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Guideline for joining AOA chrome carbide and complex carbide welded overlay wear plates

Caution: When welding AOA wear plates care should always be taken to eliminate dilution of the Hardface layer into any mild steel structural weld. Dilution of the Hardface layer will result in the pick up of high levels of carbon and chrome causing precipitation of chromium carbides and resulting in a brittle weld.

All structural welding must be performed from the mild steel side directly to the mild steel. Welds to the Hardface layer exhibit no structural strength.

For aesthetic reasons weld joins across the weld bead should be avoided. Longitudinal joins are the preferred option.

This document is intended as a general guide only. All welding must be performed in accordance with the appropriate welding standards and occupational health and safety standards.

1. Grind a weld preparation of 45 degrees to 2mm from the Hardface/Mild steel interface on the mild steel side. I.E 8 on 10 will have an 8*45 degree, 6 on 6 4*45 degree (Photo 1). A 4*30 degree preparation on the hard face side should be suitable for all thickness except those with less than 6mm hardfacing and more than 8mm. Adjust preparation accordingly.

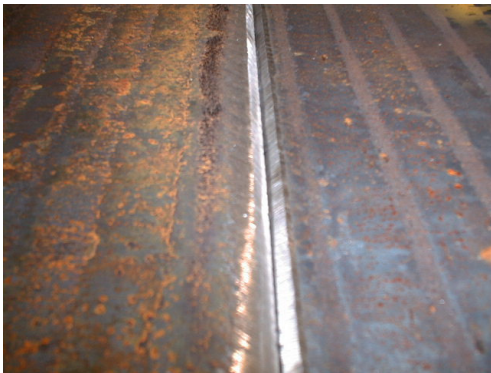


Photo 1

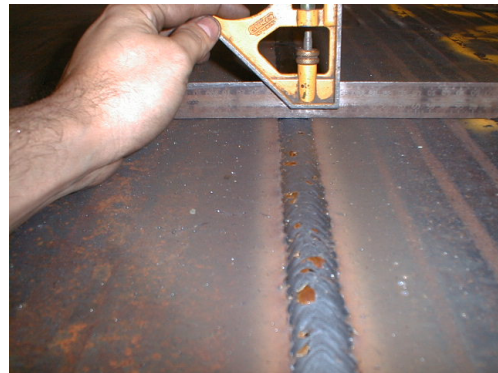


Photo 2

2. Perform a mild steel butt weld according to the appropriate welding standard (Photo 2). Single double or triple passes can be performed at any qualified welding operators discretion. Consideration should be given to the penetration into the remaining 2mm above the Hardface/mild steel interface and any possible dilution from the Hardface layer. As welding can only be performed from the mild steel side it is important to achieve a weld penetration totaling approx 90% of the thickness but not exceeding 95%. Should concerns relate to the ability to achieve this then a stainless welding consumable should be used.

The work piece should be pre-tensioned and secured to offset shrinkage pulling which will cause the plate to form a “V” shape. This is best achieved by packing under the weld joint with an appropriate thickness and clamping both outer edges of the work piece after tacking.

3. Grind flush for a “hidden” join if required. (Photo 3)



Photo 3



Photo 4

4. Perform a Hardface sealing weld on the AOA overlay (Photo 4). No special considerations are required the weld should be simply a re-melting of the hard layer to as deep a penetration as possible. The consumables used should be as close as possible to the chemical analysis of the AOA hard layer, however most welding consumables may be used. It must be considered that any consumable used, which has a lower chemical analysis, will dilute that section of the AOA hard layer and result in an area of more rapid wear. Consumables of low analysis such as mild steel may cause large cracks along the edges of the weld due to shrinkage. An acceptable Hardface consumable will have >4% carbon >20% chrome.

Hardface sealing welds should be performed as flat as possible to achieve a “hidden” weld if required (Photo 5). Raised welds can be ground flat, with difficulty, due to the wear resistance of the material.

The Hardface weld can be used to correct any pulling distortion mentioned earlier by once again pre-tensioning the work piece according to requirement. In this case a hot slow pass is appropriate to generate sufficient heat in the work piece.



Photo 5

Approved 20/5/2001

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