



## **Design for Manufacture and Assembly: Time to Save**



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## 1.0 Simplify the Process

Countless products enter the marketplace every year. However, many do not turn a profit. In fact, three-quarters of all consumer products fail to reach the first-year sales threshold of \$7.5 million and a mere 3 percent succeed in pulling in \$50 million during their first 12 months on shelves – the figure industry experts cite as the standard for a “highly successful” debut.<sup>1</sup>

While a variety of internal missteps can lay the groundwork for failure, there is one error that often proves most fatal to companies and entrepreneurs with potentially transformative products: getting mired in product development limbo.

In most cases, producers fail to move from conception to production in a timely manner due to slow-moving strategic planning activities or reliance on external manufacturers that maintain antiquated or segmented design, fabrication and assembly processes.

Individuals and businesses can avoid such a situation and increase their chances of releasing successful products by partnering with product development firms that embrace the design for manufacture and assembly methodology. This proven approach facilitates the creation of quality products while reducing time-to-market and keeping overhead costs low.



<sup>1</sup>“Why Most Product Launches Fail,” Harvard Business Review, 2011.

## 1.1 Understanding DFM&A



Engineering faculty at the University of Massachusetts are credited with establishing the core concepts of DFM&A, which is said to have grown out of a National Science Foundation-funded research project conducted at the college in 1977.<sup>2</sup> The methodology combines two existing fabrication strategies – design for manufacture and design for assembly – into one integrated product development model designed to produce goods that contain few parts (DFA) and are easy to manufacture en masse (DFM).

Manufacturers fleshed out DFM&A in the years following its creation at UMass, creating multiple universal guidelines for properly deploying the methodology, including:

- Designing for as few parts as possible.
- Adopting modular design principles.
- Minimizing fastener usage.
- Reducing post-assembly adjustment.
- Supporting production variation.

<sup>2</sup>"DFMA and Its Roles in the Integrated Product Development Process," Massachusetts Institute of Technology, 1996.

By the 1980s, producers across multiple sectors had embraced DFM&A – most notably, automotive manufacturer Ford, which oversaw one of the first great product release successes attributed to the strategy.<sup>3</sup> The company debuted the DFM&A-produced Taurus in 1985, a vehicle that not only sold well but saved Ford billions in overhead.

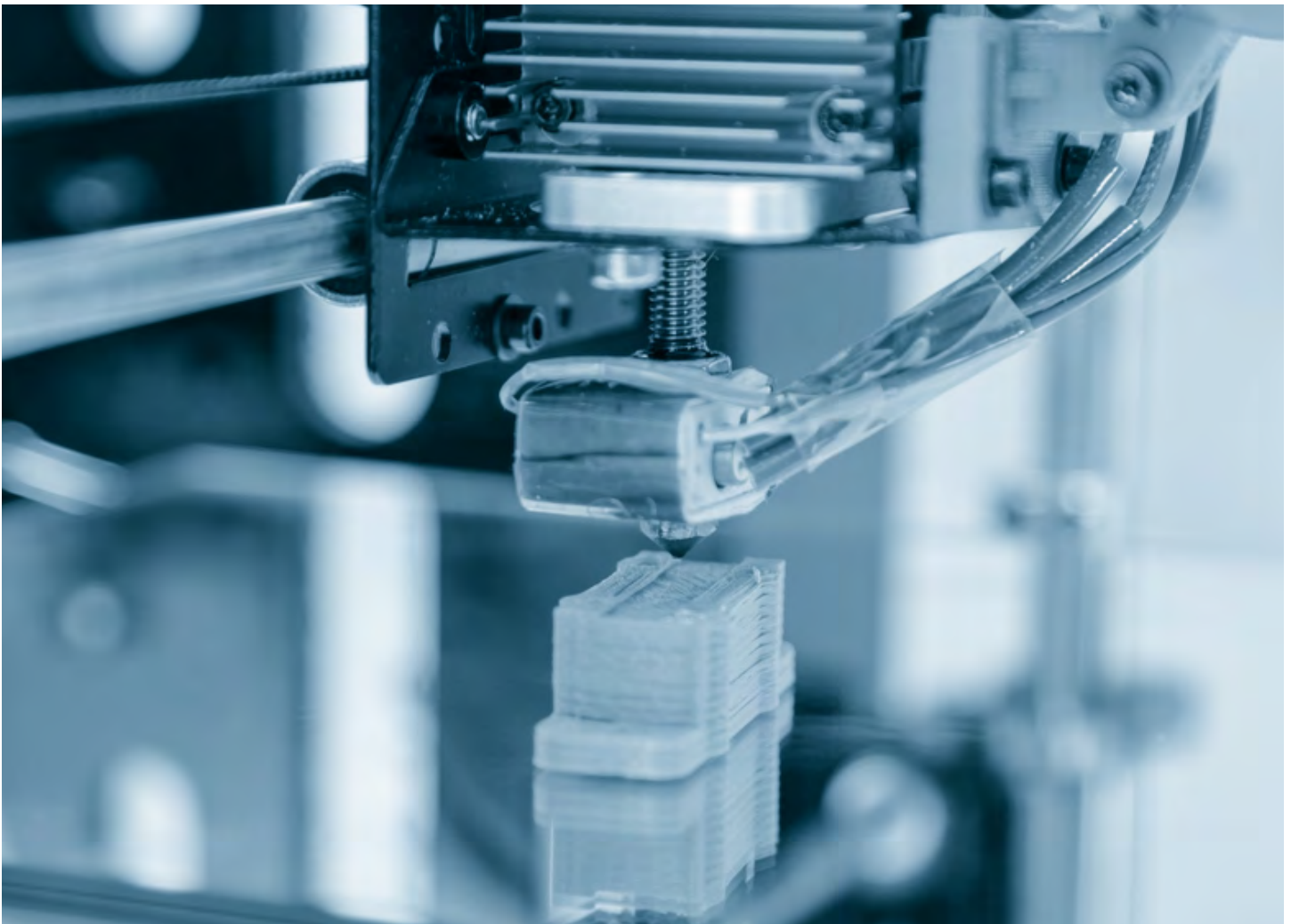
Today, organizations everywhere are leveraging DFM&A in their operations and finding success. For example, the Royal Institute of British Architects promotes the approach in the construction space, where builders are using prefabrication processes to assemble 80 percent of structural components offsite.<sup>4</sup>

