

Why Would I Want A Mobile Automated Vehicle?



- **Mission:** To promote the market awareness, growth, and effective use of driverless industrial vehicle systems (e.g. AGVs, AMRs, and AGCs)
- **Vision:** To be the trusted, independent authority on driverless industrial vehicle systems
- **Members:** To meet the current members of the Mobile Automation Group, [click here](#).





Online Training Module 3: Why Would I Want A Mobile Automated Vehicle?

Today, we're going to explore how Mobile Automated Vehicles can benefit your operation!



Online Training Module 3: Why Would I Want A Mobile Automated Vehicle?



The world is quickly changing.
Finding and keeping workers
is a real issue.

Labor Issues



- MAVs operate 24/7 and the systems are designed to meet peak demand.
- MAVs allow for the shifting of available labor to mutually beneficial roles.



LACK OF AVAILABLE LABOR AN ISSUE

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Workforce participation remains below pre-pandemic levels. We have 3 million fewer Americans working today (January 2023) compared to February of 2020.

We have a lot of jobs, but not enough workers to fill them. If every unemployed person in the country found a job, we would still have 4 million open jobs.

<https://www.uschamber.com/workforce/understanding-americas-labor-shortage>

- MAVs are designed for long-term operational excellence with many systems operating longer than ten years.
- One of the key points is the number of working hours of MAV. If you spend \$500K for a MAV system, this amount will be the same (almost) whether the MAV works 8 hours or 24 hours, 5 days a week or 7 days a week.



<https://www.gallup.com/workplace/247391/fixable-problem-costs-businesses-trillion.aspx>
<https://www.bls.gov/news.release/jolts.t04.htm>



LABOR RETENTION & LOST DOLLARS

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According to the U.S. Bureau of Labor Statistics (BLS), 4.25 million people quit their jobs in January 2022, up from 3.3 million in 2021.

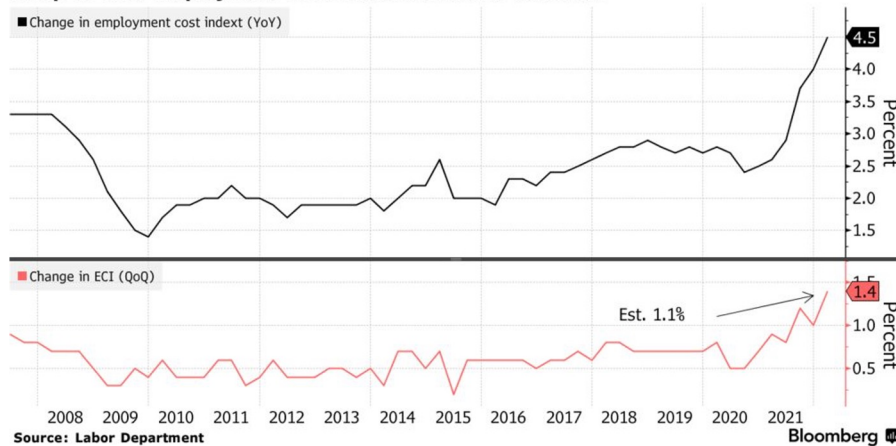
One Trillion Dollars . . .

That's what U.S. businesses are losing every year due to voluntary turnover. And the most astounding part is that most of this damage is self-inflicted.

- MAVs offset increasing labor costs very well through either a singular capital investment or a structured lease path to ownership.
- According to the U.S. Bureau of Labor Statistics (BLS), in the last years, the hourly wages of Warehousing and Manufacturing operators have reached more than \$20/hour on average.

Record Rise

Jump in U.S. employment costs stokes inflation concerns



INCREASING LABOR COSTS

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With many available job vacancies, workers are cherry picking roles based upon higher pay and perks.

Not only are direct costs increasing, but also indirect costs like insurance and damage are climbing.



A safe workplace is essential to both employees and the bottom line.



Safety and Ergonomics

- MAVs are designed for the utmost in operational safety for people and objects. They feature non-contact safety systems that provide safe and consistent operation. (Safety risk assessments are recommended per industry standards.)
- MAVs adhere to several standards to ensure safe operation:
 - **ANSI/ITSDF B56.5-2019:** Focuses primarily on collision avoidance, prevention of tipping, and other physical concerns associated with autonomous vehicles and their motion. [DOWNLOAD B56.5-2019 HERE](#)
 - **ANSI/RIA R15.08-1-2020:** Addresses safety issues associated with putting an industrial robot (that they refer to as a “manipulator”) on a mobile platform. [DOWNLOAD R15.08-1-2020 HERE](#)
 - **ASTM F45:** Outlines test methods for items like path accuracy, repeatability, the ability for AMRs to dock themselves for recharging, etc. [DOWNLOAD ASTM F45 HERE](#)



INJURIES AND WORSE

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The U.S. Bureau of Labor Statistics (BLS) estimates that between 2011 and 2017, approximately 8,500 to 9,000 non-fatal forklift accidents occurred per year.

