Safety and New Standards for Mobile Automation

Presented by:

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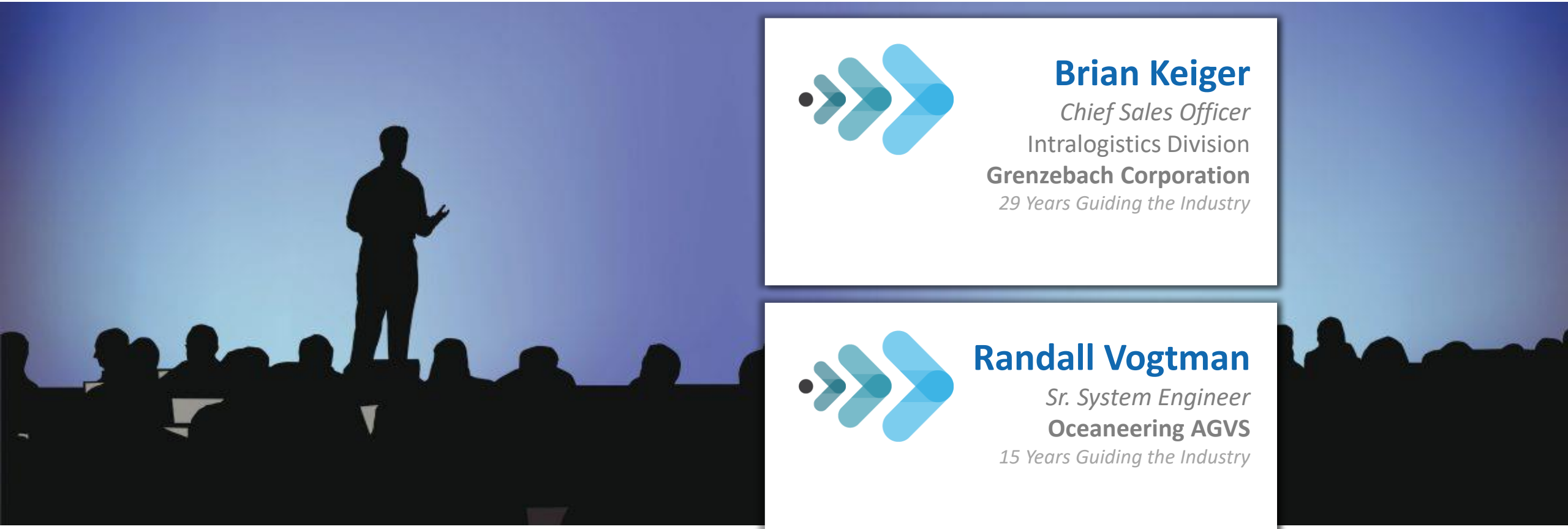

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Who We Are

- Group of leading mobile automation system and component suppliers
- Mission: To promote growth and effective use of Mobile Automation Systems in manufacturing, warehousing, distribution and other key markets

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Mobile Automation Equipment Manufacturers/Suppliers	Component Suppliers

AMERDEN AGVS
AutoGuide
OCEANEERING
Velodyne LiDAR
BANNER
more sensors, more solutions
DAIFUKU
DAIFUKU NORTH AMERICA
DEMATIC
Creating Logistics Results
Rocla
Rockwell Automation
EnerSys
OCEANEERING
ELETTRIC80
swisslog
brother
at your side
NEUGART
fetch
robotics
RAYMOND
SIEMENS
KOLLMORGEN
GRENZEBACH
TRANSBOTICS
Battery Watering Technologies
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People. Products. Productivity.
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Better Technology, Better World.
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SICK
Sensor Intelligence.

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Session Description (Abstract)

There have been significant safety standard developments in the AGV/AMR industry to support new technologies. For emerging technologies, such as industrial mobile robots that work and collaborate with humans, efforts are ongoing to further define safety protocols for the proper application of risk reduction measures to provide a safe working environment for employees.



