

of Minnesota, Inc.









**10 Steps to Reduce Manufacturing Costs** 

### 10 Steps to Reduce Manufacturing Costs

Maintaining your competitive stance in the manufacturing industry requires constant searching for improvements of efficiency and reduced waste. Manufacturing cost reduction efforts often result in a significant savings of product, manufacturing, and life cycle costs; thereby increasing overall profitability. Having served the manufacturing industry for over 27 years, we have a tremendous amount of expertise in helping organizations just like yours reduce costs to create more efficient and lucrative manufacturing procedures.

This guide to reducing your manufacturing costs provides 10 helpful steps to help you minimize costs in the areas of:

- 1. Product Design
- 2. Eliminating Waste
- 3. Implementing Lean Production Principles
- 4. Reducing Unnecessary On-Hand Inventory
- 5. Building Vendor / Partner Relationships
- 6. Reducing Overhead Costs
- 7. Standardizing Parts
- 8. Rationalizing Your Product Line
- 9. Supply Chain Management Simplification
- 10. Ongoing Total Cost Measurement

### 1. Improve the Product Design Process

Designing products to minimize part costs and material overhead is the first strategy to lowering manufacturing costs. Since cost cannot be easily removed after product design, it must be taken into account ahead of time. Product design decisions have the highest impact of all cost reduction strategies because product architecture can account for 80% of the cost. Encourage designers, engineers, manufacturers, marketers and purchasers to work together to determine the best way to reduce the cost of the product prior to

production.

# **Top 3 Strategies to Reducing Product Design Manufacturing Costs**

#### A. Minimize part cost

A huge component to minimizing part costs can be found in buying off-the-shelf parts. This not only saves considerable amounts of money, but also helps the company focus on the real mission of designing and building quality products. Suppliers of off-the-shelf parts are more efficient at their specialty, often producing high-quality, reliable and warranty-covered parts that you could not have produced on your own. By implementing this strategy, companies can work cost savings into the product design itself.

#### B. Evaluate and improve quality costs

Quality cost reduction is an important step in reducing manufacturing costs. Without continual assessment of and improvement upon the manufacturing process, the Cost of Quality can eat up 15% to 40% of the revenue. However, these costs can be greatly reduced; and, in some cases, even lead to nearly double the profit.

The goal of this strategy is to design in quality; improve the design and reliability of the product and prevent costly errors, defects, reworks and overhead demands. Designing in quality requires a significant amount of planning and preparation; such as taking past quality problems into consideration, simplifying designs, automating processes and thoroughly documenting every step of the design.

Often the product's return on investment (ROI) does not warrant the cost of quality; therefore, evaluating and reducing quality costs early in the design phase can give companies a unique advantage.

To determine the minimum quality costs for a product, you must calculate the total cost. Since

cost of quality should be the first cost driver to be quantified by total cost, the minimum quality cost should be easy to determine. Ask yourself the following questions to determine your minimum quality cost:

- How low can the cost go without compromising the integrity of the product?
- Where can the design of my product be simplified?
- How does the cost of quality impact the total cost?

The extra effort taken to reduce quality costs not only reduces overall manufacturing costs, but can increase sales by creating a higher-quality product.

#### C. Make the planning stage count

Manufacturing costs can be reduced simply by spending more time in the planning stage rather than rushing to start the design and production process. Up-front preparation allows teams to discover problems prior to design; saving the time, cost and frustration of change orders to fix faulty products.

The first step in the process is to properly define the product. Taking the time to define the goal of production will not only save in regards to change orders, but it will also result in a better product overall.

Next, seek to identify the customer who will potentially be purchasing this product. (What is their demographic? What features are they looking for? How much are they willing to spend? etc.). This is a good time to make sure that you have open communication between Marketing and the rest of your team. You may have a design concept meant for a sophisticated buyer, but perhaps the market opening is for the first time buyer who is looking for a simple product with a low to moderate price point. Your design should fit the right market. Explore the concept with

Marketing and consider getting some first-hand advice from consumers. Defining the product begins by defining the buyer and end-user (if the buyer is someone other than the end-user). After all, a great product is only successful if it is useful to your customer.

