Applied Fabricators Inc: Counting Stacked Sheet Metal

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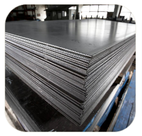
Background

Applied Fabricators Inc. is a sheet metal trim shop located in Greenfield, Indiana. The company was founded in 1984 by Julie and Bob Reeve, currently owned by their son Brandon Reeve. AFAB specializes in three different divisions: roof edge metal, cold storage trim, and glass and glazier trim. Cold storage is the biggest part of their business, which accounts for two-thirds of production. They prioritize flexible and customizable solutions based on the client's needs.

Problem Statement

No means to reduce the time spent counting nor a reliable way to verify customer claims.



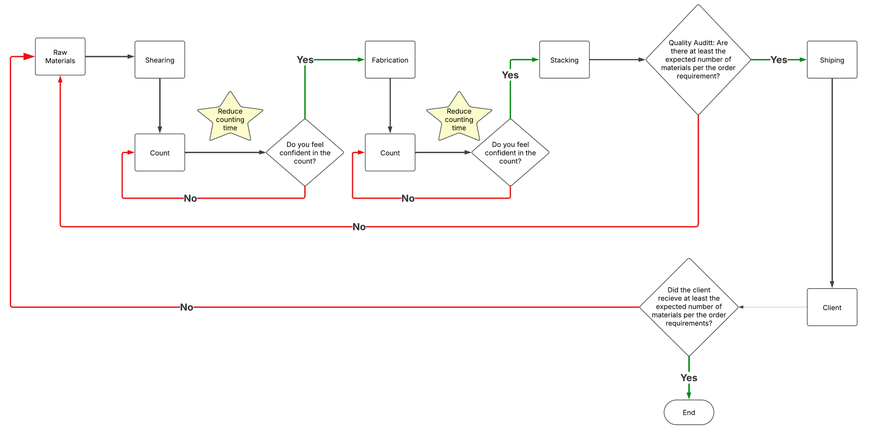
Contributing Factors:

- No standard process for **counting or stacking parts**
- Lack of **reliable tools** for accurate counts
- High variability in **part size, shape, quantity, and stacking method**

Consequences:

- Permits **human error**, that can lead to **miscounts** and **re-counts**
- **Excessive time** spent on counting tasks
- No consistent method to **verify customer claims**

System Model



AFAB uses a job shop style of manufacturing due to its ability to curate custom parts to fit the client's needs, thus making standardization difficult.

Methods & Results

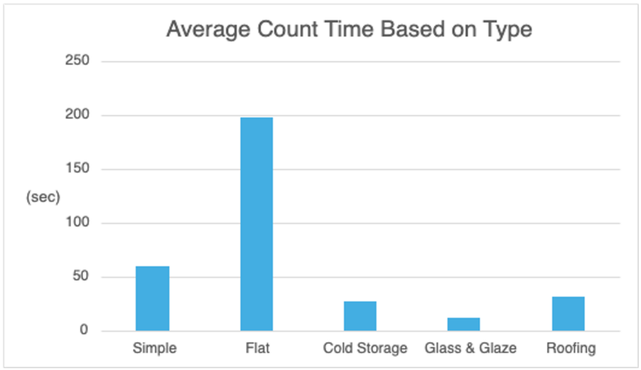
Progression

Research → Collect Data → Analyze Data → Implement

Time Study

Date	Shipment#	Quantity	Part Size	# of Profile(s)	Part Family	Part Description	Time to Count (seconds)
4/4/25	6109	22	Medium	1	Roofing	Coping	9
4/4/25	6062	65	Medium	3	Roofing	Coping/Chairs/Splices	27
4/4/25	6095	41	Medium	10	Roofing	Gutter/D.S./Gravel	20
4/7/25	6118	6	Medium	3	Roofing	Snap Edge/Cleat/Splice	3
4/7/25	6124	22	Medium	2	Roofing	Coping/Splices	9
4/8/25	6122	57	Medium	12	Glass & Glaze	Hats / Angle	36
4/8/25	6123	100	Medium	6	Cold Storage	Flats	45
4/8/25	6123	80	Medium	1	Cold Storage	Angle	36
4/9/25	6120	15	Medium	8	Glass & Glaze	Caps/Flats/Angle	11
4/10/25	6152	12	Medium	1	Glass & Glaze	Angle	5
4/10/25	6151	160	Medium	1	Roofing	Angle	2

Statistical Analysis



Comparative Analysis

Approach	Description	Advantages	Disadvantages
Standardized Stacking and Bundling	Stacking sheet metals for visual grouping and bundling to reduce mental load	- Reduces cognitive load - Optimizes space usage	- Customization makes it difficult - Prone to human error
Counting Scales	Using scales to determine the number of parts using weight	- Fast and automated - If variance is low, there is minimal process change	- High variance in part weight can lead to miscounts - Requires large sample size for calibration
Sortation Robot	Use robot for stacking and counting process	- Reduces human error - Increase efficiency and automation	- Expensive - Client is averse to robotic solutions
AI Scanners	Using AI image recognition for counting	- Provides automated counting - Reduces human errors	- Difficult for non-standardized parts - Needs data to train
Machine Program Capabilities	The fabricating machines can grab data on quantities of parts per shipment.	- Aids the counters with counting - Reduces human errors - Potential for collecting data and rectifying customer claims	- Currently, data from all machines cannot be collected - If an error or defect is found during the quality audit, the machines' count is not valid

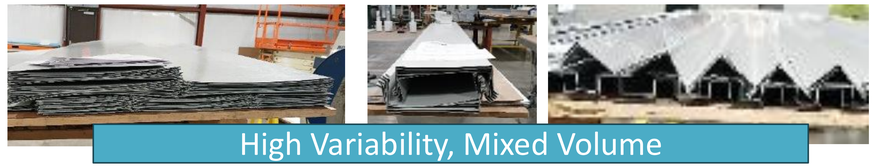
Standard Operating Procedures

Stacking and Bundling → Packaging → Picture Taking → Upon Delivery

Potential with RFID Scanning

Discussion

Challenges



High Variability, Mixed Volume

Limited production data make implementing systems based on digital records difficult.

Next Steps

Time studies to evaluate difference between trained auditor and average workers. To determine proposed SOPs benefits for all workers. Predicting cost savings.

Future Improvements

Integrating RFID tags to digitally track bundles.

- Improves inventory verification.
- Reduces reliance on manual methods.
- Avoid miscounts and customer claims.
- Improve employee and customer satisfaction.