

Setup Time Reduction

Making the First 30 Percent Reduction in Setup Time in Your Shop

Part II

By Jerry Claunch

Last month's article examined the first two steps in setup time reduction:

(1) preparing the workforce for setup time reduction and (2) quality first. This month's article continues this important series with how setup time reduction affects your business and how to obtain the first 30 percent reduction in setup time.

Become Your Customer

A short time ago, I had an interesting conversation with a fabrication shop. I was inquiring about the cost of tool cabinets so my customers could store all of the tools they need for equipment setup. This cabinet will certainly reduce setup time. When informed of the price, I asked the potential cabinet supplier if there were any discounts available. The answer was, "Yes, if you order 10 or more cabinets at the same time, because setup time can be amortized over more parts." When you analyze the response, the price is higher on one cabinet primarily due to setup time and he was encouraging me to order 10 cabinets at a time, which will make my lead time and costs increase because I will now put nine cabinets in stock for future sales.

Consider for a moment what that telephone call might have been like if the supplier had reduced setup time. Maybe my minimum order quantity for a discount would be three cabinets. Instead, I sought to find another source for the cabinets that would provide them at a lower cost and less minimum quantity. This probably happens to some of the inquiries received for product. Since there is no doubt in my mind that setup time can be reduced in any industry, you can be assured that setup time reduction will help your customers-and mean more business for you. This is one way to out-distance your competition.

The Cost of Reducing Setup Time

It is important to understand that reducing setup time is not free, but it is less costly than not doing it. If approached correctly, reducing setup time will reduce your costs and increase capacity, thus paying for itself. Your setup time reduction process should begin with low-cost implementation. The definition of low cost is, "You will pay for the improvement in less than three months."

In order to do this, you need to have completed the information in Figures 1 through 3 from the previous article, which detailed Calculating Setup Time Value, Machine Utilization and Machine Setup Time Tracking, respectively. The additional profit potential you identified on line five can be multiplied by 20 percent, which tells you how much money can be spent to achieve low-cost improvements. Now it's important to find the opportunities to reduce setup time-ones that provide the most benefits. Here is a checklist you can use to reduce setup time by approximately 30 percent.

Step 3-Setting Your Goal

Once you begin setup time reduction, it is important to identify the amount of reduction you intend

to achieve and communicate this throughout your company. I suggest 75 percent as the minimum reduction goal you should set. This may sound high, but it is very achievable. The most aggressive setup time reduction I have been involved with resulted in a setup time reduction from 43 minutes to 45 seconds. That's a 98 percent reduction in setup time. This was accomplished in a four-month period with no full-time effort. I get a lot of nervous laughs when I propose a 75 percent reduction in setup time. This nervousness becomes more pronounced when I say that a 95 percent reduction is a real possibility for your operations.

Many assumptions exist about setups including, "We must setup; therefore we must allow for setup time at every operation," "You cannot reduce setup time," "Setup has always taken 35 minutes for this operation," "What makes you so smart that you can reduce setup time when others can't?"

You cannot accept setup time. You must reduce it, and believe me, it isn't difficult. Management must emphasize and focus all efforts on setup time reduction. If I were you, I would not be satisfied with less than a 95 percent reduction as long as everyone in the company is part of the effort. You should target 50 percent reductions over and over-doing so and never quitting should result in a 95 percent reduction in setup time, at least.

Don't Start Until You Are Prepared to Succeed

Too often companies see the benefits of improvements such as setup time and are too quick to start. Remember that improvement takes time, which too often causes companies to simply let the improvement die out. The most common cause of failure is management's lack of commitment.

If you answer yes to these questions, your company is ready to begin.

1. Is reducing setup time vital to your company's success?
2. Are you willing to spend time every week examining improvement possibilities and implementing them?
3. Are you willing and able to support this effort daily?
4. Are you determined to make setup time reduction a reality in your company?

