1623493 BIRD J.H.

AIRMANSHIP.

ROYAL AIR FORCE.

1 FLIGHT
10 COURSE

I.T.W.
HILLSIDE CAMP.
BULAWAYO

Notebook for use in Schools.

24 E.F.T.S.
INDUNA.

21 S.F.T.S.
KUMALO.

91/2250. Wt. 6865. 500M. Bks. 12/41. J. D. & Co. Ltd.

AIR-FRAME CONSTRUCTION

Maintenance

Units are responsible for the technical maintenance of aeroplanes, airframes, engines and ancillary equipment on their charge

Comprises of

① Inspections
② Cleaning and anti-corrosive treatment
③ Lubrication of working parts
④ Repairs under approved schemes
⑤ Embodiment of modifications
⑥ Replacement of worn and damaged parts
⑦ Testing.

The following A.P's and (technical) documents are used for technical maintenance

① Form 700
② Aeroplane maintenance regulation
③ Aircraft maintenance schedule
④ Units maintenance orders
⑤ Aeroplane repair scheme
⑥ Schedule of spare parts.
⑦ Log book.
⑧ A.P. 1086 (Stores vocabulary)
⑨ A.P. 1464 (Engineering manual)

The object of technical maintenance
① To keep the maximum no. of aircraft serviceable
② To give the pilot and crew confidence in their A/C
③ The economical use of equipment.
④ To keep the standard of air worthyness up to the standard required by operational and training commands.

Distribution of maintenance work on R.A.F. Station

Flights
To keep the aircraft in the air day by day. It consists of general servicing, daily inspections, in between flight inspection, cleaning and picketing out of aircraft.

Maintenance flight
The work carried out by this section is work needing more time or work beyond the capacity of the flights. The work consists of major and minor inspections, repairs, modifications and replacements

Station workshops
The work carried out by this section is work needing special facilities and consists of complete overhauls of engines and airframes. Work performed by blacksmiths, carpenters, sheet metal workers, fabric workers etc.
The main responsibility for all maintenance work in a flight lies with the flight commander who is to plan maintenance work so as to make the flight as self-supporting as possible. He is to maintain liason with the station engineering officer and other specialist officers consulting them as necessary upon all aspects of maintenance work and especially when abnormal damage is expected by the report given by the tradesman.

Inspections made on aircraft
1, Daily inspection
2, In-between flight inspections
3, Major inspections
4, Minor inspections
5, Major and minor inspections taken from flying hours of the aircraft

Minor Insp. 40 hrs. 40* (80) 40** (120) 40*** (160)
Major " 320 " . 320* (640). 320 (960)**.

All work performed at inspections is done progressively e.g. items to be inspected at a 40 hr. inspection would be those items of an aircraft that may need any type of maintenance after the aircraft has flown 40 hrs. No other part of the aircraft would be inspected. At a 40^{*} inspection carried out after 80 hrs. flying, all items needing maintenance at 80 hrs. flying would be inspected plus items needing maintenance 40 hrs. inspection and so on through inspection schedule of the aircraft.

1st inspection	made	at	40 hrs	flying		40
2nd	"	..	.. 80	..	..	$40^{*} = 40 + 40^{*}$
3rd	"	..	.. 120	..	..	$40^{**} = 40 + 40^{**}$
4th	"	..	.. 160	..	..	$40^{***} = 40 + 40^{*} + 40^{***}$
5th	"	..	.. 200	..	..	$40 = 40$
6th	"	..	.. 240	..	..	$40^{**} = 40 + 40^{*} + 40^{**}$
7th	"	..	.. 280	..	..	$40 = 40$
8th	"	..	.. 320	..	..	major Insp. $40 + 40^{*} + 40^{**} + 40^{***}$.

Repeat the old schedule until 640 hrs. when major becomes 320^{*} while at 960 hrs inspection is called 320^{**}. After 960 hrs. the aircraft starts its hours over again. These inspections may be anticipated or delayed for five hours.

Objects.

To allow inspections to be staggered, allowing the maximum number of aircraft to be kept serviceable

Daily inspections

Carried out once every day and at this inspection all tradesmen certify on form 700 that their individual part of the aircraft is airworthy for another 24 hours. They may be made prior to night flying with authority of the flight commander and immediately after a minor or major inspection. They may be delayed up to a period of seven days.