That’s a rate of about 25 injuries per day across the U.S. Meanwhile, between 74 and 94 deaths occurred each year involving this type of industrial truck.

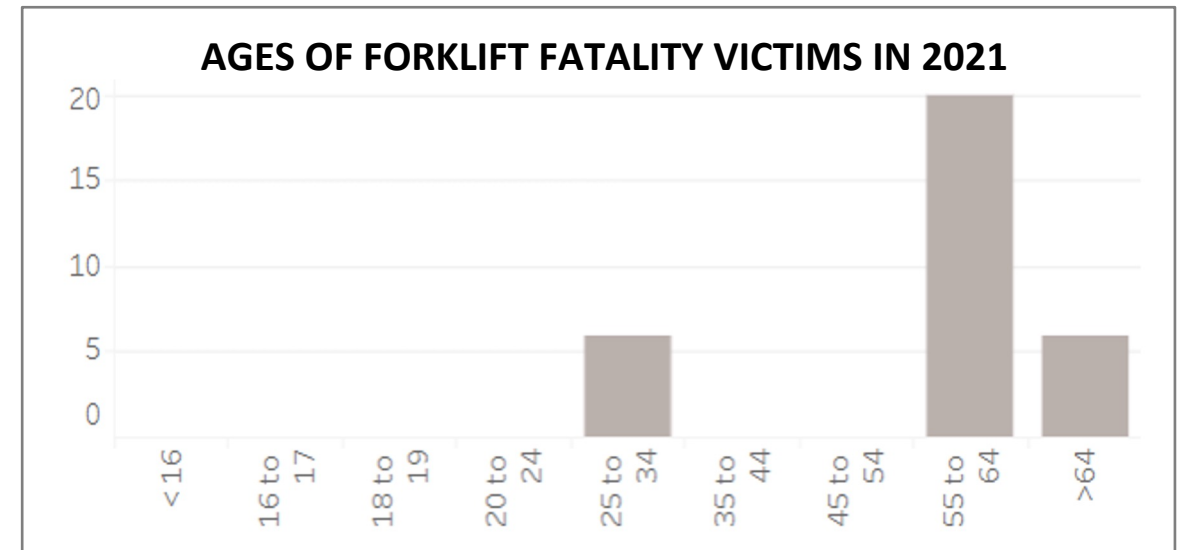
Source: [National Safety Council: Injury Facts 2023](#)

NUMBER OF REPORTED FORKLIFT-RELATED DEATHS ANNUALLY, 2011–2021										
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
66	68	70	65	71	72	54	85	79	78	70



U.S. Forklift Fatalities Statistics

- It has been reported that a rough average of 1 in 6 workplace deaths in the U.S. is forklift-related. It's one of the deadliest parts of any workplace.



Source: [National Safety Council: Injury Facts 2023](#)

- BLS has not published final 2022 forklift fatalities, but it is projected to be close 90 deaths.

- MAVs are engineered to work precisely in concert with humans. The systems are designed to minimize the lifting and dragging of product, as well as optimize the placement of the loads at the appropriate ergonomic height for workers.



ERGONOMIC CONCERNS

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The impact of not addressing ergonomic issues is not only workers compensation claims, but also lost efficiency and labor turnover.

By automating tasks, companies improve employee ergonomics and morale, as workers can instead focus on more complex assignments.

- Having MAVs (instead of people) perform non-value-added tasks ensures operations continuity in case of lockdowns or restrictions on social movements.



COVID-19 RESPONSE

WORK SAFE

- Sit 3ft apart from other people
- Wear a mask inside the premise
- Avoid socializing with colleagues, inside or outside
- Stagger work and break hours
- Disinfect shared surfaces before and after use
- Work from home whenever possible



