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# Maximizing the contributions of people in your processing plant

How to balance people and technology to optimize plant operations.

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Jul 7th, 2021





Shift-to-shift management is a vulnerable point in 24/7 plant operations. Information shared during the shift handovers represents a critical foundation for continuity. It serves as a running protocol of relevant events and conditions that together describe the state of manufacturing processes within a specific time period.

Courtesy of eschbach

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In its relentless march toward end-to-end automation, technology has continually upended the boundaries between man and machine in industrial enterprises. With recent advances in artificial intelligence (AI) supported by endless computing resources in the cloud, we must now ask ourselves: “How much longer will we need people directly involved in manufacturing?”

The fact is, we will always have people involved in process manufacturing plants. So perhaps the better approach is to look for ways to create an environment where we are able to balance the best attributes of people and technology to assure optimization of communication, safety and production. This article explores new roles within an organization and how technology, created to support critical human factors, will help people and machines collaborate to provide the breakthrough advances in productivity that society needs in the decades to come.

## The machine/human connection

As long ago as the 1950s, scientists were exploring the relationships between people

and its main aim is to provide a rational means of determining which system-level functions should be carried out by humans and which should be carried out by machines.

Research outlines six areas where people prevail. These areas include detection, perception, judgement, induction, improvisation and long-term memory. Conversely, machines excel at speed, power, computation, replication, simultaneous operations and short-term memory.

So, in looking toward technology investments, the focus should not be simply on replacing people with machines but rather how – using the positive attributes of both people and machines – there can be productive and symbiotic relationships.

## Highlighting the human factor

You may think that the massive reduction in the price of computer memory over time would mean that the results of functional allocation research no longer applies. However, many organizations have simply invested in data storage without considering how it will be accessed, understood and used in practice. Storing data only makes sense if it is relevant and actionable. This requires data that can be processed and appropriately visualized for people. It is very easy to overwhelm people with data and make things too complicated. Understanding human factors is essential to avoid these problems.

Human memory works differently than machine memory. While machines are very good at capturing and storing data, humans are able to remember perceptions, images and feelings. Thus, only people can draw on human attributes to create a better understanding from things that have been experienced or memorized from past experiences.

Reliability is another example. Machines are reliable only for certain defined situations for which they have been programmed – such as repeating the same set of actions on a production line. People, however, through their powers of perception, improvisation and detection, among other attributes, are reliable within and outside of the defined operational domain because they can continually adapt. Thus, the reliability of people and machines cannot be measured in the same way. Technology can only do what we

Perhaps the most relevant example of human adaptability has been the response to the upheaval caused by the COVID-19 pandemic. Business as usual required creative workarounds to keep manufacturing processes in motion while workers at almost all levels were working from home or managing processes with skeleton crews. In many ways, these adaptations have been successful because of the creativity and adaptability of people, not the machines.

As technology has evolved, particularly with automation in process manufacturing plants, systems have become more complex. As the price of storing data has declined and cloud-based systems have emerged, more and more information is available for data mining, but in general, the process industry has not invested the millions of dollars necessary to ensure that the data can be utilized effectively.

Managing and mining the data is a "people" activity. Thus the concept of replacing people with machines should not be the focus. Instead the emphasis should be on implementing technology that can be used effectively by people on the shop floor.

## The complexities and advantages of IoT

The Internet of Things (IoT) and the Industrial Internet of Things (IIoT) have delivered even more complexities as well as great advantages to process manufacturing. IIoT has brought together more components, delivered more data and connections, created situations where fewer people are needed to manage processes, and has hastened the speed to manage manufacturing processes. But with all these exponential — and ever growing — changes, the question still remains: How do we handle how people will work and thrive in this fast-changing environment?

## Designing for people — invest in human factors

If we want technology to work, we need to design it for people. By understanding the human factors, it is important to recognize the true relevance of people in a process manufacturing environment.

Processes are run by many people at different levels and different sites within an organization. There is not one person who knows everything. There are — at the

supervisors who, in turn, may be reporting into the corporate structure. All of these people and teams are using technology in some way to do their jobs. Deployed technology that is designed to help people and teams work together more collaboratively and thus, effectively, will be far more successful than technology that is complex, difficult to use and requires people to adapt their behaviors to use it.

For example, people have a good memory when it comes to experiences, perceptions and emotions, but they are not so reliable when processing data when compared to a machine. In a 12-hour shift, how much data is retained or forgotten during that shift? On a good day, a high proportion of data generated may be retained. On a stressful shift, it may be only half. Transfer of data to the next team will be directly affected by this, especially when errors and omissions of communication are factored in.

