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GENERAL ADAPTER
WELDING INSTRUCTIONS

HITACHI G.E.T. (GROUND ENGAGING TOOLS)

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70th Anniversary

Adapters

Successfully welding adapters to a bucket lip is the first step in maximising the wear life of bucket teeth.

Here we outline the steps to weld bucket adapters to bucket edges.

These instructions are a general guideline for more in depth information please contact a welding professional.

Preparation:

1. Use basic electrodes with a low content of hydrogen E7018 weld rod or E70T-5 (do not use E70T-1) cored wire with CO2 gas shielding. Store weld rod in 120°C oven. Recondition exposed supply of weld rod by reheating for two hours at 260°C. Remove only enough weld rod for one hour of use. The moisture level of exposed low hydrogen electrodes can be too high and cause weld cracking.
2. Grind all weld points smooth on the base edges and on the adapter Note: high speed disc sanders are preferred over grinders as grinding on a cold, heat treated steel with a grinding wheel can generate hot spots. Indicated by a blue/ black or brown colour. Rapid cooling after grinding creates small surface cracks.
3. Using a wire brush remove all paint, rust, grease and dirt from the surfaces to be welded.
4. Do not weld, flame cut, gouge or do any heavy grinding on the base edge, adapters or welds until the area is preheated to 204°C to 260°C.
5. Do not use gas shielded welding in windy areas or where fans are present. Poor welds can occur due to excessive cooling.

Pre-heating Instructions:

- It is not necessary to preheat the adapters or the base edge when the base cutting edge is 25mm thick or less.
- Do not preheat the entire length of the blade edge already welded to a bucket. Expansion of the base edge can cause cracks in the rear edge weld.
- Do not preheat any portion of the base edge or adapters until all components are at room temperature.
- Verify position of corner adapters to the bucket and then equally space the adapters across the base edge.
- Preheat the entire adapter and an area of the base edge extending 100mm beyond the weld area from the side opposite to be welded.
- Heat to 260°C and check the temperatures of both pieces on the side to be welded.
- To prevent losing hardness, do not exceed 315°C. Reheat if temperatures fall below 175°C.

General Welding Instructions:

1. The ground cable should be firmly attached to the base edge, not the adapters.
2. Position the work so that the weld can be applied horizontally, allowing for higher amperage and deposition rates along with a puddle of molten metal that is easier to control.
3. Good weld fusion with adapters and base edge is extremely critical. Incomplete fusion with the adapter or base edge will result in an underbead crack. This unseen crack, with time, will propagate to the surface at the edge of the weld, leading to a strap or base edge cracking and finally to breakage.
4. Adapters commonly have a 30° to 45° bevel along the sides of the edge straps which makes it difficult to obtain the proper electrode angle and to maintain puddle control unless the base edge is positioned on end. Ideally the bevel welds are best controlled with the base edge vertical and the adapter sides horizontal, and the fillet welds with the edge moved off from vertical as shown.
5. In most cases, it will be impossible to adjust the weld area in to this position, but whatever angle the edge or bucket can be placed it will be helpful in preventing the molten puddle from pulling away from the bevelled surface. More numerous, but smaller, weld passes will help to compensate for lack of proper position.

Warning: ***Welding on painted areas is not recommended. Do not perform any procedure until you read and understand the information contained within.***

Welding Instructions: ***Two Strap Adapters***

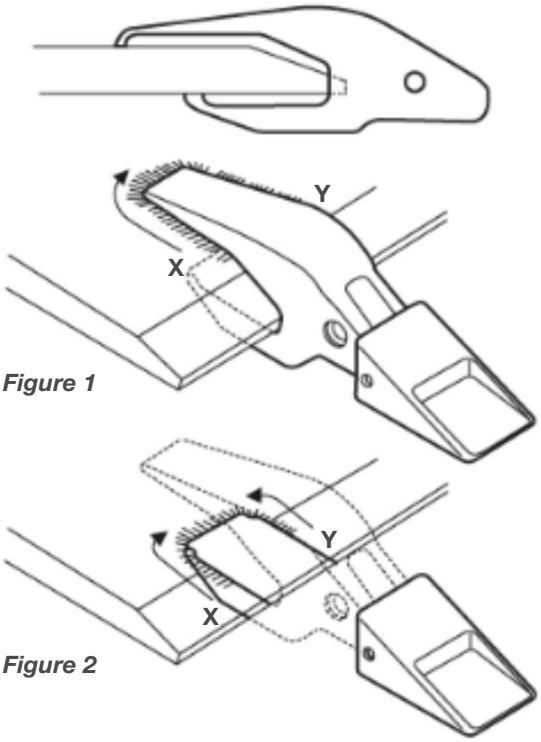


Figure 1

Figure 2

1. Place the adapters on the blade and make sure they settle well on the bevel.
2. Preheat and weld the adapters in place with a few welding points. See general welding instructions.
3. Start welding in the centre of the above strap of the adapter, welding around it until reaching the same point on the opposite side (Area A, Fig 2).
    - Continue with welding strings on each side from the initial points at 25mm from the border of the lip until meeting the first string again.
    - Repeat until completion.
4. Polish the welding surface with a grindstone.
5. Turn the bucket upside down.
6. Weld the lower part of the adapter (short strap) starting at 25mm from the border of the lip until the centre of the backside. Welding alternative strings on each side which will meet on the backside until they reach the specified welding thickness.
7. Use a grindstone to eliminate the irregularities to obtain a smooth finish.

