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**How Technological
Advances Are Changing
the Manufacturing Industry**

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**Lean plays a part in you
getting your cookies!**

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Happy Spring. We're very much looking forward to putting the snowblowers and shovels back in hiding for a spell. Looking forward to the warmth and colors of trees and surrounding vegetation returning. Though the winter was relatively mild, it was more than long enough.

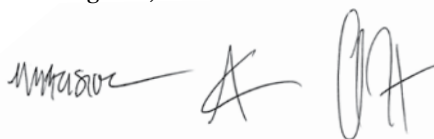
This issue of the Gateway see's our quarterly columnist, Paul Critchley, manifesting a dialogue that showcases the principles of lean manufacturing in the organization and distribution of his daughter's Girl Scout cookie order(s). It's a very fun piece and the metaphor is sound. Check it out. A nice lighthearted piece to get Q2 rolling.

Here's a taste:

"As the father of two young girls, husband to our troop's "Cookie mom" (and pickup truck owner), I had the privilege of going to the central pickup location to pick up all of the cases of cookies our troop had sold over the past several weeks. Having partaken in previous Girl Scout-related activities, I honestly wasn't expecting a smooth transaction (ask me about waiting in line for two hours to buy hot dogs at a Jamboree in 90-degree weather!). Braced for the worst, I reluctantly agreed. After going through the exercise, and as a Lean guy, I must admit that I was thoroughly impressed!"

The second feature is entitled, "How Technological Advances Are Changing the Manufacturing Industry," and is a quick overview of the recent wave of technological advances that are moving our industry forward. It was fun to research and write, and we're sure there are pieces of it incorporated into your operative processes. Let us know which ones. Let your customers know which ones. We'd love to showcase your story and place the spotlight on what services and value you provide your industry peers and end-user customer base.

Kind regards,



THE Gateway MAGAZINE

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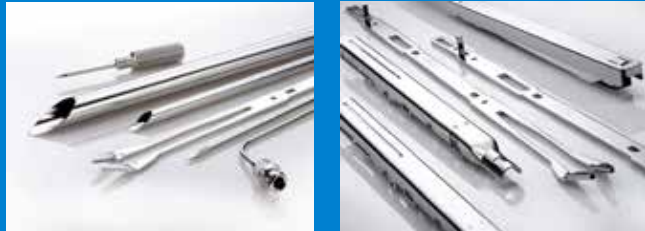
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HOW TECHNOLOGICAL ADVANCES ARE CHANGING THE MANUFACTURING INDUSTRY

Technology continues to revolutionize the manufacturing industry, bringing new levels of efficiency, productivity, and competitiveness. The integration of automation, 3D printing, augmented reality (AR) and virtual reality (VR), the Internet of Things (IoT), and blockchain is transforming the way products are designed, produced, and shipped. Let's explore each of these technological advancements and their impact on the manufacturing industry.



Automation

Automation has been one of the most significant technological advances in manufacturing. Automated machines have improved efficiency and productivity, allowing manufacturers to produce products faster and with greater precision. These machines can perform tasks that were previously done by humans, resulting in fewer errors and increased consistency. Additionally, automation has made manufacturing jobs safer by removing the need for workers to perform dangerous tasks.

For example, automotive companies are increasingly using robotic machines to assemble cars. These machines can perform tasks such as:

- Cutting
- Painting
- Forming
- Screwing
- Assembling
- and More
- Welding

This results in faster production times and bolstered quality with fewer defects due to human variables. Manufacturers are also using artificial intelligence (AI) to optimize processes and reduce costs. AI-powered machines can analyze data to identify and fix inefficiencies in production.



3D Printing

3D printing, also known as additive manufacturing, has transformed the manufacturing industry by allowing manufacturers to produce complex parts and components easily. Unlike traditional manufacturing, which involves subtracting material from a larger block, 3D printing builds objects by adding layers of material on top of each other. This process allows manufacturers to create complex shapes and designs that would be difficult or impossible to achieve with traditional manufacturing methods.

