Dr. Die Cast

Are there really Cost Benefits to Process Control?

There has been a lot of ink spilled and trees killed regarding process control and explanations of what it is and what it isn't.

What are some of the costs of not controlling a process? What are the costs of variability or lack of consistency? The following lists a few reasons for excess costs I've witnessed.

1. Late shipments
2. Overtime
3. Material returns
4. Premium freight/dedicated trucking/charter flight/ etc. (see #1 above)
5. Sorting costs
6. Rework costs
7. Increased utility costs (gas & electric)
8. Travel costs to your customer's plant for on-site sorting or containment
9. Loss of business for failing to maintain quality levels.
10. Increased remelt cost (Remelt isn't free)
11. Increased melt loss for re-melting scrap/rejected parts.
12. Loss of die casting machine availability while replacing scrapped product.
13. Wear and tear on equipment and tooling.
14. Loss of other plant capacity (remelt, machining, utilities) that could have been making other products.
15. Frequent conference calls with your customer's "Supplier Quality Department or SQE", Purchasing and Scheduling departments.
16. Unscheduled customer visits camped out in your plant "expediting" their castings.
17. Fill in your own.

Don't over complicate it! There are some beneficial practices that are relatively low tech and inexpensive. A simple "P" Chart that tracks hourly production results can provide powerful insight into repetitive production and/or quality problems. Often, managers will insist that the process needs to operate at a faster cycle time because it is not meeting the "quoted cycle time". However I have frequently discovered that when it runs, it is running at or better than the quoted cycle time. The problem is "un-reported or under reported" downtime. Missing this information can be due to a spoken or unspoken rule of not reporting anything less than 5 minutes of downtime. But what if the machine is down 10 times an hour for 1 to 2 minutes each time? You could have had 16 to 20% downtime and never have an explanation. A short description of machine problems or performance each hour, such as, "Ran OK", or "Sticking biscuit" or "Pot ran low", etc., helps us to focus our attention on the cause and effect.

Computerized process monitoring and trend charting has become more economical and effective. One of the most underutilized features of a computerized process monitoring system is the trend chart. For example, by reviewing a trend chart I was able to identify the cause of a chronic machine interruption. The biscuit size would trend down as the metal level in the furnace dropped during normal use. When the furnace was refilled, the biscuit size increased significantly and within a couple of shots, broke off due to excess heat and length, leaving the robot with nothing to grab. Each sudden increase in biscuit length was followed by a cycle interruption of various times depending on how near the operator was when the machine stopped. The solution involved repairing the dosing furnace.

On another occasion I was able to identify an anomaly in the machine hydraulics that was equivalent to 279 PPM. In other words, once in 48 hours the intensifier miss-fired. This prompted some corrections to the machine hydraulics and by programming limits in the process monitor, each shot could be validated against known good parameters.

What's the lowest PPM "problem" that was solved using a monitor? Possibly the "lowest PPM problem" that was solved by reviewing monitor data was a 9 PPM failure! I have written about the validity of using a "Pre-fill" process on die castings. It gets even

Who's Dr. Die Cast?
Robert P. McClintic
Die Casting Consultant

Bob McClintic & Associates
523 Lincoln Lawns Dr. NW
Walker, MI 49534

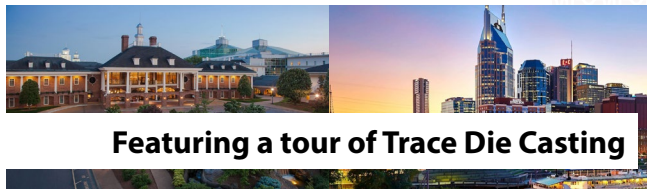
RMcClintic@ameritech.net
www.drdiecast.com
616.292.0454

more complicated when using it on a multi-cavity die. The problem casting was related to 4 cavities on a "tree shaped" gate and runner. The lower cavities started filling before the upper cavities and the gate started to solidify before the part was completely filled and pressurized. By setting limits on the slow to fast shot changeover position in the monitor, we were able to scrap out of parameter shots before they reached the next operation. At the same time, a stack light would alert the operator to correct the out of specification parameter.

The number of parameters that can be tracked on a trend chart can be as high as 35 which is more than enough. You can typically get your most significant data looking at 8 to 10 parameters.

As with any system, filling up a hard drive or a file cabinet with data is only valuable when acted upon. Someone has to review it and make decisions based on good engineering data. Do you need to improve? Take a look at your tracking system and review it with your process and quality departments. Perhaps the tools already exist and are simply underutilized.

See you at the Plant Management Conference in Nashville!



Featuring a tour of Trace Die Casting

PLANT MANAGEMENT CONFERENCE

May 1-3, 2019
Gaylord Opryland Resort
Nashville, TN