

THE REAL COST OF IGNORING DESIGN FOR MANUFACTURING IN PRODUCT DEVELOPMENT

By Dave Schoell, President, Hankschaft

Most production problems don't start on the manufacturing floor. They start much earlier, when product teams finalize a design before asking how they'll build it.

We've seen this happen across new product launches and transfer projects. A design may perform exactly as intended, but production tells a different story. Materials wear faster than expected, plastic parts crack in predictable locations, and tight tolerances slow production and increase scrap. None of those problems surprise us because they usually trace back to decisions made during product development.

Design for Manufacturing (DFM) changes that process. Instead of discovering problems after production begins, we evaluate materials, tooling, tolerances, and specifications while changes are still feasible. This approach saves time and reduces costs.

COMMON DESIGN FOR MANUFACTURING MISTAKES

One of the biggest mistakes we see happens long before production begins. A product team finishes the design, hands it to manufacturing, and expects everything else to fall into place. But that's rarely how it works.

A design can function exactly as intended and still create problems on the production floor. We've seen plastic parts crack because a seam ended up in a high-stress area. We've seen materials that looked right on paper wear out too quickly in the field. We've also seen tight tolerances drive up scrap rates because they left no room for normal manufacturing variation.

Transfer projects often expose these issues. A company moves an existing product to a new manufacturer expecting better results, but the same problems follow because the design never changed.

That's why we like to get involved early. When we review a design before tooling begins, we can spot issues while they're still inexpensive to fix. A small change during product development can eliminate months of production headaches later.

CAPITAL INVESTMENT CONSIDERATIONS

Moving production from one country to another involves much more than shipping tooling to a new factory. Every manufacturing transfer requires companies to prove they can build the same product with the same level of quality.

We've worked on enough manufacturing transfers to know the tooling is only one part of the process. Before production can begin, the new manufacturer has to qualify the tooling and validate the manufacturing process. Depending on the product, the company may also need to complete additional certifications to meet customer or regulatory requirements.

Many companies begin by comparing labor costs or tariffs because those costs are easy to measure. The bigger investment often comes after the move, when the new facility works to produce the same quality and consistency as the previous manufacturer. The design may stay the same, but small process changes can still affect part fit and performance. Identifying and correcting those issues adds cost and can delay production.

Understanding the full scope of a manufacturing transfer before making the move helps companies set realistic expectations and avoid costly surprises later.

TOLERANCING ISSUES THAT IMPACT MANUFACTURABILITY

Tolerances can look perfectly reasonable on a drawing and still create problems once production begins. That's why we review every technical drawing before tooling starts. Our engineers look for dimensions that are difficult to hold consistently and identify areas where the design may create unnecessary manufacturing challenges.

We also perform mold flow and tooling analyses early in the process. A small design change can affect the way an entire part fills, cools, or releases from the mold. Finding issues during product development allows us to correct them before they become production problems.

The same approach applies to material specifications. A material may meet the requirements on paper but perform differently in the real world. When we find that disconnect, we recommend changes based on testing and our manufacturing experience so customers can move into production with greater confidence.

SPECIFICATION CHALLENGES THAT AFFECT PRODUCTION

Not every specification can be manufactured as written. We occasionally receive designs with performance requirements that exceed what the product can physically deliver, and it's better to identify those limitations before production begins than after tooling is complete.

One customer asked us to develop a DC motor powered by a thermocouple while meeting specific voltage and current requirements. Those requirements couldn't work together. Rather than build samples we knew would fail, we explained the limitations and discussed what needed to change. Once they adjusted the available voltage and current, we were able to deliver a motor that met the application's requirements.

Those conversations aren't always easy, but they're an important part of the engineering process. If a specification won't work in production, we'd rather address it during product development than after a customer has invested time and money in the wrong solution.

BALANCING SPECIFICATIONS WITH COST REALITIES

Every design decision comes with tradeoffs. Improving one aspect of a product often affects another, whether that's cost, manufacturability, long-term performance, or production efficiency.

That's why we encourage customers to involve manufacturing early in the design process. Those conversations help identify where a specification adds value and where it creates unnecessary cost or complexity. In many cases, a small design change can simplify production without affecting how the product performs.

Our goal isn't to change a customer's design for the sake of manufacturing. It's to help them build a product that performs as intended while making the best use of materials, tooling, and production resources.

Need help avoiding costly DFM mistakes? Contact Hankschaft to learn how early manufacturing involvement can reduce redesigns, control costs, and improve product quality.



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