



Credit: ptrtoolsandplastics

Is US Based Manufacturing The Key To Surviving 2020 and Beyond?

Having worked in manufacturing automation for much of my career I am a keen observer of the global trends in the manufacturing supply chain. Even before the global pandemic struck this year, changing the dynamics of the global marketplace, the US was already facing a bitter trade war with China, which is only set to worsen as both sides ramp up the rhetoric and subsequent actions.

There is a growing concern that manufacturing in the USA will suffer greatly due to the combined effects of the trade war and the pandemic. In a survey conducted by Thomas in February of 2020 over 60% of US companies were already experiencing some impact due to supply chain disruptions as COVID-19 had impacted China before anywhere else. I bet, this number far exceeds 60% now. As the pandemic has dragged on in the US and elsewhere, the supply chain disruptions have been unimaginable. When shopping online during this shelter-in-place I was personally faced with delivery windows that ranged in the weeks to months. So much for two-day delivery!

As the situation worsened, many companies were looking to mitigate the situation, some by looking for alternate suppliers or even delaying taking orders or shutting down operations. Post-shutdown, when automotive companies re-opened production they were faced to slow production down or delay openings due to supply shortages.

Should US manufacturer's be looking to move manufacturing or even the final assembly to the US shores? Or to Mexico? There are pros and cons to both on-shoring and near-shoring. The answer is not going to be one-solution that fits all US companies. Depending on the industry, the existing infrastructure, the economic value, and other considerations, a company may choose near-shoring or to bring operations into the US (on-shoring). For

example, since there are already existing automotive manufacturing infrastructure in Mexico it might make sense to expand in Mexico if you are in the automotive sector.

A recent article from MHLNews said the savings by moving from China to another South Asian country is not that much when compared to moving operations to Mexico (a mere 1% differential). That outweighs the time to market considerations given the proximity to the market. However, with unemployment on the rise in the US there is likely an argument to be made for on-shoring as a viable alternative.

The debate on on-shoring vs near-shoring vs off-shoring, is decades old. And always had pundits in each camp. The pandemic, one of those black swan events, has acted as an accelerator, moving this from an casual (or politically charged) debate to one that has spurred action across multiple industries.

We mustn't forget that China is the world's second largest economy, and despite rising labor costs that are still significantly lower than those in the USA and Europe, there is a growing middle class, and the long term manufacturing costs will rise to the level of hampering the economic viability of importing raw materials and sub assemblies into the US.

As a growing industrial economy however, we must also learn from the manufacturing methodologies that China has developed over the last 50 years - levels of engineering and automation that are far superior to the aging manufacturing plants that have existed in the US for longer than most readers of this article have been alive.

We need to adopt newer methodology and upgrade our manufacturing operations to automated facilities that are independent of the foibles of what it means to be human.

In the next segment of this three part series, I will explore factory automation and how it can help with this shift to on-shoring or near-shoring.

I welcome your thoughts and inputs on the ideas discussed here.



Credit: Flickr

Factory Automation: Why It Is Absolutely Crucial For Success

In the previous segment, I presented the argument for moving manufacturing / supply chain closer to the largest market - right here in the North America. Convergence of two recent events is resulting in many companies looking to move back their supply chains - to the US or close by to Mexico. Meanwhile, the Canadian company Communitech is investing 100's of thousands of dollars to lure immigrant work force away from the US with a promise of 10 day turn around for H-1B Visas.

Today I want to address the need for leveraging automation in your facilities to help maximize the long term value of this shift to near-shoring operations. Automation is not the Holy Grail to address all the challenges a company or operation may encounter. However, with advancements in technology, and availability of products and services, not availing of automation in your facility is setting up for failure. The advantages of automation is more than meets the eye however. Here are some arguments on why automation is good for you:

Labor: Two challenges with labor today. Availability and Inversion. The labor challenges manifest differently in different parts of the world. The impacts are varying as well. To reduce impact of labor availability on your operations companies must consider automation. Especially in workflows that are repetitive and low value add to the product - such as moving materials to and from work cells, or moving semi-finished or finished products to and from dock to storage and on to further processing, as the situation may warrant. Furthermore, using automation to move materials frees humans from carrying out repetitive, dirty or dangerous jobs allowing them to work on value added tasks.

