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NOVEMBER 2012

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# MOLDS: That leaking feeling

By Steve Johnson, ToolingDocs LLC



Water leaks, both internal and external, continue to be one of the biggest causes of unscheduled mold downtime.

In molds, most water leaks occur around static seals where dissimilar metals, such as a P-20 plate, contact hardened steel tooling, such as A2, D2, or S7. This dissimilar contact sets the stage for the formation of Fe<sub>2</sub>O<sub>3</sub>, the reddish form of iron oxide that we know as rust. The oxide is a larger molecule than iron, so it puffs up and cracks, exposing more bare metal. Mobile oxygen in the metal moves deeper into the base steel, continuing destruction and creating the “rust lives” mythology.

Cavity blocks and cores are the typical victims, where the walls and bottoms of glands pit and erode until the O-ring

can no longer conform to the depth of the pit and water seeps past. The leaks can be enhanced by a mold’s opening and closing, acting as a virtual pump by slightly moving or shifting tooling with every cycle, and by opening stress cracks that would normally not leak during a static bench test of the circuits.

The end result? Thousands of company dollars lost per year, not only through excessive repair hours and tooling, but also press idle time, scrapped parts, and missed or late orders. In the longer term, molds and components get prematurely replaced that could have — and should have — made thousands of more cycles and parts.

All too often, eroding steel goes untreated until the leak is sufficient to stop production, at which point all hell breaks loose. From there, the focus often revolves around doing what’s necessary to get the mold back into production as quickly as possible, rather than around discovering how to stop the rust. Stopping the leak is usually either a matter of stuffing a larger O-ring into the pitted gland, stuffing two O-rings into the gland whose combined cross-sections are slightly larger than the single O-ring, or cleaning the pits by milling/re-cutting the gland area oversize and installing the next larger sized O-ring.

These and other tricks of the trade are all cheap, short-term fixes; if any of them work, great. If not, then try again... and again.

A second option is to get proactive and eliminate water leaks as a whole. It is, in my experience, the better choice — and the costs of leaks to a typical shop will, if analyzed, back me up. I was involved in analyzing one U.S. company’s year-long water leak costs, for example, and it revealed some startling facts. Twenty-eight molds in all for the year were stopped for internal water leaks, and four more for external leaks where hose lines popped off or were too short or worn through (which soaked

the entire mold instead of just one area), for a total labor and tooling cost of \$11,472.50 (all figures US). The problem was spread among 14 different molds, incidentally, with two molds accounting for 36 per cent of the total leakers in frequency and costs.

Direct tooling and labor costs were only part of the company’s total expenses. The total labour hours (173.25) were applied to press idle time, in this case \$45.00 per hour, for another \$7,796.25. Add in an average of three hours for each of the 28 stops for mold pull, reset, and start-up times for another \$4,200, and the result was a whopping \$23,468.75 in total costs for water leak issues!

We also discovered that one mold accounted for six stops, so this was a good place to begin repairs. Further review revealed the mold had four O-ring groove locations that were pitted and in need of welding, re-facing, and then stripping and plating of the entire 18-inch by 24-inch by 2-inch-thick plate in nickel. The cost of this repair was \$675.00 to weld and spot face the four grooves and another \$300.00 to apply nickel plating, for a repair cost of \$975.00 — making the return on investment for this repair about four months, since volumes were to remain constant in the upcoming year. Looking at it from this perspective, the decision to fix it right was a no-brainer.

The morale of this story? Don’t assume that the cost of putting up with random water leaks is cheaper than the cost of eliminating them. Once you understand the total costs of this common problem, it becomes an easy, justified decision to fix the mold right. **GPL**

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