

## Client Background



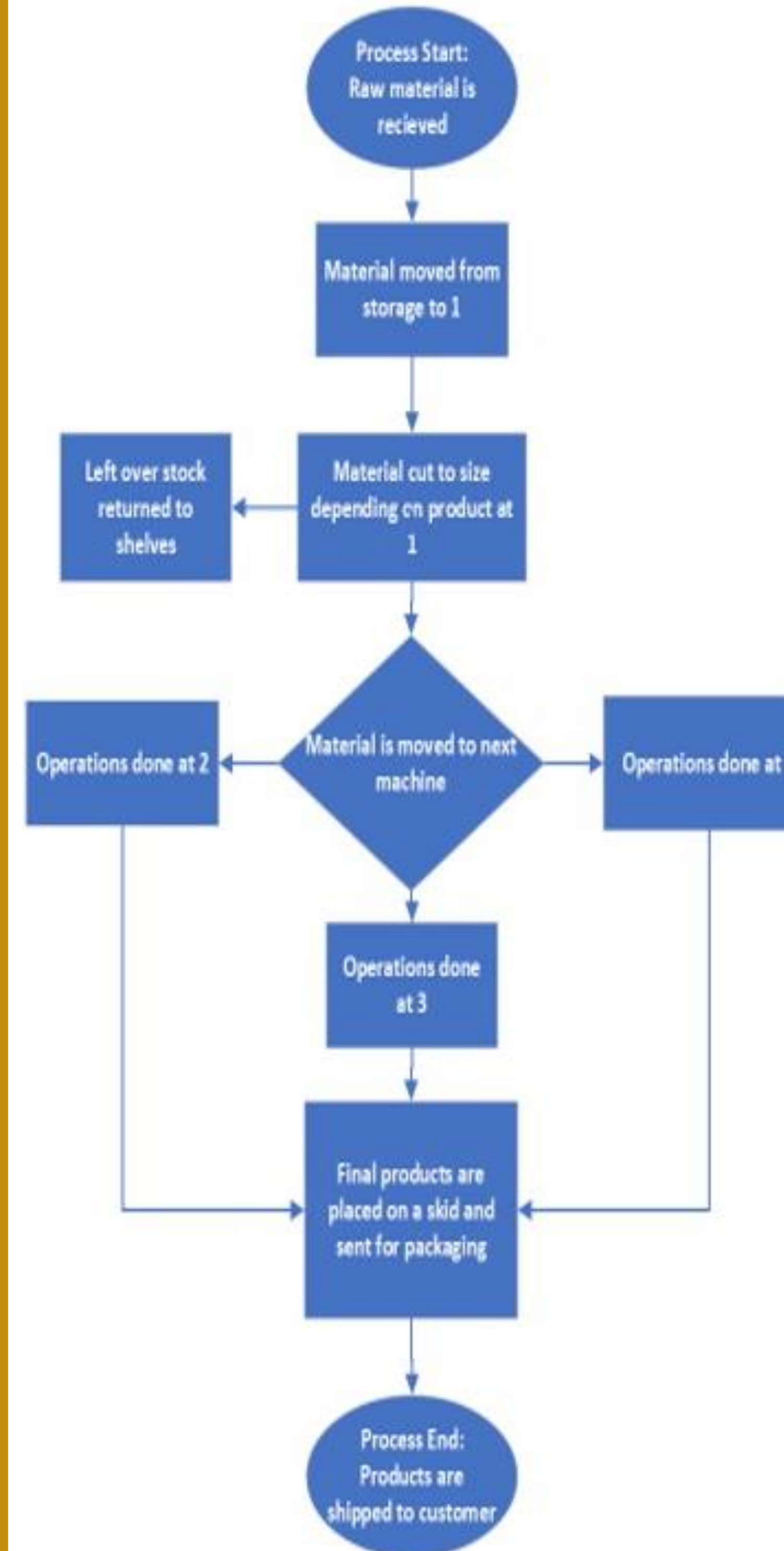
Applied Fabricators or AFAB is a sheet metal job shop located in Greenfield, IN.

They fabricate roof edge metal, single skin wall panels, and other industrial sheet metal products.

AFAB supplies primarily to the refrigeration, roofing, glass/glazing trim and architectural metal panel industries.