For example, medical device companies are using 3D printing to create customized prosthetics and implants that fit individual patients perfectly. Aerospace manufacturers are using 3D printing to reduce the weight of aircraft by creating parts with intricate designs that can only be produced with additive manufacturing.

Benefits of 3D printing include:

- Prototype and tooling production on-demand, leading to faster turnaround times on parts and projects.
- Reduced costs for producing custom or low-volume parts by eliminating tooling costs and reducing the amount of material waste.
- Offers a wider range of design freedom and flexibility, leading to quicker design iterations and changes.
- Increases efficiency by allowing the manufacturer to print complex parts all at once instead of producing each part individually.
- Provides the ability to print parts using various materials, including metals, plastics, and even composites.

3D printing provides job shops a new and innovative way to meet the demands of their customers without the need for costly tooling and reducing lead times. It also provides an opportunity to create more efficient and higher-quality parts than before.



Augmented Reality (AR) and Virtual Reality (VR)

AR and VR have enormous potential in the manufacturing industry by allowing workers and engineers to visualize products and processes in a virtual environment. AR and VR can help workers reduce errors in manufacturing by providing them with a visual guide to follow. Additionally, AR and VR can help engineers and designers collaborate more effectively by allowing multiple team members to view and manipulate a design simultaneously.

Manufacturers are using AR and VR to create virtual prototypes to test before building physical prototypes.

Benefits of Augmented Reality (AR):

- Improved quality control by providing real-time information and feedback to workers.
- Provides more efficient training for a new workforce.
- Faster production and assembly times by providing real-time information on the assembly process.
- Increased safety by providing real-time information to workers, reducing errors and accidents.

- Facilitates the visualization of the end product in the design phase, allowing the manufacturer to make changes before the production of the actual product.

Benefits of Virtual Reality (VR):

- Improved product design by allowing manufacturers to view product designs in a virtual environment.
- Provides a platform for engineers and designers to collaborate in real time.
- Reduced cost because manufacturers can test product designs before creating physical prototypes.
- Provides a faster way to train workers by allowing them to train in virtual environments and situations.
- Allows for observation and optimization of the manufacturing process.

Overall, AR and VR are revolutionizing the manufacturing industry by providing manufacturers with new and innovative ways to become more efficient in the design, production, and assembly of products as well as the training of the workforce.

The Internet of Things (IoT)

The Internet of Things (IoT) is having a significant impact on the manufacturing industry. IoT refers to the interconnectivity of devices, machines and systems using the internet, which allows them to communicate and exchange data. In the manufacturing industry, IoT is being used to improve efficiency, productivity, and quality control.

One of the main advantages of IoT in manufacturing is the ability to gather real-time data from machines and equipment. This data can be used to monitor the performance of machines and equipment, identify potential issues, and predict when maintenance is required. This leads to preventative maintenance and reduces the likelihood of unplanned downtime, which can be costly to businesses.

IoT is also being used to optimize supply chain management. By giving manufacturers better visibility into their supply chain, IoT can help them identify inefficiencies, improve planning and forecasting, and reduce waste. This leads to more efficient supply chains and reduced costs.

IoT can also help manufacturers improve quality control. By using sensors and tracking devices to monitor products from production through to delivery, manufacturers can ensure that products are of high quality and meet customer requirements. This can lead to increased customer satisfaction and better business performance.

Overall, IoT is revolutionizing the manufacturing industry by providing manufacturers with new ways to collect and use data. By improving efficiency, supply chain management, and quality control, IoT is helping manufacturers stay competitive in a rapidly changing industry.

Artificial Intelligence in Manufacturing

Artificial Intelligence refers to the use of computer algorithms to perform tasks that were previously done by humans. In the manufacturing industry, AI has been used to improve efficiency and reduce the



occurrence of defects. AI is also used to optimize supply chains and improve forecasting.

