AGV Safety
Practical Considerations

Sponsored by:

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When **compliant** with **regulations**, machines and tools are considered **safe**.
Any machine or tool can be *unsafe* when used *improperly*. 
The Actors

Three key elements to AGV Safety:

- The user
- The environment
- The machine
The User
## The Environment

<table>
<thead>
<tr>
<th></th>
<th>Lift Truck</th>
<th>AGV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>7.5 mi/hr</td>
<td>2.5 mi/hr</td>
</tr>
<tr>
<td>Safety Equipment</td>
<td>Driver Training</td>
<td>Safety towards environment</td>
</tr>
<tr>
<td>Travel Path</td>
<td>Random Paths</td>
<td>Defined Repetitive Path</td>
</tr>
<tr>
<td>Visual Travel Indicators (Blinkers, Beacons, etc.)</td>
<td>Varying</td>
<td>Standard</td>
</tr>
<tr>
<td>Audible Travel Indicators (FWD/REV Tones, Alarms)</td>
<td>Varying</td>
<td>Standard</td>
</tr>
<tr>
<td>Restricted Areas</td>
<td>Driver Training</td>
<td>Known</td>
</tr>
</tbody>
</table>
The Machine - AGV

- USA B56 Standard
- European Machine Directive + CE Label = EN 1526
Automatic Guided Vehicles

Are safer today than at any time in their history of use.
The Machine – AGV

- Equipment Specific Additions
The Machine – AGV

- Equipment Specific Additions
Most accidents happen as a result of *behavior*.

- Distractions
- Habituation (complacency)
- Shortcuts
An Example

Any machine or tool can be unsafe when used improperly.
Respect the machine and employ safe practices.
Case study – Initial Investment

![Diagram showing safety and investment relationship for AGV Safety System.](image)
Case study – Diagnostic Improvement

Example: Self testing sensors

AGV Safety System

Investment

Safety
Case study – Station Routine

- **AGV Safety System**
  - Example: Self testing sensors
  - Example: Carry load higher @ drops
  - Example: Extend Floor Bumper @ pick stand

**Investment** = $$ / Lost TPut

<table>
<thead>
<tr>
<th>Safety</th>
<th>Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>AGV Safety System</td>
</tr>
<tr>
<td>3</td>
<td>Example: Self testing sensors</td>
</tr>
<tr>
<td>4</td>
<td>Example: Carry load higher @ drops</td>
</tr>
<tr>
<td></td>
<td>Example: Extend Floor Bumper @ pick stand</td>
</tr>
</tbody>
</table>

**Examples:**
- Carry load higher @ drops
- Extend Floor Bumper @ pick stand
- Investment = $$ / Lost TPut
Case study – Environmental Updates

1. AGV Safety System
2. Signage
   Pick position guarding
   Floor painting
3. Example:
   Self testing sensors
4. Examples:
   Carry load higher @ drops
   Extend Floor Bumper @ pick stand
   Investment = $$ / Lost TPut
5. Investment = $$ / Lost TPut
Case study – Training & Awareness

Safety

Investment

AGV Safety System

Enhanced & Continual Safety Training & Awareness

Signage
Pick position guarding
Floor painting

Example:
Self testing sensors

Examples:
Carry load higher @ drops
Extend Floor Bumper @ pick stand
Investment = $$ / Lost TPut

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Safety has **3 key** elements:

- The user
- The environment
- The machine
Conclusion – AGV Specific

- AGVs are *safer* than they have ever been, and getting *safer*

- AGVs are a *safe solution*

- **Safety** requires *constant awareness*
For More Information:

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