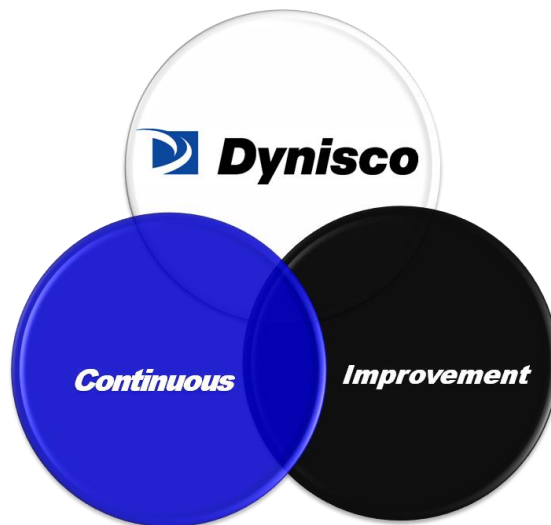




# Dynisco's DFMA Implementation: Overcoming the Fear of Change

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## **Introduction**

Any high level initiative a company tries to introduce within its culture requires a well engineered plan. Dynisco's plan to implement the use of Boothroyd Dewhurst's (BDI) DFMA software and philosophy included pairing the DFMA initiative with their Lean initiative into the company's Continuous Improvement (CI) Group. The members of Dynisco's CI Group are chartered with implementing DFMA and Lean programs to improve products and processes across multiple Dynisco companies.

With the companies Dynisco has acquired, each one comes with its own challenges and inherited company culture. New initiatives mean people will need to change their day to day processes in order to improve them. While some folks will recite the cliché that "change is good," most people share a common trait amongst us and that is, they fear change. It is definitely a factor that the CI Group has encountered at Dynisco. So, how can this fear of change be overcome while implementing new initiatives intended to help our products and processes, our day to day work, and the company's bottom line? The following will review the steps Dynisco's CI Group is taking and continues to establish.

## **Dynisco**

Part of Roper Industries' Energy, Systems, and Controls business group, Dynisco has been a world leader in developing innovative, high-quality solutions for plastics extrusion processes for 60 years. Other acquired Dynisco Companies include DJ Instruments, Viatran, Alpha Technologies, and the most recent acquisition, Hao Ying Measurement and Control Technology in China. Collectively, Dynisco Companies provide temperature and pressure sensors, controls, and analytical instruments used in the following industries; Plastics, Oil and Gas, Rubber and Composites, and Life Sciences. Dynisco Companies are located in four sites across the Northeast U. S. that includes Franklin and Billerica, Massachusetts, Buffalo, New York, and Akron, Ohio. The latest acquisition, Hao Ying is located in Shanghai, China. Other Dynisco sites include regional manufacture and distribution centers in Heilbronn, Germany and Malaysia. Dynisco's CI Group consists of three CI Leads, three Quality Managers along with a CI Technician and 3 DFMA/Lean Consultants to round out the group.

## **Challenges**

The main challenge with the DFMA implementation is to introduce the DFMA software and philosophy to engineers who have not been exposed to the BDI methodology, essentially starting from scratch with DFMA. Asking engineers to run additional engineering analyses can be taxing to think of from their point of view. The request for DFMA analyses in the design process or current project is sometimes met with, "there is no time based on the schedule." Another response is, "we have designed without DFMA so far and we have the highest market share." These responses tie directly to the existing culture within each building and are sometimes followed with, "we've always done it this way (without DFMA)."

This network of thinking can be tough to crack when trying to implement new processes and change the way things are done. Being leaders in the market for existing products is a strong defense in the engineer's eyes and this is where complacency comes into play. Engineers will argue that since we lead in our markets, we can't make a mistake if we don't change anything. (That's just what the

competition wants to hear.) However, many opportunities exist with products that are outdated and require refreshed designs. This is where applying DFMA can help tremendously. It is a challenge though to say to the engineers who sustain leading products that they can be even better by applying DFMA techniques. DFMA techniques are proven in achieving improved design efficiency and cost reductions. To those unexposed to DFMA, the perception is that cost reduction just means making the product cheaper. Those experienced in DFMA will tell you the reality is that cost reductions can be obtained with DFMA without reducing product function. Similar perceptions exist on the Lean side like, implementing Lean means an employer wants to reduce headcount, when in fact Lean is about increasing productivity and capacity.