The advantages of AI in manufacturing are numerous. AI improves efficiency by optimizing production processes and reducing downtime. According to a report by McKinsey, AI can reduce equipment downtime by up to 50%. AI also reduces defects by identifying potential issues before they become a problem. A study by Genpact found that AI can reduce defects by up to 80%.

Examples of AI in manufacturing can be found in various industries. Today, AI is used in industries like aerospace, automotive, and healthcare.

Blockchain

Blockchain is a distributed database that records transactions and is resistant to modification. Blockchain has the potential to revolutionize the manufacturing industry by eliminating the need for intermediaries and creating a secure and transparent supply chain. Blockchain can help manufacturers track products from raw materials to finished goods, reducing the risk of counterfeiting and fraud.

For example, blockchain can be used to authenticate luxury goods, ensuring they are genuine and not counterfeit. Similarly, blockchain can be used to track the origin of food products, reducing the risk of foodborne illness.

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Challenges and Opportunities of Technological Advances in Manufacturing

While technological advances in manufacturing present many opportunities, they also pose challenges. One challenge is the cost of implementing new technology. Many businesses are hesitant to invest in new technology due to the high upfront costs.

Another challenge is the disruption that new technology can cause. The introduction of new technology can lead to job loss, as machines replace humans in production processes. This can have a negative impact on the community, leading to resentment and resistance to change.

Despite these challenges, technological advances in manufacturing present many opportunities. New technology can increase efficiency, reduce costs, and improve the quality of products. It can also lead to new jobs and industries, such as the growing field of robotics.

In Conclusion

Technological advances are changing the manufacturing industry in unprecedented ways, creating new opportunities for businesses to compete in the global marketplace. From automation and 3D printing to augmented reality and blockchain, manufacturers are embracing these innovations to streamline their operations, reduce costs, and improve product quality. The future of manufacturing is likely to be a combination of these technologies, creating a more efficient and productive industry. The companies that embrace these advancements and integrate them into their operations will be the ones that thrive in the years ahead.

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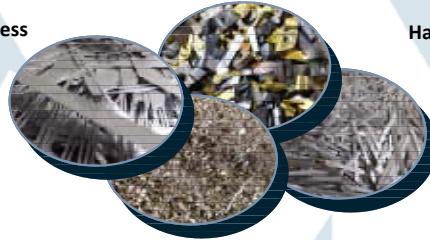
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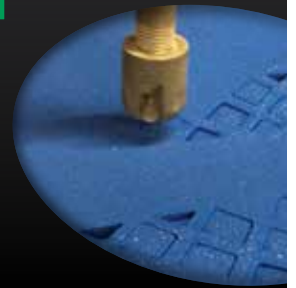
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LEAN PLAYS A PART IN YOU GETTING YOUR COOKIES!



Written by: Paul Critchley

Over the last month or so, you've probably noticed the little boxes of happiness popping up all through your office. Purple, red, orange, and brown...I speak, of course, about Girl Scout cookies. Those once-a-year packages of goodness that many folks look forward to receiving after having ordered them months ago.

As the father of two young girls, husband to our troop's "Cookie mom" (and pickup truck owner), I had the privilege of going to the central pickup location to pick up all of the cases of cookies our troop had sold over the past several weeks. Having partaken in previous Girl Scout-related activities, I honestly wasn't expecting a smooth transaction (ask me about waiting in line for two hours to buy hot dogs at a Jamboree in 90-degree weather!). Braced for the worst, I reluctantly agreed. After going through the exercise, and as a Lean guy, I must admit that I was thoroughly impressed!

The pickup location was a large parking lot at a local business, where several semi-trailers had been strategically parked the night before. Upon arrival, we were directed toward a woman who checked us in. After exchanging pleasantries, she asked us for our troop number and upon providing it, she quickly found our Cookie Summary Sheet (something I'd never known existed!). She confirmed the numbers with us, and with a couple of small pieces of tape turned my truck into a rolling visual control. I'll divert here just for moment: I'm very particular about my vehicles – I don't let anyone else work on them or drive them. I'm the guy who always park well away from other cars in parking lots to avoid inadvertent door dings. Imagine my anxiety when I realized that tape (tape!) would be applied to it.