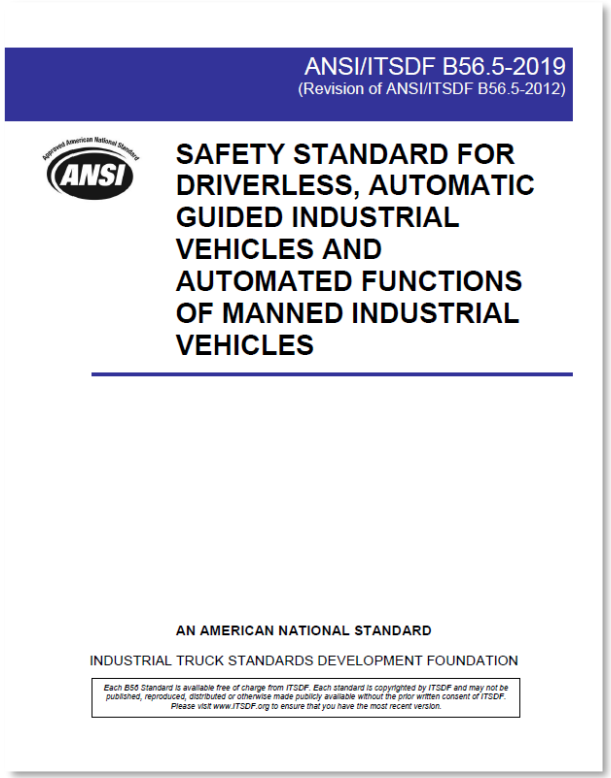


Latest Releases

- The newly published revision to the existing ANSI/ITSDF B56.5-2019 standard published by the ITSDF (Industrial Truck Standards Development Foundation) is the latest regulation for Safety Standard for Driverless, Automatic Guided Industrial Vehicles and Automated Functions of Manned Industrial Vehicles.
- Underwriters Laboratory has released UL 3100 Outline of Investigation for Automated Guided Vehicles (AGVs).

Major Changes to ANSI/ITSDF B56.5

- ANSI/ITSDF B56.5-2019 was approved as a revision by the American National Standards Institute on August 6, 2019
- The standard is available from the Industrial Truck Standards Development Foundation (ITSDF) website http://www.itsdf.org/cue/b56-standards.html
- Presentation discusses recent changes and is not intended to be a comprehensive summary of the document


ANSI/ITSDF B56.5-2019
(Revision of ANSI/ITSDF B56.5-2012)

SAFETY STANDARD FOR DRIVERLESS, AUTOMATIC GUIDED INDUSTRIAL VEHICLES AND AUTOMATED FUNCTIONS OF MANNED INDUSTRIAL VEHICLES

