Nuts and bolts, tips and tricks from our resident industry experts.

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THE ISSUES WITH WELDING IN COLLISION REPAIR

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Over the past few years, we have written multiple articles explaining all the different processes for welding operations in the collision repair field. This article will mention all those different processes, but we will also talk about the issues with each welding procedure. Additionally, we will be listing a general setup procedure for each process. (**** NOTE: WE WILL NOT DISCUSS OR EXPLAIN ALUMINUM WELDING PROCEDURES AND PROCESSES. ALTHOUGH LARRY MONTANEZ IS A CERTIFIED ALUMINUM WELDER WITH MULTIPLE OEMs, WE WILL NOT DISCUSS THE PROCESS. THIS IS DUE TO THE FACT THAT WHEN REQUIRED TO WELD ALUMINUM, THE REPAIR FACILTY MUST BE ON AN OEM REPAIR PROGRAM. EACH OF THESE PROGRAMS HAS ITS OWN PROPRIETARY WELDING CERTIFICATION TEST.)*

The main reason we are writing this article is to address the extremely poor quality of welds due to developed bad habits and a lack of education and pride in one's work. Over the past three years, we have inspected over 300 vehicles for quality of repair issues, performed over 150 technician evaluations for welding, been contacted by email to review photos of welds and commented on numerous posts on Facebook, LinkedIn and Instagram about vehicle repairs involving welds. What we have seen is absolutely awful and disgraceful. The lack of proper welds we have observed on repaired vehicles is alarming. Through our inspections, conversations with other experts and in the hands-on classes we teach, we have been able to compile a short list of the main causes of bad welds. The following are the main issues that cause bad welds, with an explanation and a solution for each welding process.

Key:
MAG/W: Metal Active Gas Welding (Steel)
MIG/B: Metal Inert Gas Brazing (Steel)
STRSW: Squeeze Type Resistance Spot Welding

Seeing the weld: There are a multitude of issues in not seeing the weld. Many of these are easily correctable (MAG/W or MIG/B).

No protection at all: Many times, we see techs attempt to weld a "tack" weld or even try to weld two pieces together by closing their eyes or (even worse) looking at the weld with no eye protection at all. This not only dangerous, but also very foolish. Not wearing eye protection will damage your eyes and you will eventually become blind. Additionally, if a spark flies into your unprotected eye(s), you will most likely lose it/them.

Poor eye sight: Another issue with seeing the weld is just that – seeing the weld (STRSW, MAG/W or MIG/B). Even with the best welding mask, many techs have bad eyesight or just bad eyesight when welding, either of which can be corrected by a visit to the eye doctor. We suggest you bring your mask (MAG/W or MIG/B).

Inadequate welding mask (MAG/W or MIG/B): Many techs are still wearing the old style non-auto darkening masks, which make it very difficult for you to line up the welding gun to the weld location, set your hands and body position and *then* attempt to weld while trying to shake your head forward and back to get the mask to fall down over your face. A good quality auto-darkening mask is the best choice for welding; look for one with an adjustable shade selector. Shades for steel welding generally should be 9 – 11 depending on the amperage.

Poor mask maintenance (MAG/W or MIG/B): Even if the tech has a good quality mask, many of them forget that the front outside and the rear inside clear lenses require replacement regularly. A package of five for each lens is only about $12 to $15 and practically makes the mask as good as new.

Body position: To properly weld, you need to position yourself so you can see the weld puddle, and not look at the top of the nozzle from behind. For either the push or pull technique welding

horizontally, vertically or flat, you need to position your body to either side of the gun torch and just ahead of the end of the stick out of the wire. For the overhead weld - either push or pull - you will need to position the workpiece or yourself to the workpiece at eyebrow or forehead level. This will give you an excellent position to see the weld puddle. Your body position may be from the side, or you can be positioned directly in front of the welding gun and weld towards your mask. Remember that you may need to slide your hands and/or shift your weight as you make some of the welds, so practice a couple of dry runs in the right position with all of your equipment on.

