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No 8 of 12

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REPORT OF AN INSPECTION OF

THE NEW AERODROME AT

PORT STANLEY, FALKLAND ISLANDS

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Appendix: CAA Fire Service comment upon the Fire Equipment to be provided for Stanley Airport

- 3.3 Taxiway length: 105 metres
width: 15 metres
surface: asphalt
- 3.4 Apron length: 84 metres
width: 40 metres
area: 3360 sq. metres
surface: asphalt
- 3.5 Strip length: 1370 metres
width: 150 metres
surface: grass on sand and peat
- 3.6 Clearways At both runway ends:

length: 265 metres
width: 150 metres

3.7 Declared Distances

Runway 08:	Take-off Run Available	1250 m.
	Emergency Distance	1250 m.
	Take-Off Distance Available	1515 m.
	Landing Distance Available	1250 m.
Runway 26:	Take-Off Run Available	1250 m.
	Emergency Distance	1250 m.
	Take-Off Distance Available	1515 m.
	Landing Distance Available	1250 m.

- 3.8 Aerodrome Elevation
- | | |
|------------------|-----------|
| Reference point: | 23 metres |
| Threshold 08 | 21 metres |
| Threshold 26 | 23 metres |
| Overall Slope | 0.16% |

- 3.9 Pavements Design Strength Load Classification Number (LCN) 16
(Load Classification Group (LCG) 5)

4 Runway Condition

- 4.1 The runway has been subjected to major remedial works since it was first constructed and surfaced; the surface therefore presents a patchy appearance. Although the quality of the finish of the Marshal Asphalt surface is somewhat variable over the runway, the surface as a whole is acceptable. The runway is smooth to manoeuvre on, and appears to shed rainwater satisfactorily. The transition from runway to strip at the runway edges and ends is acceptable.
- 4.2 Pavement bearing strength tests now being completed indicate that the actual bearing strength will be considerably in excess of the design pavement strength: there is no reason to doubt the accuracy of these tests. It is estimated, conservatively that the runway will fall within Load Classification Group 5.

- 4.3 The runway is satisfactory for the unlimited operation of Fokker F.27 aircraft, and other aircraft in this class (eg HS-748 aircraft). It is also considered that the runway will be satisfactory for the operation of F.28 type aircraft, at the limited operating weights which would be imposed on the aircraft by the runway length; these restricted weights should allow for a maximum pay-load operation into Stanley from Comodoro Rivadavia, and the probability of at least a maximum passenger load out of Stanley.
- 4.4 Runway markings are satisfactory: they comprise runway designators (08 and 26) runway threshold and centre-line markings. A wind direction indicator is also installed, adjacent to the runway.

5. Aerodrome Strip

- 5.1 The strip area (ie the graded and levelled area of ground in which the runway is contained) consists of sand with a small mixture of peat within the top surface layer to ensure good grass seed germination and growth. The strip has been sown with grass sprayed with a thin bitumen emulsion which is designed to secure the sandy surface against erosion while grass is growing. The grading and seeding of the strip has been completed, with the exception of the strip end at the eastern end of the runway, where work is still in progress: grass growth is still in a very early stage, but the grass germination and ground cover seems to be very successful.
- 5.2 The overall condition of the strip appears to be satisfactory. There are areas, especially on the outer limits of the strip, where some subsidence has occurred and ponding was apparent; the Consultant's resident engineer, however, advised that these areas will be made good and re-seeded. The surface of the grass area is still soft, but limited movement on the surface by a Land-Rover (the movement was limited by the need to avoid excessive disturbance of the surface while the grass is still not yet established) indicated that the surface should be capable of safely carrying an aircraft. It is possible that some rutting of the surface might result, but this should be fairly easily remedied by rolling, and there is no reason to suppose that the strip surface will not be satisfactory.