Industrial manufacturers are, of course, doing the same, integrating DFM&A processes into existing lean workflows and achieving great success for themselves and their clients.<sup>5</sup>

<sup>3</sup>"DFMA Cuts Billions in Manufacturing Costs," Design News, 2016.

<sup>4</sup>"RIBA Plan of Work 2013: Design For Manufacturing and Assembly," Royal Institute of British Architects, 2013.

<sup>5</sup>"DFMA – A Potent Lean Methodology," Assembly Magazine, 2013.



## 1.2 The Benefits and Dangers of DFM&A



Organizations that adopt DFM&A or collaborate with external manufacturers that use the strategy tend to see significant results. Producers have been known to cut required parts inventories in half, a material savings that results in sturdier, easier-to-replicate products that cost less and hit the market quicker.

Additionally, because DFM&A emphasizes holistic product development, many businesses see cost savings as a result of more in-depth product planning processes. During the design phase, 60 percent to 80 percent of the fixed production costs associated with a given product are determined. When businesses can carefully plan out

simpler products while including variability in the equation, expenses drop dramatically.

While potentially transformative, the DFM&A methodology comes with some pitfalls – namely, extended lead times and increased tooling costs. These outcomes often unfold due to sales forecasting errors and overdesign. With these undesirable scenarios in mind, engineers should collaborate with clients’ engineering, marketing and sales teams to develop quality products that not only pass muster but also set businesses up for success in the marketplace. Through this collaborative process, clients get the most out of DFM&A without running into the roadblocks that can come with over-reliance on the strategy.

<sup>5</sup>“Measuring DFMA Savings,” Automation World, 2008.

<sup>6</sup>“Measuring DFMA Savings,” Automation World, 2008.

<sup>7</sup>“DFMA and Its Roles in the Integrated Product Development Process,” Massachusetts Institute of Technology, 1996.

## 2.0 An Improved End Product

Companies or entrepreneurs searching for success cannot afford to pin their ambitions to antiquated and fractured development and testing processes that drive up overhead costs, increase time-to-market and result in less profitable products. In today's marketplace, an arena ruled by ever-changing consumer

trends, these companies must embrace accelerated workflows that reduce the expense of churning out physical offerings and ensure items hit the shelves at the height of demand.

By taking a more balanced approach to using DFM&A, engineers and their clients will both be rewarded.

Connect with us today to learn more about our unique approach to DFM&A





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