



Design for Manufacture: Better Information... Better Pricing

New Methods for Supply Chain
Management

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Abstract

Dynisco corporation has been utilizing Design for Assembly (DFA) for its new designs and product refresh programs for a number of years. We have seen significant benefits in terms of assembly simplification, design modularity and part count reduction. Engineers have started to adopt the concepts of design simplification and reduction of unique parts. In addition, the DFA vocabulary has become common within the organization. As Dynisco continues to evolve its use of Design for Manufacture and Assembly (DFMA), we have started to take advantage of Design for Manufacture (DFM). Design for Manufacture is a rather powerful tool that provides detailed manufacturing models of printed circuit board assemblies (PCBAs) and component parts. The model uses various parameters to generate different cost models that can be compared to each other. The cost models can then be evaluated against actual pricing to determine if fair pricing is being achieved or if the organization is being overcharged for its material components. Dynisco has been shifting its supply chain focus from transactional based activities towards analysis based activities utilizing the models generated from DFM. These models have helped drive conversations with suppliers in addition to evaluating price based on actual data. The following paper describes, in more detail, Dynisco's change in supply chain focus and how it is utilizing DFM models to enhance its negotiations with suppliers.

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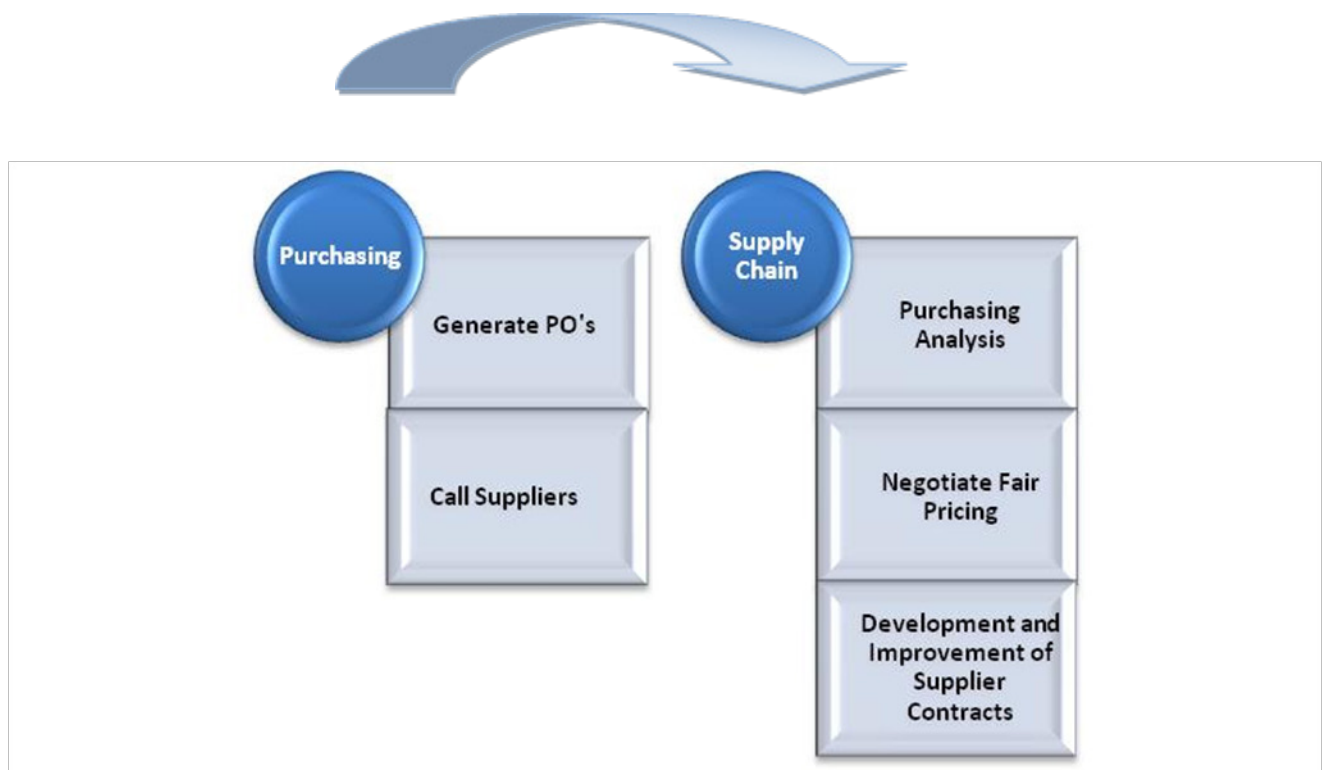
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Introduction

