



CAP 356

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DEPARTMENT OF TRADE AND INDUSTRY

Fire and rescue operations at Heathrow Airport

Report of the working party

LONDON: HER MAJESTY'S STATIONERY OFFICE

Price £1.80 net

CAP 356

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Fire and rescue operations following an aircraft accident at Heathrow Airport

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1971

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List of Recommendations

* indicates that by the time of our final meeting in May 1971 action had been taken by the authority or organisation concerned.

Recommendation No.		<i>Paragraph</i>	<i>Page</i>
1	That the BAA sets up at Heathrow a Standing Committee with representation from the other authorities or organisations involved, to keep the emergency arrangements under review and to provide a focal point for dealing with suggestions or criticisms.	11	10
2*	That the BAA institutes a procedure which requires the ATC Watch Supervisor, on duty when an aircraft accident occurs outside the aerodrome boundary, to inform the BAA Fire Service of the occurrence and its location.	42	18
3*	That the BAA Fire Service continues to attend aircraft accidents, occurring within the aerodrome boundary, with all available appliances; for accidents occurring beyond the boundary and thought to be located not more than 2 miles from the airport perimeter road, the attendance should not exceed 50 per cent of the media; beyond 2 miles no automatic attendance should be made although, at the discretion of the BAA Fire Service Officer-in-Charge, one appliance may be despatched in response to a request from the accident site for technical advice or for support with specialised equipment.	45	18
4*	That the BAA Fire Service attends all calls to fires occurring in aerodrome bulk fuel installations, in aircraft parked on aprons or in hangars. Attendance should be with all the available appliances in the first instance due to the nature of these fires and the risk they present to operations at the aerodrome, and because of the special equipment which the BAA Fire Service has available.	46	19
5*	That the BAA Fire Service makes a predetermined attendance for calls to all other fires involving premises, technical installations or structures or for incidents where persons are known or are thought to be at risk. This will normally be one appliance capable of fire-fighting operations. The decision in respect of an additional attendance in response to a message from the incident shall be at the discretion of the BAA Fire Service Officer-in-Charge, having regard to the anticipated attendance and response time of the London Fire Brigade.	46	19
6*	That the BAA Fire Service continues to inform the Air Traffic Control if, through the discharge of extinguishing	46	19

	media or for any other reason, the available strength of the Service drops by two or more categories in terms of the scale set out in Section VI of the licensing document CAP 168.		
7*	That the BAA Fire Service makes available Junior Officers of a grade not less than Section Leader with responsibility for the conduct of parts of the fireground operations at an aircraft accident, leaving the Officer-in-Charge of the overall attendance, usually an Aerodrome Fire Officer Grade II, to direct all phases of the operation.	54	21
8	That unless a rescue tender can be provided which meets the recommended response time to all parts of the aerodrome from one fire station, the BAA provides a rescue tender in each fire station at Heathrow.	64	24
9	That if the two rescue tenders recommended for Heathrow are provided, each should be manned by a two-man rescue team. One of these rescue tenders should also carry the Officer-in-Charge of the Watch. If only one rescue tender is available, both two-man rescue crews should ride this appliance.	67	24
10	That the Department of Trade and Industry ensures that research be continued to improve aircraft escape equipment, and a study be made of the need for, and design of, a ground device to facilitate evacuation.	69	26
11	That the Department of Trade and Industry provides shorter courses, probably lasting 3 to 4 days, specifically for police and local authority fire and ambulance personnel, at an attractive fee which recognises that these courses will consist of lectures and discussions but will not involve participation in fire exercises.	75	27
12*	That the BAA holds a reserve of 50 Furley stretchers (or their modern equivalent) and 30 carrying canvases with 6 pairs of carrying poles.	106	38
13	That the Department of Trade and Industry amends Scale 5 of Table VII-1 of Section VII of the new Licensing Document (CAP 168) to require a minimum holding of 80 stretchers comprising 50 Furley type and 30 carrying canvases with 6 pairs of poles.	106	38
14*	That the BAA holds 300 blankets on the emergency medical equipment vehicle.	107	38
15	That further enquiry and research into a more suitable and economical bag to contain corpses be made by those directly concerned. When a source of suitable bags is found, some should be acquired. There is, however, a division of responsibility involved because aircraft accidents may occur both on and off the aerodrome. Accordingly the	108	39

- BAA should provide 100 bags to be held against incidents occurring on the aerodrome; whilst the local authorities concerned should consider whether they have a similar need.
- 16 That the responsible authorities review the changes in passenger loads that will be carried by the larger aircraft, both in service and coming into service, so that the emergency plans may be amended to meet the new demands that may be made upon them. 110 39
- 17 That an ambulance service continues to be provided at Heathrow. But, if the BAA withdraws its service, the most effective alternative would be for the GLC to establish an ambulance station at the aerodrome. 111 40
- 18* That the NW Regional Metropolitan Hospital Board draws up a list of second and third line hospitals. It should be issued to the Ambulance Services (for executive action), to the BAA, the Heathrow Port Health Control Unit and to the police (for information). Amendments should be circulated when necessary. 117 41
- 19 That, whenever possible, the medical services attend with the Aerodrome Fire Service at 'off-aerodrome' accidents within the area covered by that service. 119 42
- 20 That the BAA establishes procedures for reporting or directing passengers, to ensure that any slightly injured or apparently uninjured survivors found away from the scene are assembled with the others at the casualty receiving or reception centres. 121 42
- 21* That the limited medical facilities on the aerodrome are kept manned. When only one Nursing Officer is on duty at the Airport Medical Centre it is essential that she remains there. 121 42
- 22 That Customs Immigration Officers examination, where this is considered necessary in respect of the survivors of an accident involving an 'ex-foreign' or a 'departing for foreign' aircraft, should be undertaken at the designated reception centres. 123 43
- 23 That in future the following terms be used: 124 43
1. *First aid post/casualty collecting point*. This will mean a point usually in the vicinity of the accident where those persons requiring treatment and/or transport to hospital will be collected.
 2. *Casualty receiving centre*. Is a centre on the airport set aside for minor injuries. At Heathrow such centres are the ACJMS and Airport Medical Centres.
 3. *Reception centre*. This is a centre for seemingly uninjured survivors. At Heathrow such centres are located in the airport VIP lounges in the terminal complex.
 4. *First aid equipment supply point*. This is self-explanatory.

Recommendation No.		Paragraph	Page
24	That hospitals, given the role of supporting hospital in an exercise, should consider assuming that of designated hospital when it appears necessary to them to train their staff in this role.	126	44
25	That the BAA gives consideration to means of finding the necessary extra manpower for searching for and collecting survivors.	144	49
26	That the airlines introduce into the briefing given to passengers in an aircraft about to make a landing which is likely to involve an emergency evacuation, instructions that they should remain in the vicinity of the aircraft after the evacuation has been completed, and contact an official as soon as possible.	144	49
27	That the BAA includes in the guidance issued to airline operators a reference to the latter's responsibility to provide adequate transport for passengers at an aircraft accident.	145	50
28	That the BAA issues a management memorandum at least once a year, but more frequently if necessary, to all organisations concerned on the aerodrome, reminding existing staff and instructing new staff as to their responsibilities and duties in the event of an aircraft accident. New organisations concerned with emergency procedures on the aerodrome are to be issued with a comprehensive set of relevant emergency orders and guidance.	146	50
29	That the Department of Trade and Industry seeks to obtain international agreement on procedures which will ensure that accurate information as to the number of persons on board is readily available to the aerodrome authority or emergency services in the event of an accident.	147/150	51
30	That the Heathrow Emergency Orders should contain procedures for obtaining from the airline operator, or his agent, information as to the number of persons on board an aircraft involved in an emergency, and passing it as soon as possible to the emergency services via the fire service watchroom. When this information cannot be obtained at the aerodrome, arrangements should be made to try to obtain it from the aircraft whilst in flight if this can be done without aggravating the emergency situation.	147/150	51
31	That whenever possible the Rendezvous Point Officer should remind crews of incoming emergency services vehicles that flashing lights should be put out on arrival at the incident.	151	51
32	That the airlines issue their non-uniformed personnel with some simple form of identification, which will be easily recognisable by the police officers on duty.	152	52

Recommendation No.*Paragraph Page*

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|-----|---|---------|----|
| 33 | That the BAA, the police and the local authority services ensure that plans are made to provide adequate mortuary facilities to be used in the event of an aircraft accident at Heathrow. | 153/154 | 52 |
| 34 | That the BAA continues to provide accommodation and facilities as at present, to be used as a temporary mortuary and property bureau for accidents at Heathrow. | 155 | 53 |
| 35* | That only the BAA/FS north side station watchroom acknowledges the 'first alert call'. The 'second call' procedure, whereby the PABX Emergency Supervisor reads back the message, remains unchanged. | 165 | 57 |
| 36 | That where any question of circuit discipline is involved the Station Telecommunications Officer (STO), Heathrow Airport, should make available transcripts from, or a recording of, the 'crash line' channel to facilitate investigation by all those concerned. | 165 | 57 |
| 37* | That the BAA and the Metropolitan Police consider the cost/benefit and provision of Post Office priority signalling facilities between Heathrow and the Hayes and West Drayton Police Stations. | 170 | 58 |
| 38 | That the BAA/FS north side station watchroom console be ergonomically designed and re-engineered to alleviate the work-load on the Watchroom Attendant during an emergency alert. | | 59 |
| 39* | That the GMC tone call facility on the BAA/FS channel be withdrawn from the vehicles and placed under the control of the watchroom, vehicles communicating with GMC first requesting the facility from their watchroom control. | 174/175 | 61 |
| 40 | That hospitals ensure that new staff are fully briefed on the communications facilities that are available and how best they may be utilised. | 181 | 63 |
| 41* | That for incident control purposes, the Metropolitan Police details police officers to provide liaison between the ambulance, fire and police services. | 183/184 | 64 |
| 42 | That ready interchange of information on terminology and other matters be encouraged between the services, either by regular discussion at an appropriate level or through the regular exchange of information between all services. | 191 | 65 |
| 43 | That the BAA adopts the minimum area and surface conditions listed in paragraph 197 as the standard requirements for RVPs at Heathrow. | 197 | 67 |

Recommendation No.		Paragraph	Page
44	That the BAA retains the emergency access (previously known as RVP NW) leading from the northern perimeter road to Block I as an alternative exit point to be used in the event of an accident on Runway 28R/10L.	200	67
45	That the BAA retains RVP North-East until the facilities at RVP East are fully restored.	200	68
46	That the BAA designates the section of the old perimeter road opposite No. 10 sub-station as the assembly area for RVP West.	200	68
47	That the BAA considers how best to provide some form of traffic control to ensure freedom of movement for emergency vehicles within the aerodrome.	203	69
48*	That the BAA provides conspicuous reflective directional signs for turn-off points from the outside roads and access routes within the airport boundary.	203	69
49	That the BAA introduces an operational procedure to permit a change in the initially nominated RVP.	204	69
50	That the BAA provides in the Heathrow Emergency Orders that there should be a minimum of 4 guides available at the nominated RVP within 4 minutes of the alert.	206	71
51	That the BAA with the services concerned ensure that there will be adequate guidance throughout the duration of the incident for ambulances conveying injured persons to hospitals; bearing in mind that more than one route may be needed.	207/208	71
52	That the BAA relocates the RVP South telephone, now on the perimeter road, at sub-station 8.	210	72
53*	That the BAA ensures that the RVP Officer wears some distinguishing mark to identify himself.	211	72
54	That the BAA arranges for suitable instructions to be included in the Heathrow Emergency Orders to ensure that messages to the external emergency services employ standard terminology in referring to locations on the aerodrome.	216/218	74

Chapter 1 General introduction

Origins

1 The Working Party was formed following a recommendation in the report published in August 1969 on the accident to Boeing 707 G-ARWE that a broadly based Working Party be set up to consider the problems of fire and rescue services at Heathrow. This recommendation was accepted by the Board of Trade (now the Department of Trade and Industry) and invitations to serve on the Working Party, together with its terms of reference and some guidance notes were sent out by the Director-General of Safety and Operations in October 1969. (These are reproduced at Appendix 1.)

Representation

2 The response to the invitation resulted in a very welcome full representation at senior and directing level from the Metropolitan Police; the Fire and Ambulance Services of the Local Authorities; the British Airports Authority and the Heathrow Airline Operators Committee. This, together with the representatives of the Department of Trade and Industry, made a total of 24 members and provided the opportunity to consider in detail the problems of post accident services. (The membership is shown at Appendix 2.)

Working arrangements

3 The Working Party held its first introductory meeting on 18 December 1969 to discuss working arrangements. In order to facilitate and expedite the work we agreed to divide into three main Groups to consider the problems of:

- (a) The police
- (b) The fire services
- (c) The ambulance and medical services.

We also arranged for special Groups to consider and report on the problems common to the above three services. These were:

- (i) Communications
- (ii) Rendezvous points.

Terms of reference

4 Our terms of reference were:

to review and report on the problems of fire and rescue operations in respect of aircraft accidents at Heathrow, including the problem of co-ordination between British Airport Authority services and those of local authorities and to make recommendations.

The guidance notes sent out with the invitation to serve on the Working Party were accepted as a basis for our work. We did not consider it to be part of our task to re-examine the circumstances of the accident to G-ARWE or to review each recommendation or criticism in the report that related to fire and rescue services to see whether or not we agreed with it; we decided rather to look afresh and in detail at every aspect of the post-accident services and their co-ordination to discover where improvements could be made and to put forward recommendations accordingly.

5 We also considered it inappropriate for us to tackle the problems of the long term policy on aviation fire fighting media and scales of equipment. This is being examined internationally by a Panel on Rescue and Fire Fighting set up by the International Civil Aviation Organisation. The Department of Trade and Industry which is represented on the Panel, will be considering these aspects during the next year or two and will be forming policy in consultation with the various organisations that are involved.

Working Party findings and progress achieved

6 The results of our studies and our recommendations are set out in this Report. It is probably the first time that all the organisations concerned have been able to get together at a senior level and over a period attend a series of meetings to consider in detail the problems and organisation of post-accident services. It has been a most useful exercise and, although we found no major deficiency, a number of detailed items where improvement could be made were agreed.

7 We were not, however, dealing with a static situation as it was at the time of the accident. When we first convened many changes had already taken place and improvements introduced by the British Airports Authority. Also, during our deliberations, each of the Services has been able to make improvements by accepting and adopting immediately findings of the Working Party without waiting for the final Report and its recommendations. This process of evolution and improvement should continue in the future. A list of improvements carried out by BAA at Heathrow since the G-ARWE accident is included in Appendix 13; this excludes those items which have been dealt with in this Report and which are marked with an asterisk against the recommendation where action has been taken by the authority or organisation concerned.

Inter-service co-ordination—emergency plans

8 The Airport Authority is concerned primarily with aircraft accidents on or near the aerodrome, and the organisation and procedures which are set in motion following an accident are set out in detail in the Heathrow Emergency Orders. Every licensed civil aerodrome is required under Section VI of the Licensing Document (CAP 168) to issue Emergency Plans and Orders. They are compiled by the aerodrome managements and give precise guidance, which can be implemented at short notice, to the authorities or organisations that will be involved in the event of an emergency or accident at, or adjacent to, an aerodrome. The Department of Trade and Industry examines the emergency plans of each licensed

aerodrome, and advises on their content and scope in relation to the aerodrome's resources and the support that may be obtained from the local authority or other agencies in the immediate area. The Department issues a copy of model Emergency Orders upon which aerodrome authorities are invited to base their particular versions.

9 Heathrow Emergency Orders which are written and promulgated by the British Airports Authority, indicate the responsibilities of, as well as the action to be taken by the British Airports Authority, the National Air Traffic Control Service personnel and others at Heathrow Airport in the event of:

- (a) Aircraft accident/aircraft accident imminent
- (b) Aircraft ground incident
- (c) Full emergency
- (d) Local standby
- (e) Domestic fires and special services

Since these Orders also serve as an action guide for other persons and organisations, they are distributed to the Metropolitan Police, the local authority emergency services, the medical and hospital authorities, the airways corporations and some other airline operators. All other airline operators have summaries of the Orders which outline the emergency organisation for information and action by the recipients.

(*Note:* We have been informed that during our enquiry the BAA has made arrangements for every airline company to be provided with an up-to-date copy of the complete Heathrow Emergency Orders.)

10 The local authorities are concerned not only with aircraft accidents but also with other disasters which may need urgently the services of the police, fire, ambulance and hospital organisations. They have a responsibility for the protection of life and property within their area. Most local authorities have Disaster Plans which include the mobilisation and deployment of police, fire, ambulance, hospital and medical services in the event of a major accident irrespective of the cause. Within this wider framework the particular emergency services integrate their own major accident plans. This is an important point because the organisation and arrangements for dealing with aircraft accidents should fit in with those for other disasters, to obtain the benefits of uniformity and a well-drilled service. In the case of Heathrow Airport, the Greater London Council and the Hillingdon Borough Council are the main local authorities involved in conjunction with the Metropolitan Police which, unlike the majority of UK police forces, is not part of the local authority.

11 We examined the Heathrow Emergency Orders and other emergency services' plans especially where they referred to aircraft accidents. We considered that our task was not to attempt to rewrite them but to determine whether they adequately met the known requirements as far as these could be foreseen. In our opinion it is most important that, after our enquiry is complete, all authorities responsible for the plans should ensure that these are reviewed each year to take account of changing requirements. To ensure the effectiveness and the co-ordination of the various services following an accident — and the fire, police, ambulance and hospital services of more than one local authority may be involved — it is essential that their emergency orders and those of the airport are

compatible. We consider that there should be an interchange of orders and procedures between all organisations involved in order to eliminate as far as is possible deficiencies caused by poor liaison, ignorance or misunderstandings. Changes should not take place without immediate inter-service notification and an explanation of the underlying reasons. To deal effectively with a major crash requires not only detailed planning of the actions to be taken by the various organised emergency services, but also the rapid mobilisation of any assistance which can be made available by other bodies. Such arrangements should be included in the emergency planning.

We *recommend* that the BAA sets up at Heathrow a Standing Committee with representation from the other authorities or organisations involved, to keep the emergency arrangements under review and to provide a focal point for dealing with suggestions or criticisms.

Recommendation No. 1

Policy and cost-effectiveness

12 The primary objective of an aerodrome fire service is to save lives. This means taking steps to ensure the rapid and safe evacuation of the occupants of the aircraft. Secondary objectives are to save aircraft, property and equipment.

13 In principle an aerodrome fire service is located, equipped and manned with the aim of reaching the scene of an aircraft accident on the aerodrome within some two or three minutes, controlling the fire in one or two minutes and providing conditions suitable for rescue and evacuation. Aviation may thus be thought to be better served than other forms of transport. However, the results of an accident on an airport, especially in the case of a large aircraft, may be immediate and massive and may need not only the resources of an aerodrome fire service, but also large scale assistance from outside as soon as it can be mobilised.

14 Although we were asked to take into account the 'cost-effectiveness' of any recommendations which we might make, we have not subjected to economic study and analysis any of the improvements that we have considered. This is due partly to the lack of readily available resources to do this, partly because the majority of our recommendations do not involve major expenditure, and also because we believed that policy on matters of aerodrome safety services is to some extent a question of subjective judgement, there being insufficient meaningful values on which the 'effectiveness' of safety can be costed. However, we have borne in mind the probable costs in making our recommendations.

15 We know that opinions on the need for a fire service and on its strength vary from one extreme — that no aerodrome fire service is economically or statistically justified — to the other which advocates bigger and better services than those now provided. We have accepted the general policy inherent in the Department of Trade and Industry's licensing requirements which have been built up over many years of experience and which are broadly equivalent to the internationally agreed guidance on the subject, and concentrated our attention on how best they could be deployed, organised and co-ordinated with the large scale assistance available from local resources.

Location of accident 'on' or 'off' the aerodrome

16 We have given particular attention to the responsibilities of the aerodrome's and local authorities' services in cases where the location of the accident is on, near or away from the aerodrome. The aerodrome's services are normally only concerned with those on or near the aerodrome. In these cases their action is to hand over progressively to the local authorities' services when they arrive while the aerodrome services withdraw, replenish and get themselves into a state of readiness to permit the aerodrome to resume full flying operations.

Application of Working Party findings to other aerodromes

17 We have dealt exclusively with Heathrow and its problems. These may vary in the case of other aerodromes, depending on their location and the resources of the aerodrome and local emergency services.

Nevertheless, we believe that our findings and recommendations may be helpful to others and that in a number of cases the formation of a local Working Party such as this one will be useful in pinpointing problems, working out solutions and co-ordinating the emergency orders and instructions.

Report of the Departmental Committee on Fire Services

18 Towards the end of our deliberations the Holroyd Report was brought to the attention of the Working Party. (*Report of the Departmental Committee on the Fire Service*. Cmnd 4371. HMSO. 1970. The relevant extracts are at Appendix 4.) The report suggests that this Working Party considers whether operational advantages would flow from integrating airport fire services with the public fire service. They conclude that full integration would be more efficient operationally (but more costly) in those cases where the local authorities control civil airports.

19 This Working Party's terms of reference are limited to the consideration of the Heathrow fire and rescue services. We have not visited other airports or examined their organisation. The following comments on this subject are, therefore, of a general nature.

20 Two important factors are fundamental to providing an effective airport fire and rescue service — one operational and the other managerial. Firstly, the problems of fire fighting and rescue following an aircraft accident are specialised ones in respect of the fire situations which may be encountered and the materials and structures involved, which call for specialised knowledge, skills, techniques and training, and specialised equipment and media which need to be deployed at high speed, but probably for a limited duration pending the arrival of the local authority's brigade. This is in line with the view expressed in the Holroyd Report (paragraph 146) in support of industrial fire brigades which face similar specialised problems, and we find it difficult to accept the statement in paragraph 142 which implies that the techniques required for dealing with the fire and rescue problems following an aircraft accident on an aerodrome are not basically different from those carried out by the local authority fire service in dealing with domestic fires. Secondly, the control and direction of the airport fire services should be under the

control of the airport management so that they are able to meet their licensing obligations and to fulfill their safety obligations to the aircraft operators. This means not only the operational control, but also decisions on equipment, manning and training. They also need to exercise financial control in respect of their own trading accounts.

21 After an aircraft accident on or near an airport, which is first attended by the airport fire service, the normal procedure is for the local authority fire service to attend and take over control allowing the airport fire service to withdraw and replenish. This implies planning and collaboration between the two services.

22 In the case of aerodromes where the licensee is the local authority we believe that an effective and efficient service can be provided by either integrated or separate fire services. This is supported by the evidence of the Department of Trade and Industry from their inspections of these services. The question of integration should be one for each local authority to decide after considering the relative advantages or disadvantages from the points of view of organisation, operational efficiency and cost.

23 In cases where the aerodrome operator is not a local authority, and may be a government department, another authority (such as the BAA) or a private or commercial organisation, there would be considerable management problems involved in integration and we can think of no over-riding operational advantage that would suggest that this should be the recommended system. We consider that integration should be a matter for mutual agreement between the two authorities if they wish to pursue it.

Heathrow Airport London

General description

24 The map of the aerodrome at Appendix 7 shows that it consists of 2 main runways running east/west and a subsidiary aligned northeast/southwest. The main fire station is situated on the north side, the passenger buildings, control tower, BAA management offices and a second fire station in the central area, and the cargo terminal and general aviation areas on the south side. The offices and maintenance bases of BEA and BOAC are to the east and the main fuel farm to the west. The aerodrome covers 2721 acres.

25 The annual passenger flow exceeds 14 million and the aircraft movements 258,000. The number of passenger aircraft using the airport continues to increase at a rate of about $7\frac{1}{2}$ per cent per annum, although a ceiling may be reached in the future as the number of movements approaches the airport's maximum capacity. About 25 per cent of all movements consist of large four-engined jet aircraft. The Boeing 747 currently operated by Pan Am and TWA commenced operations in January 1970. Movements by this type of aircraft will increase when BOAC, Lufthansa and other airlines bring their aircraft into service. Their average passenger capacity exceeds 350 but this may in the future exceed 450 for some charter flights.

26 From the fire and rescue point of view, Heathrow is already in the highest category envisaged under the licensing document CAP 168. The potential number of casualties from an aircraft accident will tend to increase as larger aircraft are brought into service. The emergency services' plans therefore need to be tailored to provide for the potential risk. In considering this problem we realise that the statistics refer only to persons on board. There is always the possibility that houses, factories and third parties may be involved in aircraft accidents both 'on' and 'off' the aerodrome and the numbers of casualties may thus be increased.

Chapter 2 Fire and rescue

Introduction

27 Using the pattern of a hypothetical aircraft accident as a guide we examined the procedures of the organisations involved in the fire and rescue operations from the initial alarm through to the ultimate fireground activities. We considered concurrently any related questions arising from this examination.

Aerodrome fire service

Licensing

28 One of the conditions of the aerodrome licence issued by the Department of Trade and Industry under Article 65 of the Air Navigation Order 1970, requires the licensee to provide an aerodrome fire service to an appropriate scale as set out in Section VI of the licensing document: Civil Aviation Publication (CAP) 168. This document also specifies minimum standards and operational requirements in respect of the quantities of fire extinguishing media, scales of rescue equipment, personnel, training and emergency organisation. In the case of Heathrow this service is provided by the British Airports Authority (BAA). (An extract of Section VI of CAP 168 is at Appendix 5.)

Function

29 The primary objective of an aerodrome fire service is to save lives. Its achievement can depend on the following:

- (a) the effectiveness of the equipment;
- (b) the speed with which the equipment and personnel can be brought into action; and
- (c) the training received — hence the effectiveness of the personnel.

Operational planning for major aircraft accident situations

30 As it would not be economically practicable to provide at an aerodrome a fire and rescue organisation capable of dealing with a major accident solely from its own resources, the development of effective emergency plans to ensure the prompt mobilisation of fire, ambulance, medical and police support from externally based authorities is an important requirement in the licensing of civil aerodromes.

Local authority fire services

Statutory responsibility

31 The Fire Services Act 1947 (Section 1) provides that it shall be the duty of every fire authority in Great Britain to make provision for fire fighting purposes; and in particular every fire authority shall secure:

- (a) the services for their area of such a fire brigade and such equipment as may be necessary to meet efficiently all normal requirements;
- (b) the efficient training of the members of the fire brigade;
- (c) efficient arrangements for dealing with calls for the assistance of the fire brigade in case of fire and for summoning members of the fire brigade;
- (d) efficient arrangements for obtaining, by inspection or otherwise, information required for fire fighting purposes with respect to the character of the buildings and other property in the area of the fire authority, the available water supplies and the means of access thereto, and other material local circumstances;
- (e) efficient arrangements for ensuring that reasonable steps are taken to prevent or mitigate damage to property resulting from measures taken in dealing with fires in the area of the fire authority;
- (f) efficient arrangements for the giving, when requested, of advice in respect of buildings and other property in the area of the fire authority as to fire prevention, restricting the spread of fires, and means of escape in case of fire.

The Greater London Council have this responsibility in respect of Heathrow Airport, nearly all of which lies within the Greater London Council area. A small section of the southern part of the aerodrome comes within the area of the Surrey County Council, but by arrangements with the GLC under Section 12 of the Fire Services Act 1947 the latter undertakes fire fighting responsibilities for the whole of the aerodrome, with Surrey Fire Brigade giving assistance and support as requested and carrying out fire prevention work in their section. The Buckinghamshire Fire Brigade assists the London Fire Brigade (LFB) with attendances at the aerodrome. Such inter-fire brigade arrangements for reinforcement are in accordance with Section 2 of the Fire Services Acts 1947 and 1959.

Transfer of command at aircraft accidents on Heathrow Airport

32 Although the LFB has overall responsibility for fire fighting at Heathrow, the first attack at aircraft accidents on the aerodromes is normally made by the British Airports Authority Fire Service (BAA/FS). The initial role of the LFB in these circumstances is to act in support, and the senior BAA/FS officer present is in overall command of the fire attack on the aircraft. When a senior LFB officer arrives he assumes command of the combined fire service operations; however, it has been agreed between the two fire services that he will not, without consultation with the BAA/FS officer-in-charge, alter the deployment of appliances, equipment and manpower, or withdraw tactical control of the situation from the BAA/FS unless he deems this to be absolutely necessary.

Local authority fire services' operational role at aircraft accidents on Heathrow Airport

33 Aircraft accidents may be accompanied by fire because of the large quantities of flammable fuels and liquids which may have been released in the presence of sources of ignition. A characteristic of these fires is that they spread and reach major proportions very quickly. This rapid development jeopardises survivability within the aircraft; the permanent need therefore is to be able to make an immediate and effective attack with all available resources, to protect the surviving occupants and to create conditions in which their escape or rescue is possible.

