



Forget screws! Use snaps instead

Mike Hudspeth

A reader writes, "Your article on bad design (*A good example of bad design*, 2/8/07) gave me déjà vu about almost every difficulty you had with the hotel shower controls. I have been a manufacturing engineer for almost 40 years, and my biggest "drives me crazy" is a product or component not designed for manufacturability. Your article stressed how important it is to design intuitive products. But this is impossible unless engineers can first generate designs that assemblers and fabricators have no problem understanding or producing. So how about writing an article on designing for manufacture and assembly?"

You got it! Here a few ways to practice DFM and DFA:

First, design for specific manufacturing processes. Experience and training informs you that, say, forged parts are tougher in use than machined ones, but they are also slower and costlier to produce. Or, when precision is important, it might make sense to injection mold rather than stamp parts, because stamping allows no control over surface finish. Likewise, when only one side of a part must be precise, blow or rotational molding might make sense. Fortunately, design guides such as <http://designinsite.dk> can help.

Also, keep in mind that material can affect process tolerances. For example, we make extruded plastic tubing, and extrusion is a precise process. But when cutting off the parts, we keep the length tolerances large because the material stretches.

Edited by Leslie Gordon

Don't forget to design for ease of fabrication. Avoid sharp corners and thin walls, which cause stress in parts. Avoid features requiring special measures to build like undercuts and side pulls. Design parts so they can be made with standard end mills and drills. And try to minimize secondary operations such as grinding.

A good rule: Keep it simple. For example, you might be able to minimize the number of assembly steps by combining multiple parts into one. A good, solid snap, say, might work in place of a wire strap or screw. Examine the order in which parts logically fit together. Make sure assemblers can get their fingers in any recesses. And design parts to go together only one way. Create intuitive alignment features and mold-in such helpful features as orientation arrows.

In addition, design for disassembly as well. Often, someone must eventually maintain or repair products. And a product getting recycled must be taken apart. When using snaps, provide a way for them to be unsnapped.

Lastly, design for automation. Robots never get distracted or tired, so include features such as flanges that accommodate robotic-arm grippers.

The upshot — Critical for industrial design, DFM and DFA help bring together many disciplines to achieve a stated goal. **MD**

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