We don't pretend to be welding experts, so we advise that you always consult a professional and your user manual. But these instructions will help to guide you.

Welding Instructions: **Bottom Strap Adapters**

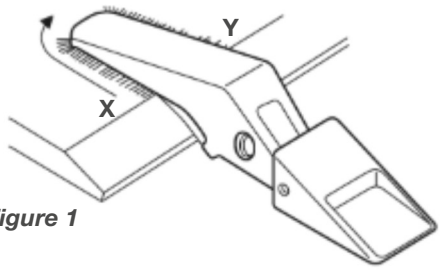
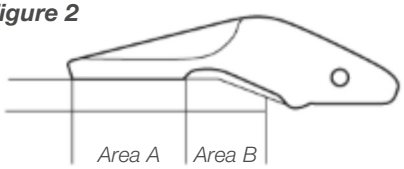


Figure 1

Figure 2



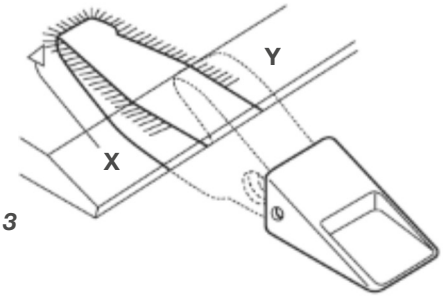


Figure 3

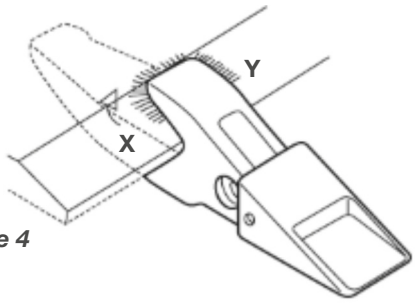
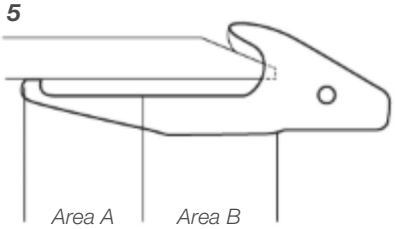


Figure 4

Figure 5



1. Place the adapters on the blade and make sure they settle well on the bevel.
2. Preheat and weld the adapters in place with a few welding points. ***See general welding instructions.***
3. Start with the initial welding points in Fig 1 taking into account that 25mm of the front part will have to remain without welding.
4. Weld the lower part of the strap starting with a string of 100mm from the border of the lip (Area B, Fig 3), welding around it until reaching the same point on the opposite side.
   - Continue welding from X to Y until joining the ends at the first string (Fig 1).
   - Repeat the process various times until the welding has reached the dimension specified in the table below (Fig 6) for Area B.
5. Continue welding in Area A gradually extending to Area B to reach gradual transition until Area A has reached the size specified in the table (Fig 6).
6. Polish the welding surface with a grindstone trying to maintain the grooves caused by the grindstone parallel to the border of the lip (Fig 5).
7. Now start welding the short (upper) strap beginning the welding string at an initial point of approx.
   - 25mm from the border of the lip continuing the border of the loader blade until finishing at 25mm from the border of the other side (Fig 2).
8. Repeat the process until reaching the welding thickness indicated in the table (Fig 6) for Area A (Fig 3).
9. Use a grindstone to eliminate the irregularities to obtain a smooth finish.

We don't pretend to be welding experts, so we advise that you always consult a professional and your user manual. But these instructions will help to guide you.