34 At Heathrow, the BAA/FS is able to provide this initial intensive fire attack because of their specialised equipment and training and because the position of the fire stations gives the most immediate access to accidents in the area.

35 Local authority fire services have an important contribution to make at aircraft accidents occurring on the aerodrome. They provide expert fire and rescue support after the aerodrome fire service has made the first attack on the fire and are also available to consolidate any advantages gained.

36 The first appliances of the LFB aim to arrive at the Heathrow rendezvous points 5 minutes after getting the 'alert' call. A pre-determined attendance is sent comprising: 10 pumping appliances, 1 hose layer, 1 foam tender, 1 emergency tender, 1 breathing apparatus control van (BACV), 1 control unit. Additionally, a unit comprising 1 hose layer and 1 pumping appliance stands by at the aerodrome main fire station, and 1 turntable ladder is ordered to the nominated rendezvous point. This attendance is capable of attacking residual and secondary fires and suppressing fresh outbreaks. It is invaluable as a source of the extra equipment and manpower which may be needed at a major accident involving the rescue of many casualties. Where buildings are included in the post-accident fire the LFB is able to draw on a wealth of experience, using its special skills and equipment. How these LFB reinforcements are used, whether on fire fighting, water supply or rescue work, is dependent upon the particular circumstances of each accident and on the judgement of the officer-in-charge.

Local authority fire services with aerodromes in their area

37 It is not in our terms of reference to consider aerodromes other than Heathrow. However, we note that some local authorities (including London, Surrey and Bucks.) have acquired, or are considering the provision of, foam appliances and hose layers (as appropriate) with some regard to aerodrome fuel farm or aviation risks in their areas. We consider this to be a sound development, and suggest that other local authorities with aerodromes in their areas may wish to review their capability of giving assistance at aircraft accidents.

Operations at aerodromes with depleted fire services

The meaning and effect of depleted fire services

38 The operation of aerodromes used by public transport passenger-carrying aircraft is subject to the terms of the aerodrome licence which require, amongst other things that:

'No aircraft shall take-off or land at the aerodrome unless such fire fighting and rescue services and such medical services and equipment as are required in respect of such an aircraft in the Department of Trade and Industry publication CAP 168 (Licensing of Aerodromes) are provided there. Such services and equipment shall at all times when the aerodrome is available for the take-off or landing of aircraft be kept fit and ready for immediate turnout'.

39 The Department of Trade and Industry issues to licensees, managements, operators and others concerned with civil aerodromes, memoranda containing advice and guidance on policy. At Appendix 6 is a copy of

such a memorandum — DAT 1/70, (now being revised to take account of the new Licensing Document) which deals with the subject of depleted fire service cover. The aerodrome fire service may be partially or wholly depleted for a number of reasons including being already committed to an accident, 'domestic' fire, or other incident from which it cannot disengage, or because the extinguishing media carried by the appliances have been discharged. (In this context 'domestic' fire is defined as any fire on the aerodrome not included in the categories 'aircraft accident', 'aircraft ground incident', 'full emergency' and 'local standby'). When an aerodrome fire service is substantially depleted it cannot provide an adequate service in the event of all emergencies, the normal consequence of this is for aircraft operations to be restricted in accordance with DAT Memorandum 1/70 until the fire and rescue service is again restored, wholly or in part.

Policy governing restricted operations

40 We recognise that it is the responsibility of the managements of licensed aerodromes to keep themselves informed of the state of availability of their aerodrome fire services and to take appropriate action when these are depleted. In the case of the BAA Fire Service at Heathrow the effect of depleted cover upon aerodrome operations and the consequential action to be taken are a matter of policy for the BAA within the limits set out in the DAT Memorandum No. 1/70. This policy needs to be flexible if it is to take account of the economic penalties of restricting operations, and the cost of additional fire cover. The airline companies, although appreciative of BAA/FS attendances at domestic fires on the aerodrome, can be faced with costly diversions caused by the resultant depletion of cover, and the aerodrome would lose part of its revenue from landing fees.

The need for guidance

41 We consider that to enable the BAA Fire Service to make effective decisions it needs clear guidance and discretionary powers from management. We therefore examined the present situation at Heathrow concerning the effects of BAA/FS attendance at domestic fires and special service calls on the aerodrome and at accidents off the aerodrome. The following paragraphs contain our recommendations which aim to provide this basic guidance.

(*Note.* We understand that during the course of our enquiry the new procedures that we have suggested for BAA/FS attendances at domestic fires and off-aerodrome aircraft accidents have been accepted by the BAA, and that implementing instructions have now been issued to all BAA aerodromes.)

Responsibility for sending the BAA/FS off the aerodrome

42 Whilst the BAA has no responsibility for attending aircraft accidents outside the licensed area of the aerodrome, it has, for humanitarian reasons, been the practice to make an attendance within a limited area. At the outset of our examination of the problem of depleted fire cover at Heathrow, we noticed that the relevant instructions in the Emergency Orders were misleading since they implied that Air Traffic Control had responsibility for deciding on BAA/FS attendance off the aerodrome. The resultant depletion could involve a restriction on aircraft operations which is a BAA management responsibility to impose. When both the Fire Service and the ATC were under common management by a government department, the wording in the Emergency Orders was correct. Since the formation of the BAA, the Fire Service comes under their control, whilst

the ATC remains with the Department of Trade. We consider that the precise responsibilities should be clearly stated.

We therefore *recommend* that the BAA institutes a procedure which requires the Air Traffic Control Watch Supervisor, on duty when an aircraft accident occurs outside the aerodrome boundary, to inform the BAA Fire Service of the occurrence and its location.

Recommendation No. 2

(*Note.* We note that the BAA has now clarified this question in consultation with the Department of Trade.)

Strength and area of operation of a BAA/FS attendance off the aerodrome

43 Given that the aerodrome management must decide policy in respect of how far from the aerodrome and in what strength the BAA/FS should attend off-aerodrome accidents and for the aerodrome operations to continue, we considered the present conditions under which the BAA/FS attended. From these we formulated a recommendation which we suggest will, if incorporated in Heathrow Emergency Orders, give clear guidance as to BAA/FS attendance in future.

44 It is normal practice at present for the BAA/FS to make a full attendance at accidents occurring on the aerodrome. For aircraft accidents occurring off the aerodrome, but within 2 miles of the airport perimeter road, the BAA/FS makes a partial attendance. This ensures that sufficient cover remains to protect continuing operations. We consider that the size of BAA/FS attendance off the aerodrome must be a matter of judgement based on the BAA/FS tactical position at the time but, in view of present equipment held, a limit of 50 per cent of the available media should cause no major change in aerodrome operations.

45 As to the distance that the Fire Service should go from the aerodrome, we consider 2 miles from the airport perimeter road to be a reasonable general limit. We realise that in practice a fixed distance may seem unrealistic with regard to the varying road and traffic conditions on different sides of the aerodrome, but consider that an arbitrary limit should be stated as an administrative expedient for the benefit of the surrounding local authority emergency services as well as those of the aerodrome.

We therefore *recommend* that the BAA Fire Service continues to attend aircraft accidents, occurring within the aerodrome boundary, with all available appliances; for accidents occurring beyond the boundary and thought to be located not more than 2 miles from the airport perimeter road, the attendance should not exceed 50 per cent of the media; beyond 2 miles no automatic attendance should be made although, at the discretion of the BAA Fire Service officer-in-charge, one appliance may be despatched in response to a request from the accident site for technical advice or for support with specialised equipment.

Recommendation No. 3

Strength and duration of BAA/FS attendance at domestic fires

46 Although there is no obligation upon the BAA/FS to attend domestic calls, it has always done so. The LFB makes an attendance whether or not the BAA/FS has responded and regardless of the strength of their attendance. However, there was a need to consider the extent to which the BAA/FS attendance at a domestic call would reduce its capability of dealing adequately with an aircraft accident should one occur at the same time. We therefore considered the operational need for the BAA/FS to attend domestic fires and special service calls at Heathrow. We

considered that a separate appliance and crew for domestic purposes was not required but that any response to domestic fires and special services should be made from the appliances and crews provided to meet the licensing requirement. We accordingly made the following recommendations.

Recommendation No. 4

We recommend that the BAA Fire Service attends all calls to fires occurring in aerodrome bulk fuel installations, in aircraft parked on aprons or in hangars. Attendance should be with all available appliances in the first instance due to the nature of these fires and the risk they present to operations at the aerodrome, and because of the special equipment which the BAA Fire Service has available.

Recommendation No. 5

We recommend that the BAA Fire Service makes a predetermined attendance for calls to all other fires involving premises, technical installations or structures or for incidents where persons are known or are thought to be at risk. This will normally be one appliance capable of fire fighting operations. The decision in respect of an additional attendance in response to a message from the incident shall be at the discretion of the BAA Fire Service officer-in-charge, having regard to the anticipated attendance and response time of the London Fire Brigade.

Recommendation No. 6

We recommend that the BAA Fire Service continues to inform the Air Traffic Control if, through the discharge of extinguishing media or for any other other reason, the available strength of the Service drops by two or more categories in terms of the scale set out in Section VI of the licensing document CAP 168.

Siting of BAA fire stations at Heathrow

47 The need for an aerodrome fire service to have the shortest possible response times is self-evident. A definition in current ICAO documentation describes response time as 'the time taken between the initial call to the rescue and fire fighting service and the first effective intervention by a rescue and fire fighting vehicle'. Of the many factors which can affect a fire service's response time, the ICAO 'Aerodrome Manual', considers the location of the aerodrome fire station to be one of prime importance. It recommends that fire and rescue equipment should have instant access to aerodrome movement areas and be capable of reaching the extremities of the aerodrome and runways in minimum time and desirably within three minutes under optimum conditions of visibility and surface conditions.

Present sites of BAA fire stations at Heathrow

48 There are 2 BAA fire stations at Heathrow. The main (north) station is just to the north of and about midway along Runway 28 R/10L. The central fire station is situated to the south of the central terminal area at the extremity of No 1 passenger pier (see the map at Appendix 7).

BAA/FS response time trials

49 Tests carried out in February and April 1970 demonstrated that it is possible for vehicles to reach the extreme ends of both main runways within the 3 minutes recommended by ICAO. We realise that only part of the total force may reach the accident scene within this time but consider that these tests at Heathrow adequately demonstrate that the BAA/FS can meet the ICAO recommendation and a similar requirement in the

revised CAP 168. We also note the present disposition of vehicles between the two stations and understand that one further bay is to be provided at the central station, so that when full Category X cover is provided, with a minimum of 8,000 gallons of water carried on vehicles, the disposition of the available media will be broadly equal between the two stations. Accepting the demonstrated response times as a true indication of capability and assuming that the first vehicles from the nearest station discharge at maximum capacity, the duration of the first attack will be more than 2 minutes and therefore long enough for the vehicles from the other station to arrive and continue the attack. We note that the BAA re-equipment programme provides that the initial discharge rate from two foam tenders from either station exceeds the licensing requirements for a Category X aerodrome.

50 From our examination of the response times, it is clear that the north station has an advantage over the central station in one case, has parity in another and is predictably worse in the case of Runway 28L/10R. The north station, on its present site, serves Runway 28R/10L and gives reasonably direct access to the central area complex where a fuelling fire may present serious problems. The central station is sited to provide immediate cover for the central area and to serve Runways 23/05 and 28L/10R. The principal buildings in the new Freight Terminal and in the maintenance areas have built-in fire protection systems. Aircraft fire risks outside these buildings are not likely to involve a risk to many lives, nevertheless, for any call to an emergency involving an aircraft on the ground the BAA/FS would make a full attendance. We consider, therefore, that tactically the present location of the fire stations offers reasonable response times to both areas.

Possible re-siting of fire stations

51 On the possibility of re-siting it is reasonable to consider what advantages might be gained in improved response times. The original plan when Heathrow was being developed was to site the main station in the central area but this was changed because it was thought that better use could be made of the limited space available if a smaller station was built there. Other proposals considered at that time were to site one station to the south, in No 2 maintenance area, or to build the fire stations at the east and west ends of the aerodrome. The present configuration with the main station on the north side was adopted after an analysis of the plotted positions of all aircraft accidents which had occurred on or around Heathrow up to 1961. This analysis showed that the shortest response times for all appliances would have been from fire stations at the central and northern sites, and four significant accidents which occurred subsequently have borne out this theory.

Conclusion

52 On the evidence available we do not consider that any change in the present siting of the fire stations at Heathrow is justified.

Command and manpower of the BAA/FS

53 Although present arrangements at Heathrow more than fulfil the requirements described in CAP 168 in terms of watch and overall command, we consider that the related questions of command and manpower exert a strong influence on the scope and efficiency of fireground

tactics. We therefore examined the BAA/FS structure in relation to the present equipment. We consider that the BAA/FS is making effective use of the trained firemen under its command. We note that the BAA/FS is implementing a programme of re-equipment, with appliances of improved fireground and operational flexibility, which will modify present fireground tactics and manpower requirements. This, coupled with any future changes in licensing requirements that may occur as a result of the continuing ICAO studies, precludes any precise forecast of the future BAA/FS manning structure.

54 In the past some criticism has been made about command and it has been suggested that there is a requirement for a high calibre of appliance commander. We suggest that this should be interpreted in terms of ability. Fire services aim, by attracting the right type of recruit and by selective employment and training processes, to produce competent appliance commanders who are qualified by experience and by their qualities of leadership.

Recommendation No. 7

We recommend that the BAA Fire Service makes available junior officers of a grade not less than Section Leader with responsibility for the conduct of parts of the fireground operations at an aircraft accident, leaving the officer-in-charge of the overall attendance, usually an Aerodrome Fire Officer Grade II, to direct all phases of the operation.
(Note: We understand that this organisation is in operation.)

Equipment

General observations

55 We considered whether the existing equipment and media at Heathrow now work adequately and meet the criteria and requirements laid down by the Department of Trade and Industry in CAP 168; and we found this to be the case. Since 1968 considerable effort has been made by the BAA to improve equipment and to correct equipment defects. Maintenance procedures (including testing and inspection) for equipment, eg. delivery hose, have been revised and we have no reason to believe that present maintenance procedures are inadequate.

Foam and water-tenders

56 'Nubian Major' appliances are now in service at Heathrow. The capabilities of this appliance are markedly greater than those of the ordinary 'Nubian' appliances which were in service in 1968. The present 'Major' model carries nearly twice as much water, 1500 gall. in place of 800 gall.; 260 gall. of foam liquid compared with a previous 100 gall. and, whereas the older type of monitor had an output of 200 gall. per min., the output of the new one is 660 gall. per min. — a capability that may be increased. Further important advantages of the 'Major' are the ability to produce foam whilst moving at reduced speed, a sideline pressure adjusting device, and the availability of engine speed control at the monitor operator's position. The first provides an appliance commander with greater tactical flexibility which can increase the efficacy of the vital initial attack on the fire, and the second is a device designed to prevent transmission of excessive pressures from the main pump to the sideline hoses when these are being used at the same time as the monitor.

Hydrants

57 One of the safety advantages enjoyed by Heathrow Airport is an extensive hydrant and deluge system. The deluge systems are in the larger hangars and freight terminal, whilst the hydrants are arranged in 3 rings: an inner ring around the central area; a middle ring within the area formed by the centre portions of the runways; and an outer ring round the outside edge of the outer runways. The hydrant system operates on stored pressure and has pumps which start automatically as the hydrants are operated. A constant pressure of 125/lbs/sq. in. is provided throughout the system making available approximately 450 gall. of water per min. from each of the twin hydrant outlets. Although the availability of this hydrant system is at present accepted as meeting part of the licensing requirement for water supply, this will no longer be necessary after the introduction of the new appliances since they carry the required quantity. The Department of Trade has already advised the BAA to this effect. The hydrant system and the hose-laying vehicle will continue to be an invaluable reserve should one of the major foam-making appliances become unserviceable and they will be useful in the support of foam producing appliances after the initial attack. The hydrant system is also needed to facilitate the fighting of fires in buildings and technical installations.

Monitors

58 In view of the increasing fuselage heights of new large aircraft (the Boeing 747 is approximately twice the height of the Boeing 707) we considered the desirability of elevating the fire appliance monitor above vehicle roof level. In theory this should give a more accurate trajectory for the delivery of foam. The precise need for elevated monitors has still to be established and we recognise that there are a number of difficulties to be overcome should it be decided to provide them. These include the stability problems which will arise when an elevated monitor is operated, and the loss of water-carrying capacity caused by the weight of the monitor-elevating structure. We note that the Department of Trade is examining the problems of an elevated monitor based on a vehicle with a larger chassis capable of carrying 3000 gallons or more.

Rescue tenders

59 Our discussion on the operational role of rescue tenders revealed a difference of opinion within the Working Party. The basic concept, which had the support of the majority and is contained in the ICAO Aerodrome Manual Part 5 Volume I, is of an appliance capable of rapid response and carrying rescue tools and equipment, a small quantity of an extinguishing agent and a crew whose primary duty is to initiate rescue operations or to assist the evacuation of aircraft's occupants. As the performance of this vehicle should enable it to reach the scene ahead of the major fire fighting appliances the officer-in-charge riding on this vehicle could use this advantage to assess the situation and to direct the tactical disposition of the appliances. ICAO recognises the need for rescue tenders to have a superior performance and recommends that they should accelerate from 0-50 mph in 35 seconds, as compared with 45 seconds for major fire fighting appliances.

60 The difference of opinion centered on the measure of advantage to be gained by the superior performance of rescue tenders and the overall effect on manning which is caused by providing separate crews for rescue tenders. It was argued that over the relatively short distances travelled

by aerodrome fire appliances the rescue tender would reach the accident site only a few seconds ahead of the main appliances, and this would not give the officer-in-charge any significant tactical advantage. Any advantage claimed had not been clearly substantiated. In respect of manning, the difference of view was on the question of the optimum use of all crew-members in the total attendance.

61 The precise function of a rescue tender, crewed by the officer-in-charge, a driver and two men intended to operate as a rescue-team, was examined and one view was that this may not be the most effective arrangement. Any men required to form the rescue element might well ride on the major fire fighting appliances and thus have the operational flexibility to assist in the fire attack, if this were necessary on arrival, or to conduct rescue operations if these were possible. As all men in the BAA Fire Service are trained in the whole range of fireground duties each could take part in fire fighting or rescue work as required. We noted that the BAA provides more men on the foam-producing appliances than are necessary to achieve the minimum discharge rates required by the licence.

62 In considering these opposing views we had regard to the technical developments incorporated in BAA's new foam tenders and to the possible development of rescue tenders. It is accepted that the foam tenders have the ability to discharge their contents very rapidly which could mean that the crew-members would become available for other duties when the foam tenders were exhausted. The majority were not satisfied that this would provide an adequate level of rescue effort in the earliest phase of an operation where, with a serious fire situation, the opportunities for rescue may be brief. It is our view that with large aircraft with high passenger loads the rescue element should arrive with appropriate equipment in a separate vehicle which will not be liable to diversion for major fire fighting activities, which may be conducted on the move. The rescue personnel may need to don special clothing and breathing apparatus and to deploy apparatus to give access to, or egress from, the aircraft. These considerations led us to the conclusion that rescue tenders should be separately crewed (although when there are no immediate rescue operations to perform, these men can undertake other duties at the direction of the officer-in-charge).

63 In considering the need for a device which will provide a means of rapid descent for escaping passengers we recognised that there may be problems in incorporating this equipment in the rescue tender. We were aware of studies which are in progress within BAA and by an inter-departmental committee under the chairmanship of the Department of the Environment. Whilst it is too early to anticipate the outcome of these we are of the opinion that it would be undesirable to require the rescue tender to carry the escape device in addition to its normal equipment if the effect would be to restrict the performance and the deployment of the vehicle. Similarly, we feel that to carry more than a small quantity of the supplementary extinguishing agents on the present type of rescue tender may not only affect its performance but would also present unacceptable problems in operational deployment.

64 We find a special operational situation exists at Heathrow because two fire stations are provided to meet the essential response time. As there is only one rescue tender its operational advantages are limited to those

locations which can be reached first from the fire station in which it is based. We consider this to be undesirable and are of the view that the operational advantages of a rescue tender should be available regardless of the location of the incident. This, and the views expressed in paras 65 to 67 inclusive, are those of the majority of the Working Party.

We therefore *recommend* that, unless a rescue tender can be provided which meets the recommended response time to all parts of the aerodrome from one fire station, the BAA provides a rescue tender in each fire station at Heathrow.

Recommendation No. 8

Manning for a rescue tender

65 We accepted that the manning of appliances is a matter for agreement between the licensing authority and the aerodrome authority. At each licensing inspection there are a number of factors which together determine the acceptability for licensing of the fire fighting and rescue service, and the sole objective of the assessment must be to ensure that the manner of provision satisfies the terms of the licensing document. We were therefore in some difficulty in expressing the manning which we felt to be necessary to operate rescue tenders, since this required consideration of only one aspect of the overall manning requirement. The situation was made more difficult because the BAA Fire Service is midway through a re-equipment programme.

66 It was our opinion, notwithstanding these difficulties, that having recommended the provision of rescue tenders, we should also express a view on the manning of these appliances so as to provide a complete picture of their operational employment. For rescue tenders designed to serve a dual role, combining the carriage of some fire fighting agent and the rescue equipment, the crewing must recognise the possible need for the simultaneous performance of both functions. Rescue tenders which are designed primarily as appliances carrying tools and equipment for use in rescue operations should be manned so as to provide not less than one two-man group trained and equipped for entry into the occupied portion of the aircraft and for search and rescue operations. In addition a rescue tender may carry the officer-in-charge of the total attendance who will have overall direction of fire fighting and rescue operations.

67 One two-man unit, making entry at a single point may not be sufficient to deal with the rescue requirement in accidents involving aircraft seating 150 or more passengers; and little assistance can be expected from the crews of the fire fighting appliances during the early stages of an accident with fire when the need for rescue may be most urgent. For this situation the rescue element should consist of at least two two-man units not including the officer-in-charge but, for the reasons we have already given, we would accept that the manner in which these men should be provided is a subject for agreement between the aerodrome and the licensing authority. In the case of Heathrow, and based on our current knowledge of the types of rescue tender available, we have recommended that two should be provided unless one can meet the recommended response time. We make the following recommendation in respect of manning.

We *recommend* that, if the two rescue tenders recommended for Heathrow are provided, each should be manned by a two-man rescue team. One of these rescue tenders should also carry the officer-in-charge

Recommendation No. 9

of the Watch. If only one rescue tender is available, both two-man rescue crews should ride this appliance.

Minority opinion of the British Airports Authority

68 The British Airports Authority, having recently conducted tests which show that either their Nubian Majors or their rescue tenders can meet the ICAO response times from either the north or the central fire station, note that, as they accord with the proviso in Recommendation No. 8, it is unnecessary to provide a rescue tender in each fire station. Indeed, ICAO requirements are met without a second fire station, but the BAA intend to keep the central (or subsidiary) fire station in use to provide shorter first attendance times to some parts of the aerodrome. The BAA consider the value of rescue tenders, which are not required by the aerodrome licence, has been over-estimated. As there has been no change in ICAO advice, particularly in the Aerodrome Manual since 1957, it is time to re-think the need for and role of rescue tenders. Fourteen years ago they had a speed advantage over then current major appliances, but tests now show that the Nubian Major is little behind a rescue tender, if at all. The idea that the rescue tender enables the officer-in-charge to arrive first and, after assessing the situation, to order deployment of his appliances, the BAA therefore believe is illusory. Initial deployment is on the initiative of the appliance commander, based on sound training. In any case, it is impossible for the officer-in-charge to be at the same time in two fire stations geographically well separated, and he may not be in the station nearer the incident. The small quantity of supplementary media carried on rescue tenders is of little use in a major conflagration and a separate rescue team of firemen, riding a rescue tender, can be left helpless by not having a good supply of extinguishants ready to hand. With the new methods of massive foam attack, the crews of most foam tenders, having exhausted their media in about two minutes, are wholly available for rescue, for which they are equally trained. It is better for the rescue element to be provided out of the crews riding major vehicles, capable of quickly discharging their contents. For this reason, the BAA consider that when men are provided solely for rescue, assuming that is necessary, it is better to have some riding major appliances from the nearest fire station and not concentrate them all in one lightly equipped vehicle starting from a fire station which may be further from the scene of an accident. Present rescue tenders do carry the small quantities of rescue tools prescribed in the Licensing Pamphlet, some of them only suitable for wooden aircraft, but it is also acceptable to carry them on a major appliance. It is just as possible to don special clothing and carry breathing apparatus on a major vehicle as on a rescue tender, and hence this advantage of a rescue tender quoted in para. 62 is also the BAA believe, illusory. The BAA believes that a 'cost-effectiveness' study would not substantiate the provision of rescue tenders and supplementary media vehicles nor of crew without substantial quantities of extinguishants to hand.

Ground rescue devices

69 Under Articles 10 and 12 and Schedule 5 of the Air Navigation Order 1970, certain UK registered public transport passenger carrying aircraft are required to carry equipment to enable passengers to reach the ground safely in an emergency while the aircraft is on the ground. However, there is evidence of an undesirably high rate of failure of in-built aircraft escape devices. They fail either for mechanical reasons or because they are destroyed by fire. We therefore consider that a ground rescue device

could be useful pending the improvement of escape slide equipment. We note that the Defence Materials Standardisation Committee (DMSC), Fire fighting Equipment Sub-Committee, is considering the operational requirement for such devices.

We recommend that the DTI ensures that research be continued to improve aircraft escape equipment, and a study be made of the need for, and the design of, a ground device to facilitate evacuation. *Recommendation No. 10*

70 We find that other possible means of safe descent, whilst all occasionally efficacious, have each got limitations:

(a) *Ladders*

These, apart from problems of length and weight, limit the exit rate to one at a time at a speed dependent upon the ability of the individual to use a ladder.

(b) *Steps*

These are expensive and bulky, and with larger aircraft from which occupants may emerge 2 or 3 abreast, steps of the requisite size will be too large to be deployed rapidly.

(c) *Inflatable or other types of soft cushion or pad*

The problem of escape from elevated, unreachable parts of an aircraft may occasionally be solved by the use of a cushion or pad as a breakfall. Limitations are the reluctance of some escapers to jump, and the slow follow-on rate due to the time taken for each successful jumper to recover and move away.

Training

General

71 We regard training as most important and note that since 1968 more training facilities, including two out-of-service aircraft carcasses, have been made available at Heathrow. Realistic, 'hot'-fire practices still tend to be infrequent, because such activities at Heathrow are often cramped by the need to maintain the required fire-cover, and because of the suggested effects of such activities on the public and on the airline passengers' morale. It is hoped that the limitations imposed by fire-cover requirements will be largely overcome with the advent of new equipment which will create a greater operational reserve. We note that the BAA Fire Service hold 'hot'-fire exercises with the London Fire Brigade. All BAA/FS firemen are given continuation training at the Department of Trade and Industry Fire Service Training School, at intervals not exceeding 3 years — a frequency higher than that recommended in CAP 168 — which reflects the importance which the BAA place on regular training at a central training establishment. In addition there are facilities at the aerodrome for them to receive continuation training throughout their period of service.

Combined exercises

72 We consider overall, large-scale combined exercises, held regularly — not less than once a year — are effective in revealing the strengths and weaknesses in aerodrome emergency procedures. We realise the difficulties involved in holding major exercises at Heathrow and we note that it is

the intention of the BAA to hold at least one large-scale exercise annually as in the past. In addition, limited exercises can be beneficial in testing individual aspects of emergency procedures.

Co-operation and facilities afforded by airline companies

73 We note that the BAA/FS enjoys good co-operation and help with training from the airlines, especially those with terminal facilities on the aerodrome. Since our enquiry began, arrangements have been made, with the assistance of the Airline Operators Committee, to improve opportunities for the BAA/FS to have aircraft familiarisation training, and we note that the local authority emergency services will be included in the scheme.

Technical training

74 We consider that there is undoubtedly an interdependence between fire brigades involved in fire and rescue work at aircraft accidents. These accidents call for a shared knowledge of the aerodrome and its problems, a clear chain of command and an understanding of each other's specialities. It is important that there should be appropriate training in aircraft fire fighting for personnel from non-aerodrome fire services which attend airport incidents. This will ensure that there is a full understanding of the various operational contributions which each can make, as well as providing some familiarisation with aircraft fire fighting and rescue techniques and the problems involved. During our enquiry the representatives of the police and the local authority fire and ambulance services expressed a wish to receive training in some aspects of aircraft fire fighting and rescue, to assist them in the operational planning and performance of their duties and enable them to produce instructors capable of continuing training within the individual services.

