

PART 1

MINOR REPAIRS

The repairs described in this Part are limited in scope because they have been devised with a view to avoiding, as far as possible, the use of non-portable special tools, jigs, or other equipment which it is not practicable to provide as standard Unit equipment. Repairs which are beyond the scope of this Part will be described in the Repair Leaflets in Part 2 of this Volume.

In this Part, the prohibition of repairs in certain areas or the absence of a suitable repair instruction for any damage sustained is not to be taken as meaning that the component is beyond repair. Reference should be made to Part 2 where a Repair Leaflet covering major damage may be found.

In the absence of any instructions and when the appropriate technical officer considers that repair on site is practicable, a request for a repair scheme is to be submitted to the Directorate of Aircraft Engineering, Air Ministry. When such a request is submitted, full details with sketches and/or photographs indicating the exact location and extent of the damage are to be attached.

LIST OF CHAPTERS

Note.—A detailed list of contents appears at the beginning of each chapter

- 1 Introductory repair information
- 2 Fuselage
- 3 Main planes
- 4 Tail unit
- 5 Alighting gear
- 6 Engine nacelles
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VULCAN AIRCRAFT - REPAIR AND RECONDITIONING INSTRUCTIONS

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Note.- This leaflet is to be inserted in its correct numerical order following the Marker Card for Advance Information Leaflets at the beginning of the book.

RIVETING OF AIR INTAKE SKINS

When it is necessary to renew "pop" rivets in the air intake skin, or to fit them in place of solid rivets, the following procedure should be adopted, to obviate any possibility of loose mandrels being drawn into the engine and to ensure that the rivets are sealed.

Dip replacement rivets in cold setting Araldite 121 N before fitting. After curing time has elapsed for the Araldite (generally 12 hours, or over night) the rivets should be filled with Ryland's "pop" rivet filler No. 2313.

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Remove and destroy A.I.L. No.2/57 which this leaflet supersedes.

Canopy fairings replacement

General

The fairings are attached at the forward end of the canopy and should it become necessary to replace one or more of the panels the following procedure must be strictly adhered to.

Preparation of surfaces

In all metal bonding, surface cleanliness is very important. The bottom and forward members of the canopy are magnesium alloy castings, and the chromate protective treatment on them should be protected against the various solvents used for cleaning the bonding surface.

- (1) Remove paint etc. in the area to be bonded by applying paint remover (33B/1125) taking care that the treated area is slightly larger than that required for fitment of the fairing. After removal of the paint great care must be taken to wash off with water all traces of the spent stripper. Thoroughly dry the surface with a clean rag.
- (2) The clean alloy skin surface is now etched for bonding by treating with Deoxidine (33C/748) applied with a brush. The surface must be kept wet for a period of 5-10 minutes after which all traces of Deoxidine must be removed by washing with cotton-wool swabs soaked in water. Thoroughly dry the surface which should now show a "whitish" appearance after the above treatment. If the skin under the fairings has been etched previously there is no need to carry out the foregoing. The following treatment is all that is required. A cleansing and light etching operation with Deoxidine 202 should be carried out, and the surface afterwards washed down with water to remove any traces of the etching liquid. Dry the surface with a clean rag.
- (3) Offer the replacement fairing to the canopy which should be in position on the aircraft, and check for alignment of the faces, noting if there are any slight discrepancies so that allowance can be made when applying the Araldite compound (33C/1451).
- (4) Before fitment the bonding face of the fairing should be roughened by means of coarse sandpaper or a hacksaw blade.
- (5) When carrying out operations sub.para.1 - 2 it would be advisable to remove the canopy from the aircraft, protect the hinge arms etc. before standing it upright in order that the solvents used, will tend to run away from the magnesium alloy members, and not effect the chromate treatment. If inadvertently some of the solvent runs onto the members and destroys the chromate treatment, the following action must be taken. Wash off with water the solvent involved and dry immediately. With a small brush apply Solenious Acid Solution over the damaged treatment area, making sure that no acid goes on the canopy skins. No further treatment is required and the fairing can be bonded on top of the chromate treatment.

Bonding compound

The compound to be used for attaching the fairing to the canopy is made up of 100 parts by weight of Araldite 121N (33C/1451) and 4 to 5 parts by weight of standard cold setting Hardener 951 (33C/1372). These constituents should be mixed thoroughly, adding the hardener to the resin, and taking care that the resin around the sides of the container is scraped off to dislodge the adherent resin. In order to extend the pot life of the resin, when mixed, it should be transferred from the mixing container and spread out onto a clean sheet of thick gauge aluminium in a layer of about

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$\frac{1}{4}$ in. thick or less. The pot life of the resin is about $1\frac{1}{2}$ hours depending on the prevailing temperatures. When the resin has thickened up to a point where it can no longer be easily applied and spread, the pot life is considered to have expired.

