AGVs – Delivering a Quick Payback

Sponsored by:

Presented by:

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MHI

Agenda

- Key Financial Terms
- Typical Project
- Financial Payback Justification Calculations
- Project Case Study

Key Financial Terms

Capital Budgeting

- The process to determine whether a project such as purchasing an AGV system should be pursued
- Capital budgeting techniques determine which projects will yield an acceptable return over an applicable period of time
- A popular method of evaluating potential projects is calculating payback period

Key Financial Terms

Payback Period - a simple measure of the time it takes to recover the capital spent on an investment

- shorter payback periods are preferred

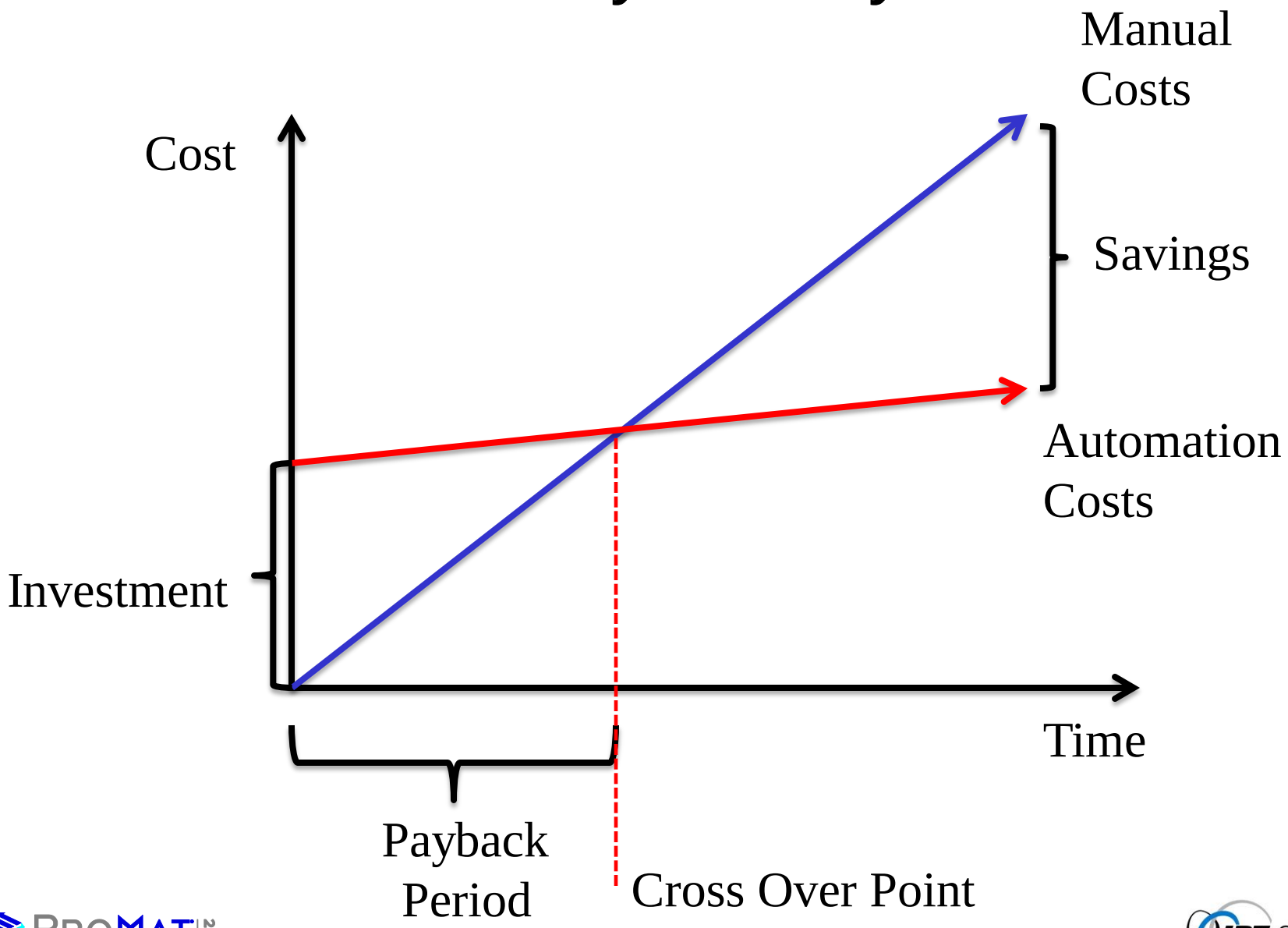
Strengths - Quick, easy comparison for short projects that provide benefits over similar durations

Weaknesses - Disregards future benefit stream after initial capital is recovered. Disregards any effects of interest

Typical Project Options

Manual Forklift or AGV

Look for your Payback



Gather Costs for Manual Operation

1. Equipment Leasing
2. Operating Cost*
3. Operators/Supervisors*
4. Maintenance*

* The primary cost is labor including wages, benefits, healthcare

Gather Costs for Manual Operation

Let's look at a 10 Fork Truck operation running 24x7

1. Equipment Leasing

Sit Down Lift Trucks

$1,100/mo x 10 trucks = $11,000/mo

$11,000 x 12 months = **$132,000/yr**

TOTAL Annual Leasing = $132,000

Gather Costs for Manual Operation

2. Operating Cost

Operating Cost Per Manual Truck Per Hour = $5.50

Operating Cost Per Manual Truck Per Shift = $44

Operating Cost Per Manual Truck Per Day = $132

Operating Cost Total Trucks Per Day = $1,320

Operating Cost Total Trucks Per Year = **$481,800**

3. Operators/Supervisors

	Supervisor	Lead	Checker	FT Driver
Hourly Cost Per Person	$39.27	$25.46	$24.58	$23.08
Total Number of Personnel	1	3	3	30
Labor Cost Per Year	$81,681	$158,870	$153,379	$1,440,192

