

# DAIFUKU



## Smart Handling Presentation

**Manufacturing Attacks Labor Shortage and Turnover with AGVs**  
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# Manufacturing and Assembly Issues Never End



# Costs, Technical and Business Issues of Today



## What Are They?

1. Need to Reduce Labor and Material Cost
  - Automation can reduce Labor Cost
2. Safety of Employees
  - Ergonomics in Manufacturing
3. Automation Builds in Repeatability, Reliability and Quality
  - ❑ More Issues rise to the top with COVID
4. Employee Turnover, Ranked #1 issue in North America
5. Labor Shortage, Ranked #2 in North America
  - Manufacturing Labor Costs Climbing Due to Inflation
6. Supply Chain Issues

# How can Manufacturing Combat These Issues



1. Companies look to attract Women to fill Manufacturing Jobs
  - Women out number Men for Labor resources
2. Companies are changing Assembly Lines to reduce boredom and increase Job Satisfaction
3. Companies are offering New and Old Incentives to retain and bring in more labor
4. Manufacturing is adopting Automation of AGVs and AMRs at a fast rate to combat all of the issues.

# Global AGV Market By Region



- **2016 the AGV Market prediction for North America was \$640M in New Orders**
  - Based on MHI Statistics Reported, NA will hit \$600M in order for 2022
- **Latest Market Research says AGV/AMR market will grow to \$18Billion by 2025**
  - ***North America market is expected to hit \$4B in 2025, \$1.5B will be AGV sales***

**TABLE 53** AUTOMATED GUIDED VEHICLE MARKET, BY REGION, 2014-2022 (USD MILLION)

Region	2014	2015	2016	2018	2020	2022	CAGR (2016-2022)
North America	289.2	320.8	355.5	435.4	529.9	640.1	10.3%
Europe	442.5	488.4	538.8	654.2	788.6	942.1	9.8%
Asia-Pacific	336.9	376.7	421.2	524.8	649.8	802.1	11.3%
RoW	208.9	229.7	252.6	304.5	364.1	428.0	9.2%
<b>Total</b>	<b>1,277.5</b>	<b>1,415.6</b>	<b>1,568.0</b>	<b>1,918.9</b>	<b>2,332.5</b>	<b>2,812.3</b>	<b>10.2%</b>

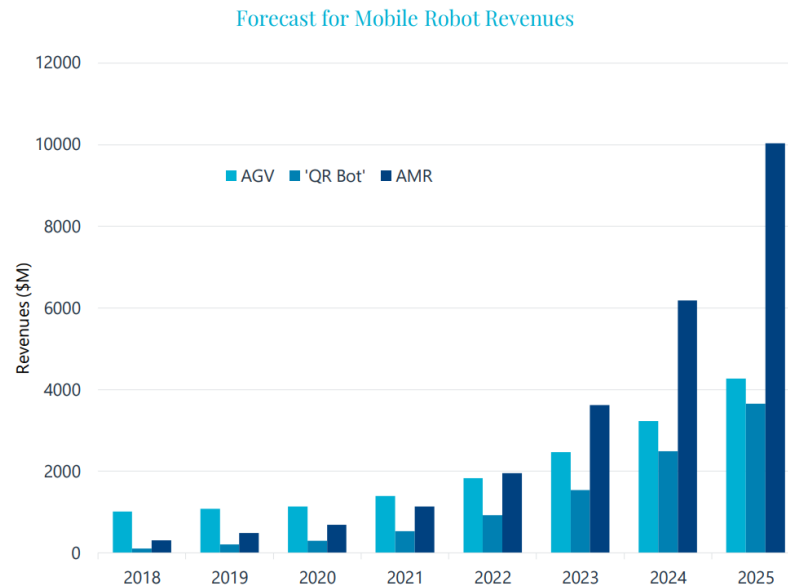
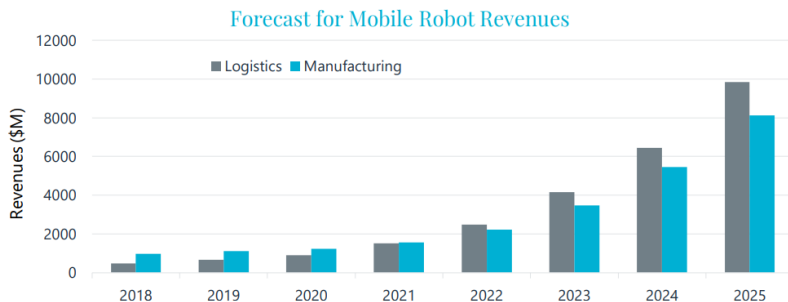
Source: Material Handling Industry Association of America, (MHIA), International Federation of Robotics, Automated Material Handling Association Ltd. (U.K.), Investors Presentation, Industry Journals, Magazines, and MarketsandMarkets Analysis.

