff accruing >2 years service typically must be offered permanent positions due to employment legislation

Staffing

- Rostering appears out of line with passenger demand fluctuations, particularly at off-peak times and during the early morning peak
- Based on the roster data, trolley staff increased by 13.7% while passenger numbers increased by 8% in 2004 (This may not be the case if the weekly figure is untypical of the yearly average i.e. 2004 actual spend not available)



Hourly passenger numbers per Trolley Agent 4th-10th July 2004

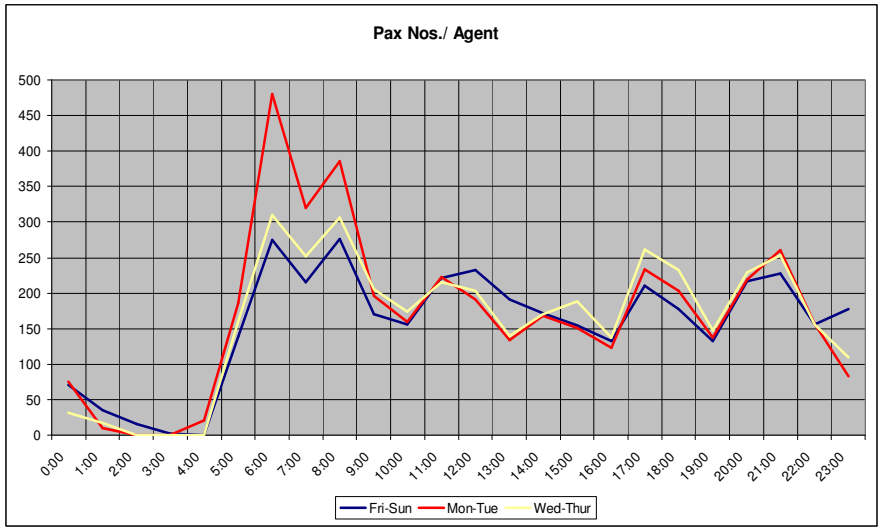
Source: DAA, BAH analysis

… and that trolley resources could be optimised more in line with passenger flows

Resource Allocation

- During Summer, weekday nightshifts have more resources than weekend nightshifts with no apparent operational rationale for this as there is a very limited workload demand between 2200 and 0500
- Realignment of manning would provide better coverage of morning and afternoon peaks in Summer; winter manning is more closely aligned with workload
- Passenger volume can vary by up to 25% between high and low levels across the week, variance between high and low resource levels is approximately 10% in summer. Winter variations are not as great but still imply that planning is more roster-driven than workload-driven
- Winter passenger numbers are 34% below summer levels yet resource levels only reduced by 16.5%. Therefore, the proportion of temporary staff in in winter is not reduced proportionate to demand

Alignment



Hourly passenger numbers per Trolley Agent 5th-12th December 2004

Source: DAA, BAH analysis

In conclusion, although DAA may be able to better align its trolley resources to passenger throughput by focusing on key areas of the operation, trolley staff do not appear to be poorly utilised

