Automated Guided Vehicle – Implementation and Best Practices

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# Company Profile

<table>
<thead>
<tr>
<th><strong>Company Name</strong></th>
<th>DF Automation &amp; Robotics Sdn Bhd (1006594-V)</th>
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<tbody>
<tr>
<td><strong>Incorporated</strong></td>
<td>June 2012</td>
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<td><strong>Headquarter</strong></td>
<td>Johor Malaysia</td>
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<tr>
<td><strong>Number of employees</strong></td>
<td>≈ 40</td>
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<td><strong>Present in</strong></td>
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<tr>
<td><strong>Company Business</strong></td>
<td>• Design, manufacture &amp; supply Automated Guided Vehicle (AGV) total solution</td>
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<tr>
<td></td>
<td>• Design &amp; supply automation &amp; robotics solution</td>
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Customers
A manufacturing plant can be as big as 20,000 square meter.
Thousand of goods are being moved between locations in a day.
PROBLEM: Rely on physical workforce

- Low skill job: labour intensive, tiring and dangerous.
- Human factors: inefficient, foreigner workers’ issues, theft, etc.
- Cost: minimum wages increased.

weight up to 500kg

walk average 3000m
How to automate material handling **without** using conveyor that is more **flexible** and yet can reduce labour reliance?
Products

User Interface Panel

Control Panel

Safety sensors 1: Laser scanner

Safety sensors 2: Bumper switch

Software:

NavWiz

Auto Charge

Differential Driving wheels
Navigation Method Options

MG : Magnetic

Magnetic Tape specs:
• Self-Adhesive with 3M tape
• Width: 50mm
• Thickness: 1.5mm
• Length: 25m/roll
• Color: Black
• Polarity: N Top S bottom

TS : Trackless / Natural Features

DF Trackless Features:
• Can be switch between Natural feature navigation & magnetic navigation
Accessories for AGV Total Solution: 1. AGV Fleet Management System (FMS)

FMS Architecture

Local Area Network (LAN)

- Client PC
- Client PC
- Client PC
- Client PC
- AGV FMS Server
- Machine
- Other integration

Wi-Fi Network

FMS usage:

- AGVs traffic control
- Task management
- Scheduling control
- Centralized monitoring of AGVs information Eg: Location, battery level, status and etc
- Centralized AGVs control Eg: Map change, sequence change, setting change and etc
- Data logging and reporting
Accessories for AGV Total Solution: 2. Call System

Call System Usage:
- Used to summon AGV wirelessly to specific location
- Monitor AGV current task list/task queue
- Monitor AGV status
- Remotely control AGV/AGVs
Accessories for AGV Total Solution:
3. Wireless remote I/O Module
Accessories for AGV Total Solution:

4. Others

Custom software development service

Additional Monitor for display

Trolley Position guide/platform
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Requirements:
• Need to use users’ existing trolleys
Implementation and Best Practices (Case studies)

1. Special trolleys
2. **Customised handler**
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Requirements:
- To automate a flexible production line that manufacture motorcycle
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Requirements:
• The AGV needs to be integrated with the factory lean manufacturing philosophy.
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. **F&B**
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Requirements:
- Smaller AGV with full functions and yet able to carry foods to 50 tables.
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
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7. Forklift
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Requirements:
- Smaller AGV with full functions and yet able to carry foods to 50 tables.
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. **1 tonne Pallet Jack**
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Requirements:
- 30 mins point-to-point delivery of 1 tonne pallet. Need to carry the pallet jack also.
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. **Pallet only**
7. Forklift
8. Continuous production flow
9. Warehouse with handling

**Requirements:**
- To transfer pallets only fully autonomous without interference from human.
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. **Forklift**
8. Continuous production flow
9. Warehouse with handling

**Requirements:**
- To perform as a normal forklift up to 2 tonne but autonomously.
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Requirements:
- Automate production flow with 20 AGVs
- Need to pick up cart automatically
- One way only
Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. **Warehouse with handling**

Requirements:
- AGV integrates with robotic arm and able do precise positioning and perform pick & place.

https://youtu.be/dsQsGGiojAI
Conclusion

AGV itself is not very useful, it has to be Designed with a Total Solution in mind.

Thank you very much,

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Conclusion

https://youtu.be/EFmZXCQrOs0