# AGV Market Update



## Robust & Exponential Growth Forecast to 2025

- Despite lowering our short-term forecast for the industry, we still predict robust growth for mobile robots with revenues reaching \$18 billion in 2025.
- Nearly 2.1 million mobile robots will have been shipped by the end of 2025 with nearly 860,000 of these added in 2025 itself.
- Both AGVs and AMRs will enjoy strong demand over the next five years, however the rapid adoption of AMRs and the greater range of possible applications means that AMR revenues will dwarf AGV revenues by 2025.



# Objectives of AGV's in Manufacturing & Assembly



- Quality:
  - AGV Assembly Lines have no Buffer Inventory in the Assembly Line
  - Defects are Repaired at Point of Notice or Eliminated
  - AGV Systems are Linked with MES System to Eliminate and Reduce Quality Issues.
- Cost:
  - Line Side Delivery of Parts “Just in Time”
  - Supermarket Delivery Systems
    - Kitted Parts so Workers have parts when they need them
  - No Non-Value-Added Labor
- Deadlines:
  - Production Throughput is Increased for Entire Process

# How Are AGVs Used for Delivery Systems



## Let's Look at Some Systems



# AGV's in Manufacturing and Assembly

## AGV Delivery Systems



# AGV's in Manufacturing and Assembly

## AGV Delivery Systems





# AGVs fill Open Fork Truck Positions



# AGVs Supply Power to Conveyor Systems



# Benefits of AGV Assembly Lines



## • **Benefits of Use and Design**

- Faster ROI than other Automated Assembly Lines
- Ability to Solve Ergonomic Issues of Assembly
- Integrates Easily with MES Systems
- Meets International ANSI Safety Standards
- Assembly Lines Adopt to any Available Floor Space
- No Permanent Barriers or Obstacles
- Meets Requirements of Lean Manufacturing
- Works well with Robotic Automation
- Encourages Just In Time Parts Delivery
- Scalable by Adding and Subtracting AGV's
- Long Life Span with Minimal Maintenance
- Promotes Green Energy Technology
- Proven Technology over 50 Years
- Low "Total Cost of Ownership" for Users
- Safe, Reliable, Predictable Over and Over
- Customers Can Change and Modify Themselves
- Assembly Line can Change Products with New Tooling
- Accepts Lift Deck, Turntables and Slew Bearings
- Can be used in Product Run Tests
- Maximizes Production Floor Space