Another challenge for DFMA implementation lies within the supply chain. DFMA, especially the Design for Manufacture (DFM) portion of the software, can help engineers and buyers become educated consumers by providing “should cost” estimates on parts and products early in the design and quoting process. Dynisco is trying to implement a process where the buyers request a DFM estimate run on a part before getting suppliers to quote. This is quite an alteration from the blind exchange of print-to-quote-to-purchase order process that exists today.

The challenges are many; from lack of exposure to DFMA, to no time in the design process for DFMA, to being a market leader not wanting to risk making a mistake to the product’s design, to dealing with perceptions, to changing a quoting process, and finally to people’s fear of change. These fears all fall under the umbrella of the company culture that exists in many buildings, at many companies.

### **Challenges Accepted!**

In order to achieve improvements to products and processes, and the necessary change in culture, Dynisco has followed each step of their DFMA implementation plan. To start, an introductory kick-off meeting was carried out at each site. This presentation included showing the benefits of DFMA, why Dynisco has embraced this initiative, and how DFMA will be applied across the Dynisco product lines. Careful consideration was taken at this point to not overpromise results nor introduce DFMA with great fanfare.

Engineers love structure. Similar to 3D modeling software file maintenance, having basic structures in place for maintaining DFMA files will provide engineers with structure in this area. Best practices or users guides were established along with file naming conventions, revision control, and a file repository. Additionally, a DFMA Project List was created to take in all requests for analysis from each Dynisco site. DFMA requests are then prioritized in the queue and updated monthly.

The next step was to begin training the engineers. Dynisco sites started with BDI’s core training that consisted of two days of training on the software. A monthly user’s group meeting was established. This is a monthly webinar and conference call between Dynisco’s four U.S. sites that provides an opportunity for the engineers to see point-and-click training on specific topics in the Design for Assembly (DFA) and DFM software. This hour is spent reviewing tips and techniques for the users to get comfortable with the software and provide continual training to compliment BDI’s core training sessions. Dynisco also plans advanced training events for their core users. Advance training is intended to expand on topics and techniques within the basics of DFMA.

Another portion of Dynisco's DFMA implementation plan was creating DFMA Events. These are two to three (but not limited to) events scheduled into the engineering project plan. The DFMA Events consist of a few days of conferences with the projects major stakeholders. Attendees include executive team members, engineering, operations, quality, supply chain, and even bringing in suppliers. The design is reviewed with the team scouring the bill of material in the DFA software and models on the overhead reviewing the product assembly and manufacturability.

Tying to the DFMA Events is introducing benchmarking as a standard practice for both Dynisco products and competitor products. Performing baseline or benchmarking analyses on one's own product as well as competitors while using DFMA in the process, provides valuable insight for the engineers on the product's design and manufacturability. These baselines also have provided additional DFMA training.

Dynisco's Value Analysis/Value Engineering (VAVE) Group works closely with the engineering groups and supply chain members. The goal of this is to revise the quoting process to include DFM estimates. It also shows the engineer the impact of their design decisions and how things like tolerances for example, affect part cost. The CI Group is providing the training so the engineers and buyers become more educated consumers with regards to the cost of their parts and products.

For Dynisco's DFMA implementation, the way to interrupt the existing cultural equilibrium that resists change is to introduce an internal disruptor that targets the individual engineers, provides the training and tools necessary so that they become the DFMA drivers. The CI Group becomes that calculated disruptor that uses their expertise to show the individual engineers the benefits of applying DFMA to their products and instill a sense of "want" in the engineer. That is the key; make them "want" to be successful with DFMA.

This has to start with one or a few engineers to execute DFMA on a few projects with the goal of getting "small wins." These small wins will turn into big wins as the engineer continues applying DFMA on projects. Few will become many and only then will the culture start to change and overcome their fears of changing the way they design.

