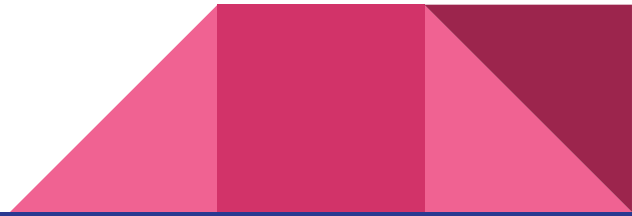
Team 8 Presentation

Priyanshu Sethi, Gavin Ward, Evan Poirier, Trenton Ottman, Nathan Hubbell

The Problem

- It costs **$298,122** to operate the assembly line during a quarter

- Repairs account for **$254,922** which is too high



The Solution

- We can bring the total cost down to **$48,978**
- We save **$249,144** on repairs alone

But How?

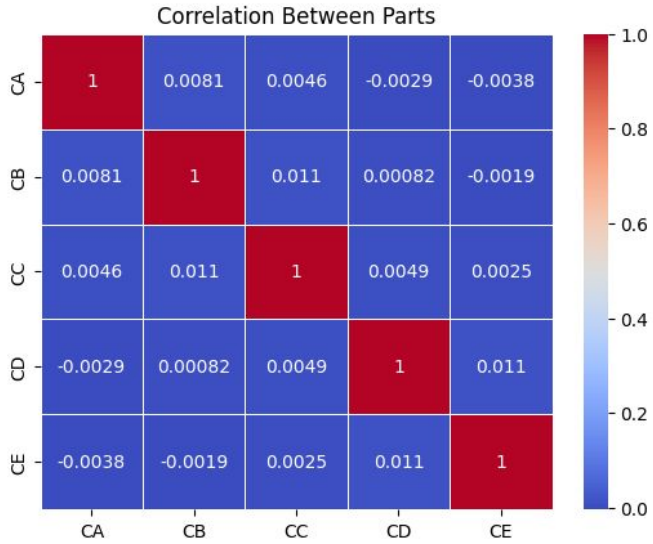
The Three Step Process

Strategize - Optimize - Utilize

- **Strategize** and reorder the assembly stations
- **Optimize** inventory allocations and restock triggers to never run out of parts
- **Utilize** the material handlers to efficiently restock the stations

Let’s Strategize

We want to make sure that the positioning of one station does not influence other stations.

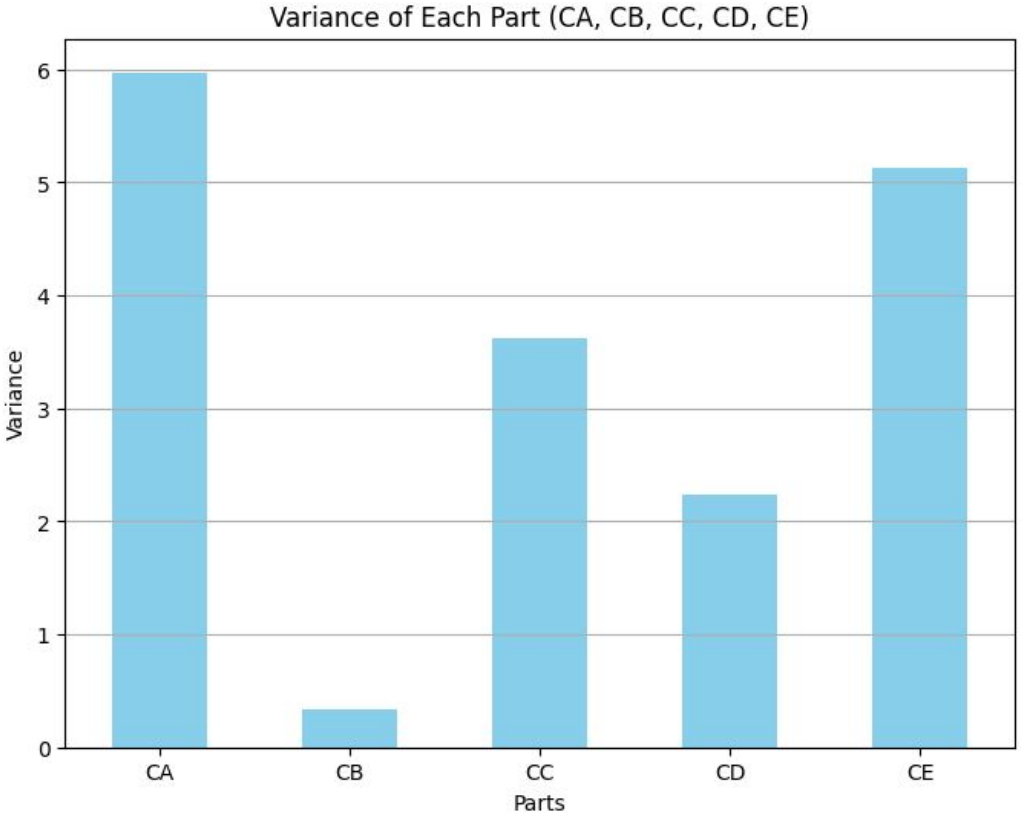


What Now?

