



APPLICATION CUSTOMER STORY: RLM Industries

FDM Tooling Helps Foundry Produce Quality Investment Castings in Only a Week

“In seven days we produced perfectly matching gear set castings that met drawing requirements and specifications and were functional as part of the assembly.”

– Rick Meachum, Vice President of Sales, RLM Industries

SITUATION

RLM Industries is a leading supplier of investment castings to the military, construction, food processing and handling, and automotive industries. The company is capable of pouring virtually any ferrous or non-ferrous alloy as an investment casting. Investment casting offers much higher levels of design freedom than other casting processes so multiple parts can often be converted into one part with a substantial reduction in manufacturing cost.

HOW DOES FDM COMPARE TO TRADITIONAL METHODS FOR PDS?

METHOD	PRODUCTION TIME	COST
CNC	2 months	\$5,000 to \$20,000
FDM	1 week	\$1,250
SAVINGS	7 weeks (88%)	\$3,750 to \$18,750 (75% to 94%)

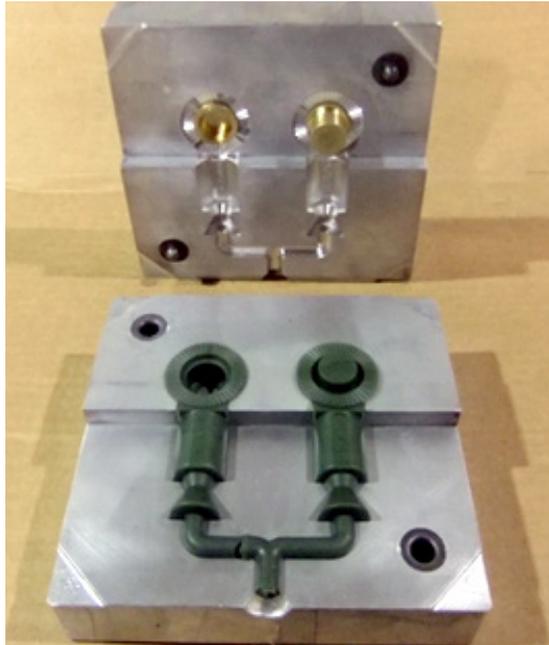
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APPLICATION CUSTOMER STORY:

RLM Industries



RLM used FDM patterns to meet a critical deadline for the US Army's MIM-104 Patriot, a surface-to-air missile system.

Recently a major manufacturer of components and assemblies for the military found itself in danger of missing critical delivery deadlines when the foundry they had been using couldn't produce investment castings that met drawing specifications. "The gear set is a critical component in the launching of the Patriot surface-to-air missile system," said Rick Meachum, vice president of sales for RLM. The original foundry used injection molding to produce investment casting patterns. It typically takes two months and costs \$5,000 to \$20,000 to make these injection molds, review the patterns and make adjustments.

SOLUTION

RLM's customer needed a faster and less expensive solution to the problem and asked if it could help. RLM has pioneered an approach that uses Stratasys Fused Deposition Modeling (FDM) to create ABS investment casting patterns. The same FDM patterns, which provide a perfect representation of the final part, can also be used for review prior to casting. The cost is only \$1,250 to produce patterns, and typical lead time to deliver investment cast parts, including time for design review and adjustment, is only one week. Post operations such as machining, NDT (non-destructive testing) and heat treating would increase lead time.

RLM began the project by modifying the CAD model provided by the customer.



Pouring metal into gear set casting shell.

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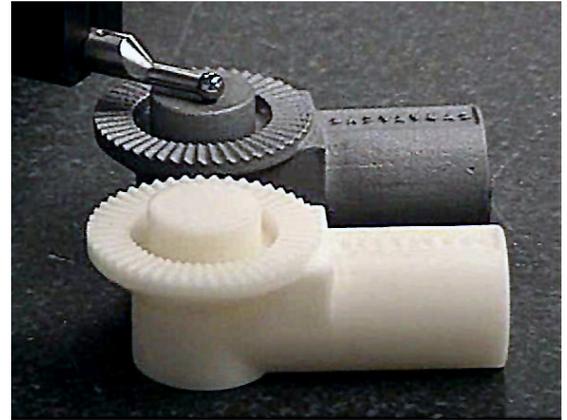
RLM Industries

These revisions were completed in one day, and at the end of that day, engineers set up their Stratasys machine to produce an FDM prototype. Using the prototype in an assembly review, the customer found an interference. RLM made some modifications to the CAD model and printed another prototype, which allowed the customer to approve the design.

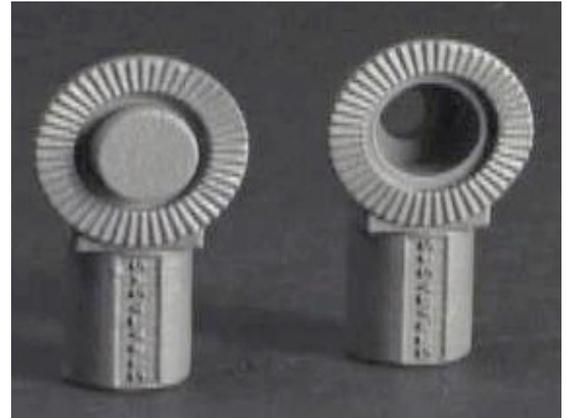
RLM then moved immediately into production of the first prototype castings, using the FDM parts as patterns for the investment casting process. The castings matched the patterns perfectly, and the customer approved them. The production of the first prototypes also allowed RLM to refine the casting process and the configuration of the casting tree.

RESULTS

“Using Stratasys equipment and technology, we were able to build patterns in less than a day,” Meachum concluded. “The patterns were then expedited through our process, and in seven days we produced perfectly matching gear set castings that met drawing requirements and specifications and were functional as part of the assembly. The castings were used for a test launch. We now have time to build hard tooling with all parties confident in the knowledge that the part design and dimensional attributes are correct for a large-quantity, production order.”



Male FDM pattern (foreground) and finished casting being inspected with coordinate measuring machine touch probe.



For RLM Industries, investment castings were produced to specifications in only seven days using FDM method.



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info@stratasys.com

STRATASYS.COM

HEADQUARTERS

7665 Commerce Way, Eden Prairie, MN 55344

+1 888 480 3548 (US Toll Free)

+1 952 937 3000 (Intl)

+1 952 937 0070 (Fax)

2 Holtzman St., Science Park, PO Box 2496

Rehovot 76124, Israel

+972 74 745-4000

+972 74 745-5000 (Fax)

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