**Anything <u>underlined</u> in the body may be clicked to a direct hyperlink for more info**
**Close the hyperlinked box to exit the window and return to this newsletter**
**Discussed topics are boxed to reduce the need to scroll pages - read each box as a section.**

# MetaLLife. NEWS ThermaLLife.

## Weld Repair & The Stress Correction
Print this Newsletter

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**NADCA**'s newest heat treat spec 207-2006 has a two page section discussing the guidelines for proper weld repair or correction welding. Everything from the aspect of heat affected zone, die prep, procedure, preheat, and post stress temper guidelines are carefully spelled out.

One very important step that is missing, however, is a discussion of how the weld affects the integrity of the tool and preventative steps that should be taken to relieve the resultant tensile stresses.

**MetaLLife®** is extremely beneficial in removing the undesirable tensile stresses that affect welded areas. As you read the explanation of the causes of these weld stresses, please refer to the graph shown below.

Our recommendation is to make sure that any welded tool is heat stress tempered and then subsequently followed by an application of the **MetaLLife®** process to provide the benefits mentioned.

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Residual Stresses from Welding
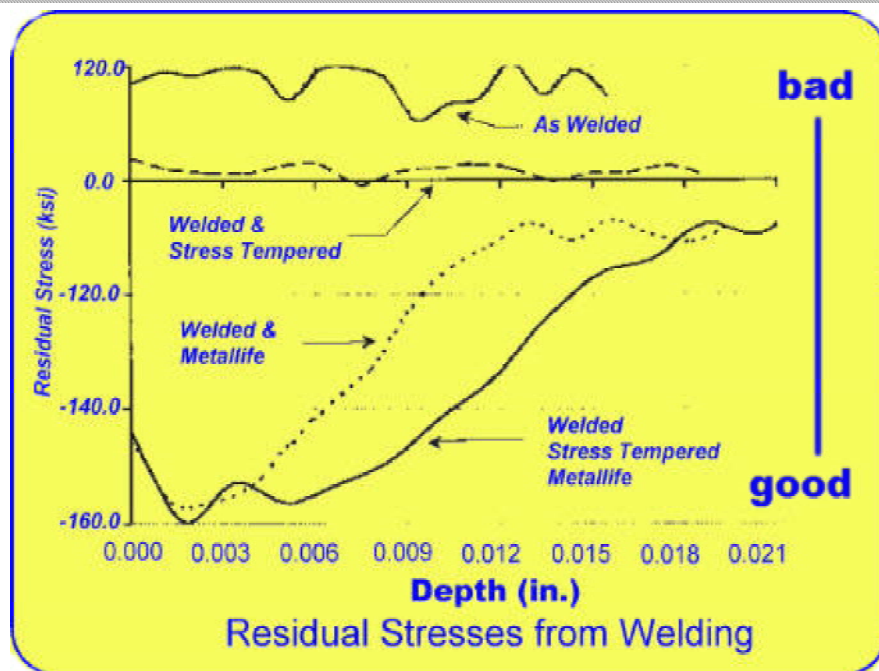
Residual tensile stress from welding is created because the weld consumable is

As shown above, **MetaLLife®** is extremely beneficial in reversing the residual stress from

applied in its molten state. This is its hottest, most expanded state. It then bonds to the base material, which is much cooler. The weld cools rapidly and attempts to shrink during the cooling. Because it has already bonded to the cooler and stronger base material, the weld is unable to shrink. The net result is a weld that is, essentially, "stretched" by the base material.

The heat affected zone is usually most affected by the residual stress and hence where failure will usually occur. Inconsistency in the weld filler material, metal chemistry, weld geometry, porosity, etc..., act as stress risers for the residual and applied tensile stress to initiate die fatigue failure

welding that tends to cause failure. These stresses in the die cast tool's heat affected zone are converted to a beneficial compressive state.

The above graph demonstrates a number of interesting changes in residual stress when welding, thermal stress relieving and after MetaLLife®. Tensile stresses generated from welding are additive with applied load stresses. This is why these combined stresses accelerate failure at welded locations.

Heat stress tempering to reduce the tensile to zero (approximate) then following with MetaLLife®, restores the integrity of the weld and its relationship with the base material.

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**Do you know that at the bottom of our Badger Metal home page, that we have posted a free conversion program?**

You have a choice of either downloading a small zipped exe file that runs without any installation or go directly to an English web conversion site.

Clicking on the side bar buttons will

also allow you to have this choice.

The conversion program (only 548K) is quite versatile in converting - common and uncommon values for density, distance, energy, flow, mass, power, acceleration, speed, temperature...as well as 12 more types plus a custom tab for setting up your own conversion table. No installation is required. Just open the exe file.

The website offers similar conversions but does not require any file download.

**More tips to come in future newsletters**

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