FACE IT, margins are tight and are likely to remain that way. We all know that you can improve revenues in two ways: raise prices and/or reduce costs. Raising prices is possible when you have a unique value proposition that cannot easily be replicated. Customers are willing to pay more for that value. For the rest of us, reducing costs is a key to improving revenues.

So, how do you reduce setup time? What is the process of shortening a makeready? There are various strategies ranging from lowering the quality standards (a bad idea) to purchasing expensive and sophisticated new equipment. New presses nearly always have faster startups. However, my preferred method for reducing makeready time, is a proven strategy that does not involve lowering standards or investing heavily in equipment.

Developed in the automotive industry, SMED (Single Minute Exchange of Dies) outlines a structured process for analyzing and reducing makeready times for any operation that involves discrete setups. While it was developed in the context of setting up stamping dies in the automotive industry, its application is far reaching. This includes printing presses, converting lines, and platemaking.

Makeready time is undesirable. Customers do not value it. Generally considered part of the print process and factored into cost estimates, the fact remains that makeready times can be reduced, and the printer can either increase profit or lower pricing.

The SMED process was initially outlined in the 1985 book: A Revolution in Manufacturing: The SMED System by Shigeo Shingo, an industrial engineer who developed the methodology for Toyota. The process was further refined for the
WHAT IS SMED?

SMED focuses on a few key principles. The first principle is to analyze every minute of time during a production changeover to determine which activities are internal and which are external processes. Internal processes are simply activities that must be performed while the equipment is stopped. In other words, for mechanical or safety reasons, the press must be shut down.

The goal, of course, is to make sure all activities that can be performed externally are indeed being performed as a premakeready function. I am always amazed at how much time is spent on activities that could be performed ahead of time with a little thought.

It is worth addressing how discovery is achieved when focusing on setup reduction. An important “LEAN” principle is learning to see. This concept addresses how we can so easily miss seeing due to preconceived opinions. The word paradigm is often misunderstood, but it has powerful implications.

A paradigm could be defined as someone’s “world view.” It is how you interpret what you see. So, if you ask an operator if he/she does external activities while the press is stopped (which is unfavorable), most will emphatically say no. Operators generally do what they were taught. And, they are hard workers and perceive themselves as doing the right thing because of their efforts. So, asking is not the best approach.

The best approach is to document a makeready in a different manner. I recommend simply videotaping a few makereadies in an unobstructive manner. Then, ask the operators to watch and simply document any thoughts. Ask their peers to watch and document those observations. Videotaping is a powerful way of moving beyond what is believed (perception), to focus on what is really happening (reality). It can be intimidating, so be certain to approach this diplomatically.

After a few makereadies have been taped and analyzed, have a baseline from which to improve. Progress is best achieved systematically. The following 10-step approach, identified in Setup Reduction for Printers outlines several different ways to shave time off of a makeready. The reality is that there are few huge gains. But five minutes shaved here and five minutes shaved there, add up to significant reductions. So what are the 10 steps in reducing setup time?

THE 10 STEP SETUP REDUCTION PROCESS

1. Benchmark a current makeready
2. Minimize internal processes
3. Analyze, minimize, and standardize setup tools and fasteners
4. Put tools and supplies close by and in an organized manner
5. Use positioning and registration aids
6. Work to minimize adjustments required
7. Use parallel setup processes
8. Standardize, coordinate, and improve your makeready activities
9. Mistake-proof your makeready
10. Re-engineer when all else fails

When combined, these steps shave critical time out of the makeready process, improving the bottom line of a business. But the processes must be done methodically and, generally, in sequence. Each step takes a little time out of the process. It may be tempting to jump down a few steps but you will get the biggest benefit by tackling each step in sequence, using a team approach. A well-trained and motivated team, comprised of four or five individuals, will provide the greatest impact on setup reduction. The team should have knowledge of the process, but one or two “outside” eyes are always helpful.

While we do not have space in this column to discuss each of these steps in detail, I will spend the balance of this article focusing on Step 4: putting tools and supplies close by and in an organized manner. As noted above, you really need to start at step one though to get the best gains.

