

# On-Line Training Program

## Module I

### *What is an AGV?*



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**AGVS Product Section**

of

**MHI**

# What is an AGV?

## Definitions you might see online at various websites

- An automatic guided vehicle system (AGVS) consists of one or more computer-controlled, wheel-based load carriers (normally battery powered) that runs on the plant or warehouse floor (or if outdoors on a paved area) without the need for an onboard operator or driver. (MHI)
- An automated guided vehicle or automatic guided vehicle (AGV) is a mobile robot that follows markers or wires in the floor, or uses vision or lasers. They are most often used in industrial applications to move materials around a manufacturing facility or a warehouse. (Wikipedia)



# What is an AGV?

## Definitions you might see on online at various websites

- The term "automated guided vehicle" (AGV) is a general one that encompasses all transport systems capable of functioning without driver operation. The term "driverless" is often used in the context of automatic guided vehicles to describe industrial trucks, used primarily in manufacturing and distribution settings, that would conventionally have been driver-operated (US Legal.com)
- A materials handling system that uses automated vehicles such as carts, pallets or trays which are programmed to move between different manufacturing and warehouse stations without a driver. These systems are used to increase efficiency, decrease damage to goods and reduce overhead by limiting the number of employees required to complete the job. (Business Dictionary.com)



# What is an AGV?

## Summary of AGV definitions

- There are many definitions for AGVs
- Simply put AGVs are: “A driverless vehicle used to move materials efficiently in a facility”
- However, AGVs are sophisticated machines that represent a complete material handling solution and are installed in numerous industries and a wide range of applications. AGVs can increase efficiency and productivity as well as reduce product damage and labor costs.



# Why are AGVs used?

- Replace manually operated material handling vehicles such as a lift truck
- Good response to labor shortages
- Allow employees to be reassigned to areas where they can add value to the product
- Provide safe, efficient, cost-effective movement of materials



# What types of AGVs are available?

- Masted vehicles – forked, clamp, single-double
- Unit Load – lift deck, conveyor
- Tow or Tuggers
- Carts
- Custom

Each of these vehicles are explained in more detail in Module 4a



# What types of applications use AGVs?

## ■ Manufacturing

- Raw material handling
- Work-in-process movement
- Parts/Tooling delivery
- Finished goods movement
- Removal of waste to recycling

## ■ Warehousing/Distribution

- Product storage and retrieval (block stack, in racking, etc.)
- Pallet handling
- Automatic truck/Trailer loading
- Material movement to support picking of mixed pallets



# What are the parts of an AGV system?

These are the most common pieces of an AGV system:

- Vehicle
- Host software
- Wireless communication
- User interface
- Battery/Charger



# What are the parts of an AGV system?

## Vehicle

- The vehicle is the machine that provides material movement
- There can be a single vehicle or as many as 100 or more in a system
- Vehicle types include:
  - Masted vehicles – forked, clamp, single-double
  - Unit load - lift deck, conveyor
  - Tow or tuggers
  - Carts
  - Custom

See Module 4a for more detail information about these vehicles



# What are the parts of an AGV system?

## Host software

- The host software has many functions in the control of and communication with an AGV:
  - Controls AGV traffic routing to maximize efficiency and to minimize traffic congestion (the host software acts as a traffic cop)
  - Assigns the vehicle material movement requests
  - Monitors and controls all external inputs and outputs (I/O) to allow material movement (i.e. battery charging, automatic doors, load present sensors)
  - Communicates with supervisory software controlling manufacturing/warehousing (warehouse management systems, production control systems, material resource planning systems and the like)
  - Monitors system and notifies personnel of alarm conditions
  - Generates standard reports to analyze system performance
- Simple systems may operate without host software
- See Module 4b for more information on Host Software

# What are the parts of an AGV system?

## Battery/Charger

- Automatic guided vehicles are powered by batteries
- There are many types of battery technologies used in AGVs including:
  - Flooded lead acid
  - NiCad
  - Lithium ion
  - Sealed
  - Inductive power
  - Fuel cells
- Options for battery charging:
  - Swap (automatic or manual) – battery gets down to a certain level, the depleted battery is removed and a fully charged battery is installed
  - Opportunity charging – periodically the vehicle reports to a charging station as the battery is depleted. Typically this is during periods when fewer material movements are required



# What are the parts of an AGV system?

## User Interface

- The user interface allows the user to monitor and support an AGV system. The user interface provides:
  - A material movement request for the vehicle
  - Alarm management – alarms for vehicles, communication, I/O, etc., can be seen, acknowledged, and cleared.
  - Report management – to analyze system alarms and vehicle utilization to improve overall operation.



***For More Information:***

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<http://www.mhi.org/agvs>