COVID-19 CREATES NEW CONCERNS


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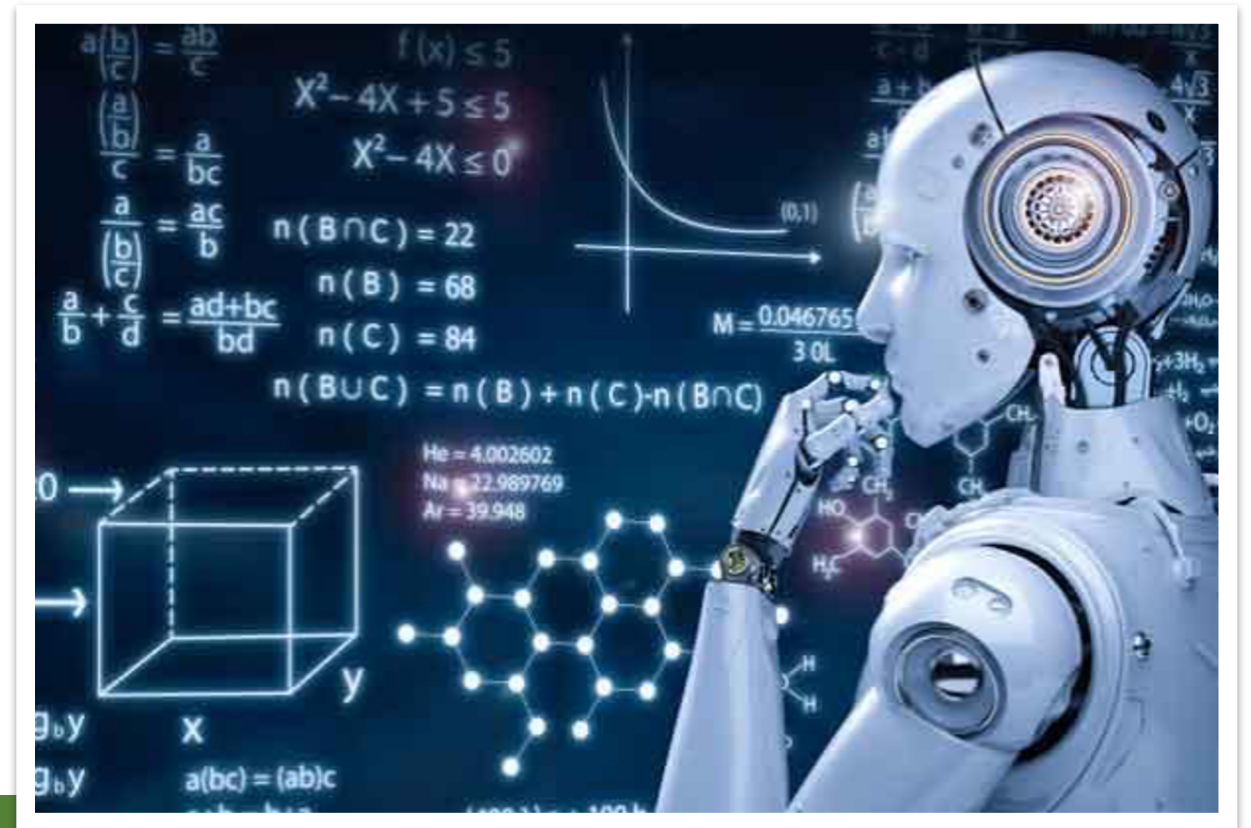
After the recent COVID-19 pandemic situation all factories and property managers are worried about worker's illness transmission.



Humans are an effective way to transmit infections, thus reducing worker headcount minimizes the contagion probability.



No company runs well without systems that work well together.



Bridging Operations Seamlessly

- MAVs have complete control of the product, from pick up to drop off.
- MAVs have built-in technology to identify the product being picked up. This can be done in myriad ways using existing and new technologies.
- MAVs virtually guarantee that product arrives where it is needed when it is required.



PRODUCT TRACKING & TRANSPORT

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It is of the utmost importance to be able to track product effectively through the entire process.



- MAVs easily interface with existing upper-level software systems. These can be used for order generation, workflow processing, and production tracking.
- MAVs also communicate with floor-based systems like programmable logic controllers (PLCs) and other discrete controls, as well as with graphical user interfaces (GUIs).

