

Lean-Manufacturing Principles

Reduce Turret-Press Setup Times

When setup times start to rise, shops typically examine planning, housekeeping, plant layout and preventive maintenance. Efficiently run shops use as much of a standard turret load as possible, and create and enforce simple housekeeping rules.

BY DEV BEAL AND JEFF PAULSON

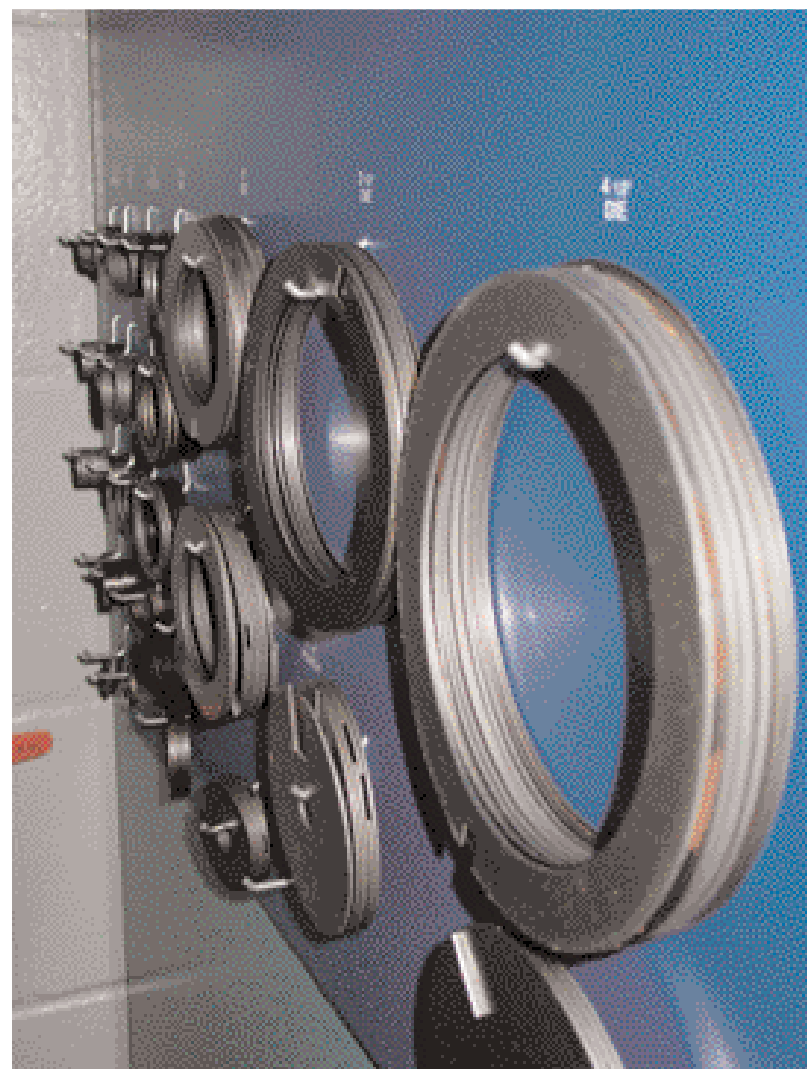
A quiet punch area is a shop manager's worst nightmare, and nothing eats into productivity more than prolonged machine setup times. This can result from lack of cooperation, wasted motion and confusion. To add fuel to the fire, operators are challenged by changing work schedules; programmers must maintain proficient turret-load standards; and managers must create the proper balance to achieve success. All of these conditions cause slowdowns, which most likely occur when:

- 1) Setup technicians do not have setup standards for tool locations;
- 2) Programmers ignore standard turret configurations; and
- 3) Managers fail to establish and follow a first-rate production plan.

The Usual Suspects

When setup times start to rise, shops typically examine planning, housekeeping, plant layout and preventive maintenance. Turret presses

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Managers and operators must agree on a standard location for every tool not in use, so that the tools required for a job can be easily found. Ways to achieve this include creating a shadow board (above) that indicates a place for storing every tool, and maintaining well-organized die cabinets (right).



hold anywhere from 20 to 60 tools, and jobs running on these machines can use any number of tools. If a standard turret load is not used, operators must change the majority of the tools between jobs, increasing setup time. Efficiently run shops use as much of a standard turret load as possible—the majority of the work runs with a given set of tools in order to minimize the need to change tools. All turret-team members should constantly weigh in on a particular job's volume to establish the right balance between running a unique setup and nibbling an application utilizing the standard load. The quality-versus-volume balance must be maintained to achieve success.

Also, without sufficient housekeeping standards in place, a shop can quickly become overrun with oil, misplaced

5 Ms for Assessing Setup Scenarios

5 Ms	Assessment Questions
Man	Do the required tools reside at an arm's length from the employee?
Method	Are punch and die holders current or out of date?
Material	Do consumables perform as well as they should?
Machine	Does the preventive-maintenance plan include turret alignment as well as proper machine cleaning and maintenance?
Measurement	Time the entire setup process—where can changes be made?

tools, parts and stamping byproducts such as slugs or part skeletons. As a result, setup times increase since the shop lacks a clean working area for setting the tools and staging them for machine loading. Creating and enforcing simple housekeeping rules facilitates faster setup times. Efficient punch-press users typically create specialized carts or work benches that support all necessary tooling-setup locations, as well as allocated areas to prepare tooling for subsequent jobs. Additionally, simple modifications can be made to the shop-floor layout to minimize setup times. For example, how far does an employee walk to tooling storage cabinets, and how far should this distance really be for effective setup times?

