What About The Other Mobile Workers?

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Wireless technology holds key to boosting productivity, effectiveness of essential human element in operations.

There are three essential elements in modern manufacturing operations— or, manufacturing's three Cs: Capacity, Consistency, Compliance.

It's a common site at any factory, power plant, refinery, or other production facility: a worker, armed with pen and clipboard, making rounds, checking non-instrumented equipment, and filling out forms. Big companies love their data collection forms. Unfortunately, even in the best run companies, these forms often wind up in binders or file drawers somewhere and the information is rarely used effectively by management, if at all. Indeed, manual, paper-based systems for data collection are the Achilles' heel of modern manufacturing and production. Fortunately, advances in wireless, mobile technology have set the stage for the day when we can say, "Remember when we used to do that with pen and clipboard?"

The 3 Cs

There are three essential elements in modern manufacturing operations— or, manufacturing's three Cs:

- Capacity— the absence of down-time.
- Consistency— the requirement that all production machinery operates within specific parameters.

- Compliance— the need to meet or exceed regulatory and internal process, safety, and product standards.

Almost every manufacturing company ultimately relies on its workers contributing their knowledge, observational skills, and prompt action to ensure maximum production up-time and product quality without sacrificing compliance with safety, regulatory, and internal standards.

In the last decade, the number of staff at most manufacturing and processing facilities has shrunk due to a greater focus on automation and the retirement of seasoned workers while the operations workload has remained constant or even grown. This situation has left plant operations management with a smaller, less experienced front-line workforce with a paperwork and reporting workload that can seem overwhelming. This stretched workforce doesn't always have the intimate knowledge of the processes they monitor to allow them to take consistently effective and timely corrective action.

Big, far-flung corporations have a seemingly insatiable need for information about their operations, but more often than not the information cannot be gathered, collated, and analyzed across the enterprise using traditional paper and spreadsheet methods without costly labor expense and delay. Even worse, after the stale information is analyzed, it can become the basis for business decisions that may no longer be valid or prudent. As a result, large companies are operating with serious "blind spots," unaware of opportunities for process improvement that are within their grasp.

The Vital Role Of Mobile Workers

"Mobile workers" are not just the stereotypical "road warriors" who you see lined up in the airports. They are also workers at fixed locations, such as processing plants and factories, who generally do not work at a desk or who don't have regular and easy access to a desktop computer.

The vital roles played by mobile workers making the rounds of their plant raise several challenges:

1) Managing the work flows of the data gatherers.
2) Ensuring accountability and compliance with regulatory, product safety, and quality standards.
3) Reporting, analyzing, and issuing alerts to interested parties in a timely fashion after observational data has been collected to ensure that deterioration in field conditions does not cause product quality to suffer.
4) Providing front-line workers with the decision-support tools they need— whenever and wherever they need them.

After data has been collected, reported, and analyzed, there often is a need to communicate findings and directions— text, diagrams, photos— back to front-line workers and managers to ensure consistent quality and efficiency. For example, where machines can be set or adjusted to perform within specific parameters or

ranges, front-line operators need guidance on best practices. These front-line decision-makers simply can't lug around manuals or always be accompanied by experienced managers. Front-line workers need to be self sufficient, much like their "road warrior" associates.

As global business competition intensifies, corporations are beginning to feel a sense of urgency to abandon and replace paper-based, manual data collection "systems" with automated, electronic systems. Likewise, the empowerment of front-line workers also demands that they be equipped with adequate decision-support technology in order to maximize their productivity and effectiveness.

The Paper Plague

Paper forms and manual systems are plagued with problems. Revising and distributing forms can be a challenge, as is making sure the reporting employee has the current form. If there's an urgent need to collect information on a new issue, there is no quick and easy way to notify the data gatherers and track compliance.

The biggest problem, however, is that in order for the collected information to be useful, it must be converted manually into digital data, often in the form of a spreadsheet or keyed into a plant control system. And, even then, the process is time-consuming and prone to errors. Predictably, the data conversion often never occurs, or by the time it is done, the information is no longer useful. Even when the process is semi-automated, typically the information is only available by means of batch computing, and the information is often no longer timely and actionable. Multiple electronic spreadsheets can become as cumbersome and unwieldy as paper forms.

Then, there is the problem of communicating timely, accurate data back to the front-line decision makers and providing them with the decision support tools they need. Some companies attempt to address this need by using their most experienced front-line managers as "resources" who help less experienced associates navigate through unfamiliar situations. That solution is inadequate because these workers need 24/7 access to updated critical information and the knowledge base related to operational issues and best practices.

The Mobile Electronic Information Age

The advance of wireless, mobile technology has enabled solutions that deliver the decision support tools that front-line workers need and eliminate paper-based manual systems for data collection and reporting. Three trends are converging to make this a reality:

- The advent of powerful, relatively inexpensive handheld computers and smart phones capable of broadband connection to the Internet.
- Movement toward standard operating systems for these mobile devices, such as Microsoft's Windows Mobile, Symbian, and Palm OS, which opens the door to application development by thousands of programmers

worldwide.
- Web-based applications which make easily usable dynamic forms accessible to as many workers as necessary, 24/7.

The growing acceptance and use of smart phones and handheld computers with broadband capability opens the door to a wide array of rich, dynamic content. A handheld computer can present the user with a dynamic form that can be filled in and electronically sent back to the home office upon completion.

Today's mobile technology can do much more for businesses than send and receive e-mail, simple text, and voice communications. The existing technology can combine in one package virtually all facets of gathering, analyzing, and reporting field data. In addition, it provides mobile workers with access to the decision-support reference material they need to employ best practices when they are confronted with problem conditions in the field. With this technology:

- A manager can organize users into multiple groups, assign roles, and control access to forms and collected content.
- A non-technical manager can create, revise, and publish forms as needed, with testing and version tracking.
- Reference photos, text, and diagrams that enable front line decision makers to take prompt and effective corrective action on the spot can be published.
- A manager can assign one-time and recurring data collection rounds, notify users, and have the software manage deadline reminders.
- Field workers can collect and submit data directly to a database program.
- Field workers can collect information incrementally as fits their routine and workflow.
- A manager can view the collected data in chart and graph forms or can output collected data in standard formats for integration into historians, controls systems, and other back-end systems.

And, most importantly, the data can be analyzed in real time, rather than waiting weeks for it.

Implications For Business And Beyond

The replacement of paper-based manual data collection systems will do much more than improve worker efficiency. This transformation could have a profound impact on how companies operate and expand, because they now will have access to more timely actionable data as never before. Instead of sitting around in file drawers or waiting for batch processing and getting stale, the collected data can be easily tabulated, reported, and analyzed in real time.

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