WHITE PAPER

A Changing Landscape for Engineering

The need to work closer with purchasing & production

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It's no secret that low-cost competition from overseas, soaring energy prices and the continued strength of the Canadian dollar have combined to expose several weaknesses in the Canadian manufacturing sector. Companies are under the gun as never before to become more efficient and optimize production. The glory days are over and the time has come for companies to realize that they can no longer rely on layoffs alone to stop the attrition.

In 2007 alone, 132,000 Canadian workers lost their jobs in the manufacturing industry. More than double the statistics of the previous year's 2006 total of 59,000 jobs lost.

For years, we ignored the rise of overseas competitors, and took advantage of the favourable exchange rate when exporting goods in US dollars. This resulted in a certain degree of complacency and gave little reason to address poor productivity levels.

What does this have to do with engineering?

It's no longer just the design that matters, but more the ownership of the design's application with respect to how it affects the entire organization. The engineering department cannot do it alone, however, and must be backed by an executive team that actively promotes continuous improvement and cost reduction initiatives from initial conception right through to finished product.

Given the new realities, companies must empower their engineering teams to take a more active role in cost reduction strategies and begin approaching their position with more of a business mindset. As stewards of design, engineers must balance quality and selling features with price, but they must also be aware of how ease of manufacturing and assembly contribute to lowering costs. That being said, companies should never endorse cost-cutting measures at the expense of quality or safety.

Instead of simply reducing prices and sacrificing margins to compete with low-cost competitors, companies should concentrate on lowering internal costs by streamlining product development, manufacturing and procurement, thereby allowing them to lower prices without sacrificing profit margins.

Why companies should encourage their engineers to work closer with purchasing and production to improve efficiency and reduce costs?

Every company's goal is to speed up new product development (bring products to market faster), minimize idle time, lower production cycle times and maintain a cost efficient inventory. Process innovation and collaboration between engineering, manufacturing and procurement is essential to making this happen. Minimizing design flaws from the prototype stage, and ensuring they are fixed before moving on to full scale production is one component. Another is having a clear understanding of what those design revisions mean for both manufacturing and procurement.

One of the earliest adopters of this approach was the American Motors Corporation. After years of declining sales throughout the1970's, AMC faced a daunting task of competing against much stronger and larger competition. In the early 1980's, AMC came up with a process called Product Lifecyle Measurement or Management (PLM). Using PLM techniques, AMC introduced the Jeep Cherokee and later the Jeep Grand Cherokee – both credited with launching the SUV Market (Sport Utility Vehicle). The system was so successful that after AMC was purchased by Chrysler in 1987, the process was adopted throughout the corporation allowing Chrysler to become the lowest cost producer with development costs that were half the industry average at that time.

Product Lifecycle Management is an internal principle centered on product development and proper documentation of engineering changes within a common data-

base. PLM is responsible for the introduction of CAD (computer aided design) software, which allowed engineers to make immediate changes to designs. Before the availability of CAD, these changes were extremely costly as they were more manual and time consuming.

PLM is a company-specific philosophy and not a simple cut and paste solution for all. The over-arching idea is to have a system in place that ensures the continuous reporting and measurement of all engineering changes as well as all design and manufacturing improvements. PLM is a continuous feedback loop. Manufacturing reports back to engineering on production and assembly cycle times. Engineering reports back to purchasing on potential changes in material and parts, and the resulting impact those changes will have on current inventory.

Working Closer with Manufacturing and Procurement:

Manufacturing and assembly cycle times are driven largely by a product's design. Suppliers with quick turnaround times on materials and parts are an essential component, as they help to reduce inventory costs and improve product to market lead times. Engineering can play a pivotal role in both these areas by working with purchasing and QA (quality assurance) to create a short list of preferred suppliers and by taking an active role in witnessing and discussing how the end product will be manufactured and assembled.

To accomplish this, companies may use an Engineering Change Notice (ECN) as a way to initiate and document changes. These ECNs allow engineers to change processes and instructions for production and assembly, review quality issues, and ultimately reduce downtime and rejected products. They can also be used to help ease the financial burden of unused or outdated parts in inventory, which we showed to be extremely expensive in our previous article, *Understanding the True Cost of Inventory*. This is accomplished by documenting what current inventory of materials and parts can still be used prior to implementing any design revisions. Purchasing and the appropriate suppliers are then made aware of the need to change the part on future orders.

