

# Designing for Manufacturability and Savings

Product design establishes the feature set, how well the features work, and the marketability of a product. The design of a product determines 80% of the cost, and directly affects quality, reliability and serviceability. It also determines how easily and quickly the product is manufactured and how manufacturing improvements like just-in-time and lean manufacturing can be introduced. Having good product development is a powerful competitive advantage and the immense cost saving potential of good product design is quickly becoming a viable alternative to automation and offshore manufacturing.

Some key design rules we follow here at Argo include...

## **Concurrent Engineering**

Using concurrent engineering of parts and tooling to minimize tooling complexity, cost, and lead-time maximizes throughput, quality, repeatability and flexibility. This way, errors and redesigns can be discovered early in the design process when the project is still flexible. By locating and fixing these issues early, the design team can avoid what often become costly errors as the project moves to more complicated computational models and eventually into the actual manufacturing of hardware.

## **Learning from the Past**

In order to not repeat the same mistakes, it is important to understand all challenges with current and past products with respect to manufacturability, introduction into production, quality, reparability, serviceability, test performance, and so on. This is especially true if previous engineering is being integrated into new designs.

## **Minimizing Tooling Costs**

Organizing manufacturing lines according to lean principles enables output to increase in any given line, reducing the costs of acquiring additional tooling. The same techniques and design concepts, paired with attention to costs, that reduce assembly hours can also be applied to reduce tooling costs. Flexible tools can be used in the fabrication or assembly of multiple parts rather than being dedicated to a particular part or a small family of parts. Ideally, they should also have very low setup times. Tools that can make many different parts can be used to fill in to reduce bottlenecks by allowing for the manufacturing of whatever subassemblies are needed to continue the production flow through the plant.

## **Designing for Ease**

Designing for easy fabrication, processing, and assembly is a primary design consideration. Even if labor costs are reported to be a small percentage of the selling price, challenges in manufacturing, processing, and assembly can generate enormous costs, cause production delays, and demand the time of precious resources.

Design for Manufacturability can significantly reduce costs since products can be quickly assembled from fewer parts. Products are easier to build and assemble, in less time, with better quality. Parts that are designed for simple fabrication helps to encourage the standardization of parts, maximum use of purchased parts, modular design, and efficient production.