I had visions of them using duct tape, applied right on to my paint, and the hours I'd have to spend in the garage with my heat gun to get it off without pulling the topcoat along with it. I was relieved to see that the tape was in fact low-adhesion painter's tape, and the woman who applied it always did so to car windows – never to the paint. It was obvious she'd been trained on what to use and how to use it. Crisis averted!

After being affixed with our new adornment, we entered the moving line of trucks and minivans who were being loaded up with cookies. Each cookie flavor had its own, well-staffed station, and the line moved quickly and safely as each vehicle stopped at each station to get loaded with its allotment.

Likewise, as each vehicle moved through the line and was loaded with individual cookie flavors, the Summary Sheet was marked off, indicating that that part of the order had been filled. As each portion of the order was loaded, it was double checked by each troop's representative to ensure that we'd received the exact number of boxes we'd ordered. Admittedly, this is technically non-value added since it's a quality inspection, but it's also well worth the few seconds it took to ensure that the numbers were right. No one wants to get shorted their shortbread! (See what I did there?)

Once all the cookies had been loaded, a final sign off from the troop rep (my lovely wife) certified that we'd gotten what we'd come for, and we were on our way. Total time elapsed: 23 minutes. Total cases loaded: 66. Not bad!

Overall, it was a simple system, which all truly great systems are. The parking lot was setup with plenty of room to maneuver – but not too much so as to cause confusion about what was next or create traffic jams as people wondered if they were supposed to be in two lanes or one...

I personally very much appreciated the easy-to-follow-and-understand Summary Sheet. Not only was it color-matched to the colors of the individual boxes of cookies, but the numbers were large, making them easy-to-read. No doubt this cut down on mistakes and cycle time, too.

It was nice to see an organization not necessarily known for Lean to be employing many of its tools. What could have been a painful experience was actually enjoyable to be a part of, as odd as that may sound. For me, that's some of the best part of Lean. When a process is well-thought out and executed per the plan, it's borderline artwork. It makes the entire experience – for everyone involved – that much better. Workers don't have to worry about bad information, finding someone "who knows what's going on" or figuring out what's right and what's wrong. Similarly, we folks who were doing pickup were treated to a very good customer experience – low stress, clear directions, and a fast turnaround time.

About the only thing I will criticize a bit is the name they chose for the new cookie. "S'mores" were recently introduced, and despite being a natural fit with the motif

of a scouting organization, the name conflicts with the long-standing cookie champ, the Samoa. Given how close the two names are, the troop leaders cautioned the girls to make sure they were logging the correct cookie when they were taking orders. Even despite this added instruction – a few orders were entered incorrectly due to miscommunication and misunderstanding. Given that this is a one-a-year event, it's easy to understand how some folks would get confused about what they really want, especially for folks who aren't looking right at the pictures when they're ordering...

So, as you munch down on your Thin Mints and Tagalongs, give a small hat-tip to Lean for getting them to you efficiently! Happy Spring!

About Paul Critchley

Paul Critchley is a recognized thought leader on employee engagement and continuous improvement and has helped businesses around the world achieve greater levels of success through the application of Lean techniques. A frequent speaker, he has keynoted at numerous corporate events, as well as at international conventions such as AME's annual Lean conference and at OpEx Week. He's also the host of "The New England Lean Podcast," a weekly show that focuses on Lean leadership and New England-based businesses.

Paul is a former Board Member of the Northeast Region of AME, holds a B.S. in Mechanical Engineering, a M.S. degree in Management and a M.S. in Organizational Leadership.