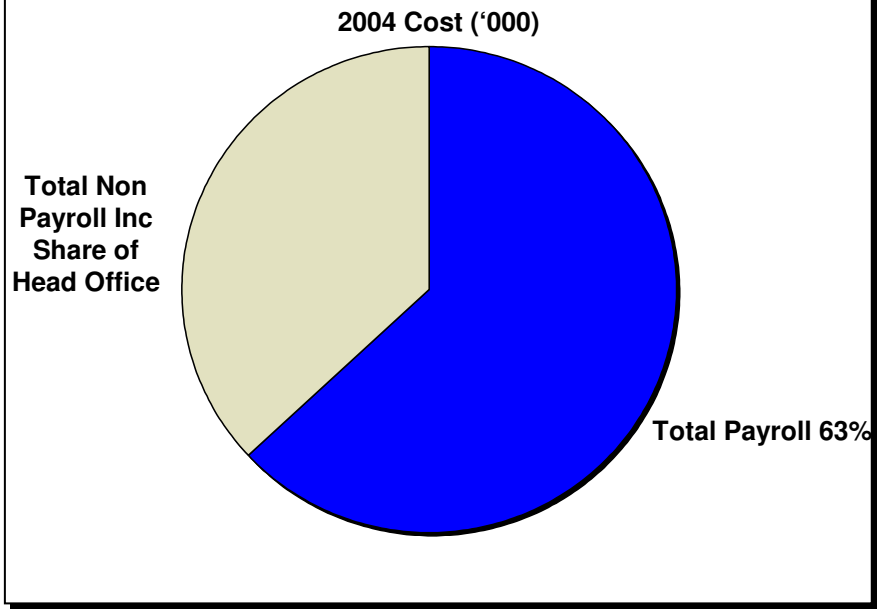
- A 'bottom up' resource model for Trolleys based around four "generalised" geographic areas of DAA operations was developed for comparative purposes:
  - departure concourse clearance to trolley bays outside the terminal
  - taxi rank and 'near' car park clearance back to the baggage hall
  - two 'remote' teams for car parks and bus stations
- Allocation of static resources on the following basis comprise minimum resource levels for such a model:
  - 10 staff (two teams of three for terminal areas and two teams of two (driver and agent) for remote area equivalent to a core early and late operation of around 30 FTE plus a further three FTE for a skeleton nightshift (33 FTE total)
- This implies that the DAA operation is over resourced to the value of about nine FTE's above this minimum resource level i.e. 27% above a minimum operation coverage for a trolley operation.
  - this is not considered to be excessive for an operation the size of Dublin Airport with its relatively high passenger volumes
- Productivity analysis of the Trolley operation comparing summer and winter performance indicates that there is the potential for 10% efficiencies

Retail is managed directly by DAA rather than ARI at Dublin Airport which limits the comparability of the retail operation to ARI run concessions

- Dublin Airport operates many of its own retail facilities, including some catering facilities, and others are operated on a concession basis
- Retail staff are employees of Dublin Airport and many costs are shown in the costs of Dublin Airport, rather than netted off against retail receipts. This means that the income recorded for DAA's self-operated retail and catering is not directly comparable against other concession income, making comparison against the performance of retail concessionaires more difficult
- Retail performance needs to be assessed not just on cost, but on income net of cost, which overlaps with the income study
- The ARI group obtains retail concessions at foreign airports, and is therefore capable of achieving market levels of performance in airport retail, which experience no doubt benefits DAA retail operations; but DAA retail does not experience direct competition and slack performance, if any, is not exposed
- It is possible that competition for retail operations currently held by DAA directly would lead to better performance (having regard to income as well as cost), but such conclusions are difficult to draw based on current information. DAA has, however, included an efficiency gain (on the cost side) in its projections, with no increase in staff and a reduction in wages relative to the average rate of increase, by 1.5% per year
- DAA is considering moving to a master concession approach to retail, where ARI or any other suitable candidate could act as the master concessionaire, organising all other retail activities
- This could lead to improved performance in retail activities, but further detailed analysis on retail activity, taking particular account of income net of cost, would be required to quantify any performance improvement

Although not a candidate for outsourcing, police, security and fire services account for the largest proportion of payroll costs

Breakdown of DAA Costs in DAA Model (2004)



Source: DAA Model for 2004

Police, Security and Fire Services

- Although security (not police) is outsourced at many airports (e.g. Charles de Gaulle, Orly, Arlanda), it is currently recognised in many countries that security at an airport is of particular national concern, and it would generally be desirable for the airport to be closely supervising the identity and work of airport security personnel.
- Progressively, Airport Police Staff (APS) are being replaced with Airport Search Unit (ASU) staff.
- The number of Airport Search Unit (ASU) staff has risen rapidly. Real unit costs have also risen rapidly. Details of staffing levels, rostering and pay scales were obtained and the operation was modelled to gain insight into efficiency. This is reported on the following pages
- Fire service manning is largely dictated by regulation. As a result, this operation was considered to be non-controllable by DAA
- An Garda Siochana also has a unit at the airport, separate to the Airport Police Service (APS). There may be economies of scale in combining these services, but then DAA would have far less control