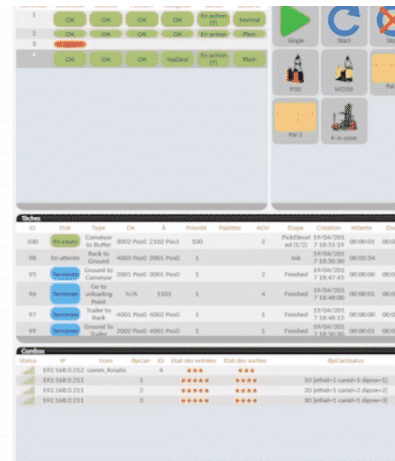
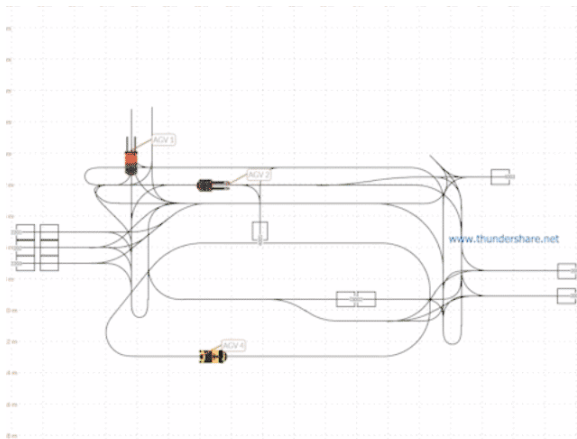
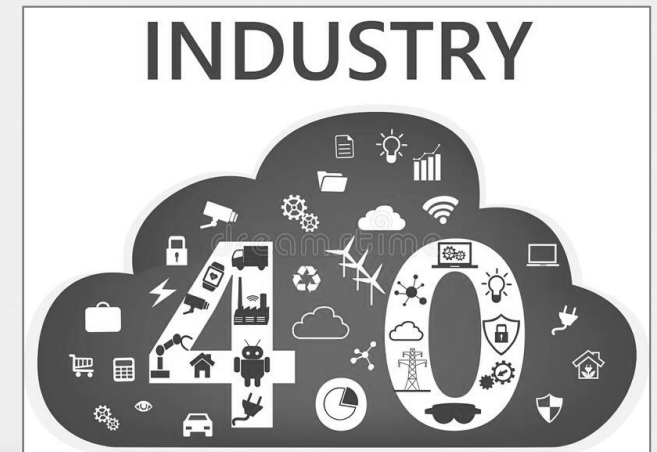


INFORMATION TECHNOLOGY & COMMUNICATIONS

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The ability of systems to communicate with each other as well as with humans is a hallmark of Industry 4.0 and is vitally important.



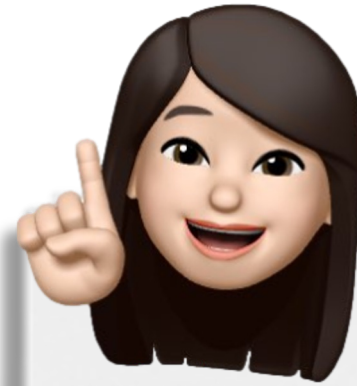
ID	Type	Car	Assigned	Available	Area	Edge	Condition	Release	Count
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102	Connected	40021 Plead 20015 Plead	500	2	Finished	24-04-2021	00:00:00	00:00:00	00:00:00
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106	Connected	40021 Plead 20015 Plead	500	2	Finished	24-04-2021	00:00:00	00:00:00	00:00:00
107	Connected	40021 Plead 20015 Plead	500	2	Finished	24-04-2021	00:00:00	00:00:00	00:00:00
108	Connected	40021 Plead 20015 Plead	500	2	Finished	24-04-2021	00:00:00	00:00:00	00:00:00
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110	Connected	40021 Plead 20015 Plead	500	2	Finished	24-04-2021	00:00:00	00:00:00	00:00:00

Protection from an unforeseen business risk, like a pandemic, is essential!



Risk Mitigation and Future Proofing

- MAVs allow for redistribution of resources to more mutually beneficial roles.
- MAVs are typically designed to meet the “Peak of Peak” demand for short periods time.
- MAV systems are easily scalable and expand to meet increased throughput due to growth without the addition labor.



MANAGING GROWTH & PEAKS

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Companies grow and the ability to manage that growth is a key strategic factor in planning.

Labor is hard to find and is continually becoming more expensive.



- MAVs do not pose the human resources and operational impacts of downsizing.
- MAVs eliminate the impact of rehiring and retraining when demand returns.