In-between flight inspections

Carried out to ascertain the level of the oil in the aircraft in between each flight. Also made to make sure everything is in full working order for the next flight.

Object of periodical inspections

Periodical inspections are major and minor

① To that defects may be detected at an early stage and so prevent any further damage.
② To prevent waste of time and labour on the part of all tradesmen.
③ To keep the cost of maintenance as low as possible
④ To keep the maximum number of aircraft serviceable.

✓

The pilot should be in attendance at the inspection of his aircraft because:-

① He has to make a group check of his 'plane
② He knows the aeroplanes flying faults
③ He knows to what strains and stresses the aircraft has been subjected to, previous to the inspections
④ He will be able to obtain further knowledge of the construction and maintenance of his aircraft.
⑤ His attendance will inspire pride of workmanship on the part of all tradesmen.

Modifications

Made to improve the air worthiness of the aircraft and also to improve the design.

Type 1. Carried out immediately

Type 2. Any time before and not later than the next minor inspection.

Type 3. Any time before and not later than the next major inspection

✓ Progressive repair and replacements.

Due essentially if the maximum number of aircraft are to be kept serviceable and if accumulation of work is to be avoided.

Continuous pressure of intensive flying may at times induce a tendency to postpone repairs which the routine inspections show to be desirable but not vital.

Within limits postponements may at times be permitted, but must be resisted as far as possible, otherwise more serious wear and deterioration occurs. The plane may become unserviceable for periods long enough to interfere seriously with flying and may necessitate the assistance of personnel and technical resources outside the unit.

✓ Units maintenance orders.

Issued in two parts.

Part 1 a) Issued by station commander. When describing the units maintenance organisation.
b) Co-ordinating the technical work on the station.
c) Defining individual responsibilities for

maintenance work on the station.
d) Ensuring that the correct maintenance documents are kept by all sections. Ensuring the best serviceability of the aircraft and also ensuring the safety of all flying personnel.
e) Describing the procedure to be adapted with aircraft on reserve, on detachment, and visiting aircraft.

Part 2. Issued by the Squadron Commander.

a) To ensure best serviceability with least time and labour.

b) A maintenance schedule amended by Squadron Commander if necessary to meet local conditions. They contain the time and frequency of the inspections made on the aircraft & also the work to be carried out at these inspection times.

Form 700.

1) Allocated to each plane throughout the R.A.F. It is issued to ensure the best serviceability of the aircraft.
2) To make individuals responsible for work performed on the aircraft.
3) To form a log of all work performed on the aircraft.

The form 700 may last until:-
a) It is full
b) It has been used for a month.
c) It has been used for 40 flying hours after which it is filed for a period of 1 year.

Contents of Form 700.

1) Cover: serial no. aircrafts name and number and engine no.
2) Inside cover: Instructions for use (700 A).
3) 1st page: details of aircraft such as its range fuel and oil capacity, fuel and oil consumption, and R.P.M. When the next two minor and next major inspections are due.
The maintenance personnel allocated to that aircraft.
4) D.I. certificate (daily inspection).
5) Change of serviceability and repair log.
6) Periodical inspection certificate.
7) Further instructions for use.

Entries made each day in D.I. certificate
1, The date
2, Flying hours of engine and airframes
3, Initials of tradesmen certifying they have made their daily inspection.
4, State of fuel, oil and coolant.
5, Initials of airman responsible (usually flight mec)
6, Initials of F/Sgt. in charge of flight.
7, Initials of pilot in column 26.
8, Daily flying time
9, Pilot and NCO's checks.

Why the pilot signs in column 26.
1, He certifies he has seen the initials of tradesman stating they have made they D.I. Also he has seen the initials of F/Sgt. in charge of the flight certifying the aircraft is serviceable
2, He is aware there is enough oil fuel and coolant for the flight he is about to make.
3, He has seen that the aircraft is serviceable from the last time it was unserviceable. It should be placed serviceable by a competent N.C.O. or officer. May be placed serviceable by pilot with permission of flight commander.

Change of serviceability and repair log.
Used for placing aircraft serviceable and U.S. and for recording any work done on the aircraft while it was U.S.

How to place an aircraft U.S.
Use the C. of S and R. log columns 1 to 8 and enter the following information
1, Date
2, Time
3, Whether engine or airframe is U.S.
4, Nature of defect.
5, Signature of person wishing aircraft to be placed U.S.
6, Hang board with U.S. on it in a prominent position on the aircraft and report the matter to the flight commander.
Any technical tradesman may place an aircraft U.S.