In recent years, companies have really begun to put energy into premakeready functions. This involves staging substrates, inks, dies, foils, anilox rolls, and other supplies and tools for the pressrun. Stopping the press and accumulating the needed supplies for the next job wastes much time.

Let us start with a basic premise: The least amount of press downtime will occur when all needed materials (i.e. stock), press components (i.e. anilox rolls), and tools (i.e. adjustment tools) are within arm’s reach of the place they will be used at the precise moment they are needed. Further, all tools must incorporate the four “easies”:

- Easy to see
- Easy to get
- Easy to use
- Easy to put back

Since tools are often stored press-side, many companies employ shadow boards close to the point of use. This is a good approach and generally addresses many of the above bullet points. However, if we get back to the premise noted earlier, questions do come up. Are the best tools being employed? For example, some fasteners are easier to engage, provide optimum torque with the least amount of motion or time, and disengage more simply than other fasteners. Is this the best tool for the fastener? Is the tool used in multiple places? Is the tool being transported around or is another operator waiting on the tool? These are all important considerations your team should discuss.

How inks, substrates, foils, dies, anilox rolls, and other press components and supplies get press-side is another important part of reducing makeready time. Many companies use a premakeready function, essentially having someone other than the operator accumulate the necessary job supplies and deliver them press-side, prior to the finish of the previous job.

How premakereadies are initiated, performed, verified as being accurate, and delivered press-side is essential to a good premakeready. For example, we only want to stage just prior to a job (10-30 minutes prior). So what initiates or signals a premakeready activity in your business? Is it fail
proof? Are materials staged and ready every time? Are they the right materials every time? I have seen poorly prepared premakereadies in a lot of shops. Sometimes, the wrong supplies are picked. Sometimes, parts are missing. Sometimes, the premakeready supplies are late to press.

Like all printing, process control extends to the premakeready function and a robust process is needed to ensure accuracy and timeliness. Nothing will slow down a make ready more than the wrong ink or stock being pulled. What methods are used to monitor and mistake-proof a premakeready? Are systems in place to reduce human error? A thoughtful premakeready process addresses mistake elimination.

Carts are a popular approach for assembling materials and wheeling them press-side. A premake ready cart is designed as a mobile storage unit for all materials.

That may make sense but it may also make sense to have a separate finishing cart, where dies, foils, and other finishing components are staged. The cart itself should be thoughtfully designed, so that a simple glance can determine if items are missing or not. Simple visual queues provide a simple means to verify all materials are properly staged.

**STARTING POINT**

I am a firm believer that every company should focus on setup reduction. It is not simply for struggling companies. So, where to start? Go back up to step one— benchmark a current make ready. One cannot improve unless any problems are known. There are many good books about SMED. Get hold of one. Then, train employees and empower teams to begin to make structured improvements.

One final thought— it is difficult to sustain improvements when they involve changing long-formed habits. Without question, in some corporate cultures improvements are hard to come by. So, it is vital to really understand one’s own culture and begin to build a workforce founded on continuous improvement. If a firm has a workforce built around traditional work habits, it will have to rebuild it into an empowered workforce. The outcomes are well worth the effort.

Reduced setup time is a real game changer. Faster make reads not only contribute directly to the bottom line but they also open up opportunities for shorter run lengths. Further, less time spent annually on make reads means increased capacity. Where else can a company get additional capacity for free? So, do not set this aside as another thing to get to “eventually.” Now is the time to embrace setup reduction.

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About the Author: Malcolm Keil is a professor in the Graphic Communication Department at California Polytechnic State University. He oversees instruction in flexographic plating and press operations at Cal Poly, as well as teaches Quality Management, Printed Electronics, Cost Estimating, Packaging Workflow and LEAN Manufacturing. With more than 25 years of experience, Malcolm is a frequent speaker and contributor at FTA events. He has written more than 50 scholarly papers and articles and authored two books: “Lean Printing: Pathway to Success,” and “Designer’s Postpress Companion.” Malcolm currently chairs FTAs Educational Leadership Council and serves on FTAs TEST Advisory Board. He received his Ph.D. in 1985 from University of Missouri. In 2004, Malcolm was recognized as the Print and Graphics Scholarship Foundation’s Educator of the Year.