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LEAN THOUGHTS

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Design for Assembly (DFA) But … it can work anywhere

While presenting at a conference we had the fortune to be presenting during the same flight as Dr. Mike Shipulski. Since then, we have enjoyed a wonderful banter about DFA and Lean. Most recently he sent me copies of a couple of papers he has written on the topic of DFA. But like any good PhD. He goes on and on … so if you want the complete articles … e-mail mike at mike.shipulski@hypertherm.com … The following is my heavily edited version and hopefully I can convey Mike's key thoughts.

Six Lessons Learned from a Successful Design For Assembly Program

Each company works with Design for Assembly (DFA) methods for different reasons. Some companies want to take cost out of their products, some want to make more products in their factories, and some want to simplify the product to increase quality and reliability. In a growing market a company wants to reduce labor content to get more products through the factory to meet demand without adding assembly workers. And, in a growing market a company wants to reduce the required floor space required to meet demand without building another factory. Remarkably, the goals are similar for companies in declining markets, though the reasons are different. In declining markets, companies want to meet demand with the fewest assembly workers so work from consolidated plants can be brought into the factory without adding assembly workers. And, reduced floor space is desired to provide space for the work from the consolidated plants. In either case, a successful DFA program can help.

Done well, a DFA project can result in material and labor savings of 50%. But, it takes more effort to put in place a sustainable DFA program that becomes part of a company's culture. Six lessons learned are described from a successful DFA program at Hypertherm, Inc., a privately-held company that designs and manufactures plasma cutting equipment.

1 - Link Company Profitability to the DFA work.
When Design for Assembly (DFA) methods are introduced to the Design Engineering Community, there is typically a resounding lack of interest in the methods. The lack of interest is due to the lack of knowledge about the methods and the significant cost savings that can be achieved. To overcome the inertia, it's important educate the Design Engineering Community on how to do the work (at a high level) and give examples of successful programs that have achieved significant savings in labor time and material cost. Initially, uneducated engineers don't believe that the straight-forward DFA methods can achieve 50% reductions in part count, 50% reductions in labor time and 25% reductions in material cost. It's best to provide the engineers with real designs that have successfully used DFA to save money and eliminate parts. Real examples can be found on the Web or provided by a good DFA trainer. Once the engineers see real examples of the cost savings, you're home free. Most engineers make the link to company profitability on their own, but explicit calculations of the profits from a 25% cost reduction is a good way .

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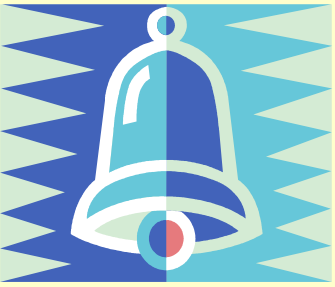
Where "Lean Thoughts" Become Reality



Design Engineering Leadership must demand that Design Engineers take responsibility for labor content and fundamental assembly defects.

- Tell them why they're going to do it
- Tell them how they're going to do it.
- Engineering must have stay the course.

Engineering Leadership must define the need for change
Product cost, product quality, product reliability and it's now your job to improve all.

2 - Set Explicit and Challenging Goals.
Marketing or Business Leaders set a ridiculous, but achievable target for product cost – 40% reduction – at the start of a new product development effort. The cost target was incorporated into the product specification to focus the engineering work, and Design Engineering translated the cost target into goals for part count (50% reduction), labor time (50% reduction) and material cost (38% reduction. Initially, the Engineering Team did not take the targets seriously.

3 – Engineers must Assemble the Existing Product Before DFA training
Design Engineering Leadership must ask for a Pareto chart of the number of parts by types.

Design Engineers will want to use BOMs to create the Pareto chart.

Design Engineers will do their best to stay off the production floor, deferring to the Manufacturing Engineers as the experts.

Design Engineers Build existing product and create Pareto of part count by part type
Design Engineering Leadership must send the Design Engineers out to the production floor to build the existing product themselves and count the parts as the product is built.

Design Engineers will come back from the production floor tired, bloody and with a new-found distain for the existing design and a new-found respect for people that assemble the existing product.

The biggest bar on the Pareto chart will be fasteners.

Design Engineers will not understand why labor content and assembly defects are their responsibility. However, they will understand after they receive training on DFA.

4. Train by Doing
Train on DFA by scoring the existing design in a group setting
It is now time to train the Design Engineers in DFA.

Give a short overview and then score an existing sub assembly.

Score more sub assemblies, then score the entire product. The best learning comes from scoring existing designs in a group and talking about the scoring part-by-part.

5. Start Small and Do the Easy Stuff First

6. Engineers Present Results to Company Leadership
Give them credit.

Random thoughts for later

Define Improvement Opportunities
Create Opportunity Pareto charts
Labor Reduction Opportunity – sort DFA analysis by largest labor content

Assembly Defect Reduction Opportunity – sort DFA analysis by number of repeated operations

Define the important areas of the design to focus on, what you have time to fix, and you'll leave on the table for next time.

Redesign the product or design the new product.

Design Engineering Leadership informs the Design Engineers that they are responsible for the design sequence, and communicating defect-prone parts of the design that must be handled with manufacturing process means.

Mike Shipulski is the Director of Engineering at Hypertherm, Inc., a privately-held company that designs and manufactures plasma arc cutting systems. Even though Mike has a Ph.D. in Manufacturing, Hypertherm still lets him design their products.

2008 Consortium Event Schedule

T our W orkshop C onference

January	February	March	April	May	June
T **Wednesday 16** Eaton Electrical, contact Joe Fisher, JoeRFisher@eaton.com	T **Wednesday 13,** ACE Bakery, contact Cindy Grolleman, cgrolleman@acebakery.com	T **Wednesday 19,** Nestle Waters, contact Mariela Castano mcastano@perriergroup.com	T **Wednesday 16,** CTS Corp., contact Bob Garces, Bob.Garces@ac.ctscorp.com **Consortium Shareshowcase** **Saturday 05** Eaton Milton. Contact Cindy Grolleman cgrolleman@acebakery.com or Joe Fisher JoeRFisher@eaton.com	T **Wednesday 14,** Stackpole CSD, contact Don Barber Don.Barber@stackpole.ca	T **Wednesday 18,** Morrison LaMothe, contact Tony Vita tvita@morrisonlamthe.com
July	**August**	**September**	**October**	**November**	**December**
		T **Wednesday 24,** Kraft Foods, contact Hanif Jivraj hjivraj@Kraft.com	T **Wednesday 08,** CGL Manufacturing contact Dave Deskur daved@cglmfg.com	T **Wednesday 12,** Messier-Dowty, contact Mike Smith Mike.Smith@Messier-dowty.on.ca	T **Wednesday 10,** Orenda, contact Brenda McIntosh brendamcintosh@orenda.com