STRATASYS®

Weathering the Elements

Image 1: FDM played a vital role in the development of the Opteva® 500 ATM. Image 2: Rendering of early design concept for the Opteva 500. Image 3: Outdoor testing of an ATM prototype built with FDM components.

Prototype Functions in Sleet, Snow, Temps from -5° to +95° F and High Humidity

"Because the FDM prototypes held up under these conditions, I'm confident that we can begin rapid manufacturing of ATM components with FDM."

- Rich Lute, Diebold

Real Challenge

Automated teller machines must safeguard and dispense cash in harsh and abusive conditions. When Diebold, Incorporated designs an ATM, it relies on FDM (fused deposition modeling) prototyping systems to prove out the design. With FDM, Diebold builds working ATM prototypes with components tough enough for machine-function tests.

Real Solution

In the past, Diebold used various types of rapid prototyping and urethane cast parts. Seeking improved functionality, the company began buying FDM prototypes from Stratasys' RedEye division. "The FDM parts give us the accuracy and functionality we need," says senior mechanical engineer Rich Lute. "We also eliminate throw-away, single-use prototypes, since an FDM part serves many purposes."

Over the past two years, Diebold has purchased nearly 600 parts from RedEye – some as large as 18 x 50 x 4 inches (457 x 1,270 x 102 mm). On average, the company places one order per week. With such a great need for prototypes, Diebold recently purchased an FDM Titan™. FDM now accounts for 90 percent of all prototypes used in the design of Diebold ATMs.

Because the functional FDM prototypes help improve component design so much, Diebold is now more confident when it mills a production tool. The number of tools that require rework has been significantly reduced. And that amounts to significant savings for the company.

Lute finds that the polycarbonate and ABS prototypes accurately predict the performance of injection-molded parts. So much so that he became convinced it was better to replace cast urethane parts with FDM parts on demonstration and testing units. This was decided after one machine was constructed from parts built via FDM and a second was built from cast urethane parts. Both ATMs were shipped out for testing. The cast urethane ATM had many broken parts, but the FDM unit arrived intact and ready for use. "This gave us confidence to use FDM parts for much more than prototyping," says Lute.

Lute then tried FDM for environmental testing of bezels, fascias and module components for two ATMs. Over the course of a year, the machines were exposed to rain, sleet, snow, and temperatures from -5° to +95° F, as well as humidity levels of 85 percent. Through it all, there were no failures. "We found FDM really holds up during our battery of tests," says Lute. The immediate benefit is faster response, lower tooling cost and improved products.

"Because the FDM parts held up under these conditions, I'm confident we can begin rapid manufacturing ATM components with FDM. When we do, we won't need to spend $40,000 on a tool that makes 10 parts," says Lute. Rapid manufacturing will open new markets for custom ATMs and create new options for creating replacement parts for out-of-production machines, according to Lute. "We only need to have the right opportunity to make it happen."

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