75 We consider that suitable courses of training in aircraft fire fighting and rescue techniques can best be provided at the Department of Trade and Industry Fire Service Training School. However, the nature and duration of the normal range of courses for aerodrome students are not suitable for police and local authority fire and ambulance personnel who are primarily engaged in duties other than aerodrome duties. Furthermore the present weekly charge of £75 (which includes accommodation but not meals) for normal courses is related to the cost of providing realistic fire fighting and rescue situations. Charges of this order would not be appropriate for special, shorter courses, nor would they encourage local authorities or other sponsoring agencies to take advantage of them.

Recommendation No. 11

We recommend that the Department of Trade and Industry provides shorter courses, probably lasting 3 to 4 days, specifically for police and local authority fire and ambulance personnel, at an attractive fee which recognises that these courses will consist largely of lectures and discussions but will not involve participation in fire exercises.

Conclusions

76 At the time of our enquiry no serious defects were discovered in the fire and rescue arrangements at Heathrow. We were pleased to note, early on in our enquiry, the very close and effective liaison and willingness to co-operate which exists between the British Airports Authority Fire

Service and the Constabulary, the local authority Fire Brigades, Ambulance Services and the Metropolitan Police, all of which have responsibilities at the airport.

77 We came across several problems in the emergency arrangements to which solutions have either been suggested in our recommendations, or have already been effected or put in hand by the organisations concerned.

Chapter 3 Medical and ambulance services

Introduction

78 Our examination of the arrangements for the provision of medical and ambulance services at Heathrow, and of problems of post-accident care, was based on a broad consideration of what could arise following an aircraft accident. As part of our study we also considered relevant parts of the Emergency Orders and Schemes of all the emergency services and hospitals concerned and of the Airport Authority.

Responsibility to provide ambulances, medical services and equipment at licensed aerodromes

79 The relevant section of CAP 168 requires the licensee to make arrangements to provide or procure various medical services and equipment. (An extract of Section VII of CAP 168 is at Appendix 8.)

Ambulances

80 There is an obligation in certain circumstances for the aerodrome to provide an ambulance or other suitable vehicle. Paragraph 3 of CAP 168 Section VII states:

3 Unless an ambulance or ambulances from outside sources can arrive at the aerodrome within 15 minutes of being summoned an ambulance or other vehicle capable of conveying not less than two stretcher cases shall be provided on the aerodrome.

In respect of Heathrow the Greater London Council has responsibilities under Section 27 of the National Health Service Act, 1946, for meeting ambulance needs arising on the aerodrome. It is apparent from our examination (see paragraph 109) that external ambulances are available within 15 minutes from the London Ambulance Service. There is therefore no obligation for BAA to provide any ambulances at Heathrow, although in fact they do so (see paragraph 84(iii)).

Other medical services and equipment

81 Our examination of the emergency medical arrangements at Heathrow shows that the services and equipment provided are in excess of the requirements of CAP 168.

Medical, ambulance and hospital services available and their deployment

Medical and ambulance services available on the aerodrome

82 The following organisations have qualified medical and nursing staff on duty at the aerodrome. Some or all of these will assist in the treatment or after-care of casualties resulting from an aircraft accident, but the number of staff available depends upon the time and day of the week.

Health Control Unit, London Borough of Hillingdon

83 The Health Control Unit at Heathrow consists of 8 Medical Officers and 50 clerk receptionists under the direct control of the Principal Medical Officer who, in turn, is responsible to the Director of Health and Welfare for the Borough of Hillingdon. The formal duties of the Medical Officers are mainly routine port health work, immunisations, and the examination of Commonwealth immigrants and aliens. The Health Control Unit has no nursing sisters on the staff, or beds under its control. The Medical Officers and clerk/receptionists are located in the passenger terminals. During normal office hours the distribution allows for a maximum of three Medical Officers in Terminal 3, and one or two in Terminals 1 and 2. During the working week only one Medical Officer is available at night and he is based in Terminal 2. At weekends two are available. The Medical Officers will offer assistance to the BAA nursing staff on request, and their duties in the event of an aircraft accident are defined in the Heathrow Emergency Orders, Part II, Section F. If a Medical Officer is required to attend an aircraft emergency at the aerodrome during office hours, he comes from Terminals 1 and 2 because these are closest to the BAA Medical Centre, Queens Building. He is, as described in Emergency Orders, the Medical Officer-in-Charge at the scene of the accident.

British Airports Authority

84 (i) *Nursing staff.* The BAA Medical Organisation at Heathrow has eight Nursing Officers and one Principal Nursing Officer who provide a 24-hour service. This nursing staff carries out occupational health duties and offers limited medical care for BAA employees at the aerodrome. It is also available for emergency treatment to other employees and the public where no alternative medical facility is available. It is responsible through the administration manager at Heathrow to the general manager, for day to day administration, and to the BAA Chief Medical Officer for professional matters. The nursing staff is accommodated in the Medical Centre, Queens Building. This centre comprises one large treatment room, and 2 recovery rooms with six to seven beds. There are plans to enlarge this centre in the near future. BAA have an arrangement with the Health Control Unit whereby the nursing staff is able to ask for the assistance of one of the unit's Medical Officers either for the daily routine or for emergency work at the centre. In the event of an aircraft emergency, the nursing staff works closely with the Health Control Unit Medical Officers.

(ii) *Medical equipment.* The BAA Medical Service holds surgical dressings, instruments, drugs and first aid equipment. In addition it has resuscitation equipment, two large inflatable tents, 200 blankets, 50 stretchers and a quantity of plastic sheets. All the above are held in immediate readiness on a vehicle for transportation to the scene. (See also paragraphs 106 and 107.)

(iii) *Ambulances.* Acting as agents of the airlines and the London Ambulance Service, the BAA at present provides a service of two ambulances between 0700 hrs and 2300 hrs, and one between 2300 hrs and 0700 hrs. These vehicles, like those of the local authority, are of the two-wheel drive type and do not have a cross country capability. There is a BAA four-wheel drive vehicle (not an ambulance) at Heathrow which carries stretchers and other bulky equipment. This is a useful addition to the vehicle force which can help in the deployment or ferrying casualties at aircraft accidents and is particularly useful on the soft grass areas. BAA ambulances are primarily for the transfer of sick and invalid

passengers to and from aircraft or hospital, but they are also available for accidents or other emergencies. In the case of aircraft accidents they are driven to the scene where their crews — two firemen to each vehicle — function as ambulance drivers and attendants. They carry the injured to the first aid tents and may convey patients to hospital. At the discretion of the BAA/FS officer they may be directed to assist with rescue work. However, they are primarily regarded as ambulance crews by BAA and it is intended that they should function as such. The resuscitation equipment, stretchers, blankets, plastic sheets and dressings carried on the BAA vehicles are available for the use of the SMO and medical staff at the scene as required.

Air Corporations Joint Medical Service (ACJMS)

85 The Air Corporations Joint Medical Service provides an occupational health service for BEA and BOAC, with its headquarters at the airport. The Service has one of its doctors always within telephone reach and on call all the week. Four occupational health units, manned by a minimum of 1 or 2 of the Service's nursing staff throughout the 24 hours, are located in the BOAC Maintenance Complex, Speedbird House; the BEA Maintenance Complex (West Pen); the Central Area Medical Unit, South Office Wing, central area; and in the cargo terminal, southern area. There are no wards but each unit has small rest rooms and one small emergency resuscitation room. In the event of an accident at Heathrow, affecting any airline, the full resources of the ACJMS are at the disposal of the British Airports Authority. A local instruction regarding action to be taken when there is an aircraft or serious ground accident, is issued to ACJMS medical staff. In addition a précis of this instruction has been distributed to all ACJMS and BEA/BOAC units so that they are fully aware of the essentials of the action required (copy at Appendix 11). The ACJMS Central Area Medical Unit is the co-ordinating medical centre for the Service. This is because although the BOAC duty room is advised of a disaster affecting any airline they, as a matter of procedure, inform the Central Area Medical Unit with which they have a direct communications link.

Department of Trade and Industry

86 There are 2 doctors and 1 nursing sister accommodated in the Queens Building but with no facilities for treating casualties. Under the control of the Chief Medical Officer, their duties consist of the medical examination of aircrew and air traffic control officers in connection with licensing. They are at the aerodrome only during office hours. In the event of an accident whilst they are on duty, their instructions are to report to the Medical Officer-in-Charge and act upon his orders.

Medical and ambulance services available outside the aerodrome

87 When large numbers of casualties are involved it is unlikely that as many doctors or nurses as would be desirable could be concentrated at the scene of the accident in the time available. Neither would it be appropriate to denude the local hospitals of a large part of their qualified staff. They are better utilised where the equipment and facilities are available. In the event of a major emergency the aim of the medical and ambulance services is to give injured persons essential treatment on the spot and transfer them to the hospitals as quickly as possible. The following paragraphs describe the external medical and ambulance services which respond in the event of an aircraft accident.

Ambulance facilities

88 London Ambulance Service

(i) *Strength and disposition.* The London Ambulance Service can call upon resources of some 1600 fully trained ambulancemen/women plus 400 others with a simple first aid qualification, and about a thousand vehicles, 320 of which are fully-equipped accident ambulances. The ability of the London Ambulance Service to respond on a large scale to a call to Heathrow Airport is governed by two factors — how far ambulances in sufficient numbers are from the aerodrome and whether they are immediately available or are dealing at the time with other emergencies. The nearest ambulance station is in Sipson Way on the north side of the Bath Road only a few hundred yards from the aerodrome entrance. This station houses one ambulance which might at any time be attending an accident on the nearby motorway or some other emergency outside the aerodrome. Seven other ambulance stations are within a straight-line distance of 5 miles from the aerodrome. These stations together with that in Sipson Way normally provide 27 emergency ambulances during the main part of the day reducing to 9 at night. Additional ambulances could be brought in readily from further afield especially at night when traffic conditions are likely to permit a fast journey. No aircraft accident involving injured survivors to the extent now contemplated has occurred in this country but the experience of the London Ambulance Service in attending train accidents indicates that a sufficient number of ambulances can be mobilised to provide a satisfactory shuttle service between Heathrow Airport and the hospitals. Rescue operations coupled with the need for a medical check as to the nature of injuries and the application of essential treatment on the spot mean that large numbers of casualties are unlikely to require simultaneous removal and that a shuttle service can be quickly established. Emergency calls are received at the Central Emergency Control at Waterloo (London SE1) and at sub-controls at Kenton (Middlesex) and Ilford (Essex), all of which can initiate the Ambulance Service Major Emergency Plan. Calls from Heathrow Airport are at present routed to the Kenton sub-control but by about the end of 1971 the sub-controls at Kenton and Ilford will cease to be involved and the calls will be routed direct to Central Emergency Control.

(ii) *Major Emergency Plan.* In essence the London Ambulance Service Emergency Plan is designed to deal with all large-scale accidents irrespective of their cause. However, because of the specialised nature of air transport, certain modifications are necessary. Aerodrome emergency plans involve the use of rendezvous points on the aerodrome perimeter to which outside emergency services report before being guided to the scene of the accident. Modifications to the ambulance emergency plan adapt it to these special arrangements and ensure prompt, co-ordinated action when an aircraft is involved within the aerodrome boundary. Beyond the aerodrome boundary the normal major emergency procedures will apply. Table No. 1 shows the principal actions that would be taken, some simultaneously, by Ambulance Control on receipt of a disaster alert in respect of a large, laden passenger aircraft. If the magnitude of the disaster was apparent from the first call the whole of the major emergency plan would be put into operation immediately.

89 Surrey Ambulance Service

(i) *Assistance to, and co-operation with, London Ambulance Service.* The major part of Heathrow Airport lies within the Greater London Council area. There is a small part within the Surrey County Council area, but by

Table 1

An extract of the principal items shown on a step-by-step chart which is kept ready to hand by the Senior Ambulance Control Officer to enable him to ensure that emergency action is taken methodically.

Ambulance services

- 1 Order in ambulances from nearby stations with instructions for the first crew to arrive to radio a situation report and then to start organising ambulance operations on the spot. This means setting up casualty collecting points, ambulance loading points and so on.
- 2 Mobilise ambulances further afield.
- 3 Alert neighbouring ambulance services and ask for assistance — either to send ambulances to the scene or to cover parts of London from which ambulances had been sent to the incident.
- 4 Despatch the nearest emergency control vehicle with its equipment trailer and follow up with one or more of the other three similar units, if considered necessary, and other stocks of equipment.
- 5 Detail the appropriate senior officer to attend to take charge of ambulance operations at the scene.
- 6 Send an ambulance officer with radio to each hospital.
- 7 Call in off-duty ambulance crews and control staff.
- 8 Stop non-essential work in the area affected and redistribute the remaining resources over the whole of Greater London.

Other services

- 1 Alert the appropriate hospital according to the agreed plans and classify as the Designated Hospital. The hospital recognises this term and puts its own disaster plan into effect.
- 2 Alert other nearby hospitals and classify as Supporting Hospitals. These hospitals, too, take action according to prepared plans.
- 3 Request medical teams from the hospitals and send ambulances to fetch them if required.
- 4 Check that the police and fire brigade have been alerted.
- 5 Alert the emergency bed service.

arrangement with the London Ambulance Service the latter accept responsibility to cover the entire airport and the Surrey Ambulance Service gives assistance and support when requested. This arrangement is in accord with the official policy that in emergencies there are in effect no boundaries between the services of adjacent counties.

(ii) *Strength and disposition.* Surrey Ambulance Service has a maximum of 65 fully equipped emergency ambulances operational at peak times, and a minimum of 20 at off-peak times. These are stationed throughout the Surrey County Council area, and although a first attendance at Heathrow would probably be drawn from the Ambulance Station at Ashford, this could be reinforced by other ambulances from Egham, Chertsey and elsewhere in Surrey if the situation warranted it. There are also 4 control and equipment vehicles, permanently manned and loaded with reserve stretchers and first aid equipment. One of these is stationed at Chertsey.

90 Buckinghamshire Ambulance Service

Strength and disposition. Buckinghamshire Ambulance Service has a total of 40 fully equipped ambulances for deployment on emergencies at peak times, based at main and sub-stations within the Slough, High Wycombe, Aylesbury and Bletchley areas. Of these, 10 ambulances are always available at off-peak times and would remain for local emergency cover

by backing-up if initially deployed. Attendance at Heathrow would in the first instance be from Slough Ambulance Station with support from Chalfont-St.-Peter, Amersham and High Wycombe. In addition there are 2 radio-controlled, fully-equipped (dressings, blankets, stretchers) ambulance control vehicles for immediate deployment based at Slough and Aylesbury.

Hospital facilities

91 Designated and Supporting hospitals

Hospitals in the London area have been grouped into four metropolitan regions: NE, SE, SW and NW. Within each region certain hospitals are listed by the Regional Hospital Boards as those which, in the event of a major emergency in the area, are able to provide mobile medical teams and act in a 'designated' or 'supporting' role for the reception of casualties.

92 Heathrow Airport lies within the North West Metropolitan Hospital Region and the three nearest major hospitals are Ashford, Hillingdon, and West Middlesex. At Appendix E of the Heathrow Emergency Orders each of these has been allocated areas of the aerodrome identified by lettered squares on the crash grid map. Ashford has the responsibility for most of the aerodrome.

Under this scheme in the event of accidents occurring in the areas covered by the reference letter the relevant hospital automatically becomes the 'designated' hospital. The remaining two becoming 'supporting' hospitals.

93 A 'designated' hospital is that one most accessible to the scene of the accident. The decision as to whether a hospital is to have a 'designated' or 'supporting' role is made by the London Ambulance Service, and is included in the 'major accident' message passed to the hospitals. The designated hospital is responsible, inter alia, for providing a senior medical officer to go to the accident scene. In the case of an accident within the boundary of Heathrow Airport, medical control is vested in the Port Health Medical Officer, who is in charge. Elsewhere the Senior Medical Officer from the designated hospital will act as Senior Medical Officer-in-Charge. In addition the designated hospital will if required provide a medical team or teams to go to the accident. A hospital mobile unit usually comprises: at least 1 member of the medical staff, 1 sister and 4 trained nurses, together with medical equipment and drugs.

94 A 'supporting' hospital is one which is alerted with, or subsequently to, the designated hospital and will be required to support the latter. Because they need to have the full facilities necessary to treat severely injured casualties, supporting hospitals are selected by the London Ambulance Service from the list of hospitals issued by the Regional Hospital Board.

95 Hospitals Major Accident Schemes

In collaboration with the Regional Hospital Boards who have responsibility for the disaster plans in their areas, each hospital has developed a Major Accident Scheme. (Extracts from a relevant example may be found at Appendix 10.) These schemes, detailing the hospital organisation and procedures, are designed to give instructions and guidance to the hospital staff so that they know exactly what duties they have to perform. The

various sections cover the medical, nursing and administrative staff concerned with arrangements for assistance at the accident, and for the reception of casualties at the hospital. Sections of a hospital's scheme may possibly be brought into action if circumstances suggest it may be needed; the underlying principle being that it is preferable to institute an emergency procedure when not fully required, rather than to fail to bring it into effect until it is too late.

Consideration of emergency arrangements

96 In our consideration of the aerodrome medical, ambulance and hospital emergency arrangements, several matters arose which required amplification or separate treatment. In some cases where changes were thought necessary the appropriate authorities have acted upon our suggestions without waiting for the Working Party to complete its enquiry. The following paragraphs contain our findings and specific recommendations.

Statistics

97 When examining the resources of the medical, ambulance and hospital emergency services, and attempting to assess the possible current and future requirements, we sought some statistical evidence on which to base our discussions. This was obtained from various UK and international aviation sources and included information about aircraft types in service, traffic, passenger loads and records of fatal or other injuries resulting from past accidents.

98 In considering the probable number of casualties following a fatal accident we assumed the maximum as being the seating capacity of the aircraft involved. We made a study of the available worldwide information to assess the average percentage of passengers who may require medical aid (Table 2). These figures gave some guidance, but in order to obtain a more realistic estimate we extracted information which applied only to accidents that had occurred on or within 2 miles of aerodromes in the period January 1959 to March 1969. This information is directly related to the area over which the Heathrow fire and rescue, and the associated medical services will normally attend (Table 3).

99 From Table 3 it will be seen that the number of jet transport accidents in which there were fatalities, and which occurred within two miles of an aerodrome, was 15 per cent of the total number of accidents in this area.

100 This table also shows that the average number of occupants killed in fatal accidents was 56 per cent and that of those surviving 44 per cent. Table 2 shows these averages as 70 per cent and 30 per cent respectively over the period of eight years.

101 There are no available figures to show the number of occupants that needed ambulance, medical or hospital treatment. It can be assumed that of those fatally injured some may have survived the crash for a period and needed treatment. Some of the other survivors may also have needed attention. In a serious accident resulting in a high proportion of fatalities, it may be assumed that the surviving occupants are likely to be injured and need treatment. Department of Trade and Industry, Medical Branch, statistics show that of all categories of injured survivors,

Table 2

Accidents with passenger fatalities on scheduled air services 1961-1968

	Year	Type of aircraft			Totals
		Turbo-Jet	Turbo-propeller	Piston engined	
(A) Number of fatal passenger accidents	1961	6	6	13	25
	1962	7	7	14	28
	1963	5	5	21	31
	1964	3	6	15	24
	1965	5	3	17	25
	1966	7	6	18	31
	1967	12	9	9	30
	1968	9	9	16	34
(B) Number of passengers killed	1961	257	192	356	805
	1962	424	100	241	765
	1963	347	47	321	715
	1964	136	252	271	659
	1965	250	39	399	688
	1966	451	217	331	999
	1967	358	154	164	676
	1968	361	475	140	976
(C) Number of passengers surviving	1961	105	13	51	169
	1962	79	23	81	183
	1963	88	1	179	268
	1964	180	205	117	502
	1965	51	0	53	104
	1966	80	1	51	132
	1967	275	95	110	480
	1968	271	89	29	389

(Extracted from ICAO Circular 88.AN/74.)

Total passengers killed (B) expressed as a percentage of total passengers carried on turbo-jets (B + C)

1961	1962	1963	1964	1965	1966	1967	1968	
= 71%	85%	82%	43%	83%	85%	57%	58%	(average 70%)

Table 3

World wide civil jet transport aircraft accidents which occurred on or within 2 n. miles of aerodromes in the period January 1959-March 1969

Total number of accidents	Total number of crew and passengers involved (Approx.)	Number of fatal accidents	Total of persons on board aircraft in fatal accidents	Number of crew and passengers killed	Third party fatalities	No. of occupants killed expressed as a percentage of total persons on board aircraft involved in fatal accidents
(1)	(2)	(3)	(4)	(5)	(6)	(7)
209	11,500	31	1,878	1,038	93	56% (Cols. 5 and 4)

(Source: Dept. of Trade & Industry, Flight Safety Directorate.)

80 per cent have head injuries (this includes various degrees of concussion as well as facial injuries and skull fractures). Some 60 per cent will have limb injuries, 25 per cent abdominal injuries, 20 per cent chest injuries, 15 per cent spinal injuries and 5 per cent burns. It is obviously possible to break down categories of injuries in different ways, and the above makes no distinction between major and minor injuries; however, we considered it adequate for the purposes of planning first aid measures.

102 The American Flight Safety Foundation published information for the period 1956-67 with the object of determining the effectiveness of aircraft emergency evacuation systems. Their findings, so far as they relate to the Working Party, are that the death rate in survivable fatal accidents (which they defined as an accident in which there are one or more fatalities and one or more survivors) had shown no steady trend during the eleven years that were considered. It had vacillated on either side of the 50 per cent average, going as low as 22 per cent in one year and as high as 84.7 per cent in another. On the average, however, it had remained high because of difficulties in evacuating persons from aircraft.

103 In attempting to evaluate these statistics we took into account several other factors. First, although statistics show an average load factor of 60 per cent (see Table 4), in many 'charter' flights this figure is often nearer 100 per cent of capacity. Second, the dead and injured from a crash in an area similar to Heathrow could include third party casualties besides the passengers and crew. Third, the personal knowledge of some Members of the Working Party of certain accidents already quoted in the above tables indicates that the statistics can give an erroneous impression of the number of hospital cases.

Table 4

Heathrow Airport, London: Passenger Statistics 1969

Average seating capacity of aircraft	105-110
Average load factor	60- 65%
Average passenger complement per aircraft	67

(Sources: BAA Operations/Statistics and DTI Flight Safety Directorate.)

Table 5

Passenger capacities of some types of aircraft using Heathrow Airport, London

<i>Aircraft</i>	<i>Passenger capacity</i>
Boeing 747	363 (exceeding 450 on charter)
Boeing 707/727	180
Convair	110
Britannia	139
Comet 4B	102
DC 8 (Super)	179
VC 10 (Super)	174
Trident 2E	115

(Source: BAA Statistics.)

104 We decided that a figure of 50 per cent for injured survivors from an aircraft disaster was a practical basis upon which to estimate medical and ambulance emergency requirements. Although we are aware that at a particular accident this assessment could be grossly in error, particularly if third parties are involved.

Medical and ambulance equipment

105 In the light of this decision we evaluated existing and future holdings of medical and ambulance equipment. The adequacy of general medical and surgical supplies carried by the ambulance services and the hospitals' mobile emergency medical teams is a matter for their professional judgement although CAP 168 states the minimum holdings of basic medical supplies required under the terms of the aerodrome licence. In the case of Heathrow, the other medical organisations have their own supplies. The availability of drugs and other medical equipment is the responsibility of BAA, and these are augmented by the resources of the mobile teams in the event of an accident. All must ensure that suitable arrangements are made to bring forward additional supplies if there is a particular call on special items.

Stretchers

106 Some 50 stretchers are held by the BAA at Heathrow. These are carried together with 200 blankets, on a special vehicle held permanently in readiness for immediate dispatch to an accident. However, these are of an obsolete type and unsuitable for use with modern ambulances. The best alternatives are the Furley stretchers which are currently used by the ambulance services, or carrying-canvasses (with poles). The numbers required to be held take into account not only our statistical estimate of likely casualty figures, but also the local authority ambulance attendance at an accident. Each attending London ambulance has 3 effective stretchers. The London Ambulance Service planned build-up caters for 100 stretchers to be at the airport with more available if required. We also note that the first attendance from the Surrey Ambulance Services has similar reinforcements available.

We *recommend* that the BAA holds a reserve of 50 Furley stretchers and 30 carrying-canvasses with 6 pairs of carrying poles.

Recommendation No. 12

(*Note:* We understand that during our enquiry the BAA had another vehicle specially modified and equipped, which replaced the existing vehicle. The equipment includes: 30 carrying sheets (with poles) and 50 Mark 11 stretchers with plastolene beds. These latter are an improved version of the Furley stretcher made especially to BAA specifications.)

We further *recommend* that the Department of Trade and Industry amends Scale 5 of Table VII-1 of Section VII of the licensing document (CAP 168) to require a minimum holding of 80 stretchers comprising 50 Furley type and 30 carrying canvasses with 6 pairs of poles.

Recommendation No. 13

Blankets

107 Although the 200 blankets provided by the BAA has proved to be a reasonable number for aircraft up to the size of the Boeing 707s, we consider this should be increased for the larger types now entering service.

We *recommend* that the BAA holds 300 blankets on the emergency medical equipment vehicle.

Recommendation No. 14

(*Note:* We understand that this has now been implemented.)

Plastic bags

108 We learnt during our enquiry of the existence of specially designed, re-usable, plastic bags which are intended for the dead and their clothing. To have a complete corpse or set of remains, and its clothing, is important as an aid to the pathologist establishing the cause of death, and for identification purposes. The use of such bags is hygienic and obviously would help make this aspect of the police and emergency services' work less unpleasant. Since we first heard of these plastic bags, enquiries made by the Metropolitan Police have shown that they are not commercially available in the UK. However, an American supplier has been traced and the Department of Trade and Industry has obtained a sample. Upon examination this sample proves to be more elaborate and expensive (US \$30) than the article we envisaged.

Recommendation No. 15

We recommend that further enquiry and research into a more suitable and economical bag be made by those directly concerned. When a source of suitable bags is found, some should be acquired. There is, however, a division of responsibility involved because aircraft accidents may occur both on and off the aerodrome. Accordingly the BAA should provide 100 bags to be held against incidents occurring on the aerodrome; whilst the local authorities concerned should consider whether they have a similar need.

Ambulance availability and assessment of requirements

109 We considered the adequacy of the numbers of ambulances available at the aerodrome within 15 minutes of an accident occurring. Under the London Ambulance Service Major Emergency Plan, 4 ambulances are sent immediately to any incident — and this includes Heathrow Airport — that appears likely to be a major disaster. Having sent this first detachment, Ambulance Control ensures that as the incident progresses there is a steady flow of ambulances to the scene. 40 spot checks carried out over recent months within the London Ambulance Service, to find the number of ambulances available either in their stations or on the road within 5 miles of Heathrow showed numbers varying from 4 to 20, but in only 2 cases were there less than 8. On these facts, and from our examination of the resources and emergency mobilisation plans of the London and neighbouring County Ambulance Services described in paragraphs 88–90 a first attendance of 4 ambulances is considered to be a realistic number in the absence of more detailed information about the accident.

110 We consider that the existing Ambulance Service emergency plans are capable of dealing with the potential number of casualties. However, regard must be given to large aircraft passenger loads and the likelihood of their future increase.

Recommendation No. 16

We recommend that the responsible authorities review the changes in passenger loads that will be carried by the larger aircraft, both in service and coming into service, so that the emergency plans may be amended to meet the new demands that may be made upon them.

111 We have noted in paragraph 84(iii) that an ambulance service is provided by the BAA at Heathrow, although this does not arise as part of the licensing requirement. We are of the opinion that an internally based ambulance service is an important facility and should be provided at an aerodrome of this size. Its normal role is to transport sick, injured or infirm passengers or persons within the aerodrome either as a repayment

service to the airline, or as part of the medical facility provided for injured persons. The fact that it is available does reduce the load on the GLC Ambulance Service and GLC recognises this by contributing to the cost. The emergency orders cover the use of this service.

We *recommend* that an ambulance service continues to be provided at Heathrow. But, if the BAA withdraws its service, the most effective alternative would be for the GLC to establish an ambulance station at the aerodrome.

Recommendation No. 17

112 During our examination we questioned why multi-berth ambulances were not used, and found that 4-berth ambulances tried at Gatwick Airport by the Surrey Ambulance Service were not a success. In practice 2-berth ambulances are easier to load and, what is more important, the attendant is better able to look after 2 than 4 stretcher cases. 2-berth ambulances at present in use convert easily to accommodate 8 sitting patients, or 4 sitting in addition to 1 stretcher or, alternatively, 2 stretchers. In the Heathrow area there are no ambulances with more than 2 berths, and there are no plans for their introduction.