6. Taxiway and Apron

- 6.1 The general condition of the taxiway and apron pavement areas was satisfactory for operational use. The transition from taxiway to strip, and apron to natural surface areas, was firm and appears to present no hazard.

7. Obstructions

- 7.1 There are no critical obstructions in the approach and take-off areas: the Consultant is collecting data for the preparation of an ICAO Type A obstruction chart.

8. Aerodrome Drains

- 8.1 The strip is bounded along its entire length (except where it is crossed by the taxiway) by open drains located 150 metres from the runway edges:

open drains are also located on either side of the taxiway and apron. The sides of the drains are lined over about half the total depth with concrete lining slabs, with the natural sandy surface over the upper part of the side of the drain. This upper surface has been grassed, but the grass is not yet fully established or capable of binding the surface against erosion; there is consequently some erosion of the drain sides in localised areas. The contractor has taken measures to abate erosion in these areas, but it seems likely that there will continue to be some erosion of sand from the drain sides into the drain channel until grass is fully established. The degree of erosion and the amount of sand seeping into the drains are not likely to be so severe as to significantly reduce the function of the drains, but taken together with the probable drift of wind-blown sand into the drains, a steady and continuous programme of drain clearance will be required. Once Completion Certificates in respect of the strip and the drainage system have been authorised, responsibility for this task will rest with the aerodrome operator. The aerodrome operator will in any case have to maintain a drain-clearance programme in respect of sand ingress from sources other than erosion of the drain banks, which would also take care of the eroded sand, and the contractor will also have to make good any significant bank erosion; it is recommended that some arrangement should be made for immediate holding action to be taken by the contractor at all significant erosion points, whenever the erosion occurs during the maintenance period, to prevent any major deterioration of the drain sides which would in turn call for increased maintenance by the aerodrome operator after the contractor's responsibilities have been completely discharged.

9 Communications and Navigation Aids

- 9.1 These were the subject of an earlier specialist inspection carried out by Mr P G Hutton in April 1977. The telecommunication service had then been found satisfactory for introduction in operational service, subject to completion of 2 outstanding items of work, viz, a modification to ensure compatibility between the SSB H/F ground/ground receivers at Port Stanley and the DSB equipment in use in Argentine; and a deficiency with the transmitter keying systems. Neither of these items had been rectified at the time of this general aerodrome inspection, although arrangements have been made (through Cable and Wireless and with the assistance of the Civil Aviation Authority) for the deficiencies to be made good.
- 9.2 Although the 2 deficiencies were still outstanding, tests were made from the airport terminal operations room console on the 2 primary HF frequencies 5703 Mhz and 5573 Mhz. Satisfactory contacts were made with Ezeiza ACC, Bahia Blanca ACC, and Comodoro Rivadavia ACC. There was some considerable delay between requesting, by telephone, a change of frequency and actually having the frequency available on the console. It is felt that this was due to slow reaction by staff at the transmitter/receiver stations, and can probably be resolved by agreed procedures with Cable and Wireless at Port Stanley; the need to make such HF frequency changes is not, in any case, likely to be critical in current operating conditions.

- 9.3 Satisfactory air tests were made of the VHF air/ground frequency, and of the aerodrome locator non-directional beacon. No further checks, beyond those carried out by Mr P G Hutton and by LADE aircraft, were made of the long-range non-directional beacon; the tests already carried out are considered to have established the acceptability of this facility.
- 9.4 It is considered that all the telecommunications and radio-navigational aids, as presently installed, could now be brought into operational use; the use of the telecommunications facilities need not wait upon completion of rectification (now in hand) of the two deficiencies referred to in paragraph 9.1.

