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## Engineering Maintenance at Birmingham International Airport

Organisation de la maintenance de l'aéroport international de Birmingham

Unterhaltungsplanung für Birminghams Internationalen Flughafen

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Tony Hartley, born 1944, qualified as a Chartered Municipal and Civil Engineer before joining West Midlands County Council and leading the design team on the 1977 - 1984 Airport Project. As Head of Engineering, he had the liaison role during the Eurohub Project. He has been General Manager of Engineering Services since 1989.

### SUMMARY

The paper demonstrates the approach to maintenance at Birmingham International Airport since the opening of the Main Terminal in 1984 and Eurohub in July 1991. It reflects the changes introduced to accommodate new buildings and increased passenger throughput as well as a move from Local Government practice to an independent Public Limited Company.

### RÉSUMÉ

La communication expose la procédure prévue pour la maintenance de l'aéroport international de Birmingham, depuis l'ouverture du terminal principal en 1984 et de l'Eurohub en 1991. Elle reflète les modifications rendues nécessaires, tant par l'intégration de nouveaux bâtiments et l'accroissement du flux de passagers que par la remise de l'exploitation, de l'administration publique locale à une société indépendante.

### ZUSAMMENFASSUNG

Der Beitrag beschreibt die Vorgehensweise für die Unterhaltung des Internationalen Flughafens seit der Eröffnung des Hauptterminals 1984 und des Euro-Hubs 1991. Sie spiegelt die Veränderungen wider, die zur Integration neuer Gebäude und zum wachsenden Fluggastaufkommen wie auch infolge des Wechsels der Verwaltung von der öffentlichen Hand zu einer privatwirtschaftlichen Gesellschaft nötig wurden.



## 1. INTRODUCTION

Opened in 1939, Birmingham International Airport is currently the fifth largest in the United Kingdom with a passenger throughput exceeding 4.2 million passengers per annum and operating costs in excess of £43 million.

The Airport is wholly owned by the seven District Councils of the former County of West Midlands and became a Public Limited Company on 1st April 1987. The Company has a Board of Directors comprising four Executive and ten Councillor Directors. In 1991 a second terminal, Eurohub, was opened as a result of a Joint Venture between the Airport, British Airways and the private sector.

The principal objective of the Company is to operate the Airport for the benefit of the West Midlands region and to achieve a return on capital which is satisfactory to the Shareholders.

An Airport can only be successful and profitable if it makes effective and efficient use of its assets which obviously need to be maintained.

The Airport Engineering Department at Birmingham is responsible for the maintenance of the Company assets and has a budget of £5.6 million which represents some 13% of the total operating costs.

	1989/90	1990/91	1991/92	1992/93	Estimated 1993/94
	£'000	£'000	£'000	£'000	£'000
Employees	1,290	1,302	1,697	1,847	1,947
Utilities	1,050	1,160	1,583	1,557	1,811
Maintenance & Repair	950	1,212	1,101	1,430	1,683
Transport	87	141	147	206	211
	<u>3,377</u>	<u>3,815</u>	<u>4,528</u> *	<u>5,040</u> *	<u>5,652</u> *

\* Includes costs for Eurohub which for the part year 1991/92 were £670,000, for 92/93 £1,156 and for 93/84 are estimated to be £1,247.

The Engineering budget for 1993/4 was set at £5.8 million which as with the previous year reflects major maintenance of plant and equipment in the Main Terminal which is now 10 years old.

Birmingham Airport operates 24 hours per day seven days a week and therefore there has to be an engineering presence at all times. Since the opening of the Main Terminal Building in 1984, the opportunity was taken to review and re-organise the structure of the Department in order to accommodate the £64 million development. Subsequent developments including the £60 million Eurohub which opened July 1991 have necessitated continual review.

The introduction of MAGLEV necessitated the recruitment of controllers and diagnostic technicians which gave the Department the opportunity of centralising works requisitions/fault reporting systems in the Control Room which also accommodates the computerised Building Management System.

## 2. ORGANISATION

At an operational level, responsibility for new development and maintenance is divided between a number of people:-

### New Development

Airport Surveyor	- Building and Civil Engineering Works
Airport Electrical Engineer	- Electrical Works

In addition, two Contract Engineers assist with new development.

### Maintenance

Senior Maintenance Manager	- overall responsibility for 80 staff
Terminals Maintenance Manager	- 33 staff
Airfield Maintenance Manager	- 21 staff
Eurohub Maintenance Manager	- 10 staff
Motor Transport Manager	- 7 staff
Engineering Support Manager	- 3 staff
Support Services	- 2 staff

All senior members of the Department have a considerable involvement with the capital new works programme (annual expenditure currently about £18 million) and other joint ventures in which the Airport is involved.

The Department, with the exception of Building Management, Maglev Control, Maglev maintenance staff and Terminals maintenance staff, is accommodated in one central complex adjacent to the Airport Fire Station.

The complex, comprising offices, workshops and stores gives the Department a central base which is linked to the central control facility enabling all engineering functions, including Maglev, to be directed from just two locations.

BIA plc, under a management agreement, provide various services including engineering to the Eurohub Terminal. However, the Eurohub Board expect the level of service they require at a cost they can afford. This led to the preparation of fully detailed and costed submission on predicted maintenance and running costs for a given level of service. The submission prepared by the Department recognised the need for a dedicated workforce to be based in the building led by a Maintenance Manager.

### 3. COST CONTROL AND BUDGETS

With the change of status to PLC, new accounting procedures have been introduced. Over the last two years, the Company has introduced a Business Centre approach which has involved a change to the control of maintenance budgets. The Engineering Department assists the various client departments when setting their budgets and manages them on their behalf.