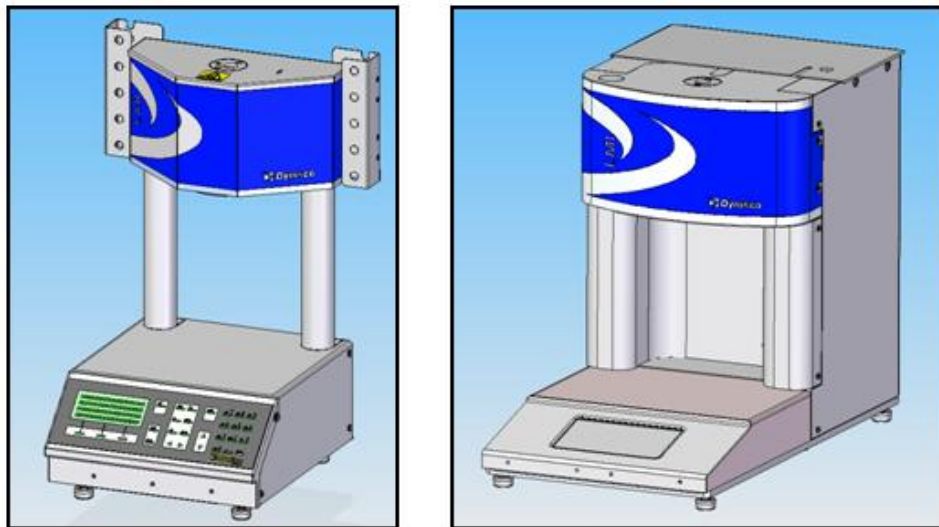
### **What has changed?**

So has Dynisco's DFMA implementation plan worked? Remember, small wins are the key. The following are some examples:

- "DFMA, I thought that's what I always did, design it and hand it over to manufacturing so they can assemble it." This individual was not exposed to DFMA previously. The intent here is not to be critical, but to provide the necessary education on DFMA. Months later after being trained on basic DFMA principles, this same engineer visited a supplier, handed the supplier a drawing and asked the supplier if he could make the part. The new part combined two parts into one and would also lead to the elimination of 4 mounting screws. This is an example of the DFMA mindset at its core, eliminate parts and eliminate fasteners. A small win.

- “I’m afraid of this Lean stuff.” Why? “Because then I’m going to have to change.” The individual who stated this, months later participated in DFMA events that focused on cost reduction activities. The engineer was responsible for providing critical design knowledge that led to significant cost reductions. If he was still afraid of change, it did not show as he was practicing Lean product design with DFMA. Another small win.
- On one of Dynisco’s new product development projects, the fear of change was evident. New methods, tight schedules, and the desire to get the project right led to internal debates between groups. The goal of the project was to refresh an antiquated product and install new features based on voice of the customer feedback. The DFMA baseline of the product showed a total part count of 200, a DFA Index of 6.7, and an opportunity to reduce the total manufactured cost. At the first DFMA Event for this project, the DFMA summary of the new design showed parts and costs increasing. Despite the setbacks, by the time of the second DFMA Event, the team was able to regroup. The part count was reduced from 223 to 209 and the team was able to identify and reduce costs by 40%. While the part count reduction was minimal, it’s still a small win. The impact to cost was the first big win at Dynisco. Reducing cost before going to production shows that the engineers are embracing the mindset required to be successful using DFMA. They are doing it!

**FIG. 1 – Results on Dynisco’s LMI 4000 refresh project.**



	<u>Existing</u>	<u>Refresh DFMA #1</u>	<u>Refresh DFMA #2</u>
Part Count	200	223	209
Theoretical Min.	39	58	58
DFA Index	6.4	6.7	9.4
Manufacturing Cost	Baseline	+27%	-40% from DFMA 1 to 2

- One Dynisco engineer approached the CI Group to show a design where DFMA techniques were applied. “I want to show you that we’re listening.” This statement in itself is a tremendous compliment to the CI Groups efforts.