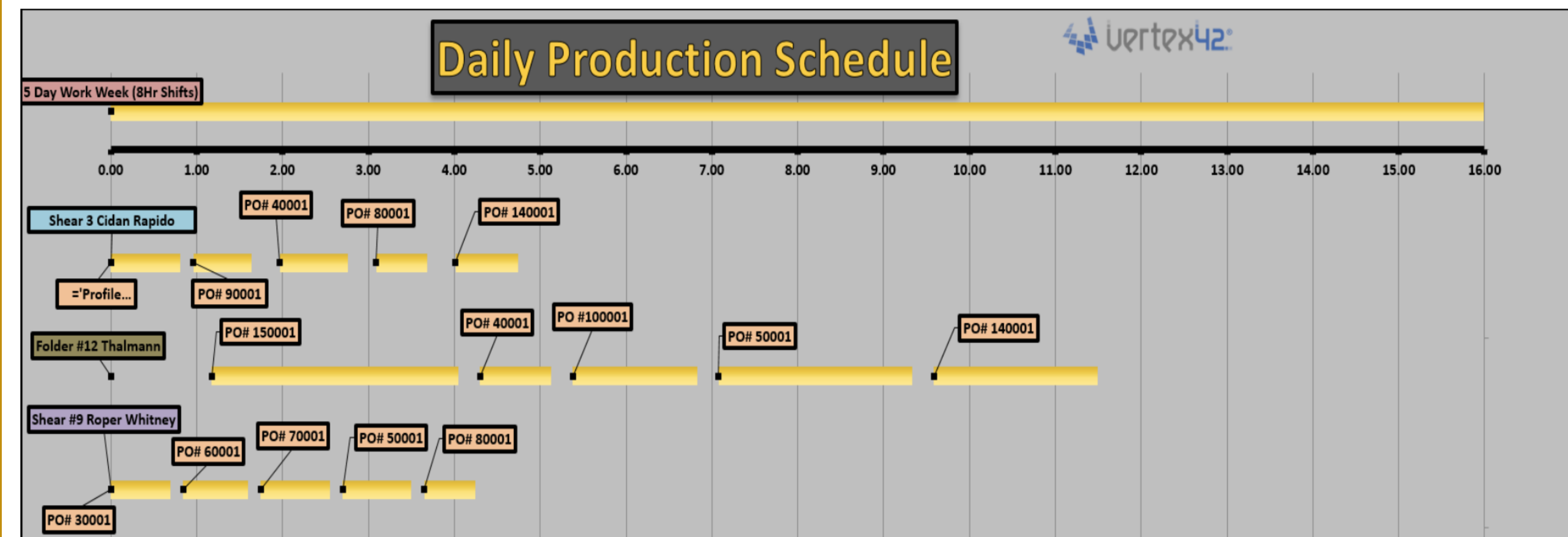


## System Model



## Solution

- Provide AFAB with options on companies to equip legacy machines with data collection capabilities.
- Introduce production scheduling methods.
- Present subscription-based company or team created scheduling tool.
- Facilitate solution integration by creating a comprehensive training document.

