

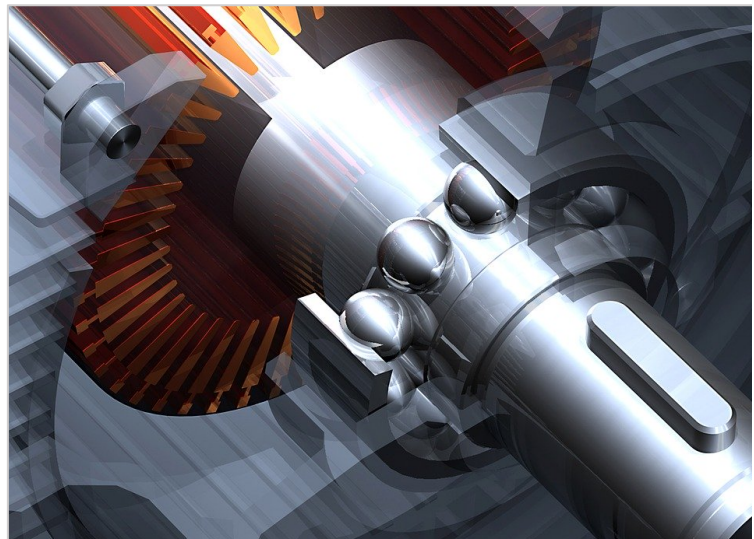
## Streamlining the Process with Design for Manufacturing and Assembly

It's a time-honored childhood tradition. Getting together with your buddies and building an impressive fort in the backyard. A ramshackle but charming sticks, old blankets, rocks, and leaves masterpiece proudly displayed with a pirate flag on top. This complicated process probably took days of construction and reconstruction—innovative engineering at its finest.

Then, your sister and her friends come along. They inspect your work, scatter off to collect supplies from their homes, and quickly regroup to construct a Mount Everest worthy base camp with basic-but-sturdy tarps, ropes, poles, stakes, and bungee cords. And, to add insult to injury, a storm blows through, and guess which fort is left standing?

Welcome to your first experience with Design for Manufacturing and Assembly (DFMA)!

As a critical part of the product development cycle, DFMA involves optimizing the design and assembly of your product for its manufacturing and assembly process, merging the design requirements of the product with its production method. Employing DFMA tactics reduces the cost and difficulty of producing a product while maintaining its quality.



What's another reason Design for Manufacturing and Assembly is so imperative? Something that's at the top of every business priority list - cost reduction. Did you know About 70% of the manufacturing costs of a product can be attributed to design and assembly decisions like materials, manufacturing, and tool selection? It only makes sense that focusing on design optimization reduces the cost of manufacturing.

DFMA is an engineering methodology that focuses on the early design phases of the product lifecycle. By emphasizing DFMA from the start, it will reduce time-to-market and total production costs by prioritizing both the ease of manufacture for the product's parts and the simplified assembly of those parts into the final product.

World-famous entrepreneur, inventor and designer, Steve Jobs sums up the concept of DFMA perfectly: "That's been one of my mantras - focus and simplicity. Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. But it's worth it in the end because once you get there, you can move mountains."

Phase one in DFMA starts with bringing in manufacturing experts such as those at Delta Technology to consult with on your design. Lowering manufacturing costs and forecasting glitches is always the easiest at the during the design stage. Work with the people in manufacturing to examine and improve upon your design. Tap into their experience; the experts have probably already experienced and addressed many of the potential production problems first-hand!



Keep these guidelines in mind when evaluating Design for Manufacturing and Assembly:

- Minimizing the number of components reduces assembly and ordering costs, reducing work-in-process, and simplifying automation.
- By designing for ease of part-fabrication, the geometry of parts is examined, and unnecessary features are eliminated.
- Evaluating tolerances of parts reduces costly risks. It's crucial that the parts be designed to fit within process capability.
- By designing components with clarity, it ensures they can only be assembled one way.
- Focus on Minimizing the use of flexible components: Parts made of rubber, gaskets, cables, and so on, should be limited as handling and assembly is generally more difficult.
- Design for ease of assembly: For example, the use of snap-fits and adhesive bonding rather than threaded fasteners such as nuts and bolts.
- Eliminate or reduce required adjustments: Designing adjustments into a product means there are more opportunities for out-of-adjustment conditions to arise.
- Your material choice can impact your cost, part quality, and manufacturing method. What properties does your part require? How many cycles should it last? Are there any weight requirements?

- Spec for the loosest tolerances that allow a good product - and consult the trade organization for your manufacturing process on what is reasonable for that process
- Decide which manufacturing process would be most cost-effective for production? Additive, subtractive, or forming?
- Use standard parts or components. Doing this will reduce the cost of new designs while improving inventory management and time-to-market.

By tapping into the many years of experience that Delta Technology has accumulated, different design and manufacturing options can be explored, and various cost options can be reviewed before moving forward. We love seeing a well-designed product come together and look forward to hearing from you.

## About Delta Technology:

Delta Technology has been the integrator and the manufacturers' strategic partner of choice for robotics, automation, and custom manufacturing solutions since 1997. We are proud to employ Industry 4.0 methodologies to creatively and expertly design, engineer, and build custom industrial automation solutions to solve the most complex manufacturing challenges.

We partner with our customers to clearly identify their challenges and understand their goals. Based on our findings and our extensive experience in manufacturing, we design and engineer the best custom solutions for them.

We specialize in:

- Design, engineering, fabrication, and assembly of custom industrial automation and robotics solutions
- Cutting-edge and modern lean automation and lean robotics
- Machine-control software development
- Integration of automation equipment
- Vision-guided robotics, inspection systems, and adaptive controls