✓

How to place an aircraft serviceable

Use columns 9 - 14 of C. of S. and R. log.
The following information would be given:-
1, The nature of work carried out while A/c was U.S.
2, Signature of airman carrying out that work, date and time of finish
3, Signature of N.C.O making group inspection
4, Signature of competent N.C.O or officer placing aircraft S. in column 14.

Periodical inspection certificate

One certificate used for each trade
1, Date
2, When inspection was due
3, When the inspection was made
4, Type of inspection
5, Initials of airmen carrying out inspection
6, Initials of pilot or N.C.O making group check.

Travelling copy of Form 700

The only entries that are made different are those which are filled in at the front page. Always carried on an aircraft when on a cross country flight or when the aircraft is liable to be away from its base more than 24 hrs. Any nature of work carried out on the aircraft while it is away from its base is recorded in the travelling copy of Form 700. When the aircraft returns to its base again all entries made in the airborne copy of the form 700 are transferred into the original copy and signed by the pilot as being correct

Test flights

Height tests and weight tests.

Any pilot may be called upon to make an air test

When a test flight is necessary.

1, After major and minor inspections
2, After any repairs, modifications and replacements or any alteration which may alter the characteristics of the aircraft
3, All training aircraft at flying training schools are tested every morning by a qualified pilot before U/T's start their days work

Pilots procedure for test

1) Inspect form 700 and note whether aircraft has been placed serviceable and for what reasons it is being tested.
2, Make an external check of the aircraft, noting such items as loose cowlings, level of oleo legs, pressures of tyres and the cleanliness of the aircraft.
3) Test all control surfaces for ease of movement and instinctive control
4, Test all trimming devices
5, Test the flaps and any hydraulically operated gear, other than the undercarriage
6, Test the brakes for equal operation.
7, Run up the engine and test for a, vibration b, engine temperature c, drop in revs. when one mag is cut out d, two positions of the throttle
8, Test the propeller for coarse and fine pitch.

The responsibility is the pilots that all personnel making the test have a parachute and are conversant with its use. The only personnel allowed to make the test with the pilot are those responsible for ~~making~~ work necessitating the tests.

Procedure during a test

1, Fly the aircraft to a reasonable height
2, Test the trim for rigging by flying with hands and feet off.
3, Test the aircraft control surfaces for ease of movement by putting the aircraft in turning, banking, ~~[illegible]~~ movements.
4, Test all trimming devices
5, Test the flaps while taking off and landing
6, Test the slats
7, Test the undercarriage for warning devices
8, Test any hydraulically operated gear, including landing lights, bomb doors etc.
9, Test the engine
10, Test the propeller.
11, Test all flying instruments including "George"

After landing, the pilot should make a check of the exterior of the aircraft noting any defects that may have developed during flight. He should next give his report to the correct authority on the conditions of the aircraft. If a report of airunworthiness is given a further test flight is necessary after the fault has been rectified

When an aircraft can be considered U.S.
① When an entry has been made in change of serviceability and repair log.
②. When a major or minor inspection is due
③. After 24 hours the aircraft becomes U.S.
④. Bad landing
⑤. Forced landing.

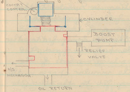
Airscrews 10th. Apl. 1943.
The transformation of biplane to monoplane and the increased power output of aero-engines has necessitated a radical change in air screw design. Aircraft of medium or low power and performance were adequately served by the fixed airscrew but A/C with speeds over 300 M.P.H. require a coarse pitch for S + L flight which would prevent the engine from realising full power for take off and climb. As no airscrew can be designed which could perform a satisfactory compromise between the requirements of take off and climb and level flight on one hand, on the other, airscrews have been developed with detachable blades, rotatably mounted in the hub sockets with a means of varying pitch in flight. These are known as variable pitch airscrews. Others have been developed on which the pitch may be adjusted on the ground to form fixed pitch airscrews in flight.
Airscrew types
a, Fixed pitch b, Variable pitch ⓑ Adjustable pitch or constant pitch ③ Two speed variable