Figure 6:

Area A	Area B	
12mm	6mm	25
15mm	7mm	30
18mm	9mm	35-40
25mm	12mm	45-50
30mm	17mm	55-60

Figure 7

Welding Instructions: ***Flush Mount Adapters***

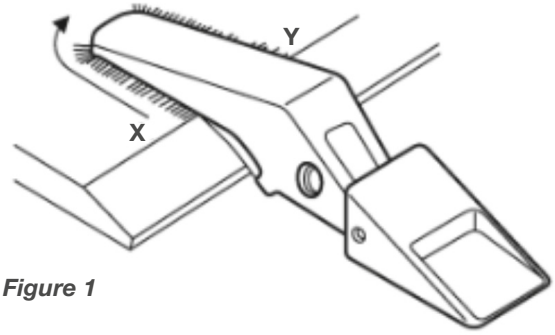
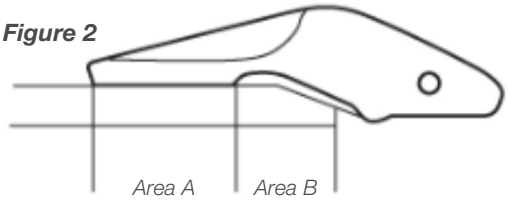


Figure 1

Figure 2



1. Place the adapter on the lip so that the corner adapters are well placed on the corners. Make sure that they sit well on the bevel of the blade.
2. Preheat and start welding a few points to maintain the adapters in place.
   See general welding instructions.
3. It is convenient to start welding at point X and Y as shown in Fig 1 in order to make sure that the defects of the welding that is produced at the beginning of the strings can be eliminated.
4. Start welding in the centre of the strap of the adapter welding around it until reaching the same point in the opposite side (Area B, Fig 2).
   - Continue welding strings on each side from the initial points at 25mm from the border to the lip until meeting the first string again (Area A, Fig 2.).
   - Repeat the indicated operations until completing the welding with the required thickness.
5. Weld the remaining part between the adapter and the border of the lip. Maintain the same thickness of the string that for the rest of the welding.
6. Use a grindstone to eliminate the irregularities to obtain a smooth finish, especially in the lower front part.

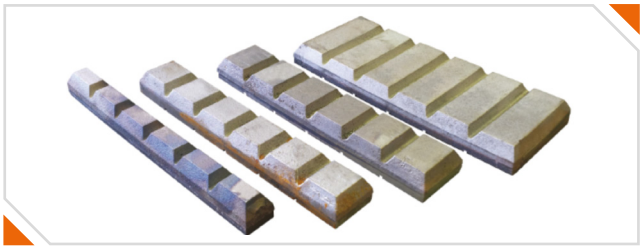
We don't pretend to be welding experts, so we advise that you always consult a professional and your user manual. But these instructions will help to guide you.

Welding Instructions: ***Wear Protection***

These wear protection parts work to protect the edges of buckets that make contact with the ground while digging. By undergoing proper preparation and welding, you will prolong the life of your bucket significantly.
Prior to welding chocky bars, read instructions on cutting and forming first.

1. Ensure the backing plate and matting metal surface is clean and flat.
2. Welding rod selection: Low hydrogen weld rods or gas covered cored wire is recommended. Gas shielded solid MIG wire Ø1,2mm max Flux cored wire Ø1,6mm max to ASTM/AWS A5.18 classification ER705-6 Low hydrogen electrode Ø3,25mm max t ASTM/AWS A5.1 classification. E7016-1H8 or E7018-1H4
3. Do not preheat the chocky bars.
4. Clamp and tack weld the part in to position.
5. Stitch weld, laying 50mm maximum length on each run. Alternate ends or sides to minimise heat input.
6. Do not deposit weld within 2mm from joint between part and steel backing plate as shown in Fig 6.

***Caution:* Temperatures must not exceed 200°C. Excessive heat input may cause cracking and delamination. Use thermal crayons to monitor temperature. Do not weld continuously. This may cause warping, de-lamination and cracking. If a complete peripheral weld is required, use stitch weld procedure as per step 5.**



Chocky Bars:
Chocky Bar's are easy to use and require no excessive cutting, compared to sheets or plates.

Chocky Bars can be formed onto inner or outer contoured surfaces providing an extra level of wear protection on buckets, excavators, drag line machines or for lining chutes and rock box edges.