Total Labor Cost Per Year = **$1,834,122**

Total Operating and Labor Cost = $2,315,922 Per Year

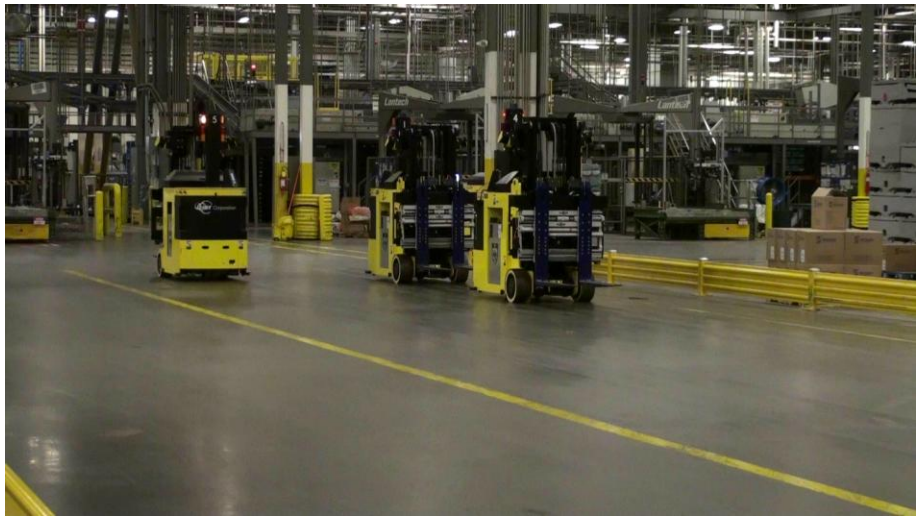
Gather Costs for Manual Operation

4. Maintenance
   - Assumed to be the same as AGV

Total Annual Manual Costs = $2,447,922

Gather Costs for Automation

1. Capital Cost
2. Operating Cost
3. Operators/Supervisors
4. Maintenance



Gather Costs for Automation

1. Capital Cost - $3,700,000

   Includes design, fabrication, and commissioning of AGV system. AGV System includes:

   16 vehicles

   34 batteries

   16 chargers/automatic swap battery storage locations

Gather Costs for Automation

2. Operating Cost

   $3 per AGV per Hour

   Includes electricity and typical replacement parts

   $3 x 16 Vehicles x 24 Hours/Day x 365 = **$420,480 per year**

3. Operators/Supervisors

	Supervisor	Lead	Checker	FT Driver
Hourly Cost Per Person	$39.27	$25.46	$24.58	$23.08
Total Number of Personnel	0	3	0	0
Labor Cost Per Year	$0	$158,870	$0	$0

Total Labor Cost Per Year = **$158,870**

Total Operating and Labor Cost = $579,350 Per Year

Gather Costs for Automation

4. Maintenance
   - Assumed to be the same as for manual system

Financial Payback Justification Calculations

Cost Summary for Manually Operated System

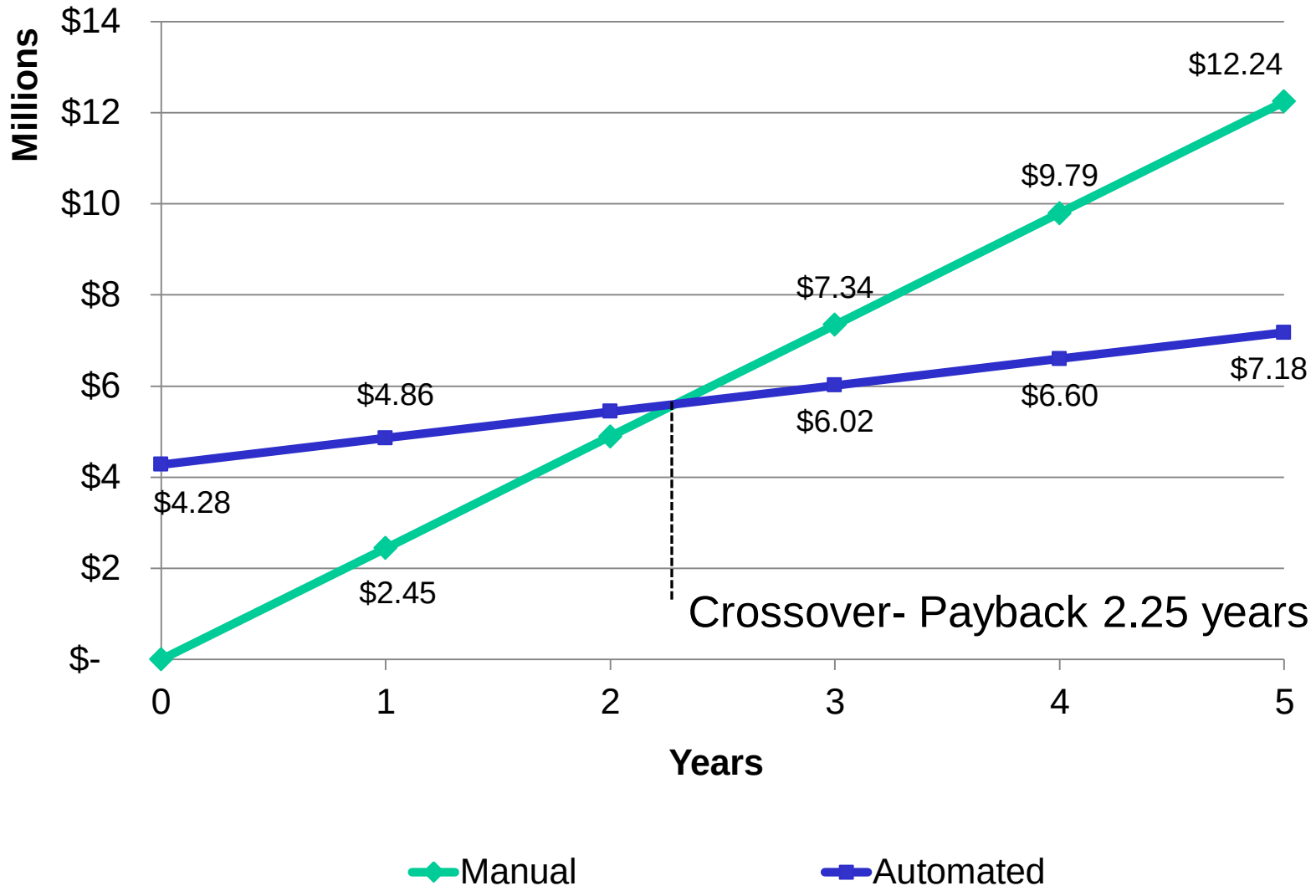
Year	Equipment Leasing	Operating & Labor Cost	Total Annual Costs	Rolling Total Costs
1	$132,000	$2,315,922	$2,447,922	$2,447,922
2	$132,000	$2,315,922	$2,447,922	$4,895,844
3	$132,000	$2,315,922	$2,447,922	$7,343,766
4	$132,000	$2,315,922	$2,447,922	$9,791,688
5	$132,000	$2,315,922	$2,447,922	$12,239,610