As worldwide competition in business becomes more challenging, so does the ability to improve gross margin and operating profit. Today's customers have many more choices as a result of the internet and the ability to obtain comparative pricing across the globe. As a result of these opportunities for customers, more and more pressure is being placed on Supply Chain Organizations to seek out the best supplier options while still managing and ultimately driving down costs. Another major difference is many of today's businesses are extremely dependent on their suppliers. Suppliers and the overall supply chain have become much more integrated into the strategic facets of our businesses. Therefore it is critical to understand the pricing structure of the materials that are being supplied. Supply chains utilizing Design for Manufacture (DFM) information through the process of component modeling can drive better discussions with suppliers and ultimately achieve better pricing.

Transforming the Supply Chain

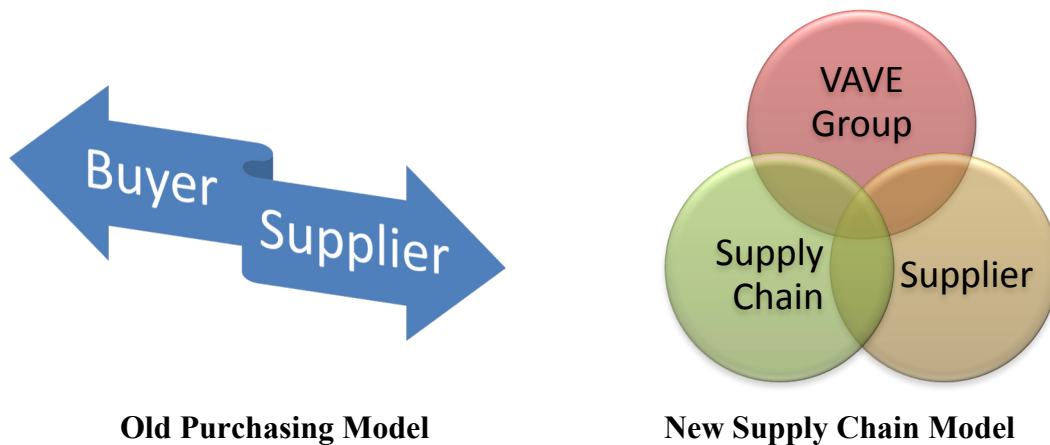
Supply chain organizations have significantly transformed their positions in the modern day of business. Successful supply chain organizations are requiring a different range of skills to ensure that the flow of material is consistent. Interruptions in this flow can result in lost production, lost revenues and ultimately lost customers. Therefore, a greater importance has been placed on individuals who are involved in maintaining a strong and healthy supply chain. At Dynisco, we have been working to transform our “buyers” to “supply chain analysts”. More and more emphasis is being placed on the analysis of purchasing data while working towards minimizing and de-emphasizing the transactional activities. Tools such as E-Kanban, which support longer term blanket orders, are being utilized to automate repetitive transactions while providing valuable data on usage, inventory turns and supplier performance. The time saved by minimizing the transactional activity has been redirected towards analyzing data, developing new and more beneficial contracts, and negotiating fair pricing using manufacturing data and models.



Transformation to Value Added Activities

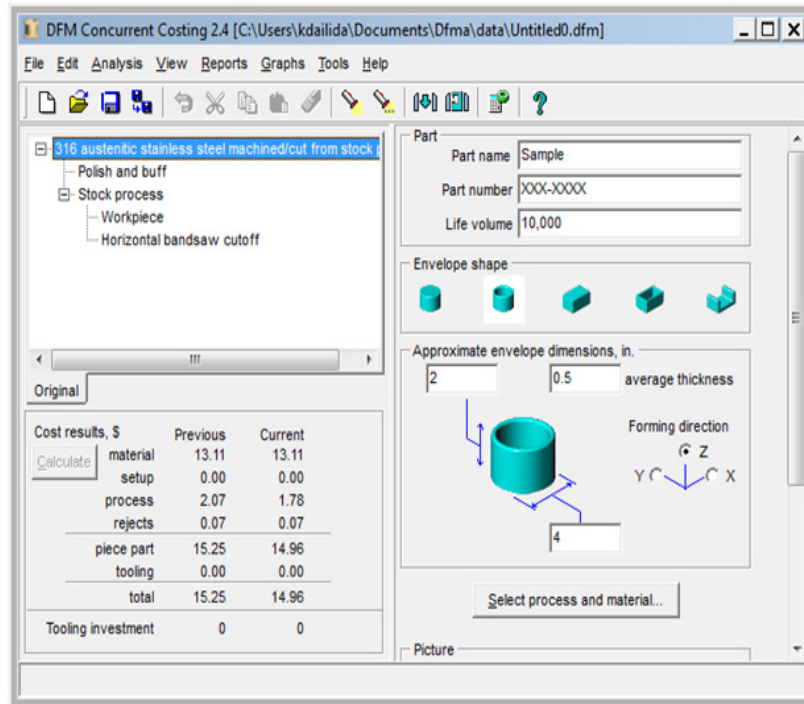
In order to help with the transformation of our supply chain organization we first had to recognize our limitations and identify our needs in order to drive change. In a historical purchasing model, the buyer and supplier bantered back and forth regarding pricing until one or

