Automatic Guided Vehicles (AGVs): Elements & System Considerations

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Elements & Considerations of AGV System Design

- Vehicle Type & Configuration
- Guidance Technology
- System Simulation
- Power Technology & Weight
- Floor, Grade and Other
Vehicle Type and Configuration

• Four Common Types

- Fork
- Lift Deck
- Unit Load
- Conveyor deck
- Tugger
Heavy Load Vehicles

• Coils
• Ingots
• Jumbo Reels
• Custom
Fork Vehicle Considerations

- Outrigger, Counterbalanced or Under-rigger
- Pantograph or Traversing Mast Reach
- Single or Double Fork
- Side-shift forks
- All wheel steer – omnidirectional
- FMEA - Failure Modes and Effects Analysis

Moving more product per move lowers and/or shorter routes reduces fleets size.
Conveyor Deck Considerations

- Single or Dual Conveyor
- Off-board Power requirements vs Fork AGV
- Layout considerations
- Fleet size vs fork vehicle
- Buffer consideration
Lift Deck AGV Considerations

- Turning radius
- Electric vs Hydraulic Lift
- Differential steering vs single steer drive

Diff Drive

Steer- Drive
Three wheel configuration

QUAD
Tugger Considerations

• Braking – Negative g’s to stop vehicle safely (esp. ramp)
• Grades – Much more torque to go up grade
• Automatic Coupling/Hitching
Guidance

• Each varies in cost, performance & flexibility.
Power Choices

- Batteries – Vary in weight, cycles, cost.
  - Lead Acid
  - Lithium Chemistries – Higher Cost and Performance
- Fuel Cells
- Both are Zero Emissions
- Run time proportional to weight
Simulations

- Good guidelines
- What-if Scenarios
- Software varies
- No humans
- Perfect Conditions
Other Considerations

• Temperature - Humidity

• Flooring needs to be conductive. Many new coatings are nonconductive. No visible difference.

• Drains, slopes or grades.

• EMI

• Wi-Fi Coverage
For More Information

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