Body protection (MAG/W or MIG/B): Many techs do not wear the proper welding jacket, gloves, boots or even pants when welding. Not wearing the proper gear can cause you to burn yourself – making you move your position while welding and causing incorrect welds.

Not cleaning (STRSW, MAG/W or MIG/B): One of the biggest issues we see is improper cleaning of the weld site. For any type of welding, it is necessary to clean the weld zone of any paint, dirt, debris, corrosion and grease. We have written about how to clean the weld zone before, but here is an overview. Never use brake cleaner to clean areas to be welded! Burning brake cleaner can generate very dangerous fumes.

For MAG/W or MIG/B, wax and grease the area, sand the area with 80-grit or a plastic rotary brush to remove only the paint material on all sides (both outer and inner areas), wipe the area with wax and grease remover (make sure you are wearing gloves) and make sure all welding edges are smooth. Do not use a grinder (36-grit or coarser), as it will thin out the material and may cause the area to be weaker and/or burnthrough to occur. Now, based on the OEM procedures, you may have to spray weld-through primer to the inner flanges or leave the area bare metal. Regardless of whether you use weld primer or not, make sure to clean the weld zone with a stainless steel wire brush just prior to welding. For STRSW, wax and grease the area and sand it with 80-grit or a plastic rotary brush to remove only the paint material on all sides (both outer and inner areas), or (per the OEM procedure) wipe the area with wax and grease remover. (Make sure you are wearing gloves.) Do not use a grinder (36-grit or coarser), as it will thin out the material and may cause the area to be weaker and/or burnthrough to occur. Based on the OEM procedures, you may have to spray weld-through primer to the inner flanges; just prime the original inner flange and leave the e-coat on the new panel's inner flange or apply a specific seam sealer or structural bonding adhesive to the inner flanges. Remember: You *must* have access to both sides of the flange to complete a STRSW. Single-sided welding is not an approved welding procedure. Please remember that attempting to weld through anything but bare metal will cause poor welds.

Improper gun angle (MAG/W or MIG/B): There are multiple gun angles to use when welding, depending on the type of weld joint you are welding on, the thickness of the material and your welding position. We could spend an entire article explaining gun angles and positions. We recommend that you check out the Miller Welding or Lincoln Welding websites for more information on this, or feel free to contact us if you have any questions.

Equipment maintenance: For STRSW, you need to ensure the welding tips are always clean by sanding them with emery cloth every 10 welds. Prior to using the machine, check the tips to see if they need sharpening (with the specific tool for that machine) if applicable, or change the end cap tips. Additionally, make sure the tips are lined up properly. For MAG/W or MIG/B, ensure that the contact tip and nozzle are clean using a stainless steel wire brush and welding pliers. Also, always have a few extra contact tips and nozzles on hand.

Weld testing (MAG/W or MIG/B): To prepare for welding on a vehicle, you should make test samples of the material you will be welding in the position you'll be welding, and then destructively test them. This too could be a subject warranting its own complete article, so please feel free to contact us if you have any questions.

Although there are multiple joining procedures to repair today's advanced substrate vehicles, MAG welding is still recommended in many cases. However, this is slowly being replaced with STRSW, MIG brazing, weld bonding and rivet bonding. Today's technicians no longer have to make the decision of how to replace a component. Not only has the manufacturer done it for them, but they have also outlined the joining method to use. Today's technicians *must* constantly practice and train to become professionals in their field. Following all the procedures and steps for replacing and affixing a replacement component to a collision-damaged vehicle will ensure that the vehicle is repaired correctly per the only recognized authority – the OEM!

We hope this article has helped the industry to better understand the issues surrounding welding on collision-damaged vehicles and how to correct those errors. Feel free to contact us if you have any questions.

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Executive Director's Thoughts

Sometimes, the simple things are easily missed when repair processes get complicated. You can have the best welder, the best training and the proper prep work, but if you go to weld with a bad/old helmet, you're done for. Keeping up with these minor issues can be easily addressed with checklists that include all the basics. Step by step!

- Jordan Hendler