Velocity: There has never been a bigger need to manage velocity through the supply chain. Already in a state of change due to the Amazon effect, the pandemic has dramatically shifted consumer buying patterns resulting in explosion of eCommerce and the resulting effect on the supply chain especially in sort/pick/pack operations. For example, moving materials (goods) to humans to be picked and packed will reduce the amount of walking done by operators inside large warehouses.

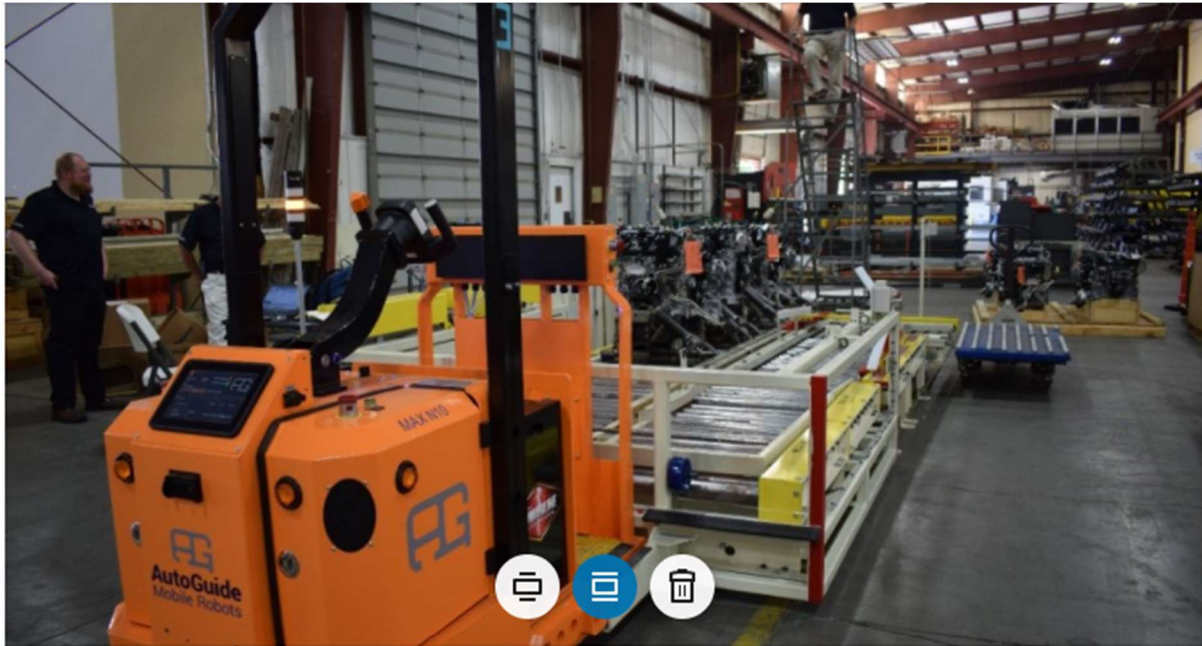
Quality: Automated processes perform the tasks continuously, consistently, and improve quality by eliminating errors commonly caused by fatigue or some other form of sub-optimal performance. By adding cameras, vision systems, and other forms of sensors to the automation cells (including robots) enhances capabilities to carry out highly exacting quality inspections and measurements, ensuring the quality of the process and the product. With automation there is definitely a magnitude improvement in quality. We see robots, automated & autonomous mobile robots (AGV/AMR), and other forms of automation delivering quality in a timely and cost efficient manner.

Safety: When using human powered vehicles (such as fork lifts, pallet jacks, tuggers, etc.) to move materials in a factory or warehouse we are often faced with safety incidents I recently visited a facility where they had 125 human powered vehicles of six different form factors zipping along, criss-crossing aisles and travel paths. This is not unique to this one facility or to this operation. This is a common across the industry. Automation which includes AMRs, controls, and factory side integration helps reduce safety incidents as the different components of the automated solution is inter-connected and communicates in real time - unlikely humans operating independent machinery.

Predictability: With advancement in machine learning and artificial intelligence (ML/AI) advanced algorithms and data visualization can provide predictive intelligence to ensure smooth, consistent, and repeatable operations in a 7x24 scenario. We now the ability for data to be seamlessly collected and aggregated for both real-time and post event analysis. A multitude of sensors and actuators allow for continual troubleshooting, as well as collecting self diagnostic data for maintenance and continuous improvement purposes. Asset utilization can improve dramatically with reduced downtime due to maintenance, spare parts shortage, or raw material shortage. Lights out operation is becoming more a reality due to advancements in automation and technology.

