

Chapter 6 PROCEDURES FOLLOWING HAZARDOUS INCIDENTS

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Introduction

1. The information contained in this chapter and the subsequent appendixes is to be applied when hazardous incidents have been reported.

2. For the purpose of these instructions, a hazardous incident is one which could result in damage to an aircraft which may not be immediately apparent.

3. When an aircraft has been subjected to such conditions, to a degree which warrants the pilot of the aircraft reporting the incident on Form A.700, it is essential that the checks detailed in the relevant appendix, and any necessary repairs and/

or adjustments, are made before the aircraft is again certified as serviceable for flight.

4. In general, the type of damage which may occur and should be anticipated during examination is as follows:-

- (1) Insecurity of attachments
- (2) Cracks in, or fracture of, structure
- (3) Contamination
- (4) Any form of structural distortion, i.e., skin wrinkling
- (5) Defective or missing rivets
- (6) Chafing, scoring or fraying of components
- (7) Broken locking devices

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Insert this leaflet in A.P. 101B-1202-1A, Cover 1, Sect. 2, Chap. 6, App. 1 to face para 1.

CARRIER-BORNE HEAVY LANDING

The following examination must be undertaken in the event of the aircraft being subjected to a carrier-borne heavy landing with the tail skid touching the deck first. This examination is additional to the normal procedure following a heavy landing laid down in Appendix 1 opposite.

- | | |
|--|--|
| (1) Examine the tail skid shoe, skid body and shoe bolts for security, cracks and damage. | (7) Examine the trunnion and attachments to the frame for security, cracks and damage. |
| (2) Examine the tail skid hinge fittings and diaphragms, including the centre hinge support diaphragm, for security, cracks and damage. | (8) Examine the frame posts for security, cracks and damage. |
| (3) Examine the tail skid hinge for security, cracks and damage. Ensure that the clearance limits on the tie bar assembly are in accordance with those given in Cover 2, Sect. 3, Chap. 5, para 108. | (9) Examine the hydraulic pipes to the jack for security and damage. |
| (4) Examine the eye fitting for security, cracks and damage. | (10) Examine the structure around the tail skid aperture for cracks and damage. |
| (5) Examine the jack eye-ends for security, cracks and damage. | (11) Examine the arresting arm 'A' frame side members for damage. |
| (6) Examine the jack for security and signs of fluid leakage. | (12) If all the foregoing checks prove satisfactory, a complete function test of the tail skid should be effected (Cover 2, Sect. 3, Chap. 5). |

Note...

- (1) The information contained in this leaflet will be incorporated by normal amendment action in due course.
- (2) If, after receipt of this leaflet, an amendment list with a prior date and conflicting information is received, the information in this leaflet is to take precedence.

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Appendix 1 HEAVY LANDING

ILLUSTRATION

Fig

Undercarriage deformation checking
dimensions 1

In the event of the aircraft being subjected to a heavy landing, the following examination must be completed before the aircraft is flown again.

1. Wheels

- (1) Examine the wheels for security, cracks and other damage.
- (2) Examine the tyres for wear, cuts and burning. When as a result of a heavy landing the undercarriage or wheel is damaged, the tyre, although showing no visible signs, may be damaged due to bottoming. In all such cases the tyre is to be scrapped.

2. Undercarriage units

- (1) Examine each undercarriage unit and wheel fork for security, cracks and damage.

- (2) Examine the shortening mechanism of each unit for security, damage and distortion.
- (3) Examine the upper attachment of each unit to the inner plane for security and the structure in the vicinity for damage and distortion.
- (4) Examine the attachments and bearings of each retraction jack for security and damage.
- (5) Examine each shock-absorber strut for security and evidence of fluid leakage. Check that the dimension between the shock-absorber pin centres on each undercarriage unit is in accordance with the deflection curve (*Cover 2, Sect. 3, Chap. 5*).
- (6) Examine each retraction jack, swivel

couplings and associated pipelines for security, damage and fluid leakage.

- (7) Examine the hydraulic pipes of the brake units for security and damage.

3. Nose wheel unit

- (1) Examine the main fitting and wheel fork for security, cracks and damage.
- (2) Examine the excluder ring around the pivot bracket, below the lower bearing, for damage.
- (3) Examine the attachment points for security and the structure in the vicinity for damage and distortion.
- (4) Examine the steering mechanism for security and damage.

