Safety and New Standards for Mobile Automation

Presented by:
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Meet Your Speakers . . .

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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
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/ITSDSF B56.5

- ANSI/ITSDSF 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 (ITSDSF) 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
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

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

Direction of Travel

Fixed Structure

Clearance 1

Clearance 2

PAYLOAD

Positioned Objects

Vehicle Stopping Distance

45°

a

b

c

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

<table>
<thead>
<tr>
<th>designated area</th>
<th>rated speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>guidepath clearance</td>
<td>restricted area</td>
</tr>
<tr>
<td>hazardous location</td>
<td>risk assessment</td>
</tr>
<tr>
<td>operating modes</td>
<td>safeguard</td>
</tr>
<tr>
<td>passenger</td>
<td>safeguarding</td>
</tr>
<tr>
<td>pendant control</td>
<td>training, verifiable</td>
</tr>
<tr>
<td>processor monitor</td>
<td>vehicle, guided tow</td>
</tr>
<tr>
<td>qualified person</td>
<td>vehicle system, automatic guided</td>
</tr>
<tr>
<td>rated capacity</td>
<td>verifiable approval</td>
</tr>
<tr>
<td>rated load</td>
<td>Very Narrow Aisle (VNA) restricted area</td>
</tr>
</tbody>
</table>
## Changed Glossary Entries

<table>
<thead>
<tr>
<th>hazard zone</th>
<th>non-contact sensing device</th>
</tr>
</thead>
<tbody>
<tr>
<td>intended path</td>
<td>non-restricted area</td>
</tr>
<tr>
<td>local operator</td>
<td>safety stop</td>
</tr>
<tr>
<td>main direction of travel</td>
<td>semi-automatic operation</td>
</tr>
<tr>
<td>manned industrial vehicle</td>
<td>sleep (optional)</td>
</tr>
<tr>
<td>manual operation</td>
<td>supplier</td>
</tr>
<tr>
<td>manufacturer</td>
<td>system supplier</td>
</tr>
<tr>
<td>modification</td>
<td></td>
</tr>
</tbody>
</table>
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
electric 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
  - 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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