Parting Shots

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Flash—it's not as cheap as you think

Throughout the die casting industry, it is customary for the die cast operators to keep a putty knife handy to scrape flash off the die faces. Many operators even keep them in their hip pockets for convenience. Sometimes, I have found it almost impossible to even find a putty knife in the possession of an operator.

While flash may be a fact of life of our process, it is not acceptable in the levels we often tolerate.

Some misconceptions concerning flash:

1. *It helps vent the die.* Wrong! It allows uncontrolled loss of cavity pressure. It increases the thickness of the casting, the gates, and the overflows adding weight that is not in the quote.

2. *It doesn't cost anything.* Wrong! Flash is only 20 percent recoverable, if that. On a recent automotive casting for example, we "spotted the die" to correct the flash problem. The machine had an auto ladle, so it poured the same amount of metal after the repair as it did before. However when we started back up, the biscuit was 1 inch longer than it was before we spotted the die. We were running a 3-1/2" tip. Therefore, we were loosing 9.621 cubic inches of metal every shot. That is 0.9621 lbs. of metal every shot! The casting was scheduled to run 8,000 pieces/wk. at 4 cavity (which we were seldom able to do during that period because of the problems caused by flash.) 8,000 pcs./4 cavity=2,000 shots × 50 weeks=100,000 shots/year. × 0.9621 lbs. /shot=96,210 lbs./year × $.75/lb. metal=$72,157/year in metal ×.80 (80 percent lost metal)=$57,726 net loss/year due to flash on this single job.

A die that flashes 0.025 inch with a projected area of 94 square inches, like this automotive casting, has 3.4 cubic inches of excess material. That is 0.34 lbs. per shot excess material. Let's say that the die runs 100,000 shots per year like this casting. That is an extra 34,000 lbs. of metal which we pay for and is not included in the quote. 34,000 lbs. × $0.75/lb. =$25,500 /year!

Trim thickness can also be a major cause of quality problems. If a slide flashes, such as happened frequently on another automotive component, it can result in trim shear. If die repair relieves the trim die while the die is flashing, then when the slide blow condition is corrected, there will be excessive trim burr remaining.

In addition, scrap generated from lost cavity pressure results in internal porosity that is not visible from the surface. Generally, it is revealed when the casting is machined. There may be other processes prior to machining which add additional cost to the casting. These might include such operations as vibratory finish, as for the another automotive valve, shot blasting as performed on a variety of castings, or painting as done to other castings, etc. The painting on some castings nearly doubles the cost of the casting to that point! Machining occurs as a final operation. At this time, two-thirds of the selling price is in the outside operations of paint and machining.

If the defects reach the customer before they are detected, the cost of correction is further increased. We must pay travel costs, plus wages for sorting or rework in a customers facility. Travel cost alone to a nearby customer can run at least $250. Time away from the die casting plant to address the problem could be a minimum of 1-1/2 days. In addition, there are corrective action meetings to explain the cause of the defect, and to describe procedures for prevention in the future. The meetings add additional cost to the defective castings.

3. *"I can't afford to fix it."* See above. The direct cost to correct the flashing problem described above, was one person, one shift. $15./hr × 8 hrs. =$120. "If you can't afford to fix it, you can't afford to run it."

Other problems resulting from flash:

1. On dies with slides, flash accumulates under the slides, keeps the slide from fully seating, and results in dimensional problems. Example on an automotive control valve: When the slide is backed out, the valve seat has excessive machine stock, and we give away metal. The cam lock holds the die open allowing additional flash, which accelerates the accumulation of flash under the slide.

2. Flash accumulation under a slide can lead to compound damage on the die. One example of this is broken horn pins. This can also damage both the slide carrier and the key ways.

3. Safety: We have all experienced the discomfort of being burned by flying flash. In most cases, this is minor. However, worst case can result in lost time injuries and lost time.

4. Housekeeping: Much of the "trash" beneath the dies and on the floors around the die cast machines is flash. It becomes contaminated with die lube, tip lube, hydraulic fluid, die heater fluid, and water. This makes it virtually unusable as remelt. This is where a lot of the 80 percent number comes from in item 1. above.

5. Lost time from restarts: Accumulated over a 24 hour period, this can be a huge impact on quality, and productivity. Each restart can result in at least one and sometimes as many as three cold *"start up"* shots. They are either thrown out by the operator, which is the correct procedure, or later at machining after adding additional value to the casting.

By no means is this list complete, but I believe that the above has a major impact on our profitability.

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