Financial Payback Justification Calculations

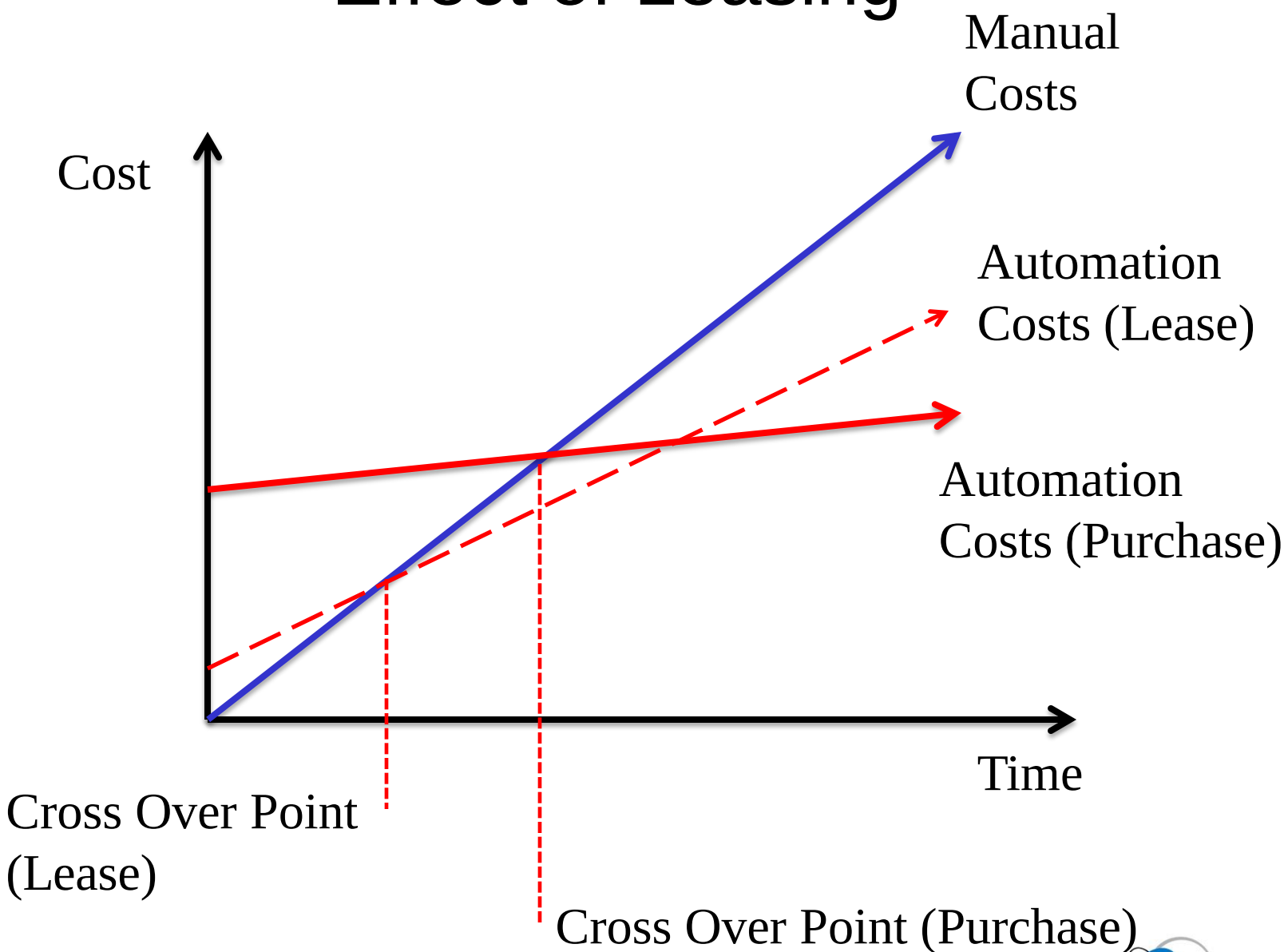
Cost Summary for Automated System

Year	Equipment Cost	Operating & Labor Cost	Total Annual Costs	Rolling Total Costs
1	$3,700,000	$579,350	$4,279,350	$4,279,350
2		$579,350	$579,350	$4,858,700
3		$579,350	$579,350	$5,438,050
4		$579,350	$579,350	$6,017,400
5		$579,350	$579,350	$6,596,750