the other folded through attrition. If the supplier wanted to maintain the business, they surmounted to the pressure and reduced their price. This common practice drove many small suppliers out of business. As mentioned previously, transactional activities were a major part of the purchasing groups daily tasks. Dynisco made a concerted effort to minimize these activities and replace them with more value added activities, such as data analysis. As part of a new supply chain model, the needed to obtain a better understanding of how the components they were responsible for procuring were manufactured was prioritized. In order to provide the additional education on manufacturing processes, the Dynisco Value Add Value Engineering group (VAVE) was incorporated into the model. The VAVE group filled a critical gap, enabling the purchasing department to transform into a group that added much more value within the Dynisco business.

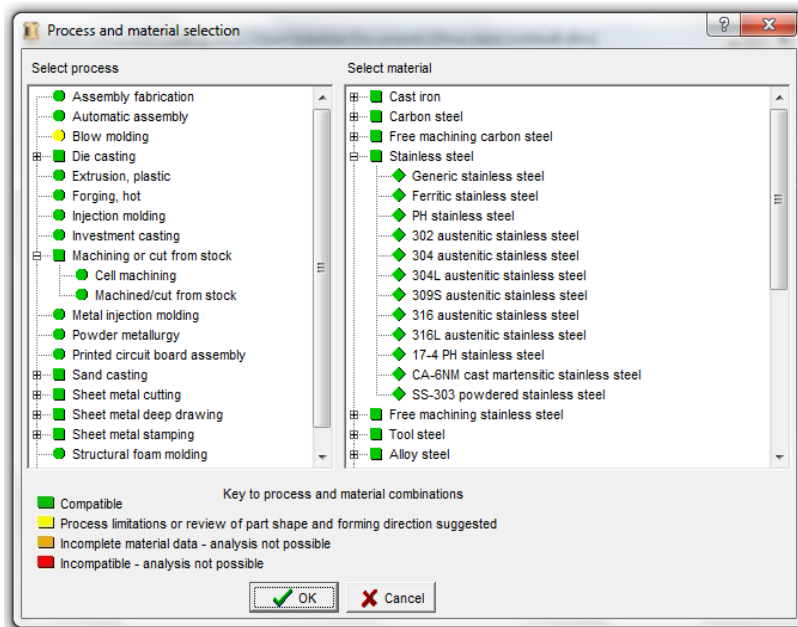


Leveraging Better Information through DFM

One of the most significant benefits to incorporating the VAVE group within the Dynisco supply chain group was the utilization of the information provided in the Design for Manufacture (DFM) analysis. Design for Manufacture is a tool that can be used to create a cost model of a component, or PCBA. Geometries and multiple manufacturing parameters are utilized to generate a model of the component that can then be analyzed. Machining libraries, contained within the software, provide the most desired paths of manufacturing. Different materials can also be evaluated, utilizing the machining library as a pathway to the generation of the most logical manufacturing routing. Once all of the data has been supplied, multiple cost models can be generated and compared to each other in an effort to determine the most cost effective manner of manufacturing.



DFM Geometry input



DFM Process & Material Selection input

One of the simplest ways to describe the power of leveraging the DFM information during price negotiations is by equating it to the experience of purchasing a car today vs. 15 years ago. In the 1990's, purchasing an automobile was a rather painful process. Prospective buyers would reluctantly walk into a automobile show room where they would seek out a sales

One of the larger barriers to overcome, when the supply chain group was presented with DFM and its benefits, was the level of uneasiness in presenting the DFM data to a supplier. Initially, the perception of the group was that the data was going to be used to challenge the supplier in an effort to put them back on their heels. Dynisco was not only going to tell the supplier how to make the part but also how much it should cost. This made the group very uneasy and rather reluctant to adopt the new process, for fear that bridges would be burned and relationships with key suppliers would be tarnished. In reality, this was not the case and the process of utilizing DFM information and presenting it to the suppliers was quite different than what the group expected. In order to develop an initial comfort level with the information, the following process was presented to the supply chain group.

