

Setup Time Reduction
Eliminating the Trials and Travel Time in Your Setup
Part V
By Jerry W. Claunch

Last month's article examined the eighth and ninth steps in setup time reduction (8) Eliminating the hand tools and (9) Eliminate the tweaking during setup. This month's article continues this important series with eliminating the trials and travel required to setup.

If you have been implementing improvements at your plant as this series is being published, you should be very pleased with your results so far. Now you are ready to examine the trial runs done during setup.

Step 10 - Eliminating the trials during setup.

Trials occur when the setup expert runs the operation then checks the part dimensionally, makes an adjustment, runs the operation again, checks the part, makes an adjustment and so on, until a good part is produced. Trials are typically done to ensure that scrap is not generated during setup. Typically, your operators are very careful to leave material on the parts after turning, milling and grinding, etc. While this seems to be a good practice, it can be the source of unnecessary downtime during setup. In figure 5-1 you see a chart to monitor the trials during setup. Using this chart reinforces the goal of no trials and allows you the opportunity to capture the cause.

Your attitude plays an important part

When it comes to eliminating trials, your attitude will affect this improvement. If you set the goal to eliminate trials, you will make some reduction at the least, and may in fact eliminate trials altogether. If your attitude is that trials can not be reduced, your chance of achieving any improvement is lost. The only separation between success and failure may be your attitude. Look at the technology we have today simply because someone wouldn't take no for an answer. I recommend that you decide right now that trials can be reduced at your facility and determine that you will not be side tracked in any way in achieving this step.

Dry runs without parts

Many times operators will run a program without parts to ensure there are no "crashes". While this practice seems to be reasonable, it is usually unnecessary and causes the setup to take longer than necessary. If you really fear crashes during setup, it is not a setup issue. Find the cause of the crashes and implement corrective action. Running the job without parts is simply too time consuming to allow.

Reducing the time for trial runs

One method used to reduce trials during setup is to run the part complete, then check the dimensions of all features at that operation. This is far faster than checking the dimensions after each feature of a given operation. Still there may be a better way. If

you have CNC (Computer Numerically Controlled) equipment, I propose that there is no need to gradually move to the desired dimension.

Eliminating trials

Many operators, during setup, will enter offsets in order to ensure they have stock left on the part and not generate scrap. If you program a known point on the fixture in relation to the part, and know where all the tools are set, either by touching off, or better yet providing preset tooling, the operator during setup should be able to go right to the finished dimension. I too, want to be careful and would never encourage careless activities, but in today's technology, we don't always need to enter offsets.

Since you have invested in equipment and tooling that should eliminate trial runs, I propose you begin to work with the employees during setup to run parts to the correct dimension without entering offsets and without more than one cycle of the operation to obtain a good part.

Scrap and rework are manifestations of trial runs

Any time there is scrap or rework as a result of a setup, you have trials occurring in your setups. Do not allow anyone to accept this scrap or rework as part of doing business. This practice must be eliminated as quickly as possible. Typically the only reason for scrap and rework as a result of setup is that we haven't taken the time to examine the setup and determine to eliminate the scrap and rework caused by the setup.

Asking why you can't get a good part the first time may be the best method to determine what needs to be addressed in order to eliminate trials. "Just because" is not the correct answer. There must be a reason, otherwise there is no need for the trial. Once a reasonable reason is submitted, then go to work eliminating the reason. Your ultimate goal is no trial runs, no scrap and no rework during setup.

Look at previous operations to eliminate trials

Many times, the cause of trials during a setup is caused by previous operations. If, in a previous operation, the part was produced close to a tolerance limit, this causes the subsequent operation to be more time consuming.

Target specification or nominal of the tolerance during setup

The best practice is to target the specification during setup. Figure 5-2 shows a chart to use during setup. It doesn't matter what the specification or the tolerances are. This chart allows you to monitor how well your setup experts perform to tolerance. In teaching quality to production employees, you should clearly differentiate between the specification dimension and the acceptable tolerance. The specification is the dimension that is desired and provides the best product. During setup the goal should be to target the specification which allows the setup to be faster. Tolerances are established to allow for variation of the process. If, during setup, the process is barely within the tolerance limit, that operation and subsequent operations will have a more difficult time, especially during setup.

Step 11 - Eliminating the travel during setup.

I can not remember a setup that did not involve travel. Usually the travel time spent going to get things or put things away constitutes a great deal of wasted time. Many companies plan for travel time during setup while the machine is stopped for setup. An employee at a plant in Ft. Lauderdale, Florida had been writing up a list of the tools required for setup on his grinder at the start of setup then went to the tool crib (travel time) to get those tools. He had been doing this for over 30 years. What a tremendous waste of time, talent and machine utilization.

I watch many setups and constantly see the setup expert leave the machine to get tooling, fixtures, materials, hand tools, information, prints, going to Quality Control, going to the inspection equipment and to do data entry. As you observe this situation in your plant, remember that 80% of travel time is easily eliminated by simply doing the task that causes the travel before the setup begins or after the setup is completed. As seen in Figure 5-3, your goal should be to never observe a machine in setup with no setup expert working at the machine.

Some of your setup travel should already be eliminated with the implementation of article 2's 30% reduction checklist. Whenever you observe travel during setup, find out why the setup experts are leaving the machine and determine how to eliminate the need for the travel. The travel could be to power down the machine which may indicate the need to move the electrical cabinet.