Cost Summary Comparison



Effect of Leasing



Project Background

Fortune 50 Beverage Producer

Production and Packaging Facility Located in Southeastern US

All Warehousing/Storage Done in Adjacent Building

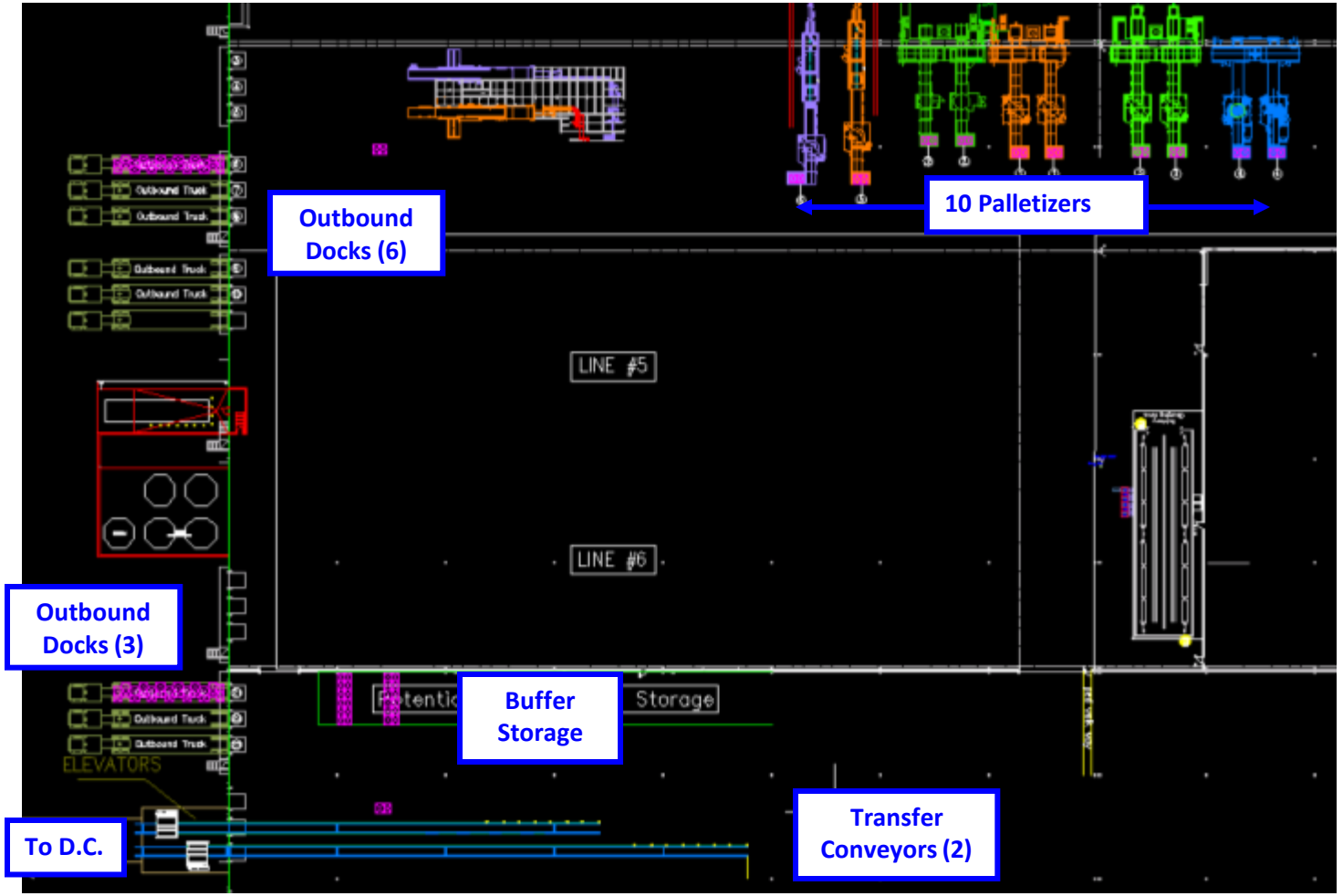
Highly Automated Production/Packaging Process

Operates 24 x 7

Project Description

- Handling pallets
  40” (W) x 48” (L) x 67” (H); 2,500 lbs/pallet
- Pickup products at 10 stretch wrappers
- Deliver product onto outbound shipping trailers, or transfer conveyors to DC
- If transfer conveyors are jammed or down, provide temporary block stacking in buffer storage area
- Fully integrated with WMS

