

EDWIN LOWE LTD, BIRMINGHAM, UK

SOME COMMENTS ON THE WELDING PROCESS - OF THE PRESSED STEEL BEARING HOUSING ASSEMBLIES (CARTRIDGES) ONTO THE STEEL ROLLER TUBES

OPENING REMARKS

The generally accepted method of welding pressed steel bearing housings onto the steel roller tube is through the medium of a twin headed MIG welding lathe. This operates in principle in a similar fashion to a machining lathe - with a fixed headstock and a moving/adjustable tailstock - to accommodate different lengths of rollers - i.e. both troughing and return rollers.

The main difference with the twin headed MIG welding lathe is that each weld head now incorporates assembly tooling for rollers, together with a MIG weld gun - instead of the cutting tools normally associated with a machining lathe.

Some other relevant comments on precisely how our cartridges are welded onto the roller tube are summarised here viz:

1. ROLLER ASSEMBLY PRIOR TO WELDING

As already mentioned elsewhere - in contrast to traditional assembly/welding techniques - a cartridge based roller is preassembled and pregreased, prior to the welding process i.e:

- The roller tube and roller shaft, together with two pre-greased bearing housing cartridges, are preassembled - prior to presentation to the welding machine.
- The preassembled roller is normally placed onto a 'V' block (or equivalent) situated upon the main bed of the welding machine - between the two weld heads.
- The first part of the cycle enables the head tooling on the two opposing heads of the welding lathe to carry out in essence what is the final assembly operation of the roller manufacturing process.

See our other working paper concerning "Automatic self alignment of all components within the welded steel roller".

- The second part of the same cycle - is the actual weld process - i.e. the dwell time of the two weld guns on each of the opposing weld heads, laying down at both ends of the roller, the relevant weld bead, between the edge of the cartridge flange and the roller tube face.

2. DIFFERENT STYLES OF WELDING

Our customers generally use one of two principal ways of welding bearing housing cartridges onto their roller tubes. These are:

- Butt Weld - i.e. here the outside diameter of the cartridge flange is welded onto the two opposing outer end faces of the pre-prepared roller tube.

SOME COMMENTS ON THE WELDING PROCESS - OF THE PRESSED STEEL BEARING HOUSING ASSEMBLIES (CARTRIDGES) ONTO THE STEEL ROLLER TUBES
(Page 2.....)

- Recess Weld - here the outside diameter of the cartridge flange is firstly assembled into a recess which has been machined into the two opposing ends of the roller tube - before the weld cycle takes place.

- i.e. in essence a machined “seat” has been created around the bore diameter of the tube, with a rear face which is at 90° to the roller central axis. The back face of the cartridge flange therefore abutts against this pre-prepared rear face, prior to the weld cycle.

(Attached to these working notes is a sketch showing these two main styles of weld configuration).

3. THE WELD FILLET

- The actual weld bead as will be seen from the sketch, is laid down into a pre-prepared right angled channel, which is called the Weld Fillet.
- The Weld Fillet ideally should consist of two even sides at 90° to each other - i.e. each side measuring the same length.
- For Butt Weld configuration rollers - the weld bead must not appear above the surface plane of the roller tube outside diameter -

- i.e. if a “bulge” of weld bead appears above the outer surface of the roller tube - then there is the risk that the conveyor belt, via lateral movement during operation, can act as a kind of “sandpaper” and destroy the integrity of the weld.

If this occurs - there is a serious risk that the roller will collapse upon the conveyor belt.

- For a Recess Weld style fillet - this is not a serious problem. Provided that the weld bead itself is of good quality in terms of welding the two components together - cosmetics may play a part here - but the mechanics of the weld are self contained.
- On this basis a Recess Weld cycle time can in fact be slightly faster than a Butt Weld cycle time.

4. PREPARATION OF THE ROLLER TUBE - BEFORE THE WELDING OPERATION

- For a Butt Weld configuration roller - the two opposing outer faces of the cut roller tube must be faced via a secondary operation, after the tube has been cut - in order to ensure that the outer faces of the cut roller tube are:
 - Free from deformity or burr, and
 - Precisely at 90° to the central axis of the tube.

SOME COMMENTS ON THE WELDING PROCESS - OF THE PRESSED STEEL BEARING HOUSING ASSEMBLIES (CARTRIDGES) ONTO THE STEEL ROLLER TUBES

(Page 3.....)

- For Recess Weld rollers - a roller tube is machined around the inside diameter/bore of the tube - ideally at both ends simultaneously - around the tube central axis, in order to provide the “seat” for the cartridge/bearing housing flange.