Once the product has been properly defined, the next step is to develop a team of key personnel to discuss the product design and potential issues. This should include: engineers, manufacturers, designers and vendors. With the experience and expertise of each team member, the design of the product will be more thorough and many, if not all, potential problems will be discovered, discussed and solved prior to their occurrence.

#### 2. Eliminate Waste

The idea of 'Lean Manufacturing' was originally developed by the Toyota executive Taiichi Ohno (thanks to Henry Ford and Dr. W. Edwards Deming) during the post-Second World War reconstruction period in Japan. A three-part philosophy, lean production encourages waste elimination, improved productivity and reduced inventory.

In the next steps we will look at how adopting lean manufacturing principles can reduce manufacturing costs by increasing labor productivity, minimizing production throughput times, cutting inventories, and reducing errors and scrap by as much as half. However, we must first look at the core principle of lean production, (doing more with less) and a large part of this has to do with eliminating waste.

According to research conducted by the Lean Enterprise Research Centre (LERC), 60% of production activities in a typical manufacturing operation are waste – meaning they add no value at all for the customer. The good news is that just about every company has an opportunity to cut manufacturing costs using lean manufacturing techniques and other best practices.

Waste can take many forms and includes everything from overproduction, waiting time, and excess inventory; to over-processing, defective units and transportation. Before you even begin to implement lean manufacturing strategies, you must first understand what creates value for your customer. Only a fraction of the total production time and effort actually adds value. By knowing what the customer wants, companies can identify and eliminate nonvalue adding activities.

# 3. Implement Lean Production Principles

A company that is committed to lean production will regularly ask the following three questions:

- What value does the product produce for our customer?
- What steps in our process contribute to or hinder this value?
- How can we eliminate non-value adding processes, and streamline (make more efficient) those that are valuable?

#### **Lean Production Principles**<sup>1</sup>

- Identify and eliminate bottlenecks to improve a continuously flowing operation.
- Properly organize work areas. A system known as 5S has been proven particularly effective.
  - Sort items eliminate anything that isn't needed (tools, parts, assembly instructions).
  - Set in order organize useful items to improve efficiency and clearly identify the place for each item.
  - Shine keep the work area as clean as possible, putting all tools back at the end of each shift.

- Standardize make each workstation the same so a worker can perform the same task at any workstation.
- Sustain maintain and review your standards on a regular basis for adherence to the standard and for potential waste elimination.
- Implement Andon a visual feedback technique that allows personnel on the plant floor to communicate regarding production status, the need for assistance, or when production must be stopped.
- Reduce delays between steps in the production process by continuously seeking to keep it flowing as smoothly as possible at all times.
- Spend time on the manufacturing floor and keep the lines of communication open. The benefit of this is twofold:
  - If you are where the action is, you are better able to note potential improvements to your process.
  - Being amongst your staff allows you to build relationships with production employees which will make them more comfortable with approaching you with challenges they are experiencing or any ideas they have for improvements.
- Make sure goals are aligned organization-wide. The goals of your company, plans of management, and tasks performed on the floor should be aligned to achieve the desired end-result.
- Implement automation whenever possible. Many systems are able to be configured for automation, thus freeing up staff members to be able to focus on other tasks.

- **Fix the root causes of issues** rather than putting a band aid on the effects.
- Practice PDCA Plan; Do; Check; Act.
- Kaizen<sup>2</sup> Encourage people throughout your organization to work together to achieve consistent and ongoing improvements - small and large.
- Develop KPI's (Key Performance Indicators) which encourage desired behavior and results and measure them regularly.
- Consistently measure productivity losses and look for ways to minimize them. This includes: downtime (both short and long stops), setup adjustments, performance, quality issues, and product rejections.
- Make SMART Goals. Specific; Measureable;
  Attainable; Relevant; and Time-Specific.
- Practice TPM Total Productive Maintenance. This idea encourages ongoing proactive and preventative maintenance in order to avoid production losses, by empowering operators to keep their machines running at optimum levels.