Downsizing & Right-Sizing

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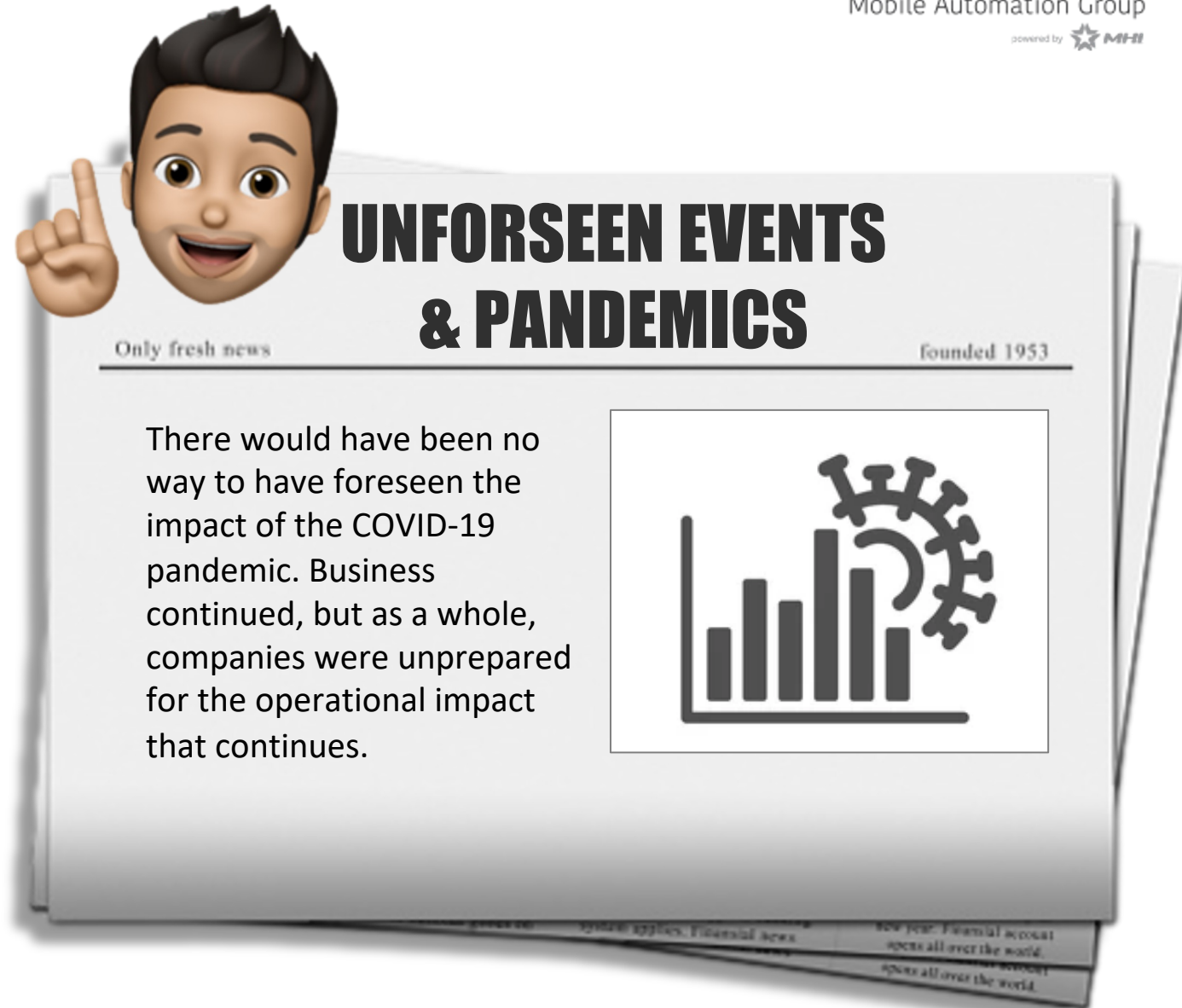
founded 1953

In a shifting economy, in many cases, demand decreases.

That results in a business requirement to right-size or downsize.




- MAVs represent a strategic, operational capability that prepares businesses for dramatic and dynamic surges in labor availability.



UNFORSEEN EVENTS & PANDEMICS

Only fresh news founded 1953

There would have been no way to have foreseen the impact of the COVID-19 pandemic. Business continued, but as a whole, companies were unprepared for the operational impact that continues.



The newspaper clipping is titled "UNFORSEEN EVENTS & PANDEMICS" and includes the text "Only fresh news" on the left and "founded 1953" on the right. The main body of text discusses the impact of the COVID-19 pandemic. To the right of the text is a square box containing a bar chart with four bars of increasing height, topped with a gear icon. At the bottom of the clipping, there is a line of text that is partially obscured and repeated: "New Year: Financial report opens all over the world".