Step 4-Implement the 30 Percent Reduction List

You are now ready to begin the setup time reduction process. While reducing setup time is not difficult, it does take time, effort and money. In order to use your money effectively, it is recommended that you begin with this listing of reduction possibilities, since they all are low-cost improvements that will help your company reduce setup time by approximately 30 percent. These items can be implemented initially and will free up production capacity. Figure 1 (page xx) provides a check sheet to track your progress.

Hand Tools

During most setups, anywhere from four to 10 minutes are spent getting or finding the right hand tool, which is wasted time. One solution for eliminating this wasted time is to incorporate cabinets at the machine, which contain all of the tools and small change parts to be used during setup. Figure 2 (page xx) shows a cabinet that one company installed at each machine. They put a shadow of the tool behind each hanger to identify any missing tools prior to starting the setup. If

tools are constantly missing, you may need to put a lock on the cabinet and have supervision personnel responsible for ensuring that all of the tools remain available.

Fasteners

Much like hand tools, five to 10 minutes of setup time can be spent looking for fasteners (screws, nuts or bolts). A good rule of thumb for fasteners is to have five for every one needed during setup. This will eliminate the search for fasteners and makes damaged fastener replacement simple. You may question why you should have five of every fastener. Experience shows that having one is never enough and try as you may, some of the extra fasteners will have damaged threads or heads or are otherwise unusable. Therefore, it is recommended that you have five and work diligently to get everyone to make sure they are all usable. At this point, you may be able to have only two of every fastener at every machine.

Change Parts

Your change parts should be organized and labeled for easy identification. All change parts should be at the machine while the machine is running the previous job. The old change parts can be moved away from the machine after the new job begins.

Cleaning of Change Parts

In many shops, there is a certain amount of cleaning to be done once a fixture, mold, tool or other change part is used. If possible, purchase duplicates so the change parts can be cleaned while the machine is producing. Your shop should strive to have no need for blowing, scraping, stoning, filing or sanding any change part during setup. Only the machine table or permanent parts of the machine should be cleaned during setup.

Maintenance of Change Parts

Never let your employees deal with maintenance problems during setup. This is especially important for fixtures, tooling, molds and dies. Establish a procedure for notifying maintenance personnel of the repair needed and make certain everyone follows that procedure. I have observed setups where operators "make do" with items needing repair instead of getting them fixed. When asked why they do that, many say they don't care, which means the people that are supposed to make the repairs won't do it. I often wonder how a repair is supposed to get done when the right people aren't even notified.

Lubricants, Chemicals and Solvents

You may want to include these in the cabinet for the hand tools, but put a system in place that gets the containers filled prior to setup. Remember to have Material Safety Data Sheets available as well.

Guard Removal

Whenever guards must be removed during setup, you will find that fasteners are the method of attachment more than 95 percent of the time. The goal is to eliminate fasteners used to remove guards. Hinges, magnets, toggle clamps and one-quarter turn fasteners, push action fasteners, quick acting nuts and slide latches are possible solutions. Most CNC machines have guards that are pushed out of the way. You can have a very safe shop without having slow setup due to guard

removal. Figure 3 (page xx) shows some possible guard attachment methods. Always make sure that improvements to reduce setup time do not put you in violation of OSHA regulations.

Scrap and Rework

Scrap and rework should not be accepted during or as a result of setup. In many cases, CNC machines are setup like manual machines used to be. With all due respect, entering offsets and carefully getting to a dimension during setup may not be necessary. In Addition, targeting nominal of the specification is always better than just getting within a tolerance limit. Also reference the first article under "Quality First."

Setup Procedures

Most companies do not have standardized procedures to be followed during setup. Most setup experts use methods they have developed throughout the years-there are good setup habits to be shared and bad habits to be eliminated. Developing setup procedures at every machine should be required and as improvements are made, these procedures should be updated.

Deliver the Change Parts in Kits or Buy A Cart

Putting all change parts in kits external to the setup provides a tremendous opportunity for setup time reduction. Ensure that all of the kits are complete and any presetting of the tools, gages or fixtures is done with 100 percent quality. The kits can be brought to the machine while the previous job is running.