The correlation graph demonstrates that **positioning of one station does not affect the others.**

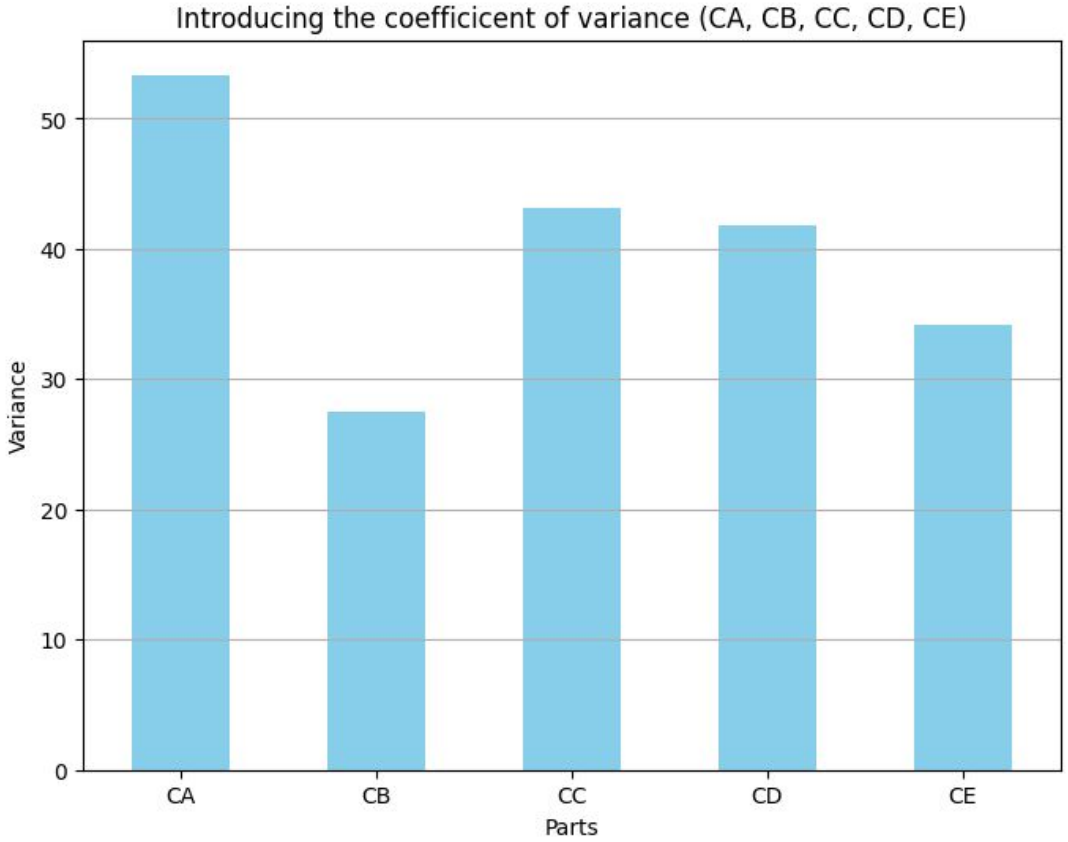
But, different stations have **varying amount of parts** and they're all used in different quantities based on historical data.

That means we can put the more **stable stations** further down the assembly line since we can be more accurate about their inventory.



Different stations have different amounts of variants.

To represent variance with this in mind, we need to use a better variance measure.



This accounts for the different amount of parts at each station.

$$\text{Coefficient of Variation (CV)} = \frac{\text{Standard Deviation (s)}}{\text{Sample Mean } (\bar{x})}$$

The Final Assembly Line

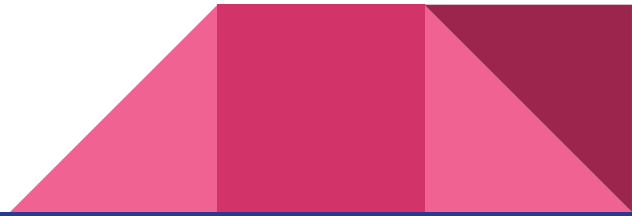
We placed the most variant part at the front, and the least variant at the back.