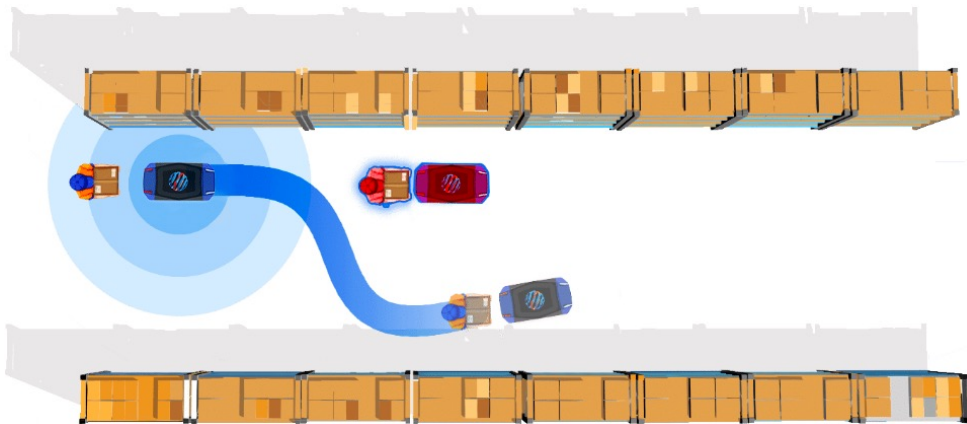


How about some things that tend to hide a bit?



Indirect Costs and Other Benefits

- MAVs move product at a safe and consistent speed and acceleration. Drops due to excessive speed or stops are virtually eliminated.
- MAVs are extremely precise in their ability to pick and drop loads.
- MAVs follow the best path and avoid physical obstruction as well as using onboard sensors to provide a safety field around the vehicle.



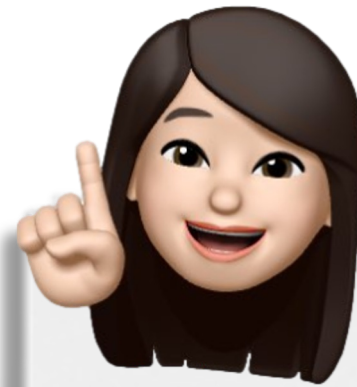
Only fresh news **COST OF PRODUCT & FACILITY DAMAGE** founded 1953

From a facility standpoint, damage to product is a huge loss. However, the cost of damage to infrastructure like columns and racking can be extreme safety issues.



The newspaper clipping features a large, bold title 'COST OF PRODUCT & FACILITY DAMAGE' and a sub-headline 'founded 1953'. The main text discusses the high cost of product damage and infrastructure damage. To the right of the text is an illustration of two black building icons, one of which is broken and tilted. The newspaper clipping is shown as a stack of papers with some text visible on the bottom page.

- MAVs operate on a range of different power sources, from battery technology to fuel cells. The best power source can be selected based upon business needs and availability.
- MAVs are flexible with respect to charging paradigms. In many cases charging can be scheduled to occur in windows of time that represent lowest cost of energy.

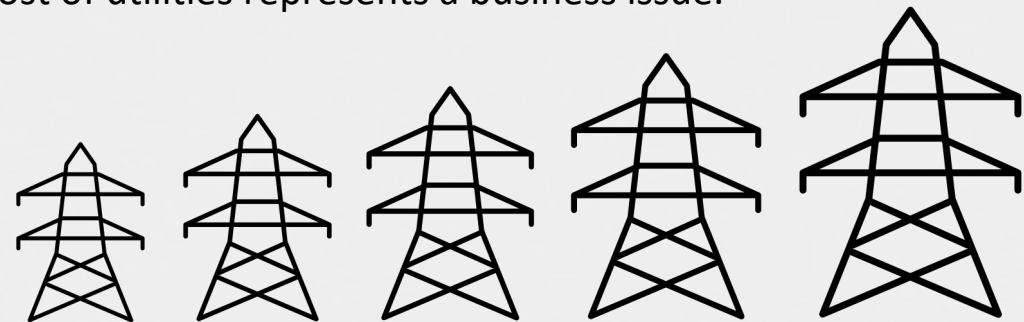


RISING COST OF UTILITIES

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Often overlooked but definitely impactful, the ever-rising cost of utilities represents a business issue.



- MAVs operate well in environments that are hazardous to humans, eliminating the increase in premiums for human workers.
- MAVs simply do not require insurance...



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INSURANCE & LIABILITY COSTS

founded 1953

Along with workers compensation insurance comes a litany of insurance types that continue to increase and scale with the size of your workforce and the perceived dangers of the workplace.



- MAVs operate 24/7 without breaks and are designed to meet throughput demand while a portion of the fleet is charging.
- MAV systems can perform functions in a 'lights out' fashion, working on moving product when other operations in the facility are not operational.