People are always a bit imprecise. Relying on people to remember all information and to communicate it reliably either verbally or via written documents will always be problematic. Inaccurate communication can result in many different problems, including safety issues.

Recognizing the issues caused by imprecise transfer of information leads to a need to provide easy-to-use technology to support people to overcome their natural limitations. However, there will be much greater benefits if the technology does more than just handle data. It must enhance the natural human capabilities by allowing insights created during the shift to be transferred to the next shift so that the incoming shift gets a better understanding of what is happening and can act on it more quickly and effectively. Collaboration, via technology, among the shift teams creates a higher level of efficiency, quality and safety.

Successful process manufacturing enterprises will embrace an approach that elevates the attributes of both people and technology to help the human-machine network work together in a more collaborative way.

Courtesy of eschbach

## A high-quality digital shift handover process

Shift-to-shift management is a vulnerable point in 24/7 plant operations. Information shared during the shift handovers represents a critical foundation for continuity. It serves as a running protocol of relevant events and conditions that together describe the state of manufacturing processes within a specific time period. To align all these sources, technology in the form of a digital shift management solution, allows

## Embrace technology and support human factors

Technology will not replace people. Our aim should be to use technology to enable people to use their natural capabilities and increase their performance. Successful process manufacturing enterprises will embrace an approach that elevates the attributes of both people and technology to help the human-machine network work together in a more collaborative way. This will ensure more transparency, reliability and visibility across all plant functions to help teams better communicate and optimize outcomes. People-centric technology, in other words, technology that has been designed with people in mind, enables organizational teams to improve productivity, cost efficiencies, quality and safety.

*Andreas Eschbach is the founder and CEO of the software company [eschbach](#), which helps production teams stay safe and work smarter through better information sharing and collaboration. Holding a degree in computer science, he draws his practical experience from leading a variety of international software consulting, and implementation projects for leading chemical manufacturing companies, focusing on production, continuous improvement, EHS, and maintenance. His company is a provider of manufacturing solutions and headquartered in southern Germany with offices in Boston, Massachusetts.*

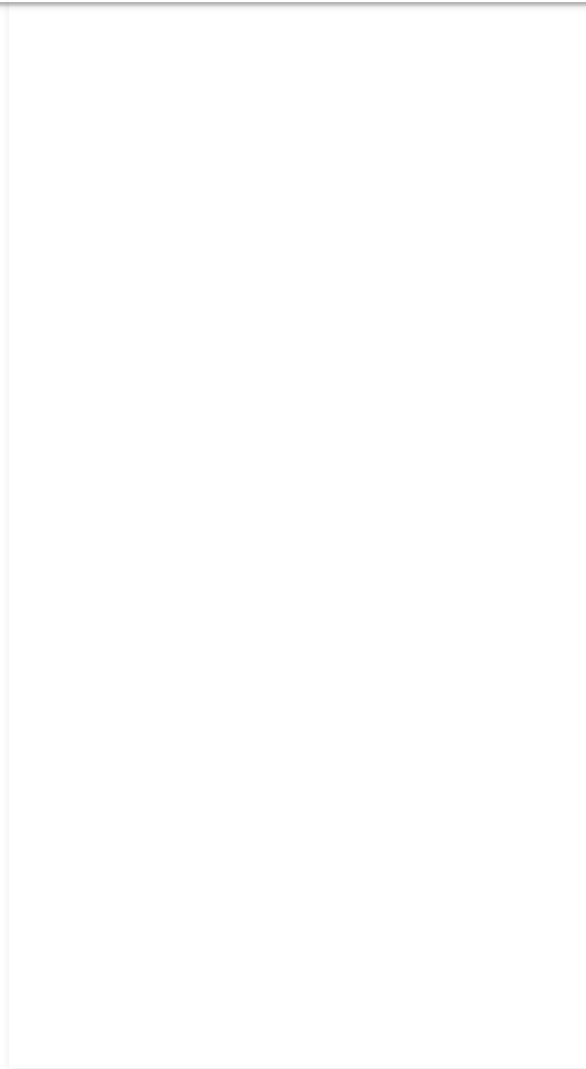
*Andy Brazier is a risk consultant specializing in human factors and process safety. He has a chemical engineering degree, PhD and vast consultancy experience. He has worked as a consultant since 1996.*

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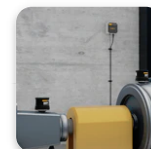


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Dynamic measurements provide a more accurate understanding of caking than can be gathered with simple methods. Such knowledge can be used to develop cost-effective solutions for powder storage and management.