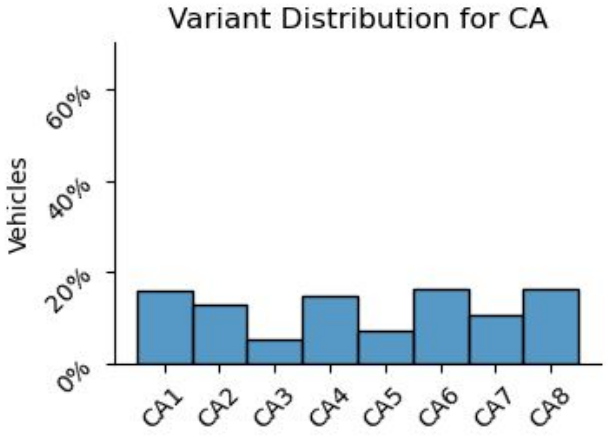
CA: ~10 mins to restock
CC: ~15 mins to restock
CE: ~ 18 mins to restock
CD: ~ 23 mins to restock
CB: ~30 mins to restock

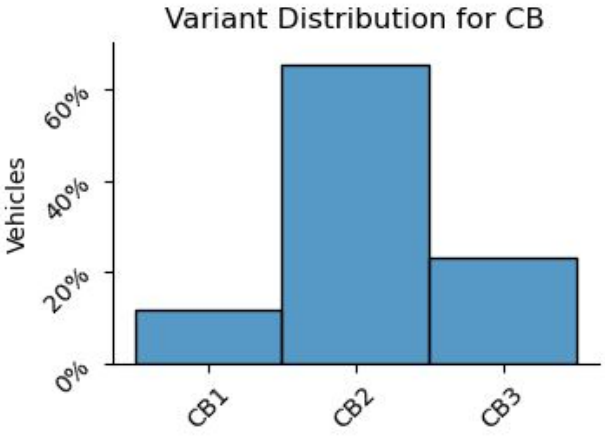
This order alone saves us about **$50,000**

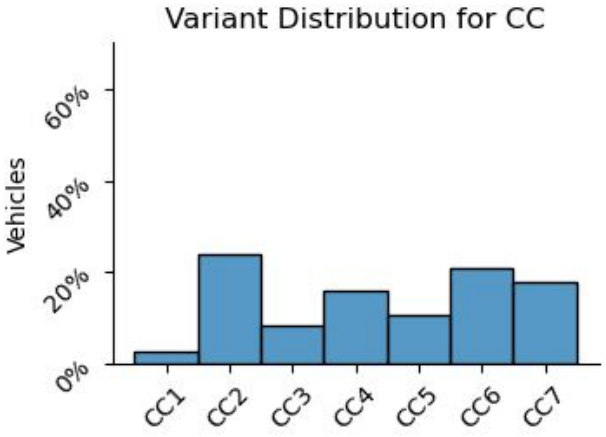
Now Optimize!

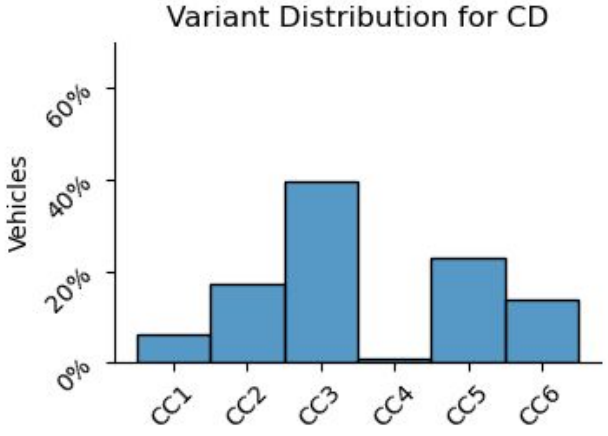
Relying on our stability based restocking method, **past trends** can be analyzed to predict the usage of each part at a station keeping the hard limit of 100 in mind.

