



Cycletime Tips - Automotive

Volume 14: Stereolithography

Many of our customers have been encouraged to bring value to current and potential business partners through accepting some design responsibility. With this value proposition, comes a thorough knowledge of thermoplastic part design, tool design, materials, and process alternatives. During the initial design phases, immediately after a thorough understanding of the application has been gleaned, a concept part is created and a material is selected. The responsibilities placed upon the designer are often times too tedious to produce a perfect design – especially when several pieces are involved in a large program. A product development tool available to our industry today exists in Stereolithography.

This 3-D prototyping technique has been at our disposal for approximately 25 years and it can be very helpful to either verify the effectiveness of a design or win-over a skeptical customer. The old saying, “A picture is worth a thousand words” definitely applies here. This procedure enables you to produce a part that is intended to look very similar to the intended form. With computer-aided design (CAD), the software is only as good as the human driving it and some design projects are so complex that mistakes can and will occur. In nearly all cases, the investment more than pays for itself in preventing costly engineering changes and/or time revising instead of working on other project aspects.

The process, simply stated, involves a computer, software that divides your design into layers (5 to 10 per millimeter), a perforated platform, an ultraviolet laser, and a vat of liquid photopolymer. The guided laser causes the liquid within the design perimeter to cure, layer by layer, until the product is built exactly like the CAD model provided. Depending on the size of the component, several can be produced at the same time if desired. Afterward, the parts are rinsed and baked to insure thorough curing.

This method has been refined to the point that most parts can be produced in less than 8 hours. During its inception, some had said that it could replace standard plastic part fabrication methods. Since the material used is so brittle (similar to general-purpose polystyrene), even if the speed is vastly improved the polymer development must be substantially enhanced as well. Other prototyping methods are generally used when parts are required that will closely emulate functional reality in engineering polymers.

Please feel free to contact Jim Cardinal or me if you should have questions about this or other means of generating prototype components.

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