Installation

Using a spatula or a blunt knife blade a film of the resin compound should be well worked into the bonding surfaces of the canopy and fairing. After the initial film has been smeared on, a body of the compound sufficient to fill up any discrepancies between the mating faces, and a fair surplus quantity should be applied so that in squeezing out the excess adhesive, any trapped air is swept out at the same time. Surplus resin should be wiped away to leave a neat fillet around the joint.

The adhesive itself, or the quality of the bond, does not benefit from the application of pressure during setting but some light pressure will almost certainly be required to ensure that the fairing is held down and in proper contact all round the rim. Adhesive tape and plasticine may be useful in maintaining the mating position of the parts while curing is in process. At this stage the rivets and Parker-Kalon screws which are fitted at the forward end of the fairings only, should now be assembled. Using the existing holes in the canopy skin and forward mag. alloy member as location points, drill through the fairing so that all the holes are in perfect alignment. All rivets and Parker-Kalon screws should be dipped in Celloseal before assembly. As the rivets are not the normal type a description is appended below.

Rivets $\left. \begin{matrix} \{422\} \\ \{508\} \end{matrix} \right\}$ Advel self-sealing C/sk. 120° }
Hole dia. Morse No.20 - .161 in.

Parker-Kalon type 'Z' S.970 No.2 x $\frac{3}{16}$ in. long. (Self-tapping screw C/sk.) }
Hole dia. Morse No.47 - .0785 in. x $\frac{3}{16}$ in. deep. C/sk. hole 82° x .048 in. deep. }

Alternative Parker-Kalon screws which may be used.

Parker-Kalon type 'Z' S.970 No.4 x $\frac{3}{16}$ in. long. (Self-tapping screw C/sk.)

Hole dia. Morse No.37 - .104 in. x $\frac{3}{16}$ in. deep C/sk. hole 82° x .064 in. deep.

Note.- Great care should be taken, if, for any reason the holes for the Parker-Kalon screws have to be redrilled, that the depth stated is not exceeded.

Special tools required are:-

- (1) Advel rivetting Gun
- (2) Backmarker

Manufacturer
Aviation Developments Ltd.

Curing time

Despite the term "cold setting", curing is still dependent on the actual temperature prevailing. If the temperature is below 60°F , localised heating should be used to bring the temperature up to at least 60°F as this figure should be regarded as the absolute minimum for serious bonding work.

With an ambient temperature of 65°F the curing to the initial hard state takes about 12 hours, and at least 48 hours to reach full strength curing. If the temperature should vary during the curing time, a check regarding the state of the resin can be obtained by retaining a sample of the squeezed out resin and keeping it under the same conditions. In normal

temperature 60^oF the resin compound should certainly be quite hard, after 24 hours have elapsed, and a mix that has not hardened after this time must be suspect.

Final finish

Any irregularities in contours, and surface blemishes both around the joints, and in the actual fairings can be filled and smoothed over with an additional quantity of the Araldite 121N adhesive.

Bleed holes

A small 1/16 in. leak hole is provided in each fairing to bleed off any leaks that may occur in the canopy skinning under the fairing. Care must be exercised that this hole is not blocked up during the bonding operation.

Final spray

No spraying should be undertaken until the resin compound has reached full strength curing. This may take several days depending on the prevailing temperature. Cellulose and synthetic thinners will dissolve the resin prior to full strength curing so the wisdom of not spraying until the cure is complete can be appreciated.

Care in handling

Frequent handling of cold setting Hardener 951 can cause dermatitis. Avoid unnecessary contact and keep all containers, weighing equipment, spatulas etc. in a clean non-sticky state. Clean all equipment immediately after use with the aid of cellulose or synthetic thinners, then washing down with water, and finally wiping dry.

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ADVANCE INFORMATION LEAFLET NO. 6/57

Note.- This leaflet is to be inserted in its correct numerical order following the Marker Card for Advance Information Leaflets at the beginning of the book.