10 Aerodrome Lighting

- 10.1 Aerodrome lighting comprises a VASI system serving the main landing threshold at Runway 27, and portable Metalline lamps for runway edge lighting. The lighting is not intended to provide for regular night flying operations, but to assist landings in poor visibility or the emergency conditions of a delayed aircraft, as well as for take-offs in twilight conditions for delayed aircraft. The VASIS glide slope is set at 3° , which should ensure that landing aircraft cross the threshold at an acceptable height and do not touch down short of the runway. LADE pilots are relatively inexperienced in the use of the VASIS equipment, but should have no difficulty in accommodating to the 3° glide slope.
- 10.2 Ground checks were carried out on the VASIS installations using the check stick, and found to require only fine adjustment on the outer boxes of three of the units.
- 10.3 Flight checks were made using the FIGAS Beaver aircraft, in conditions of poor visibility and low broken cloud, from an altitude of 1500 ft, using VASIS settings of 100% and 30% brightness. The effective range of the VASIS light units and the azimuth spread was satisfactory; the intensity control worked effectively, and the colour change was satisfactory.
- 10.4 In the wet conditions which prevailed on the aerodrome strip area during this inspection, some of the concrete slabs in which the VASIS units are mounted, stood immersed in wide puddles of water; it is suggested that drainage should be improved at these positions to ensure that the concrete mounting slabs are not constantly standing in water; the Resident Engineer was so advised.

11 Fire and Rescue Services

- 11.1 The provision of fire and rescue services has been considered on the basis of the aircraft operating into Stanley, the amount of traffic, and the physical conditions of the aerodrome and its surroundings.
- 11.2 The critical (and only) aircraft operating at present is the LADE F27 Friendship; traffic is limited to two movements per week. The fire cover requirements, on the basis of this aircraft and the limited number of movements, fall within Category 3 in the ICAO/CAA fire cover scales (the latest CAA and ICAO scales

- are now virtually identical): Category 3 calls, in terms of the fire fighting media to be provided (and assuming that fluoroprotein foam is used) for appliances carrying 270 gallons of water for foam production and 300 lbs of dry chemicals.
- 11.3 References have been made to the possible use of F28 aircraft at Stanley. If this aircraft came into service, to supplement or to replace the F27 at the present low frequency of operations, the fire cover required would rise to Category 4, requiring appliances carrying 550 gallons of water and 300 lbs of dry chemical. The LADE representative of Stanley advised that it was unlikely that the F28 would be brought into service at Stanley until traffic warranted its use. It is suggested, however, that any increase in traffic at Stanley would be better served by an increase in the frequency of F27 services into Stanley rather than by maintaining a low frequency service using the bigger aircraft.
 - 11.4 While considering the scale of fire cover requirements, and in view of the uncertainty of traffic development at Stanley, it may be of interest to note that if F.27 movements remained static and if local light aircraft traffic increased as a result of the introduction of the new aerodrome, or from any rearrangement of the FIGAS fleet to include light single or twin engined land-planes, so that there resulted a wide difference between the size of aeroplanes taken account of in assessing aircraft movements, it is conceivable that, on the basis of ICAO guidance material, the fire cover could be reduced down to Category 2, requiring only 150 gallons of water and 200 lbs of dry chemical media.
 - 11.5 The fire and rescue equipment currently available at the temporary aerodrome consists only of one "Firefly" Land-Rover foam tender, and can be regarded as providing no more than a token fire service capable of dealing with minor incidents such as engine starting fires or tyre or brake failure fires.
 - 11.6 The equipment now being provided is intended to give Category 3 fire cover; when the equipment becomes available, the aerodrome fire service will comprise the present "Firefly" Land-Rover and a "Red Wing" Land-Rover appliance two 250 gallon water tankers to be towed by the Land-Rover appliances, and a further emergency equipment/secondary media trailer, to be towed by a Land Rover.
 - 11.7 Providing that fluoroprotein foam is used, these appliances, providing 575 gallons of water/foam and 100 lbs of secondary dry chemical media, more than meet the primary water/foam need for Category 3, but fall short in terms of dry chemical media (by 200 lbs).
 - 11.8 The Land-Rover appliances, towing tank trailers, do not meet CAA performance requirements in terms of acceleration or cruising speed. However, having regard to the relatively small size of the aerodrome, the location of the apron where the appliance will stand, and to the surface that should exist in the strip area, it is considered that these appliances should be able to reach any incident within the aerodrome movement area limits within the recommended three-minute response time; the acceleration and speed deficiencies are therefore less significant than they would otherwise have been.