Plant Layout



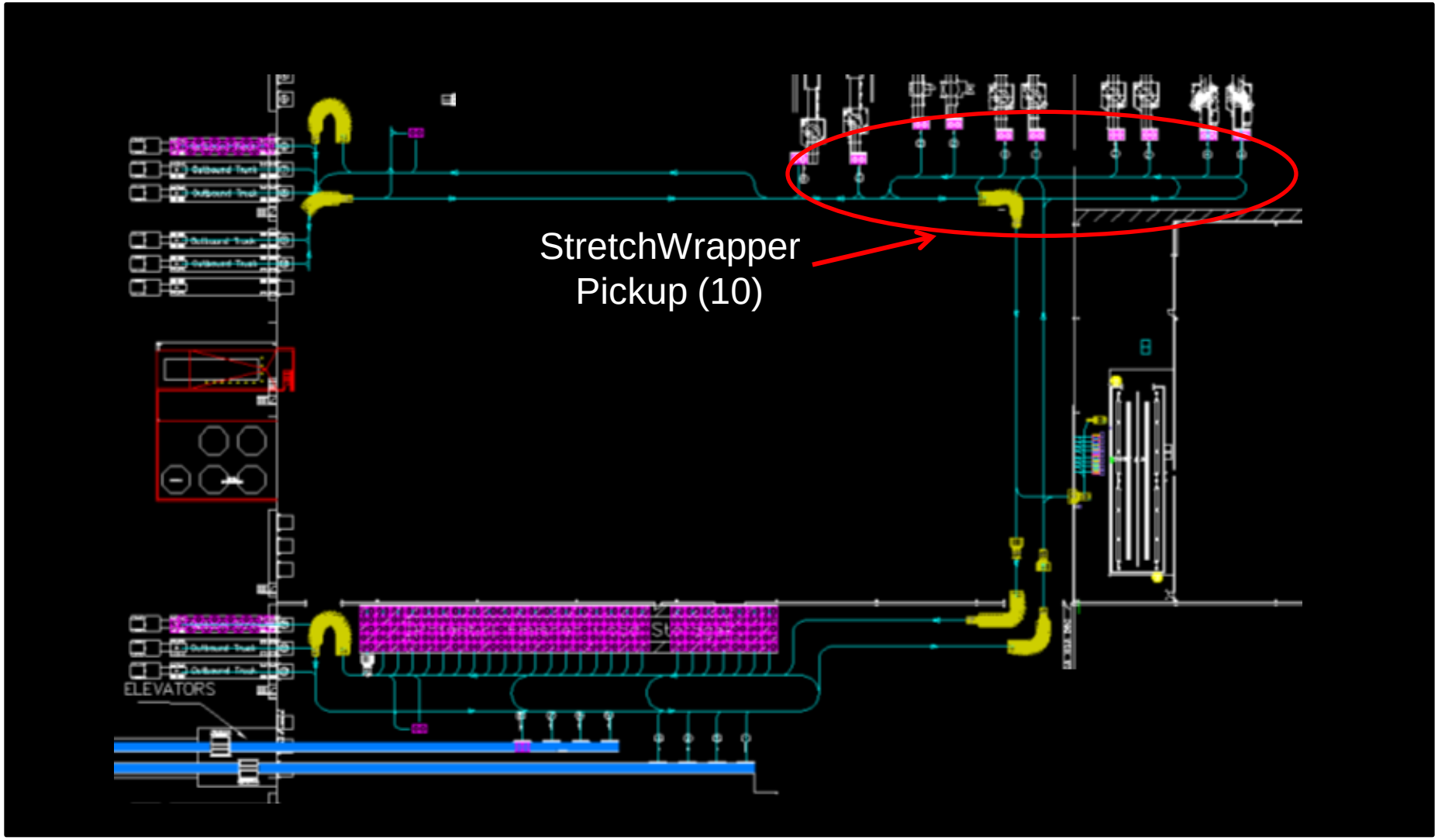
Objectives of Automation

- Automate routine pallet movement at end of line
- Move up to 160 pallets/hour
- Load standard, over-the-road trailers
- Support 7 trailer loading patterns including 20, 21, 22, 23, 24, 25, and 26 pallets based on product weight
- Maximize plant safety
- Reduce plant (dock door) and product damage
- Maximize flexibility to respond to future changes
- Payback required in less than 2 years

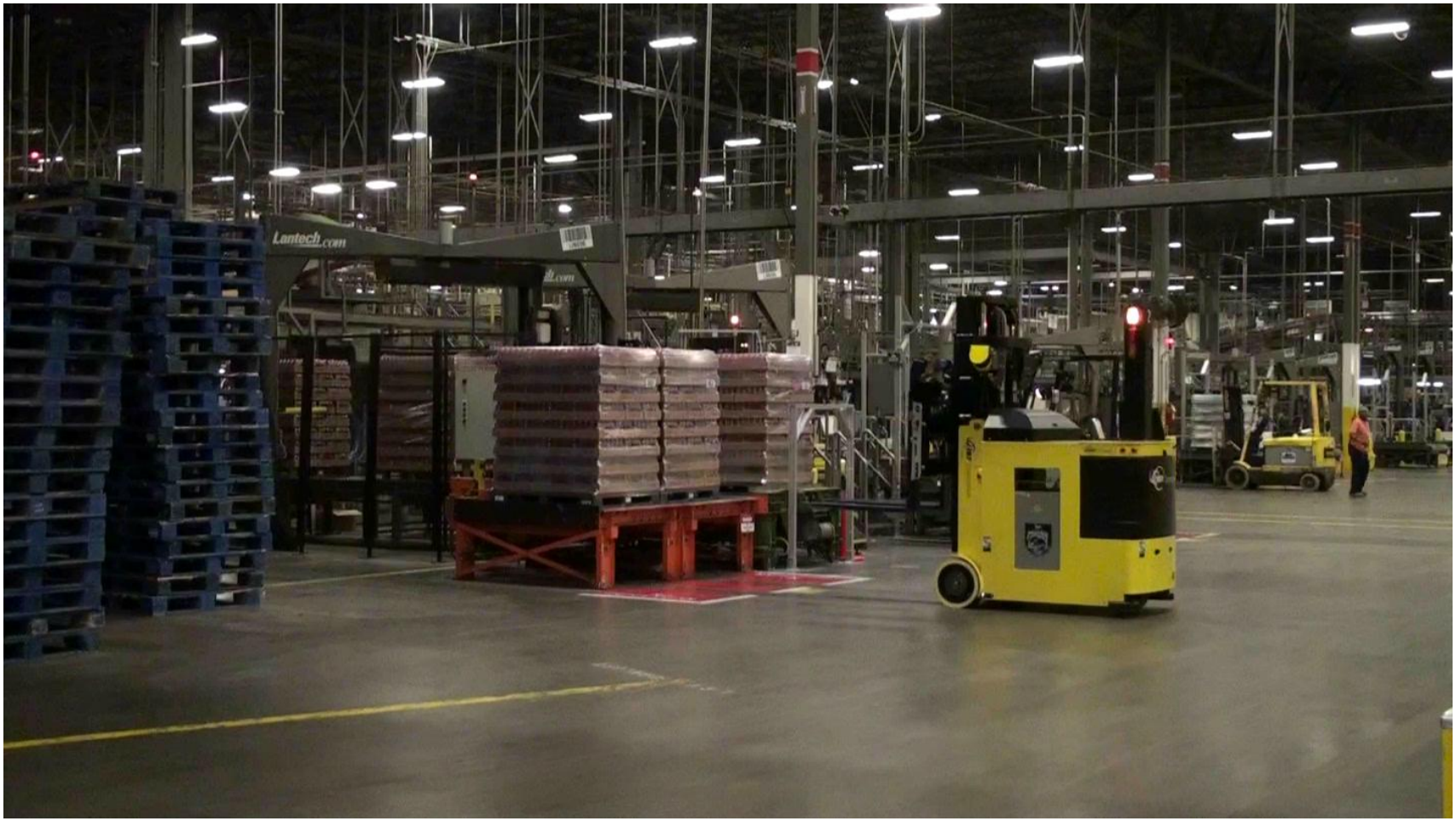
Project Solution

- 10 laser guided vehicles with single/double fork attachment
- 1 Multi-purpose fork vehicle for automatic battery exchange (patented)