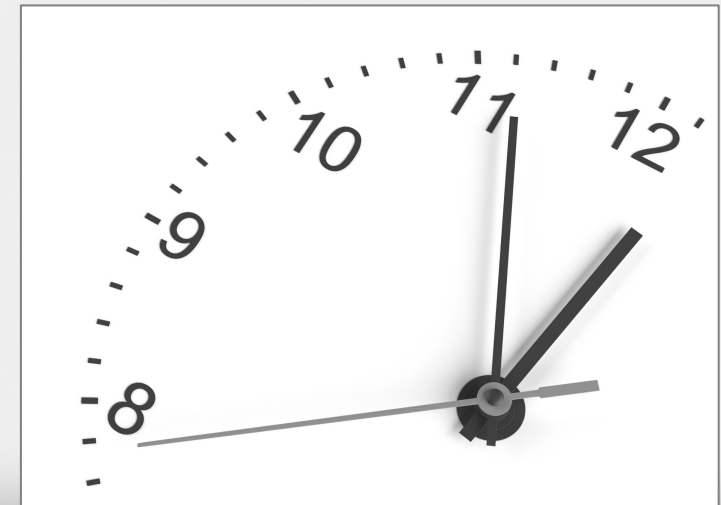


COSTS OF DOWNTIME

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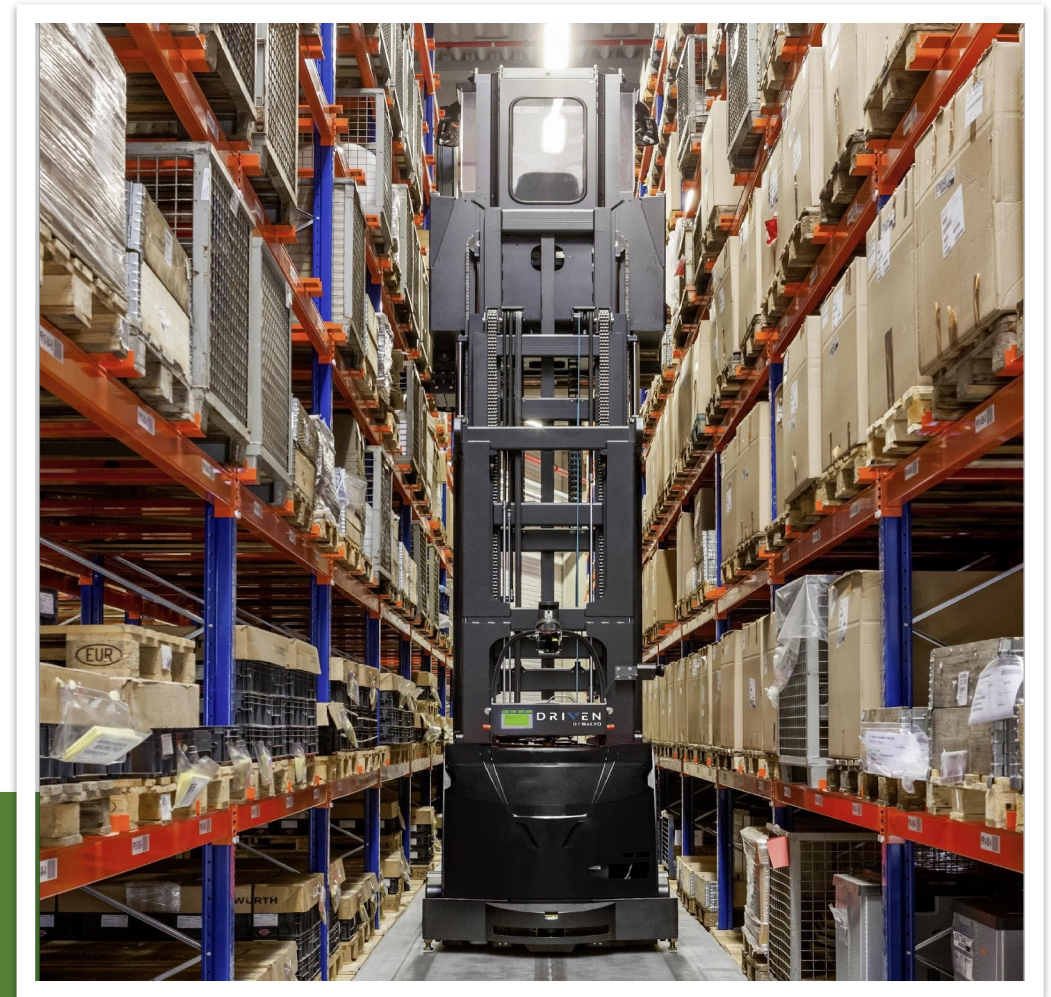
When building an operation around human workers you plan for breaks and time off.



How about a few more things to consider!

