Roundtable Q&A: Machining

Marty Cavegn, Steve Dicke, Pete Marut, and Trisha Mowry

1. Why are machined components still a viable part option for medical devices over cheaper plastic ones?

Marty Cavegn
Sales Engineer, Top Tool Co.

A key piece of functionality or performance often requires a material property—tensile strength, wear surface durability, or strength-to-size ratio—that plastic molded components alone can’t supply. When metals are the solutions, stamping and forming makes metal fabrication viable by delivering parts per dollar instead of dollars per part. There is a lot of precedent for replacing a $3 machined or laser-cut part with a precision stamped component at 25 cents per unit. This is especially true when you optimize for stamping and forming manufacturability during design or R&D. In some cases, the best solution is a hybrid of techniques, like overmolding a stamped component into an assembly.

Steve Dicke
VP of Sales, Connecticut Spring & Stamping
Pete Marut
Sales Engineer—Stampings, Connecticut Spring & Stamping
While plastics have come a long way, they still cannot match the strength of steel. Our machining of stampings provides an additional cost savings on rigid components in many applications.

Trisha Mowry
CEO, Metal Craft & Riverside Machine and Engineering
The density and strength of metal machined parts is much greater than that of plastic. Certain areas have such high strength requirements that machined metals

and reusable devices are still necessary. One example would be that plastic parts have a much higher chance of galling than metal parts do. Another advantage of metal parts is their ability to be cleaned at much higher temperatures without any thermal reaction.

2. How have newer metals enhanced machined component offerings for medical device designers?

MC: From a stamping and forming perspective, the door to benefitting from emerging and exotic materials—and doing it cost effectively—is opening wider all the time. Nitinol, for example, provides better elasticity than plastic, but with much higher strength. As a result, designers have definite and accelerating plans to exploit its functionality, versatility, and durability. The key manufacturing issue—from the perspectives of cost, productivity, and precision—has been how to manipulate the material. Stamping and tooling advances that are keeping pace with new materials have been successful resolving difficulties that accompany properties like durability and abrasiveness.

TM: Newer metals are becoming stronger and lighter than ever before. Many people chose to go with plastic because of its lighter weight but the strength isn't there. Metal parts offer increased strength for just a little more weight with the new metals and alloys available today. They also allow us to use metals that are dissimilar for better function without gall or bind.

3. What impact have coatings made on the additional value machined components can offer?

SD/PM: Coatings such as Teflon can provide enhanced lubricity when needed. Others provide increased surface hardness for increased wearability.

TM: Coatings have added extended product life to machined metal devices. Increased lubricity causes less wear on the cutting edges or wear surfaces, which greatly extends the life of the product.

4. Any thoughts/comments on machining or another related area that you would like to share with medical device manufacturers to aid them?

MC: The best contract manufacturing results come from "design for manufacturability" collaborations, instead of "arm's length" customer/vendor purchasing transactions, that integrate the supply chain to optimize manufacturability. The optimal solution often is not a single method approach. Assemblies that merge stamped components and plastic overmolding are an example. Each method meets the "parts per dollar" outcome that volume manufacturing must deliver. Together, they provide the functional performance of metal and the complex geometry fit of a molded part—an effective combination of form, fit, and function. It's unrealistic to be expert in all manufacturing methods. Collaboration can be the key to superior results.

SD/PM: CSS is always open to be contacted during the early design stages and discuss converting any of the fully machined parts into a stamped and machined part at a lower cost.

TM: Design engineers hear that the new equipment can hold unreal tolerances. What they need to know is that is in a perfect environment and no cutter wear or wear on the machine. Partnering engineers with manufacturers to improve manufacturability and cost reduction should be a combined goal.

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