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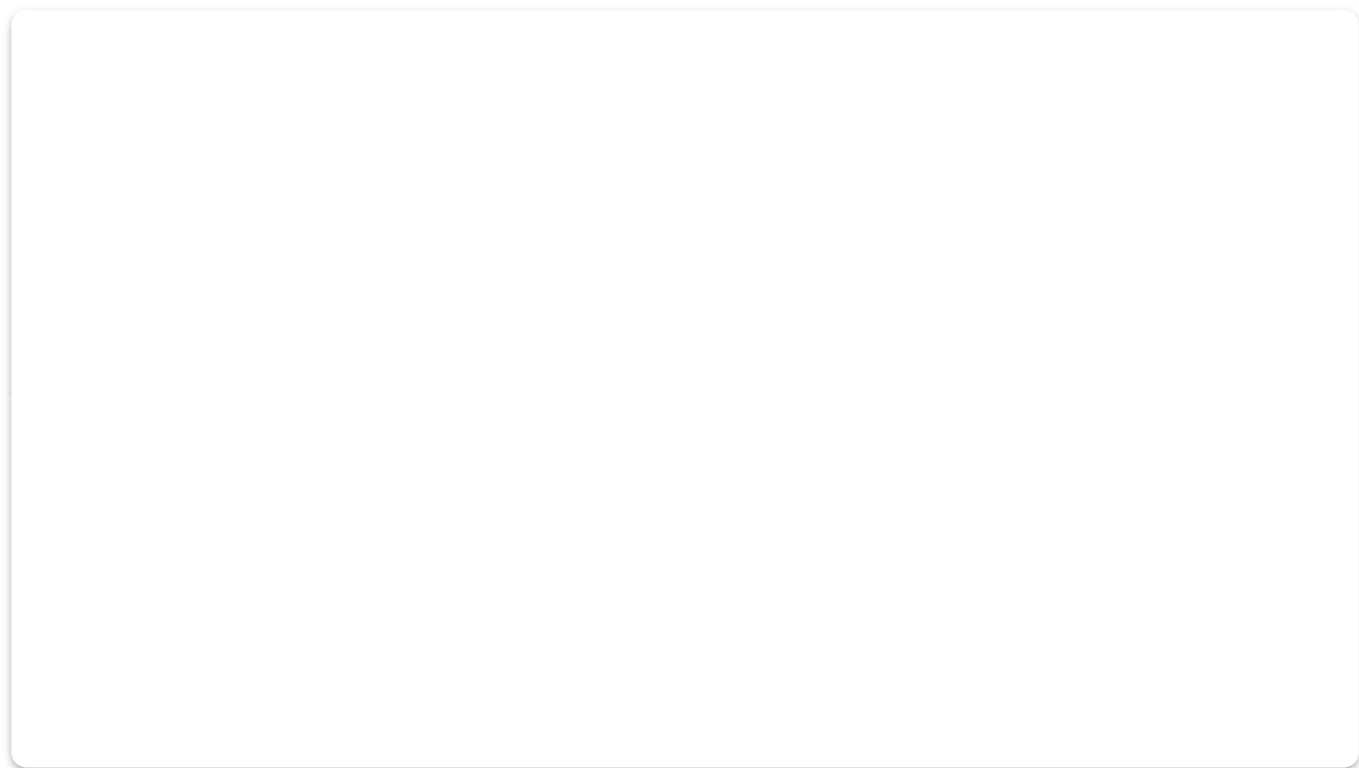
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## PMMI Expo Las Vegas to reunite the packaging and processing industries this September

Show producer PMMI, The Association for Packaging and Processing Technologies, will reunite the packaging and processing community with over 1,500 exhibitors, targeted, world-class education and countless networking opportunities.