All of this allows for better deployment of people in jobs that cannot be carried out by machines alone. In today's agile production environment there is a need to be able to balance human and non-human operation, providing the capability to speed up or slow down parts of the process in order to meet specific demand cycles. Modern safety features built into robots, AMRs and conveyance systems allow for collaborative operation that provides a safer workplace.

All of this automation comes at a price however, and requires major capital investment from companies. In the next segment of this three part series, I will look more closely at what it means to fully embrace an automated workplace.



Credit: Heartland Automation

Meet AMR - The Factory Worker That Never Gets Tired Or Sick

In the final part of this three part article I want to bring the discussion to a conclusion by discussing Autonomous Mobile Robots (AMR) and it's role in the future of material transfer.

AMRs have been around for many years and in spite of wishing for mass adoption by the product companies it has been slower to pick up. There are many reasons and opinions on why that is the case but the future is looking brighter.

I made the case in the 1st and 2nd segment of this article on why companies should look to bring their supply chains closer to their market. And the need for automation. The cost of automation appears higher in the short term compared to the alternative however, a well designed and planned automation solution will provide a payback in under 2 years and will continue to do well beyond.

In this segment I call upon manufacturing facilities, distribution centers, warehouses, and other operations that rely heavily on humans to perform repetitive material transfer tasks to give AMRs a serious consideration. By leveraging AMRs to perform the dull, dirty, and dangerous job of moving materials, companies have the opportunity to re-deploy labor to other value added jobs, at the same improving velocity, predictability, and reducing safety incidents. There is the added benefit that AMRs have 24/7 availability and never require breaks or get sick. Whilst some may find it unfair that I am advocating putting people out of work, what I am actually promoting is better use of a person's time in providing capabilities that are not simply repetitive or mundane. Replacing a work function with an AMR is a one time investment, and the long run the tangible and intangible benefits delivered by the AMR based solution for material transfer far outweigh the initial cost outlays.

A recent case study involving Autonomous Mobile Robots (AMRs) for transporting finished pallets to stretch wrappers in a large food packaging manufacturer had dramatic results. The project involved replacing human operated fork lift trucks with autonomous pallet stacker vehicles. The results were dramatic in reduction of wasted hours, efficiencies gained, and cost reductions by automating a traditional manual process. However, there was also the hidden benefit of not having to continually re-train the AMRs to do the job. It turned out there was a significant staff turnover rate when it came to fork lift truck operators, and the cost of continually hiring and training new personnel on a quarterly basis had a major impact on lost working hours and downtime due to longer waiting periods between operations.

What of the humans though? Well, in the above example the operators quit on their own because the job was not what they thought it was, they got bored, or they were offered something less challenging than driving a forklift. Re-training and re-deployment of current employees becomes a higher priority for companies as they invest more in automation. At the same time, it becomes a private-public enterprise opportunity to invest in retraining the labor pool that is becoming available so they can be ready for the future tasks in robotics and automation.

The technology stack on the AMRs have improved significantly in the past few years and the interoperability stack between platforms are getting better. It is not where it needs to be but there are efforts underway to get there fueled by end-customers demanding the different AMR and robot technology they have implemented get easier to manage and operate within their facility. More on this in an article that will be published soon.

A key advantage of an AMR over an AGV (automated guided vehicle) is the ability to incorporate AMRs into existing facilities and workflows with minimal infrastructure changes. An AMR based material transfer solution offers the flexibility and scale needed to grow with the operations and adapt to changing business and operational needs of an organization.

AMRs come in different form factors and provide a myriad of functions to support different use cases. The integration capabilities are getting better and smarter providing factory side integration to custom conveyance and stand-based material transfer. From trailer unloading, to moving pallets or custom containers to storage, moving goods to people, end-of-line processing solutions, to replenishing work-cells, or pick-cells.....there is an AMR that is right for your operation.

In a future article I will explore the question on investment. No doubt the investment required in replacing repetitive labor intensive tasks with automated systems could be a massive capital investment, but I can assure you if planned correctly, and done right, the program will show return on investment in 2 to 3 years.

I welcome your thoughts of course and would love to connect to discuss your operational requirements and find the right AMR solution for you. You can reach me by commenting below.