# GROUP A - GENERAL INFORMATION

## LIST OF CONTENTS

## GROUP A - GENERAL INFORMATION

**Introduction**

1. Each group in Part 2 bears the same relationship to the chapters in Part 1, e.g., Part 2, Group B, Fuselage; and Part 1, Chapter 2, Fuselage.

2. Each group of leaflets in Part 2 commences with a leaflet bearing a list of contents.

3. New leaflets or re-issues of existing leaflets in an amended form, are issued in the normal manner with an amendment list to this volume.

4. Part 2 refers specifically to Vulcan B Mk.1 and Mk.1A aircraft. For Vulcan B Mk.2 aircraft refer to the Appendix 1 to Part 2.

5. A leaflet may call up manufacturers repair drawings and, when required, these must be requisitioned in accordance with the procedure laid down in A.P.3158, Vol.2, Leaflet D.7.

*NOTE . . .*
*The issue number of manufacturers repair drawings is important and the latest issue of the relevant drawing must be used.*

## GROUP A - GENERAL INFORMATION

### STRESSED JACKING OF MK.1, MK.1A AND MK.2 AIRCRAFT

1. The following instructions should be strictly adhered to:-

(1) Drain the fuel from all tanks.

(2) Close all engine doors.

(3) Jack up the aircraft using the main jacking points. Refer to A.P.4505A and C, Vol.1, Book 1, Sect.2, Chap.4.

(4) The aircraft must be rigged and checked in accordance with the instructions quoted in the Volume 1. Chap.4. For Mk.2 aircraft refer to A.P.4505B, Vol.1, Sect.2, Chap.4.

(5) Adjust the nose steady jack at the fuselage front pressure bulkhead until the jacking pads are touching the skin, measure the jack extension, and then apply pressure on the jack until the dimension at the jack extension is increased by 7/16 in.

(6) Position the wing trestles (U.1058) below each wing and ensure that the outer portion of the wing trestles (U.1132) is located at rib 618. Apply pressure at ribs 618 and raise the wing tips without twist by 2.0 in. For Mk.2 aircraft use wing trestles U.J.T. No.16 positioned at ribs 126.5.

(7) It is important that the aircraft should not be disturbed until the work is completed. It is permissible to open any one engine access door in each bay for access to the underside of the centre section wing top skins.

*NOTE ...*

*During the embodiment of repairs and modifications it has been found from experience that it is necessary to do a daily rigging check to ensure that the aircraft is in the initial stressed jacked condition. It is therefore recommended that this check is carried out each day prior to commencing work on the aircraft.*

### OPERATION PROCEDURE

2. Provided instructions and restrictions quoted on the drawings and leaflets are strictly adhered to, the list of repairs, modifications etc. tabulated in Table 1, can be worked on simultaneously when the aircraft is stressed jacked.

TABLE 1

| Item | Description | Repair Leaflet No. |
|---|---|---|
| (1) | Repair to stringer attachment brackets-front pressure bulkhead, station 372 F. | B.2/1 |
| (2) | Repair to stringer attachment brackets - forward face, rear pressure bulkhead, station 204 F. | B.2/2 |
| (3) | Repair to stringer attachment brackets - aft face, rear pressure bulkhead, station 204 F. | C.1/2 |
| (4) | Repair to stringer attachment brackets - forward and aft faces of rear spar, station 355.5A. | C.2/1 |
| (5) | Repair to stringer attachment brackets - forward face of transport former, station 428A. | C.2/2 |
| (6) | Repair to stringer attachment brackets - aft face of transport former, station 428A.(Mk.1). | B.3/1 |
| (7) | Repair to stringer attachment brackets - aft face of transport former, station 428 A.(Mk.1A and Mk.2). | B.3/2 |
| (8) | Mod.1787. To introduce external strap plates on the top surface of the fuselage on both sides of the rear pressure bulkhead, station 204 F, to obviate defective stringer bracket replacement. | - |
| (9) | Mod.1338. To introduce aluminium alloy stringer brackets in lieu of magnesium alloy brackets at the bulkhead, station 75 F. | - |
| (10) | Renewal of wing tank tunnel skins. | C.4/1 |
| (11) | Change of material. Rib webs, joint straps and access doors. Undercarriage bay rib 212.5. | C.4/2 |
| (12) | Removal, replacement or renewal of main undercarriage units and, if required, the undercarriage may be functioned. Final settings of undercarriage micro switches and functions must be done as instructed in A.P.4505A and C, Vol.1, Book 1, Sect.3, Chap.5. | - |
| (13) | Removal, replacement or renewal of control surfaces. | - |
| (14) | Repairs to fin bottom skins. | D.1/1 |
| (15) | Repairs to fin top skins. | D.1/2 |
| (16) | Insertion repairs to fin ribs 12, 13, 14, 15, 16 and 17 | D.1/3 |
| (17) | Repairs to centre hinge rib web - aft portion. | D.1/4 |
| (18) | Mod.831 and Mod.1454,parts A to F inclusive. If only Mod.831 is being embodied, all the skins affected by this modification can be removed and renewed at the same time. This also applies if only Mod.1454 is being embodied. However if both modifications are being embodied concurrently, Mod.831 must be finished completely, before de-skinning the area affected by Mod.1454 or vice versa. As an alternative to the above, it is permissible for the modifications to be embodied in any way suitable to the operators, provided not more than four skin panels on each side of the aircraft are removed at the same time. | - |

## GROUP A - GENERAL INFORMATION

### CRACKING AND CORROSION OF MAGNESIUM ALLOY STRINGER BRACKETS

**Corrosion damage limitations**

1. Corrosion which, when removed, leaves the bracket excessively pitted is not acceptable as this will result in notches, the presence of which increases the danger of cracking. To guide those concerned in determining whether or not a bracket is to be replaced, pitting is acceptable up to the size of a pin-head, which must be blended out as smoothly as possible with the surrounding surface.