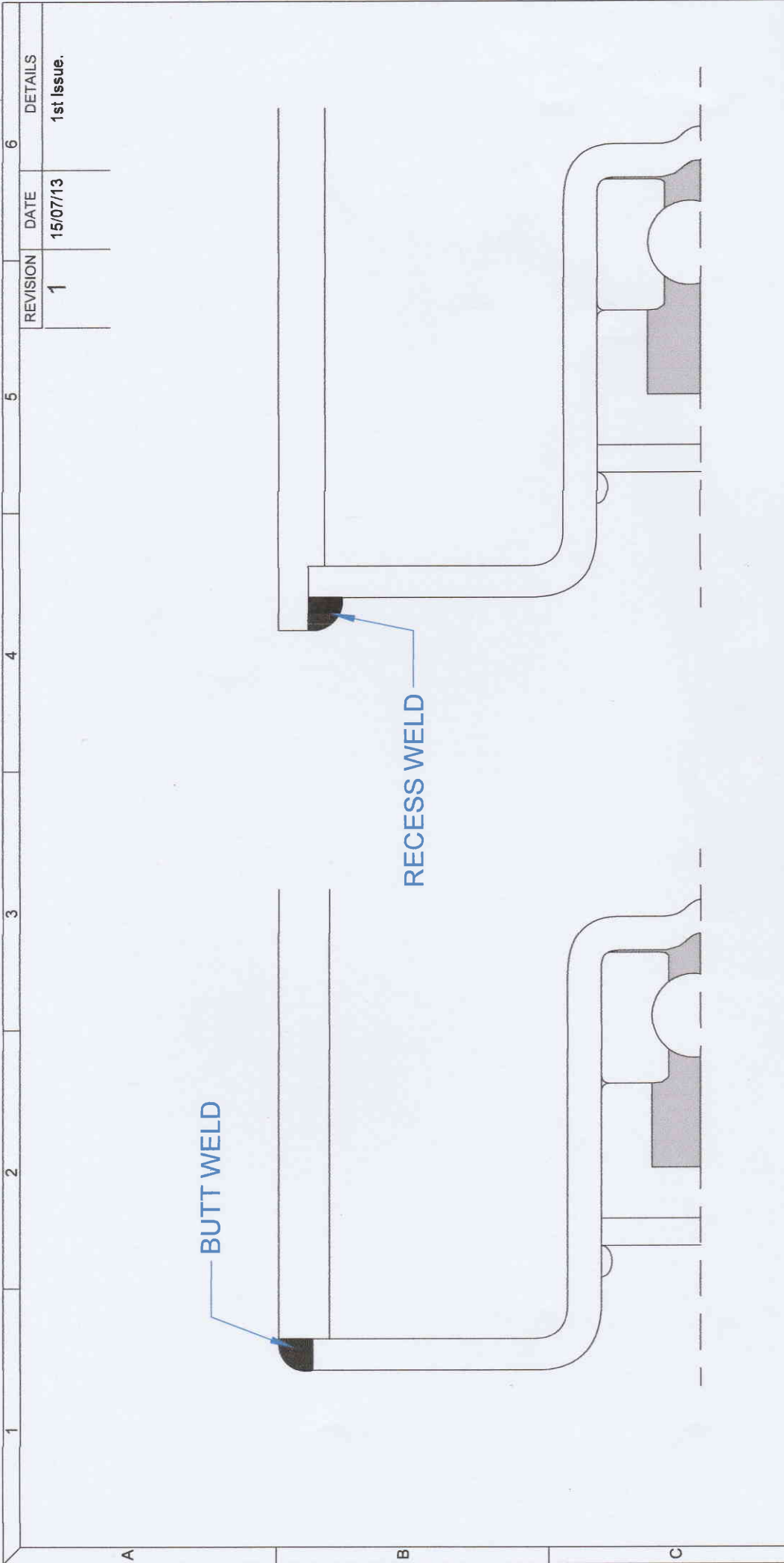
The rear face of this machined recess against must be a precisely 90° to the roller tube central axis - so that it provides an absolutely vertical and flat platform for the bearing housing flange.

- With regard to the depth of the recess from the outer face of the tube - this should be a minimum of 2 x the flange thickness of the bearing housing itself.
- The width of the “shelf” formed by the machined recess method should be between 0.50 mm and 1.00 mm ideally - dependent upon the actual cartridge specification being used.

5. ADDITIONAL COMMENTS

- For a Butt Weld configuration - the profile of the weld bead should exhibit a smooth curved radius - to “blend” the outer face of the roller tube with the external face of the cartridge flange.
- For the Butt Weld configuration - care should be taken that the weld bead ‘overlap’ does not give rise to a deformity in the weld bead itself which projects beyond the outer face of the roller tube outside diameter - for reasons mentioned earlier in this working paper.
- For the Recess Weld configuration - the two points mentioned above are not major considerations - since the weld bead is laid down within the body of the roller tube. This is one reason why the Recess Weld cycle time can be quicker than the equivalent Butt Weld cycle time.

A V Cook
Edwin Lowe Ltd
Birmingham, England
05.03.14



NOTES:

EDWIN LOWE LTD
 ALDRIDGE ROAD
 BIRMINGHAM B42 2HB, UK
 TEL: +44 121 356 5255/6
 EMAIL: info@edwinlowe.com



TITLE:

ALTERNATIVE WELD STYLES

- BUTT WELD
 - RECESS WELD

SIZE: **A4** DRAWN BY: **JM** DWG NO: **--**

REV: **1**

ALL DIMENSIONS IN
 MILLEMETERS

NOT TO SCALE DATE: 15/07/13

SHEET: 1 OF 1

6 DETAILS
 1st Issue.

5 REVISION DATE
 1 15/07/13