Using Business Solve, monthly management accounts are produced and circulated to all budget holders. The alphanumeric Business Centre coding system used is powerful and enables the location, budget holder and type of expenditure to be identified.

eg	P2 TM 032344	
Passenger Terminal	Terminal Manager	Baggage Handling

The annual budget is determined by the Department and reflects the planned maintenance programme and the past year's performance. Contingency is provided but controlled by the Executive Management Group. The budget is submitted to the Board for final approval.

Each line manager has responsibility for managing the various client budgets but expenditure levels are imposed which ensure effective control.

With effect from 1st April 1993 a Business Centre approach to financial accountability was introduced. There are three Business Centres, namely Airfield, Customer and Property Services. Each Centre is headed by a Manager who is responsible for both income and expenditure. In addition, a sub-business centre was established for Engineering.



#### 4. FAULT REPORTING/WORK REQUISITIONS

The fault reporting system introduced in 1989 also embraces a works requisition and hazard report system. The system has been refined and computerised so that faults can be analysed and performance and availability of plant and equipment figures produced to compare against predetermined target figures.

To enable the Department to respond to urgent problems, key tradesmen carry two-way radios and can be contacted directly from the Building Management Room.

#### 5. COMPUTERISATION

At present within the Department, the areas of computer use are limited to:-

- Building Management System
- Energy Monitoring
- MT Work Scheduling
- Building Fault Reporting/Works Requisitions
- Planned Preventative Maintenance

The PPM system is the most recent innovation and is being introduced on a phased basis. The system went live in Eurohub in February 1992 and was extended to Main Terminal in February 1993 and introduced on the Airfield November 1993,

#### 6. STORES AND PURCHASING

The purchasing function is controlled by the Purchasing Manager whose section is separate from the Engineering Department. However, the Engineering Stores, accounting for approximately 60% of the total items held in store and 85% of the stock value are under the control of the Engineering Support Manager who reports directly to the Senior Maintenance Manager.

Stationery, clothes, cleaning materials etc are now held with suppliers and called for directly to the end user.

Good liaison between Purchasing and the Engineering Department ensures an effective store holding without excessive costs. The stock holding of items and quantities is regularly reviewed and revised as required.

All orders for goods and services are placed through the Purchasing Department.

#### 7. MOTOR TRANSPORT

The Section, supervised by the MT Manager is responsible for the maintenance of 100 vehicles owned by the Airport. Vehicles are generally serviced on a fixed time interval basis. Work scheduling is done using a budget software package run on a Tandon (IBM compatible). The Airport Company is now concentrating on specialist vehicle maintenance and has moved toward contract hire for 'common user' vehicles.

In addition, having resolved insurance problems, the MT section has commenced third party maintenance and also maintains the leased vehicles.

#### 8. BUILDING SERVICES, AIRFIELD LIGHTING AND SPECIALIST EQUIPMENT

The Maintenance Managers allocate their work using a basic job sheet system. The tradesmen undertake reactive (breakdown) maintenance and minor works. Major building and pavement maintenance/alterations are undertaken by contractors.



The three groundsmen are responsible for maintaining the 750 acres of grass areas. Horticultural works are undertaken by contractors. Waste collection previously undertaken in house is now contracted out and three members of staff have been redeployed.

Airfield lighting is inspected twice daily and outages are attended to on an opportunity basis. Building Services and specialist equipment is checked daily and maintained in accordance with manufacturers recommendation and in the light of operating experience. The frequency of maintenance also takes account of hours run, seasonal opportunity and condition monitoring.

Whilst the MT Section and Building Tradesmen work alternating shifts, the Electricians and Fitters, together with the Engineering Duty Manager, provide 24 hour cover. The shift pattern is complex and provides for minimal manning at night with most of the planned work being undertaken by the early and late shifts. However, with the growth in business, management are having to review when certain PPM can be undertaken, which may result in strengthening the night shift.

## 9. ENERGY AND MAINTENANCE

Good maintenance, including rectification of faults, makes a major contribution to energy cost reduction. This has enabled the Airport to give a corporate commitment to energy efficiency.

The chillers are now linked to a Strainer Cycle System which uses the cooling towers to directly chill water when the ambient conditions allow. This has drastically reduced the running time of the chillers and at a cost of £100,000 has yielded savings of £70,000 per annum on electricity costs. This, coupled with an interruptible gas supply for the main boilers, has rendered the Heat Recovery System redundant and it has now been removed.

With phased removal of the Heat Recovery System, further operating improvements were made and two years ago a small scale CHP scheme was installed. The System involves two CHP units and, utilising a discounted electricity purchase option, has yielded savings of £20,000 per annum at no capital cost. Other schemes implemented include low wattage fittings on airfield lighting, metering and automatic control of internal lighting using infra-red devices.

## 10. SKILLS AND TRAINING

To enable the Department to cope with an ever increasing amount of new technology, particularly micro-electronics, a programme of training/re-training existing staff, including multi-skilling, has been prepared and introduced by the Engineering Support Manager.

In addition, all new project budgets include a provision for training and staff are actively encouraged to observe the installation of new equipment and be present during commissioning.

## 11. CONCLUSION

The maintenance strategy of the Department is the provision of cost effective services matched to the operational and commercial requirements of the Airport.

As has already been stated, Airport Engineering costs are substantial and planned maintenance is a key tactic in the maintenance strategy. Good planning, combined with effective management, maximises the potential of the maintenance resources.

Most importantly, the Department has been set up as a 'Service Company' providing a cost effective/efficient engineering service to client departments. Ultimately this will lead to direct competition with the private sector companies offering such expertise.

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