# How Are AGVs and AMRs used Today



## Let's Look at Some Systems

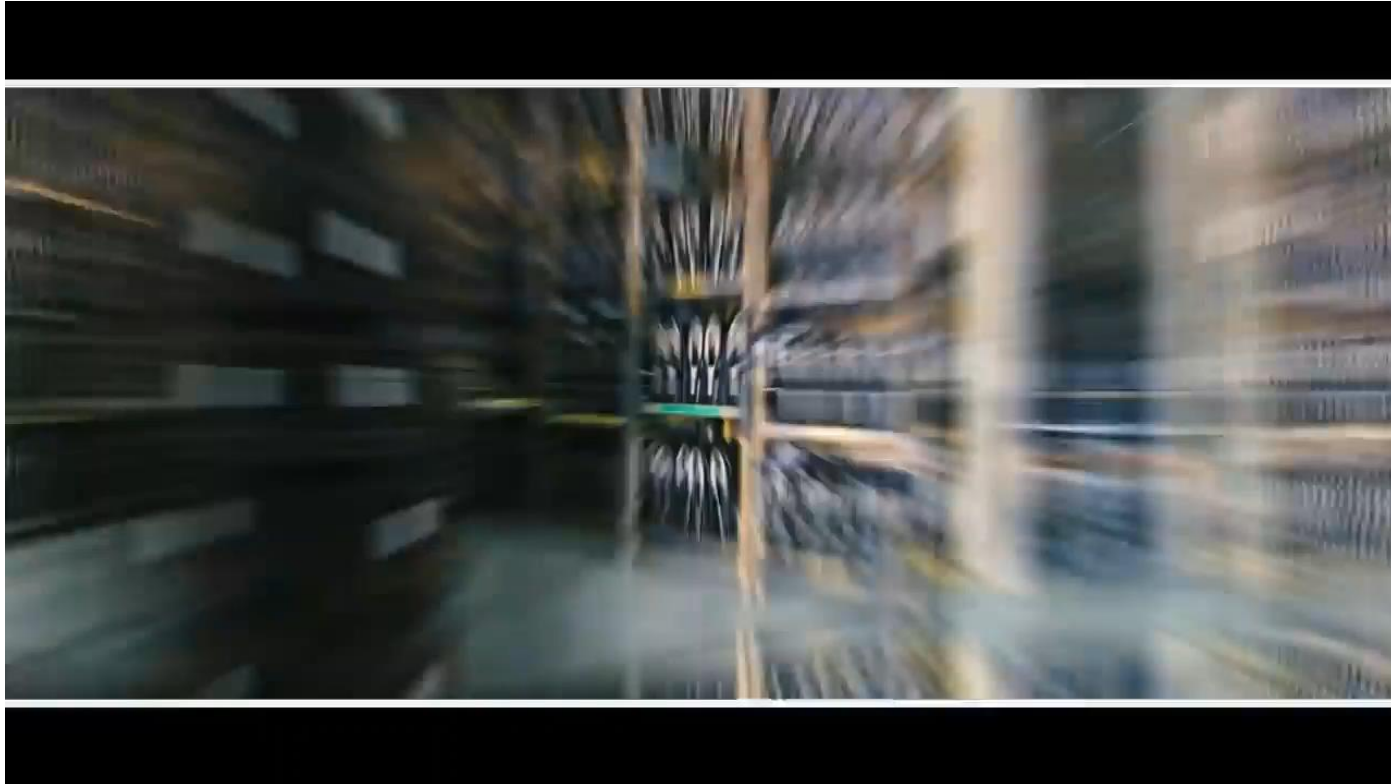


# AGVs Address Safety on Assembly Lines

## Truck Frame Assembly Line

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# Benefits of AGV Assembly Lines

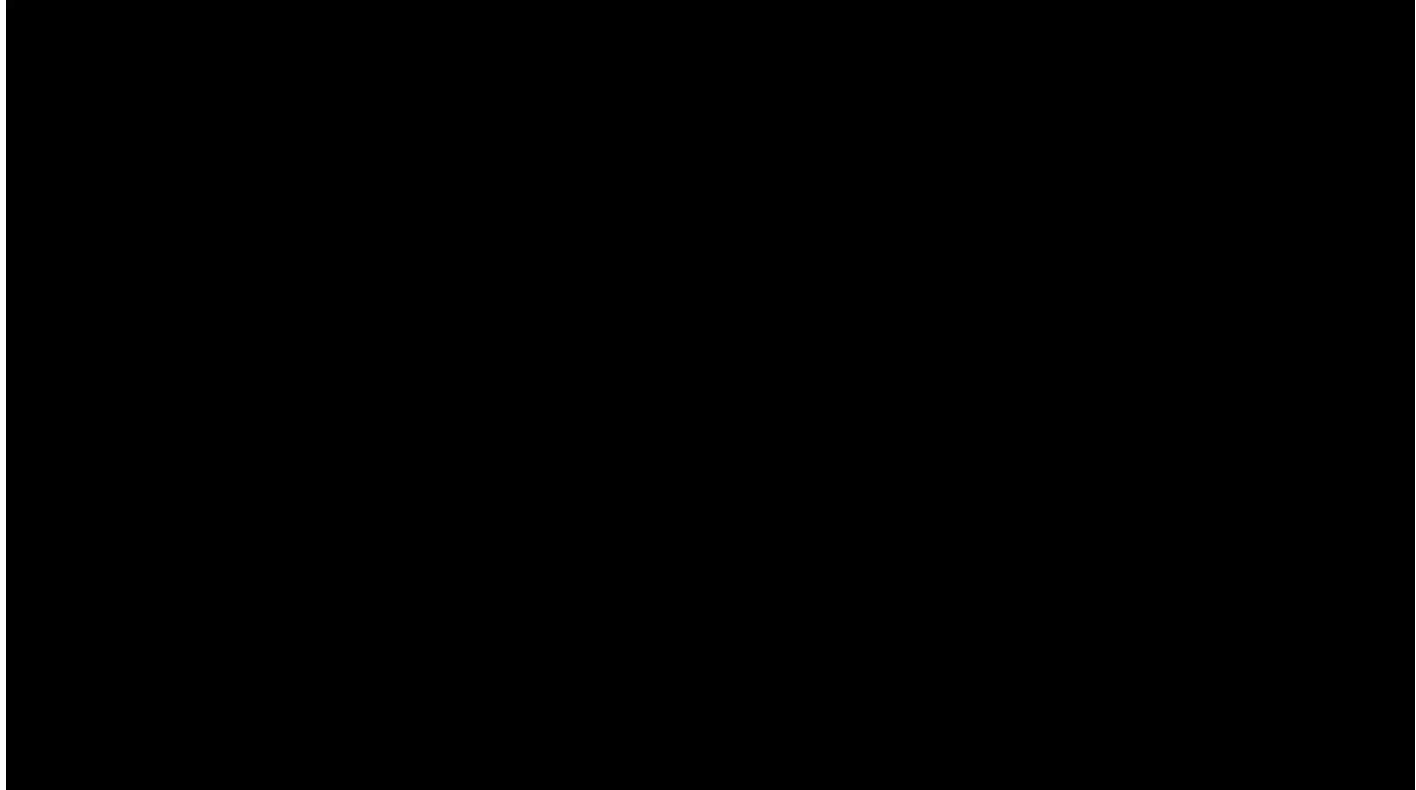




# Harley-Davidson York, PA



115 AGCs



# Flexible AGV Assembly Line for Large Engines



# Automating TSA Bag Inspections at Airports





# Thank You