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Port undercarriage bay

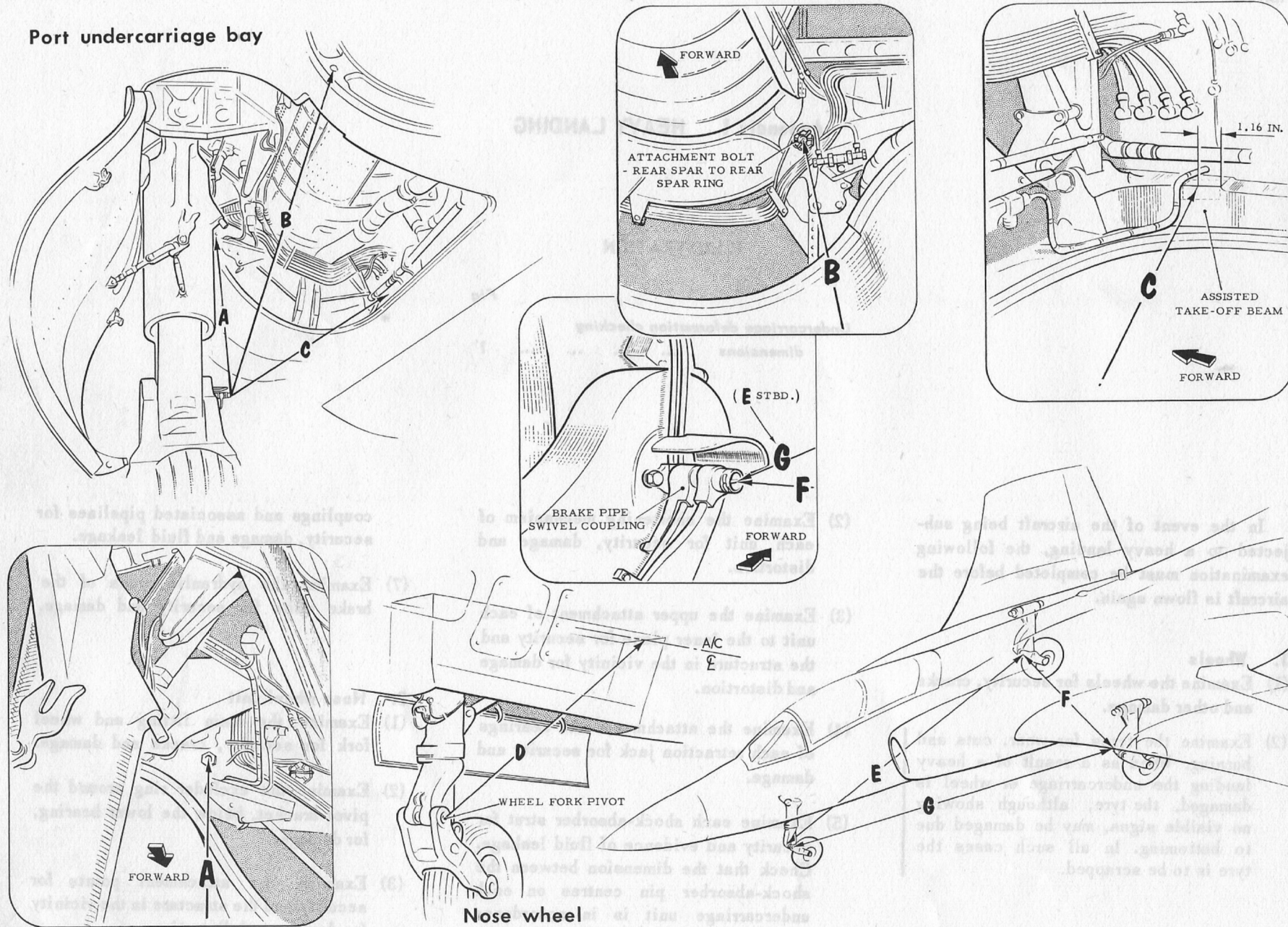


Fig. 1. Undercarriage deformation checking dimensions

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- (5) Examine the shock-absorber strut for security and evidence of fluid leakage. Check that the dimension between the shock-absorber pin centres is in accordance with the deflection curve (*Cover 2, Sect. 3, Chap. 5*).
- (6) Examine the telescopic lock strut for security and damage.
- (7) Examine all associated hydraulic pipe connections, swivel couplings and assemblies for security, damage and leakage.

