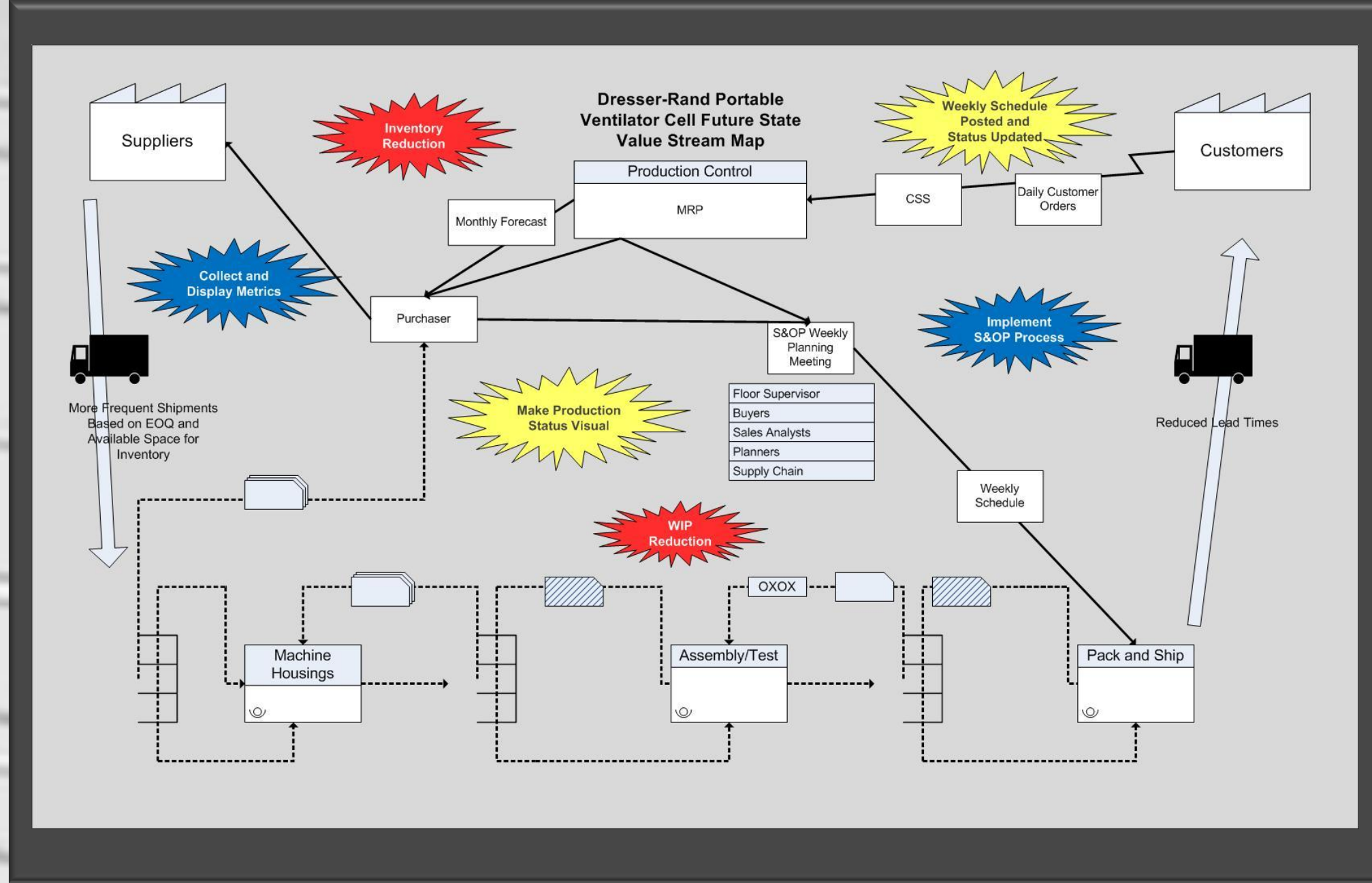


Dresser-Rand Portable Ventilator Cell Process Innovation

FUTURE STATE VALUE STREAM MAP



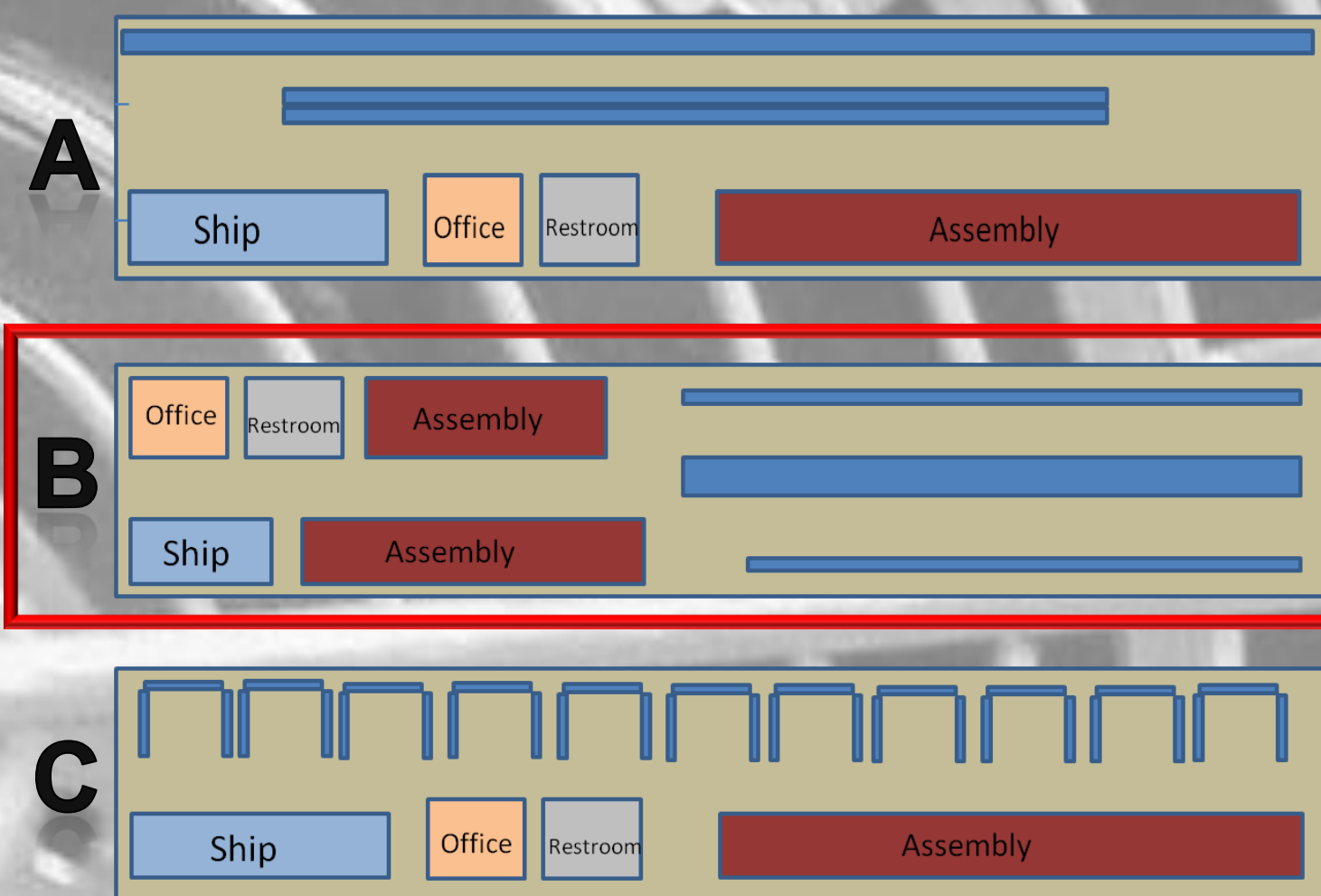
INVENTORY & FLOW ANALYSIS AND IMPROVEMENTS:

VALUE STREAM MAPPING

- Current state and future state maps were generated to analyze the flow in the cell currently and the optimal flow.
- Several Kaizen events were held to initiate improvements

1. Metric Implementation – Data collection was initiated for three important metrics that were not being tracked: On time orders, Cell efficiency, and Inventory Accuracy
2. Inventory Reduction Process – PV inventory was analyzed to get a grasp on the current inventory situation and to highlight areas for improvement. Inventory reduction was focused around what will fit in the new layout design.
3. Sales and Operations Planning – A n S&OP process was created and communicated to Dresser-Rand. The team assisted in preparation of data for the first meeting and implementation of the process.