Plant Layout



Stretchwrapper Pickup



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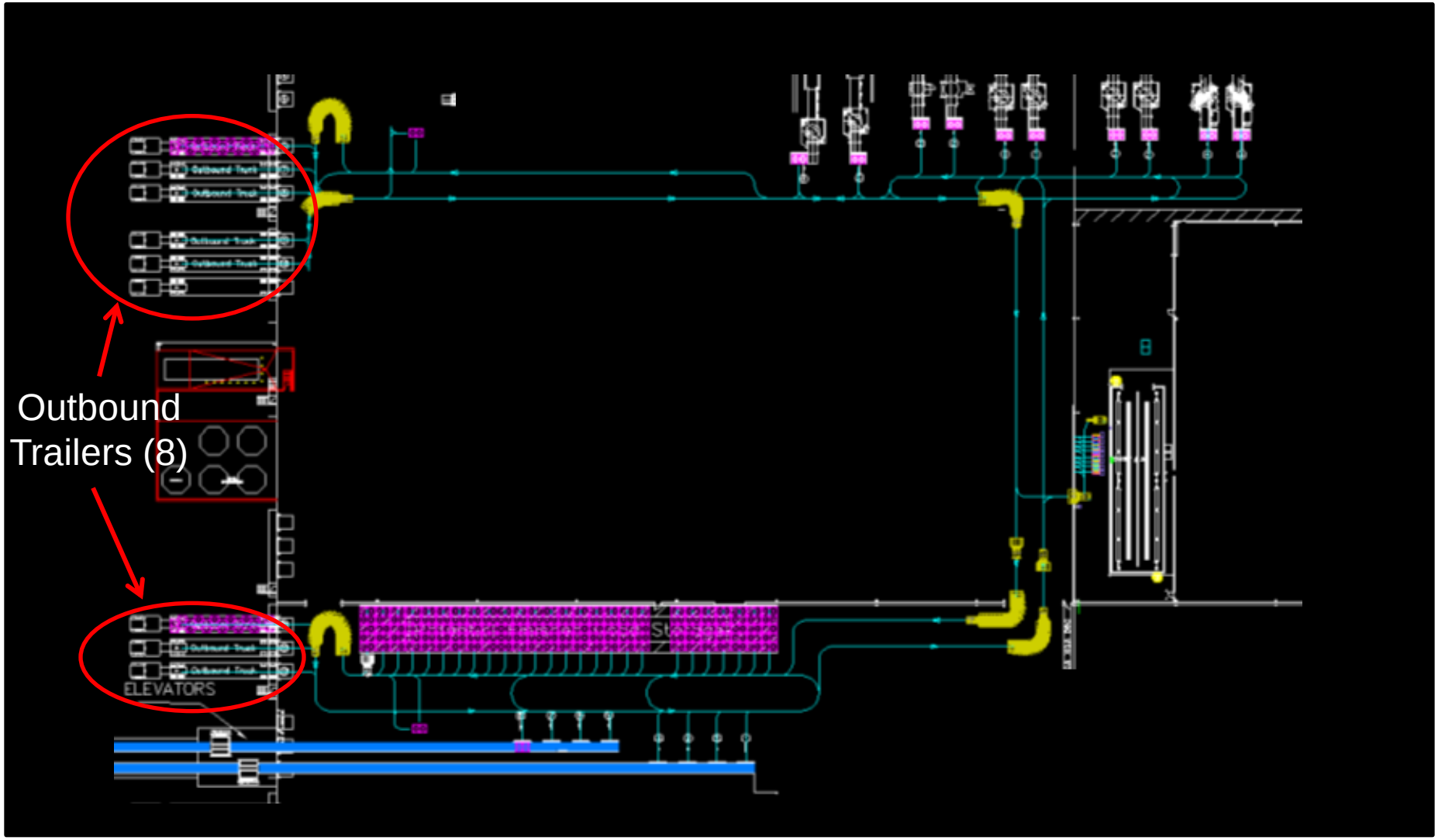
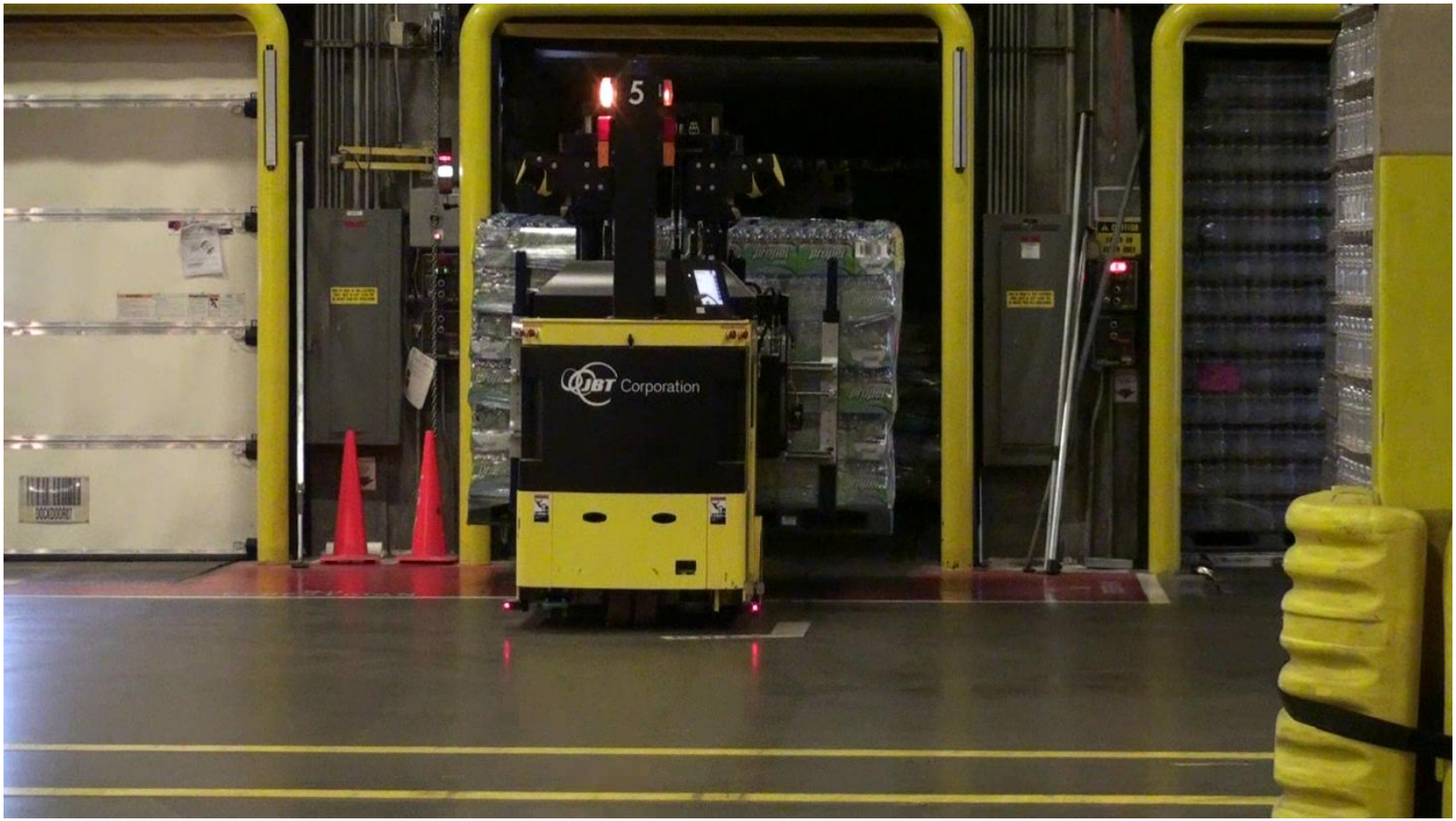


