Goodwill Commercial Services: Warehouse Layout Design and Process Improvement

PURDUE UNIVERSITY | School of Industrial Engineering

Adit Shah, Alexa Garcia, Ashwin Jayaraj, Dolaine Qian, Kaitlyn Dougherty

Client Contact: Jason Wiley

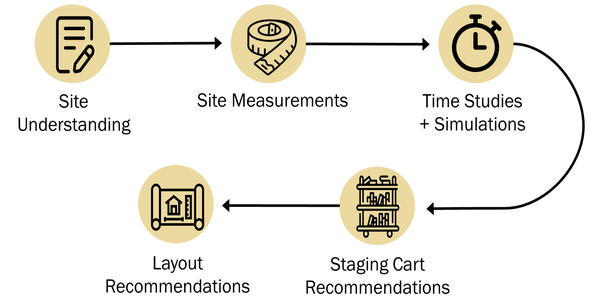
Company Background

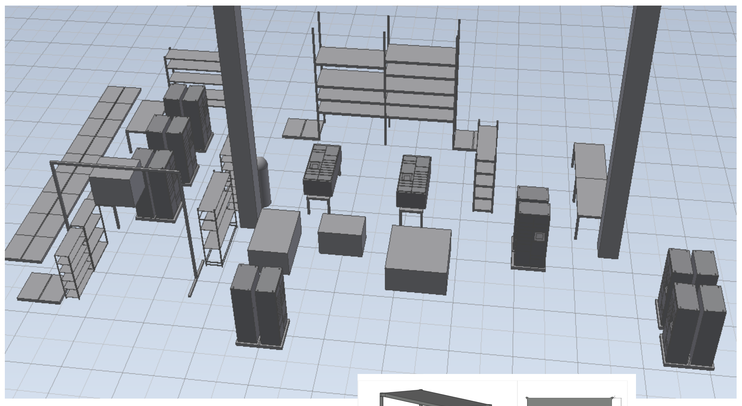
- Located in Indianapolis, Indiana
- Contract manufacturing, packaging, and assembly for various customers. Client's customer focus for this project: Noble Lockers
- There is a 100% turnover rate on Noble line
- Currently there is a need to reduce waste within the Noble Locker system to speed up the assembly process and meet customer demand

Problem Statement

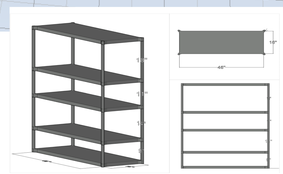
The client's current production layout hinders efficient material flow and product assembly. This suboptimal design requires workers to spend excessive time retrieving essential tools, components, and subassemblies, leading to bottlenecks and delays in the production process. Additionally, the lack of a compartmentalized storage system and inadequate damage-prevention measures for the staging carts result in a significant number of damaged parts, necessitating rework and impacting production efficiency. This extends production lead times, potentially impacting product quality, and ultimately hindering the client's ability to meet customer demands promptly.

Methodology

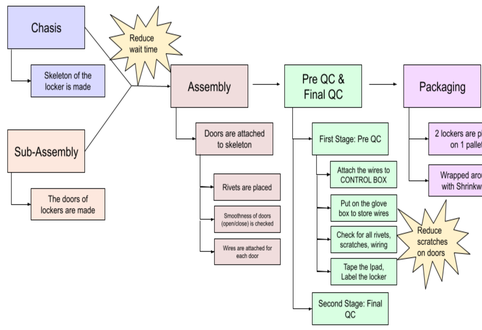




Above: *3D CAD model of current Noble line*
Right: *3D CAD model of current staging cart*

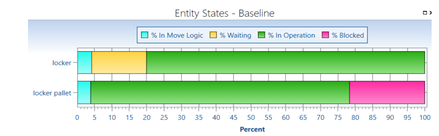


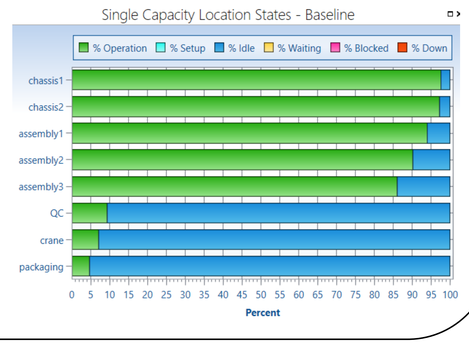
Current System Model



Process Layout for Noble Lockers

- Layout
  - 2 sub-assembly stations, 3 assembly stations, 2 chassis stations, 2-3 packaging, 1 Pre-QC, 1 QC
  - Output: 44 lockers /80 hours
  - Demand: 44 lockers /40 hours
  - Problems: sequential stations not adjacent, flow bottleneck between chassis and assembly
  - CRAFT score of 625
- Staging Carts
  - 10 mobile staging carts, used to each hold all assembly components for 1 locker
  - Problems: parts stack on top of one another and separated by carboard or thin foam leads to components getting scratched





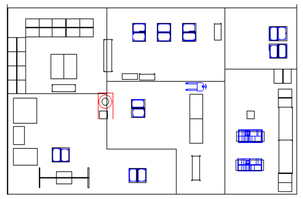
Discussion

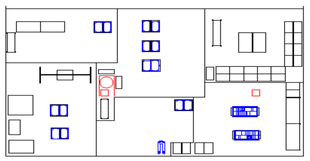
Staging Carts

- Dividers: Wire Shelving Dividers and ULINE Bin Cart
- Material: Felt or Foam Padding
- Used a Weighted Decision Matrix

Layout

- Option A:
  - CRAFT score of 680
  - Simulation (40 hour) output of 44 lockers
- Option B:
  - CRAFT score of 610
  - Simulation (40 hour) output of 44 lockers
- Used AutoCAD Architecture and Inventor to make 2D and 3D layouts
- Used ProModel for Simulations





Further Recommendations

- Consolidate Assembly stations from 3 to 2 (bottleneck)
- Have 2 employees at each Assembly station
  - 1 from previously 3rd Assembly station
  - 1 from available station (Packaging, Pre-QC, etc.)
- Increase frequency of QC inspection

Results

Staging Carts: Wire Shelving Dividers and Felt

WDM scores of 3.6 and 3.35

Layout: Option B