Use of other vehicles to transport injured survivors

113 We considered a suggestion that vehicles other than ambulances might be used in an emergency to transport sitting patients or stretcher cases. We agreed there should be a pool of transport (see also paragraph 145) which it would be the responsibility of the airline or handling agent to supply, and upon which the Police Incident Officer could call — through the Senior BAA Operations Officer — as required by the Medical Officer-in-Charge or the Ambulance Incident Officer. However, vehicles other than ambulances should be used only as a last resort to carry casualties. When they are used, the ambulance service must be informed so that directions can be given with regard to the hospitals they are to use.

Hospitals' organisation

114 In an accident involving any aircraft there is always the possibility of 'third parties' being injured in addition to the aircraft crew and passengers. If the aircraft has the capacity of a Boeing 747 the total casualties resulting from a disaster of this magnitude at Heathrow could overwhelm the hospitals first alerted (Table 6) and would involve other hospitals in the region.

Table 6

Hospital casualty handling capacity

The estimated capabilities of the three hospitals designated for Heathrow are as follows:

Ashford	25 major and 50 minor casualties.
Hillingdon	30–40 cases could be admitted, and a further 70–100 cases needing comparatively minor attention could be dealt with in the Accident Dept.
West Middlesex	20 major and 40 minor casualties.

115 We consider it essential that the initial hospital organisation for Heathrow should be capable of expansion into and integration with the disaster plans formulated by the Regional Hospital Board. Heathrow comes within the aegis of the North-West Regional Metropolitan Hospital

Board and we conferred with Dr S Mackenzie, the Deputy Senior Administrative Medical Officer, who has responsibility for the disaster plans of this region.

116 He accepted the validity of our statistical basis for estimating likely casualties, and noted our acceptance of the principle underlying the present hospital disaster organisation. We recognise that besides the internal difficulties involving the re-arrangement of bed states, moving convalescent patients, and the allocation of theatres, the most serious problem for the designated hospitals is to cater for the flow of casualties from the disaster together with other incoming emergency cases. The Ambulance Incident Officer and Ambulance Control between them ensure that the hospitals first alerted are not inundated, and bring in other hospitals, in accordance with the list supplied to them, in support as required. It is emphasised that it is part of the duties of Ambulance Control to ensure that the hospital facilities in an area are not overloaded. (Extracts of London Ambulance Service Major Emergency Plan are at Appendix 3.)

117 Because of the problems involved in bringing in second and third line support hospitals, we decided that the London Ambulance Service, together with that of Surrey and of Buckinghamshire, should follow a list supplied by the appropriate Regional Hospital Boards. It was to be expected that the ambulance services would work through the list in a pre-selected order, but they wished to retain the right to vary the order of selection in the light of circumstances they may be faced with at the time. If this pre-selection is correlated to the appropriate 'first-designated' hospital according to the present arrangement, the spread of effect of a high concentration of casualties at Heathrow can be absorbed and at the same time other emergency cases adequately catered for.

Recommendation No. 18

We recommend that the NW Regional Metropolitan Hospital Board draws up a list of second and third line hospitals. It should be issued to the Ambulance Services (for executive action), to the BAA, the Heathrow Port Health Control Unit and to the police (for information). Amendments should be circulated when necessary.

(Note: During our enquiry the NW Regional Metropolitan Hospital Board has consulted neighbouring Regional Hospital Boards and drawn up the list of hospitals shown at Appendix 9. We understand that the Board has issued this list which the ambulance services are now using.)

Conclusion

118 We agree with the principle of the existing system of hospital emergency organisation as described in this report and we consider that the organisation is capable of handling a major aircraft disaster.

Attendance at off-aerodrome accidents

119 Although part of the aerodrome fire service attends off-aerodrome accidents within 2 miles of the boundary as a matter of procedure, the aerodrome medical services have no similar plans. This is no doubt because there is a countrywide 'Hospitals Major Accidents Scheme' for any disaster whatever its original cause. Nevertheless we consider there are strong humanitarian and moral obligations to render whatever assistance is possible. However, because of staffing limitations there are times (eg. evenings, week-ends, Bank Holidays) when there is a reduced

staff on duty and the aerodrome emergency organisation could be placed in jeopardy if the sole medical officer present left the confines of the aerodrome.

We recommend that, whenever possible, the medical services attend with the aerodrome fire service at 'off-aerodrome' accidents within the area covered by that service. *Recommendation No. 19*

First aid

120 All fire service personnel at Heathrow are first aid trained to varying degrees; but, in the event of an aircraft accident, the aerodrome fire service is primarily committed to fire fighting and rescue work. If the nursing sisters are excluded there are no first aid personnel who can be immediately available during the crucial initial stage of the accident before the local authority ambulance services arrive. There may be a limited period, between occurrence of the accident and the local authority reinforcement of the aerodrome fire service, when very few people are available to give assistance to passengers who may have managed to extricate themselves from the aircraft. We thought of the possibility of covering this phase by having a small first aid party, of say 6 persons, continuously on duty at the aerodrome. However, further consideration convinced us that this idea, although initially attractive, involves insuperable difficulties. Not the least of these would be recruiting and maintaining a sufficient number of suitable people from the aerodrome personnel; all of whom would need to be trained to a recognised standard of first aid as a prerequisite to forming a nucleus from which the roster of 6 would be drawn. There are problems involving industrial relations, eg. hours of work and rates of pay, and there are also the more general questions of organisation, finance and accommodation. Furthermore, even if these were settled practically and economically there remains the problem of alerting and transporting the 6-man team to the scene in time for it to act effectively within the critical period mentioned above. From these considerations we decided that a permanent first aid party would be impracticable and we make no recommendation in this respect.

'Uninjured' survivors

121 After an aircraft accident there are likely to be a number of passengers apparently uninjured who will find their own way from the scene and who may or may not be directed to one of the first aid posts or casualty receiving centres on the aerodrome. It is difficult to ascertain whether persons presumably uninjured are in fact so. The delayed effects of shock and some injuries caused by the crash, e.g. by rapid deceleration, are well known medically. Part of the nursing sisters' task is to interview such apparently uninjured survivors in the reception centres and try to discover any latent injury or shock resulting from the crash.

We recommend that the BAA establishes procedures for reporting or directing passengers, to ensure that any slightly injured or apparently uninjured survivors found away from the scene are assembled with the others at the casualty receiving or reception centres. *Recommendation No. 20*

We further recommend that the limited medical facilities on the aerodrome are kept manned. When only one nursing officer is on duty at the Airport Medical Centre it is essential that she remains there. *Recommendation No. 21*

Heathrow Emergency Orders — Section F — action by medical authorities

122 During our enquiry, this Section and related Sections and Appendices in these Orders were under revision by the BAA to take account of changes proposed in the airport medical organisation. Dr A Trueman (Chief Medical Officer, BAA) kindly submitted for our consideration and comment a draft of his proposals. We examined this in detail and the various textual amendments that we suggested have been accepted. In addition we feel that two points merit special mention here:

- (a) *Pre-packed equipment.* Provided that adequate arrangements are made for regular inspection and maintenance, we support the proposal that pre-packed emergency medical equipment be stored on a vehicle reserved for that purpose.
- (b) *Transport for the medical officer-in-charge.* We are convinced that the use of a BAA constabulary vehicle to transport the MO in charge and the nursing officer is vital, giving as it does both a communications link and the authority to move freely about the aerodrome.

Customs and immigration authorities

123 In the case of an accident involving an 'ex-foreign' or a 'departing for foreign' aircraft, uninjured survivors are, if necessary, brought back to a passenger terminal for customs and immigration clearance. Out of consideration for their after-care and comfort we consider they should not be moved from point to point more than is absolutely necessary.

Recommendation No. 22 We recommend that customs/immigration examination, where this is considered necessary in respect of the survivors of an accident involving an 'ex-foreign' or a 'departing for foreign' aircraft, should be undertaken at the designated reception centres.

Terminology

124 At various times we came across some confusion in the use of such terms as 'casualty clearing station', 'casualty receiving station,' and 'first aid post' which led us to seek clarification as to which category of casualty is dealt with in each case. As a result of discussions between the organisations represented agreement was reached as to the appropriate nomenclature.

Recommendation No. 23 We recommend that in future the following terms be used:

- 1 *First aid post/casualty collecting point.* This will mean a point, usually in the vicinity of the accident where those persons requiring treatment and/or transport to hospital will be collected.
- 2 *Casualty receiving centre.* Is a centre on the airport set aside for minor injuries. At Heathrow such centres are the ACJMS and Airport Medical Centres.
- 3 *Reception centre.* This is a centre for seemingly uninjured survivors. At Heathrow such centres are located in the airport VIP lounges in the terminal complex.
- 4 *First aid equipment supply point.* This is self explanatory.

Refrigeration

125 It was evident from our discussions that a large number of dead could result from an aircraft disaster, and that the processes of autopsy and identification could take some time to complete. We were concerned that the Metropolitan Police should have early access to a means of preservation

of adequate capacity. During our enquiry, discussions took place between the Metropolitan Police and the local Coroner's Officer and we are informed that sufficient public mortuary accommodation exists in the area around Heathrow to provide storage for corpses.

Training exercises

126 Full-scale exercises are normally held only once a year, and we consider that the hospitals' internal organisation is insufficiently exercised if they are in the 'supporting' role for, say, two consecutive years.

We recommend that hospitals, given the role of supporting hospital in an exercise, should consider assuming that of designated hospital when it appears necessary to them to train their staff in this role.

Recommendation No. 24

Conclusions

127 We found no cause for disquiet in the current emergency procedures relating to the medical and ambulance services for Heathrow. Indeed it is most encouraging to find that a number of individual organisations with separate responsibilities can co-ordinate their activities to produce a coherent plan, which has withstood detailed examination so well.

128 Not unnaturally there are some loopholes in the present arrangements which are either subject to our recommendations, or have been taken care of by a revision of the emergency procedures of the organisations concerned.

Chapter 4 Police

Introduction

129 We have looked at the police emergency facilities and procedures at Heathrow, and find that there are only two police organisations concerned with aircraft accidents and emergencies there, the British Airports Authority Constabulary (BAAC) and the Metropolitan Police (MP). While the HQ of the latter is at New Scotland Yard the local responsibility for action at Heathrow rests with X Division at Hayes. Although T Division encroaches across the southern boundary of the airport, co-ordination at working level is centred on Hayes. Except for a small area to the west side of the aerodrome, within the Thames Valley Constabulary, no other police force is concerned with aircraft accidents within 2 statute miles from the boundary of the aerodrome. The police are concerned not only with aircraft accidents in their area but also with all other accidents and emergencies.

130 Our survey of police responsibilities was based upon schedules of duties currently undertaken by the police. These schedules were derived from relevant parts of the Heathrow, the Metropolitan Police, and BAA Constabulary Emergency Orders, supplemented by the personal experience of the officers concerned. We considered these schedules from the point of view first of whether the police were the most suitable organisation to carry out these duties, whether any could be better carried out by other organisations, and whether there were any duties which ought to be added to those currently undertaken by the police. We followed this up by assessing, so far as we were able, whether the existing arrangements, both organisationally and taking into account equipment and communications, would enable the police to discharge their duties in a satisfactory manner. In some cases improvements were put in hand straight away, others awaited completion of studies of this Working Party.

Police duties

131 In the event of an aircraft accident at Heathrow, the police emergency procedures are initiated by the BAA Constabulary stationed on the aerodrome. As the action progresses, control is assumed by the Metropolitan Police mainly from X Division, who are first alerted by the BAAC information room. The MP provides an Incident Officer with a communications vehicle, and police emergency teams for various pre-allocated tasks such as: rescue, casualty clearance, documentation, crowd control, and manning of the base station, temporary mortuary and property bureau. We are informed that a new procedure, recently introduced and tried in the Sub-Division, for 'calling-out' senior officers and off-duty officers required to perform these duties has proved satisfactory.

132 MP Headquarters at New Scotland Yard are also informed of the emergency, both by the BAAC information room which alerts the Traffic Control Information Room, and by the PABX at Heathrow which alerts

the main Information Room. As a result, New Scotland Yard implements certain emergency plans, including those for sending traffic patrol vehicles and appropriate area patrol cars to assist at pre-arranged locations around the aerodrome, to the nominated rendezvous points, and to the hospitals.

133 Our examination of these police arrangements, which are carried out in co-operation with the BAA Constabulary, shows them to be satisfactory. The communications problems referred to in Chapter 5 have now been resolved.

The BAAC information room

134 As well as alerting the MP the BAAC information room also alerts all staff in its own police station, all BAAC vehicles, motorcyclists and foot patrols, and implements various other emergency procedures. These include: sending a vehicle, containing the first aid post equipment kept at the police station, to collect the duty medical officer and the senior nursing sister; detailing cars, as available, to the RVP to act as lead vehicles; detailing another vehicle to stand by at Constabulary HQ to transport personnel to the scene, and later to assist in the Incident Officer's disposition of foot patrols; despatching motorcyclists to open access gates as required, and to control traffic at the access to the rendezvous point; detailing one motorcyclist to act as a second line of communication for the police Incident Officer.

135 Before the establishment of the base station the BAAC information room receives incoming calls about casualties, and other enquiries, and records details for the eventual information of the MP. When the base station is set up, the information room stands by to receive or transmit messages from all sources including the Incident Officer, Medical Officer and Rendezvous Officer, either taking the necessary action or informing the base station.

Conclusion

136 In our opinion the BAAC information room emergency arrangements are satisfactory.

The Rendezvous Point Officer

137 When an aircraft accident occurs the senior BAAC sergeant on duty assumes control of the rendezvous point. This rendezvous point officer's duties include:

- (a) nominating lead cars and informing the information room of the radio call-sign of these cars and his own car;
- (b) arranging for traffic control at the RVP in order to expedite the movement of incoming emergency service vehicles;
- (c) ensuring the expeditious departure, with a lead car, of the first line of local authority fire appliances, using marshalling vehicles as a first choice of lead car whenever possible; at the same time informing the Incident Officer of the impending arrival of these fire appliances;
- (d) keeping in communication with the Incident Officer; informing him of the arrival of ambulances, and providing escorts for vehicles required at the scene; holding vehicles at the rendezvous point as instructed by the Incident Officer; informing the BAAC information room as vehicles arrive at the rendezvous point; thereafter, maintaining a listening watch on the radio to assist the Incident Officer as required.

Conclusion

138 We consider that the arrangements for the RVP officer are satisfactory.

Incident Officer's responsibilities

Operational responsibilities

139 Each emergency service involved in work in connection with a major incident appoints an Incident Officer who is responsible for the command and deployment of his service's resources. Whilst each agency can fulfil its own obligations under its own command, no one aspect of an incident can be effectively discharged in isolation. Consequently a considerable amount of co-ordination of effort is necessary. Due to the all-embracing nature of police duty it is now generally recognised that the police Incident Officer will act as the co-ordinator of effort at the scene. At aircraft accidents at Heathrow this police Incident Officer is initially provided by the BAA Constabulary. However, by a long-standing arrangement with the Chief Constable, BAA Constabulary, the MP takes over on arrival.

140 In addition to the role of overall co-ordinator, the nature of accepted police responsibilities and duties are as detailed in the following tables:

Table 7

Initial action

The police Incident Officer:

Establishes the police incident control post taking into account wind direction; accessibility; possible danger from other factors; location of other services' incident control vehicles if already present.

Ensures that only the re-circulating lights of the incident control vehicles of police, fire, ambulance and airport authority are kept illuminated in order to reduce confusion for both rescuers and rescued alike.

Assesses the severity of the incident and summons assistance from other services as required. (See list at Appendix 12.)

Directs individual or teams of police officers as required to carry out tasks in connection with:

- (a) *Rendezvous point* — marshalling and escorting to scene.
 - (b) *Rescue* — at scene and collecting uninjured persons together whilst awaiting transport to remove them.
 - (c) *Casualty clearance* — through a casualty collecting point in liaison with Ambulance Service Incident Officer.
 - (d) *Liaison officers* — one posted with personal radio to fire, ambulance and airport authority incident control vehicles to ensure *co-ordination* of effort. Also to airline control room to ensure that police and airline efforts in informing next-of-kin etc. are not duplicated.
 - (e) *Security* — exclusion of unauthorised persons from scene.
 - (f) *Crowd control* — related to security and control of sightseers and souvenir hunters.
 - (g) *Traffic control* — including diversions of all except essential services away from vicinity of incident; arranging priority routes into and away from scene (with escorts as required).
 - (h) *Marshalling essential services* — at scene to ensure availability and quick turn-round.
 - (i) *Sweep search* — organised as soon as possible to safeguard uninjured, but shocked persons who may have wandered away from scene; locating injured or dead flung from wreckage on impact, also property.
 - (j) *Property* — safe custody at scene followed by removal under police escort to a property bureau.
 - (k) *Press liaison* — at scene.
-

Table 8

Further action

The police Incident Officer arranges the following responsibilities which are co-related to the initial action:

- (a) *Shelter* — temporary places to be arranged for uninjured and/or shocked and homeless.
 - (b) *Documentation* — police officers to be posted to places of shelter; hospitals and temporary and permanent mortuaries to obtain particulars of persons involved and pass them to *base station*.
 - (c) *Base station* — a permanent police building with telephone and R/T facilities to deal with the responsibilities detailed in paragraph 156 below.
 - (d) *Property bureau* — a permanent building where property can be listed, accounted for and restored to its rightful owner.
 - (e) *Temporary mortuary* — a suitably equipped building wherein the bodies of persons killed in the incident can be temporarily lodged pending removal to permanent public mortuaries for pathological examination and identification.
 - (f) *Safeguarding wreckage* — may be required for expert examination to establish cause of incident or investigate sabotage etc.
-

Statutory responsibilities

141 The police Incident Officer has to satisfy numerous statutory requirements, in addition to the operational responsibilities shown in Tables Nos. 7 and 8.

Incident Officer's requirements from the airline (or handling agent) concerned in the incident

142 The following list shows some of the many ways in which the airline can assist the emergency services, in this case, the police:

- (a) Have readily available an accurate number of persons on board the aircraft. This may be supplied verbally immediately after an accident occurs. (See paragraphs 147–150).
- (b) Despatch coaches to the scene of the accident for the purpose of carrying uninjured passengers to the appropriate reception centres. (See paragraphs 121 and 145).
- (c) If the accident is on the aerodrome, ensure that the drivers know where the passengers should be taken in accordance with airport emergency orders. At Heathrow the uninjured should be taken to the reception centres which is one of the VIP lounges in the terminal complex.
- (d) Supply as soon as practicable a written list of the names of passengers and crew, supplemented later by a list of names and addresses and next-of-kin if available.
- (e) Supply as soon as practicable information relating to the cargo which the aircraft was carrying, with particular reference to livestock, cargo of high value, also 'restricted cargo' such as explosive, highly flammable, radio-active, corrosive or other high risk substances on board.
- (f) Ensure that airline traffic staff are directed to telephone the police base station immediately on arrival at the VIP suite or other location informing police that they have survivors there. Police will then despatch officers to those locations for documentation purposes, but if survivors wish to leave before police arrive, their particulars should be taken by the airline staff and handed to police.

- (g) Arrange for an airline representative to go to the police base station to act as liaison officer between police and airline to avoid any duplication of effort, particularly where informing next-of-kin is concerned. Police will also supply an officer to work in the airline control room after being informed by the airline that their control room is open and its location.
- (h) Find out from the police base station where property from the aircraft is being taken. An airline representative can then attend that location to receive the property from the police for restoration to its rightful owner.

(*Note:* The above list could easily be for general application, although in our enquiry we considered only Heathrow. We therefore offer the suggestion that in an aircraft accident within a police area where, possibly, no previous experience of airline procedures has been met, it would assist the police if the airline makes the police Incident Officer aware of the airline's facilities in order that there is no duplication of effort.)

143 In our examination of the police Incident Officer's co-ordination duties and requirements, we found several aspects of the emergency procedures at an aircraft accident which are either important in themselves or have some unsatisfactory features, so as to merit separate consideration. In the following paragraphs we discuss these in detail and make a number of specific recommendations.

Search for and collection of passengers/casualties

144 A prime need immediately after an aircraft accident is to gather together uninjured and slightly injured survivors, and to try and prevent them from leaving the accident scene before the arrival of proper escorts and transport. It is essential that these people are collected and taken to the designated reception centres. Although the BAA Constabulary Incident Officer will try to give some attention to this problem, he is obviously not able to organise a proper police search — a most important task — and one which is an accepted MP responsibility (see Table No. 7). The basic difficulty is one of available manpower in the first few minutes of an aircraft accident, when the police cannot muster the necessary men and the fire service is unlikely to help because they are fully committed to fire or rescue work.

Recommendation No. 25 We recommend that the BAA gives consideration to means of finding the necessary extra manpower.

Recommendation No. 26 We recommend that the airlines introduce into the briefing given to passengers in an aircraft about to make a landing which is likely to involve an emergency evacuation, instructions that they should remain in the vicinity of the aircraft after the evacuation has been completed, and contact an official as soon as possible.

Vehicles for collecting passengers

145 To assist in the collection of uninjured or slightly injured passengers from an aircraft accident, it is necessary that sufficient vehicles are available to transport them from the accident scene (see also paragraph 113).

It is primarily a responsibility of the appropriate airline (or handling agent) to ensure that adequate transport is made available. The larger airline operators have terminal buses or coaches available for collecting aircraft passengers at an accident, but often the smaller airlines cannot do this and need to rely on their handling agents. If difficulty is experienced in obtaining coaches, the police Incident Officer should be able, through the senior BAA Operations Officer, to arrange their supply from the airline concerned.

We *recommend* that the BAA includes in the guidance issued to airline operators a reference to the latter's responsibility to provide adequate transport for passengers at an aircraft accident.

Recommendation No. 27

(*Note:* We are informed that as a result of recent discussions between the BAA and the airlines, the BAA are now satisfied that all airlines have adequate arrangements to supply vehicles.)

Guidance to airlines and other organisations

146 We attach particular importance to the fact that the airline has certain responsibilities when an aircraft accident occurs. We have already referred above to some of the requirements from the airline, and we consider it essential that guidance is promulgated defining the assistance which the airline and other organisations on the aerodrome can give to the emergency services. We note that the BAA is issuing a copy of the Heathrow Emergency Orders to all airlines on the aerodrome.

We *recommend* that the BAA issues a management memorandum at least once a year, but more frequently if necessary, to all organisations concerned on the aerodrome, reminding existing staff and instructing new staff as to their responsibilities and duties in the event of an aircraft accident. New organisations concerned with emergency procedures on the aerodrome are to be issued with a comprehensive set of relevant emergency orders and guidance.

Recommendation No. 28

Persons on board

147 We have referred in paragraph 142 to the need for the operator to have available an accurate figure for the total number of persons on board. This information is required by all sections of the emergency services, including those searching for survivors and casualties. Whilst lack of an accurate figure is unlikely to jeopardise passengers, it could result in unnecessary risk to and effort by members of the rescue services, at a time when all their resources are stretched to the limit.

148 Previously the number on board was usually included in the flight plan or departure message sent over the ATC communications network, but this is no longer the case. For scheduled services, particularly into Heathrow, the airlines' own needs usually ensure that the operator or his handling agent will have this information at the arrival aerodrome before the aircraft lands. There will be the exceptional cases of diversions where this may not apply. In the case of non-scheduled aircraft there is less certainty of the operator or his representative at the arrival aerodrome having this information. The total number on board is normally available to the captain of the aircraft, but, in an emergency, he may not always

be able to transmit this information, or it may be impracticable for ATC to ask for it.

149 We considered as an alternative the possibility of issuing to the emergency services details of the passenger capacities of types of aircraft using the airport. However, these can vary so much, not only in respect of changes in seating arrangements but also in the actual occupancy on a particular flight. Our view was that such basic information would be of insufficient value to justify its distribution and use for the purpose envisaged.

150 There is no complete solution to the problem at present, and we consider that the DTI should continue to seek international agreement on an acceptable procedure which will provide the emergency services with an accurate figure of the number of persons aboard. In the meantime, the emergency orders at Heathrow should contain procedures for alternative means of getting the information from the operator, or his agent, to the emergency services. In the case of scheduled or other flights where the number of passengers on board is known at the airport, this information will come from the appropriate airline office. In other cases the aircrew should pass the information to ATC and thence to the emergency services. There may be occasions when the crew will be too involved with the emergency situation to obtain or pass on the information, in which case it will need to be obtained at a later stage by any means available. We suggest that in the first case the preferred routing would be from the airline operator to the fire service watchroom, then in parallel to the fire officer at the scene and to the BAAC information room, and thence to the Incident Officer. In the second case ATC could pass the information to the fire service watch room who would then pass it on as above.

Recommendation No. 29 We recommend that DTI seeks to obtain international agreement on procedures which will ensure that accurate information as to the number of persons on board is readily available to the aerodrome authority or emergency services in the event of an accident.

Recommendation No. 30 We recommend that the Heathrow Emergency Orders should contain procedures for obtaining from the airline operator, or his agent, information as to the number of persons on board an aircraft involved in an emergency, and passing it as soon as possible to the emergency services via the fire service watchroom. When this information cannot be obtained at the aerodrome arrangements should be made to try to obtain it from the aircraft whilst in flight, if this can be done without aggravating the emergency situation.

Extinction of flashing lights on vehicles

151 Although each emergency service has internal instructions regarding this, it remains a difficult problem to achieve total compliance at all accidents. There is a risk of confusion caused by too many vehicles failing to extinguish these lights at the accident scene. Only the incident posts and the guide vehicles should have flashing lights switched on.

Recommendation No. 31 We recommend that whenever possible the Rendezvous Point Officer should remind crews of incoming emergency services vehicles that flashing lights on vehicles should be put out on arrival at the incident.

Identification of airline personnel

152 We recognise the problem for the police to identify airline personnel and other officials, not in uniform, who wish to go to the scene of the accident. Airline officials dressed in plain clothes attending the scene of an accident on behalf of their company are often stopped and questioned by the police as to their presence there, because the police attempt as far as possible to exclude unauthorised persons from the scene of any incident. It will assist police and the official concerned if he is supplied with some form of visual identification mark which he can display.

We *recommend* that the airlines issue their non-uniformed personnel with some simple form of identification which will be easily recognisable by the police officers on duty.

Recommendation No. 32

Mortuary and property bureau

153 We are convinced that adequate mortuary facilities are very important since they permit the collection and temporary storage of bodies for identification and post-mortem examination. From the latter, valuable medical evidence is derived as to the possible cause of an accident as well as the cause of death of the individual.

154 We took note of a United Kingdom paper submitted to the International Civil Aviation Organisation (ICAO), PEL/MED/TRG Divisional meeting in Montreal, June 1970. This paper proposes, amongst other things, that police and airport authorities should ensure that local preparations are made to provide at immediate notice mortuary facilities adequate to meet the needs of a major air disaster. In general, we consider that the problems involved can be satisfactorily solved if the police, local authorities and the airport authority are able to negotiate agreed standards for mortuary accommodation and the related facilities. We consider that the desirable features for a temporary mortuary and property bureau should include:

For the mortuary

- Wide main doorway
- Capacity initially for 50 corpses
- Electric light
- Ventilation
- Washable, drained floor
- Washing facilities
- Toilets
- An administration office, with telephone
- An identification room, isolated with a separate access.

For the property bureau

- A large room of about 2,500 square feet with an administration office and telephone.

We *recommend* that the BAA, the police and the local authority services ensure that plans are made to provide adequate mortuary facilities to be used in the event of an aircraft accident at Heathrow.

Recommendation No. 33

155 We note that the BAA, although under no legal obligation to do so provides Building 461 for temporary use as a mortuary and property bureau by the police emergency mortuary team. Until recently this police team had to work under bad conditions, but we are informed that the temporary accommodation and facilities now provided are considered satisfactory.

Recommendation No. 34 We recommend that the BAA continues to provide accommodation and facilities as at present, to be used as a temporary mortuary and property bureau for accidents at Heathrow.

Responsibilities of police base station

156 Police base station is normally established in the Sub-Divisional Police Headquarters covering the area in which the incident occurs. For incidents occurring on the aerodrome or on most of the Sub-Divisions of X and T Divisions of the Metropolitan Police surrounding the aerodrome, police base station is established in the lecture room of the headquarters of the British Airports Authority Constabulary by arrangement with the Chief Constable, BAAC.