Once lean principles have been implemented, be sure to create documented best practices for your specific work process. The goal is to encourage the application of lean techniques and ongoing improvements as well as to minimize the desire to revert back to old habits.

# 4. Reduce Unnecessary On-Hand Inventory

After eliminating waste and implementing lean production practices, companies must then assess their inventory costs. By reducing all in-process or current inventory, manufacturers can lower costs and, ultimately, raise profits. While companies use several techniques to go about reducing inventory, the Just-in-Time (JIT) strategy is one of the most effective.

Many companies view a warehouse full of goods as an asset to their business; however, lean manufacturing considers goods that are not being shipped or sold as waste. If those products are just sitting, racking up storage costs, no profit is being made on them and the company is wasting money. The Just-in-Time strategy encourages companies to hold little or no inventory beyond what is required for immediate production or distribution.

With that in mind, you do not want to get rid of your inventory entirely. On-hand inventory can alleviate the stress of unforeseen production problems, such as holdups, mechanical errors, equipment errors and workforce challenges. The extra inventory can help protect your business should a problem arise. Make sure that this shock-absorber is not masking additional waste.

The goal of the JIT strategy is to help businesses make sure they have the right amount of inventory on hand when it is needed by manufacturing, with parts based on actual customer demand rather than on projected analysis. For this strategy to work, consistency is crucial. The Just-in-Time strategy reduces costs, eliminates waste and improves efficiency; allowing the company to get products to the customer on time, at a lower overall cost.

# 5. Build and Improve Vendor / Partner Relationships

By focusing on vendor and partner relationships that build value, companies may be able to reduce their design and manufacturing costs. When vendors and partners understand and operate according to DFM (Design for Manufacturability) guidelines, they know their own process capabilities. What's more, they can help your engineers avoid making costly mistakes that could raise costs, delay delivery and compromise quality. They may even be able to help engineer custom parts and tools for you at a lower cost.

Vendors and manufacturing companies can learn from each other and, in response, strive to make each job better, faster and less expensive overall. This relationship provides the lowest total cost because interacting with the customer's team results in:

- Vendors understanding the challenges and issues faced by the customer.
- Vendors making suggestions early on in the process that will maximize manufacturability.
- Vendors working with customers early in an effort to keep the total cost to a minimum.

#### 6. Reduce Overhead Costs

Several key components to cutting overhead costs in manufacturing are to produce standard products that can be built-to-order without forecasts or inventory; and to produce special products through mass-customization on-demand. In both approaches, once a confirmed order for products is received; products are built.

The results can be staggering. Inventory Carrying Costs can be eliminated (the standard "rule of thumb" for inventory carrying cost is 25% of inventory value on hand<sup>3</sup>), and procurement costs can be reduced with automatic, on-demand resupply. Mass-customization on-demand equates to better customer responsiveness which, in theory, should lead to more sales. Although this is not a manufacturing cost cutting measure, it certainly is a happy by-product.

#### 7. Standardize Parts

Standardization (the fourth S of 5Ss applies to both process and product) makes it easier for parts to be pulled into assembly, instead of ordering and waiting, by reducing the number of part types. Fewer types of parts, ordered in larger quantities, will reduce part and material overhead cost. Additional benefits include floor space reduction, overhead cost cuts, and time saved in setup, logistics and supply chain management.

Other types of standardization, which can also affect manufacturing cost reduction, include tools, features, raw materials, and processes. By making all parts available at all points of use, standardization improves flexibility and reduces costs for manufacturers.

In Build-to-Order and Mass Customization, manufacturing cost reduction is realized at the parts and raw materials level. Standardization supports the fundamental concept of build-to-order and mass customization in that all parts must be available at all points of use. This eliminates the setup to find, load, or kit parts.