Loading Trailer



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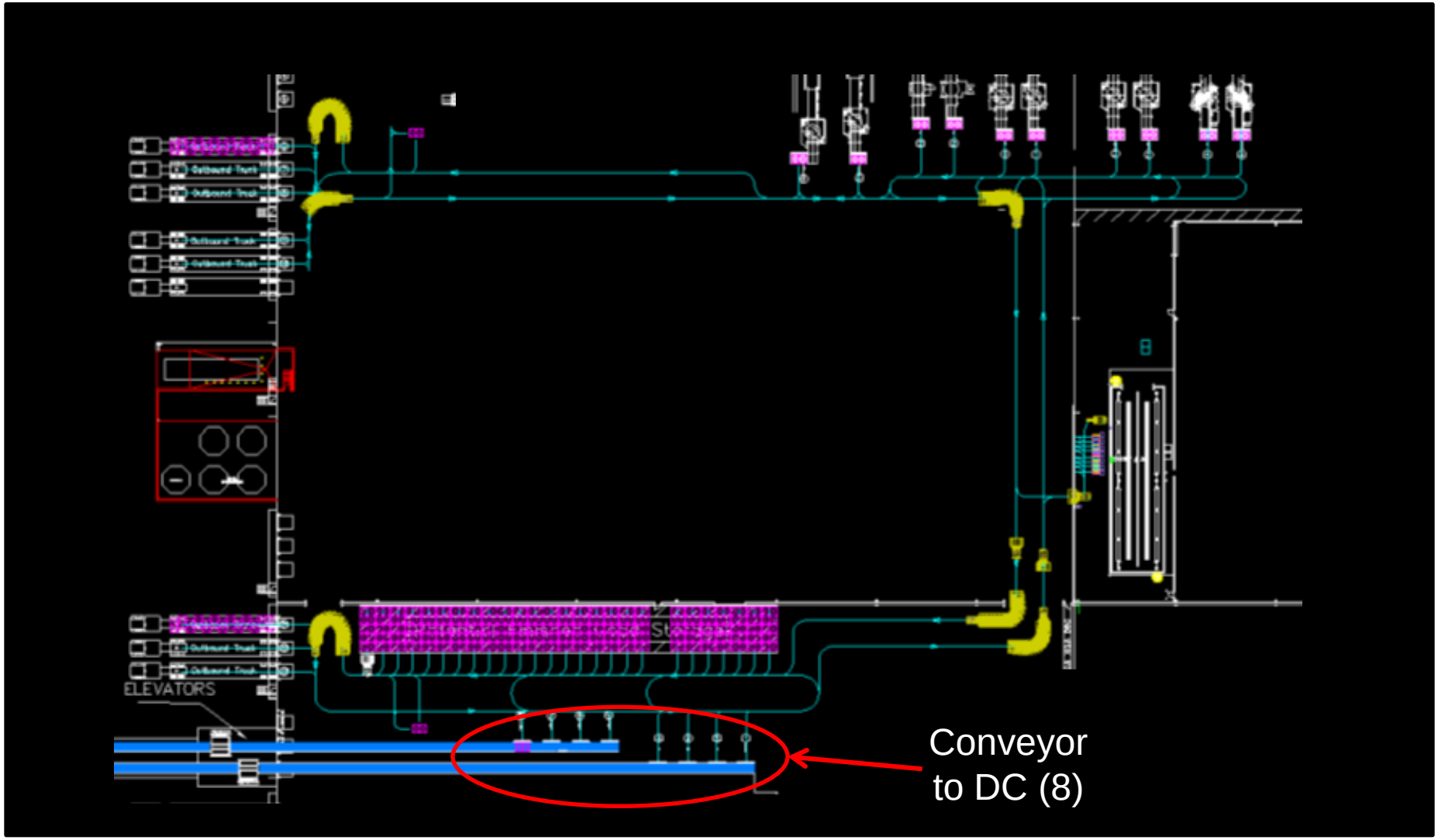
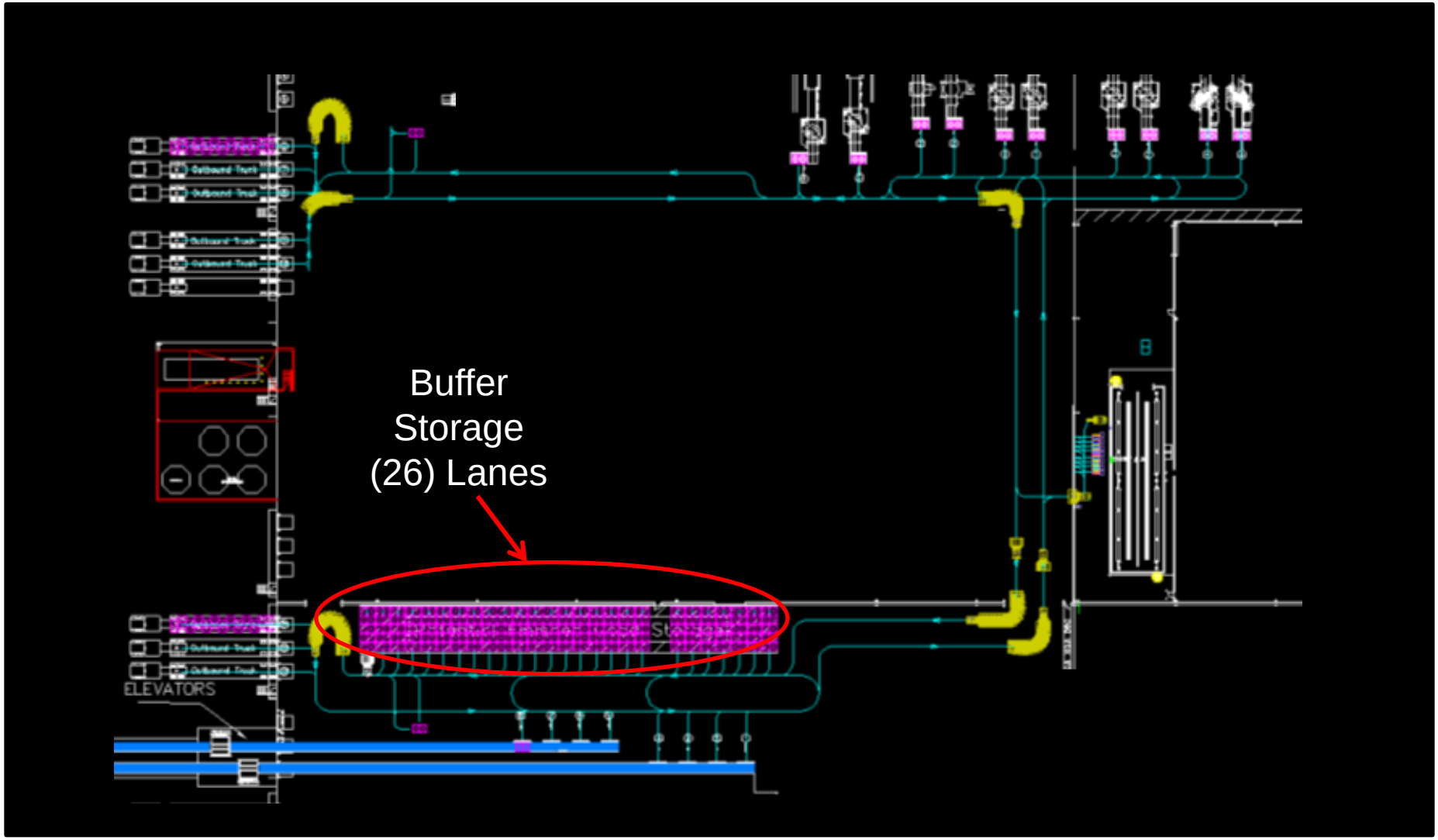