The officer-in-charge of base station is responsible for:

- (i) *Casualty bureau*, the staff of which:
 - (a) receives information relating to casualties from hospitals; mortuaries; reception centres etc.
 - (b) compiles a current list of casualties;
 - (c) receives enquiries from relatives and the public;
 - (d) records and compares information regarding casualties with enquiries from relatives;
 - (e) arranges that next-of-kin are informed either by the airline or police.
- (ii) *Assistance* to be supplied on request of the Incident Officer and relief of personnel at the scene and elsewhere if the incident is protracted.
- (iii) *Press bureau* ie. press enquiries made other than to the Incident Officer at the scene.
- (iv) *Liaison* with the airline or other agency involved in the incident and with the temporary mortuary and property bureau.
- (v) *Information* on the operation of base station which is passed to the various agencies on the aerodrome such as the telephone exchange, the Management Duty Officer, medical centres, passenger buildings, customs and excise.
- (vi) *Telephone numbers* available for public and press enquiries which are disseminated through the medium of BBC radio and BBC and commercial television networks.

157 In the event of an incident involving large numbers of casualties which would produce more enquiries than the base station could reasonably handle, the casualty bureau operations would be transferred to force headquarters. In the case of the Metropolitan Police, the central casualty bureau would be opened at New Scotland Yard and the officer-in-charge of base station would be responsible for ensuring that information on the transfer is passed to all agencies involved.

Conclusions

158 We are particularly impressed by the evidence of close liaison and co-operation between the police forces concerned, and see no reason to doubt the efficacy of the transfer of 'base station' in the BAAC HQ from BAAC information room to the MP organisation in the same building, or in the field as between the BAAC Incident Officer and his colleague from the MP on his arrival (see paragraph 139). Generally we find no reason to suggest that any duties currently carried out by the police should be transferred elsewhere, nor have we discovered additional police duties. Bearing in mind our recommendations in this chapter, and the communications improvements dealt with in Chapter 5, we are satisfied with the police emergency arrangements for Heathrow.

Chapter 5 Communications

Introduction

159 We examined the communications organisation serving the emergency services at Heathrow to ensure that, in the event of an aircraft accident, there is a co-ordinated system which is as swift, efficient and uncomplicated as possible. This system may conveniently be considered in five main groups:

- (a) The alerting system
- (b) 'On-airport' radio communications
- (c) 'Off-airport' services' communications
- (d) Incident post communications
- (e) Other communications problems

The alerting system

160 Figure No. 1 shows diagrammatically the landline facilities available at Heathrow Airport for alerting and liaison between the various emergency services. The four types of line shown emanating from the ATC tower are:

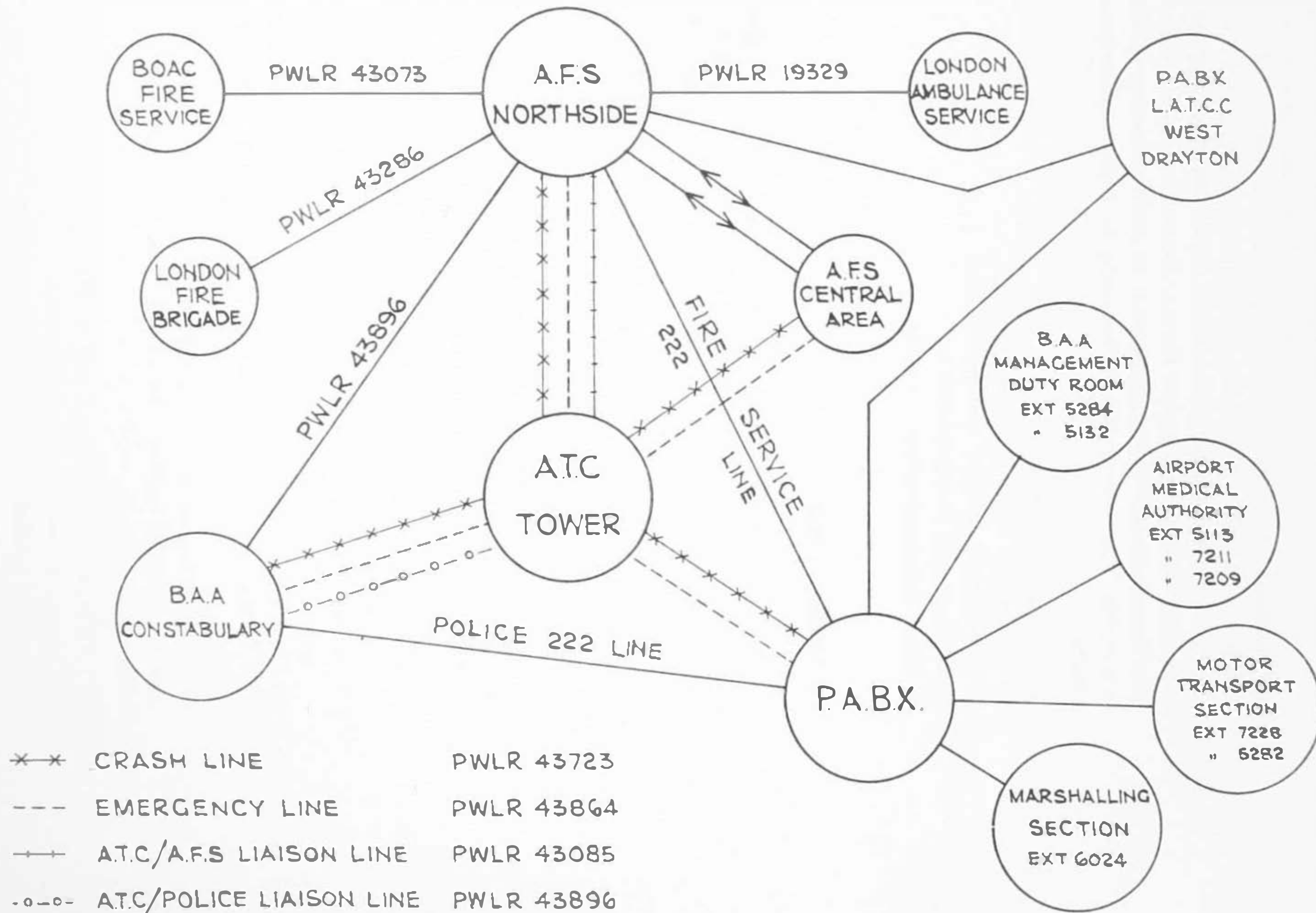
- (a) *The crash line* A unidirectional signalling line from ATC to the BAA/FS north station watchroom, PABX emergency supervisor, BAA Constabulary and the BAA/FS central area sub station watchroom. This line is used for alerting the emergency services in the event of an accident and for passing the accident messages.
- (b) *The emergency line* An omnidirectional line between ATC and the BAA/FS north station watchroom, PABX emergency supervisor, BAA Constabulary and the BAA/FS central area sub station watchroom. This line duplicates the crash line and is used for full emergency and standby procedures.
- (c) *The ATC BAA/FS liaison line* A bi-directional line between ATC and the BAA/FS north station watchroom.
- (d) *The ATC/BAA Constabulary liaison line* A bi-directional line between ATC and BAA Constabulary for direct liaison as necessary.

161 For alerting off-airport emergency services and other agencies, direct lines are available between the BAA/FS north station watchroom and the following:

- (a) LFB/Northern Command HQ Wembley
- (b) London Ambulance Service, Kenton
- (c) BAA/FS central area sub station watchroom.

In addition the BAA/FS north station watchroom and the BAA Constabulary are interconnected and have access to the PABX via the airport emergency services line '222'. There is another line from the BAA/FS north station watchroom to the London Air Traffic Control Centre (LATCC) PABX at West Drayton through which emergency services could be alerted. There is also a direct line to the BOAC Fire Service.

FIGURE 1



HEATHROW AIRPORT - EMERGENCY SERVICES ALERTING & LIAISON.

162 The present alerting system, which was modified subsequently to the G-ARWE accident, operates over a unidirectional signalling private wire telephone line, known as the 'crash line', between the ATC and the airport services concerned. It provides for the simultaneous alerting of the BAA/FS north station watchroom, the BAA/FS central area sub station watchroom, the PABX emergency supervisor and the BAA Constabulary directly from ATC, and all transmissions over it are recorded on the airport operational recorders. The procedure followed, as detailed in the Heathrow Emergency Orders, requires ATC to initiate the 'crash alert' call, thereby activating visual and audio alarms at the emergency services' watch positions and illuminating answer lights on the ATC control desk. On receipt of responses to the call the respective answer lights are extinguished and the call facilities are restored. The initial emergency message is then transmitted by ATC and monitored by the PABX emergency supervisor.

163 The initial emergency message is usually very brief giving the nominated rendezvous point and containing only the limited information available at the time. A second message, originated shortly afterwards gives further details of the accident with other relevant information and may nominate a revised rendezvous point. On receipt of the accident message the various airport emergency services are responsible for disseminating the details to their related outside services who in turn may be required to alert other authorities. For example, the ambulance service are required to alert the appropriate hospitals.

164 Under current arrangements there is some delay in relaying the alert through the BAA/FS north station watchroom to the ambulance services. It was suggested to us that they should receive a warning at the same time as the fire services. We understand the natural desire of all the services concerned to be alerted as soon as possible in the event of an accident, but on balance we do not consider that a change is justified. Whilst it may be technically possible to achieve simultaneous alerting, there is always the danger of sacrificing some degree of communication discipline, the effect of which would be to delay the passing of the message to the most vital emergency service — the fire service.

165 We consider that the present initial alerting system is efficient and reliable. However there have in the past been alleged instances of indifferent discipline on the circuit which caused unnecessary delays in clearing the initial alert message.

Recommendation No. 35

After consideration of the existing alert call procedures we *recommend* that only the BAA/FS north station watchroom acknowledges the 'first alert call'. The 'second call' procedure whereby the PABX emergency supervisor reads back the message, remains unchanged.

Recommendation No. 36

We further *recommend* that where any question of circuit discipline is involved the Station Telecommunications Officer (STO), Heathrow Airport, should make available transcripts from, or a recording of, the 'crash line' channel, to facilitate investigation by all those concerned.

166 An important aspect of communications which we examined concerned alerting and RVP indication. At present the 'aircraft crash alarm' received by the LFB does not include the RVP, and, initially, all LFB appliances are ordered to RVP north. If a different RVP is subsequently nominated by

ATC, appliances are re-directed en route by radio. This system could, we think, be substantially improved by a more sophisticated alarm signal to LFB control incorporating a positive indication of the nominated RVP. This facility would also allow the LFB to despatch the appropriate attendance from the nearest stations according to the RVP nominated. During our enquiry arrangements were made for LFB and BAA communications experts to consider this proposal and examine possible solutions.

167 An inter-switchboard Post Office priority signalling system, for use in aircraft alerts only, between the BAA/FS north station watchroom and LFB/Northern Command HQ Wembley, was introduced into service following the accident to G-ARWE. This has proved operationally beneficial in minimising the delay in the initial alerting of the LFB. Under the first stage of the new alerting system, a visual and audible signal in the LFB control room, and operated from the BAA north station, indicates that the BAA/FS has received a crash alarm. On receipt of an alarm signal, the LFB sends fire appliances to the RVP north, redirecting them by radio if necessary when the details of the call are subsequently received by telephone from the BAA watchroom.

168 A second stage of the system, shortly to be installed, will enable the BAA fire station to indicate the precise RVP to be used, thus obviating the necessity for possible redirection and further accelerating the attendance of fire appliances. We consider that extension of this facility to the London Ambulance Service would have merit. (*Note: We understand that consideration is being given to this by the London Ambulance Service.*)

169 Another question concerns the alerting of the Metropolitan Police at Hayes and West Drayton Police Stations. The BAA Constabulary are, under the current procedures, responsible for alerting the Metropolitan Police at Hayes. This is effected by means of a telephone call over an inter-switchboard private wire, Hayes in turn relay the message to West Drayton via similar facilities. It is claimed that up to four minutes can elapse before West Drayton obtains the message.

170 It has been suggested that the introduction of Post Office priority signalling facilities between Heathrow and Hayes and between Hayes and West Drayton would reduce the delay. Alternatively, a parallel Post Office priority signalling system from Heathrow to both Hayes and West Drayton would reduce the delay even further. It should be appreciated, however, that in the first case some time must elapse for the transit of the message through the Hayes relay point and in the second case strict circuit discipline would need to be observed or the benefits which might accrue would be lost.

We recommend that the BAA and the Metropolitan Police consider the cost/benefit and provision of Post Office priority signalling facilities between Heathrow and the Hayes and West Drayton Police Stations.

Recommendation No. 37

(*Note: We understand that during our enquiry these arrangements have been considered, and the parallel Post Office priority signalling system is now installed and working satisfactorily.*)

BAA/FS north station watchroom

171 The BAA/FS north station watchroom, during the alert and initial phase of an accident, is the focal point of operation for the emergency services. The watch position is manned continuously by an attendant who is responsible for taking the alert message and relaying it in accordance with local instructions. He is also required, on receipt of an accident alert, to carry out other functions such as, announcing the emergency over a tannoy system, sounding a siren crash alarm and actuating control switches for traffic lights, doors and road barriers. The BAA/FS VHF radio base station is operated from the watch position by the watchroom attendant, who is also responsible for accepting calls over the private wire telephone network.

172 Many of the facilities now available in the station watchroom are developments of, or additions to the original concept, consequently the operating console has become overburdened with appendages such as lights and telephone handsets. Control switches and alarms installed later had to be mounted on an adjacent wall, giving an untidy appearance and an apparently complicated control position. Whilst we consider the facilities provided are adequate, we recognise there is a need for rationalisation.

Recommendation No. 38

We recommend that the BAA/FS north station watchroom console be ergonomically designed and re-engineered to alleviate the workload on the watchroom attendant during an emergency alert.

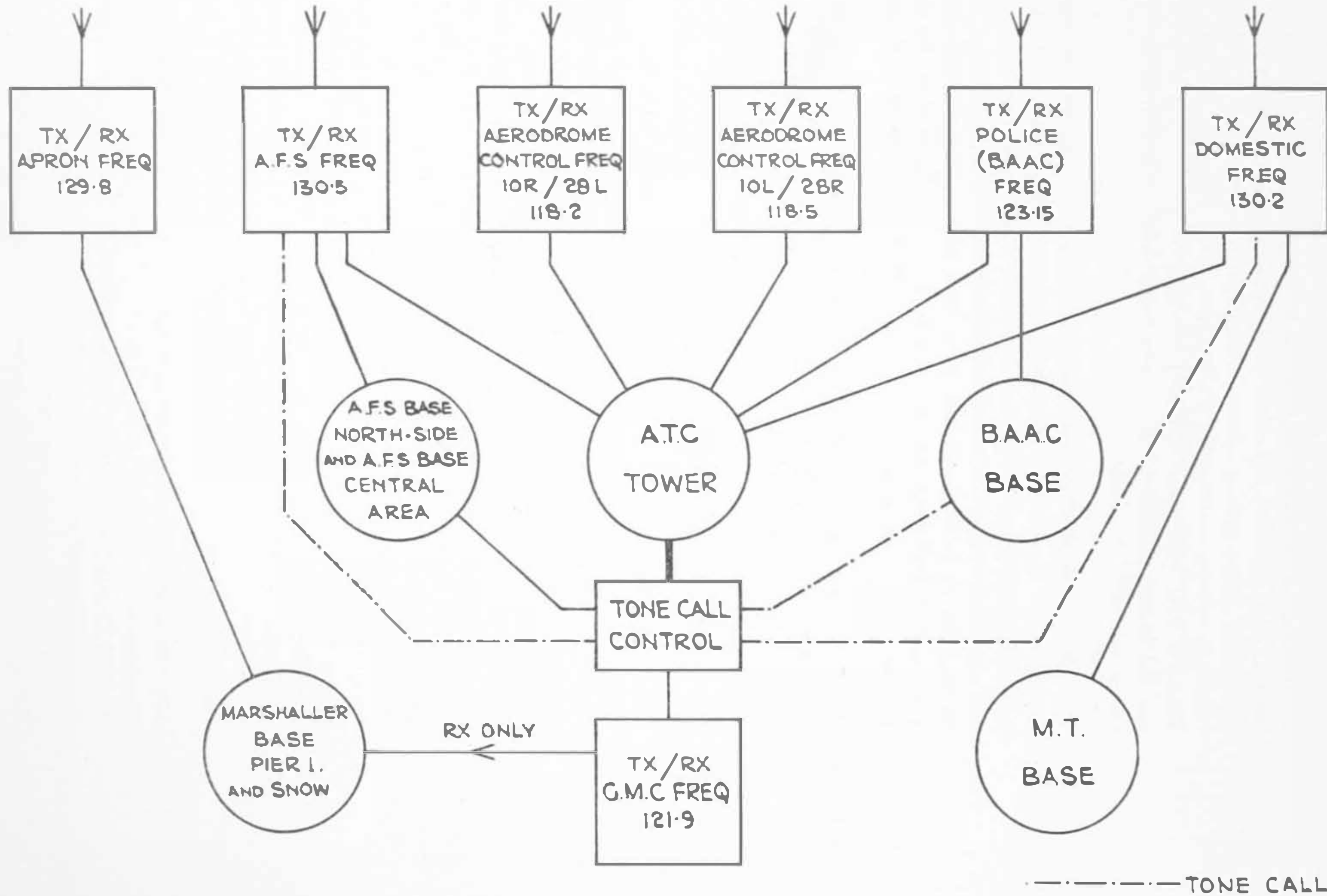
'On-airport' radio communications

173 Figure No. 2 shows in a simplified block-schematic form the organisation of land mobile radio communications at Heathrow. It can be seen that each service has its own discrete R/T channel for maintaining communication between its control station and respective service vehicles. Additionally BAA vehicles, if suitably equipped, are able to alert Air Traffic Control in the control tower, by a system known as 'tone calling', that they wish to communicate with them. Air Traffic Control can then by selecting the appropriate channel, establish communication with the vehicle on the caller's frequency. In the case of BAA Constabulary vehicles, tone call to Air Traffic Control is effected through their control station. BAA/FS lead vehicles are equipped with multi-channel mobile sets which enable them to communicate directly with ATC on the Air Controller's frequency. This was instituted as a result of the difficulties experienced during the G-ARWE accident. It should be noted that when the airport land mobiles VHF channels have been replaced by UHF during 1971, the means of meeting this requirement will need to be reconsidered.

174 The tone call facility referred to above enables any fire vehicle requiring ATC clearance to cross runways or taxiways, to communicate with the Ground Movement Controller (GMC). The latter is responsible for co-ordinating and controlling aircraft and vehicle movements on the runways, taxiways and manoeuvring areas of the airport. In practice the Ground Movement Controller cannot always give immediate clearance and has to refer to the Air Movement Controller; this can cause delay to the Fire Service. To avoid this difficulty, designated BAA/FS lead vehicles have been equipped with additional VHF channels enabling them to communicate directly with the Air Controller. This arrangement has proved satisfactory to both the BAA/FS and ATC.

HEATHROW AIRPORT - LAND MOBILE COMMUNICATIONS

FIGURE 2



175 As regards the future use of the GMC tone call facility, we consider it would be operationally advantageous if this use were subject to some control.

Recommendation No. 39

We recommend that the GMC tone call facility on the BAA/FS channel be withdrawn from the vehicles and placed under the control of the watchroom. Vehicles communicating with GMC first requesting the facility from their watchroom control.

(Note: We understand that this recommendation has been implemented during our enquiry.)

'Off-airport' Services communications

176 'Off-airport' Services such as the Metropolitan Police, London Fire Brigade, London Ambulance Service and Surrey Fire Brigade have their own discrete channels in the Home Office Land Mobile VHF bands. To facilitate operation of the incident 'base station' in the BAAC headquarters, communication equipment is provided by the Metropolitan Police aligned on their own channels. The use of Metropolitan Police frequencies is essential for maintaining the degree of liaison necessary under emergency conditions. We note that they intend to augment existing equipment, both at BAAC HQ and at the scene of an incident, by the provision of radio equipment on their traffic control channels. (Note: This has now been implemented.) We also note that Surrey Fire Brigade vehicles are now equipped with multi-channel radio equipment which could enable them to communicate with other fire brigades. However, installation of similar equipment in the vehicles of other fire services has not yet been fully implemented. We consider this to be a desirable feature so far as their attendance at Heathrow Airport is concerned, as it would ultimately give improved co-ordination between the outside brigades involved.

Communications with hospitals

177 When we examined the chain of communications normally operated within the medical and ambulance emergency organisation, we were particularly anxious to ensure that the organisations initially alerted, as well as the extra hospitals and services that may be involved later as the incident progressed, were able to inter-communicate effectively.

178 The London Ambulance Service has responsibility for alerting the designated and supporting hospitals, to which the Metropolitan Police initially despatch patrol cars providing radio communication channels to the police Incident Officer. The ambulance service also sends radio-equipped vehicles to the hospitals, for ambulance supervision and hospital liaison, which provides a communication link between the hospitals, Ambulance HQ Control and the ambulance Incident Officer at the accident scene. Although the police R/T cars at the hospital are primarily intended to assist in the collation of information required by the police, they are available, where necessary, for relaying ambulance service messages thus providing a back up to the existing ambulance and hospital facilities. The extensive telephone facilities in the BAAC HQ provide the communication

channels which should normally be used by the hospitals to pass information to the 'base station'.

179 We note that the Metropolitan Police intend when possible to replace their mobiles, initially despatched to the hospitals, by portable radios operated by police officers, which can be more conveniently situated inside the hospitals. This will reduce the time-lag between origination and despatch of an R/T message.

180 The effects of an accident may involve hospitals in adjoining counties and require co-operation between the Metropolitan Police and the county police authorities. To this end, the Metropolitan Police have already established liaison with the surrounding police forces. This will involve the police in sending radio cars to each supporting hospital, ie. expanding the arrangements currently adopted by the Metropolitan Police.

Conclusion

181 We consider that the communication facilities and organisation between hospitals and the Incident Officers are an adequate and satisfactory solution to a difficult problem. However, some improvement in operating efficiency could be effected by ensuring that new hospital staff are fully briefed.

Recommendation No. 40 We recommend that hospitals ensure that new staff are fully briefed on the facilities that are available and how they may be best utilised.

Incident post communications

182 Figure No. 3 is a block schematic diagram incorporating the additional facilities recommended in this Report and showing the main lines of communication available at an accident scene.

183 During the initial phase of an accident a BAA incident caravan equipped with a telephone and two radio communications channels (domestic and ground movement control), attends the incident post and is manned by the BAA Constabulary who nominate the police Incident Officer responsible for co-ordinating the activity of the attending services. The transfer of responsibility for the co-ordinating duties to a Metropolitan Police Incident Officer takes place during the build-up stage when outside services begin to arrive at the scene. Liaison between Incident Officers of the various services is effected by police officers equipped with portable radio equipment, supplementing police cars stationed at strategic locations and at the designated rendezvous point.

184 We concur with the intention of the Metropolitan Police to provide and equip a special communications/incident coach to be stationed permanently at the West Drayton Police Station for use in the event of an accident at Heathrow Airport. In addition to being equipped for communicating with their own force, it is proposed to install equipment carrying the BAA Constabulary VHF channel; we consider this will result in improved liaison at the accident scene.

(*Note:* We understand that this special coach is now in service.)

We *recommend* that for incident control purposes, the Metropolitan Police details police officers to provide liaison between the ambulance, fire and police services.

Recommendation No. 41

Conclusion

185 We note that this recommendation has now been implemented and we are satisfied that it provides a satisfactory communication organisation at the incident post and ensures adequate liaison between the participating services.

186 We recognised the need for improved fireground communications in the BAA/FS to co-ordinate the operations of groups of fire appliances and the activities of rescue teams which may be within the fuselage. We are aware of the intentions of the BAA to meet this requirement by the provision of additional portable equipment.

Other communication problems

Inter-service communications

187 *Common, emergency communication channel.* We found insufficient evidence, in support of a criticism implying inadequate communications liaison at the accident scene, that would warrant major changes in the organisation which has been evolved from practical experience over past years. The criticism was probably due to a lack of understanding of the communications facilities normally available in such circumstances. This is necessarily a complex organisation which must take into account the requirement for each service to maintain internal liaison on its own communication network. This has the advantage that individual channel loading is kept within acceptable limits which would not be the case if, as has been suggested, a common emergency communication channel was established.

188 *Conclusion.* We consider that the establishment of such a channel is impracticable.

189 *Multi-channel mobile radio equipment.* It has also been suggested that intercommunication between the various attending services would be facilitated by the provision and installation of multi-channel mobile equipments. These, it was thought, would allow vehicles to communicate one with another and, presumably, with any base station or portable hand set. In practice, this is not the case because mobile equipment is not normally manufactured which would permit operation using the different radio communications techniques (eg. frequency and amplitude modulation) and over the widely dispersed radio frequencies employed. Furthermore without an integrated control station to exercise circuit discipline and provide the necessary inter-service liaison, considerable confusion could result from vehicles leaving their normal operational channel and therefore failing to respond to base station calls.

190 *Conclusion.* For these reasons we do not consider the use of multi-channel mobile installations for this purpose to be viable or desirable.

191 *Terminology.* The involvement at an airport accident of personnel from many different services could result in common terms used in one service being misunderstood by members of another. We therefore looked into this problem to decide upon common terminology which could have general usage. We find that whilst anomalies may have existed in the past they have now been resolved in discussions between the respective senior officers of the emergency services.

Recommendation No. 42 We recommend, however, that ready interchange of information on terminology and other matters be encouraged between the services, either by regular discussion at an appropriate level or through the regular exchange of information between all services.

192 *Exercise.* An exercise was mounted by BAA in November 1970 and opportunity was taken to test and evaluate the effects of the changes in communication procedures and the new or revised facilities provided. It served to familiarise personnel with the current organisation and to give them an opportunity to try it out under operational conditions, but without the pressure existing under the normal accident attendance. We note that CAP 168, Section VI, Paragraph 9 requires, and that the BAA carries out, a full scale exercise each year which enables the efficiency of the alerting procedures and communication organisation to be kept under review.

Conclusions

193 We find no major faults in the present emergency communications organisation at Heathrow and we consider it to be basically sound.

194 We have made various recommendations — some of which have already been implemented. They have served, or will serve to improve even further the speed, efficiency and reliability of the system.

Chapter 6 Rendezvous points

Introduction

195 We examined the existing provision of rendezvous points (RVP) at Heathrow Airport, and considered their operational effectiveness for all the emergency services which respond to emergencies and aircraft accidents on or in the vicinity of the aerodrome.

RVP operations 'on' the aerodrome

The need for and functions of an RVP

196 The RVPs provided on the aerodrome are necessary because it is impracticable for emergency services to go direct to an accident scene, even if there were a system of pre-determined routes. This is primarily because Air Traffic Control must retain control of all traffic in the aircraft operation area and, in the event of an accident, may not be able to offer the expected pre-determined route. It would also be unreasonable to expect all responding appliances from the outside emergency services at all times to know of, recognise and adhere to any pre-determined route system that may exist, because the mobilisation process can involve appliances from areas not normally serving the aerodrome. In particular it is essential that there are arrangements ensuring that emergency service vehicles converging on an RVP, or an accident scene, do not penetrate any restricted or operational areas on the aerodrome without clearance from Air Traffic Control. An RVP may be used in two ways by the emergency services:

- (a) as an arrival point at which to aim and from which to be redeployed under guidance;
- (b) as an assembly area from which the police Incident Officer, in co-ordination with other services, may call up units or groups as they are required.

The use of RVPs also helps the police with the control of traffic to and from an accident scene.

Minimum area and surface conditions required at RVPs

197 The size, siting, construction and surface marking of RVPs and assembly areas are most important operational aspects. We consider the following to be desirable features of an effective RVP:

- (a) As direct an access as possible to the RVP from public roads outside the aerodrome. Ideally this access roadway should be 20 ft wide and hard surfaced. It need not necessarily be exclusive to the emergency services.
- (b) A waiting or marshalling area where appliances and other emergency service vehicles may avoid obstructing the access whilst waiting. It should be large enough — we suggest 1000 sq ft — to permit large and heavy appliances to manoeuvre.

- (c) As direct an access as possible to the aircraft movement area. Again, this should be hard surfaced and, to permit two-way traffic, should consist of either a single 20 ft wide roadway, or 2 adjacent 10 ft wide roadways providing a loop circuit.
- (d) Where any part of a paved or consolidated area adjoins soft, unimproved surfaces this should, if possible be kerbed or indicated in some other way to avoid the risk of vehicle immobilisation.
- (e) All the access roadways to RVPs and from RVPs to the aircraft movement area should have the edges marked, possibly by short safety posts or 'cats-eye' reflectors for use at night or in fog.
- (f) Emergency telephones should be housed in clearly marked boxes, with a locally switched light to assist users at night or in fog, and be sited prominently at the RVPs.
- (g) RVPs should be simply and clearly marked with illuminated signs.

Recommendation No. 43

We recommend that the BAA adopts the minimum area and surface conditions listed in paragraph 197 as the standard requirements for RVPs at Heathrow Airport.

