

DOUBLE-FACE SLUICE VALVES AND ARALDITE

H.M.S. CENTAUR

Trouble was experienced in H.M.S. *Centaur* with leaking firemain bulk-head isolating valves. On examination, the seats of the valve plugs were found to be heavily pitted—possibly through the combined effect of erosion and corrosion.

These valves are of the 6 in. double-face sluice type and two methods of refitting them were used by dockyard during the ship's refit :

- (i) By brazing false seats on the plugs, and
- (ii) Building up the seats by brazing.

Neither of these methods proved satisfactory although (i) was superior to (ii).

A third method using 'Araldite' to build up the plug seats was subsequently carried out as an experiment by the ships staff on two of the valves. This unusual method of repair seems to be more satisfactory ; preliminary inspection of these two valves showed the plug seats to be in perfect condition although corrosion/erosion was still taking place at the centre of the plugs. The details of this method are described below.

Preparation

The plug is set up in a lathe using the undamaged parts of the seat as a reference surface. The seat is then machined back approximately three thirty-seconds of an inch. A cut is taken across the centre of the plug to provide a reference surface after the araldite has been applied. Using a sharp 'V' tool, the seat is then 'gramophoned' across its width, the cut being left ragged to provide an extra bond.

Two other additional means of bonding the araldite to the seat have been tried and both have proved successful. They are :

- (a) By cutting three dovetails across the seat as shown in FIG. 1.
- (b) By making a series of saw cuts across the seat as shown in FIG. 2.

Before applying the araldite, the plug must be completely dry.

Black masking tape is used to provide a rim round the outside of the seat and a wooden plug is fitted in the centre. The plug is then blocked up until the seat is horizontal, after which the prepared mixture of resin, hardener and filler is poured in until a depth of approximately three sixteenths of an inch is obtained. Care must be taken to ensure that the araldite reaches the bottom of the 'gramophone' cut and that all air bubbles are removed. The araldite sets hard in 24 hours in a clean dry atmosphere after which time the wooden plug and the masking tape are removed.

This procedure is repeated for the other side of the plug.

Machining and Fitting

A measurement is taken with callipers of the distance between the seats at the bottom of the valve box—approximately half way across the width of the seat.

The plug is then set up in a lathe using the newly machined centre as a reference surface, and the seat is machined back—taking care to remove approximately the same amount of material from each side of the plug until the measurement across the narrow end is equal to the measurement taken in the box. By machining approximately one sixteenth of an inch off the plug, the majority

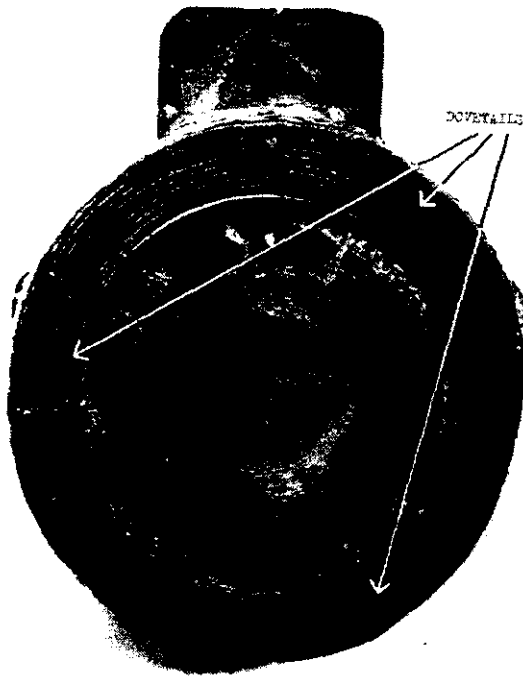


FIG. 1

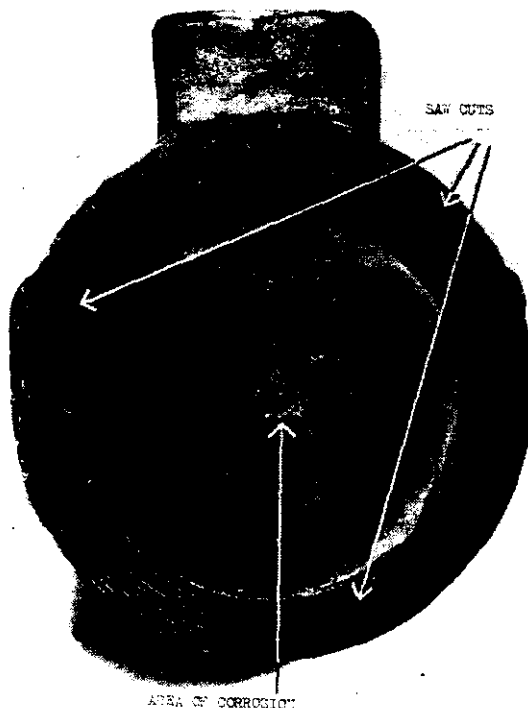


FIG. 2

DEPARTMENTAL COMMENT

This is an ingenious method of repair which could be adopted generally for building up the plug faces of sluice valves. It is intended to promulgate this method of repair in B.R.3001.

The maintenance difficulties associated with sluice valves are well known. For current new construction, lubricated plug valves are being fitted. Investigation of unlubricated 'full bore' types, e.g. 'O' ring sealed plug and ball valves, butterfly valves, etc., is proceeding.

of the air bubbles remaining are removed.

As the plug is machined on its original face and the new reference surface is cut at the same setting, the angle of the wedge of the plug remains unchanged.

Having machined the plug, the remaining fitting is done by hand, using a scraper and grinding on a port-hole glass until a perfect marking is obtained when the box and plug are mated together.

Disadvantages of Using Araldite

- (i) Accurate mixing of the resin, hardener and filler is essential —mixed araldite cannot be stored.
- (ii) Araldite must be applied to a dry surface in a fairly dry atmosphere.
- (iii) If the newly araldited plug were dropped on a hard surface, the seat might chip.

Advantages of Using Araldite

- (i) It provides a very satisfactory method of refitting the 6 in. double-face sluice valves on board ship by ships staff.
- (ii) An araldite seat appears to be completely unaffected by both corrosion and erosion caused by high water speeds.
- (iii) The corrosion/erosion which takes place on the plug centre can be repaired on board by brazing. Extremely serious pitting would have to take place before the plug becomes unserviceable.