- 11.9 The specification and design of the appliances and their fittings and equipment fall short of the optimum that could have been achieved, and as a result the potential operating efficiency of the appliances has been reduced. It is estimated that it will require at least eight men to achieve a significant level of operational efficiency using two Land-Rover appliances and water tanks, where with different fittings and design a higher level of efficiency could be achieved employing only four men. Comments on the technical efficiency of the appliance design and equipment, from the CAA Fire Service, with a recommendation for the improvement of the appliances, are contained in Appendix to this Report.
- 11.10 In view of the limitations of the equipment being provided, it is essential that the personnel manning the appliances should be sufficiently well-trained to get the utmost benefit from this equipment. It is recommended that, in addition to sending personnel to a mainland centre for basic training in the specialist techniques of fighting aircraft fires, consideration should be given to a visit to Stanley by a CAA fire training officer, for a period of at least one week, to lay down procedures, and to instruct local staff, to ensure that the best use is made of the equipment now being provided.
- 11.11 This equipment, while not fully meeting the desired standards in terms of secondary media and operating efficiency, does nevertheless provide a substantial improvement over the fire and rescue services that have hitherto been provided for current flight operations. The deficiencies should not be allowed to delay the opening of the new aerodrome to all operators, as soon as the equipment is available at the aerodrome and personnel manning the appliances are competent in handling the equipment, provided that full information on the fire and rescue services at the aerodrome is made available to all potential aircraft operators.
- 11.12 Although the Land-Rover appliances, with the towed water tanks, should be able to manoeuvre adequately over the improved surfaces within aerodrome limits, they will be in difficulty in moving over the difficult terrain beyond those limits; any heavier major appliances that might be provided for eventual Category 4 operations would almost certainly be in similar difficulties. The difficulties of operating appliances beyond the limits of the aerodrome manoeuvring areas should be met by laying out suitable tracks, or the construction of emergency roads, suitable for occasional use of heavy vehicles, especially in the over-shoot and under-shoot areas along the extended centre-line of the runway.
- 11.13 In considering the need for improved or additional fire appliances at the aerodrome note should be taken of the recommendations made by Mr D T Davies in his recent "Report on Fire Fighting Services in the Falkland Islands". A recommendation was made for the immediate provision of a major appliance to serve both the town requirements and those of the aerodrome. When implementing this recommendation, consideration should be given to an appliance designed by the CAA for us in the Scottish Highlands and Islands aerodromes. The appliance as presently designed carries 650 gallons of water/foam and 200 lbs of chemical media, with performance considerably better than that specified in the CAA/ICAO recommendations. The design and specification of such an appliance could be adjusted to meet the special requirements in the Falklands, to ensure that the aerodrome requirements are fully covered, and to co-ordinate the design and specification of a new appliance with existing equipment at Stanley. Construction time for such an appliance is of the order of nine months, and the present cost is approximately £50,000.