Look at how your plant is laid out. Far too often, storage areas, inspection equipment and other items used during setup are located along the walls of the building, inconvenient to the people utilizing them. When considering locations for items used during setup, locate the items closer to where they are used 80% of the time, then go about eliminating the need for the item during setup. Travel time during setup is one of the easiest items to eliminate during setup. This should be one source of setup time that is quickly removed from your setups.

Don't be hesitant to question inspections that are done by other than the setup expert. Travel is usually involved and many times the inspection checks the same dimensions as the setup expert, only to find that they are correct. Elimination of the inspection by others usually results in elimination of some travel during setup.

Eliminating travel is not usually difficult, and can be implemented quickly. Don't hesitate to eliminate travel during setups in your plant.

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Trials During Setup

Operator: _____

Job Number	Dimension	Number of Trials	Cause

Figure 5-1: Trial Chart

Setup Dimension Chart

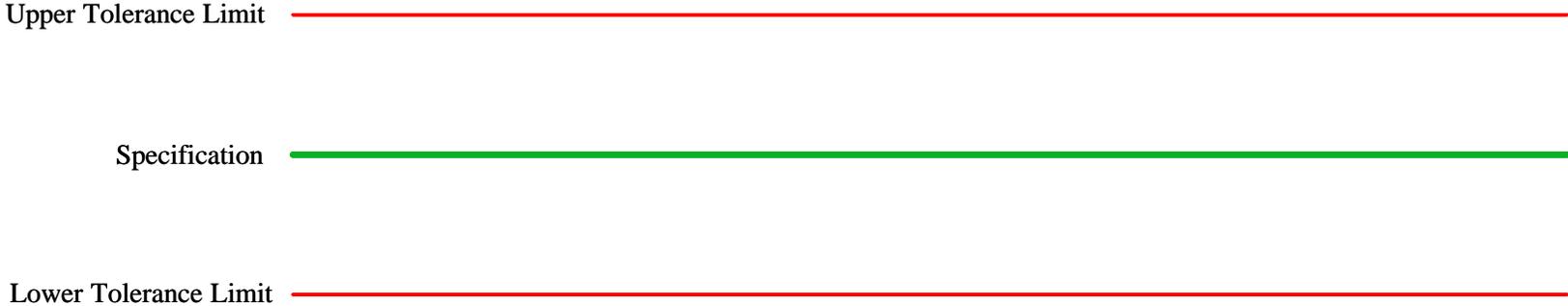


Figure 5-2: Setup Dimension Chart

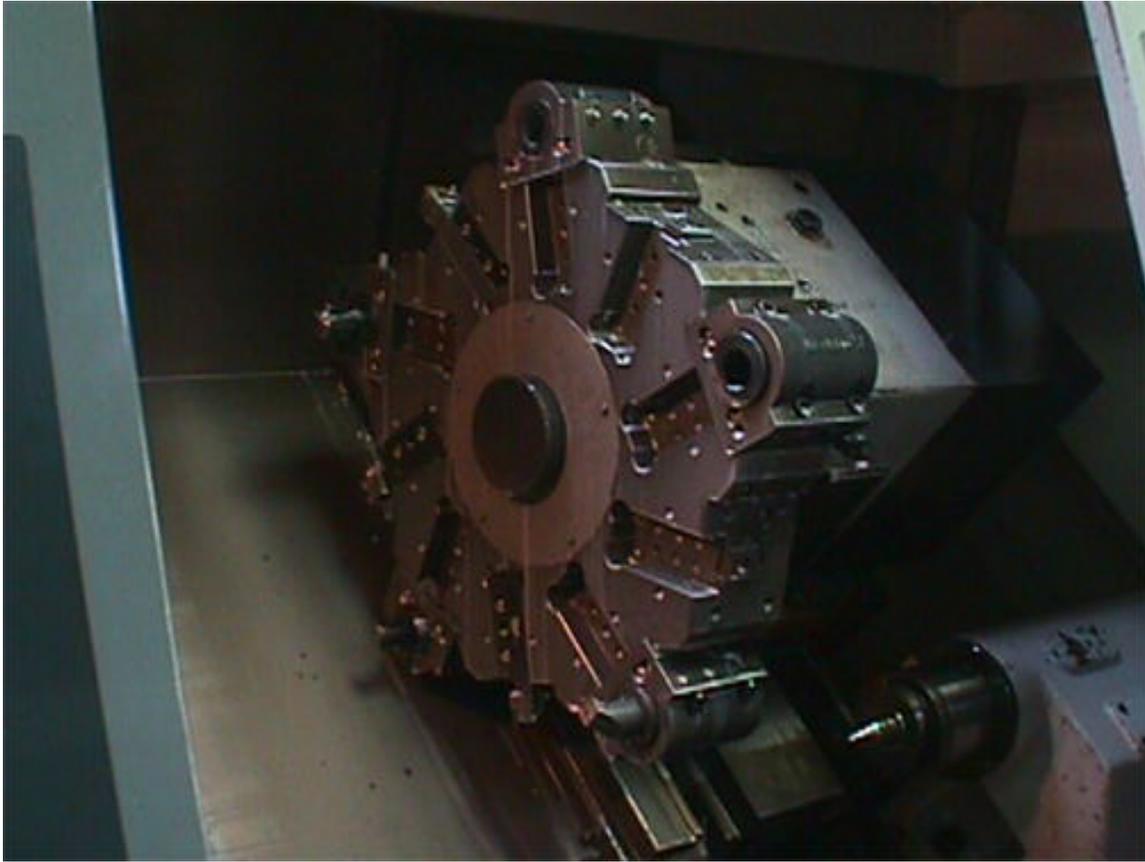


Figure 5-3