Another method to reduce setup times is to implement a preventive-maintenance plan for the tools and the machines. This includes sharpening tools at regular intervals and routinely performing tool-station alignment on the machines. Proper station alignment may prevent problems such as turret wear and substandard tool life. Consider the cost of unplanned downtime versus providing the proper time to perform these tasks at the appropriate intervals.

Other Innovative Ideas

Although most companies have adopted standard approaches to reducing setup times, some commonly over-

looked areas offer the promise of greatly increased productivity. Taking a page from lean-manufacturing practices, where the goals are to eliminate waste, improve quality, and reduce production time and cost, here are six simple ways that fabricators can reduce turret-press setup times.

1) Empower team members (employees). From the very beginning, managers must clearly state their expectations for setup times. Bolster employees' pride in the products they produce and the company for which they work. Do this by developing not only their technical skills but also their work-measurement and decision-making skills, providing employees with the necessary tools for managing their own processes. For example, during shop-floor downtime, do the employees engage in unproductive or productive activities? Employees with the proper training will spend downtime improving their work processes to achieve better results. And, employees who understand that their input into problem solving is valued will perform at higher levels, bringing about another benefit—higher employee morale.

2) Set goals for improvement. Successful goal setting requires creating attainable and measurable goals. Companies that strive for lean commit to continuously improving their processes. This improvement comes not just at

Turret-Press Setup

the management level, but throughout the company. Employees and managers must work together to develop improvement goals and identify setup-time wasters, such as tools scattered about the shop floor rather than being returned to a standard location, or random tool-sharpening habits. Establish metrics based on these areas to reduce setup times, and create financial rewards or other incentives when goals are met.

3) Create standards. Employees must participate in setting the standards; otherwise, if they are forced to follow something they see as just another rule, morale and overall productivity suffer.

The programmer should have a standard turret setup and the setup technician should have standard tool placements within the press. Then, managers and operators must agree on a standard location for every tool not in use. By creating and following such standards, operators know the tools required for the job will be on hand. One option: Create a shadow board that indicates a place for storing every tool.

Another setup-time waster is tool sharpening. Without some standard dictating how often to sharpen tools, operators will wait until they are actually setting up the tools to determine if they need sharpening or not. So, rather than each tool taking several seconds to set up, the process could take several minutes as the operator takes the time to sharpen the tool prior to loading it into the machine.

Checking for key alignment is another setup time waster, so shops should develop a standard that calls for double-

and triple-checking key alignment. Tool crashes due to improper alignment result in wasted time while an operator waits for a new tool to arrive to run the job. Here, process planning should consider the number of keys available within a particular tool set to specify the proper number of keys available, to help operators mistake-proof the process. Additionally, shops can invest in state-of-the-art tool-steel punches and dies, some of which last twice as long between regrinds as standard tools. This investment will cut tool-handling time between sharpenings in half.

4) Review the 5 Ms (see the table) for each item in the setup scenario. All employees and managers must examine and eliminate wasted motion. Ask questions for each item based on the 5 Ms to determine if changes can be made to decrease setup times.

For example, do the required tools reside at an arm's length from the employee? Are punch and die holders current or out of date? There are some new punches and dies on the market today that do not wear down as easily as older ones, which can dramatically improve tool life when punching materials that are abrasive or have high tensile strength. Do consumables perform as well as they should? Does the preventive-maintenance plan include turret alignment as well as proper machine cleaning and maintenance? Poor alignment leads to premature tool wear while improper cleaning pushes debris deeper into the machine, creating more costly and time-consuming repairs and cleaning.

Time the entire setup process. Where can changes be made? Some newer tooling is specifically engineered to cut the time spent on changing and adjusting punches. Fabricators that have time-studied this process have documented setup-time reductions from 9 min. down to 1 min. by replacing old out-of-date punch holders.

5) Make a plan, based on the goals and other ideas generated by employees and the results of the 5M study of the shop floor. Generate the plan with employee participation and feedback. With a plan created, inform all employees that the newly developed plan will be uniformly followed. For example, the plan may include guidelines as to which jobs should run together, based on common stock thickness and sheet sizes, etc., to minimize the number of change tools.

6) Stick with the plan. Often shops can be tempted to ignore the plan after a brief time if they do not realize immediate results. Build into the plan some short-term goals that, when achieved, will allow employees and managers to recognize the benefits of following the plan. This is especially critical in shops running multiple shifts. Buy-in for the plan must come from all employees on all shifts. Otherwise, while shift A is following the plan, shift B is putting tools back into the wrong places, causing shift C to waste time searching for these tools. It sounds like common sense, but without full participation from the entire company, the plan will fail. MF



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