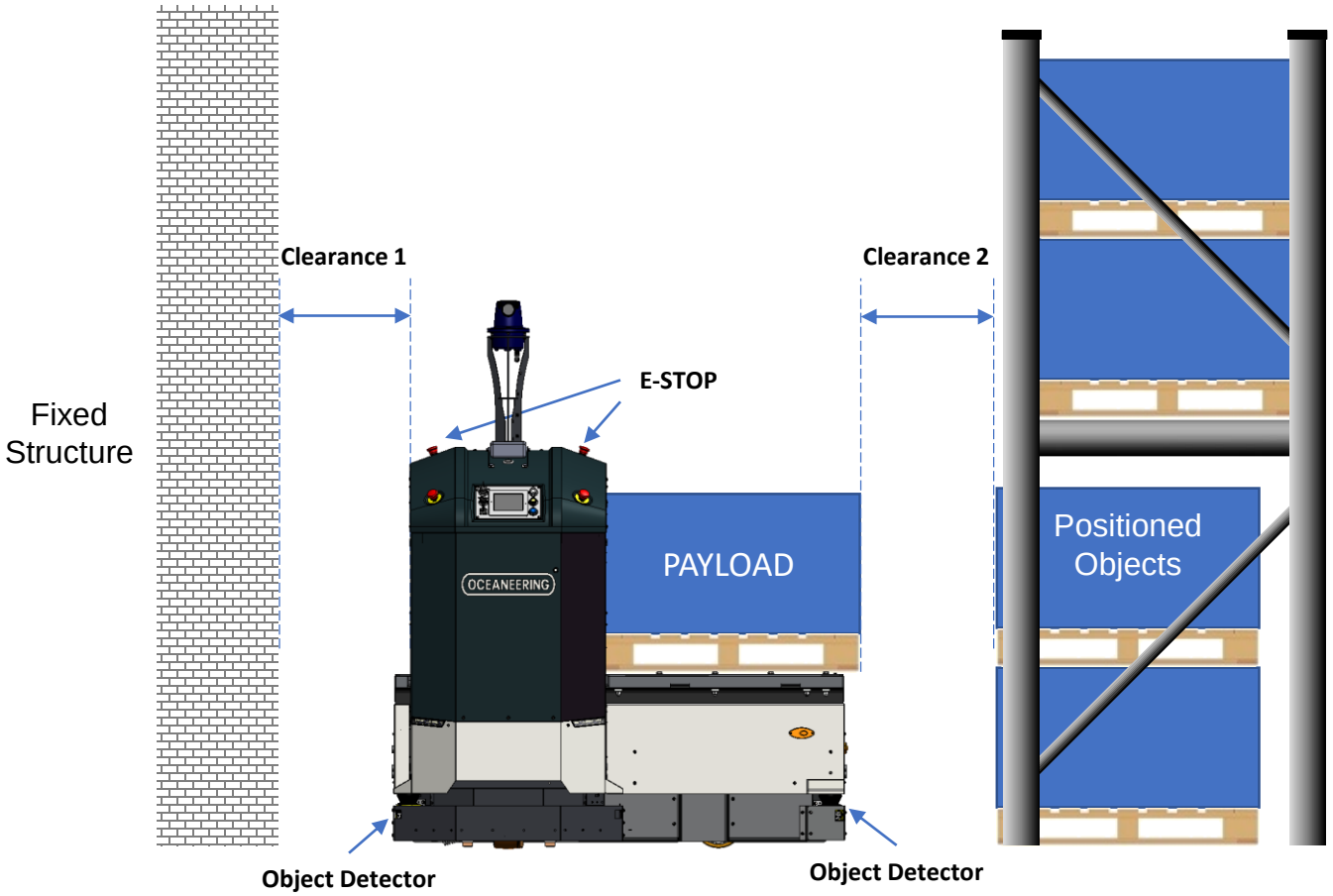
AN AMERICAN NATIONAL STANDARD

INDUSTRIAL TRUCK STANDARDS DEVELOPMENT FOUNDATION

Major Changes to ANSI/ITSDF B56.5

- Standard has been rescoped to not apply to vehicles operating in closed areas where personnel are not allowed and appropriate interlocking systems, safeguards, and procedures are in place
- Numerous additions and deletions intended to define minimal clearances between the vehicle and walls, object detection and zone classifications
- Additional glossary terms to clarify and define areas where AGVs and personnel are working
- Additional miscellaneous information regarding object detection and vehicle non-emergency controls and devices