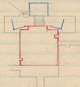
pitch (3) constant speed variable pitch (4) hydromatic.
Fixed pitch, pitch angle cannot be altered
Variable pitch, pitch angle can be changed but only when on the ground and by technical staff.
The two speed V.P.
This gives ~~[illegible]~~ fine pitch for take off and coarse pitch for level flying but no intermediate stage
The constant speed V.P.
With the aid of pitch control and throttle the engine revs. can be set and any furth movement on the throttle will not alter the revs. although it will increase and decrease the speed of the aircraft
Hamilton airscrews.
Originally Hamilton airscrews were of the two pitch design, in which one blade angle was provided to develope maximum power at take-off and the other calculated to absorb full power at maximum speed at a specified altitude or a similar condition
Whilst this design met to a large extent the requirements of civil a/c. it still left much to be desired from the military standpoint. This led to the introduction of a governor to adjust automatically the blade angles in order to maintain a constant rate of r.p.m independant of the altitude and within the normal powers required for flight of throttle openings.
In conjunction with automatic boost this feature enabled the engine to deliver full power throughout the whole range from take off to maximum speed at the rated altitude; and was the means of effecting economies by enabling the engine to operate at a maximum of efficiency throughout such a flight or alternatively by enabling any combination of R.P.M and boost control as required.
The operation of the airscrew was effected by oil pressure working together with the centrifugal forces acting on the blades and in counterweights in such a way as to balance these forces at the selected R.P.M any tendency on the part of the engine to alter its R.P.M. from that selected was

immediately followed by a variation in the oil pressure which brought about a change of blade angle sufficient to restore the speed to the controlled level. This method of governing is extremely sensitive and is perfectly satisfactory for all installations which do ~~not~~ not require more than a 20° range movement between extreme conditions of flight but where as in modern aircraft manouvrability under full power is essential it is found that 20° is not sufficient to enable the governor to maintain a constant speed. Since certain mechanical difficulties stand in the way of increasing range movement with the counter weight type of mechanism a radical departure in design was effected to provide all the movement likely to be required for constant speed control and to incorporate at the same time means of reducing drag and probability of damage in the event of engine failure. ~~The~~ The modern Hamilton hydromatic airscrew has a pitch range of 80° of which 35° is usually made available for constant speed operations. The remainder is used to turn the blades (~~[illegible]~~) with their chords into line of flight. In this position an airscrew offers the least drag resistance and produces no torque on the airscrew shaft thus bringing the engine to rest. The proportion of pitch range allocated to constant speed control may be varied as necessary but 35° is more than sufficient with present designs of aircraft to commit dives at full throttle without exceeding permissable engine R.P.M.

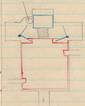
The facility with which the balance of engine R.P.M, airspeed and power can be maintained combined in this airscrew a remarkable degree of efficiency and safety this being further brought about by the advantages accruing in multi engined aircraft from the ability to feather any airscrew and thereby stop at will any engine.

The D. H. C/S. airscrew is operated in the following manner. The cockpit control lever is set at the desired revs. The movement of this lever via the rack and pinion moves the cylinder and thus exerts a fixed pressure on the end of the barrel. If the revs. below that required oil will flow from the engine driven pump past the valve into the airscrew actuating mechanism fining the airscrew pitch. When the desired revs. are obtained the governors whose speed is proportional to that of the engine exert a pressure on the underside of the valve head which overcomes the pressure of the spring forcing the valve upwards and closing the inlet to the airscrew mechanism. If the revs. are above that required the governors force the valve still higher allowing the oil to drain out of the airscrew mechanism until the airscrew is sufficiently coarsened when the valve returns to its position blocking the connecting tube. The airscrew blades are turned by means of a cylinder which slides forward to fine under oil pressure and slides back to coarse under centrifugal force.

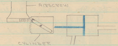




TO COARSE PITCH

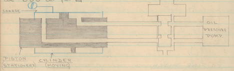


TO FINE PITCH



Rotal constant speed airscrew

The system of operating is similar to that of the D.H. with the following exception. The coarsening and fining of the airscrew is done by oil pressure, the oil being fed to either side of the piston; the piston is fixed, the cylinder moving. The oil on one side of the piston escaping by the annular spaces in the valve while oil is being fed to the other side. The actual rotation of the airscrew blades is carried out by means of a connecting link between the cylinder and the airscrew hub, the forward movement of cylinder coarsens the pitch, the oil pressure system being maintained at 350 lbs per □"



Brakes.