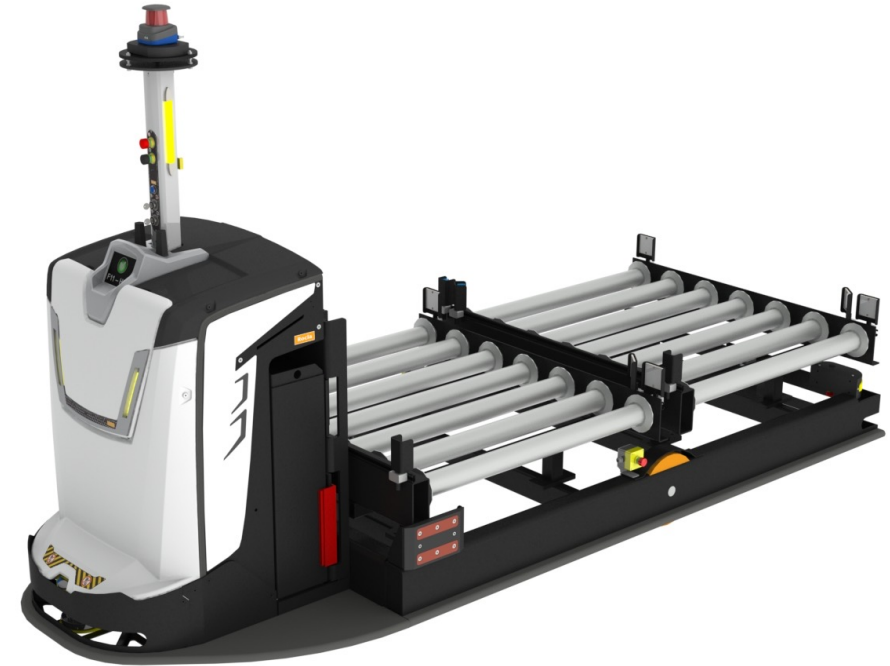


Things to Consider



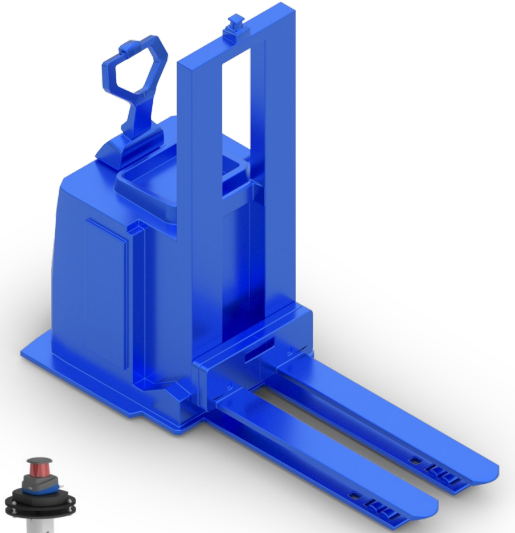
MAG | Things to Consider: Widely Adopted Labor Alternative

- MAVs are used and have widely adopted in all industries, including Warehousing and Distribution, Food and Beverage, Automotive, Manufacturing, and many more.
- MAVs are easy to install and modify.
- MAVs are incredibly flexible, with guidance and navigation technologies advancing every year.
- MAVs represent an affordable alternative to labor as well as a favorable alternative to other less automated solutions.



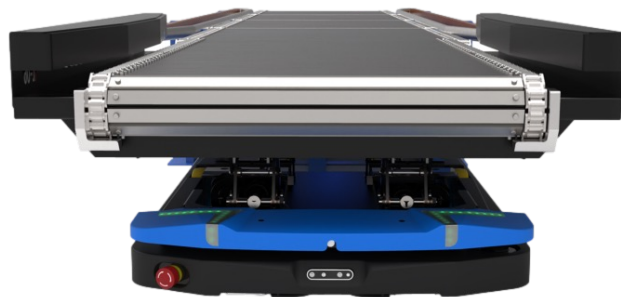
MAG | Things to Consider: Easy-to-Use in Any Application

- MAV systems are easy-to-use as well as easy to support.
- MAV vehicle types are diverse and can handle a broad range of applications.
- MAV systems represent a high return on investment and a long service life.
- MAVs can integrate seamlessly with other plant equipment (AS/RS, forklifts, conveyors, etc.).



MAG | Things to Consider: Flexible, Quiet Operation

- MAVs are clean and quiet and operate in a predictable and safe manner.
- MAVs are not a permanent obstacle. This allows for use of more areas of the facility without the need to create a physical barrier.
- MAVs are easily moved and repurposed, not only within the facility in which they were initially implemented, but also to a different facility and operation.



Congratulations!

You've finished the
third training module!



Next Up... Online Training Module 4.

For More Information...

Contact MHI's
Mobile Automation Group (MAG)
mhi.org/mag