He is passionate about Lean and creating organizational cultures that are sustainably engaged. He co-authored his first book - *The Whole Professional, A Collection of Essays to Help You Achieve a Full and Satisfying Life* to bring a fresh perspective on Work/Life Balance and how individuals and organizations can work together to achieve greater levels of attainment.

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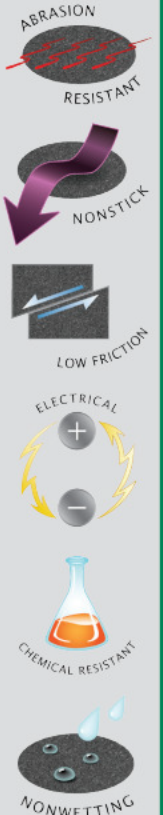
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The company has been a long time NADCAP certified company and is proud to announce another successful completion of a NADCAP re-certification audit. This standard indicates that accredited shops follow documented guidelines on how the parts are processed. The result is a consistently plated part. For the commercial industry, F.M. Callahan is also ISO: 2000 certified, but more and more companies are requiring NADCAP registration.

NADCAP is a special process certification for aerospace primes to call on for chemical processing of their hardware. NADCAP stands for National Aerospace and Defense Contractors Accreditation Program.

The company's motto is "Where The Finish Comes First". This is an organization of specialists skilled in all phases of industrial plating. The company has combined ability, service, and quality to produce plating on sizes from microscopic pin-point to gigantic two-ton pieces. Close co-operation between departments (developing, plating, maintenance, inspection, and the front office) means superior workmanship for you....the customer.



For more information about F.M. Callahan & Son and the services they provide, contact them at 22 Sharon Street, Malden, MA 02148. Tel: 781-324-5101, Fax: 781-324-1674, e-mail: ejacklin@fmcallahan.com, or visit the company web site at: www.fmcallahan.com.

CAPCO CRANE UPDATES THEIR INSTAGRAM ACCOUNT

Capco Crane and Hoist Inc. is pleased to announce the upgrading of their popular social media program on the Instagram business account. The usage of this popular and ever-growing social media platform will allow them to connect with the core desktop and mobile-ready end-users in the crane and hoist market.

Their INSTAGRAM LINK IS:
<https://www.instagram.com/capcocraneandhoist/>

Capco's VP of Marketing and Sales, David Caputo noted that he has been thrilled with the Instagram account as it allows the company to showcase innovative material handling projects and Capco Crane engineered solutions to some very compelling lifting and handling problems.

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“We have completed a large variety of crane and hoist projects throughout the years, and this will now be showcased on a daily or weekly basis.”

Expect many more of these great pictures of some amazing (and intricate) Capco projects as they continue to build and install cranes and solve material handling problems for every type of industry throughout the USA and beyond! Just search for: capcocraneandhoist



For more information about Capco's facilities and services contact David Caputo (Sales Manager) at 58 Forest Ridge Drive, Rowley, MA 01969, toll-free at 800-422-7261, fax at 978-948-2294, or visit our contact page

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Tandem draws from some of the most recognizable manufacturer names in their respective industries such as Daubert Cromwell (VCI papers & films), Static Solutions, Conductive Containers, Phoenix/Benchline

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For more information; please visit the Tandem ESD Sales Inc. expansive WEBSITE, www.tandem-esd.net, which details many of their services and product lines. Contact Tandem at 800.696.9169/978-927-8745 or email at tandem-esd@verizon.net to learn more about how they can provide you with complete industrial packaging solutions—regardless of whether you require conventional materials or customized static protective packaging, whatever it might take to satisfy your company's shipping and handling requirements. Complete satisfaction is our goal!

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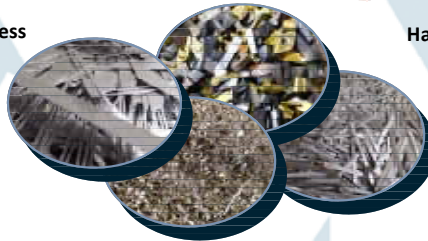
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