Key Zoning Criteria

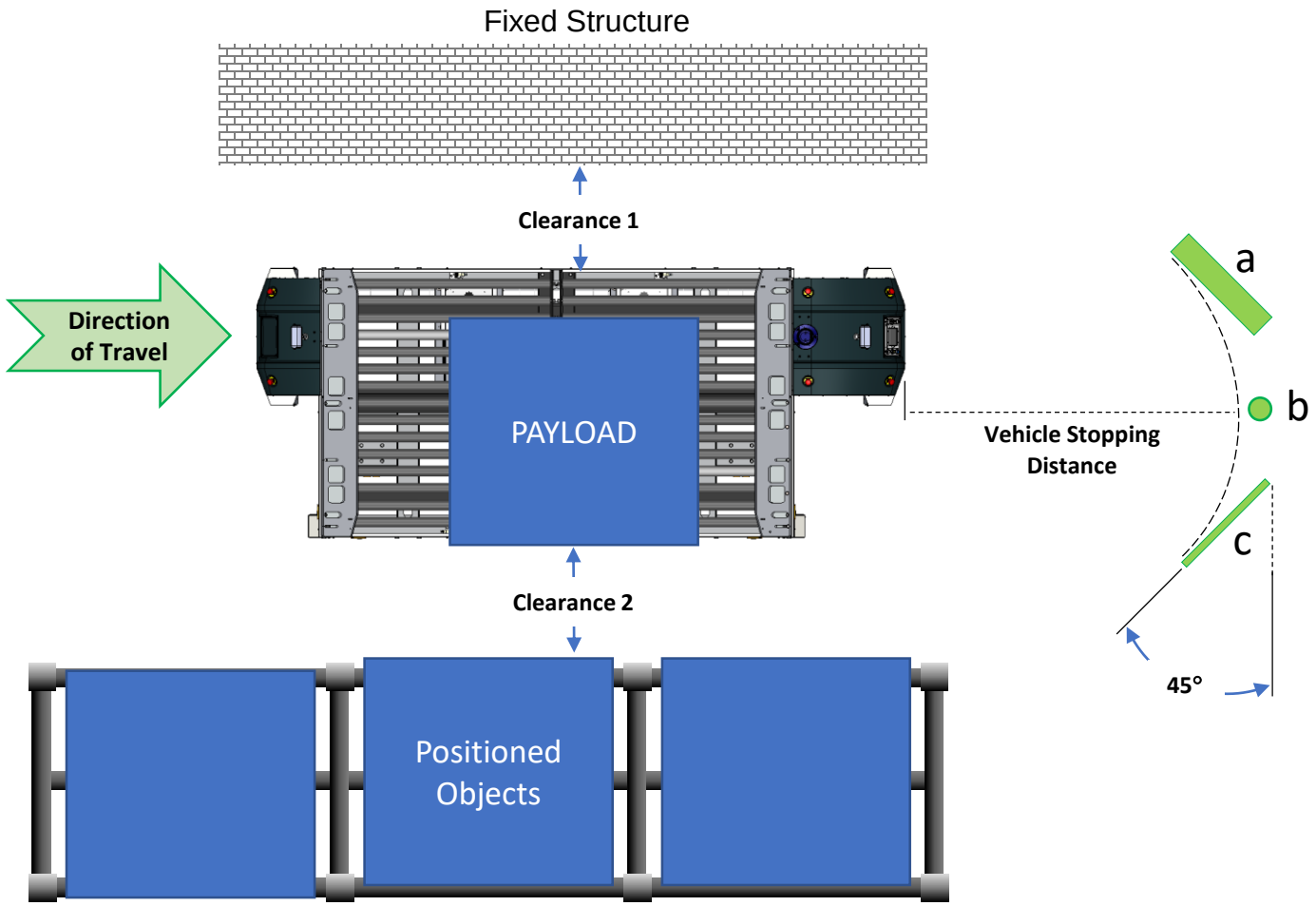


Key Zoning Criteria

- Clearance 1
- Clearance 2
- Object Detector
- E-Stop
- Operator Training
- Escape Route

Consult B56.5 Table 1 Summary of Operating Speeds and Requirements in Hazard Zones and Restricted Areas

Object Detection



Changed Definition for Object Detection Devices & Controls

- Non-contact Sensing Devices
- Test Pieces (a,b,c)

Zoning

- Criteria definition is defined in Table 1 of ANSI/ITSDF B56.5-2019
  - *Hazard zone:* an area of inadequate guidepath clearance (1.2 m/s ≈ 2.6 mph)
  - *Restricted area*: an area of inadequate guidepath clearance with no escape route or an area of guidepath clearance which cannot be protected by object detection devices. (0.3 m/s ≈ 0.6 mph)
  - *Very Narrow Aisle (VNA) restricted area*: an area defined by fixed continuous racking and clearances of less than 0.5 m on both sides. Unauthorized personnel are prohibited from entering the area.