4. Deformation check

Using a standard measuring tape (Ref No. 63B/12 or 63B/598), check that the dimensions shown on fig 1 are in accordance with the following:-

- A = 2 ft 8.75 in. \pm 0.1 in.
- B = 5 ft 3.375 in. \pm 0.1 in.
- C = 2 ft 10.86 in. \pm 0.1 in.
- D = 7 ft 5.375 in. \pm 0.1 in.
- E = 19 ft 10 in. \pm 0.2 in.
- F = 10 ft 6.2 in. \pm 0.2 in.
- G = 19 ft 10 in. \pm 0.2 in.

5. Wing tanks

- (1) On pre-Mod 5292 tank assemblies, ensure that the locking wire between the ram fork-end and body of the jack of the tank jettison pneumatic bottle and ram assembly is still tight and secure. With the aid of a lamp and mirror, ensure that

the jack lever of the lower mechanism is still hard against its stop.

- (2) On post-Mod 5292 tank assemblies, ensure that the rivet anchoring the jack lever to its spindle is secure.

Note...

It is necessary to lower the tank to perform operation (2).

6. Retraction test

If all the foregoing checks prove satisfactory, a complete function test of the alighting gear should be effected as detailed in *Cover 2, Sect. 3, Chap. 5*.

7. General aircraft structure

At the Engineer Officer's discretion, carry out the checks laid down in Appendix 2.

8. Carrier-borne heavy landing

In addition to the examinations detailed in para 1 to 7, the following examination must be undertaken in the event of the aircraft being subjected to a carrier-borne heavy landing with the tail skid touching the deck first:-

- (1) Examine the tail skid shoe, skid body and shoe bolts for security, cracks and damage.

- (2) Examine the tail skid hinge fittings and diaphragms, including the centre hinge support diaphragm, for security, cracks and damage.
- (3) Examine the tail skid hinge for security, cracks and damage. Ensure that the clearance limits on the tie bar assembly are in accordance with those given in *Cover 2, Sect. 3, Chap. 5, para 108*.
- (4) Examine the eye fitting for security, cracks and damage.
- (5) Examine the jack eye-ends for security, cracks and damage.
- (6) Examine the jack for security and signs of fluid leakage.
- (7) Examine the trunnion and attachments to the frame for security, cracks and damage.
- (8) Examine the frame posts for security, cracks and damage.
- (9) Examine the hydraulic pipes to the jack for security and damage.
- (10) Examine the structure around the tail skid aperture for cracks and damage.
- (11) Examine the arresting arm 'A' frame side members for damage.
- (12) If all the foregoing checks prove satisfactory, a complete function test of the tail skid should be effected (*Cover 2, Sect. 3, Chap. 5*).

Appendix 2 EXCESS G

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General

1. If the aircraft has been subjected to excess g, the examination given in this Appendix is to be completed before the aircraft is again certified fit for flight. Excess g may be defined as a g loading in excess of the figure laid down in the current CA release document. Should the g limitation applicable to aircraft carrying stores or wing tanks be exceeded without exceeding the higher limitation laid down for clean aircraft, only the relevant attachment points (para 4) and/or wing tank release mechanism (para 5) need be examined. If the g limitation applicable to clean aircraft is exceeded, the full examination is to be carried out. When a pilot reports that g limitations specified in any PWI, SI or STI, but not the aircraft general limitations have been exceeded, only the relevant PWI, SI or STI need to be complied with. If significant structural damage is found during first stage checks (para 2 to 6) further checks are to be carried out as detailed in para 7.

First stage checks

2. Make a general examination of the skin plating and, where accessible, the internal structure for signs of loose or pulled rivets and bolts etc., cracked or wrinkled skin and

cracked or distorted structure. Particular attention is to be paid to the following areas:-

- (1) Wing tips.
- (2) Ailerons in vicinity of centre hinge point.
- (3) Bolts in blowing slit assemblies at inner and outer plane trailing edges.
- (4) Root end of each outer plane.
- (5) Examine the port and starboard inner main planes in accordance with SI/BUCC/103 and 140.
- (6) Inner plane top and bottom skin (loose Jo-bolts).
- (7) Upper nacelle formers between spars (pre-Mod 1072 aircraft only).
- (8) Top and bottom of cockpit/centre fuselage joint.
- (9) Skin plating immediately forward of bomb bay, particularly at the corners of the bomb bay aperture.
- (10) Bomb door latches and hinge points.