Number and location of existing and proposed rendezvous points at Heathrow

198 At present there are five RVPs at Heathrow, located at positions designated N, NE, SE, S and W (see map at Appendix 7). Normally only two of these, RVP north and RVP south, are used for 'full emergency' calls. Any one of the five may be used for aircraft accidents on the aerodrome or for situations where an aircraft accident is thought to be imminent.

199 We agree with the present geographical disposition of these RVPs at the centre points and ends of main runways. With the eventual addition of RVPs at NW and E, both of which the BAA proposes to reactivate, there will be a total of seven. In our opinion this would be the ideal number and disposition of RVPs at Heathrow. It is visualised that ATC will use only RVP north or RVP south for a full emergency, but would use any one of the seven in case of an accident, selected according to the location of the accident. From an ATC point of view it would be ideal to have only RVP N or S from which to choose. In our view the other RVPs are needed to assist the emergency services to be assembled as near as possible to the accident scene.

200 We visited and inspected all the existing and proposed RVPs at Heathrow. The following are our findings and recommendations:

(i) *Existing rendezvous points*

- (a) *RVP north.* This RVP is opposite the main airport fire station and entry is controlled by traffic lights. There is good access and a large holding area is available for emergency vehicles.

Recommendation No. 44

We recommend that the BAA retains the emergency access (previously known as RVP NW) leading from the northern perimeter road to Block 1 as an alternative exit point to be used in the event of an accident on Runway 28R/10L.

- (b) *RVP northeast.* This is on the service road, 200 yards west of Harlington Corner and provides good access from the A4 to the operational area. It will be affected substantially by north side developments and by the area of prohibition associated with the

instrument landing system. As there may be insufficient room for an appliance assembly area when the developments are completed we considered whether any operational disadvantage would be imposed if this RVP was abandoned. It is our view that if RVP east is fully reactivated by BAA (see paragraph 200 (ii)(a)) this facility and those available at RVP north would be adequate for the operational needs of the emergency services in this sector of the airport.

We recommend that the BAA retains this RVP until the facilities at RVP east are fully restored.

Recommendation No. 45

- (c) *RVP southeast.* This is on the service road linking the taxiway to the emergency exit opposite Cain Lane, and has good access both from the Great South West Road and from the perimeter road.
- (d) *RVP south.* This RVP is on Green Beacon Road about 500 yards south of Block 96. We consider that the 10ft wide access road known as Green Beacon Road is inadequate for a primary RVP. The BAA planned to double the width of some 1250 ft of this road during 1970 and to improve the turning area available around sub-station 8. This work has now been completed.
- (e) *RVP west.* This is on the airport perimeter road adjacent to sub-station 10, utilising the western end of the road serving Perry Oaks fuel depot. We considered this to be an undesirable arrangement unless access to the movement area at Block 98 could be provided by making a road about 50 yards to the west of the police dog training ground. An alternative proposal to use the existing ILS road which links the new perimeter road to Block 100 is acceptable provided that the assembly area for appliances is located on a section of the old perimeter road which is opposite sub-station No. 10. Use of this site makes appliance manoeuvring safer and permits the concurrent use of the road around the sub-station. This solution involves less expenditure and reduces the number of penetrations of the security fence. The only works services required are the removal of kerb-stones at entry and departure points and the re-location of the RVP signboard.

We recommend that BAA designates the section of the old perimeter road opposite No. 10 sub-station as the assembly area for RVP west.

Recommendation No. 46

(ii) *Proposed rendezvous points*

- (a) *Proposed RVP east.* This will be at the junction of 'Old' Eastchurch Road and the taxiway leading to No. 1 Maintenance Area (east of Block 101). The BAA proposes that this RVP should be re-activated as soon as reconstruction of Eastchurch Road has been completed. We support these proposals which will provide good access to the aerodrome without the need for emergency vehicles to cross either of the main runways.
- (b) *Proposed RVP northwest.* RVP NW is to be re-activated following completion of the extension of Runway 28R/10L. BAA proposes that a 20 ft wide loop road which is to be used as a holding area should be built some 100 yards south of the extended runway centre-line and to the west of the new perimeter road. Access to the aerodrome for the emergency services will be through an adjacent gate leading from the Stanwell Moor Road and access to the operational area by way of an emergency road leading direct to the end of the runway. We support these proposed arrangements.

201 Apart from shortcomings mentioned in paragraph 200 our inspection of the existing RVPs at Heathrow revealed that the signs were inadequate and were not illuminated. However, we have already recommended in paragraph 197 above that there should be clearly marked and properly illuminated signs at all RVPs.

202 We appreciate that practical and economic considerations may limit the provision at all RVPs of the ideal facilities listed in paragraph 197. As a result of our inspection we consider a feasible solution would be to make full use of RVP north and RVP south which should be fully equipped whilst having basic facilities at the other RVPs. The facilities and conditions at RVP north and south are good as a result of the improvements carried out by the BAA.

Indicating and route-marking

203 We recognised that the emergency services had experienced difficulties in getting into the aerodrome entrance points and thence to the RVP. Traffic conditions near some RVPs are at times very bad, and the perimeter road had always presented traffic problems. In our opinion some of these problems could be overcome by having access direct to the RVPs from the main roads (subject to any overriding airport security requirements), and by having better signposting on all the routes giving a clear indication which would be helpful to service drivers who may be strangers to the area.

Recommendation No. 47 We recommend that the BAA considers how best to provide some form of traffic control to ensure freedom of movement for emergency vehicles within the aerodrome.

Recommendation No. 48 We recommend that the BAA provides conspicuous reflective directional signs for turn-off points from the outside roads, and access routes within the airport boundary.

(Note: We approved a suggested directional sign (Figure 4), submitted to us by the BAA and designed in accordance with a Ministry of Transport Advisory Circular (Traffic Signs, Regulations and General Directions (1964) Schedule I Part IV). We understand that implementation of this improved road signposting has now been put in hand by the BAA.)

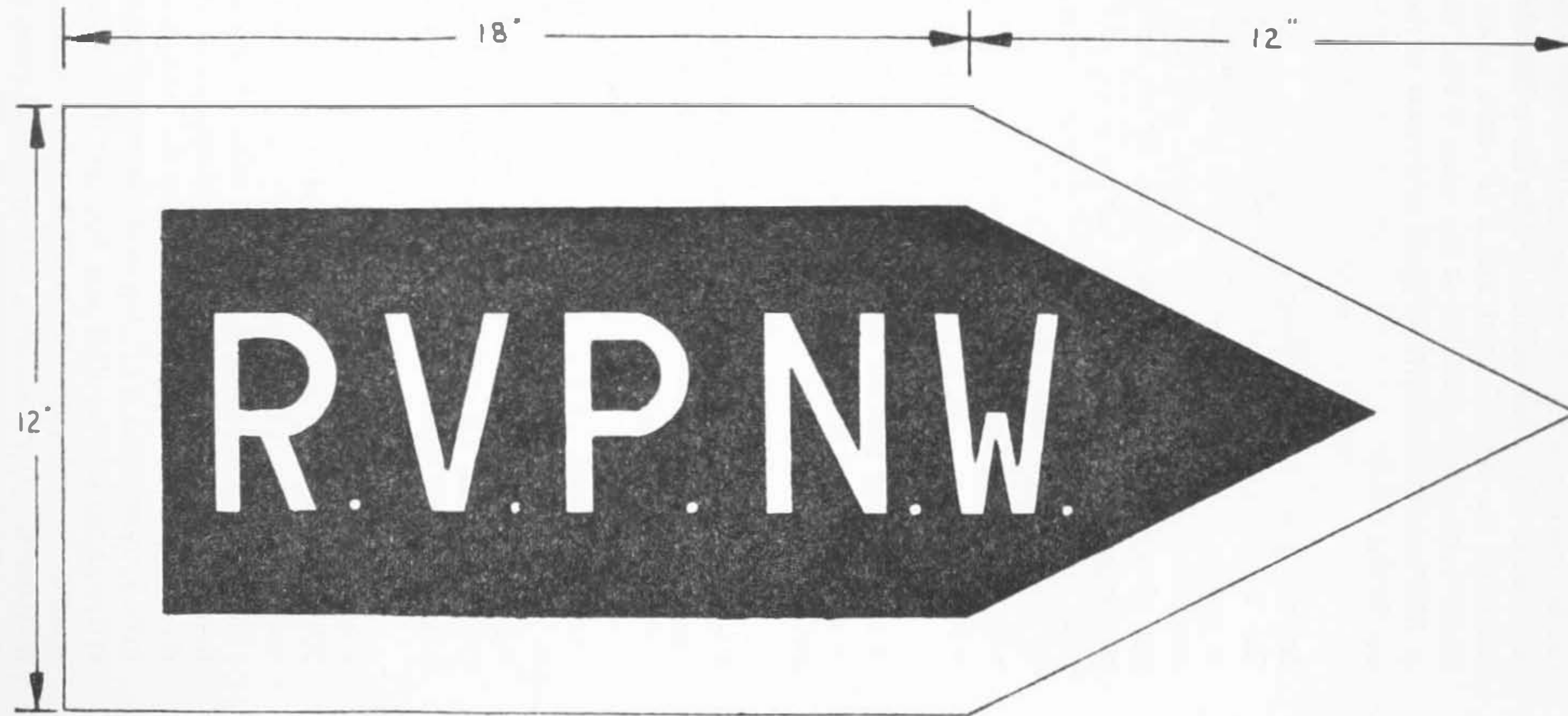
Changing the RVP selected in the initial message

204 Once an RVP has been specified in the initial accident message it is not changed by ATC. This is an ATC instruction designed to avoid confusion. Changing an RVP could affect the use of other runways and hamper ATC operations and those of the aerodrome as a whole. However, there may often be a tactical need for the emergency services to change an initially nominated RVP; for example units of an emergency service can arrive at the selected RVP and find that the accident is close to another. In such cases, or for other tactical reasons, the Incident Officer may decide, after conferring with ATC and other services concerned, that a second RVP should be used. ATC will agree to such a change whenever practicable.

Recommendation No. 49 We recommend that the BAA introduces an operational procedure to permit a change in the initially nominated RVP.

FIGURE 4

Diagram of a directional sign, designed by the British Airports Authority. The design is in accordance with a Ministry of Transport Advisory Circular: Traffic Signs Regulations and General Directions (1964) Schedule I, Part IV. The sign consists of white letters on green with a yellow surround.



RENDEZVOUS POINT SIGN

Scale 3" = 1 ft.

Guides for assembly and departure procedures

205 Once the emergency services have arrived at an RVP on the aerodrome, guidance to the accident scene is necessary. This is to avoid conflict with aircraft movements and is intended to reduce to a minimum the emergency services' attendance times. The effectiveness of this guidance depends on the early availability of a sufficient number of guides. Guidance at Heathrow is provided by BAA Constabulary and from BAA marshalling sources. This has the advantages that the vehicles used have a radio frequency on which clearance for movements can be obtained from ATC, and also that the guides have an intimate knowledge of the aerodrome.

206 There has been some criticism of the supply of guides to external services in the period immediately following an accident for which there was no previous warning. When we examined RVP procedures we found that no minimum requirement for guides had been laid down. We considered the estimated times involved and found that if the guides return to the RVP after taking the fire brigade to the scene, then, given a minimum of 4 guides and an effective liaison between the ambulance and police Incident Officers, a two-way guidance system is possible.

Recommendation No. 50 We recommend that the BAA provides in the Heathrow Emergency Orders that there should be a minimum of 4 guides available at the nominated RVP within 4 minutes of the alert.

207 The increase in staff and vehicle strength of the BAA Constabulary over the past year, and the support now given by the marshalling section of BAA suggest that previous difficulties can be largely overcome. It would be unreasonable to expect even a few manned vehicles to be permanently on standby waiting for an accident to happen, and it is inevitable therefore that at any one time the police and marshalling vehicles may all be engaged on other duties. Nevertheless we believe that these duties can be organised so that it will be possible to have this minimum number of guides at the rendezvous point within this stipulated time.

208 As well as guidance *inwards* we consider there is also a need for an adequate guidance system *away* from the accident scene. This is particularly important if an efficient shuttle service of ambulances is to be set up.

Recommendation No. 51 We recommend that the BAA with the services concerned ensure that there will be adequate guidance throughout the duration of the incident for ambulances conveying injured persons to hospitals; bearing in mind that more than one route may be needed.

Communications

209 Although emergency communications are dealt with in Chapter 5, it is appropriate for us to examine here those aspects which affect RVP operations.

210 Communications at RVPs at Heathrow are by telephones and by the RVP officer's radio transmitter/receiver.

(a) *Telephones.* Each RVP has a telephone connected to the airport switchboard from which any other number may be reached. These RVP telephones are tested daily by the BAA Constabulary. We consider that the BAA fire station telephone number displayed in each RVP telephone box is sufficient for the purposes of the emergency services.

(b) *Radio communications.* Should the RVP telephone facility become inoperative, the RVP officer can establish communications through his portable R/T set with BAA Constabulary base station, which will pass his messages to any addressee. The R/T equipment also serves as a link with the police Incident Officer.

Having examined communications at the incident and the RVP in relation to each other, we are satisfied that the present radio and telephone arrangements at RVPs are adequate except for the need to relocate the telephone at RVP south.

We recommend that the BAA relocates the RVP south telephone, now on the perimeter road, at sub-station 8.

Recommendation No. 52

(Note: This has now been implemented.)

Identification of the RVP Officer

211 In view of the numbers of uniformed officers likely to be on or near the RVP, it is essential that the RVP Officer should be easily identifiable.

We recommend that the BAA ensures that the RVP Officer wears some distinguishing mark to identify himself.

Recommendation No. 53

(Note: We understand that this Recommendation has now been implemented by the BAA.)

RVP operations 'off' the aerodrome

Fire Brigade operations

212 In the event of an aircraft accident occurring 'off' the aerodrome but within 2 miles of the airport perimeter road, the RVP nominated by ATC is used only as an assembly/dispatch point for services attending from within the aerodrome. The London Fire Brigade may elect to use this RVP as well as, or instead of, one of the 10 RVPs the Brigade have listed in their own Operational Instructions. These London Fire Brigade RVPs are situated outside the aerodrome boundary. They serve as assembly points for LFB appliances ordered to aircraft accidents outside but adjacent to the aerodrome. Each has an adequate assembly area and a telephone nearby for communications purposes. Experience has shown that this LFB system for attendance at 'off' aerodrome accidents works well.

213 During our consideration of Fire Brigade operations at RVPs 'off' the aerodrome we noted some difficulties encountered with accident location messages. (Discussed below in paragraphs 215-218.)

Metropolitan Police operations

214 We find that 'off' aerodrome RVPs are of no practical significance to the police. This is because the police proceed direct to the accident scene, and their main concern is sealing-off the accident area and establishing a marshalling area on the main approach route.

Identification of accident locations

215 When we considered the emergency procedures followed in a typical aircraft accident we were concerned by the different terminologies that

could be used to describe an accident location to the emergency services. For example, that used between ATC and the BAA/FS differs from that which the latter must use when passing the call to the London Fire Brigade. We therefore looked at all the available systems and what each emergency service uses or requires in respect of 'on' and 'off' aerodrome accidents

216 *Systems of identification*

- (a) *The airport crash grid map.* On this map the airport and immediate surroundings are shown divided into lettered squares each of which is further sub-divided into 9 numbered segments. The original map was extended for varying short distances on all sides, and these new areas identified as 'north of A', 'east of M' and so on. An accident within the area covered by this map can therefore be located by, for example, A2, B9, or 'east of M'.
- (b) *The 'block' system.* This identifies by numbers the concreted areas of the airport runways and taxiways. The system is used mostly by the internal airport services, but is not, however, generally required as part of the emergency procedure.
- (c) *Geographical references.* ie. siting well-known landmarks or buildings round the airport.
- (d) *The national grid map.*

217 *Systems used or required by the emergency services*

(i) *'On' aerodrome*

- (a) *Aircraft accidents.* For aircraft accidents 'on' the aerodrome all the outside emergency services prefer to come to a given rendezvous point and then use the guides provided. These emergency services do not need or use the 'block' system. The airport crash grid map is not as important to them as is the rendezvous point; although the police make some use of it, and it also enables the ambulance service to determine their initial choice of hospital.
- (b) *Domestic calls.* When answering domestic calls on the airport the LFB employ the 'grid reference' system from the airport crash grid map. The 'grid reference' is provided by the aerodrome fire service as an addition to the address or location when they pass the call.

(ii) *'Off' aerodrome*

For aircraft accidents in the vicinity of the aerodrome the emergency services use a combination of the airport crash grid map plus, when possible, geographic references and the 'Geographia' map of the London area. At the time of the first 'alert' message the precise location of an 'off' aerodrome accident is often not known. Later, when more accurate information is available this is passed on to the LFB.

218 After examining the above systems we consider that:

- (a) The RVP is the most important reference for the externally-based emergency services attending an accident on the aerodrome.
- (b) The 'block' system, although not needed by local authority services attending an accident, is useful to the 'on' aerodrome services.
- (c) The airport crash grid map is, in general, useful but the extended borders of this map, ie. 'north of A' etc., provide only vague guidance unless combined with some estimate of the distance involved.

(d) Geographical, descriptive references and service-provided maps will continue to be used for accidents outside the crash grid map area.

We *recommend* that the BAA arranges for suitable instructions to be included in the Heathrow Emergency Orders to ensure that messages to the external emergency services employ standard terminology in referring to locations on the aerodrome.

Recommendation No. 54

Conclusions

219 In our examination of the rendezvous point operating facilities and procedures, and in our inspection of the existing and proposed rendezvous points, we found a need for some improvements to be made. These have been included in our recommendations. It should be noted that in several cases these improvements had been considered by the responsible authority before our enquiry, and suitable proposals made or work put in hand to implement them. In other cases similar action was taken by the authority during the course of our enquiry.

220 If the authority's proposals and our recommendations are implemented, we consider the resulting provision of rendezvous points at Heathrow, and their operation, will be more effective.

Note on Working Party to consider the fire and rescue problems at Heathrow brought to light in the Whisky Echo accident report (CAP 324)

1 The Board of Trade proposes to set up the Working Party, proposed in Recommendation No. 2 (page 25) of the report of the Chief Inspector of Accidents, to review the aircraft fire and rescue operations in respect of the problems at Heathrow.

2 The Working Party will be under the Chairmanship of Mr Denys Peel, Director of Aerodromes (Technical), and the following organisations will be invited to participate:

- British Airports Authority
- Metropolitan Police
- Heathrow Airline Operators Committee
- London Fire Brigade
- Surrey Fire Brigade
- London Ambulance Services
- Surrey Ambulance Service
- Board of Trade (Southern Division).

3 The Working Party should report to the Director-General of Safety and Operations, Board of Trade, and aim at completing its work by mid-1970.

4 Owing to the number and variety of detailed local problems to review, the Working Party may wish to set up sub-groups or co-opt additional members; this should be decided by the Working Party.

5 The general terms of reference are:

To review and report on the problems of fire and rescue operations in respect of aircraft accidents at Heathrow, including the problem of co-ordination between British Airports Authority services and those of local authorities, and to make recommendations.

6 The following note is provided as a guide to the problems covered by the terms of reference, but is not exclusive:

(a) *Liaison between airport and local authorities*

Communications and interface problems between the airport fire and police services, and the local authority services. Emergency warning procedures and speed of attendance.

(b) *The siting of fire stations*

Review of siting of existing BAA and local fire stations, and of any plans for re-siting such stations. Consideration of procedures and other action to minimise response time.

(c) *Fire equipment and manning*

Review of the present and proposed equipment and manning of the BAA Fire Service, and recommendations on how it can best be deployed

in conjunction with local fire brigade assistance for the most effective and rapid fire control and rescue operations following an aircraft accident.

(d) *Domestic fires*

Consideration of extent to which arrangements for dealing with domestic fires may affect the availability of the airport fire service for aircraft accidents.

(e) *Ambulance cover*

Consideration of arrangements for ambulance cover to deal with aircraft accidents.

(f) *Training*

Consideration of the training of BAA and local fire service personnel for dealing with aircraft crash fires.

7 In making its recommendations, the Working Party should have regard to cost effectiveness and examine the benefits likely to be achieved by any increases in facilities and manning against the cost involved.

8 The Working Party should consider itself free to recommend to the Board, on any overall or long-term policy question with which it has not been able to deal, that further study or development is required.

Board of Trade

7th October, 1969

Membership

Department of Trade & Industry

Chairman	Mr D F Peel	Director Aerodromes (Technical)
	Mr E D C Cooper	Divisional Controller, Southern Division, Civil Aviation
	Mr S G Hall	Deputy Director Aero- dromes (Technical) B
	Mr N F Hildyard, DSO, DFC	Divisional Operations Officer, Southern Division. Civil Aviation
	{ Mr J L Matthews later replaced by:	Deputy Air Traffic Control Officer-in-charge, Heath- row Airport, London
	{ Mr J R Carruthers	Assistant Air Traffic Con- trol Officer-in-charge, Heathrow Airport, London
	Mr J E Lodge, DFC	Chief Fire Service Officer
	Mr E G Luff	Chief Telecommunications Officer, London Airports
	Mr J Greaves	Signals Officer, London Airports

Metropolitan Police

Chief Superintendent F F Sargent, MBE	X Division, Hayes
{ Chief Superintendent A G Hope later replaced by:	A.8 Branch, New Scot- land Yard
{ Chief Superintendent W H Gibson	A.8 Branch, New Scot- land Yard
Chief Superintendent W Wykes	A.9 Branch, New Scot- land Yard
{ Inspector P R Henman later replaced by:	A.9 Branch, New Scot- land Yard
{ Inspector E Gleeson	A.9 Branch, New Scot- land Yard

London Fire Brigade

Mr R S Watts, MBE	Assistant Chief Officer
Mr L Dunn	Deputy Assistant Chief Officer

Surrey Fire Brigade

Mr T A Andrews	Assistant Chief Officer (Now Chief Officer, Kesteven County Fire Brigade)
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<i>Buckinghamshire Fire Brigade</i>	Mr D R Close	Deputy Chief Fire Officer
<i>British Airports Authority</i>	Sir John Briscoe, BT., DFC	Director of Operations
	Mr E T Williams	Chief Fire Officer
	Mr J L Gilbert, CVO, DFC later replaced by: Mr P Edmunds	Operations Officer (Heath- row Airport, London) Operations Officer (Heath- row Airport, London)
<i>London Ambulance Service</i>	Mr N A Woodruff	Deputy Chief Ambulance Officer
<i>Surrey Ambulance Service</i>	Mr E Bates	Deputy Chief Ambulance Officer
<i>Heathrow Operators Committee</i>	Mr J C Abbott, MBE	Fire Protection Manager, British Overseas Airways Corporation

The following persons also gave assistance:

<i>British Airports Authority Constabulary</i>	Chief Inspector M Jones	
	Chief Inspector M Kiely	
<i>British Airports Authority</i>	Mr R Smith	Station Operations Officer, Heathrow Airport, Lon- don
	Mr R J Ferguson	Deputy Chief Fire Officer
	Mr F J Gray, MBE Dr A Trueman	Divisional Fire Officer Chief Medical Officer
<i>London Fire Brigade</i>	Mr A T Sennett	Deputy Assistant Chief Officer
	Mr E Allday	Deputy Assistant Chief Officer
	Mr J A C Darton	Communications Officer
<i>Surrey Fire Brigade</i>	Mr S Hatton	Assistant Divisional Officer
<i>Metropolitan Police</i>	Mr G Fox	Telecommunications Branch, New Scotland Yard
	Mr G Fuller	Telecommunications Branch, New Scotland Yard
	Chief Inspector T Lashbrook	A.8 Branch, New Scot- land Yard
	Inspector G G Digby	X Division, Hayes

<i>Department of Trade & Industry</i>	Dr A R Swanton Mr R H James	Medical Officer Deputy Station Telecommunications Officer, Heathrow Airport, London
	Mr J W MacDonald Mr D L Craddock	Deputy Chief Fire Service Officer Divisional Fire Service Officer
<i>London Ambulance Service</i>	Mr J E Moss Mr G Healy	Chief Control Superintendent Control Superintendent
<i>Air Corporations Joint Medical Service</i>	Dr A S R Peffers	Deputy Director
<i>Health Control Unit Heathrow Airport, London</i>	Dr P R Cooper	Principal Medical Officer
<i>North West Metropolitan Regional Hospital Board</i>	Dr S MacKenzie	Deputy Senior Administrative Medical Officer
<i>West Middlesex Hospital</i>	Mr I D Archibald Mr E M Steffens	Assistant Orthopaedic Surgeon Secretary
<i>South West Middlesex Hospital Management Committee</i>	Mr P R J Arnold	Group Secretary
<i>Ashford Hospital</i>	Mr D Walker	Consultant Orthopaedic Surgeon
<i>Staines Group Hospital Management Committee</i>	Mr G F Barber	Group Secretary
<i>Hillingdon Group Hospital Management Committee</i>	Mr B H Saperia	Assistant Secretary
<i>Buckinghamshire County Council</i>	Mr W C Collett	Ambulance and Transport Officer
<i>Department of Trade and Industry Secretary to Working Party</i>	Mr D Roberts	

Extracts from London Ambulance Service Major Emergency Plan

Part 1

Ambulance Service Plan—General principles

1 *Objects*

The objects of the plan are to ensure that:

- (a) Sufficient ambulances (plus special equipment) to deal with readily accessible casualties are available at the scene as soon as possible after the first alarm has been given.
- (b) As an incident progresses, there is a steady flow of ambulances at the scene for the transport of rescued casualties.
- (c) Despite the major emergency commitment occasioned by (a) and (b) above, adequate emergency cover is maintained throughout the area covered by the Ambulance Service.
- (d) Within the limits imposed by (a), (b) and (c) above, there is a minimum dislocation of the routine work of the service and that full normal work is resumed as soon as possible.

2 *Definitions*

Before giving details of the plan, it is necessary to define certain standard terms used in the ambulance service in connection with a major emergency.

- (a) *Major emergency.* A major emergency is any incident which is determined as such by the senior police, ambulance or fire officer first on the scene, or any incident in which the number of live casualties to be handled is estimated to exceed fifty, and/or in which more than one of the 'listed' hospitals were likely to be involved in handling casualties.

It is important to note that parts of the plan should be brought into operation if the circumstances at an incident appear to require this: the principle being that it is better to operate this plan when not fully required, than to fail to bring the plan into operation until it is too late. The same basic instruction which applies to a smaller single emergency case also applies to a major emergency, 'when in doubt — turn out'.

- (b) *Mobilisation.* Mobilisation is the action taken to provide the maximum number of ambulance service vehicles in an area, for emergency work.

This will be achieved by:

- Re-deploying vehicles from other control areas
- Stopping, or reducing, non urgent work
- Retaining personnel due to go off duty
- Where possible, and when required, calling in officers and other personnel who are off duty
- Splitting ambulance crews to man additional vehicles
- Mobilisation may be applied to one or more control areas

- (c) *Divisional control (crash control).* These are the controls which can receive a major emergency call from within their own area and can initiate the ambulance service major emergency plan:

<i>Name of control</i>	<i>Address</i>	<i>Telephone no.</i>	<i>Telex</i>
Central Emergency Control	150 Waterloo Road London SE1	01-734 4000	261405
Ilford Control	Aldborough Road Ilford Essex	01-554 9579	261188
Kenton Control	The Mall Kenton Middlesex	01-204 0247	261885

(d) *Central Emergency Control*. This control has two functions:

- 1 As a crash control it will be responsible for initiating the major emergency plan in respect of any incidents within its catchment area.
- 2 As the Central Emergency Control it will be responsible for co-ordinating the facilities of the service in areas not directly involved and their subsequent deployment to the support of the control concerned.

(e) *Incident control*. As soon as possible after a major emergency has been notified, the crash control will arrange the establishment of an ambulance incident control at the incident. The person in charge of the ambulance incident control will be known as the ambulance Incident Officer. The main functions of this control will be to control and co-ordinate the work of the vehicles and personnel of the ambulance service at the scene.

(f) *Designated hospital*. This is the hospital most accessible to the incident (see appendix). It will be responsible for providing a Senior Medical Officer (except for London Airport) who will be the senior representative of the hospital service at the incident. The hospital will probably, but not necessarily, provide the first mobile medical team.

(g) *Supporting hospital*. This is the term used to denote other hospitals which are alerted and which may be required to support the designated hospital. Supporting hospitals must be drawn from the list of designated hospitals as they may be required to carry out some or all of the functions of a designated hospital.