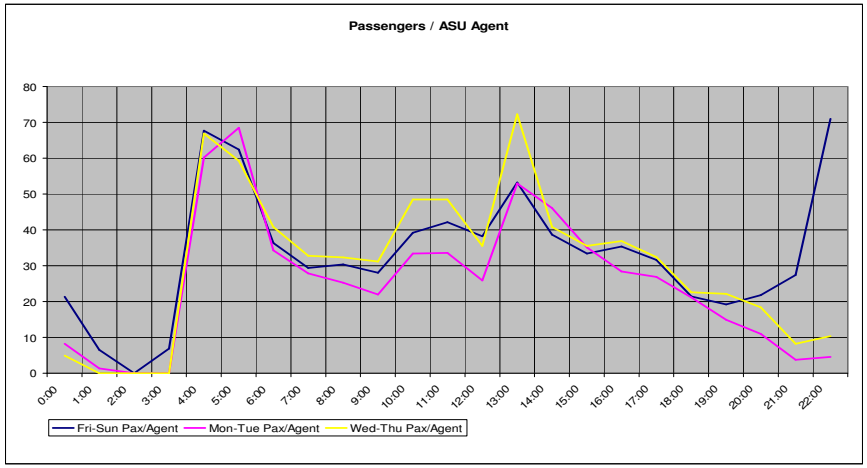
Airport Police Service (APS), Airport Search Unit (ASU) and Fire Service pay rates are not out of line with expectations

Operations

- The APS pay rates are relatively closely benchmarked on Garda pay rates, ASU pay rates are aligned with the lower increments of APS pay scales
- As ASU is a less skilled and less responsible job than APS or An Garda Siochana, similar pay scales could be regarded as unreasonable; however, it is noted that pay at the lower end of the Garda Siochana scale is not high, but there is scope for progression to higher rates, an opportunity not available to ASUs
- Peak daily manning is in the range of 26 to 30 police officers. Assuming four of these are dog patrols with the remaining two dog patrols operating the nightshift , this would typically leave 11-13 teams of two officers to cover the geography of the airport
- The roster data shows a significant growth in ASU FTE expenditure between 2003 and 2004, significantly out-stripping passenger growth by an average of 32% compared to volume growth of 8%. The extra growth in ASU numbers is due to a requirement to significantly improve service levels for the unit above 2003 performance. By the winter period the FTE equivalent is 205, 34 FTE (16%) less than their stated growth target establishment of 239 FTE
- Fire service manning is largely dictated by regulation and no scope for efficiency was identified

ASU Alignment with PAX flows

- The chart below demonstrates significant peaking at 0400 prior to the early morning shift starts of 0500 and 0600 during the summer period. This is likely to result in queues forming at security in advance of deployment of the early shift and reinforces reports by the operators that the ASU roster coverage does not match the early morning workload demand, causing unacceptable queues at security.



Passenger/ASU agent hourly flows 4th-10th July 2004

Source: DAA, BAH analysis

ASU operations appear to operate relatively efficiently but with some delays at peak times

Operations

- The ASU staffing numbers continue to grow and winter roster data demonstrates a capability to deploy a range of 8 – 16 teams of five staff throughout the operational week
- Analysis of the passenger throughput by ASU suggests the current staffing numbers should be sufficient to cope with the current level of passenger traffic within current service levels, provided X-ray machine throughput is maintained at or above five passengers per minute.
- Current operations do not involve the use of all X-Ray machines even at peak times
- Anecdotal evidence from airline operators suggests that congestion is a problem at security during peak times. This may be due to work practice issues, such as coping with ad-hoc sickness and delay in opening security points at shift start time.

