

Issue 1

Date 14.6.50

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MODELS AFFECTED

1950 "75"
1948-50 Land-Rover

UNIT AFFECTED

BODY

REPAIR OF LIGHT ALLOY BODY PANELS BY BRAZING AND SOLDERING

Information in this Bulletin should assist in carrying out minor repairs to the light alloy panels used in the construction of 1950 "75" and Land-Rover bodies.

Material

The material used for all Land-Rover panels is known as Birmabright 2 and that for 1950 "75" door, bonnet and boot lid panels as Birmabright 3.

Soldering technique is identical for both alloys.

Temperature characteristics of Birmabright are:—

Annealing	....	....	Starts at 230°C.
Softening	....	....	360° to 380°C.
Melting point	....	....	670°C. approx.

Precautions to be observed

1. Absolute cleanliness is essential.
2. Ensure that the solder has solidified before subjecting the joint or patch to any pressure.
3. After soldering, protect the joint against moisture attack or corrosion due to being in contact with other metals, with a coat of paint or film of grease.
4. Aluminium soldered joints will not anodise.

Soldering methods available

1. Brazing or Hard Soldering

Brazing is second only to welding from the corrosion resistance point of view; it gives a sound joint and is more readily carried out than welding due to the lower temperature required.

2. Soft Soldering

Soft soldering requires an even lower temperature than brazing, thereby reducing the annealing and loss of strength of the parent material due to the applied heat. It does not, however, give as sound or as strong a joint as brazing and should be avoided where corrosion resistance is an important consideration.

3. Reaction Soldering

Reaction soldering involves temperatures similar to soft soldering, but its use is somewhat limited by the special method of application.

4. Mullard Ultrasonic Soldering Iron

By this method of soldering, the oxide film is temporarily destroyed by ultrasonic stimulation, thus providing a clean surface.

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The four methods are dealt with in detail below:—

A. BRAZING

This process is distinguished from welding in that the parts to be joined are not themselves melted. The filler metal has a melting range of 575°C. to 590°C., enabling a town gas-compressed air flame to be used as an alternative to an oxy-acetylene flame; the latter is preferred, however, as it is better controlled and a more localised heat is applied, thereby minimising the danger of edge melting or local collapse. The joint will have good corrosion resistance and its strength will be of the same order as a welded joint.

Proceed as follows:—

Degrease or wipe with a trichlorethylene rag and scratch brush the parts to be joined. Clamp the parts as firmly as possible. Heat the joint with either a town gas-compressed air or oxy-acetylene blowpipe; apply a generous coating of flux to the filler rod.

The flux residue should be washed away thoroughly with hot water and a wire brush.

SUPPLIERS

Equipment

Oxy-Acetylene	.....	British Oxygen Co., Ltd., Grosvenor House, Park Lane, London, W.1., England.
Town gas-compressed air blowpipe	.....	Fletcher-Russell Co., Ltd., Warrington, Lancs., England.

Brazing Rod

Silotectic Melting Point 575-590°C.	.....	British Oxygen Co., Ltd., AS ABOVE.
or "Hari-Kari"	.....	Midland Welding Supply Co., Ltd., 620 Shirley Road, Hall Green, Birmingham 28, England.

B. SOFT SOLDERING

In this process, the solder melts at a lower temperature than in hard soldering; the solders available for use with aluminium have similar melting points to the tin-lead solders used for brass, steel or tin plate.

The greatest difficulty in soldering aluminium and its alloys is the removal of the oxide film, aluminium differing from other common metals, in that the skin of oxide formed is tough and refractory and is not removed by the ordinary fluxes.

The method generally employed requires a special solder. This is melted on the aluminium and the surface beneath is scraped with a sharp tool which can be attached to a soldering iron. Thus the oxide is removed mechanically while the solder is used as a cover to exclude air.

If the mechanical scratching is not desired, the following pre-treatment solution may be used:—

20 per cent. Phosphoric Acid.
10 per cent. Nitric Acid.
Trace of wetting agent, e.g., 0.1 per cent. "Teepol".
Balance—water.

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When the surface of the dent or joint has been scratch brushed and pre-treated by swabbing with the above solution and washed with water, the effect of the solution will be noted by a brightening of the surface of the metal treated. A blowpipe is then played on to it and a stick of 90 per cent. tin, 10 per cent. zinc solder is rubbed firmly over until it is covered with a molten layer of solder. The efficiency of the tinning can be checked at this stage by wiping off the surplus solder with a clean rag and observing whether or not there is a continuous tinned layer.

Plumbers wiping solder or the Abbey body filling solders can now be melted into the joint or dent and be wiped into position with a moleskin pad or wooden scalpel in the normal manner.

SUPPLIERS

Solders

Fryall Aluminium Solder (recommended)

Commences to melt 170°C.

Completely fluid 300°C.

"Teepol"

Grey & Martin, Ltd., City Lead Works,
Southwark Bridge, London, S.E.1,
England.

Frys Metal Foundries, Ltd., Merton Abbey,
London, S.W.19, England.

Shell Chemicals, Shell-Mex House, London.

C. REACTION SOLDERING

In this process the solder consists of a chemical mixture containing 90 per cent. of zinc chloride and 5 per cent. of ammonium chloride, which, on heating to approximately 400°C. in contact with aluminium, reacts with it, resulting in the deposition of metallic zinc on the joint. This solder tins readily without the necessity for scratching the metal surface during the soldering operation as with an ordinary aluminium solder. The fact that it is a powder and must be heated indirectly somewhat restricts its application, particularly with body panels in situ.

Proceed as follows:—

Clean the parts to be joined with a wire brush or emery cloth, place a layer of "Flinso" powder between the surfaces of the joint and build up more powder around the area of the joint or surface of the dent. Heat from underneath with a blowpipe to 300° to 400°C. until the reaction commences, after which it will proceed automatically. When the reaction is complete, the joint should be allowed to cool in air, washed and dried.

Alternatively the parts can be tinned with this powder and then the dent filled up in the same manner as described under soft soldering.

SUPPLIER

Flinso Aluminium Solder-Powder Form Grant and West, Ltd., 3 Furlong Road,
London, N.7, England.

D. MULLARD ULTRASONIC SOLDERING IRON

This equipment provides the most efficient method of soldering but entails an initial cost of approximately £70. Full details of the technique available from the supplier.

SUPPLIER

Mullard Electronic Products, Ltd.,
Electronic Equipment Division,
Aboyne Works, Aboyne Road,
London, S.W.17, England.