- 11.14 All the appliances should be in a state of manned readiness whenever flight operations are in progress at the aerodrome.
- 11.15 The deployment of the Zodiac rescue boat should take account of the situation of the aerodrome in relation to sea areas, the availability of other boats suitable for sea rescue, and the practicability of launching and operating the boat in the sea areas adjacent to the aerodrome.
- 11.16 The aerodrome is situated with approximately 1300 metres of ground between the western (take-off) end of the runway and Port Stanley Harbour, and approximately 2350 metres of ground between the eastern (landing) end of the runway and the sea; it seems reasonable to assume that the possibility of an aircraft undershooting on the approach to such an extent that it would land in the sea is fairly remote, and that there is a greater likelihood of an aircraft losing an engine at take-off and landing in the harbour.
- 11.17 If the Zodiac were to be located for use on the Cape Pembroke coast it would be necessary to establish a boat station with a launching position, and with an access road to the boat station; it does not seem practicable, in present conditions, for the boat to be stored on the aerodrome and towed out to the coast whenever the need might arise.
- 11.18 If it is possible to organise a satisfactory boat rescue service using craft already available in the harbour, under the authority and direction of FIGAS staff at the float-plane base, consideration could be given to locating the Zodiac at a base on the Cape Pembroke coast; the Zodiac should otherwise be positioned in Stanley Harbour. However, a final decision on the deployment can only be made locally in the light of local experience, especially in terms of sea states and the practicability of launching and operating in the open sea.
- 11.19 An emergency plan should be prepared, co-ordinating the aerodrome rescue services with those available from other sources, including the hospital services, the police and the military forces.

12 Security

- 12.1 The aerodrome should be fenced to exclude cattle, and unauthorised persons from using the runway as a motor-cycle track when the aerodrome is closed, in order to avoid damage to aerodrome installations (VASIS boxes, aerials, etc). It is also suggested that the aerodrome should be patrolled or inspected during non-operational hours by Police or Royal Marine patrols.

13 Services, Staff and Organisation

- 13.1 Permanent aerodrome staff consists only of an Airport Superintendent, Mr Bala Kanagasabai, and a Deputy Airport Superintendent, Mr Gerald Cheek. Mr Kanagasabai is both an experienced airport administrator and air traffic controller. Mr Cheek has recently undertaken comprehensive training in both air traffic control and airport management, in the United Kingdom.

- 13.2 Because of the present low level of traffic at the airport there is no provision for an air traffic control service at Stanley Airport, and having regard to expected traffic development, it is not expected that any provision will be made for such a service for some considerable time; an air traffic advisory service only is provided. This service can be provided by the present 2 officers, supported, where necessary in times of emergency or sickness, by FIGAS Officers already experienced in providing such information for FIGAS operations. While these arrangements are adequate for current operations and for the immediate future, if traffic does unexpectedly develop significantly there will be a need for further recruitment and training of personnel to provide air traffic advisory service, and, eventually, an air traffic control service.
- 13.3 At present, a LADE representative (who has air traffic control experience) assists in passing air traffic information messages to LADE aircraft, in Spanish, since few LADE pilots speak English. It is unlikely that LADE will wish to provide such assistance to other aircraft and although the aerodrome may be notified as providing air traffic services only in English, it may be difficult in practice to restrict operations only to aircraft having English speaking pilots. There is also the possibility that a message passed from the operational staff at Stanley, through a Spanish interpreter, may not in fact carry the precise meaning that was intended by the person originating the message: such a possibility would be particularly significant in any future development where a positive air traffic control service may be provided. It is suggested that consideration may have to be given to the eventual provision of bi-lingual air traffic service personnel at Stanley Airport, if non-English speaking pilots use the airport in any number.
- 13.4 Adequate arrangements are being made with Cable and Wireless Ltd. for the maintenance of the telecommunications, radio-navigation equipment and VASIS equipment.
- 13.5 The present arrangements for the attendance of Customs and Immigration officers should be continued at the new aerodrome, and arrangements made for the extension of these arrangements to cover any increase in international air traffic.
- 13.6 Arrangements will have to be made, probably in association with the Superintendent of Public Works, for the maintenance of the runway, taxiway and apron, the grassed areas of the strip, the drainage system, and the airport buildings, including fences. The greater part of this work in the immediate future will consist of regular clearance of the drains of wind-blown and eroded sand, and routine grass-cutting in the strip areas; it is unlikely that any significant work will be required for some considerable time on the runway, taxiway or apron, or on the aerodrome buildings.
- 13.7 It is suggested that staffing at the aerodrome (other than management staff) should consist of a nucleus of 5 maintenance workers, employed generally upon drain clearance, fence repair, painting and other general duties: all of these workers should be fully trained in the operation of the aerodrome fire appliances. Such a nucleus would allow for the manning at any time of at least one of the Land Rover Fire appliances. This nucleus of fireman/maintenance men would need to be supplemented as required by flight operational requirements to