Potential for Realignment

- DAA needs to provide a more detailed rationale of their requirement for further increased growth in ASU number (above coping with normal traffic growth). Some additional growth is explained by continued transfer of duty work between Airport Police and ASU. Additional growth beyond this would be better justified on the basis of ERP workload/demand models rather than high level benchmarking.
- Resource deployment during 2004 was sub-optimal due primarily to a recruitment lag. Higher level of resources were deployed in the winter roster data supplied compared to the summer. The efficiency analysis performed attempted to filter out this effect, providing a baseline assessment of operational and service capability.
- However, DAA has been successful in employing a large number of reduced hour workers on 4 hour shifts, thus minimising the cost of manning peaks
- No considerable degree of slack has been identified and some additional or realignment of resources may be necessary to address early morning ramp-up period and to avoid long tail-backs on security queues

Head Office accounts for a sizeable proportion of total payroll costs and was therefore scrutinised for potential efficiency gains

- DAA report that it is currently planning to reduce the number of staff at Head Office, which would reduce head office payroll costs. These appear to be entirely efficiency gains, as no consequent increase in outsourced costs is shown.

- Since Head Office functions are largely generic to commercial companies, we sought to benchmark a breakdown of costs using Booz Allen's database of Head Office cost benchmarks. Choosing benchmarks suitable for DAA, being a cost-driven rather than revenue-driven company, and having regard to the limited breakdown of the data available, we were able to conclude that:
  - The number of HR staff per 100 employees is practically the same as the BAH benchmark for commercial companies. When calculated as a proportion of total OPEX, DAA had HR costs slightly above the benchmark; however, this is consistent with DAA being relatively labour intensive in its operating costs.
  - similar benchmarking of finance function indicated that the DAA finance function cost was again close to the benchmark, depending upon precisely how one interprets the data, (including an allocation of company as well as Head Office activities).

- Therefore, these two labour intensive parts of Head Office functions do not seem materially different from benchmarks in general commercial companies.

Cost Assessment

- Framework for analysis
- Cost trends
- Non-payroll cost assessment
- Payroll cost assessment
- Conclusions

Operating cost efficiencies that should be achievable include those already volunteered by DAA and a further set of efficiencies identified by Booz Allen

- We constructed three scenarios to show the effect of our efficiency analysis:

BAH adjusted baseline scenario – No Pier D	Before DAA volunteered efficiencies	After BAH identified efficiencies
• Scenario removes visible Pier D costs from the DAA baseline opex scenario: Pier D will not open on the timescale shown • The aim is to provide a baseline without any capacity enhancement, to which the specific incremental operating costs of likely capacity enhancements can be added once identified	• Starting with the BAH adjusted baseline, this increases costs to show what they would have been without DAA's volunteered efficiencies • This shows the magnitude of the efficiencies that DAA is already volunteering on its current operating practice	• Starting with the BAH adjusted baseline, this reduces cost taking account of BAH's identified efficiencies, and also the effect of efficiency programmes DAA has effected but which appeared to us not to have been taken into account in its costing

- These scenarios provide for the incremental operating costs only of increased traffic within the existing facility
  - but we have not been able to properly adjust the rates budget or repair and maintenance budget consistently
- **DAA's operating budget will require revisiting once plans for enhancing the existing facility are firmed up**
  - **to adjust the rates budget, and the repair and maintenance budget consistent with those plans**
  - **to add the incremental operating costs of those enhanced facilities**

The Scenario "BAH adjusted Baseline - No Pier D" adds in the Dublin Airport share of Head Office costs and removes costs associated with Pier D

- Our adjusted baseline scenario was formed from the DAA baseline OPEX scenario provided to us by DAA and
  - adds 78% of Head Office costs to Dublin Airport costs
  - deletes all reference to "allocation of materials and services"
  - removes all FTE increases and other cost increases explicitly identified as "Pier D" costs
  - makes no provision for any OPEX increases which might be associated with other CAPEX projects which might be planned
  - leaves rent and rates as shown in the model, although in practice it will be different
  - leaves car parking costs as shown in the model
  - assumes a constant standard of service quality

A scenario was created by removing DAA volunteered efficiencies so that their impact can be distinguished from the current situation and from the impact of the Booz Allen efficiencies