Standard Tooling

Standardizing tooling in your plant should reduce setup time greatly. Examine and eliminate as much special tooling as possible and preset that tooling prior to delivering them the machine. If tool changers are used, the tool should have a standard position in the magazine.

Standard Routing

Using a standard routing is much like standard tooling in that 80 percent or more of your product could be manufactured using a standardized routing.

For most of you, these improvements can be implemented immediately and have been needed for a long time. Some will take longer than others and the standard tooling and routings will take some research by your engineers. As soon as implementation begins, you will experience reductions in setup time.

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Next month we will look at two specific areas for improvement in your setups:

(1) Time spent getting ready to setup and (2) threads used in setup. We will look at how to eliminate or reduce setup time and what products are on the market to help reduce these two aspects of your setup time.

Machine:	Completed by:	Date completed:
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FIRST 30% IMPROVEMENT CHECK SHEET

- Hand Tools** - Make sure hand tools are always available, prior to starting the setup. Shadows at the storage location of hand tools needed for set up, clearly identifies missing tools. This alone is a simple and effective way to know if setup hand tools are available.
- Fasteners** - Get plenty of every fastener at every machine that are needed for setup.
- Change parts** - Move all change parts to the machine while the machine is running.
- Cleaning of change parts** - All parts requiring cleaning should be cleaned externally (while the machine is producing).
- Maintenance of change parts** - None of these items used to setup should require any maintenance during setup. Establish a procedure which ensures that items needing maintenance work is completed before the setup begins.
- Lubricants, chemicals, and solvents** - Like all other items needed to complete a setup these should be available when needed and be in its proper storage container.
- Guard removal** - Removing guards typically requires the removal of fasteners that are time consuming and get damaged and lost. Install "one quarter turn" fasteners on all guards
- Scrap and rework** - Scrap and rework should not be accepted during changeover. Install process control to ensure that the cause of scrap and rework is identified and eliminated.
- Setup procedures** - Develop written setup procedures at every machine.
- Deliver the change parts in kits or buy cart** - Develop system to deliver all change parts in kits.
- Standard tooling** - Implement standardized tooling wherever possible.
- Standard routing** - Implement standardized routings wherever possible

Implementing these above changes should result in at least a 30% reduction in your current setups time which makes them well worth the effort.

Figure 2-1
First 30% reduction check sheet.