Mechanical, Pneumatic and Hydraulic

Advantages

Shorter landing run
Great manouvrability on ground
Parking and running up engines on ground.
Assist take-off in confined spaces.

Advantages of V.P. airscrews

1. Over-revving of the engine is avoided
2. Full power is maintained up to rated altitude
3. The take-off run is shortened

Disadvantages of fixed pitch airscrews

1. Maximum power output is possible only at one pre-determined altitude and speed
2. Available power at take-off is less than the maximum because of reduced R.P.M.
3. The continual change of R.P.M. with every change of altitude and airspeed shortens the life of the engine

A.P. 1423. Page 125.

Parachutes

The pilot is responsible that every casual passenger is equipped with a correctly fitting parachute and that he is fully conversant with the method of operation and escape drill. The pilot is also responsible that the above is carried out in respect of crews and that where detachable pack type parachutes are used, they must be placed in the correct stowage.

Methods of abandoning an aircraft (Tiger Moth)

Glide. jump over and to the rear
Steep dive. brace yourself against a marked tendency to fall forward when harness is released. Dive over as for glide
Spin Always abandon towards the action of the spin i.e. on the inside. To do this it is necessary to force the upper part of the body over the side of the cockpit. The occupant will then be flung clear.
Inverted Spin. Occupant will be flung clear as soon as the harness is released
In service aircraft whenever possible release harness and half-roll the aircraft

Control of a parachute

Oscillation. To stop this pull down on the high side of the canopy in both directions of swing

Sideslipping. To avoid obstructions pull down on the rigging lines on the side towards which you wish to slip.

Turning Always endeavour to face the direction in which you are drifting. To do this, pull down the canopy about 3 ft. on the side towards which you wish to turn, and with the other hand grasp the opposing group of rigging lines and give a vigourous twist or spin in the direction of turn

Maintenance
'Chutes will be inspected daily by the 'chute inspection and the pilot at the commencement of each day's flying.

Feathering an airscrew

1, Press auxiliary motor pump switch. The switch will be held closed by the action of the solenoid incorporated in the switch
2, Close the throttle
3, Turn off the fuel supply to the engine concerned.
4, Switch off the engine.
Any sequence other than the above will slow down the operation

Unfeathering an airscrew

1, Turn on the fuel.
2, Set throttle and mixture control levers to their normal starting position
3, Set airscrew pitch lever to coarse.
4, Switch on ignition
5, Press auxiliary motor pump switch and hold it closed.
6, When engine is turning at approx. 1000 revs. release the switch and the airscrew will return to the control of the constant speed V.P.
7, Open throttle to warming up position
8, When engine has reached its operational temp. carry on

Cleaning an aircraft

Fabric parts should be cleaned with non-caustic soap and warm water. Dirt, grease and oil cause fabric parts to deteriorate and make inspection difficult. Neither petrol nor paraffin may be used to clean fabric parts. Metal parts should be inspected for corrosion, and if necessary, treated. Bracing wires should be cleaned strictly in accordance with instructions as irregular cleaning may lead to weakening of the wires. The cockpit and fuselage should be free from grease and mud.

Formation Flying

Main objects
1. Concentration of power, offensive and defensive
2. Mutual support having regard to field to fire
3. The moral advantage on yourself and the enemy
4. Certain tactical objects e.g. pattern bombing

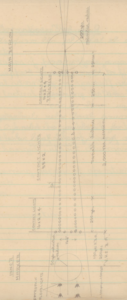
General note
Formations should be simple i.e. not unwieldy and flexible i.e. capable of being opened up, closed or changed without disorganisation.

Factors governing success of operational flying
1. Leadership
2. Discipline
3. Drill
4. Intercommunication
5. Tactics

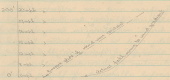
Rules for oxygen.