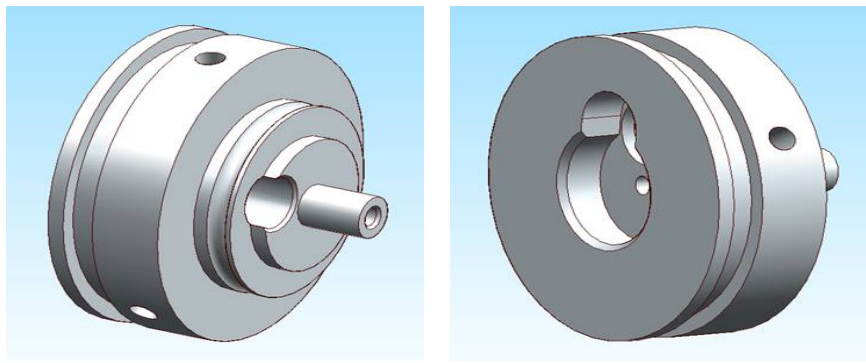
1. Identify a part or group of parts for DFM analysis, (focus on machined components)
2. Employ the VAVE group to generate an initial model of the part
3. Evaluate current pricing against the DFM model
4. Components with a price delta of less than 10% are considered as fair price parts
5. Components with a higher price delta greater than 10% should be examined in more detail
6. Generate a new list of parts for further evaluation and discussion
7. Contact the supplier(s). Explain the DFM process and how it is being utilized, and request a meeting to compare current pricing with component model cost results

In the majority of the cases, suppliers were more than willing to sit down and review pricing against the DFM cost models. Model parameters were reviewed and adjusted based on input from the suppliers. The conversations were much more meaningful due to the fact that both parties were talking with manufacturing information in hand. After several meetings with key suppliers, the supply chain team was much more open to utilizing this method to review and negotiate pricing.

Dynisco Examples

The Dynisco businesses, as a whole have been utilizing DFM analysis over the last two years. DFM was first initialized with Alpha Technologies, due to the number of component parts contained in their rheometry instrumentation. Once potential savings opportunities began to accumulate, three of the other Dynisco companies followed suit. Within the last 2 years over \$4,100,000 of supply chain spend has been identified, modeled and analyzed. Across the four business units over \$685,000 or 17% of the spend analyzed was identified as a potential for savings, based on the models generated. In the specific case of Dynisco, DFM models were

created for approximately \$925,000 of supply chain spend. After comparing the models to actual pricing, it was determined that the Dynisco Supply Chain team was achieving pricing that was 2% better than the DFM models, in total. This did not mean that savings potential did not exist. It did mean as a whole, Dynisco was achieving fair pricing from the majority of their suppliers. The models validated that the suppliers were charging a competitive price and not in any financial jeopardy due to overwhelming cost pressure created by Dynisco. Therefore additional cost reduction opportunities were focused in the direction of longer term commitments, higher volumes and payment terms. An example of a typical component part that was identified and modeled is shown in the figure below. The pricing for part number (183664) was compared to the DFM model generated using the DFMA software. The standard price was compared to the model and the delta between the two was within 5% of the standard cost.



Dynisco PN-183664

In a second example, Dynisco PN 220690 was modeled using a 1000 piece order quantity. After comparing the model to the standard pricing it was determined that the delta between the actual pricing and model was within 1% of each other. In both cases, the examples presented represented instances where the supplier was providing fair pricing based on the analysis of the parts. In a limited number of cases, deltas in the range of 25% or greater were identified and reviewed with suppliers. After review of the models, pricing was adjusted down to close the gap between the actual pricing and the model presented. This is not to say that the supplier was intentionally charging more, but in instances such as this, additional scrutiny of other components supplied by the same supplier was warranted. If similar situations were encountered, the process of developing an alternate supplier was most likely undertaken.

Conclusion

Design for Manufacture has proven to be a powerful tool in understanding and negotiating better component pricing within Dynisco. In many instances it has helped validate that competitive pricing is being achieved and that the need to jump from supplier to supplier in order to reduce cost is minimized. Although DFM information is still generated from a model,

the information is much more useful than just historical pricing alone. The supply chain organization is in a much better position to evaluate its supply base for fair pricing, the best manufacturing options and the most efficient methods. Although nothing can take the place of developing strong and trusting relationships with suppliers, the DFM tool and the information it provides, promotes better pricing through better information.

References

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