

MANUFACTURING IN THE 21ST CENTURY

Paperless and Productive



WHAT THEY NEVER TOLD YOU ABOUT “PAPERLESS” PROCESSING...

Rethinking Paper on the Factory Floor

Removing paper from the factory floor is getting more and more attention these days. The trend to remove paper from “the process” can be seen in many places today from the tremendous growth in email to ordering electronic airline tickets. However, the removal of paper from the factory floor should not, in and of itself, be the goal. *The goals of a manufacturer must go beyond paper removal.* Paperless projects should allow an electronic real-time floor system which can be highly responsive to customer needs, improve quality, improve on-time deliveries, shrink manufacturing cycle time, and minimize waste, to mention a few. And that should just be the beginning of the benefits!

The use of information systems on the floor can assist in reaching these “performance” goals if management is aware of the opportunities available to them. Management needs to think beyond the obvious and move into a more robust and all-inclusive electronic “communication” floor-focused system as the key to unlock the potential of “paperless processing”. The implementation of a paperless system should be analyzed from several points of view. By evaluating the use of paper and verbal communications that take place on the floor, an all-encompassing approach can be mapped out and functionality can be implemented in a plug-and-play approach as time and resources permit. Viewed from this perspective, the opportunities to improve the production process through an electronic floor system (and removal of paper) can be identified and then prioritized with major benefits realized.

How do I know if my business will benefit from a “paperless system?”

Every manufacturing company has floor communications requirements. The business could not make parts if some form of floor communications did not take place. Knowing what to make, how to make it and recording work completed are the basics that take place in every manufacturing company. Communications can be improved by the installation of integrated systems for the factory floor personnel. However, often times the manufacturing management does not realize that information system decisions are being made by different departments within the organization, which will manifest in isolated, departmentalized, non-integrated islands of automation. These

systems come in all shapes and sizes but some of the common names are data collection system, labor collection system, time and attendance system, scheduling system, document management system, quality control system, ISO/QS 9000 system, to name a few. Don't let these systems go forward with implementation until you have analyzed the bigger picture of a single system with a common user interface that can include several of these systems in one.

What should I include in our paperless system?

To answer this question you must analyze the uses of paper on your factory floor. The most obvious is the work packet or traveler that is created when an item is released to the floor. This traveler usually moves with the item as it travels from work center to work center. The traveler usually has several pieces of paper in it. The item routing and drawing are the most common documents included in the packet. In some factories, the work instructions are in the packet, while in other production facilities, the work instructions can be found in a book(s) at the work center.

In addition, paperwork, like time tickets, is filled out by the operator and/or supervisor to facilitate "data collection" of production information. This can include time spent in set-up time, the time to produce the items, the amount (pieces, length, weight, etc.) of item(s) produced, scrap quantities with reason codes and rework, if necessary.

But there still may be more information that must be recorded on paper. Process check-off sheets, such as required activity at the start, middle or end of an operation, may be filled in with the operator names. Quality sheets, which collect measurements about the item, can be required at one or more operations. ISO and QS9000 documents, such as corrective action procedures, must be available via some controlled document facility.

Now let's examine "invisible" paper. This invisible paper is best classified as factory floor daily communications. For example, factories may or may not have a formalized schedule or sequence for items at each operation. The sequence of the work to be completed (dispatch list) at the work center may be a print out on sheets of paper, written on a board or might be communicated verbally (invisible paper) by a supervisor. However, in some factories, workers simply pick the next item from the work queued at their work center. This may not be the best, most productive sequence in which to work. Any changes to the schedule or special reminders about the items or machines, are

often not on paper but are usually communicated by word of mouth. Another example, such as problems and downtime situations, may be discussed but not put on paper. Sometimes this information goes unrecorded do to a lack of a problem reporting system. However, this is valuable information that should be captured and should be included in a “paperless” process.

Now that you have reviewed the floor communication requirements, what is the next step?

You should now be visualizing your “paperless floor system” as a two-way communications environment, which will allow the people involved (directly and indirectly) with factory production/process data to be on one integrated system. Implementing a two way communications system among the floor operations and production management is essential to promoting a successful, useful, cost-justified system. I have witnessed companies that have installed a paperless system in an attempt to satisfy executive management. They placed a document viewer on the factory floor and distributed CAD drawings from the engineering database. Sadly enough, upper level management accepted this system as “paperless” without asking the hard question of “Where’s the beef?” in this approach. *Customer satisfaction through better on-time delivery, faster reaction to customer changes and quality production takes more than an electronic representation of drawing to the operators!*

You can categorize floor information from the production, engineering, quality and accounting point-of-view. This way, we can look at “paperless” in a new light of electronic floor information system that helps flow the parts through the factory floor production process in an “up-to-the-minute” approach that has some real meat behind it.