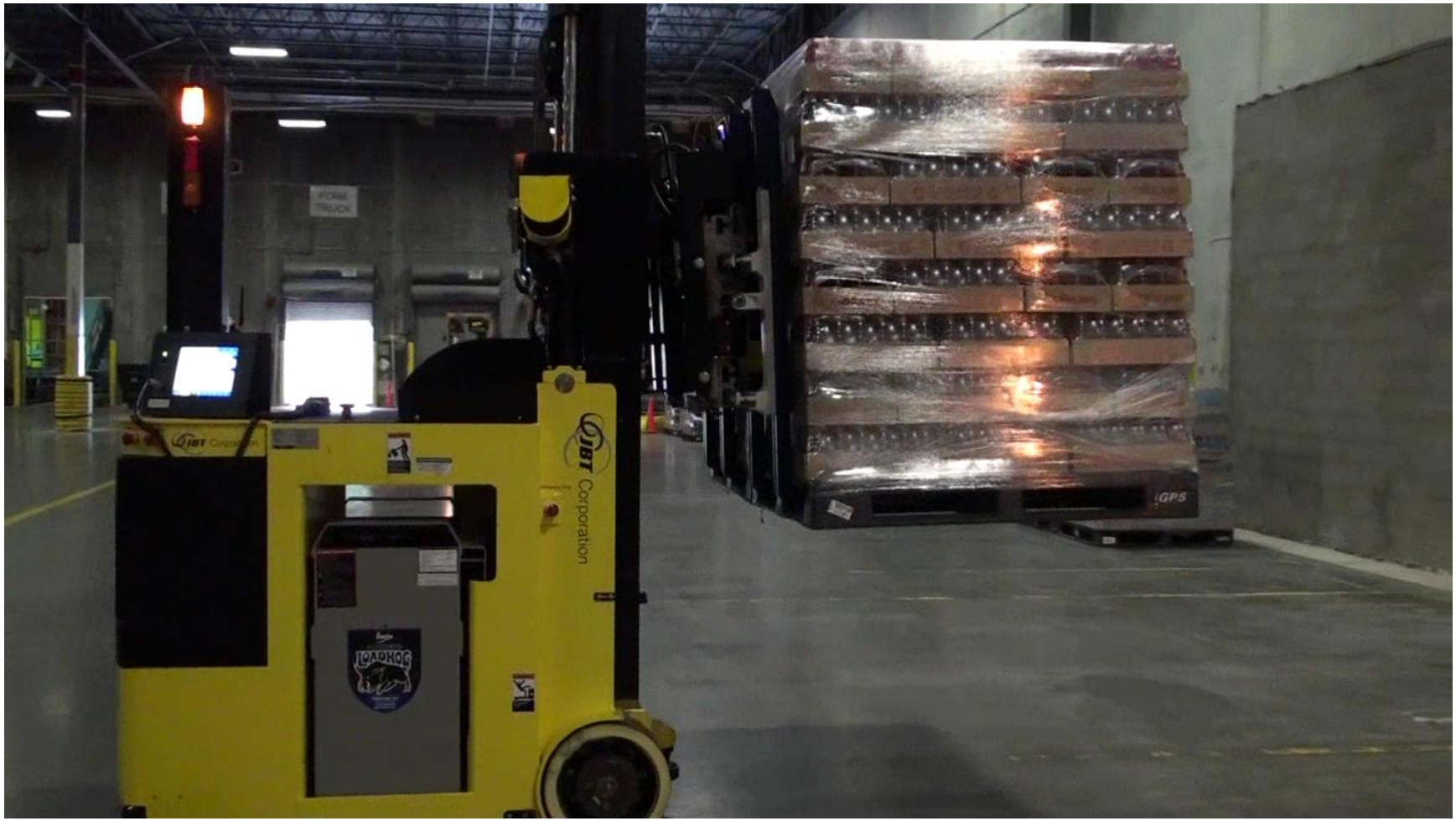


Conveyor Dropoff

Plant Layout



Buffer Storage/Retrieval



Questions

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