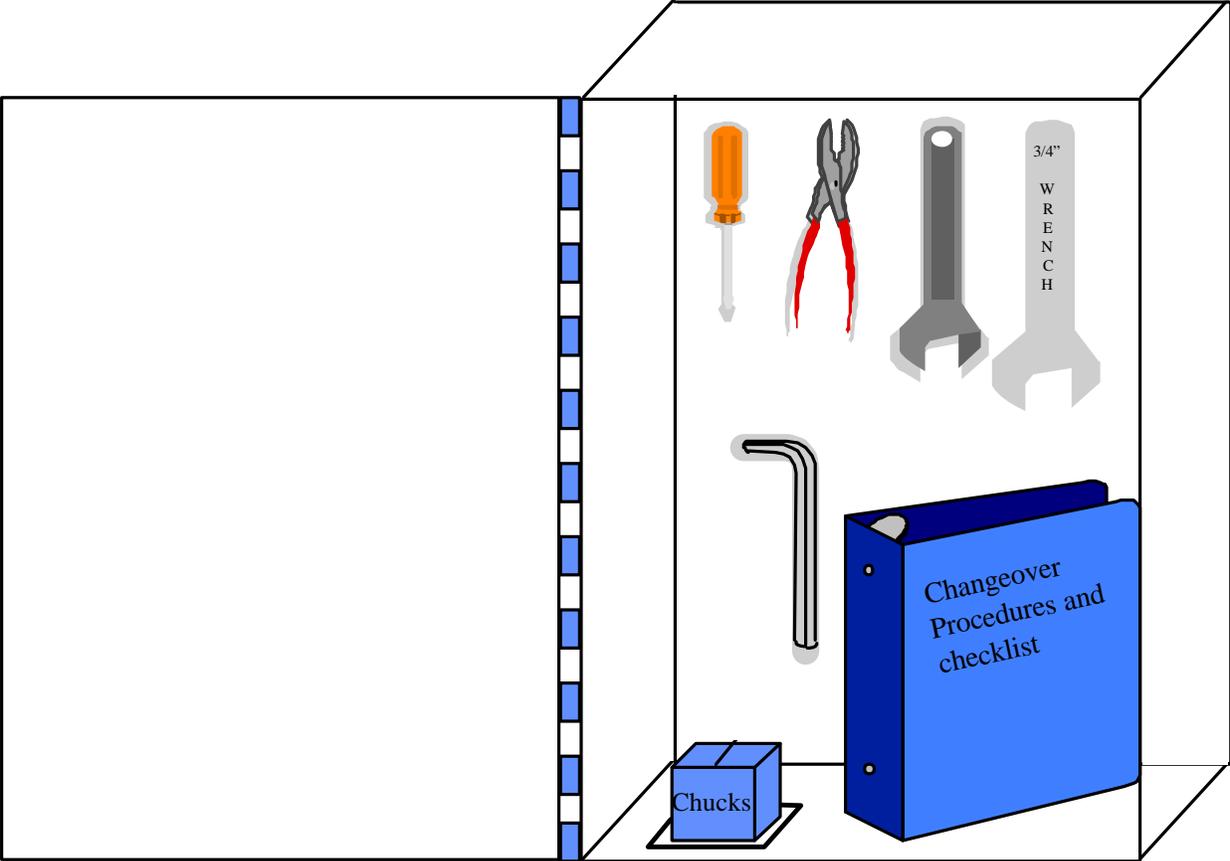
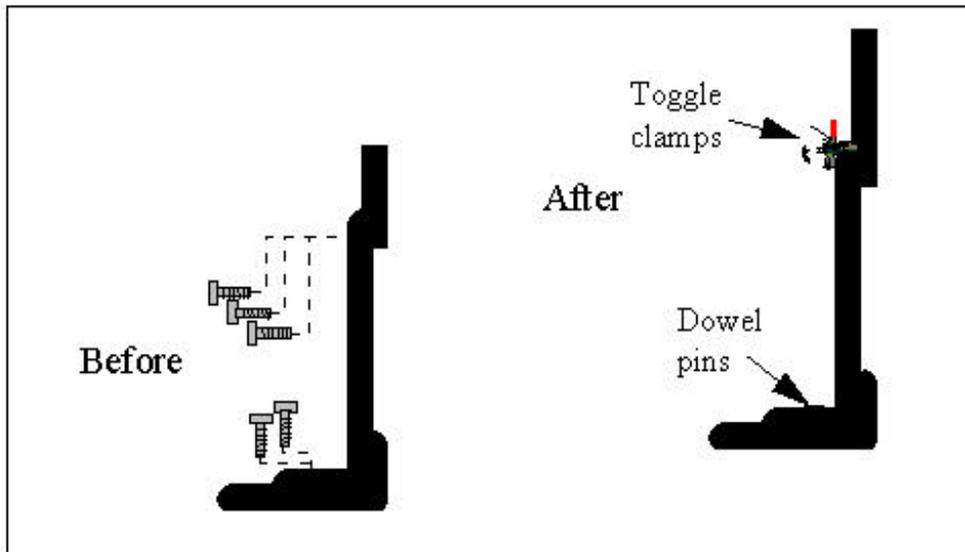


Figure 2-2
Tool cabinet with shadows for setup hand tools.



Hinged guard with spring closure



Guard on grinder

Figure 2-3
Guard Attachment Methods