If your supplier is using the Kan Ban Blanket Order Hybrid agreement that was covered in the above mentioned article, then they will have materials and parts boxed and waiting to be shipped to you. It is in your company's best interest to ensure design changes coincide with future inventory replenishment. You certainly don't want your supplier to ship parts you can't use and you can't expect them to assume responsibility for changes that render your inventory unusable.

Incorporating new parts or materials due to a design change should never proceed without first considering the implications to your current inventory as well as that of your suppliers, especially if they have finished units waiting to ship. You should also be aware of how fast your supplier can respond to the new request initiated through your ECN. Documentation of ECNs along the Product Lifecycle Management (PLM) principle provides an historical reference to help avoid problems with future product development, inventory management and manufacturing. With a history of problem solving and cost cutting measures properly documented, the motivation to continue reducing costs should spread throughout your entire organization.

Purchasing should collaborate with engineering to establish an approved vendor list. Without them, purchasing is left with few sources of supply and almost no competing criteria with which to base their buying decisions. Price alone should never be the single deciding factor in a purchasing decision. It goes without saying that quality, service, technical ability, and overall responsiveness are equally important.

Engineers today must be encouraged to work closer with purchasing to identify those suppliers who bring more to the table than price alone. Identifying suppliers whose price is competitive, but whose products

also allow for ease of assembly and low cycle times in production, will result in significant savings. Identifying suppliers that are willing to invest the time to become an active partner in solving design flaws are also an invaluable resource within PLM systems. The goal here is to foster strategic partnerships with suppliers who understand all aspects of your business and who are willing and able to provide solutions.

Purchasing must also understand that those suppliers who put in the work up front to provide cost effective solutions should never be sacrificed to get lower pricing versus other supplier bids. Price shopping is entirely different from price negotiation. Competitive bids are essential when making purchasing decisions, and serve to keep current suppliers' pricing in line and competitive. Having more than one point of reference on pricing is a must. However, why reward a supplier who is unwilling to do the homework and punish those who do? Would you rather deal with the one who can simply match pricing once the bar has been raised, or the one who goes above and beyond price and offers added value with an entire solution?

Alienating a supplier who provides the entire solution in favour of one who is willing to undercut their price, will eventually force the full service supplier to abandon pursuit. In the end, it will only hurt your company, since a valuable supplier who can help mitigate your risk of production problems is much harder to replace than one who views sales as a simple transaction. Vendors who are actively involved in lowering production cycle times are always preferred over any lower priced, transactional supplier who could be here today and gone tomorrow.

"It is unwise to pay too much, but it is worse to pay too little; you sometimes lose everything because the thing you bought was incapable of doing the thing it was bought to do. The common law of business balance prohibits paying a little and getting a lot on a consistent basis; it can't be done. If you deal with the lowest bidder, it is well to add something for the additional risk you run for things going bad. And if you do that, you will have enough to pay for something better in the first place"

John Ruskin (1819-1900)
Writer and lecturer on social and political economy

Engineers who are only concerned about design can sometimes be perceived as being indifferent to the overall needs of the company. Meanwhile, engineers who take full ownership of their designs and work alongside manufacturing and procurement can be seen as being meddlesome, since they involve themselves in areas that some co-workers may feel is not their responsibility. It is these engineers, however, who are essential to success given the reality facing Canadian manufacturers. Executives must recognize engineering's role in helping to reduce costs and improve productivity.

The key is for engineering, purchasing, quality and production to work in unison with one another. This continuous support and documentation helps new product development, eliminates issues in manufacturing, and takes into account the impact on inventory. Other benefits can include quicker development times, lower manufacturing costs, reduced downtime and more importantly improved cohesiveness and responsiveness among all departments.

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About Vicone

Vicone High Performance Rubber is a leading edge company specializing in a select group of high performance rubber products for the industrial manufacturing market. The company's value-added consulting services, procurement expertise, and extensive knowledge of the rubber industry are helping customers design, specify, prototype or troubleshoot new and existing products. Vicone draws on over ten years of experience to ensure top quality products, unparalleled customer service and 100% Just-On-Time™ delivery for the lowest total cost of ownership available.

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