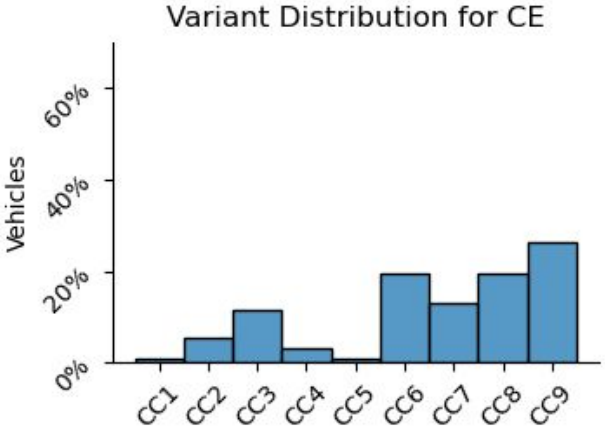


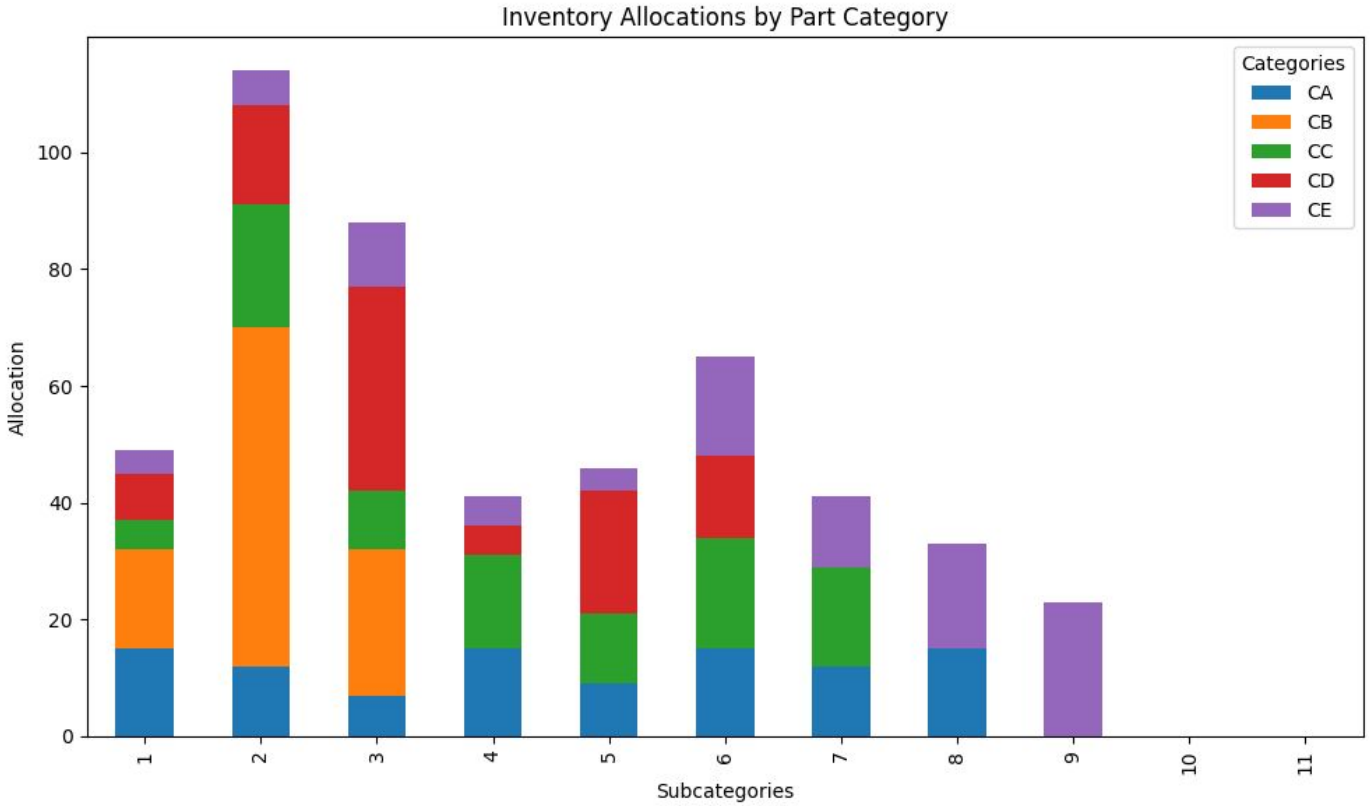

Variant Distribution for CA
Vehicles
0%
20%
40%
60%
CA1
CA2
CA3
CA4
CA5
CA6
CA7
CA8


Variant Distribution for CB
Vehicles
0%
20%
40%
60%
CB1
CB2
CB3


Variant Distribution for CC
Vehicles
0%
20%
40%
60%
CC1
CC2
CC3
CC4
CC5
CC6
CC7


Variant Distribution for CD
Vehicles
0%
20%
40%
60%
CC1
CC2
CC3
CC4
CC5
CC6


Variant Distribution for CE
Vehicles
0%
20%
40%
60%
CC1
CC2
CC3
CC4
CC5
CC6
CC7
CC8
CC9



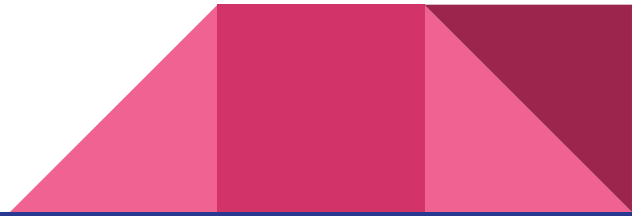
These allocations save us another **$90,000**