Engineering should evaluate its floor strategy. Before delivering a single CAD drawing the floor, you should do two things. First, you should evaluate the need for just engineering CAD drawings versus the other forms, text or visual, of item information. Could sketches or electronic pictures enhance operator understanding and, therefore, improve communications? Second, as long as we are going to deliver drawings and images, maybe we should evaluate delivering the work instructions at the same time. But, let’s not just think of the work instructions as sheets of paper to be distributed in text format. Maybe, like the CAD drawings, you should take the time to re-think document distribution and look for a potential improvement using an electronic image format. In an age of low unemployment and high turnover, maybe pictures or video clips would make more sense.

Quality Control, like the engineering department, might want their documents to deliver on demand to the operators on the floor. ISO/QS9000 information can be delivered electronically to save on the control documentation costs. As long as we are electronic, how about putting the quality/process control input sheets on the PC to allow data capture at the operator station. By incorporating this idea of recording quality data into our vision of a new factory floor system, we have moved from just viewing the “paper” to actual data capture. If that is the case, then maybe some of the quality/process data sheets should be overhauled to improve the process of data capture.

Accounting Department, what about your concerns? As long as the company is going to improve floor communications, the accounting department will certainly want to be included. Perhaps through this electronic interface, the accounting department can solve the data collection problem. This could provide a nice vehicle to simplify and improve the quality and reliability of the production information (quantity made and scrapped with reason codes). By including the data collection of production data into the “paperless” system, we can remove the production and time tickets from the floor. You can continue to improve the ROI for paperless by adding “paperless” data collection.

But what is the benefit to your customers?

Production Control doesn't know it, but their issues with “on-time” delivery could be improved with better real-time floor communications. Now that you are considering an electronic floor system to distribute engineering information and collect quality/process and accounting data, why can't we use this system to communicate the sequence of parts that need to be completed on time? Let's create a paperless dispatch list that can be viewed by operators, supervisors and production control. In fact, as long as it's electronic, why not let customer service look at it to help inform the customer on expected delivery dates?

Tying it all together...Why?

Hold on, do you know you just did? How can you tie all this information together in one easy-to-use system? Won't the operators get overwhelmed? Besides, all this started with an easy-to-define engineering oriented CAD viewer system project. Why include all of this other stuff?

The reason is simple. If you don't know where you're going, you may back yourself into a corner. Viewing the CAD drawing on the floor sounds simple enough, but the operator interface might only service this one application. Focusing on only one floor application may be fine for your software developers, but implemented by itself, without forethought about other important floor applications, may lead your company to a floor interface that is unmanageable for the operators. Over time, your company will realize other opportunities to process improvement through your floor system; however, it may be too late to painlessly retrofit additional information. Trying to look-up multiple drawings, quality/process documents, data collection sheets might be too much of a burden and destroy a good concept. So the floor interface should have the capability to do several things from the "get-go".

If some of your company's goals can be classified as improvements in customer service and/or minimizing late orders, then you want to prioritize the system requirements outlined above in such a way that the electronic floor system can help shrink cycle time through better production control. In the process of using the system, the operators can easily get to meaningful documents and record data in a timely and accurate process. In general, the system becomes the catalyst for improved manufacturing factory floor performance.

In order to implement this vision of a complete "paperless" approach and realize the associated benefits, you might first provide a human interface that is intuitive and simple to use. It should be graphical, to allow the display of not just text data, but drawings and images. It should provide two-way communications among the operators and production management.

One way to approach the floor system is to let the operators work from a prioritized list of parts at their work center. This list can be sequenced via computer logic and/or manually sequenced based on production management's experience. (Note: the issues surrounding the use of finite scheduling systems are discussed in another paper authored by MDSS.) This prioritized dispatch list must be electronic so that it can be changed to respond to customer changes and downtime situations.

Communicating to other operators or management can be simplified through the use of a messaging system that allows anyone on the floor with proper authority to send or receive important information (email). This messaging system can also be the vehicle to send alert and alarm messages to the appropriate location and allow faster time to discovery and resolution of problems.

“Paperless processing” is clearly affecting our lives and changing the way we live. But removal of paper through the delivery of documents on the factory floor may fall short of a much better, more comprehensive and beneficial approach of improving production performance. Taking a step back and evaluating your floor from a comprehensive, integrated, electronic point-of-view is a good and necessary exercise. You will have to work across departmental lines and breakdown the barriers so common in manufacturing today. That means engineering, quality, production and accounting departments cannot just formulate the “paperless” solution entirely within their respective walls. Whomever takes charge of this project, must help the entire organization to look across functional boundaries and envision an electronic floor system that moves the manufacturing production facility through the start of the 21st century with the performance based paperless approach to factory floor information. ◆

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