Issue 4 April 2020

DETROIT ROBOTICS
COMPLEXITY. AUTOMATED.

AUTOMATING FOR PART FAMILIES

INTEGRATING AUTOMATION TOOLS TO REDUCE LABOR, COST, AND TIME FOR LOW-TO MID-VOLUME MACHINING PROGRAMS

In This Issue:

Automating For Part Families

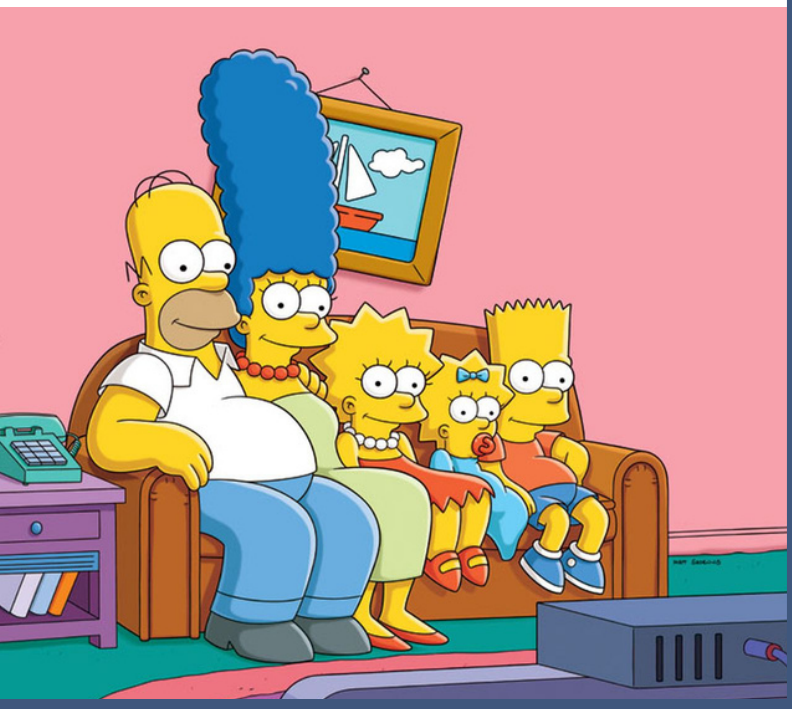
Part families are like regular families.

Some look almost identical. Others different, but with familial similarities.

A high percentage of industrial manufacturing, from automotive to aerospace, comprise part families.

Learning to automate part families based on similarities is the key to successfully managing quality, speed, and costs.

The traditional approach to managing the supply chain for part families employed strategies such as JIT (just in time) manufacturing, VMI (vendor managed inventory), co-location (vendor proximity to customer) and other inventory optimization techniques. Or, just buy more than you need today (forecasting.) This approach became increasingly dominant as global manufacturing offered a cost advantage, but failed to solve problems of lead time and, often, quality.



As part of a 3rd generation family of companies (we're a family too!) rooted in the booms and busts of Detroit automotive we've done it all over the nearly 100 years.

The epiphany of the real power of automation came to Detroit Robotics around 2006.

Our current management were freshly minted U of M engineering grads, who witnessed first-hand the hurry up and wait vagaries of big auto purchasing and inefficiencies of the manual production system.

Our forays into global production were, by any measure, successful. But, as anyone with global supply chain management experience will tell you, there's a lot than can go wrong.

When your entire supply chain speaks another language, operates on a 12-hour time difference, and your product sits in a shipping container that takes 4+ weeks to arrive, that's a lot of risk variables.

We once had an entire shipment stuck in Vladivostok for 4 months because the shipping line went bankrupt mid-voyage. How the hell do you plan for that??

It was very apparent, as early as 2006, that there was a better way.

Fanuc Detroit were then mostly focused on GMC and scaled automation.

Automation Alley was just.... well, an alley.

Automating For Part Families

From Motor City to Automation Alley

Like most big ideas, we started small. We were one of the first Fanuc Robotics customers to perform in-house integrations.

Although Fanuc integrations are now an entire industry, the early days were a lot more learn as you go (and a bunch of fun.)

Integrating bar feeders, Fanuc arms, with a Doosan CNC turning cell allowed us to build one of the first, if not lights out, then hands off, automated line. Introducing new tools and integrations to this line made steady incremental progressions to both quality, time, and costs.

Fast forward several years and a family of 20+ parts with an annual output of over 500,000 pcs. was re-shored, faster, leaner, and to quote an OE customer “by far, the best quality in the industry.”

Part families fall right into the sweet spot where part feature similarities exceed differences.

Material stock can be purchased to near net shape. Quick changes from one part to another can be automated.

For example, one current line routinely makes up to 10 fully automated part setup changes during lights-out shifts.

Advances in machining technology allow for increased part complexity for mid-volume production, including 5-Axis machining for Titanium aerospace parts.

A recent defense program provided another first. Detroit robotics managed prototype and low-volume production for a large family of parts for a test assembly. After the assembly was evaluated and approved for scaled production, we were awarded the production program.

The advantages to our customer working with the same team involved from the early stages of design and testing carried over a high degree of native experience. Team cohesion between both our respective engineering and production teams was a happy bonus.

THE TAKEAWAY

- Prototype and low- to mid-rate production relies on managing complexity at speed. Part families, by design, present opportunities to automate for time, cost, and conformity.
- Mid-volume production (up to 1 million pcs. annually) automation requires an investment in automation tools and integrations. A fully customized, dedicated line. Robotic "chops" are necessary to build and manage this, both people and tools.
- Both the customer and manufacturer should reasonably expect increases in efficiency and cost over time using this method.
- Essentially, a dedicated, automated part family line replaces the need for extended forecasting, inventory costs, and flexes easily to demand for individual parts in the family.

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