# MetaLife NEWS

**Volume 4 Issue 6** **Modes & Causes of Die Failure - Part 5** **August 1997**



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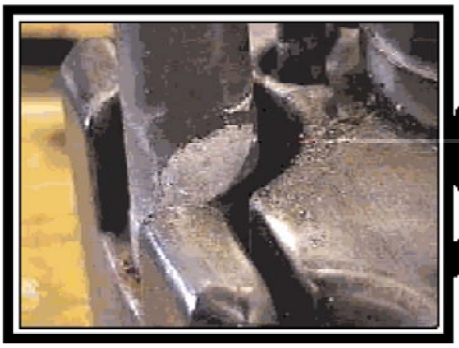

## Aluminum SOLDERING of Die Cast Dies

During the months of July and August, Badger noted that many of our customers plants were closed or production was shut down. For this reason, we decided to delay until mid August the originally scheduled July start date for the continuation of our newsletter series on the " **Modes and Causes of Die Failure**" This gives proper continuity to our readers on this important topic.

This second phase of our tutorial will discuss **Chemical Attack by Soldering**. In the next few issues we will examine its modes and discuss new coating technology. This coating technology is being used in combination with **Metalife** to **prevent** or reduce the **tendency** for aluminum alloy content to **solder** to die casting dies.

**Soldering** of metal to die cast die components such as core pins, slides, and inserts results in **costly downtime and die wear**. Soldering causes increased friction which can affect the ejection force of the die cast operation. When not enough ejection force is available, the casting has a difficult time releasing. On the other hand, increasing the release force excessively can bend ejector pins, cause casting drag marks, and make castings bend or loose tolerance. This all results in **unnecessary scrap**. It is critical that lubricant sprayed on the surface of the die, and any coating applied to the die's surface, be maintained. This forms the protective layer between the die and cast metal (aluminum) that prevents molten metal from sticking to the die's surface and minimizes the ejection force for casting release.

The solder phenomenon falls into two categories:

The dissipation of lubricant initiates a condition where aluminum solidifies rapidly to the surface of the t Mechanical soldering can normally be easily remo provided it is caught early enough and no corrosion involved. It is important to identify the hot spot condi and assure that lubricant is retained on the die in th areas. **Metalife, by its nature, increases the surf area for lubricant adhesion and creates mic reservoirs on the surface of the die steel for retain lubricant in those areas where soldering is a proble**

**Chemical soldering** involves **corrosion** and is initiated by loss of the protective lubricant barrier. T form of soldering **destroys and erodes** the original di **surface**, **configuration**, and can **affect tolerances**. occurs when **molten metal reacts chemically** with the material. The die cast insert lacks the needed protect layer to isolate the die's surface and cast metal **aluminum** Al), which **diffuses into the tool's surfa** At the same time the alloy elements in the die steel **iron** Fe) **diffuses** from the die surface **into the cast me** The bonding of the electrons of the two element's ato creates intermetallic compounds between the cast m and die surface (**$Fe_2Al_5$ & $FeAl_3$**). This intermet component, in appearance, looks like mechani soldering, however, is much more difficult to rem without **destroying the surface integrity of the die.**

In our next issues we will examine some of the **proact methods** for preventing this problem. We will report **new technology** and tests being conducted where

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| **Mechanical and Chemical**. The first of these, **mechanical soldering** is due to **hot spots** in the die that cause the lubricant to be lost on the surface of the tool. | **substrate** of the die is **treated** first with **Metalife th coated** to establish the needed protective barrier. |