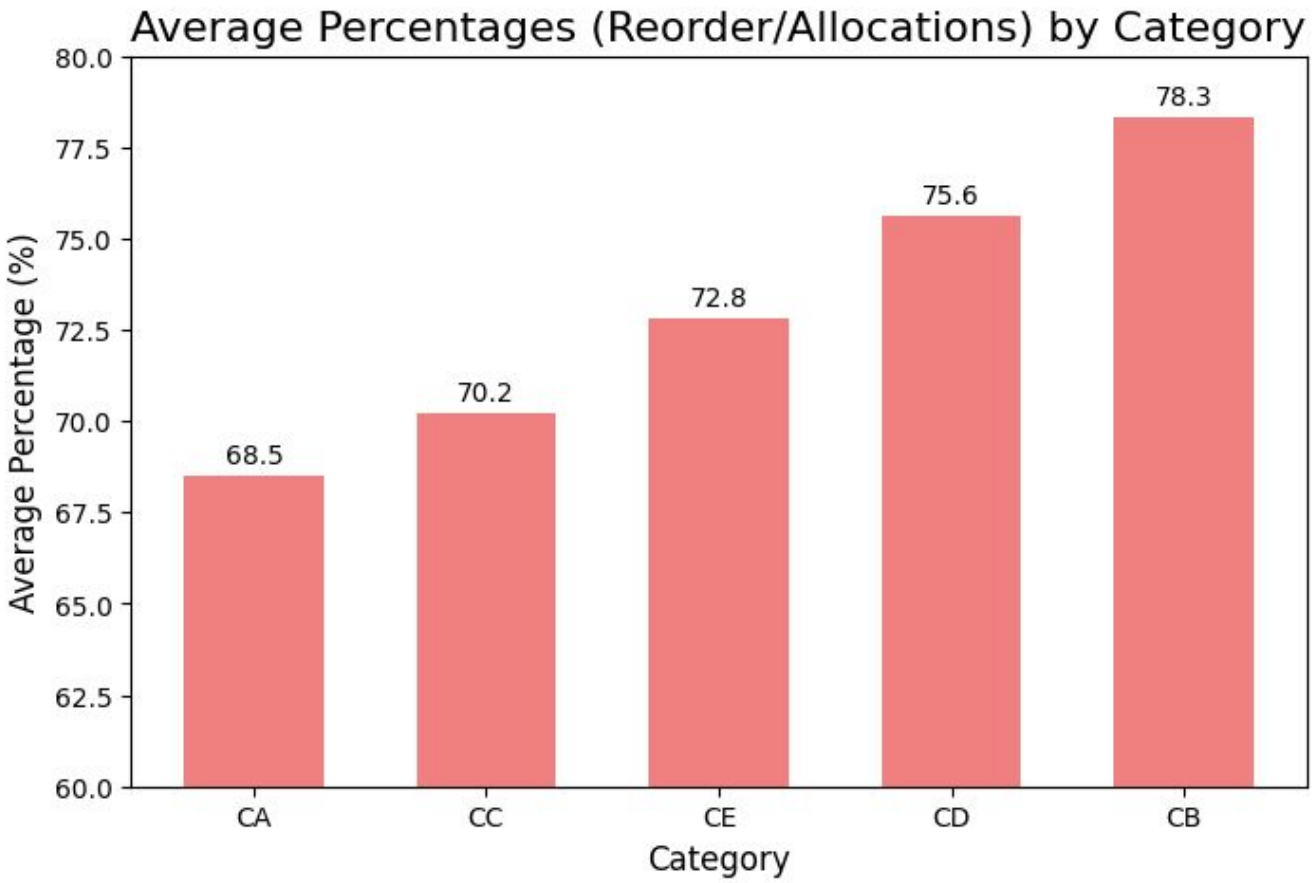
What about the Reorder Triggers?

Handlers are expensive. So let’s use them well.

The further down we go on the assembly line, the minimum stock before a reorder request is made becomes higher since it takes more time to fulfill it and the production needs to keep running.

We used an iterative algorithm on the quarterly data to accurately predict the best percentages



