Dr. Die Cast

Additive Manufacturing:
Tooling, casting or process?

Is additive manufacturing just for tooling, castings, process innovation?

Yes and all the above.

Additive manufacturing can be "value added" manufacturing, such as integrating numerous features in a casting that previously was made up of several parts, some cast, some fabricated and even various materials.

As tooling, additive manufacturing can produce tool steel cavities, cores and inserts with "conformal" cooling that greatly enhances the ability to reduce shrinkage porosity while reducing cycle time and spray time, both a result of improved cooling. The rapid solidification possible when using this technology can produce a thicker "skin". A thicker skin can improve density near machined surfaces and improve pressure tightness.

Also related to die temperature control is jet cooling. While promoted as a way to cool core pins, it is effective anywhere there are small features or inserts that run hot. Jet cooled cores overcome soldering two ways. One by reducing the surface temperature of the pin, aluminum is less prone to solder. The other, less recognized way is that the pin is shrinking faster than the casting and can create an air gap between the pin and casting resulting less friction during ejection.

Vacuum, vacuum valves and chill vents: When connected to the last place(s) to fill, vacuum can reduce back pressure in the cavity and reduce trapped air. Chill vents allow the die designer to provide a larger cross-sectional area for venting than would be practical with conventional venting. Chill vents can be used with or without vacuum.

Squeeze pins are movable core pins that act as pistons to chase (squeeze) heavy cross-sectional areas that are prone to shrinkage porosity. Once the gate is solidified, intensification is no longer effective. Even if the gate is still open, thin walls that are adjacent to heavy sections will solidify, leaving a heavy feature to solidify without the benefit of intensified metal.

Real-time process monitoring allows us to monitor the shot end parameters and performance and segregate castings that fail to meet the process parameters established by process engineers.

Wherever you are on your quest for higher quality, there are a host of available tools that can help.

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