The design went from:

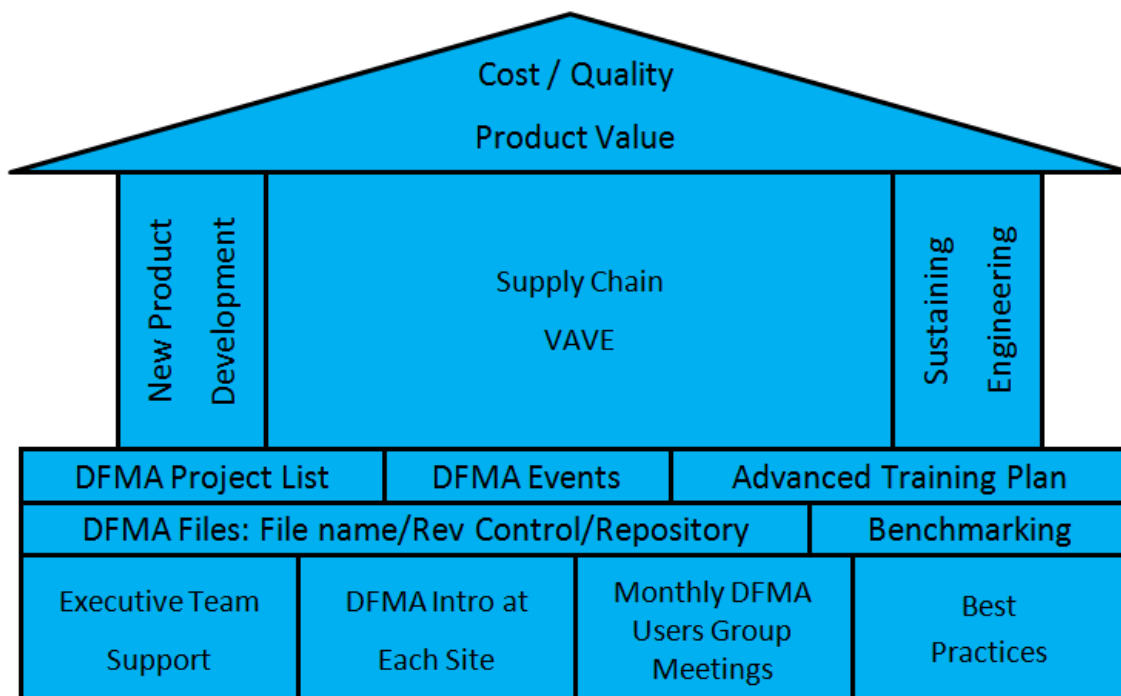
- 82 to 39 total parts
- 2 hours to only 15 minutes of assembly and a calibration time
- Eliminated rework to a machined casting
- The DFA Index improved from 5.5 to 9.8
- 76% reduction in manufacturing costs

This is an example of another good win and an individual who is embracing the changes to our design process by introducing DFMA.

**Summary**

So, how can the fear of change be overcome in the company culture? For Dynisco’s DFMA Implementation the answer is a well engineered plan that targets individuals within the engineering groups so they can be properly trained, and in turn, become the DFMA drivers. Unbalancing the cultural equilibrium that resists changes requires a disruptor to the equation. For Dynisco, the CI Group holds the mantle of being that disrupter. Change will occur slow and steady, with a consistent pursuit that starts with one or a few individuals and then growing the number of people who “want” to change and improve. This will eventually lead to applying DFMA to the areas that it will impact the most: New Product Development, Sustaining Existing Products, and within the Supply Chain.

**FIG. 2 – Dynisco’s Implementation Plan or our version of the “House of DFMA.”**



In 2009, Dynisco's CI Group itself started with a single CI consultant. DFMA and Lean were not topics of discussion at Dynisco. Today, DFMA and Lean are slowly and steadily becoming part of the new company culture. There is now a CI Lead at each site. We have modified our New Product Development process to introduce DFMA earlier in the design process. "DFMA sooner rather than later" has become the mantra. We are taking a fragmented product portfolio and turning it into a more modular portfolio. We have also adopted a Total Cost of Ownership model for the procurement of our parts instead of focusing solely on the piece part cost. And finally, our anticipated results are becoming actual results.

Overcoming the fear of change is definitely not a sprint, but a marathon. Dynisco has shown good examples of change and has made strides in improving our products and processes. Does this mean we're finished? No, we have to continue to work with our engineering groups and throughout the company for the changes to take hold.

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