### The Zero-Based Principle

The Zero-Based Principle is an effective technique which reduces the number of different parts (part types) by standardizing certain preferred parts. While this usually applies to purchased parts, it can also apply to manufactured parts. This technique asks: "What is the minimum list of part types needed to design new products?"

This approach works best when companies are at the beginning stage of developing a product line. Before product development begins, the company needs to decide which parts are essential. By developing the entire line around common parts, companies can eliminate excess parts and save on manufacturing costs.

Fundamentally, the Zero-Based Principle focuses on starting at zero and adding only what is necessary for the creation of the product rather than seeking to eliminate products from a long list. While many techniques focus on removing excess parts from an existing system, the zero-based approach excludes the excess parts from the beginning. This saves significant costs as excess parts incur overhead costs for administration and lower the manufacturing plant's efficiency and machine performance.

### **Types of Standardization**

There are many types of approaches to

standardization. In addition to the Zero-Based Principle, the following forms of standardization can also be used to reduce manufacturing costs and improve overall efficiency.

#### Tool Standardization

Tool standardization is used to determine how many types of tools are required for each step of the manufacturing process. Companies must list the tools required in each stage (assembly, alignment, calibration, testing, service and repair) and analyze the tools used for existing products. In order to find the most common tool, companies must review and prioritize tool usage history. Collaboration among all areas of the manufacturing department is needed in order to determine the tool preferences among different departments. Once the common tools are determined, companies can develop their common parts list.

#### Feature Standardization

This type of standardization focuses on standardizing "features" using the same procedures used to standardize parts and tools. A "feature" is any configuration that requires a separate tool, such as a drill, hole punch or cutting tool bit for machine tools.

#### Raw Materials Standardization

Standardizing raw materials makes manufacturing processes more flexible. Once raw material standardization is implemented, different products can be made without any setup required to change materials, tools or mechanisms. The following materials can be standardized: bar stock/tubing, protective coatings, sheet metal, programmable chips and molding/casting.

#### Process Standardization

In order to standardize processes, the engineering of the products and processes must be simultaneous. This ensures that the processes are predetermined by the design

team rather than determined as the product is designed. All processes must be coordinated and common enough to ensure that all parts and products can be built without any setup changes.

#### **Benefits of Standardization**

Standardization improves flexibility and reduces cost, as well as supports other cost reduction methods, such as build-to-order and customization. However, the benefits of standardization does not stop there. The following benefits make standardization a great choice when looking for cost-saving strategies.

#### Cost Reduction

Standardization can reduce manufacturing costs by 50%. Through purchasing leverage, manufacturers can reduce their purchasing costs considerably. Once the purchasing of parts and products are standardized, the cost of inventory will go down considerably. Since common parts are stored and resupplied only as needed, BOM, MRP, and ordering expenses will be avoided. Overhead costs, such as purchasing, put away, picking and bill paying, will be reduced as well. There is less overhead in procuring standard parts and materials that are more common and readily available.

#### Quality

The quality of your product improves with standardization because it provides for fewer picking and manufacturing errors leading to decreased quality issues. Reducing components means less testing of incoming components.

#### Flexibility

Standardization eliminates set-up, greatly reduces inventory, and simplifies supply chain management. With standardized components you can change over work centers quickly because you won't have to put away and restock as many components

with each product switch.

#### Responsiveness

Without the additional concern of too many parts and unnecessary procedures, manufacturing companies can focus on improving their response time.

Standardization frees up time and allows employees to concentrate on more efficient processes, such as Build-to-Order. With parts availability and quicker deliveries from vendors, companies can provide their customers a quick turnaround on requested products.

# 8. Rationalizing the Product Line to Focus on those Most Profitable

An often overlooked opportunity to simplify operations and free up critical resources—resulting in improved productivity, profit, and cash flow—is rationalization of the product line and all of its component parts. Product line rationalization focuses on the most profitable products, while eliminating or outsourcing low-profit products that have high overhead demands and are not compatible with manufacturing cost reduction strategies.