New Glossary Entries

designated area

guidepath clearance

hazardous location

operating modes

passenger

pendant control

processor monitor

qualified person

rated capacity

rated load

rated speed

restricted area

risk assessment

safeguard

safeguarding

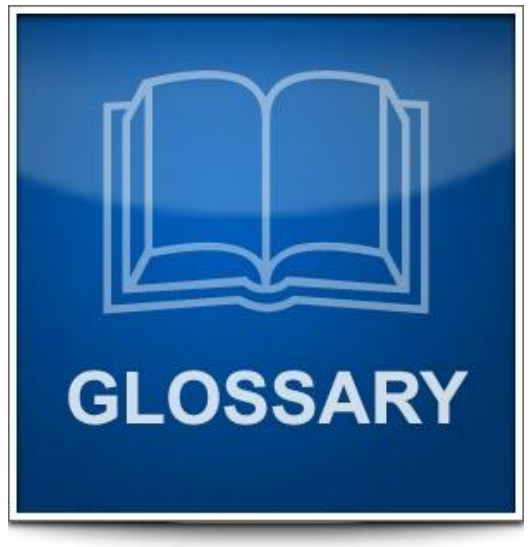
training, verifiable

vehicle, guided tow

vehicle system, automatic guided

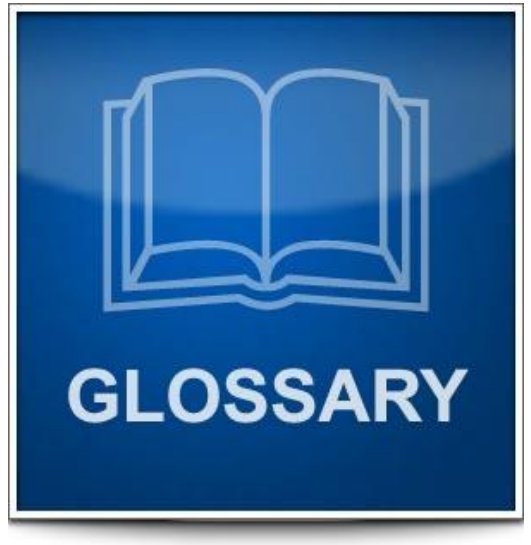
verifiable approval

Very Narrow Aisle (VNA) restricted area



Changed Glossary Entries

- *hazard zone*
- *intended path*
- *local operator*
- *main direction of travel*
- *manned industrial vehicle*
- *manual operation*
- *manufacturer*
- *modification*
- *non-contact sensing device*
- *non-restricted area*
- *safety stop*
- *semi-automatic operation*
- *sleep (optional)*
- *supplier*
- *system supplier*



Unchanged Glossary Entries

aisle, guidepath clearance

alteration

ampere-hour capacity

authorized person

automatic operation

sleep (optional)

battery charging, automatic

battery charging, central

battery charging, opportunity

brake, emergency

brake, parking

brake, service

braking

braking, controlled

bumper

deviation

drawbar pull, breakaway

drawbar pull, maximum

emergency stop

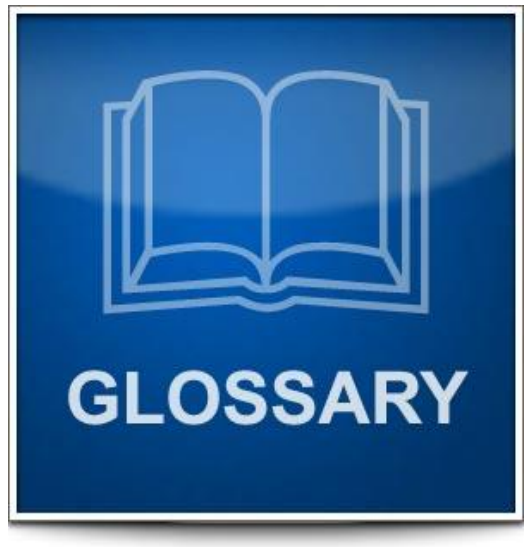
fail-safe

guided industrial vehicle system

guidepath

guidepath clearance aisle

watchdog timer



Added Additional Information

- Vehicle Non-emergency Controls and Devices
  - Monitoring, Stop Switches and Manual Controls
- Control Disconnect
  - Manual Control Switch to disconnect control circuits
  - Battery Power Disconnect

UL 3100 Outline of Investigation

for Automated Guided Vehicles (AGVs)

- The requirements address commercial or industrial environment battery-operated AGVs intended to be used indoors
  - Industrial Truck AGVs
  - Load bearing service AGVs,
  - Non-load bearing service AGVs
- Industrial Truck AGVs are intended to be used and installed in accordance with
  - ANSI/ITSDF B56.5 -2012 Safety Standard for Driverless, Automatic Guided Industrial Vehicles **and** Automated Functions of Manned Industrial Vehicles,
  - Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations, NFPA 505

UL 3100 Outline of Investigation

for Automated Guided Vehicles (AGVs)

- The document applies to battery powered AGVs and peripheral systems including the AGV specific charging device
- The Document does not include:
  - Requirements for AGVs that function as people movers.
  - Requirements for industrial robots
    - *Addressed by Standard for Robots and Robotic Equipment, UL 1740*
  - Requirements for AGVs that function as commercial and industrial floor cleaning equipment
    - *Addressed by ANSI C22.2 No. 336, Particular Requirements for rechargeable Battery-Operated Commercial Robotic Floor Treatment Machines with Traction Drives.*

UL 3100 Document Contents

- Construction
- Industrial Truck Based AGVs
- Service AGVs
- Performance
- All Products
- Industrial Truck Based AGVs and Load Bearing Service AGVs
- Marking
- Instructions

On the Horizon

- ISO is preparing to release 3691-4 Industrial trucks — Safety requirements and verification — Part 4: Driverless industrial trucks and their systems
- Work continues on the RIA R15.08, a new standard for Mobile Robot and AMR Safety

For more information:

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