- (11) Centre fuselage in vicinity of rear spar and bottom longeron.
- (12) Skin plating at centre fuselage/rear fuselage joint.
- (13) Rivets and Jo-bolts in tail plane top and bottom skins.
- (14) Rivets in top and bottom skins of tail plane flap.
- (15) Upper engine mountings (forward and rear).
- (16) Mainplane flap torque lever assembly (AP 101B-1202-5A3, Part 2, Sect 4, SP 201).
- (17) Fin spar 2 attachment bolts (SI/Bucc/115).
- (18) Apply lateral loads to fin by exerting forces to tail plane in both vertical directions (up and down). Observe that no movement occurs at the two bolts securing fin spar 3 to fuselage attachment lugs YB3-12-2214 (other than rotational movement - see Note) and sixteen bolts

securing attachment lugs to fuselage frame 562.5.

Note ...

If the two bolts securing fin to attachment lugs rotate but do not move relative to lugs, they may be considered serviceable.

- (19) Examine as far as possible; fin attachment lugs, spars and adjacent structure of frames 520, 534.5, 562.5 and 592.

- (20) Outer wing rear spar wing fold hinge fitting for failure of rib 116.5 attachment lugs (SI/Bucc/91 series).

3. Examine the inner and outer plane skin plating at each wing fold joint for signs of fouling or chafing. The required gap between the inner and outer plane skins is defined in Cover 2, Sect. 3, Chap. 2 of this Publication for pre-Mod 1188 aircraft and in A.P.101B-1202-1C, Sect. 13, Chap. 2 for post-Mod 1188 aircraft.

4. If the aircraft was carrying stores when subjected to excess g, examine the relevant store/carrier/pylon attachment points for damage, distortion and other visual evidence of failure.

5. If wing tanks were being carried when the aircraft was subjected to excess g:-

- (1) On pre-Mod 5292 tank assemblies, ensure that the locking wire between the ram fork-end and body of the jack of the tank jettison pneumatic bottle and ram assembly is still tight and secure. With the aid of a lamp and mirror, ensure that the jack lever of the lower mechanism is still hard against its stop.

- (2) On post-Mod 5292 tank assemblies, ensure that the rivet anchoring the jack lever to its spindle is secure.

Note...

It is necessary to lower the tank to perform operation (2).

6. If an in-flight refuelling pod was being carried when the aircraft was subjected to excess g:-

- (1) Visually examine the pod structure for damage, particularly the spine and main frame.

- (2) Visually check the pod for overall permanent deformation when installed on the pylon.

Note...

It is not necessary to remove the pod to perform these checks.

Further checks

7. If significant structural defects are found during first stage checks, perform the following additional checks before the next flight:-

- (1) Inspect inner wing spars using SI/Bucc/118, 119 and 124.

- (2) Inspect rear wingfold latch pins using SI/Bucc/110 and front wingfold latch pin using SP174 and CSDE/BUCC/MAG/3.

- (3) Carry out full rigging checks in accordance with AP 101B-1202-1A, Cover 1, Section 2.

- (4) Remove tail plane attachment bolts (AP 101B-1202-5A1, Schedule Ident No. 172009) one at a time and inspect holes visually for ovality or damage.

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Appendix 3 LIGHTNING STRIKES

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General

1. The effect of a lightning strike on an aircraft can vary from negligible to catastrophic failure. The main factors which determine the amount of damage sustained are:

- (1) The electrical energy of the lightning discharge.
- (2) The materials with which the airframe surfaces are made.
- (3) The protection designed into the aircraft.

Strong magnetic fields can be induced which may result in compass errors par-

ticularly if ferrous metals are in the vicinity of the compass or detector.

2. The parts of an aircraft most frequently struck are the extremities such as wing tips, control surfaces, front and rear fuselage, fin and tail plane. Protuberances, aeriels, probes and pitot heads are also vulnerable.

3. The lightning discharge travels over the surface of the aircraft. If the charge has passed between a control surface or other hinged surface and the main structure, then large electrical charges will have passed through the points of attachment. Evidence of this will be entry or exit

marks on the surface and possibly burn marks at the attachment points.