ensure that sufficient trained fire personnel are available at the aerodrome to man all the fire appliances. In considering how this may be done account could be taken of the attendance of police or customs officers; such officers, however, would of necessity have to be competent in the operation of the fire equipment, and have practised as a team in the operation of the equipment.

14 Terminal Building

- 14.1 The operational area of the Terminal Building (ie the Operations Room on the first floor) is adequate for current requirements, subject to minor modifications and improvements. The lighting requires modification to prevent glare reflecting back from the windows during periods of low external ambient light; the ATS console requires a separate source of illumination controllable from the desk panel. There are also requirements for an Aldis light, with red and green filters, a Very pistol with red and green cartridges, and a barometer to enable aircraft to be advised of the current barometric pressure at the aerodrome.
- 14.2 The Operations Room, and the location of the ATS communications console in the room, are adequate for current operations, and for operations in the foreseeable future, where an air traffic advisory service only is being provided. Depending upon the extent to which air traffic develops at Stanley, it may eventually be necessary to provide an air traffic control service at the aerodrome; this would require the re-location of the control/communications console in a visual control room having a 360° field of vision. This could be provided by the construction of a visual control room on top of the present Operations Room; alternatively, depending upon the circumstances prevailing a separate control tower could be constructed.

15 Meteorological Services

- 15.1 Adequate meteorological services, including the provision of route forecasts, are currently provided and will continue to be provided by the Stanley Meteorological Offices.

16 Aeronautical Information Services

- 16.1 Details of the aerodrome should be notified internationally through an Aeronautical Information Publication (AIP), and arrangements made for the issue and receipt of Notams.
- 16.2 Notification could be made by the Falkland Island Government through a Falkland Island Aeronautical Information Publication (AIP). This would require some expenditure in preparation and printing, and would also impose an obligation to provide an AIP amendment service, the distribution of Class One Notams (telegraphic distribution) Class Two Notams (postal distributions) and Information Circulars. As the Falklands Islands are situated within the Ezeiza Flight Information Region, some co-operation with Argentina would be necessary in the preparation of those sections of the AIP where interests and responsibilities overlap, such as Air Traffic Rules and Services, and Search

and Rescue Services. Co-operation with Argentina will also be necessary to ensure receipt of Notams relevant to Falkland Islands traffic.