LAYOUT CONCEPT SELECTION



After thorough analysis of Dresser-Rand's needs, three different layout concepts were developed.

A Pugh Matrix was created to compare the layouts and select the best option for Dresser-Rand.

Layout B was ultimately selected because it facilitated the best flow in the cell.

It provides less storage space than some other options, but inventory reduction is another goal of the project.

Concept	Racks	Space	Distance to Shipping	Aisles	Flow	Total
A	0	0	0	0	0	0
B	-	+	+	0	+	+2
C	-	0	0	-	-	-3

The team met with Dresser-Rand's contractor, Duggan & Duggan, to develop a price estimate for finishing the building and moving the assembly. A cutover plan was also created to prepare Dresser-Rand for the new building and help them determine when they are ready to move.



- Abraham Ruper – Leader (ME)
- Dan Gruber (ME)
- Eric Schroder (ME)
- Abigail Donner (ISE)
- Patrick Grogan (ISE)



Acknowledgements: John Kaemmerlen (faculty guide), Dan Wallace (sponsor), Tanya Black, Erma Simmons, Balbino Arevalo, Lucian Greco, Mike Dollinger, Ron Coleman, Vince Rybicki, Jud Hager, and PV staff.

PROJECT GOALS:

- To provide Dresser-Rand with a proposal to relocate their Portable Ventilator Cell at the Wellsville, NY site from 14,000 square feet of space on the manufacturing floor to a 7,000 square foot unequipped out building on site. The proposal includes the layout for the new building, construction analysis and estimate, and cutover plan for relocation.
- Reduce inventory in the cell by 50%, and improve people, material, and information flow.

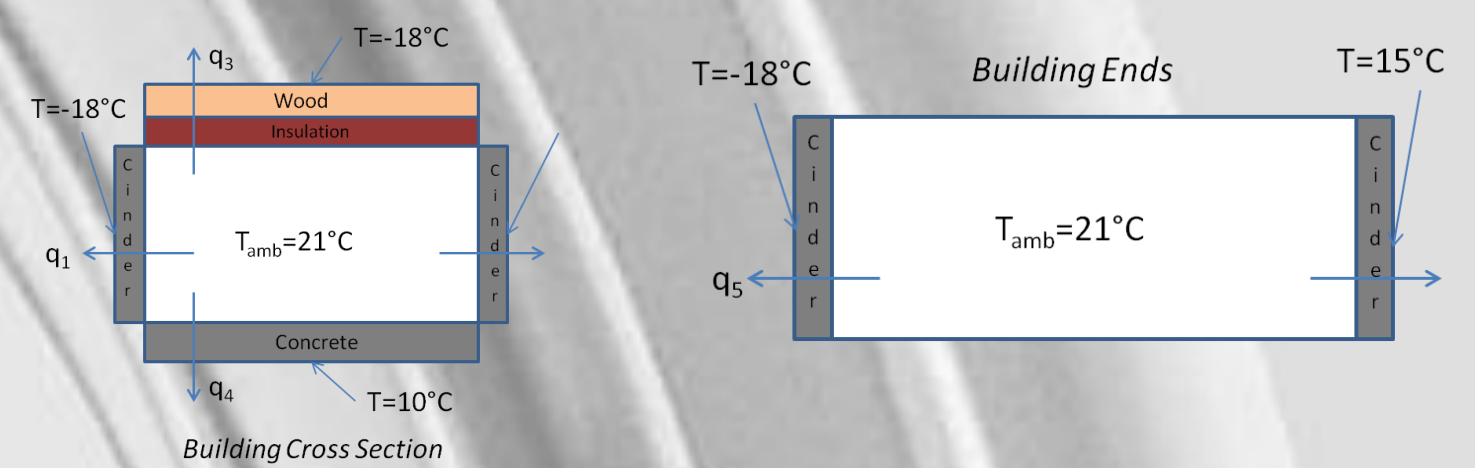
PROJECT BACKGROUND:

- The Portable Ventilator Cell was purchased and moved to the Wellsville facility five years ago, and it has been plagued with material shortages, excess inventory, and low cell efficiency. Opportunities to improve this cell are everywhere, and this team worked on several of them. Relocating the cell to the proposed building will not be possible until the 50% reduction in inventory is complete.