Part 2

Initial action by crash control

On the receipt of a major emergency alarm the senior officer on duty will take charge of the operations of his control and ensure that the following action is taken (not necessarily in the sequence detailed):

- 1 Despatch initial attendance of 4 ambulances.
- 2 Mobilise men and vehicles within working distance of the incident.
- 3 Alert emergency control vehicle.
- 4 Inform Central Emergency Control.
(Note: It may be necessary to use the services of another ambulance authority in order to implement the 'initial action' phase of the major emergency plan, particularly in the fringe areas of the Greater London Council area, and this fact should be included in the report to the Central Emergency Control.)
- 5 Inform police and fire brigade.

- 6 During normal hours despatch to the scene the Divisional Officer or Area Superintendent, whoever is nearest to act as Incident Officer. If the Area Superintendent is sent, the Divisional Officer is to be informed. Outside normal hours responsibility for the provision of a senior officer at the scene is that of the Senior Control Superintendent at the Central Emergency Control. The crash control will act on his instructions in this matter.
In addition to the above use should be made as necessary of the nearest station supervisor.
- 7 Notify appropriate hospital that it is the 'designated hospital' by informing the hospital switchboard (not casualty department) of:
 - (a) Type of incident
 - (b) Location
 - (c) Time of incident
 - (d) Estimated number and type of casualties (if available)
 - (e) Names of supporting hospitals.
- 8 Notify two other hospitals in the area that their services may be required as 'supporting hospitals'. The message will be as in 7 above and will include (a), (b) and (c), plus the name of the designated hospital. Details from the Incident Officer regarding the use of additional hospitals must be passed to the Central Emergency Control for the information of New Scotland Yard and the emergency bed service. The hospitals in question must also be alerted as 'supporting hospitals'.
- 9 Arrange transport for the mobile medical team, if requested by the hospital, or in the light of local conditions.
- 10 Increase initial attendance of ambulances in the light of additional information received.
- 11 Despatch ambulance service emergency control vehicle.
- 12 Impose radio silence on all mobiles except for essential transmissions. A radio channel will be allocated for the use of vehicles working a major emergency.
- 13 Close in available ambulances to reinforcing points.
- 14 Maintain contact with the Incident Officer and implement his requirements. Pass all requests for support to the Central Emergency Control.
- 15 Despatch an officer to supervise the unloading and turn round of ambulances at the designated and/or support hospitals, as required. These officers must be prepared to liaise with the hospital authorities on any point concerning the ambulance service, eg., the co-ordination of arrangements to free hospital beds by discharging patients or transferring them to other hospitals.
- 16 Maintain a log of all messages, and complete working sheets as necessary.

(Notes: Controls must be prepared to assist other ambulance authorities in the operation of a major emergency within the area of the other authority; implementing part or whole of the London Ambulance Service Major Emergency Plan, if this is necessary.

Crews sent to assist another authority will report to the ambulance Incident Officer of that authority, and the control concerned will ensure that a liaison officer from the London Ambulance Service is sent to the scene.)

Visual Aids

To facilitate ease of reference each Divisional Control and the Central Emergency Control are supplied with 'major emergency' boards:

- 1 To outline the action to be taken at the crash control.

- 2 For use as a plotting aid for vehicle deployment. Visual aids will also be supplied for use in special incidents, such as London and Northolt Airports, the motorways, and the Port of London.

Emergency control vehicles

Four emergency control vehicles will be located as follows:

- Oval Ambulance Station
- Whipps Cross Ambulance Station
- Hanwell Ambulance Station
- Croydon Ambulance Station.

Part 3

Action at Central Emergency Control

The Duty Senior Control Superintendent will be responsible for action taken at the Central Emergency Control in the event of a major emergency, and will ensure that the following is carried out although not necessarily in the sequence detailed:

- 1 Outside normal hours direct the most senior available officer to the scene to act as ambulance Incident Officer.
- 2 Alert all other controls to 'major emergency' standby.
- 3 Notify Chief Ambulance Officer/Deputy Chief Ambulance Officer, Chief Control Superintendent, and outside normal hours the appropriate Divisional Ambulance Officer.
- 4 Direct the movement of vehicles, personnel and equipment from other divisions, as necessary. The emergency transfer of control staff to the crash control should be considered and implemented if necessary and practicable.
- 5 If not already arranged by the crash control, despatch an officer to the designated or supporting hospitals as required, to assist in the turn round of vehicles, and to act as liaison officer with the hospital services.
- 6 Alert other neighbouring ambulance authorities, unless already deployed as part of 'initial action' by the crash control.
- 7 Authorise the suspension or adjustment of general work in the affected areas.
- 8 Inform the emergency bed service, giving names of 'designated' and supporting hospitals. Keep advised of any additional hospitals alerted.
- 9 Maintain liaison with police information room. The names of additional hospitals alerted must be passed to the information room, New Scotland Yard to enable the police to despatch radio cars and documentation teams to them.
- 10 Alert Service Public Relations Officer and maintain press liaison.
- 11 Alert the British Red Cross Society.
- 12 Ensure that at the completion of the major emergency, a 'stand down' message is given to all parties alerted during the operation.
- 13 Maintain a log of all messages.

The Duty Senior Control Superintendent will be responsible for the submission of a report on the incident to the Chief Ambulance Officer and the Chief Control Superintendent. He will ensure that reports are received from the Incident Officer, the officer in charge of the divisional control and any other relevant source.

Part 4

Duties of Incident Officer

At the start of an incident the duties of Incident Officer will be undertaken by the members of the crew of the first ambulance to arrive at the scene. Controls must ensure that a senior officer is despatched to the scene as soon as possible to take over the duties. This officer will be identified by the yellow top to his service cap. (Spare yellow cap covers will be available in the emergency control vehicle.) The efficiency with which the service can deal with a major emergency depends very largely upon the receipt at control of up to date and accurate situation reports.

- 1 Immediately on arrival the Incident Officer will make a quick appreciation of the incident, and send a radio message to the crash control to announce his arrival, together with an up to date situation report. If necessary this report must make reference to the need to advise the 'designated hospital' to provide a mobile medical team. Requests for additional vehicles should be made quoting the total number of vehicles thought to be required to clear the incident, eg. '8 ambulances required', would be an instruction to the control to send four vehicles in addition to the four already at the scene.
- 2 The Incident Officer will establish and maintain close liaison with the police, fire brigade and the hospital doctor, and will establish the ambulance incident control in close proximity to the control units of the other services. Fire brigade officers attached to the brigade control unit can be identified by a chequered red and white arm band.
- 3 The Incident Officer will establish, or confirm the establishment of:
 - (a) Ambulance control point
 - (b) Ambulance loading point(s)
 - (c) Ambulance parking point(s)
 - (d) Casualty collecting points, and/or, first aid points
 - (e) First aid equipment points
 - (f) The organisation of stretcher bearing parties, and will formulate the casualty evacuation plan in collaboration with the senior medical officer present. If it is decided to include in the plan hospitals that were not alerted initially, the crash control and the senior police officer on the site must be advised accordingly. Pending the arrival of the senior medical officer the Incident Officer will — unless operational considerations dictate otherwise — spread the casualty load between the designated hospital and all other hospitals alerted as supporting hospitals. If this action is taken the crash control and the senior police officer must be informed of the hospitals to which patients are being removed. Efforts must be made via control to keep all hospitals advised of the number of casualties being sent to them.
- 4 The Incident Officer will control all ambulances and personnel from the ambulance service at the scene, and will keep the crash control fully informed of the progress of the incident ensuring that sufficient ambulances are available at the ambulance loading point. Much of the value of an Incident Officer depends upon his ability to anticipate his possible needs at the scene and to inform the control of his requirements in sufficient time to allow for the implementation of his instructions.

- 5 Action must be taken at the ambulance loading point, in conjunction with the hospital doctor at the scene, to ensure that correct priority is given when arranging the removal of casualties. A record must be maintained of the total number of casualties removed, and the hospital to which they have been taken.
- 6 In the event of a lengthy wait by ambulances at either the ambulance loading point or the ambulance parking point, the Incident Officer will issue instructions to conserve vehicle batteries by closing ambulance radio sets with the exception of the first vehicle to be used at both points. Flashing beacons should also be switched off at the incident if there is the possibility of a delay prior to further use of the vehicle.
- 7 The Incident Officer will maintain a log of action taken and this will form part of the report that will be submitted by this officer at the completion of the incident.
- 8 Finally, the Incident Officer will notify the crash control and the Central Emergency Control as soon as the incident is closed insofar as the ambulance service is concerned. The scene will be checked for ambulance service equipment, and vehicles still at the scene will be dismissed.

Part 5

Action by ambulance crews

1 *Action by crew of the first ambulance to attend*

The first ambulance may well arrive at the scene of a major emergency before the ambulance Incident Officer and in these circumstances the crew will act as follows:

- (i) The driver must confirm with control that the incident is a major emergency and also pass any information which can be speedily obtained without leaving his vehicle. Requests for additional vehicles should be made quoting the total number of vehicles thought to be required to clear the incident, eg., '8 ambulances required' would be an instruction to control to send another 7 vehicles. The driver will remain in radio contact with control and will not leave his vehicle without the permission of control.
- (ii) The attendant will contact the officers in charge of police and fire brigade at the scene, and liaise with both of these services. He should carry out a reconnaissance, give a situation report to control and then in consultation with the senior police and fire brigade officers establish the following pending the arrival of a senior officer.
 - (a) Ambulance control point
 - (b) Ambulance parking point
 - (c) Ambulance loading points
 - (d) Casualty collecting point (or first aid point)
 - (e) First aid equipment supply point
 - (f) Stretcher bearing parties.He will maintain a record of his actions and will continue to act as Incident Officer until relieved by a more senior officer.

- (iii) It is of the utmost importance that the information passed to control by this crew, whilst concise, should be as descriptive as possible. Their information may have a considerable bearing on the manner in which the early stages of the incident are dealt with.

2 Action by crews subsequently directed to the incident

Crews subsequently directed to the incident must watch for the ambulance parking point and park their vehicle accordingly. Routes laid down by the police must be strictly adhered to.

On arrival at the parking point the driver will remain with his vehicle and the attendant will go forward to the ambulance control point or contact the ambulance Incident Officer who can be recognised by the yellow top to his service cap; thereafter the crew will act on orders received.

3 Procedure for all crews

- (i) As soon as it becomes clear that the incident is a major one and immediately sufficient ambulances are available steps should be taken to convey the seriously injured to the designated hospital, as notified by control. It is important to give priority to the removal of the most seriously injured casualties and care should be taken at the ambulance loading point to ensure this.
- (ii) Records of patients conveyed (by description if it is impossible to obtain names and addresses, eg., elderly female, teenage girl, etc.), and of the hospitals to which they have been taken will be maintained on Form LA1.
- (iii) After each trip to hospital, ambulances will report their availability to the crash control and act on instructions from that control. In a large incident casualties may have to be taken to distant hospitals and the number of ambulances available for this task will always be limited. The speedy evacuation of casualties (and thus the saving of life and the avoidance of unnecessary suffering) will depend on a quick turn round for ambulances. There must be no avoidable delays, and hospitals will have been specially requested to release incoming ambulances as quickly as possible. Crews should not delay at hospital to collect blankets, etc., — ample stocks will be available at the incident when the major emergency vehicle has been mobilised.
- (iv) At the incident all vehicles will observe radio silence except those designated by the Incident Officer. If a vehicle on radio silence wishes to send an urgent message, it must be sent through the ambulance control point/Incident Officer.

4 Fire risk

Because of the congestion and other dangers (ie., the risk of explosions from gas or petrol vapour in the case of crashed aircraft, broken gas mains and wrecked railway tankers, etc.). Smoking is prohibited at any major incident, unless definite permission is given at designated places (eg., refreshment points, etc.). The instructions of fire brigade officers must be obeyed at all times if there is a risk of fire.

5 Assistance to other authorities

Crews sent to assist with a major emergency in the area of another authority will report to the ambulance Incident Officer of that authority.

Part 6

Action at the hospital by ambulance service hospital liaison officer

An officer will be despatched in a radio equipped vehicle to the designated hospital, and each support hospital if required, and will carry out two main functions:

- (i) To ensure the quick turn-round of ambulances bringing casualties to those hospitals.
- (ii) To act as a liaison officer with the hospital authority in any matter which may affect the ambulance service, eg.:
 - To keep the Incident Officer advised of any change in the ability of the hospital to receive casualties.
 - The co-ordination of requests to move patients from wards, either as transfers to other hospitals, or as urgent discharges, to free hospital beds for incoming casualties.
 - In clinic hours to liaise with the Transport Officer concerning treatment of patients already in the hospital.

On his arrival at the hospital the officer will make himself known to the hospital authorities and, in this context it should be realised that some hospitals have arrangements to set up a special control centre for the hospital in the event of a major emergency. Throughout his time at the hospital the officer will make certain that he can be quickly contacted by the crash control, if required.

Delays to vehicles at hospitals will have the effect of reducing the number available to move casualties from the scene, and elimination of delays by the officer at the hospital will greatly contribute to the efficient management of the incident.

As soon as equipment is released at the hospital, it should be returned to the scene, and the officer must ensure that full advantage is taken of the facility offered by some hospitals to exchange equipment.

The hospital involvement with casualties will continue for a long time after the closure of the incident and there will be many requests from them for ambulance transport to return home treated casualties, normal treatment and clinic patients, plus the continuing need to transfer patients out of wards. The officer will remain at the hospital until directed to leave by control.

Part 7

Emergency control vehicles (ECV)

1 Description

Each of the four emergency control vehicles of the London Ambulance Service consists of a Land Rover with an equipment trailer. These vehicles are painted white and bear the London Ambulance Service markings.

The Land Rovers are surmounted with a blue flashing light, which is flanked on both sides by orange flashing lights.

These vehicles are provided with multi-channel radio sets netted to all controls, 'walkie-talkie' and master set, maps, information references, etc.

The equipment trailers contain sufficient dressings, blankets, stretchers, etc.,

to ensure that adequate supplies are available to deal with a large scale incident. A full inventory of this equipment is set out as an appendix to this section.

2 Purpose

The emergency control vehicles are designed to provide:

- (a) A forward-based extension of the 'crash control' at the scene of the incident.
- (b) A communications and co-ordinating centre to assist the Incident Officer in the performance of his duties.
- (c) A focal point for all medical and casualty evacuation services.

In order to meet the demand for the rapid establishment of a control at the scene of an incident, the Land Rover may be deployed without trailer.

3 Location

Emergency control vehicles will be located at the following stations:

Oval Ambulance Station
Whipps Cross Ambulance Station
Hanwell Ambulance Station
Croydon Ambulance Station.

4 Manning

The emergency control vehicles will normally be manned by a crew of three, consisting of:

- (i) A station supervisor (to act as, or link up with, the Incident Officer)
- (ii) A driver attendant (to man the master walkie-talkie radio set)
- (iii) A control officer (to man the normal radio position — acting under the instructions of the Incident Officer).

It may be necessary to vary this according to the resources available at the time of the incident. If necessary control will obtain the services of an off-duty control officer to complete the crew of the ECV in which case the driver may be instructed to collect the control officer en-route, or rendezvous at the scene.

Integration of aerodrome fire brigades with the public fire brigades

The following extract is from the 'Report of the Departmental Committee on the Fire Service' (Cmnd. 4371).

Airport fire brigades maintained by local authorities

140 The standards of fire cover to be provided at each civil airport are laid down by the Board of Trade in accordance with internationally agreed standards. The requirements are included in the licence for the airport and the brigade provided for the purpose is subject to annual inspection by the Board of Trade. The latter maintains an airport fire service training school, where training in airport fire fighting techniques is provided and certificates of competence are issued to airport firemen of supervisory grades. The arrangements for providing fire cover at each airport in accordance with the required standard are, however, a matter entirely for the licensee of the airport. We understand that at all local authority airports, except Liverpool and Leeds/Bradford, fire cover is provided by a separate civilian fire brigade. At Liverpool and Leeds/Bradford, however, the airport is fully integrated with the public fire service, which provides the necessary airport cover.

141 We asked a number of local authorities who maintain separate airport fire brigades why they do so. They take the view generally that an airport fire brigade is an industrial unit whose work differs in type and extent from that of the public fire service. An airport fire brigade is seen as an integral part of the airport organisation, working in close liaison with air traffic control staff, the operating companies, freight agents, fuel companies and other units at the airport. Airport firemen have to have an intimate knowledge of the airport, its organisation and air traffic control procedures, together with a sound knowledge of different types of aircraft which is best gained by the performance of other airport duties. They carry out a wide range of duties additional to their fire and rescue responsibilities, such as snow clearance, frost-precaution measures, bird dispersal, provision of emergency lighting and assistance with unserviceable aircraft on runways, which might be inappropriate for members of the public fire service. Airport firemen are trained in the specialised techniques of fire fighting in aircraft, in aircraft rescue techniques and in the use of specialist appliances. If the public fire brigade were to provide full-time fire cover at airports, additional staff would have to be employed to perform the extraneous duties undertaken by airport firemen. Integration of the airport with the public fire brigade, we were told, would lead to staffing problems, because airport firemen are on different pay and conditions of service and many might not satisfy the statutory qualifications for appointment and promotion in the public fire service. At some of the smaller airports the scale of operations would make it uneconomical in manpower to provide airport fire cover from the public fire service. We were informed that satisfactory liaison had been established between airport and public fire brigades to ensure that

adequate support facilities were available in an emergency and for the provision of joint training arrangements. It was also pointed out that many airports were located geographically outside the area of the controlling local authority, and this would make integration with their public fire service more difficult.

142 We recognise the force of many of these arguments and we are grateful to those authorities who gave us information on these matters. Nevertheless, we consider that, from the point of view of providing effective fire cover at airports and maximum operational efficiency, there are strong arguments in favour of integrating local authority airport and public fire brigades. Few aircraft crashes occur at airports and as a result airport firemen necessarily can obtain only limited experience of operational fire fighting in the course of their careers. Although frequent and realistic exercises are carried out by airport fire brigades, these cannot be a substitute for actual fire fighting experience. We do not accept that fire fighting and rescue techniques at air crashes are basically different from those carried out by the public fire service. Many aircraft crashes occur away from airports and have to be dealt with by the public fire service. We can see advantage from the point of view of command and control in integrating the two services. We took the opportunity, therefore, of visiting Liverpool Airport, where the airport fire brigade has been completely integrated with the City brigade. The airport appliances are provided solely for aircraft crash and rescue work and officers and men of the City brigade perform a two-yearly term of duty at the airport. Under this system many of the men in the brigade become conversant with airport traffic control and airport crash fire fighting procedures. It also ensures that all men serving at the airport have had regular fire fighting experience of a general nature, which has an important effect on maintaining morale. We were particularly impressed with the command and control advantages of integration, which ensures that the full resources of the brigade including its senior officers are available for airport fire fighting operations. A further advantage we noted is that design and development of equipment for the airport and the public fire services take into account the supporting role of the latter. We accept that full integration of local authority airport fire brigades and public fire brigades might lead to some increase in the cost of providing airport fire cover and that, because of the different conditions of service of airport firemen, special arrangements would be necessary, requiring goodwill by all concerned, to safeguard the position of these men during the transitional period following integration. But the issue which has to be faced is whether integration would provide a better standard of fire safety, particularly having regard to the increasing size of passenger aircraft and the general increase in air traffic which will occur in the future. With the proposed reorganisation of local government areas, it seems likely that most local authority airports will fall within the geographical area of the controlling local authority, which would facilitate integration. We have no doubt that full integration of the two services would be more efficient operationally. The only matter for consideration is whether the additional costs that might be involved would be justified. We *recommend* therefore, that following the reorganisation of local government and the formation of fewer and larger fire authorities which we recommend in Chapter III, those local authorities which control civil airports should review their arrangements for providing airport fire cover and consider the operational advantages of full integration of their airport and public fire brigades.

British Airports Authority Fire Service

143 The British Airports Authority is responsible for Heathrow, Gatwick, Stansted and Prestwick airports and maintains its own fire brigade to provide fire cover at these airports. We have not taken evidence from the British Airports Authority but the report on the accident of the Boeing 707-465 G/ARWE at Heathrow Airport on 8th April, 1968, served to reinforce the views which we had already formed that there would be substantial operational advantages at local authority airports in integrating the airport and public fire brigades. We note that the Heathrow accident report recommended that a broad based working party should study and report on the problems of aircraft fire and rescue operations, and suggest that the working party in the course of its deliberations should consider whether similar operational advantage would flow from integrating other airport fire brigades with the public fire service.

Industrial fire brigades

146 Many works fire brigades date from the time before the establishment of a nation-wide public fire service, when they were the only means whereby an industrialist could ensure the prompt availability of reasonable fire fighting facilities at his premises. The position is now very different, particularly in urban high fire-risk areas, where an early and substantial first attendance can be provided by the public fire service. The present trend and one which we expect to continue is for more industrial establishments to concentrate their own private efforts on fire prevention measures and to leave actual fire fighting to local authority brigades. This does not mean that works fire brigades will disappear. We have recommended in Chapter V that there should be no change in the statutory position whereby a fire authority is only required to provide a fire brigade of sufficient strength to meet all normal requirements; and, accordingly, that fire cover should continue to be assessed in relation to the general character and risk of the area and not in relation to an isolated fire risk. For a variety of reasons, some high risk industrial installations will continue to be erected in relatively remote areas and their owners or occupiers will wish as hitherto to include the provision of a works fire brigade in the arrangements which they provide to deal initially with outbreaks of fire on the premises. In addition, some industrial organisations with complicated high fire risk processes will wish to have their own works brigades because the initial attack on a fire has to be made immediately and also requires a more detailed knowledge of the processes than can be possessed by a local authority fire brigade.

Section VI Aerodrome fire and rescue services

1 Scale of protection to be provided at licensed aerodromes

- 1.1 The Fire and Rescue category of aerodromes shall be assessed whenever necessary in accordance with this paragraph on the basis of the preceding 12 months' traffic which shall be adjusted to reflect any change in the number of movements and types of aircraft expected. Where there is no record of past traffic, the category will be assessed from the estimated traffic likely to use the aerodrome in the three busiest months. The term 'movement' means a take-off or a landing, and the phrase 'number of movements' means the average number of movements per month for the three busiest months of the year. Only aeroplanes engaged in the public transport of passengers shall be counted.
- 1.2 The category of Fire Service and thereby the minimum quantities of media to be provided shall be that related to the heaviest weight category of aircraft using the aerodrome and whose number of movements is more than 150. The quantities of media shall be as specified in Table VI-1.
- 1.3 When the 'number of movements' in aircraft in the heaviest weight category is less than 50, the category of Fire Service to be provided may be one category less than would be required by paragraph 1.2 above.
- 1.4 When the 'number of movements' in the heaviest weight category is between 50 and 150, the quantities of media and discharge rates shall be not less than a figure mid way between the media provisions for the 'over 150' Fire and Rescue category and those for one category less.
- 1.5 When an out of hours movement takes place the normal Fire and Rescue Service is to be provided, except that if the concerned aircraft's maximum total weight authorised is less than the scale for which the aerodrome is licensed the quantity of media appropriate to the lower scale may be substituted. The appliances on watch are to be fully manned and in addition where appropriate ambulance cover should be available. These services should be maintained for a minimum period of fifteen minutes after the actual time of departure of an aircraft.
- 1.6 For licensed aerodromes where no public transport movements are expected the minimum level of provision shall be as given for Category I in Table VI-1. The board should be consulted on the fire and rescue requirements in cases where the aircraft weight is greater than 3,000 lb.

2 Guidance on fire fighting provisions

2.1 Foam liquid water solution

The quantities of foam liquid in Table VI-1 Column 4 are calculated on a foam liquid/water solution strength of 5 per cent which is suitable for most types of equipment. If the equipment requires a

* CAP 168 Licensing of Aerodromes, 2nd edition, 1971

Table VI-1

Minimum Quantities of Extinguishing Media Required

Fire Service category	Maximum authorised take-off weight of aeroplane	Principal agents			Supplementary agents		
		Water (gals)	Foam liquid (gals)	GPM water foam liquid solution	CO ₂ (lb)	or dry chemical (lb)	or approved vapourising liquid
I	2	3	4	5	6	7	8
I	3,000 lb. or under	30	5	20	25	30	Experience in the use of vapourising liquid is insufficient to permit precise quantities to be specified. However when such liquids are used in combination with foam they should be provided in amounts representing an extinguishing capacity at least equivalent to the amount of CO ₂ or dry chemical shown in the adjacent columns. Toxic vapourising liquids should not be used, but if this is unavoidable the degree of toxicity must be within acceptable limits.
II	3,001 to 6,500 lb.	100	5	40	50	30	
III	6,501 to 15,000 lb.	300	15	100	100	50	
IV	15,001 to 30,000 lb.	600	30	150	200	100	
V	30,001 to 60,000 lb.	900	45	200	300	150	
VI	60,001 to 90,000 lb.	1,300	65	250	600	300	
VII	90,001 to 120,000 lb.	1,800	90	300	1,200	600	
VIII	120,001 to 200,000 lb.	2,400	120	500	1,500	750	
IX	200,001 to 500,000 lb.	5,280	265	880	1,500	750	
X	Over 500,000 lb.	8,000	400	1,300	1,760	880	

higher solution strength then the quantity of foam liquid shown in Column 4 shall be increased to maintain the appropriate ratio with the water.

2.2 Supplementary agents

2.2.1 Dry powder agents to be employed in dual-agent applications shall be of a foam-compatible type.

2.2.2 When dry powder is the supplementary agent separate equipment should be available for engine starting fires. This equipment may deliver CO₂ or any other suitable agent and should be designed to be used with engines.

2.3 Extinguishing media

The required quantities of media shall be readily available. In addition a 200 per cent reserve of foam liquid and 100 per cent of supplementary agent shall be held in stores. These reserves must be stored in suitable conditions to minimise the risk of deterioration. Consignments should be used in order of delivery to avoid a prolonged shelf-life.

3. **Appliances**

- 3.1 The extinguishing media and rescue equipment shall be carried on one or more appliances each with a chassis capable of cross-country performance and capable of reaching any area within the airport boundaries. If these appliances are not self-propelled they shall be connected to a suitable towing vehicle whenever aircraft movements are taking place. The appliances shall be capable of carrying the fire and rescue personnel. Where an aerodrome licence is endorsed 'For night use' at least one appliance shall be provided with a suitable light to aid search and rescue operations in darkness. (Guidance on design features for cross-country appliances is given at Section VI appendix A.)

DAT Memorandum No 1/70

Memorandum from the Director of Aerodromes (Technical) Board of Trade Operations at airports with depleted fire services

- 1 This revised edition replaces Memorandum 3/69 issued in May 1969 and incorporates the Addendum issued in October 1969.
- 2 The following advice is for the guidance of the licensees and managements of civil aerodromes and is intended to ensure that operations involving the public transport of passengers are appropriately restricted when the fire service is seriously depleted and consequently unable to provide an adequate service in the event of an emergency. It provides for the circumstance in which the fire and rescue services are depleted partially or totally for any reason including their being committed to an accident or other incident from which they cannot disengage; or because the contents of the appliances have been discharged.
- 3 It is the responsibility of the aerodrome management to keep itself informed on the state of availability of the service and to take appropriate action when fire cover is depleted. This should include notifying pilots and operators of the deficiency and, when the depletion is serious, by restricting or suspending operations by public transport passenger-carrying aircraft until such time as adequate cover is again available.
- 4 The scale of fire cover required for licensing is set out in CAP 168 Section VI. There have been amendments subsequent to its publication; a recent revised draft promulgated by DAT shows the categories of aeroplanes as I to X, the latter being intended to cover the future jumbo jets. The categories are related to classes of aircraft, determined by maximum permissible weight. When the fire cover available is reduced by two or more categories below that required by the licence under the CAP 168 scale, aerodrome management should, subject to the exceptions in paragraph 4, initiate the following action.
 - (i) *Reduction of available fire cover by the equivalent of two categories*
The operation of public transport passenger-carrying aircraft within the category which determines the amount of fire cover required by the aerodrome licence, and aircraft of greater maximum permissible weight, should be suspended until adequate cover is again available. This means, for example, that an aerodrome at which fire cover is provided to category VIII requirements should suspend the operation of aircraft which come within category VIII or higher if the fire cover available falls to the equivalent of category VI.
 - (ii) *Reduction by more than two categories*
The restriction of operation of public transport passenger-carrying aircraft should be progressive, category by category. For example, in the case of the aerodromes quoted in (i) if the fire cover falls to the equivalent of category V the operation of aircraft which come within category VII or higher should be suspended.

(iii) *Available fire cover reduced to nil*

All passenger carrying public transport aircraft movements should be suspended.

What is stated in (i) and (ii) above is not intended to discourage aerodrome managements from taking earlier action or increasing the scope of the restriction if, having regard to the circumstances of the case, they consider this advisable.