Cutting and Forming Instructions: ***Chocky Bar Cutting Method***

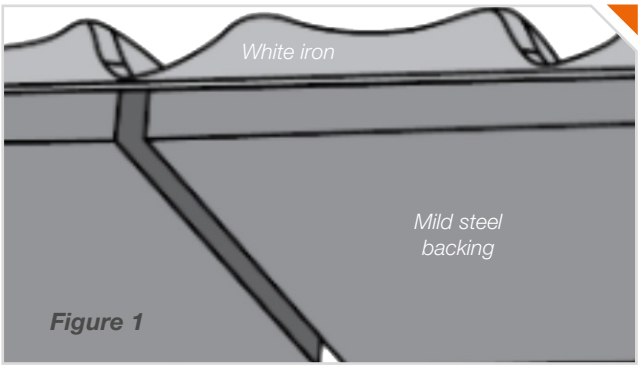


Figure 1

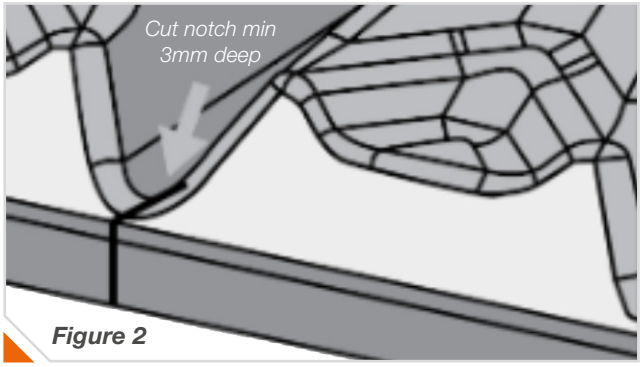


Figure 2

Preferred cutting method is high pressure abrasive water jet cutting. NOT recommended is Oxyacetylene torch, arc-air or plasma Cutting CB25 chocky bar. Cutting by abrasive discs is acceptable for CB25 chocky bars.

Cutting CB40 to CB130 chocky bars:
Cutting procedure for CB40, CB50, CB65, CB90, CB100 andCB130.

1. Secure the piece to be cut in a vice or clamp
2. Notch the backing plate as shown in Fig 1.
3. Notch the white iron a minimum of 3mm deep opposite the notch in the backing plate as per Fig 2.

***Note:* The deeper the notch in the white iron, the cleaner the break.**

***Caution:* Extreme care should be taken to when cutting to minimise local pre-heating or cracks. Delamination may occur.**

Chocky Bar: **Forming Method**

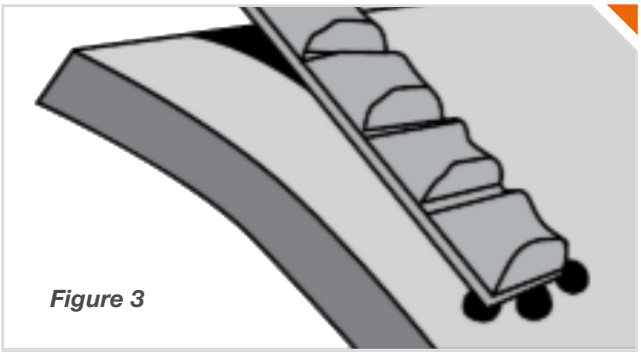


Figure 3

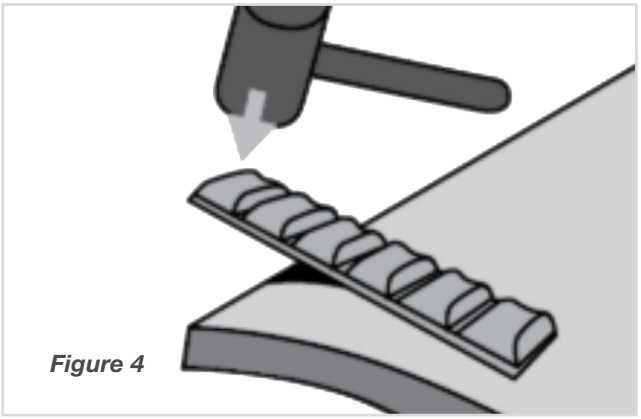


Figure 4

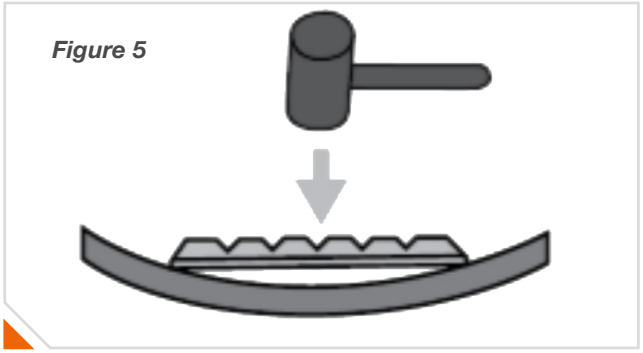


Figure 5

Note: For severe curves with a radius of less than 305mm, or inside curves, it is advisable to notch the mild steel backing plate opposite the V to assist with forming as per Fig1.

1. Clean the surface to which the chocky bar will be welded.
2. Tack weld one end of the chocky bar (as per welding procedure) in at least 3 places. Minimum of 15mm lengths per weld as in Fig 3.

- Outside curves:
  Hammer down unwelded end of chocky bar with a soft faced hammer in order to bend bar to match mating radius as shown in Fig 4.
- Inside curves:
  Starting in the centre, strike chocky bar with a soft faced hammer to bend bar to match mating radius as shown in Fig 5.

3. Stitch weld as per the welding procedure

***Note:* The chocky bar may crack. This is normal.**

Wear Plates and Buttons:

Wear Plates and Buttons are easy to use and install and require no pre or post heating when welding. The Wear Buttons provide added protection for your machine parts, that experience extensive wear and impact.