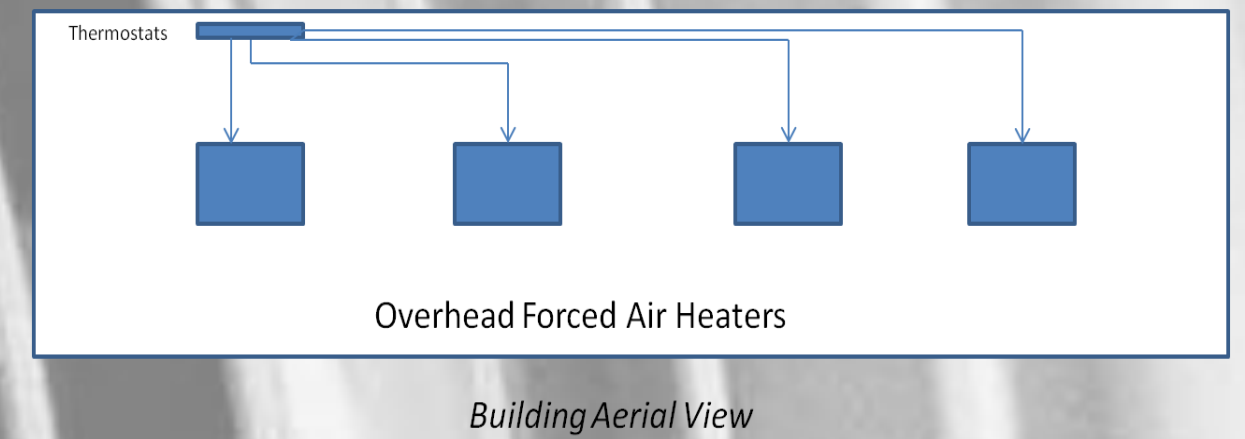
PROJECT MOTIVATION:

- Sales projections for 2011 have increased drastically, and flow within this cell must be prepared for the increase.
- The footprint that the cell is currently occupying is prime real estate for other business opportunities within Dresser-Rand.

HVAC ANALYSIS AND DESIGN



- A conservative analysis was performed using a worst case scenario and setting Outdoor Temperature at 0°F, Neighboring Room Temperature at 55°F, and Ground Temperature at 50°F.
- Four 25 kW forced air overhead heaters with individual thermostats will provide the heating needs for the cell



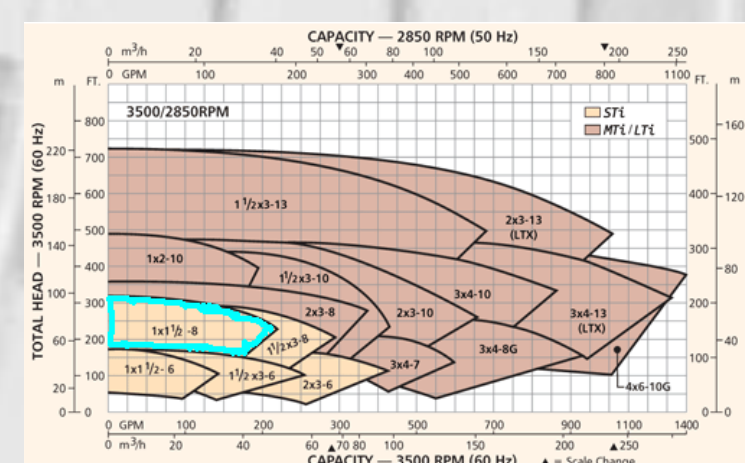
HYDRAULIC ANALYSIS

Pipe Dia: 1"
Pipe Length: ~200ft
(7) 90° bends
(1) Contraction 1.5" → 1"
Velocity=11.23 ft/s

Loss	Value	Unit
$g * z_2$	1610.0	ft ² /s ²
h_L	4865.2	ft ² /s ²
h_{Lm}	344.3	ft ² /s ²
Δp	102.6	Psig
head	236.3	ft

Out Building

Goolds 3196 STI Coverage Chart



Pump House

Pipe Dia: 1.5"
Pipe Length: ~425 ft
Vertical lift: ~50 ft
Velocity = 4.99 ft/s

Sewer

- The hydraulic analysis found that a flow of 28 gpm and head of 236 feet provided from the pumping station would be sufficient for the needs of the cell.
- The appropriate pipe diameters were determined with an optimization process comparing the head loss of smaller pipe and the cost of larger pipe.