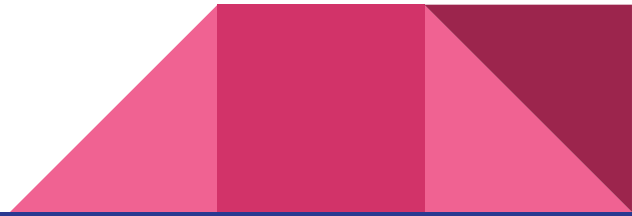


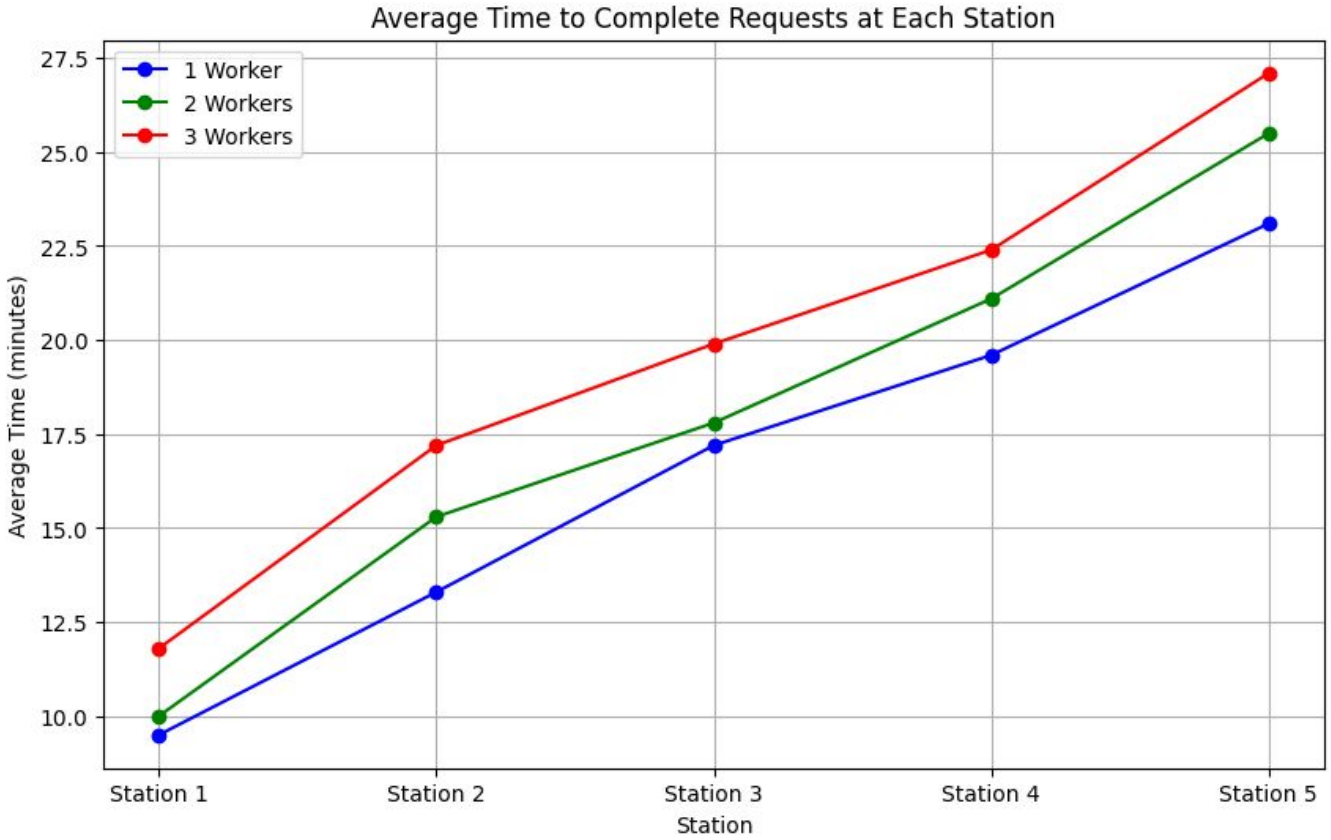
These Triggers save **$103,000** in repair costs

Finally, Utilize!

