APPENDIX 3

LIGHTNING STRIKES

General

1. Lightning strikes usually result in two types of damage, that caused by the actual strikes, and that caused by the discharge of static electricity which follows the strike. It is also possible that heavy static discharges may occur without the aircraft having been struck by lightning. Further, it is possible that certain aircraft components may become strongly magnetised, it being probable that during the lightning discharge heavy electrical currents flow in the metal airframe structure. The magnetic field produced by such electric current is the cause of magnetisation, this being an undesirable factor in the vicinity of a compass.

2. A lightning strike usually causes burning of small circular holes of approximately $\frac{1}{8}$ inch diameter, which may be clustered in one locality or scattered over a large area; results may also be indicated by burnt or discoloured skin, or rivets. Evidence of lightning strikes usually appear more prevalent in the fuselage nose section, and outer leading edges.

3. The effects of static discharge may occur as localized pitting or burning and may even result in circular holes of approximately $\frac{1}{4}$ inch diameter. Evidence of static discharge usually appears more prevalent on trailing edges, under the lower aft fuselage area, radio aerials and the main plane extremities, also on the fin and tail plane tips and trailing edges.

Examination procedure

4. Whenever a lightning strike or static electricity discharge is reported, or if it is suspected that these conditions may have been encountered, the aircraft must be examined for evidence of such, as tabulated subsequently, at the first opportunity following the incident. It is emphasised, however, that where the term "Examine" is used, the signs of damage being primarily sought are those of lightning strikes and static discharge as defined in para. 2 and 3 respectively. The examination is divided into the following two categories :—

(1) *Preliminary Examination* — intended only for en-route aircraft landing away from base, to be followed upon return to base by :—

(2) *Comprehensive Examination* — this is the normal procedure and is to be carried out at base on termination of flight.

Note . . .
The two examination categories do not imply that the repair of known damage may be deferred. The deferment of such repair will be dependent on the current repair scheme for the area of the aircraft affected and/or the effect of the damage on the airworthiness of the aircraft.

▶ **5.** On termination of a flight in which the pilot knows or suspects that the aircraft has been struck by lightning, reference is to be made to AP 100B–01– Order No. 4950 "Demagnetisation of Aircraft Struck by Lightning". This order details the individual responsibilities of Aircrew, Station Engineering Personnel and Command Headquarters. ◀

PRELIMINARY EXAMINATION (En-route aircraft only)

Item No.	Item	Operation
1	(*a*) Ejection seats (*b*) Canopy jettison system	Ensure rendered safe.
2	Fuselage exterior	Examine, paying particular attention to the nose section, air-intakes, windscreen structure and rear fuselage underside.
3	Main and tail plane surfaces and surfaces of aerofoil controls including trimming tabs and airbrake	Examine, paying particular attention to outer leading edges, trailing edges, root-ends and hinge areas of control surfaces.
4	External tanks (*if fitted*)	Examine.
5	(*a*) Main-wheel units (*b*) Nose-wheel unit	*If extended at time of incident.* Examine, paying particular attention to lower portions.
6	All flying controls, including flaps, airbrake and trimming controls	Operate each system through full range and ensure smooth freedom of movement.
7	Fire extinguishers	Check to ensure extinguisher has not been discharged.
8	Navigation lamps	Operate and ensure functioning correctly.
9	All aerials	Examine.
10	(*a*) Radio and Radar equipment (*b*) Navigation equipment	Operate and ensure functioning correctly.

COMPREHENSIVE EXAMINATION (Normal procedure)

Item No.	Item	Operation
		AIRFRAME
1	(*a*) Ejection seats (*b*) Canopy jettison system	Ensure rendered safe.
2	(*a*) Main plane root fairings (*b*) Undersurface access panels (*c*) Tail unit root fairings	(1) Remove. (2) Examine.
3	Front fuselage	Examine, paying particular attention to the windscreen structure, air-intakes, nose-wheel doors and undersurface.
4	Rear fuselage	Examine, paying particular attention to the undersurface and aft extremity. (Static discharge is usually indicated by a series of small holes along the underside at approximately the centre line.)
5	(*a*) Tail plane (*b*) Fin	Examine, paying particular attention to the trailing edges, tips and hinge areas.
6	Aerofoil control surfaces including trimming tabs	(1) Examine, paying particular attention to the trailing edges. (2) Examine hinge assemblies, as far as practicable. If signs of static discharge or pitting are found, the examination is to be extended to include trim jack and all bearing points in the respective control system. (3) Move the controls through their full range of travel and ensure freedom of movement and smooth operation.
7	Main planes	Examine, paying particular attention to the outer leading edges, inboard undersurfaces, trailing edges, hinge areas, skin joints and pitot head area.
8	External tanks (*if fitted*)	Examine.
9	Flaps	(1) Examine, paying particular attention to the trailing edges. (2) Examine hinge assemblies. If signs of static discharge or pitting are found, the examination must be extended to include all bearing points in the flap control system. (3) Operate the flap system through full range of travel and ensure smooth operation.
10	Air brake assemblies	(1) Extend and examine. (2) Examine all hinge assemblies and bearings. If signs of static discharge or pitting are found, extend the examination to the operating jack bearings. (3) Operate the air brake and ensure full and free movement and smooth operation.

Item No.	Item	Operation
11	(*a*) Main-wheel units (*b*) Nose-wheel unit	*If extended at time of incident.* Examine, paying particular attention to the lower parts of the shock absorber struts and wheels.
12	Aircraft general	If any aerials (or other protuberances) have broken away during incident, examine for incidental damage.
		ELECTRICAL
13	External and interior lighting, indicators and warning lamps	Operate and ensure functioning correctly.
13A	Electrical bonding	Carry out bonding test.
		ENGINE
14	Fire extinguishers	Check to ensure extinguisher has not been discharged.
		INSTRUMENTS
15	Deleted	
16	Gyro compass or navigation display (*as fitted*)	Test for correct functioning.
		ARMAMENT *(if fitted)*
17	Stores (*if carried*)	Remove for examination and test.
18	Release systems	Test for correct functioning.
		RADIO AND RADAR
19	Aerials	Examine.
20	All connectors (aerials to trans/rec)	(1) Disconnect. (2) Examine, particularly end connections. (3) Check for continuity and leakage from conductor to outer screen.
21	Aerial switch unit (*if fitted*)	(1) Examine, particularly connections and contacts. (2) Check for continuity and leakage from conductor to outer screen in both energized and de-energized conditions.
22	All connectors	Reconnect.
23	Installations	Operate and ensure functioning correctly.

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