

Setup Time Reduction Part I

Setup Time Reduction for Your Shop and Its Impact on Your Profits

By Jerry Claunch

This month a series of articles on setup time reduction begins. Each month steps will be presented to get this important initiative implemented. This month the first two steps are presented. Setup time has a tremendous effect on cost, and reducing setup time affords a huge opportunity to improve your profits.

Have you ever wished you could get more production time from your shop? Have you received calls from customers needing new parts or assemblies immediately, and become frustrated because you can't respond quickly enough? Have you evaluated your machine utilization only to find that the machines are down at least 20 percent of the time?

In most companies, setup time is one of the greatest contributors to downtime in their shop. Some companies accept this downtime, but are finding it more and more difficult to compete in the market. Setup times range from 15 minutes to two hours every time a machine is setup. In addition, during changeover when the machines are idle, your employees are not producing. You don't have to settle for this downtime! While this time may be necessary today, it should not be accepted. Downtime due to setup is a drain on your capacity to generate more sales and profits. The investment necessary to reduce setup time should pay for itself, if you follow the steps properly. All it takes is some effort and imagination.

"Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world"

Albert Einstein

Knowing that every machine requires setup time in order to produce is one of the barriers most shops must break through in order to increase profits and productivity.

Setup Time Defined

Setup time is the elapsed time from the completion of the previous operation until the next operation is started. It includes time needed to change parts, changing tools, fixtures or settings in order to complete the next operation or add value to the next part. This time starts when the last feature is added to the previous part or until the next part or feature is being produced.

Where Setup Time Reduction Applies in Your Company

Setup time reduction applies to every aspect of setup. What if your setup times were reduced by 75 to 95 percent? How much more production would be achieved? How much more profit could be realized?

An average part goes through five to eight operations during manufacturing. If each operation had an average setup time of 45 minutes, then a total setup time of 3.75 to six hours is lost. Using a conservative value of \$145.00 per standard hour, a part with five operations could generate as much as \$400.00 additional profit, if the setup time was reduced by only 75 percent.

How Time Affects Responsiveness to Customer Needs

Following the quality of products, time is the next most important issue to your customers—becoming a valued supplier means being able to respond when a customer has a need. Since there is no reason to exist without customers, it's easy to see how setup time reduction benefits a company—not only is hidden capacity unlocked by reducing setup time, lead time is reduced as well.

One overall goal is to reduce the queue time parts spend ahead of each operation. Customer benefits include shorter lead times, frequent on-time deliveries, product quality improvements and emergency response. This month the first two steps in setup time reduction will be addressed.

Determining Your Machine Downtime Due to Setup

If current labor reporting documents the time that employees are on setup, setup time should be able to be reported as a percentage of the available machine time. If you don't report setup time, have your operators begin tracking their setup time manually. Figure 1 provides a sample form to be placed at every machine that tracks setup time. After a month of tracking you will be able to calculate the percent of setup time, but continue to monitor for a longer period to be more precise in this percentage—a six-month period is recommended. Post the results in your shop monthly, which is one method to achieve Step 2 which is identified later. Figure 2 shows a pie chart that can be displayed in the work area.

Additional Profit Calculation

An analysis of your setup time and potential profits is now worthwhile. Analyze your machine downtime and calculate the opportunity available, if the machines were producing. A good start is to determine one day's sales and how much more would be available if some portion of downtime due to setup was eliminated. A simple calculation as outlined in Figure 3 provides the profit opportunity possible with setup time reduction.

Step 1

Preparing the Workforce for Setup Time Reduction

Before you ask employees to become involved, make sure you are prepared first. Do not start setup time reduction unless you are prepared to support it. This support is not a once-a-year review of progress, it should become a daily reinforcement of the need and recognition of improvements. If you are not prepared to encourage often, it may be best to wait until you recognize the importance and possibilities setup time reduction offers your company.

The key word is commitment. Once you are committed, it's time to get the workforce prepared. Using the previous information as well as knowledge of your market and business opportunities, it is recommended that you begin preparing the workforce for setup time reduction. Announce your intentions, encourage involvement and give ongoing direction. It is most important that you prepare managers and supervisors—these people will be key to your success and must encourage improvements. Additionally, they must coordinate between departments and shifts—no one should make improvements in a vacuum. All improvements should be discussed, reviewed and accepted by all participants. It also is recommended to involve tool engineers, tool crib employees,

manufacturing operators, maintenance, quality and finance personnel, as a minimum. A good rule of thumb is to involve everyone who has a vested interest in the result.

Employee Benefits in Doing Setup Time Reduction

It should be important to you that there are many benefits to employee participation in setup time reduction. They include implementing improvements, frustration reduction, personal and professional growth and control.

Many times employees want to change the way they do their job, especially when it comes to setups. One of the most important reasons for setup time reduction is the opportunity to make improvements a reality. Many of your employees have ideas to reduce setup time, they simply need to be evaluated and implemented.

Change is certain if your company is to continue to meet the challenges of the future, and being a part of it will allow your employees to grow. Teamwork is one way to grow personally—as your teams move through normal development stages, they will learn many new skills. Additionally, it will result in professional growth. As a result of employee interaction, they will implement improvements, understand more about other departments as well as how decisions are made. The most important benefit is control. Finally, employees can have some control over how the job is done, and eliminate the "out of control" feeling that many people experience today. Working as a team, focused on setup time reduction has so many personal benefits that it's impossible to list all of them. Opportunity for both the company and its employees provides a tremendous benefit to your customers.

Step 2

Quality First

While you are preparing your organization for setup time reduction, it is important to identify and eliminate any quality problems including scrap and rework. In many companies rework during setup which is a major cause of delay goes unreported. For example, offsets are entered, more cuts are made than necessary to add value to the part, or employees are overly careful causing unnecessary extra work. Care should be taken, but not to a fault.

If a setup can be completed without extra machine time, additional run time is provided in the future. First, identify the cause of the scrap or rework and then the corrective action—these are two separate tasks. Identifying the cause should not include implementation of corrective action. If you treat the scrap or rework as a symptom and then identify the cause(s), you will be more successful in implementing corrective action. Once you identify the cause, there are many possible solutions—this step should be done before you initiate efforts to reduce setup time. As setup times are reduced, don't allow any improvement to be diminished by other quality problems.

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PULL-OUTS

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Next month the Setup Time Reduction Article Series will examine Step 3 wherein a 30 percent reduction in setup time is not uncommon in most shops.

Calculating setup time value		
1. Identify current 12 month sales	\$	_____
2. Subtract current 12 month profit	- \$	_____
	=	_____
3. Subtract current 12 month purchases	- \$	_____
	=	_____
4. Multiply by % of downtime due to setup	X	_____ %
	= \$	_____
5. Multiply by % of setup time reduction expected	X	_____ %
	= \$	_____
		Additional profit potential

Figure 1 - 1 Sample form to be placed at every machine to track setup time.