- 16.3 The Civil Aviation Authority (Aeronautical Information Service) could, on behalf of the Falkland Islands Government, undertake the preparation and production of a Falkland Islands AIP and might be prepared to co-ordinate the supporting service and act as information distributor for the Falkland Islands Government. To indicate the possible cost of such work, the Authority has recently prepared an AIP for Brunei at a cost of £5250 excluding printing and distribution; if the Authority also provide supporting services - amendments, distribution of Notams and Circulars - a small annual charge related to the volume of message traffic would be made.
- 16.4 An alternative method of providing this service would be to arrange with Argentina for the provision of a joint service, as stated in ICAO Annex 15 (Aeronautical Information Services) Chapter 3, para 3 1 1 (b). This would mean in effect that details of Stanley Airport would be collated and published in the Argentine AIP by the Argentine Aeronautical Service. This would also accord with ICAO Annex 15 Chapter 3, para 3 1 1 1 which states that "an aeronautical information service shall collect, collate, edit and publish aeronautical information service concerning the entire territory of the State as well as areas in which the State is responsible for air traffic services outside its territory . . ."; as already stated, the Falkland Islands are situated within the Ezeiza Flight Information Region, where air traffic services are provided by Argentina. In view of the international organisation of air-traffic services, including communications services, in this region of the world, there can be no doubt that this alternative arrangement would be practical and efficient, in the Civil Aviation sense.
- 16.5 However, because of the special political situation which prevails concerning the status of the Falkland Islands, it is proposed that guidance should be sought from the Foreign and Commonwealth Office concerning the desirability of entering into any such arrangements with the Argentine authorities.
- 16.6 In the event of any delay in reaching a decision concerning the method of publishing internationally details of the new aerodrome, to such an extent that opening of the aerodrome to general traffic might be delayed, interim and temporary arrangements could be made through the United Kingdom AIS for the publication of a Notam on behalf of the Falkland Islands Government, or alternatively a Special Notice could be published in a convenient issue of UK Notams: such a Notam or Special Notice could notify all details of Port Stanley. Such an arrangement would require that firm procedures should be organised for cable communications with the UK AIS to support any Class One Notam action that might subsequently be required.
- 16.7 Any difficulty in publishing details of the aerodrome in an AIP need not delay the opening of the new aerodrome to LADE operations; adequate facilities already exist for the provision to LADE of operational information concerning the aerodrome. Similarly, delay need not affect the opening of the aerodrome to internal light aircraft traffic.

AppendixCAA FIRE SERVICE COMMENT UPON THE FIRE EQUIPMENT TO BE PROVIDED FOR STANLEY AIRPORT

- 1 The provision of a new 'Redwing' Land-Rover and two 250 gallon capacity trailer water tankers to complement the existing 'Firefly' Land-Rover should provide adequate water for foam production, using fluoroprotein or fluorochemical foam liquid, to provide fire cover for movements of the F27 SRS 100-300 aircraft. However, on both these Land-Rover/trailer units the foam production facilities are poorly conceived for aircraft fire fighting. The information available on these units is limited but opinion on each unit is offered as follows:

'Firefly' Unit

- (i) The suction hose should be connected between tank and pump prior to any aircraft movement unless it can remain permanently connected.
- (ii) The fact that the foam branches are fitted with 'dip-tubes' means that the branch operators are limited in movement to the limits of the dip-tubes when producing foam.
- (iii) To produce foam without appreciable delay two men would be required to operate the foam branches, another two to position foam liquid cans (weight approximately 60 lbs. each) at the branch positions and a fifth man to operate the pump. This unit can only be considered operationally inefficient and wasteful of manpower.

'Redwing' Unit

- (i) The suction hose should be connected between tank and pump prior to any aircraft movement unless it can remain permanently connected.
- (ii) The Mechanical Foam Generators should be connected to the pump outlets and hose and branches connected to the mechanical foam generators. If it is not convenient to move the unit with the foam generators connected to the deliveries this operation could be done immediately on preparing for foam production.
- (iii) Two men would be required to operate the branches and a third man would need to position foam liquid cans and insert the pick-up or dip tubes in the cans and operate the pump.
- (iv) This unit when operated by three men would be fairly efficient but as 'made' foam instead of water/foam liquid solution is pumped through the delivery hose, operations are limited to within two hose lengths of the unit.

- 2 It is recommended that both Firefly and Redwing Land-Rovers are fitted with a foam liquid tank of approximately 18 gallons capacity, a simple round-the-pump foam inductor, valve, etc and each unit provided with a 10X foam-making branch pipe. By this means each appliance would be capable of quickly and efficiently discharging 1,000 g.p.m. of foam when crewed by two men.

- 3 The Land-Rover/trailer units will each gross approximately 10,000 lbs. With the standard four-cylinder engine neither of the units is likely to achieve the CAA/ICAO recommended acceleration of 0 to 50 mph in 45 seconds.
- 4 There still appears to be some deficiency in secondary extinguishing media, partially overcome by the provision of the emergency trailer carrying 50 kgs of dry powder.