2. Corrosion which extends under the rivet heads must be treated as cracks, as it is considered that, on replacing the solid rivets, there is a great danger of creating further stress concentrations which will eventually lead to cracking.

3. Dealing with corrosion within the rivet holes and possibly the surfaces in contact with the stringer, we would state, that this is amply covered when a surface inspection of the bracket(s) in situ as stated in para.1 and 2 is made.

4. Corrosion of the surface adjacent to the attachment bolt, in some areas, is difficult to determine, due to the proximity of the structure. Wherever possible, the corrosion should be removed and the bracket checked as instructed in para.1. Where access for inspection of brackets is difficult, the use of hand mirrors or any other means to determine the amount and approximate depth of any corrosion, should be used. If it is considered any corrosion present in this area would, if removed, create pitting greater than the size of a pin head, the bracket should be replaced. If, however, the corrosion is considered not to exceed the limits quoted in para.1, the bracket need not be replaced, but a further examination must be carried out at the next Major inspection. The difficulties of assessing corrosion, its removal, and the treatment of brackets in situ are fully appreciated, but the decision to replace must rest with those concerned, as the only alternative is to replace brackets which are showing signs of corrosion.

### PROTECTIVE TREATMENT

5. After the removal of corrosion with the bracket in situ, the exposed area must be thoroughly cleaned and dried before applying one coat of etch primer, consisting of Accelerator, Ref.No.33B/9429195 and Base, Ref.No.33B/9429196. This must be followed by one coat of primer-zinc base Ref.No.33B/9429197, followed by one or two coats of lacquer Ref.No.33B/9432474. Brackets which have been removed from the aircraft, may be given selenious acid treatment prior to painting, but no attempt must be made to treat brackets in situ, because of the danger of leaving the acid trapped between structures.

### CRACKED BRACKET INFORMATION

**Cracked bracket limitations**

6. Brackets which are cracked at hole position No.4 in the two outer legs, and No.5 in the centre leg, (Refer to A.P. 4505B, Vol.4, S.P.600/7 for hole positions) may be classed as negligible damage, and therefore the brackets need not be replaced. If the brackets are cracked at any other position, they must be replaced with the correct bracket at the next Major inspection, unless otherwise stated in the following paragraphs. The following comments concern each structure joint in respect to cracks and corrosion of stringer brackets and action to be taken.

**Front pressure bulkhead - aft face**

7. Corrosion of the brackets at this bulkhead have not been reported, but, if present it is not expected to be severe due to the fact that they are coated with pressure sealant. Cracking of these brackets does however occur, and from experience obtained on the pressure cabin fatigue tests, cracked and corroded brackets are acceptable up to 900 cabin pressurisations. Therefore repairs at this bulkhead are only necessary prior to, or at a Major inspection.

**Rear pressure bulkhead - forward face**

8. Corrosion limits are as stated in para.1. Cracked bracket limitations as stated in para.6. The life of this structural joint is guaranteed up to 600 cabin pressurisations, i.e., second Major inspection, with defective brackets. A defective bracket need not be replaced provided there are three sound brackets at each side. There is however, one exceptto the above conditions, and that is, at the top of the bulkhead between stringers No.7 to 47 inclusive. As this is a critical structural area, cracked and possibly corroded brackets which do not conform to the conditions in para.1, must be replaced at each Major inspection. Due to the difficulty in replacing brackets in this area, Mod.1787 introduces external strap plates on both sides of the bulkhead. When this Mod. is embodied, the need for inspection and replacement of brackets in this area, stringers No.7 to 47, becomes unnecessary on Mk.1 and Mk.1A aircraft, due to the fact that their life is now limited. If Mod.1787 is embodied on Mk.2 aircraft, inspection of the stringer brackets and repairs in this area, must be carried out at each Major inspection and the results forwarded to the parent firm for assessment, so that further action may be considered.

**Rear pressure bulkhead - aft face**

9. The information and instructions given in para.8 also apply to the aft face of the rear pressure bulkhead.

**Bulkhead station 75F forward and aft faces**

10. These areas are to be inspected in accordance with A.P.4505B, Vol.4, S.P. 600/7, and, if the conditions laid down in the S.P. are not met, it is strongly recommended that Mod.1338 be embodied.

**Front spar - aft face**

11. Corrosion limits are as stated in para.1, excepting that it is permissible to remove the rivets to enable corrosion under the heads to be removed. Solid rivets, appropriate size and material specification must be used for replacement. The attachment of the stringers to the front spar in this area is not as critical, so it is permissible to continue flying with the two outer legs of the three top hat stringer brackets on each side of the aircraft cracked at rivet position No.1. However a bracket with cracks in one outer leg at rivet positions 1, 2 or 3, together with one in the centre leg at rivet positions 1, 2 or 3 must be replaced, if the brackets on either side are defective in any of the three legs, at any of the above rivet positions. Refer to A.P.4505B, Vol.4, S.P.600/7 for rivet positions. This concession is applicable to all marks of the Vulcan aircraft, but it is recommended that defective brackets on the Mk.2 aircraft be replaced at a second Major inspection.

**Rear spar - station 355.5A**
**Former 428A - forward face**
**Former 428A - aft face**

12. Corrosion limitations in para.1 apply to all stringer brackets at the above stations. Cracks in stringer brackets which can be classed as negligible damage, are fully described in para.6. Brackets which are outside the limits quoted above, must be changed at the first available opportunity, or at the next Major inspection.