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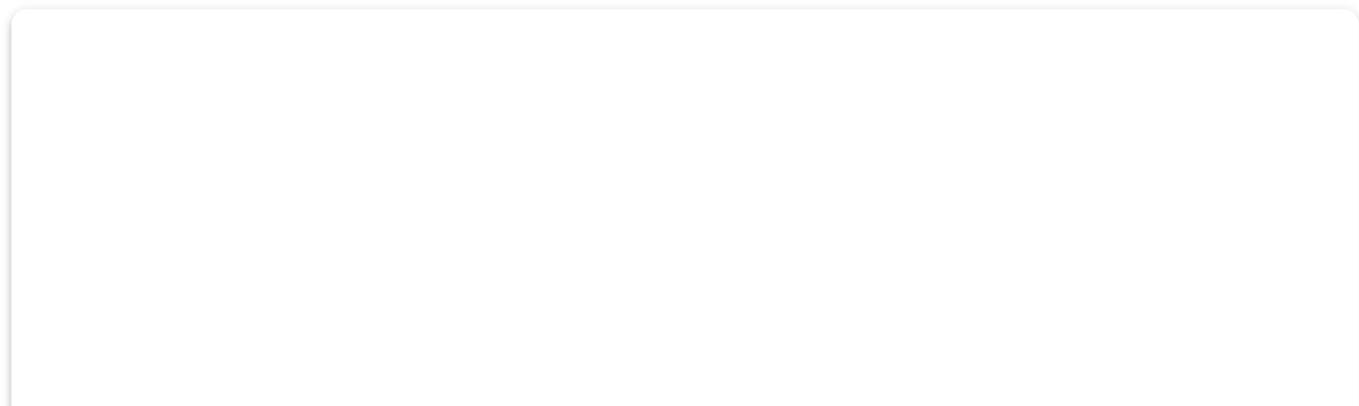
### News & Notes

#### ACC: Global chemicals output regains momentum

After two months of declines, global chemicals production gained 0.4% in May, according to data collected and tabulated by the American Chemistry Council.

[American Chemistry Council](#)

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DCS

## Modernizing aging automation systems with minimal process interruption

To streamline operations, Corbion embarked on a controlled, planned upgrade of its DCS and network infrastructure to minimize downtime and take advantage of enhanced automation features.

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## Industry Brief: Blue-White's Rob Gledhill highlights new products, shares customer success story

Company president discusses Blue-White's latest product offerings and shares a customer application story in this Industry Brief video.

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### SOCMA launches Chemical Operations Training Tool 3.0

"SOCMA is thrilled to introduce the Chemical Operations Training Tool 3.0, with increased functionalities and added elements to ensure operators are better educated and understand the chemical operations work environment," said SOCMA's Joe Dettinger.

[Society of Chemical Manufacturers and Affiliates \(SOCMA\)](#)

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### ACC: Chemical Activity Barometer rises in June

"In summary, the latest CAB reading is consistent with expansion of commerce, trade and industry," said Kevin Swift, chief economist at the American Chemistry Council.

[American Chemistry Council](#)

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Process Control & Automation

## Digital tools help batch manufacturers produce new and established products

An integrated, standards-based batch support system shortens product development times and improves overall quality.

[Kazue Sato](#)

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Asset Management

## Transitioning to Pharma 4.0 with advanced analytics

By understanding how to increase effectiveness, reliability and output while maintaining quality — with advanced analytics — pharmaceutical manufacturers will hold a sustainable competitive advantage while protecting their bottom line.

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Mixing, Blending & Size Reduction

## Promoting and preventing agglomeration in the mixing process

The ability to manipulate and control granule formation, be it in fostering it or discouraging it, is an essential skill for mixer operators in the bulk solids processing space.

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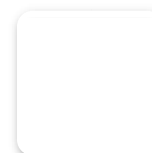
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## PSG acquires Quantex Arc Ltd., a supplier of innovative single-use precision pumping technology

The addition of Quantex further expands PSG's reach into biopharma and other hygienic applications.

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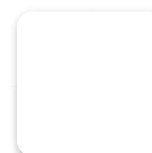
News & Notes

## ACC: US chemical production trend improves in May

The U.S. Chemical Production Regional Index rose 4.6% in May following a 1.2% decline in April and a 3.4% drop in March, according to the American Chemistry Council.

[American Chemistry Council](#)

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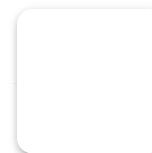
Conveyors

## Fast and thorough 'wet cleaning' of food conveyors ensures food safety

A sanitizing wet clean flushes enclosed systems to improve food safety and increase the speed of product changeovers without conveyor disassembly.

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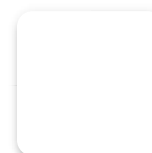
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## Meatballs on the menu in PROCESS EXPO production lines

PROCESS EXPO announces that the 2021 edition show floor will feature live demonstrations of a meatball production line using actual protein product in the formulation.

[Food Processing Suppliers Association](#)

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