Hitachi Vantara

Redesign of Controller Assembly Line for Integrated Flow, Ergonomics, and Quality



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Company Introduction

- Hitachi Vantara Manufacturing
  - Focuses on final product assembly and US distribution
- Norman location
  - Enterprise data storage manufacturing

Problem Context

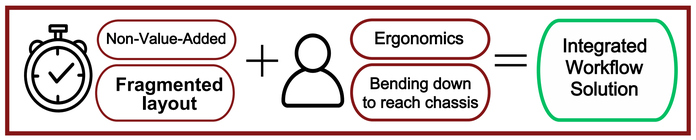


Opportunities for Improvement

- **Eliminate** repetitive walking between station and shelves
- **Unify** a physical station layout
- **Automate** loading chassis onto lift
- **Increase** storage on the line
- **Brighten** the lighting on workstations

Expected Benefits

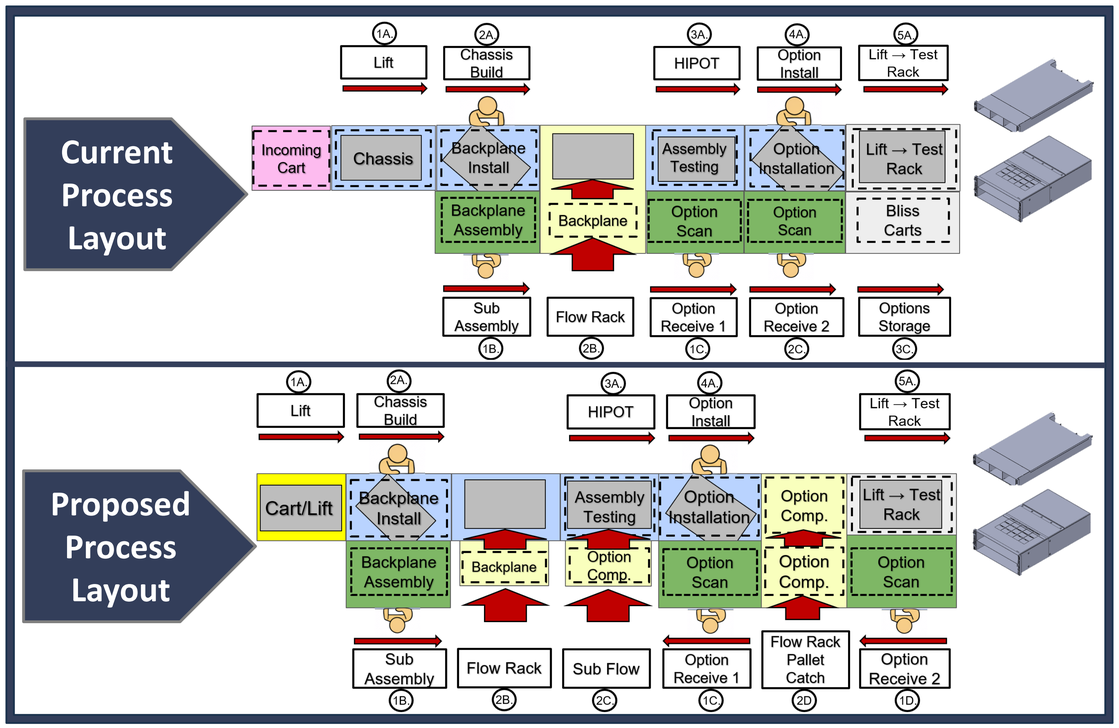
- Improved Ergonomics
- Optimized Process Flow
- Maintained or Improved Quality
- Low Maintenance Costs
- Maintained or Improved Throughput