5 Exceptions to paragraph 4 are:

- (a) the aerodrome should remain open for emergency landings.
- (b) aircraft should be permitted to land when, in the pilot's opinion a diversion or holding may be a greater potential hazard.
- (c) operations may be continued by aircraft which are not required by the Air Navigation Order to use only licensed aerodromes.

6 Promulgation of the decisions by aerodrome management should normally be through the NOTAM service and through Air Traffic Control.

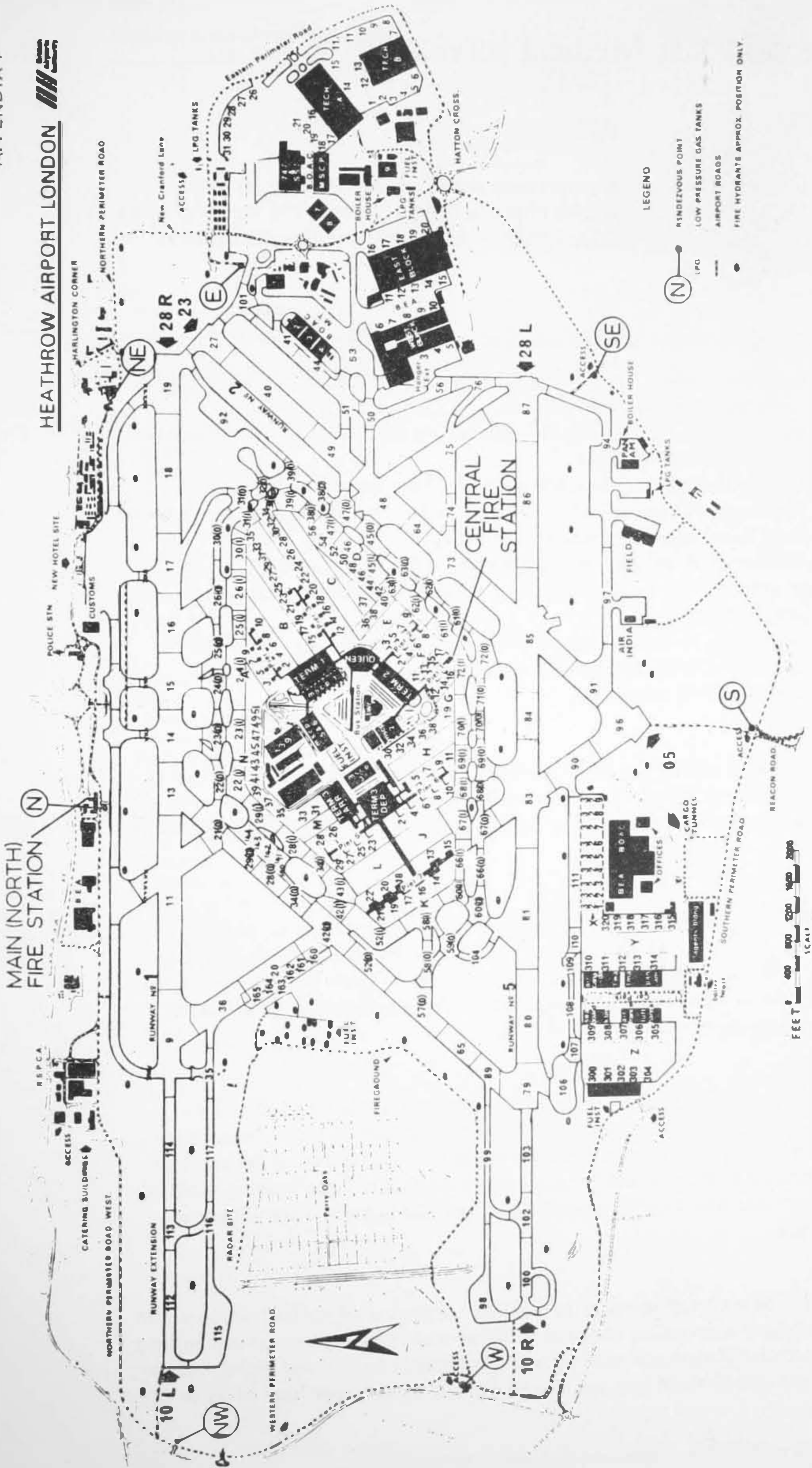
7 Messages passed from the aerodrome authority to Air Traffic Control for onward transmission to aircraft should be suitable for immediate relay to pilots. It should not be necessary for ATC to refer to tables in order to decide to which aircraft the message should be passed.

8 To meet this requirement the message should be along the following lines:

'Message from aerodrome/airport authority.
Aerodrome fire service depleted; take off/landing suspended, except in emergency, for all aircraft operating for the public transport of passengers with maximum permissible weight lbs or more'.

D F Peel
Director of Aerodromes (Technical)

HEATHROW AIRPORT LONDON



FEET 0 400 800 1200 1600 2000
 METRES 0 200 300 400 500 600

● HYDRANTS (approximate position only)

Section VII Medical services

1 At every aerodrome, arrangements shall be made whereby local practising doctors can be called upon to render assistance in the event of an aircraft accident and local hospitals to accept any resulting casualties at any hour.

2 Emergency orders shall be issued at each aerodrome which shall include:

- (a) arrangements for summoning medical assistance and local ambulances immediately an accident occurs;
- (b) arrangements for warning the appropriate hospital that accommodation for casualties is required;
- (c) the display in an appropriate position of the names, addresses and telephone numbers of the medical practitioners with whom arrangements have been made for attendance at accidents;
- (d) the display in an appropriate position of the names, addresses and telephone numbers of hospitals or medical establishments that will accept casualties;
- (e) the display in an appropriate position of the addresses and telephone numbers of ambulance stations that will provide facilities for the conveyance of casualties.

3 Unless an ambulance or ambulances from outside sources can arrive at the aerodrome within 15 minutes of being summoned an ambulance or other vehicle capable of conveying not less than two stretcher cases shall be provided on the aerodrome.

4 Where it is necessary for an ambulance or other vehicle capable of carrying casualties to be stationed on the aerodrome the driver shall be available during the hours that the aerodrome is open. If the driver is not qualified in first aid an additional person so qualified shall be available during the hours the aerodrome is open.

5 Medical supplies and equipment as shown in Table VII-1 shall be available on the aerodrome and arrangements shall be made for such of these as may be necessary to be conveyed by rapid means to the scene of an accident. They should be in charge of a nurse or other person qualified in first aid, who should be available during the hours the aerodrome is open.

6 To allow a small measure of flexibility provision of medical supplies and equipment appropriate to the next higher scale will not be required so long as occasional movements of aircraft appropriate to the next higher category do not exceed six in any one month, subject to an upper limit of 52 in any year.

* *CAP 168 Licensing of Aerodromes*, 2nd edition, 1971

Table VII-1
Minimum Scales of Medical Equipment

		<i>Category of aeroplane to be provided for</i>				
		<i>Scale 1</i>	<i>Scale 2</i>	<i>Scale 3</i>	<i>Scale 4</i>	<i>Scale 5</i>
		<i>maximum</i>	<i>maximum</i>	<i>maximum</i>	<i>maximum</i>	<i>maximum</i>
		<i>certifi-</i>	<i>certifi-</i>	<i>certifi-</i>	<i>certifi-</i>	<i>certifi-</i>
		<i>cated</i>	<i>cated</i>	<i>cated</i>	<i>cated</i>	<i>cated</i>
		<i>weight</i>	<i>weight</i>	<i>weight</i>	<i>weight</i>	<i>weight</i>
		<i>3,000 lb</i>	<i>3,001 to</i>	<i>30,001 to</i>	<i>200,001 to</i>	<i>over</i>
		<i>or under</i>	<i>30,000 lb</i>	<i>200,000 lb</i>	<i>500,000 lb</i>	<i>500,000 lb</i>
Bandages						
Elastic adhesive, 3 ins. by 3 yds.	Rolls	2	3	12	24	72
Crepe, 3 inches	Rolls	6	6	12	36	100
Loose woven, 3 ins.	Rolls	12	12	48	96	200
Triangular	No.	6	12	24	48	150
Dressings						
Medicated wound dressing, large size	No.	6	12	24	48	150
Medicated wound dressing, medium size	No.	6	12	24	48	150
Gauze, absorbent, 8 oz. packets	Pkts.	3	5	12	36	100
Adhesive plaster, zinc oxide, 3 ins.	Reels	1	1	4	12	50
Wool, cotton, absorbent 16 oz.	Pkts.	2	4	12	36	100
Miscellaneous						
Tablets, Aspirin, soluble	Tabs.	25	50	100	200	500
Salvolatile in screw-top bottle	Ozs.	1	2	3	6	12
Spirit, methylated or surgical	Pints	1	1	2	2	4
Tourniquets	No.	2	2	4	12	25
Pins, safety, curved	Dozens	2	4	8	24	50
Scissors, 6 inches	No.	2	2	4	12	30
Stretchers	No.	2	4	12	36	70
Blankets, single	No.	6	12	36	100	300
Bottles, rubber, hot water	No.	4	6	12	36	70
Bottles water, with sling and cup	No.	1	2	6	18	30
Antiseptic cream	Oz.	2	4	16	48	80

Hospitals' organisation

The following list, compiled by the North-West Metropolitan Regional Hospital Board, in conjunction with the South-West Metropolitan Regional Hospital Board, shows the 'designated' or 'supporting' hospitals which the ambulance services will use in the event of an aircraft accident at Heathrow Airport (see paragraph 117):

(A) *Designated hospitals or supporting hospitals*

<i>Straight line mileage from centre of airport</i>	<i>Hospital</i>
2	Ashford (Surrey)
4	Hillingdon
6	West Middlesex

(B) *Supporting hospitals*

<i>Straight line mileage from centre of airport</i>	<i>Hospital</i>
6½	Wexham Park (Bucks)
7½	St Peter's Chertsey (Surrey)*
8½	Kingston*
9	Central Middlesex
9½	Queen Mary's Roehampton**
10	Mount Vernon
10	Hammersmith**
10	Fulham**

* S.W. Metropolitan Regional Hospital Board

** Boards of Governors of Teaching Hospitals

Hammersmith Hospital is in the N.W. Metropolitan Region.

Extracts from The West Middlesex Hospital Major Accident Procedure

I Definition of 'major accident'

A 'Major Accident' is defined as follows:

- (a) in which the number of live 'casualties' to be handled is estimated to be in excess of 50 to 60.
- (b) which necessitates the despatch of one or more mobile medical teams to the scene of the accident.
- (c) in which more than one of the 'listed' hospitals (Appendix 'A') is likely to be involved in handling disaster casualties.

4 Raising the alarm

(a) Other than London Airport

The 'alerting' message will be prefaced with the words 'Major Accident'. The 'Designated' hospital will receive:

- (a) Brief details of the accident, the location and time;
- (b) the estimated number of casualties and type, if this information is available;
- (c) the names of any other hospitals which are being alerted to support the 'Designated Hospital'.

'Supporting' hospitals will receive the same information and will be told which is the 'Designated' hospital.

(b) London Airport

In the event of a major accident occurring at London Airport in the area of squares M, T or Z of the London Airport Crash Grid Map, West Middlesex Hospital would be the 'Designated Hospital' and the Port Health Medical Officer may ask for medical assistance at the scene of the accident. In other areas this hospital will be the 'Supporting Hospital'.

Action by co-ordinating officer (secretary)

- (a) Immediately pass the information to
 - (i) Consultant Orthopaedic Surgeon or Chairman of the Medical Committee or Vice-Chairman
 - (ii) Duty Consultant Physician who will act as Senior Medical Officer at the accident if West Middlesex Hospital is the 'Designated Hospital'.
 - (iii) If Mobile Medical Team required, the Orthopaedic Registrar, together with Duty Casualty Officer.
- (b) Request Telephonist to advise other officers as listed in paragraph (c) see page 5.
- (c) Organise transport for Senior Medical Officer at scene of accident and Mobile Medical Team (this is done by calling the ambulance service on a 999 call).
- (d) Establish Control Centre in Reception Office Out-Patient Department.
- (e) Instruct Ambulance Authorities to take other emergencies to other hospitals.
- (f) Obtain bed state from Bed Bureau.

- (g) Give instructions to the Duty Registrars and organise the evacuation of Ward C3 and other wards in readiness to receive casualties.
- (h) Delegate an administrative officer to arrange the transport of patients from the Accident and Emergency Department to the wards and the evacuation of patients from the wards if necessary.
- (i) Establish close liaison with Major Accident Officer, Senior Matron, police, Press Officer etc.
- (j) Organise in conjunction with departmental heads, the resources to deal with the anticipated number of casualties. Evacuation Centres are Sitting Rooms of Nurses Homes, empty beds on staff and other wards.
- (k) If requested by the Senior Matron, call in members of the Hospital Service Reserve and voluntary services, etc. (See Appendix D.)
- (l) If necessary notify Chaplains. (See Appendix D.)
- (m) Keep Senior Medical Officer at scene of accident informed of beds remaining for casualties by means of the Ambulance R/T Network via the Ambulance Liaison Officer or via land line to Ambulance Control.
- (n) On receiving 'Disaster Cancelled' message from Telephonist, the information should be passed to the Major Accident Officer and Telephonist etc. instructed accordingly.
- (o) To liaise with the officer from the Ambulance Service stationed at the hospital when necessary, eg. the co-ordination of arrangements to free hospital beds by discharging patients or transferring them to other hospitals.

**Action by Senior Medical Officer at the scene of the accident
(Duty Consultant Physician)**

Before leaving the hospital

1 On being advised by the Co-ordinating Officer notify the Duty House Physician and proceed with him to scene of the accident and take a copy of this document with you (spare copy in Major Accident Cupboard).

On arrival at the accident

2 Except London Airport assume immediate command of all the medical services.

3 Contact the Senior Ambulance Incident Officer who will be identified by a yellow top to his service hat (at London Airport, the Port Health Medical Officer) together with other services and make appreciation of the situation. If necessary summon mobile team(s) from designated and supporting hospitals (Appendix A) via the Ambulance Incident Officer who will contact the Base Control by radio to make the necessary arrangements.

4 Establish a Medical Services Report Centre at the Mobile Ambulance Control. This is a Land Rover with an equipment trailer. Both vehicles are painted white and bear the Ambulance Service markings. The Land Rover is surmounted with a blue flashing light which is flanked on both sides by orange flashing lights. These vehicles are provided with multi channel radio sets. They carry white coats for the doctors use.

5 Decide where the Casualty Post(s) is to be established which must be easily identifiable.

6 Report to Major Accident Officer, Designated Hospital as soon as possible through Mobile Ambulance Control an estimate of the number and type of casualties.

7 Formulate Casualty Evacuation Plan in collaboration with Senior Ambulance Officer.

8 Allocate duties to any additional doctors who reach the scene and to all helpers (eg. members of voluntary services) who offer assistance.

9 Arrange for the collection and return of medical equipment on conclusion of activities on site.

Action by Mobile Medical Team

1 The Mobile Medical Team will consist of

Orthopaedic Registrar
Duty Casualty Officer
Sister and 4 trained nurses

2 Assemble in Accident and Emergency Department and await arrival of ambulance vehicle for conveyance to scene of accident.

3 Collect key to Major Accident cupboard which is in glass box, Sister's Office, Accident and Emergency Department and help collect and load equipment hampers (as detailed in Appendix C) together with identification uniforms and wellingtons on transport which will be sent by the Ambulance Authority.

4 If already so instructed, proceed to the site of the accident. Otherwise, reassemble in Accident Department to await despatch.

5 At the site of accident, report to Senior Medical Officer at Medical Services Report Centre at the Mobile Ambulance Control. This is a Land Rover with an equipment trailer. Both vehicles are painted white and bear the Ambulance Service markings. The Land Rover is surmounted with a blue flashing light which is flanked on both sides by orange flashing lights. If the Mobile Team arrives before the Senior Medical Officer, the doctor in charge of the team will assume responsibility until the arrival of the Senior Medical Officer.

6 Establish a Casualty Post in accordance with the directions of the Senior Medical Officer on the site. (This should be in the vicinity of the Medical Services Report Centre and the Ambulance Loading Point).

7 Emergency clinical work will be carried out at the Casualty Post which will act as a filter to ensure that ambulance priority is given to the seriously injured and this may involve holding back slightly injured cases and treating them on the site if ambulance resources are limited.

8 Documentation of drugs given must be recorded on the labels provided and affixed to the patient.

Air Corporations Joint Medical Service

Aircraft Disasters

London Airport

1 Notification of an aircraft disaster — affecting any airline — will be received by Central Area Medical Unit which will act as the co-ordinating medical centre.

2 Central Area Medical Unit will immediately notify the doctor-on-call, PMO(AIR), DDMS and DMS in that order and prepare to receive casualties.

3 Central Area Medical Unit will inform other 24-hour units to stand-by or provide assistance as necessary.

4 The doctor-on-call, without waiting for further details, will proceed forthwith to the Central Area Medical Unit irrespective of the time of day or night. The doctor-on-call will use his discretion whether to proceed with any available nursing staff to the scene of the accident.

5 Under no circumstances should a 24-hour medical unit be left unmanned as casualties may be brought from any quarter.

6 The details of any passenger, whether injured or uninjured, brought to any medical unit must be notified immediately to the British Airports Authority Constabulary Control Room.

7 All medical units should also ensure that the details of any passengers are notified to the doctor-on-call at Central Area Medical Unit.

Aircraft Disasters

Outside London Airport/Overseas

1 Central Area Medical Unit will immediately notify the doctor-on-call, PMO(AIR), DDMS and DMS in that order.

2 The doctor-on-call should proceed to London Airport and be prepared to proceed overseas at short notice.

A S R Peffers
DDMS

From: Deputy Director Medical Services
To: See Distribution List
M.I.5

6th January, 1969

London Airport — Emergency procedures

In view of the changed function of certain medical units, and particularly the revised ambulance location (see 1(c) below) and control instructions, it is necessary to amend and simplify present emergency orders.

The various Standing Instructions are outlined in the BEA/BOAC Manuals on Aircraft Accidents, London Airport Station Orders, and General Staff Notices, but the salient points affecting medical staff are as follows:

1 Location of ambulances

(a) *British Airports Authority ambulances*

These are controlled by the British Airports Authority Fire and Ambulance Service and are located in the BAA Central and North side Fire Stations. If, in emergency, the BAA ambulance is ordered off the airport the Senior Sister Health Control Unit should be informed.

(b) *ACJMS passenger ambulance*

This is located in the BOAC MT Unit in the Central Area and may be used to cover any emergency notified to the Central Area Medical Unit when the 2222 emergency call procedure has not been used.

(c) *ACJMS occupational health ambulance*

As from 1st January, 1969, the occupational health ambulance will be located in the BOAC Fire Post in No. 1 Maintenance Area where it will be manned by Fire Section staff throughout the 24 hours.

2 Aircraft accidents/incidents at London Airport

Three categories of call may be notified to the Central Area Medical Unit:

- (i) Local standby
- (ii) Full emergency
- (iii) Aircraft disaster

No action is required by nursing staff for a local standby call. When a full emergency is declared, Central Area Medical Unit will ensure that a nursing sister is available to man the telephone for the duration of the emergency. No further action is necessary at that stage.

Aircraft disaster

1 Notification of an aircraft disaster — affecting any airline — will be received by Central Area Medical Unit which will act as the co-ordinating medical centre.

2 Central Area Medical Unit will immediately notify the doctor-on-call, PMO(Air), DDMS and DMS in that order and prepare to receive casualties.

3 Central Area Medical Unit will inform other 24-hour units to stand-by or provide assistance as necessary.

4 The doctor-on-call, without waiting for further details, will proceed forthwith to the Central Area Medical Unit irrespective of the time of day or night. The doctor-on-call will use his discretion whether to proceed with any available nursing staff to the scene of the accident.

5 Under no circumstances should a 24-hour medical unit be left unmanned as casualties may be brought from any quarter.

6 The details of any passenger, whether injured or uninjured, brought to any medical unit must be notified immediately to the British Airports Authority Constabulary Control Room.

7 All medical units should also ensure that the details of any passengers are notified to the doctor-on-call at Central Area Medical Unit.

8 Emergency medical kits are maintained at Central Area Medical Unit, OHU Speedbird House, and OHU (West).

3 Aircraft accidents/incidents outside London Airport/Overseas

1 Central Area Medical Unit will immediately notify the doctor-on-call, PMO(Air), DDMS and DMS in that order.

2 The doctor-on-call should proceed to London Airport and be prepared to proceed overseas at short notice.

3 After reporting at Central Area Medical Unit, the doctor-on-call should proceed as necessary to the BEA operations control centre or BOAC control centre.

4 Ground accidents or serious illness at London Airport involving BEA/BOAC personnel/passengers

(a) Reporting procedure

When BEA/BOAC staff or passengers are involved in an accident or taken seriously ill anywhere at London Airport, the person reporting the incident must dial 2222 on any BOAC or BEA telephone.

Such calls will be answered by the Board of Trade emergency switch-board operator who will state 'Emergency, which Service do you require?' For medical assistance the caller must reply 'ambulance'. After the emergency operator has obtained the name and extension number of the caller, the call will be relayed to the BAA Fire and Ambulance Service.

The caller must then repeat the request for an ambulance, stating the nature of the incident, giving the exact location and the number of persons involved.

All such 2222 emergency calls from BOAC and BEA extensions are monitored by BOAC Fire Control. All BEA 2222 calls are also monitored by ACJMS OHU|WEST located in the BEA maintenance base.

(b) Incidents in the BEA/BOAC Maintenance Area

On monitoring a 2222 call, BOAC Fire Control will:

- (i) Note details of the call and time received.
- (ii) Turn out the ACJMS ambulance to OHU Speedbird House, collect a nursing sister and proceed to the incident.
- (iii) Notify BAA Fire and Ambulance Service that ACJMS ambulance is attending, using the direct telephone line.
- (iv) Notify OHU Speedbird House giving all known details.
- (v) If call was received via BEA 2222 confirm with OHU West that they monitored the call.

(*Note: If for any reason the ACJMS ambulance or nursing sister is not available when a call is received BOAC Fire Post will notify BAA Fire and Ambulance Service that their ambulance is required, and notify OHU Speedbird House and OHU West accordingly. Whenever the BAA ambulance is used to attend BOAC/BEA staff in the Maintenance Area, BAA should be instructed to take the casualty to OHU Speedbird House or OHU West as appropriate.*)

(c) *Incidents in the North and Central Areas*

2222 calls in the Central Area and London Airport North should be actioned by the BAA Ambulance Service. They will normally take any casualty to the Health Control Unit in Queen's Building but if BEA/BOAC staff are involved, the Airport Authority watch keeper should notify Central Area Medical Unit.

Where the correct 2222 procedure is not followed and such incidents are reported direct to Central Area Medical Unit, the duty sister will use her discretion whether to use the ACJMS passenger ambulance or dial 2222 for the BAA ambulance.

5 National Health Service ambulances

When a National Health Service ambulance is required to transport a case from London Airport to hospital, medical units will be responsible for calling the outside ambulance.

A list of all appropriate NHS ambulance numbers should be kept in all ACJMS units at London Airport.

6 Emergency store/equipment

Some emergency medical equipment will continue to be located in the medical store on the 4th floor of Technical Block A, outside the former OHU in the centre of the building. The key will be attached to the emergency medical kit held in OHU Speedbird House to deal with such calls.

In the BEA Maintenance Area, there are 12 stretchers and 24 blankets held in the Main Stores which is adjacent to the OHU West and is open for 24-hours per day.

7 Serious or fatal accidents/illness

In the event of a fatal accident or illness, authority to move the body/bodies rests with the police and any such occurrence should be notified immediately to the British Airports Authority Police Control Room.

The same action should be taken if any individual dies after having been brought to a medical unit and resuscitative measures have failed.

It would be the responsibility of the police to initiate any further action necessary.

The sister on duty, in the event of serious or fatal accident/illness, will notify:

- (i) The Personnel Manager/Officer concerned.
- (ii) The doctor-on-call.
- (iii) The appropriate PMO/or deputy who will advise DMS or DDMS.

A S R Peffers
Deputy Director Medical Services.

Assistance

In assessing the severity of the incident the Police Incident Officer will consider what assistance is required at the scene and elsewhere. This may include:

- (a) Transport to remove uninjured persons, dead bodies and property.
- (b) Fire Service — heavy lifting gear etc.
- (c) Ambulance Service — extra blankets and stretchers.
- (d) Hospital Emergency Teams — police escort may be required.
- (e) Local Doctors.
- (f) St Johns Ambulance Brigade and British Red Cross Society.
- (g) Lighting — floodlights from Specially Equipped Traffic Accident cars etc.
- (h) Electricity and Gas Boards where mains supplies are involved.
- (i) GPO — installation of extra lines; mobile call office etc.
- (j) British Railways — train involvement.
- (k) Local Authority — high-rise buildings involved.
- (l) Public Address Equipment.
- (m) Ropes and signs for crowd and traffic control and diversions.
- (n) Photographers — (official not Press) in cases of incendiarism, bombs etc.
- (o) Mobile Police Station for protracted incidents.
- (p) Wireless Control Vans and Area Communications Officer to assist in protracted incidents.
- (q) Customs and Excise Officers where international travel is involved.
- (r) Veterinary Surgeons (animals in transit).
- (s) Military Aid — serious flooding; evacuation; crowd control etc.
- (t) Local Borough Emergency Corps in shoring up buildings etc.
- (u) Press Bureau Liaison Officer.
- (v) Mobile Canteens and Womens Royal Voluntary Service.
- (w) Protective clothing for officers handling bodies etc.
- (x) Police Aid from Special Patrol Group; CID Officers and other Divisions or Forces.

(Note: Requests at (b) to (f) above are made through the respective Fire or Ambulance Incident Officer.)

Action taken by the British Airports Authority at Heathrow subsequent to the accident to Boeing 707 G-ARWE

1 Selected fire appliances have been fitted with additional R/T equipment on the Air Controller's frequencies (118.2 m c/s and 118.5 m c/s). This enables the fire appliance crews to get clearance for crossing runways direct from ATC instead of as hitherto calling up the watchroom attendant.

2 Loudspeakers connected to the crash line have been installed in the duty Fire Officer's office and in the men's quarters. This enables the duty Fire Officer and the men to receive details of an incident at the same time as they are received by the watchroom attendant.

3 The internal fire alarm system has been modified and a siren substituted for the alarm bells for use only in the event of an aircraft incident.

4 A new console desk is being provided in the watchroom in the main Fire Station in order to achieve a more efficient layout of communications equipment.

5 New arrangements are in force which provide for marshalling vehicles to assist the BAA police in leading outside services to an accident on the aerodrome.

6 Improved training facilities have been provided at Heathrow so that the firemen can have more frequent and realistic 'hot' fires practices.

7 Fire hydrant maintenance has been improved. All hydrant outlets have been reamed out to remove all traces of paint and wear. An improved liaison between the Fire Service and the Engineers at Heathrow ensures that delays in reporting hydrant faults and their rectification are kept to an absolute minimum.

8 Two changes in the command structure have taken place:

- (a) The former Fire Officer-in-Charge is now at Head Office as full-time Deputy to the Chief Fire Officer and the Fire Officer-in-Charge at Heathrow no longer has extraneous responsibilities.
- (b) The Sub-Fire Station is now commanded by a Section Leader instead of a Leading Fireman. There is also a Section Leader at the main Fire Station and an AFO11 in overall charge.

9 Additional and larger fire appliances have increased the amounts of water and foam compound available.

10 The practice of using a man from a fire appliance to act as a duty driver has been discontinued.

11 Additional breathing apparatus equipment has been provided.

12 Hose testing procedures have been revised.

13 The Authority has one-piece fire resistant garments under test.

14 Arrangements have been made with most of the main user airlines for them to switch to the Fire Service radio frequency (130.5) in the event of an emergency affecting one of their aircraft. This establishes immediate communication between the aircraft Captain and the Fire Officer-in-Charge.

15 A sophisticated 'Incident Indicator Board' has been constructed in the Appliance Room of the main Fire Station. It takes the form of a display of the airport, and by illuminating selected areas and with signals the location of an incident is visually presented to personnel as they man their appliances.

16 To eliminate the possibility of a delay a new system of communications with the London Fire Brigade has been installed and is in use. Under this system a visual and audible signal in the London Fire Brigade's Control Room operated from the BAA Fire Station indicates that the BAA Fire Service has received a crash alarm.

17 Enlargement of the Central Fire Station.

(Source: BAA Fire Service)

Acknowledgements

The Chairman wishes to thank the members of the team for the unstinting effort that they found time from their normal duties to devote to the Working Party's studies. These took longer than expected because of the complexity of the subjects and the detail in which they were examined.

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