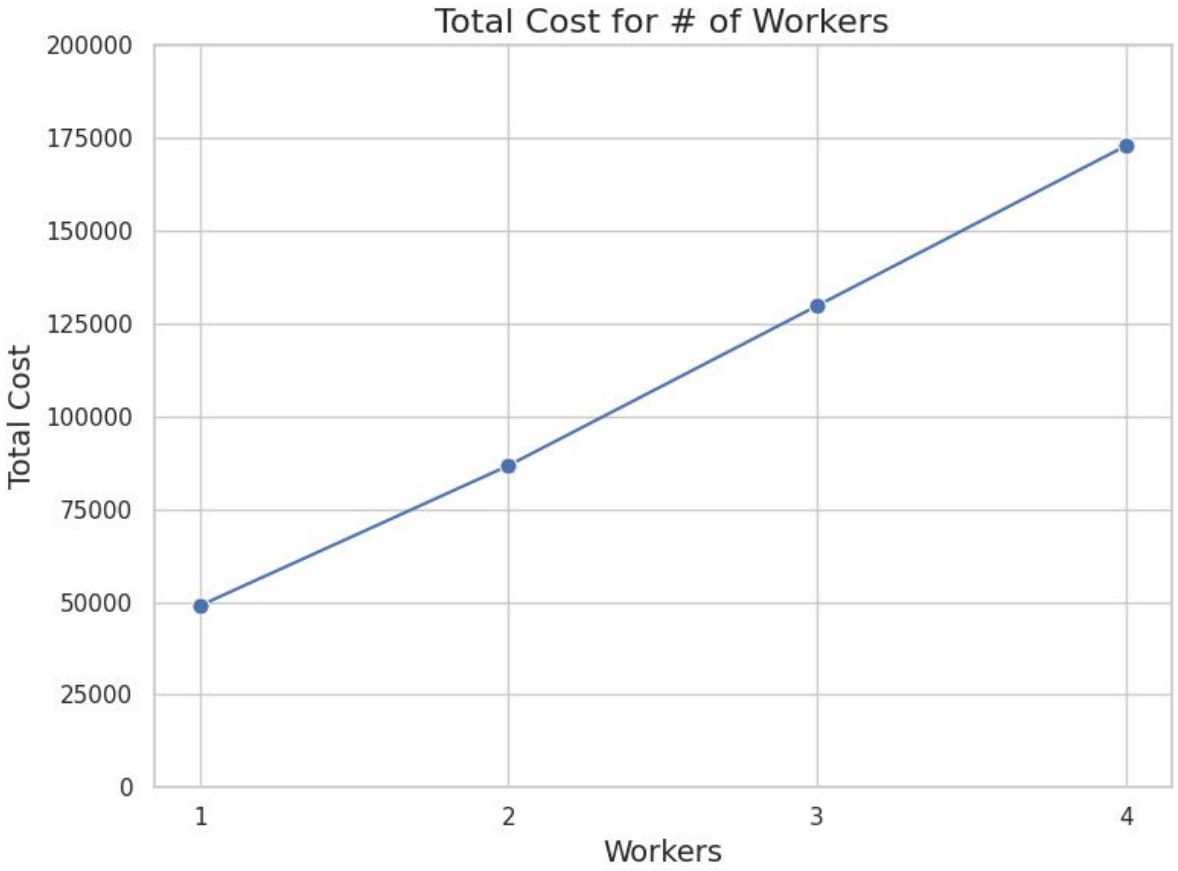
Handlers help with restocking but hiring a lot of them, can cause congestion issues on the floor.

We analyzed the part **delivery times** and historical **repair costs** to find the sweet spot for the number of handlers required.





The delivery time **goes up** as more handlers are introduced



Each handler costs $43,200 per quarter.

So we will only have **one handler** for most efficient operations.