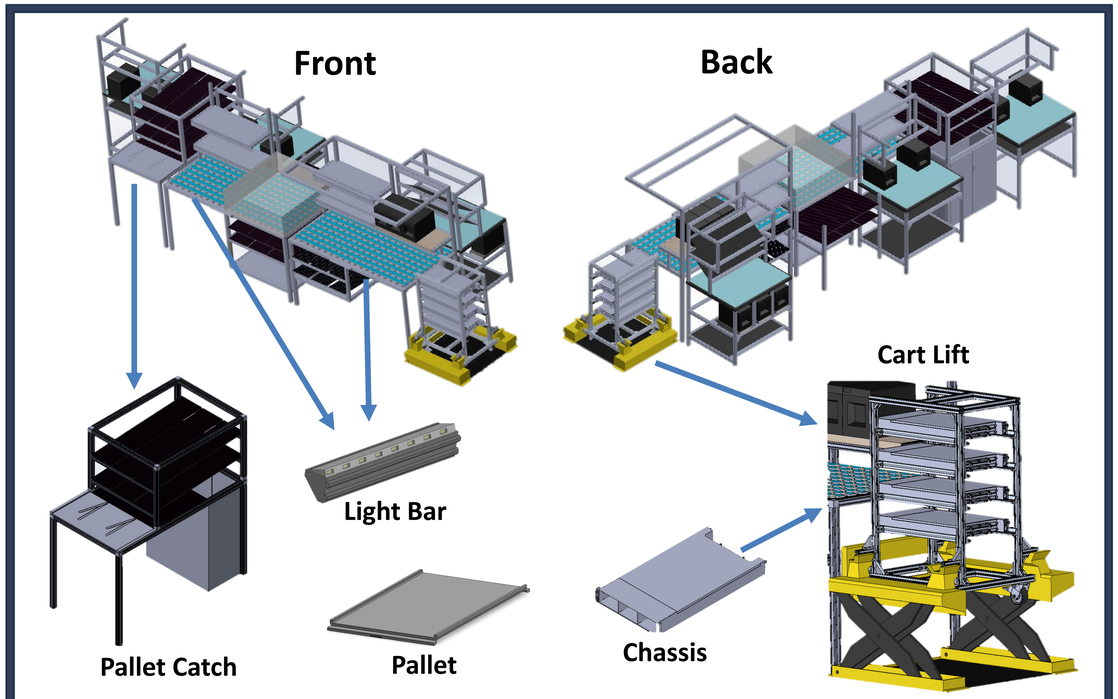
Project Requirements

Budget	Product	Scope	Stakeholders
⩽ 100k	No risk of damage	Similar footprint	Satisfy All
			☑ Hitachi ☑ ISE ABET ☑ AME ABET

Model the System



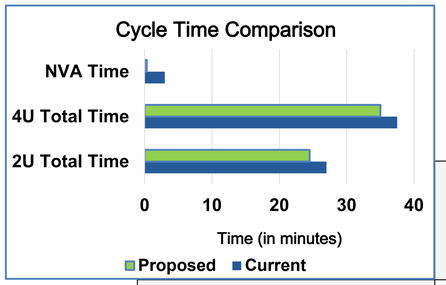
Proposed New Layout



Assess Performance

ARENA Simulation

- ☑ Observed Sample Size (per process) = **20**
- ☑ Simulation Replications = 30 (8-hour shift per replication)
- ☑ Product Mix= **2U** and 4U modeled as separate flows



Arena® Simulation Software

	Current System	Proposed System
Average Cycle Time (2U, min)	27.0	24.5
Average Cycle Time (4U, min)	37.5	35.0
Non-Value-Added Time (min)	~3.0	~0.3

RULA / REBA

↑ Operator Awareness ↑ Engineering Effects

Results

REBA: 4 → 2 ✓
RULA: 3 → 2 ✓

SNOOK Table

Initial Force: 40lb
Sustained Force: 20lb

Population Percentage not strained for task:	Current	Proposed
Initial Force - Male	>90%	>90%
Sustained Force - Male	>90%	>90%
Initial Force - Female	**88%**	>90%
Sustained Force - Female	>90%	>90%

Ergonomic Improvements

	Current	Proposed	Safe
Step Count	13	7	5-15
REBA	4	2	1-2
RULA	3	2	1-2
SNOOK	88%	>90%	>75%
Lighting	820 Lux	1,825 Lux	1k-4k Lux

[SNOOK] Percentage taken from women's initial force measurement
[Lighting] Lux= unit of illumination

Design Implementation

Primary Standards

- **ISO 9001** – Quality Management Systems
- **ISO 14001** – Environmental Management Systems
- **ISO 45001** – Occupational Health and Safety Management Systems