FORTIFY

CASE STUDY

1,000 SHOT MOLD

PUSHING THE BOUNDARIES OF 3D PRINTED INJECTION MOLD TOOLS

Application / *Injection Molding*

Volume / *1,000 parts*

Material / *Polypropylene*

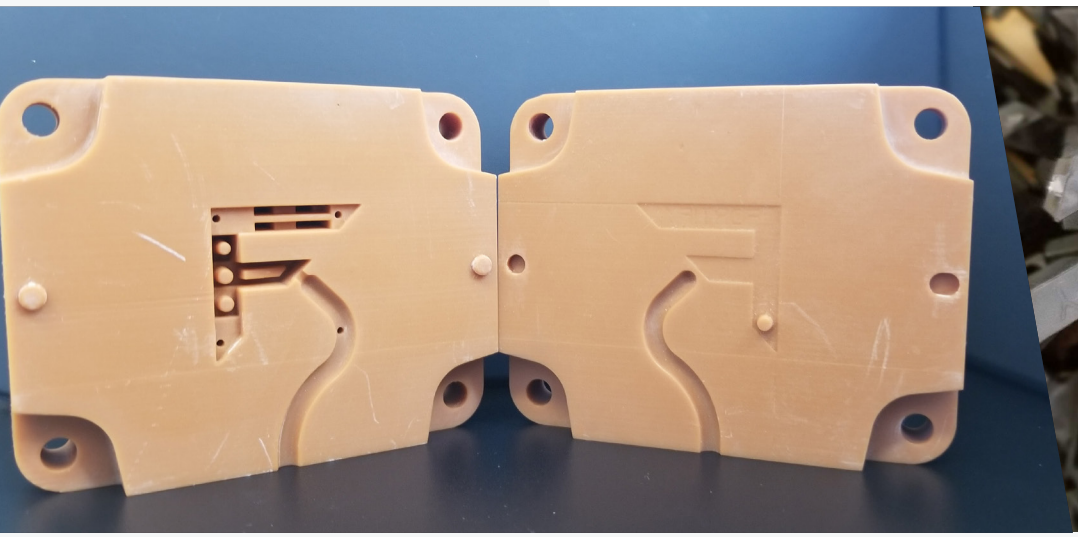
Cycle Time / *60 seconds*

THE CHALLENGE

Validate that 3D printed molds are a viable alternative to machined aluminum or steel molds for prototype and low volume manufacturing runs.

BACKGROUND

Machined aluminum has become a standard approach for prototype and low volume injection molds. While this saves time and money compared to steel tools, they are still costly and slow to produce. 3D printed tools can combat the price and long lead times, but testing over the past 10 years have shown that printed tools are not robust enough to support low-volume production runs. Tools should be able to reliably produce hundreds of parts to be considered as a viable option for low volume production. Fortify decided to run a life test on a complex design to push the limits in an automated scenario. After 1,000 shots, the test was deemed a success and halted.



THE PROCESS

Utilize Fortify's DCM Technology to 3D Print, a specially designed difficult-to-machine injection mold tool and subject it to high heat and pressures on a press for a minimum of 250 shots.

Mold Insert Design Features

The 3D Printed tool design included an array of typical and challenging injection molded scenarios:

- Ejector pins to minimize cycle times and process variability
- Shut off feature to showcase part tolerances in an applied setting
- Features as small as 50 micron in height to verify resolution
- Several high aspect ratio rib and pin features with varying draft angles
- Inject polypropylene, a commodity plastichigh with a shrink rate
- Complex geometries that would typically require EDM to produce in traditional processing

Mold was cooled for 40 seconds after each shot with an automated compressed air bath. This allowed consistent results for hundreds of shots in a row.

THE RESULTS

- Auto cycled for two days and one night
- High shrink rate of molded material
- Minimal flash on the tool regardless of shot number
- Overall tool integrity maintained throughout 1,000 shots

"These results have opened a lot of minds to the potential of 3D Printed tooling. Our partners are getting viable quantities of molded parts turned around in days instead of weeks."

– Karlo Delos Reyes, VP of Applications

FORTIFY **WHAT WILL YOU FORTIFY?**

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