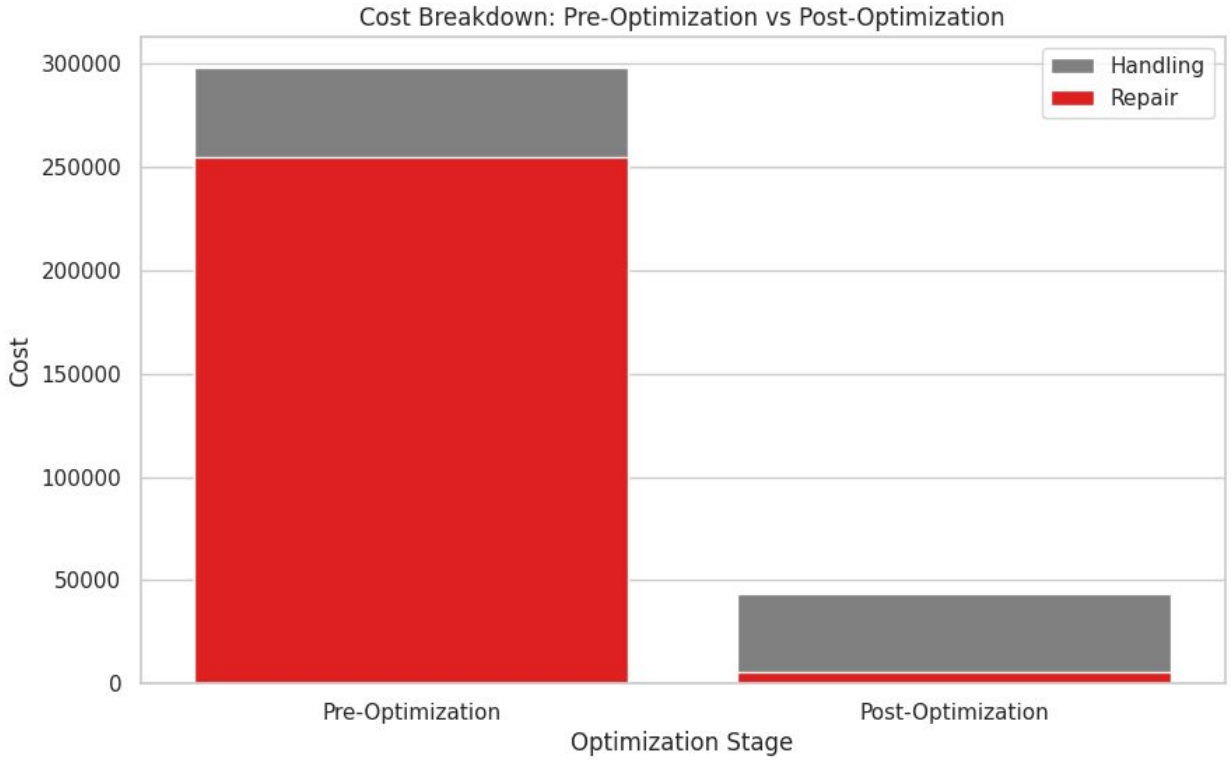
The Conclusion

Total Cost:- $297,868.5 ➡ **$48,978**

Repair Cost:- $254,922.5 ➡ **$5,778**

Handling Cost:- $43,200 ➡ **$43,200**

That's a **-85.5%** change in Total Cost,
saving us **$995,562** annually


Cost Breakdown: Pre-Optimization vs Post-Optimization
Handling
Repair
300000
250000
200000
150000
100000
50000
0
Cost
Pre-Optimization
Post-Optimization
Optimization Stage

Can we increase the storage space to 150?

Bob from corporate

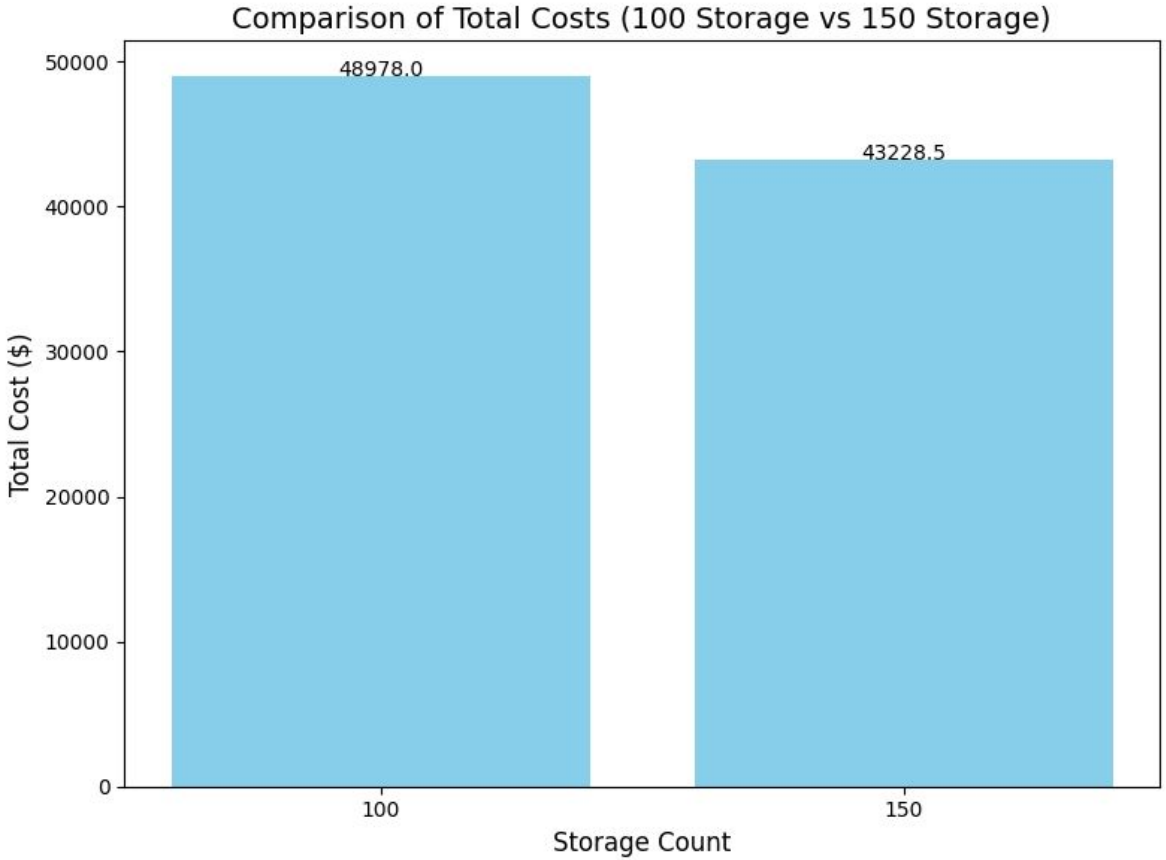
Considering Expansion

Using the same **Strategize - Optimize - Utilize** method, We can counter the existing repairs costs better with an increased storage space of 150 per station.

Our total cost goes down to **$43,228**

Repairs would only cost **$28**

In order to break even within a year, the maximum expenditure should be **$23,000** on upgrades.



Our only major expense is the handler cost, which is flat at **$43,200** quarterly.

Thank You