Oxygen to be taken by all occupants of an aircraft
① When flying above 10,000'
a If for more than 1 hour
b at night
c If the cold is extreme
② When you reach 15,000'
③ From ground level when climbing to over 15,000' at a rate of climbing exceeding 2,000' per min
④ At night from ground level when on operations

LAYOUT OF BEAM APPROACH BEACONS AND CONTACT LIGHTS FOR 2,000 YDS. RUNWAY



Wind Gradient



Methods of overcoming wind gradient

1. Employ power
2. Steepen glide
3. Start with excess speed.

Maintenance

The maintenance system is designed to suit conditions of peace and war, to impose the least restriction on flying, to illiminate extensive partial over-haul resulting in long periods of unserviceability and to avoid dislocation, owing to frequent changes of personnel. It is facilitated by standardisation of procedure within the Command, careful allotment of flying duties to individual A/c. to avoid inspections falling due at the same time, the embodiment of simple modifications during any period of unserviceability to reduce the volume of work at the time of the periodical inspection. An additional object of technical maintenance is to enable an A/c. to move from one unit to another with a complete previous history. At 420 engine running hours the Cheetah X is removed from the airframe and given a complete overhaul. The authority required for anticipating or delaying a minor inspection by 5 hrs. is that of the Squadron Technical officer, for a major inspection that of the Station technical officer

Publications used for repairs

	A/F.	Engine
General hand book	Vol. I	Vol. I
Pilot's notes		
General orders and mods.	Vol II Part I	Vol. II Part I
Maintenance schedule	 II	 II
Repair scheme	 III	 III
Schedule of spare parts	Vol III Part I	.. III .. I

Corrosion

Surface corrosion detectable on ferrous metals only by discolouration and rust and on aluminium and its alloys it takes the form of white powder and a pitted surface
Inter-chrystalline corrosion can be present and yet be non-apparent in the metal and yet sometimes can be detected by a hair crack on the surface

Causes

1. Excessive vibration
2. Incorrect heat treatment
3. Contact between two metals of different electrical potential

Surface corrosion should be removed by light scraping with a wooden tool and rubbing down with a paraffin rag. Remove all the chip protective coating and when the surface is clean and dry apply a coat of the approved paint or varnish. As a temporary measure grease may be used. Any part suspected of having inter-crystalline corrosion should be removed and tested on a magna-flux machine before passing as serviceable.
Ferrous metal parts are usually given cadmium coating, nickel or chrome plating while aluminium and it's alloys are given the anodic treatment. Cadmium coating etc consists of depositing a coating of cadmium or whatever metal is being used on to the surface of the part to be protected while the anodic treatment withdraws the aluminium oxide present in the metal and brings it to the surface to form the anti-corrosive medium. When nickel and chrome in certain quantities are alloyed to ferrous metals it is made virtually non-corrodable when subject to normal atmospheric conditions.

Types of airframes

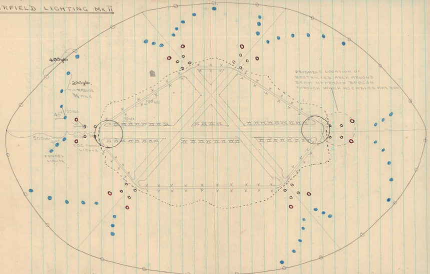
1. Two spar construction
2. Stressed skin construction
3. Geodetic construction.

Geodetic construction

Advantages

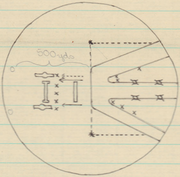
1. It is the most efficient method of disposing of the structural weight within the lines of the finely streamlined modern aircraft
2. It has a good ratio of tare to loaded weight
3. It reduces induced drag and consequently the power required for cruising
4. It lends itself to rapid construction i.e.
   a, Multi purpose jigs
   b, Panel assembly
   c, Housing of fuel tanks etc.
   d, Ease of replacement of damaged parts
   e, It is able to sustain considerable damage and still maintain flight

AIRFIELD LIGHTING Mk. II



INDEX

Outer circle lights
Fog funnel lights
Leading-in lights
Taxying lights
Flares (glim lamps).
Totem poles
Angle of approach indicator
Angle of approach indicator (portable).
Watch office
Dumbell.



NOTES ON AIRFIELD LIGHTING MARK II

1. DESCRIPTION:

The Airfield Lighting System Mk. II comprises two main parts - the lighting external to the aerodrome and the lighting on the aerodrome itself. The external lighting can be further subdivided into the Outer Circle, the Funnels and Fog Funnel lights. The Outer Circle is a series of lights placed round the aerodrome on a rough circle of 2000 yards or more radius from the centre. These lights are normally 400 yards apart. Opposite the end of each runway are situated the outed funnel lights. "Leading IN" lights are placed between the Outer Circle lights and the Funnels. Between the Outer Funnel lights and the aerodrome boundary are situated the "Fog Funnel" lights.