4. The points of entry and exit of the lightning discharge on metal skins may be identified by small circular holes of approximately $\frac{1}{8}$ in. diameter either in a cluster or scattered over a large area of the aircraft surface. More frequently however the effect will be blistering, or possibly bubbling in the case of pressurized compartment skins. The likelihood of actual penetration depends on skin thickness and the energy of the strike. Surface rivet and screw heads may also be burnt. The possibility of internal damage may be ruled out.

5. For non-metallic surfaces the damage can be more severe, loss of fibre glass panels and large holes in radomes being a possible effect. In these cases the likelihood of ingress of debris into intakes and hinge lines must be considered.

6. Cases have been reported where the electrical energy of the strike has entered

the aircraft electrical system via navigation lights, probe lights and pitot heads. Damage is usually evident at the point of entry and can extend through wiring to electrical components and connections.

Examination

7. On termination of a flight during which the Captain 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 HQs. In addition, the procedure detailed in Table 1 must be carried out.

TABLE 1 Examination following lightning strike

Item No.	Item	Operation
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A.P.101B-1202-4A2, Sect.1 Safety and Servicing Notes are to be complied with before the work detailed below is commenced.

AIRFRAME

1. Fuselage exterior surface

Look for:-

- (1) Pin holes.
- (2) Blisters.
- (3) Bubbling.
- (4) Burns to rivet and screw heads.

2. Windscreen frame

Look for burn marks at frame to fuselage joints.

3. Main planes and fin

Look for:-

- (1) Pin holes.
- (2) Blisters.
- (3) Burns to rivet and screw heads. Pay particular attention to tips and trailing edges.

4. Radomes and plastic covers

Look for damage.

Note...

If holed or missing an examination for foreign object damage is to be carried out.

TABLE 1 (continued)

Item No.	Item	Operation
5.	External tanks/stores/pylons	Look for damage.
6.	Aerials/probes/protuberances	
7.	Rudder	(1) Look for:- (a) Pin holes. (b) Blisters. (c) Scorch marks across hinges and operating rods/levers. (d) Burns to rivet and screw heads. Pay particular attention to tips and trailing edges.
8.	Ailerons	
9.	Flaps	
10.	Air brakes	
11.	Tail plane	
12.	Tail plane flap	(2) Carry out functional checks and ensure smooth operation.
		Note... <i>Indications of high electrical charges having passed across hinges or actuator attachments will indicate a need for closer examination of hinge bearings for pitting or actuators for internal leakage.</i>

Appendix 4 EMERGENCY STOP

1. Following an emergency stop, violent braking or overheating of the wheels, the wheels, tyres and brakes are to be removed and subjected to bay servicing.

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Appendix 5 ENGINE SURGE, BIRD STRIKE OR FOD

1. Following an engine surge, bird strike or report of FOD, an introscope inspection of the LP and HP compressors is to be carried out using the procedure laid down in AP 102C-1104-1, Sect 4, Chap 1, Para 5(2). The damage acceptance limits are laid down in AP 102C-1104-1, Sect 4, Chap 3, Para 2 and 3. If the compressors are within limits, check the IGVs and BVs in accordance with AP 101B-1202-5A3, SP452 and SP453. If the IGVs and BVs are serviceable, carry out acceleration and deceleration checks in accordance with AP 102C-1104-1, Sect 3, Chap 2, Para 5F and 5G.

Appendix 6 OPERATION OF MAIN PLANE FLAPS AT EXCESSIVE AIR SPEEDS

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General

1. If the aircraft main plane flaps have been operated at excessive air speeds, the examination detailed in this Appendix is to be carried out before the aircraft is again certified fit for flight. Excessive air speeds may be defined as speeds in excess of the figures laid down in AP 101B-1202-14A.

Examination

2. Generally examine the main plane skin, and where accessible the internal structure, for signs of loose or pulled rivets and bolts etc., cracked or wrinkled skin and cracked or distorted structure. Pay particular attention to the following items:-

- (1) Main plane flap torque lower assembly (AP 101B-1202-4A3(R), Sect 4, SP 709).
- (2) Flap attachment bearings and mounting brackets: visually examine for cracking, security and loose bolts.
- (3) Range of movement and rate of movement checks: carry out in full in accordance with AP 101B-1202-1A, Cover 2, Sect 3, Chap 4E.