"Before DAA volunteered efficiencies" scenario

- DAA's business plan already provides for important efficiencies in many areas. Those efficiencies we have explicitly noted are:
  - Increase in staff salaries in some areas at below the general rate of wage increase
  - a reduction in staff in some areas
  - Holding some non-payroll costs constant in nominal terms
- DAA also appears to have some efficiency programmes which have not been costed. These are included in the BAH identified efficiencies to the right

"After BAH identified efficiencies" scenario

- Booz Allen has identified a number of further efficiencies, these are made up of:
  - A reduction of 20 FTE in cleaning, relative to the current growth trend, spread over three years
  - A reduction of nine FTE in terminal services, relative to the current growth trend spread over three years
  - A reduction of cleaning wages of 0.5% per year for five years relative to average wage growth (an efficiency which we believe DAA is already in the process of achieving but has not modelled)
  - A reduction of terminal services wages of 1% per year for five years relative to average wage growth
  - Phasing out of Aviation Customer Support over three years
  - Head Office employee related overheads changing in line with two thirds of the change in level of FTE
  - The Head Office travel and subsistence budget changing in line with the change in FTE

The analysis showed efficiencies which are significant, given that in practice large amounts of the cost of the airport are uncontrollable

- If no action is taken, costs over the five year period would total €874m (nominal) – DAA volunteered efficiencies reduce this to €851m, the BAH efficiencies provide a further reduction to €844m
  - In present value terms, at 6%, without DAA action, costs would have been €775m, DAA's volunteered efficiencies reduce this to €755m, and BAH's identified efficiencies further reduce it to €749m
- Total savings, in nominal terms, represent some €30 million of which €23 million is accounted for by DAA volunteered efficiencies and €7 million by other efficiencies identified by Booz Allen
- As a proportion of total costs (NPV), total savings represent 3.5% of baseline costs, of which 2.7% is due to DAA volunteered savings, and 0.8% is due to Booz Allen identified savings

Conclusions and Recommendations

During this assessment, DAA has reported planned improvements and/or efficiencies which do not exist at present

Measures planned by DAA to improve operations	Measures planned by DAA to improve cost efficiency
▸ Potential ATC process and procedure improvements to increase the capacity of the runway system are being discussed with IAA ▸ Mitigation measures to reduce queuing when runway 10 is in use, including a passing point, are being considered ▸ Flexibility of stand use is being increased by the reduction of wing tip separation standards on the apron ▸ Combination of the two customs points in the arrivals hall into a single exit is under consideration ▸ Schemes are being investigated for better management of demand for short-term car parking ▸ A state of the art display screen is planned for the check-in concourse and is due for implementation in May 2005	▸ Head Office efficiencies: – Reduced expenditure on fees and professional services; marketing and promotional cost; technology operating costs; telephone print and stationery; and other overheads – Reduction in staffing over an interim period provides for a reduction in HO payroll costs ▸ Cleaning operation efficiencies – New wage scale that corresponds to market rate (not taken into account in DAA cost model) – Scheme to reduce the high rates of absence ▸ No increase in retail staff and a reduction in wages relative to the average rate of increase ▸ Withdrawal from basic maintenance of areas of the airport not occupied by DAA is planned

Our assessment indicates there is scope for further cost efficiencies on top of those already volunteered by the DAA

- DAA has already identified efficiencies allowing costs to fall by 3.8% by 2009 relative to the implicit growth path without the savings, which is 2.7% over five years (in NPV terms).
- Booz Allen has identified further savings of 1.1%, increasing the savings to 4.9% in 2009, which is 3.5% over five years (in NPV terms).
  - although these cost savings appear modest, many costs of an airport are highly inflexible or uncontrollable, especially security and fire staff, insurance, rates, etc.
  - the inclusion of these additional cost savings will translate into a higher value for “X” in an RPI-X formula, when combined with an underlying growth rate of passengers.
  - the value for “X” may also be more strongly influenced by the determined capital investment plans than operational efficiencies.
- We have also indicated in this report areas where examination of the definition of the service provided by DAA to the airline may increase the efficiency of the service to the airline