REPAIR TO RADIO AND RADAR CRATE RUNNERS

When Mod.439 has not been incorporated, repairs by replacement to the light alloy N.C.B. (calculator) tray runners, items 40, 41, 42, 43 of Dwg. No.T.3673 can be carried out, using the following sequence and operation:-

1. Locate N.C.B. equipment in the nose wheel bay starboard side and disconnect all connectors from the power unit (Stores Ref.9D/11) and calculator (Stores Ref.9D/2). Leave the connectors loose but clear of the crate runners. Remove the 'pip' pins and slide out the tray, item 1/T3677, complete with power unit and tray, item 1/T3678, complete with calculator.
2. Locate crate runner item 40/T3673, and at the outboard end drill out four rivets attaching the runner to support item 8/T3673, and one rivet attaching the runner to bracket item 29/T3673. At the inboard end drill out the two rivets attaching the runner to support channel item 5/T3673, and one rivet attaching runner to bracket item 35/T3673. Remove the runner from the crate.
3. Position the new runner item 2/T4542 and drill in conjunction with original rivet holes in items 5/8/29/35/T3673. De-burr and rivet using rivets A.S.2230/404.

Note.- Should the removal of rivets result in slightly larger holes, then a larger size rivet should be fitted, i.e., A.S.2230/504.

4. Locate crate runners, items 41 and 42/T3673, and at the outboard end drill out the two rivets attaching each runner to support item 9/T3673, and one rivet attaching each runner to bracket item 15/T3673. At the inboard end drill out the two rivets attaching each runner to the support channel item 3/T3673 and one rivet attaching each runner to bracket item 15/T3673. Remove the runner from the crate.
5. Position the new runners items 3 and 4/T4542 and drill in conjunction with the original rivet holes in items 3/9/15/T3673. De-burr and rivet, using A.S.2230/404.
6. Locate crate runner Item 43/T3673 and at the outboard end drill out the four rivets attaching the runner to support Item 16/T3673 and one rivet attaching runner to bracket Item 21/T3673. At the inboard end of the runner drill out the two rivets attaching the runner to the support channel, item 6/T3673, and one rivet attaching the runner to the bracket, item 39/T3673. Remove the runner from the crate.

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7. Position the new runner, item 5/T4542, and drill in conjunction with the original rivet holes in items 16/21/39/T3673. De-burr and rivet, using rivets A.S.2230/404.

8. Replace tray item 1/T3678 complete with calculator and tray item 1/T3677 complete with power unit, and replace 'pip' pins. Re-connect connectors removed in operation 1.

Note.- This repair will be incorporated in Chapter 3 of this volume in due course.

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ADVANCE INFORMATION LEAFLET NO.1/59

Insert this leaflet in A.P.4505, Vol.6, Part 1, Chap.2, to face para.219

SUB-PARA.12

Boscoprene 2100, Ref.No.33C/1284, has been approved for sealing windscreen panels and should be used on both instances detailed in this sub-para.

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ADVANCE INFORMATION LEAFLET NO. 2/59

Insert this leaflet in A.P.4505, Vol.6, Part 1, Chap.4, to follow the first leaf of text.

FIN CAP

General

404. Information given in the following paragraphs is designed to cover minor repairs only, and it should be emphasised that in order to achieve acceptable standards, considerable care must be exercised when carrying out same. A brief outline of the design features of the fin cap is described in the following paragraph.

Description

405. Material used for the construction of the fin cap is made from felt layers of Dureston Spec. R.A.I. D.T.D.5511. The overall thickness is approximately 0.25 in. consisting of five layers, with additional layers at the crown and attachment areas. Assembled on the inside at the rear end is a Gee aerial made from copper metal foil 1/64 inch thick or 28 S.W.G. (Refer to fig.403C).

Method of repair

406. Prior to carrying out repairs it is essential to remove the neoprene coating surrounding the damaged area for a distance of at least two inches beyond the outer edge. Holes up to 1 inch in diameter can be repaired as follows:- Attach a piece of cellophane over the hole inside the fin cap, and fill the cavity with a mixture of cold setting Araldite 121.N. Ref. No.33C/1451 and Hardener 951 Ref. No.33C/1372 ensuring that the filler will be slightly proud after curing to enable it to be smoothed down to the original contour. Instructions for the mixing of the compounds, curing times, and temperatures required are contained in para.223, and 226 to 228 of Chap.2. Tears or abrasions up to approximately 3 inches long by 1 inch wide including those which penetrate the first or second laminate, may be repaired by, firstly, removing any loose strands, and before applying the filling, roughening the surfaces of the damaged laminate with sandpaper to provide a mechanical key for adhesion. Enough filler should be applied so that eventually after curing, and sanding down, the original contour will be obtained. Finally remove any cellophane which has been used in the course of the repair, and refer to para.125 to 130, Chapter 1, for renewal of the Neoprene coating.

Notes

- (1) The information contained in this leaflet will be incorporated by normal amendment list 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 the leaflet is to take precedence.

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