The Outer Funnel averages 350 yards in width and 200 yards in depth. The wiring of Outer Funnel ad Fog Funnel lights is such that any one Funnel can be switched on or off independently of the others and of the full Outer Circle lighting.

2. All the above external lighting is independent of the runway lights and can be increased or decreased in intensity as required by rheostat control.

3. Inside the aerodrome boundary is the second part of the system. Along each side of the runway, lamps are let into the ground or plug points are provided to connect up to portable lamps. These lamps are so hooded that, to a pilot taking of or landing, only those on the runway are visible, according to the direction from which he runway is being used. In addition, a line of glims is provided on the runway 800 yards from windward end to indicate to a descending pilot the point where he must touch down to avoid overshooting.

4. At either side of each end of the runway is a Totem Pole 10 ft. high. Starting from the top of each pole down to about 4 ft. from ground level, there is on either side a series of 6 lights about 1 ft. apart forming a vertical bar of light. Each light is separately hooded from observation from above, The lights on the side facing inward along the runway are white, while all those on the opposite side facing outwards towards the Outer Circle are red. Thus to an aircraft coming in to land, the outward facing red lights indicate where the aerodrome boundary is and the inward facing white lights denote the far side of the aerodrome boundary. Runway and Totem Pole Lights are so wired and controlled that they are only visible to approaching aircraft.

5. A portable wind T is situated to he right of the leeward end of the flare path.

6. An Angle of Approach Indicator is situated at he down wind end of the runway.

7. Floodlights are also available for use if considered advisable.

8. METHOD OF USE:

The correct method of using the system is as follows:-

9. For Take-off: The lights of the chosen runway are switched on together with the approach sides of the Totem Poles and the up-wind or further, Funnel. In the early part of the take-off, the pilot is guided by the runway lights and the white lights on the far Totem Poles indicating the aerodrome boundary. As soon as the aircraft is airborne, the pilot can see the lights of the up wind Funnel, which then serve as leading lights. (The Outer Circle lights are not normally switched on during take off). In poor visibility, the Fog Funnel lights are illuminated.

9. <u>For Take-off</u>: The lights of the chosen runway are switched on together with the approach sides of the Totem Poles and the up-wind or further, Funnel. In the early part of the take-off, the pilot is guided by the runway lights and the white lights on the far Totem Poles indicating the aerodrome boundary. As soon as the aircraft is airborne, the pilot can see the lights of the up wind Funnel, which then serve as leading lights. (The Outer Circle lights are not normally switched on during take off). In poor visibility, the Fog Funnel lights are illuminated.

10. <u>For Landing</u>: The runway lights and near sides of the Totem Poles are switched on as before. The Angle of Approach Indicator is also switched on together with the downwind, or entry Funnel. Passing through the Funnel, the pilot next sees the red lights of the two nearer Totem Poles and the light of the Angle of Approach Indicator. By the latter, he can check his angle of descent in the normal manner. He also sees the illuminated runway and the far aerodrome boundary, which will be shown by the white lights on the far Totem Poles. The Fog Funnel, the Floodlight and the Illuminated Wind T will be switched on if required.

11. As the aircraft passes through the down-wind Funnel, the up-wind Funnel is also illuminated, in case it is necessary to go round again.

12. In bad weather, the Outer Circle is switched on.

13. Permission to land is given in the normal manner and all lighting controlled from the Flying Control Office. The Flying Control Staff regulate the scope and intensity of the lighting, according to the conditions prevailing at the time.

14. Taxy Tracks are marked by means of blue lighting, double blue lights being placed at either side of the end of each runway to indicate its position.

15. Dispersal Indicators and Marshalling posts are placed at the requisite points as required along the taxy track.

16. Visual signals conform with those laid down in AP. 129, Appendix 11.

17. At airfields equipped with Airfield Lighting Mk. 11, a "dumb-bell" is placed at the end of the runway in use immediately between the Totem Poles and is illuminated when it is unsafe to land OFF the runway.

18. When it is unsafe to land ON the runway, five portable glim lamps with red domes are placed adjacent to the "dumb-bell" in such a way as to be readily visible to an aircraft approaching to land. In addition, an Illuminated Wind T is placed as near to the end of the runway as possible and on the side of the flare path which should be used.

INDEX