Experience with first-time product line rationalization efforts suggests that more than 60% of a product line contributes less than 10% of the total margin. Successful rationalization initiatives have cut total supply chain management costs up to 50% and improved performance on inventory turns; up to 100% among top industry performers.

Total cost measurement is used to identify opportunities and support rationalization decisions. This requires gathering the proper data to develop detailed reports to analyze revenue, margins, inventory and more.

#### The Rationalization Procedure

Product rationalization is an important step in the right direction when it comes to cutting costs and

improving your manufacturing process. Product line rationalization is broken up into the following four steps:

- The least profitable products are dropped or eliminated.
- The lower profit products that need to remain in the catalog are outsourced.
- The high-profit products remain.
- The remaining products are improved with a greater focus on product development, manufacturing processes and marketing strategies.

Because these products no longer need to support the low-profit products, companies can now sell them for less and/or enjoy greater margins.

The combination of an improved focus on product development and lower overhead changes will more than make up for the revenue lost from eliminated products. In general, 80% of sales come from the best 20% of a company's products. Many manufacturers routinely add new products without removing those that aren't performing. This results in high overhead costs, lower plant capacity, lack of manufacturing resources and supply chain management complications. Take this simple test. Run a report from your ERP system on the products with the highest sales (both dollars, quantity and pick lines). Many of our clients have been surprised to see what a large percentage of their sales come from a small percentage of their product line.

## 9. Simplify Supply Chain Management

Simplifying supply chain management – including the planning, sourcing, production, delivery and returns – can be instrumental in reducing manufacturing costs. Often, one simple insight can lead to a plethora of best practices, impacting the entire supply chain. Common sense dictates that if a business process can be simplified, it will usually enhance overall performance.

As previously discussed, implementing standardization or build-to-order strategies is the first step toward simplification. Research shows that those companies with more mature supply chain practices are reducing costs faster and achieving higher profit margins than their less-mature peers. The benefits of simplified supply chain management include: reduced inventory levels and holding costs; improved manufacturing capacity utilization and order fill rates; and greater purchasing leverage. When automatic resupply is added as a component, forecasts, purchase orders, and expediting costs can also be eliminated.

## 10. Implement Ongoing Total Cost Measurement

Once you have implemented as many manufacturing cost reductions as possible, the final step is to implement total cost measurement. Total cost measurement focuses on calculating the total cost savings to encourage and support ongoing improvements.

This begins with the cost driver approach. Cost drivers are the root causes (or the things that drive) the cost. Recognizing the factors behind the costs will provide more accurate and relevant information, as well as encourage further efforts to lower or eliminate manufacturing costs.

Identifying the major cost drivers and measuring the costs to those drivers is the key to total cost measurement. A company's overhead expenses can give significant insight into cost drivers. Even though the drivers may not be directly *linked* to the overhead costs, the overhead contains costs *related* to the most important cost drivers. For costs that are defined as neither direct material nor direct labor, you can start looking at the drivers behind those costs and how they impact the total expenses.

Until the total cost can be quantified, everyone must make decisions with total cost in mind.

Linking cost with the behavior and characteristics of products or customers will reveal areas that need cost and investment reduction. Senior management must understand the importance of quantifying total cost, implementing total cost measurements and encouraging every cost decision to be made on the basis of total cost. This will not only reduce manufacturing costs; it will transform your company.

# **About Business Automation Specialists of Minnesota, Inc.**

Business Automation Specialists leverages 27 years of practical business experience with software technology to help mid-sized manufacturers and distributors capitalize on their unique business strengths. We've built our business by helping clients build theirs; enabling them to become better, faster and stronger through improved management controls, cash flow and profitability.

Business Automation Specialists is a managed ERP partner for the Microsoft Dynamics NAV ERP solution.

<sup>&</sup>lt;sup>1</sup> Vome Industries Inc., <u>www.leanproduction.com</u>

<sup>&</sup>lt;sup>2</sup> Japanese for 'change for the better'

<sup>&</sup>lt;sup>3</sup> http://www.mcasolutions.com/pdf/Cost of Inventory.pdf



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