Getting Started with Shop-Floor Integration

A Cimulus, Inc. White Paper

Often, the biggest obstacle to implementing an automatic data collection (ADC) system for your shop floor is simply not knowing where to start. There's a sense that integrating your production system with ADC has to be a long, involved process, with lots of technical and business decisions, and of course, a large price tag.

That doesn't have to be the case. In this paper, I will describe a situation common to many small-to-mid-size manufacturers, and offer a simple 4-step process that can help you develop a data collection strategy that's both practical and cost-effective.

The Situation

Paper is still the most common way for manufacturers to collect production data. This is because most ERP solutions focus on "front office" activity: invoicing, scheduling, and similar tasks. When it comes to production, those plans and schedules are turned into printed pick lists, work orders, and so on, which are passed around the shop floor and marked up by hand. After the work is finished, the forms are collected and the results manually entered back into the system.

Does this sound familiar? The good news is that if you're in this situation, you have an excellent opportunity to save time and money by leveraging the investment you've already made in your ERP system. Each piece of hand-written data you replace and every form you eliminate will give you a significant increase in productivity and accuracy.

Step 1: List the Data You Want

Begin by creating a list of the information you'd like to capture from your production process. Take a look at the paper forms you are using right now: what information are you entering back into your ERP system? This may include:

- hand-writing the number of parts produced at a station
- recording the number of scrapped parts
- writing down lot or serial numbers associated with a job
- tracking the time spent on a given machine or operation

Any information you're manually collecting and entering now is the baseline: any new system will need to do at least this much to be successful.

Now, think of any other information you'd like to capture, if you could. These "wish list" items might include data that you don't have the time or ability to track now, such as individual serial numbers or a set of QA measurements instead of a single pass/fail.

Finally, consider what you will do with the information you capture. In addition to simply feeding your ERP system, are there any other capabilities you'd like to add? You may want to be able to track jobs in process via the Web, or use cycle counts and scrap quantities to verify production totals. Not all of these features may be in the initial system, but a little "forward thinking" can help fill in any gaps in your list and get you started in the right direction.

Step 2: Imagine How to Collect It

The next step is to look at each piece of data, and figure out how you could collect it more easily than you do now. Don't worry about the specifics; focus on general solutions. Use barcoded labels in place of hand-writing job and part numbers. Read sensors and cycle counts directly from machine controllers. Read employee ID codes electronically from another system. If you're not sure, *assume it can be done*. It may be easier than you think.

You will probably find that some information simply has to come from a human. But even in those cases, think of ways to minimize their effort. If you need an employee to enter their ID, consider using a badge-swipe instead of having them enter it manually.

Finally, scan your list of data and sources, and look for ways to combine them and eliminate redundancy. For example, If you can read a cycle count from a press, and the operator provides the total number of good parts produced, you may be able to calculate a scrap quantity. Your goal is to determine the easiest way to capture the information on your list.

Step 3: Match the System to your Processes

Now that you know what to collect and how you'd like to do it, it's time to see how that might fit into your manufacturing process. Look for steps or procedures where hand-writing of data can be completely eliminated, and for opportunities to drop entire printed forms from your process. Although it's worthwhile to trim individual steps from a process, those few places where you can make a big change are your best opportunity for improvement and savings.

You should also prioritize the different options you have. Rather than trying to build the "complete" system immediately, the most practical solution typically addresses just the top 80% of the possibilities. Look for the most complicated forms, and the most error-prone procedures. These are ready-made opportunities for savings.

Another consideration is that the processes themselves may need to change. You may need to add barcode scanning steps between stations, or update your employee training. It's important to recognize that these may require additional planning, and add to the project time and effort.

Step 4: Scope Out the Solution

At this point, you have enough information to develop a project scope. There are many different approaches to shop-floor integration, and you have to decide which is best for you.

Of course, the more specific your solution becomes, the more questions and technical details that you will need to consider. For example:

- Solution architecture. Most ERP systems offer some basic shop-floor connectivity options, but only limited functionality. A standalone system may be more complex, but provides provide far more options for integration and customization.
- Physical layout and equipment. Will you use wireless or hard-wired terminals? What equipment is already on the floor, and what will need to be added? How many scanners, terminals, etc. will you use, and where will they be located for the best efficiency?
- Real-time or batch collection. Do you need up-to-the-minute production data, or should some or all of it be uploaded just once or twice a shift?
- Process questions. Does a supervisor have to validate information before it is sent upstream? Should the system page the supervisor when certain things go wrong?
- Roll-out Planning. Do you want to start with a 'pilot' line as a proof-of-concept, or to introduce the changes across the whole plant at once for maximum efficiency?

This is just a small sample, but it gives an idea of the questions to ask when creating the project scope. But always keep in mind that the ultimate goal of shop-floor data collection isn't technical, it's business: collect the data you need, and do it as efficiently and accurately as possible. Sometimes, a cheap, technically simple solution can provide 90% of the value of a top-of-the-line solution that costs five times as much.

Is it Worth the Effort?

Shop-floor integration is one of the most neglected opportunities for improving efficiency and profitability. Many manufacturers, after making a huge investment in an ERP system and other front-office solutions, have stopped their IT investment right where those products leave off. If your company could use a quick boost in productivity with a relatively small investment, take another look around your shop floor. More than likely, there is some low-hanging fruit waiting just on the other side of that door.

Cimulus, Inc. • 305 E. Eisenhower, Suite 112 • Ann Arbor, MI 48108 • (734) 327-9532 • www.cimulus.com