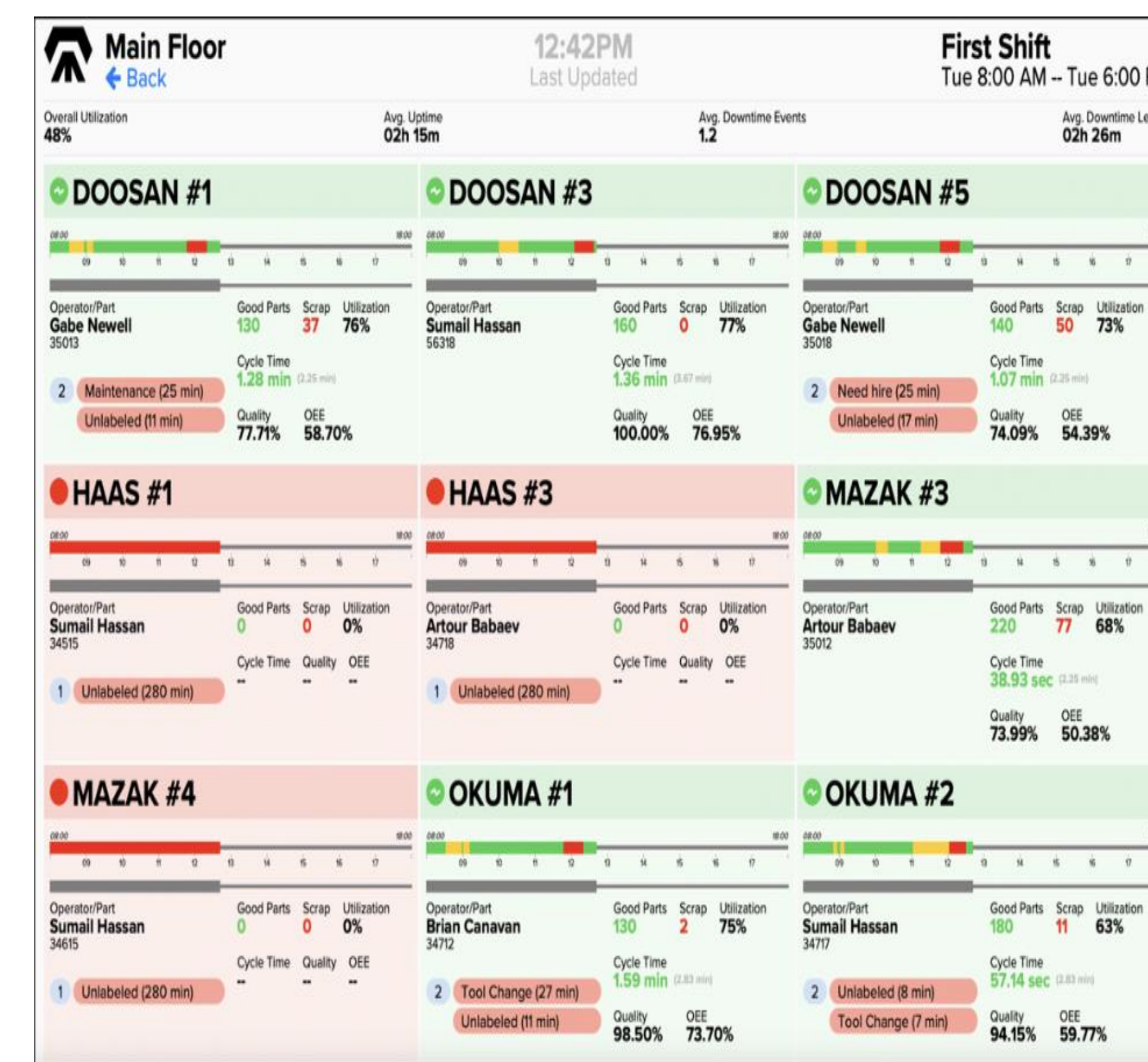


## Problem Statement

AFAB struggles with streamlined production schedules, accurate lead time estimates and is unable to provide accurate quotes to their clients.

They also lack the means to collect machine OEE data due to legacy equipment on the shop floor.

Our goal is to establish comprehensive systems for gathering machine OEE and process cycle time data, and enable AFAB to set up efficient production schedules, estimate lead times, and provide accurate quotes to clients.



Customer orders

Number	Customer name	Part number	Part name	Quantity	Customer number	Status	Created	Delivery date	Price	Manufacturing text	orders
Total: 130											
1	CO-0000	Furniture Alley Ltd	A-00004	Wooden table	5 pcs	CU-00001	In production	17.10.2016		#MO-00001	5 pcs
2	CO-0000	Furniture Alley Ltd	A-00004	Wooden table	10 pcs	CU-00001	Confirmed	16.10.2016	22.10.2016		
3	CO-0000	Furniture Alley Ltd	A-00004	Wooden table	15 pcs	CU-00002	Confirmed	17.10.2016	27.10.2016		
4	CO-0000	Furniture Alley Ltd	A-00004	Wooden table	30 pcs	CU-00001	In production	14.10.2016	19.10.2016	#MO-00001	30 pcs
5	CO-0000	Furniture Alley Ltd	A-00004	Wooden table	20 pcs	CU-00002	Waiting for confirmation	17.10.2016	24.10.2016		
6	CO-0000	Furniture Alley Ltd	A-00004	Wooden table	50 pcs	CU-00001	Shipped & invoiced	17.10.2016	24.10.2016	#MO-00001	50 pcs

## Methodology

Date of Record	Machine	Profile	Operator		
10/2/23	Sedan 12' Shear	Cold Storage Inside Corner	Ryan		
Cycle	Pickup	Run	Remove	Total	
1	1.45	28.12	1.45	31.02	
2	2.89	72.2	1.37	76.46	
3	2.64	26.43	2.4	31.47	
4	4.58	27.49	2.37	34.44	
5	4.34	24.77	2.94	32.05	
6	4.13	25.34	3.36	32.83	
7	3.51	25.91	2.47	31.89	
8	3.64	27.7	2.91	34.25	
9	4.5	23.93	2.61	31.04	
10	4.21	26.13	2.52	32.86	
11	5.01	26.95	3.51	35.47	
12	3.78	23.82	3.22	30.82	
Material transport between machines:		1 2.30.00	2	3	4
Machine Set-up time:		1 1.30.00	2	3	4
Notes: 257 total planned units. Dimensions: 2.5" x 2.5"					

Name of Company	Services	Pricing
Amper Technologies 	-Sensors and software all in one. -Includes live support 24/7. -Limited free trial.	\$12,000/year for a minimum of 10 machines
Mingo Smart 	-Sensors and software separate. -3 levels of subscription offer flexibility.	\$1,600/month \$2,400/month \$3,100/month Sensors average \$400/unit
ProShop 	-Software and dashboards. -Sensors not included, but compatible with third-party sensors. -Training, installation, service all separate.	Manufacturing-\$64/user/month Manager/Office-\$112/user/month Admin-\$148/user/month
LinorTek 	Device and software	Depends on device purchased

## Impact & Future Work

- **Data Collection:** Implementing a machine monitoring system allows AFAB to track their machine utilization and make informed production decisions.
- **Scheduling:** Machine data will facilitate production scheduling using the team's scheduling tool or MRP Easy, for more accurate planning to reduce time wasted and boost machine utilization.
- **Demand Forecasting:** Analyses of the frequency and quantity of purchase orders, and completion time, allows demand forecasting and tracking.
- **Work Force Planning:** Allocate appropriate skills for different jobs and prevent over-hiring and overtime work to reduce labor cost
- **Quoting:** Cycle time data can be used to more accurately price job orders and estimate lead times.