



The Coca-Cola script logo in white, featuring the registered trademark symbol (®) at the end of the word.

SWIRE COCA-COLA

Predicting Machinery Downtime

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Business Problem

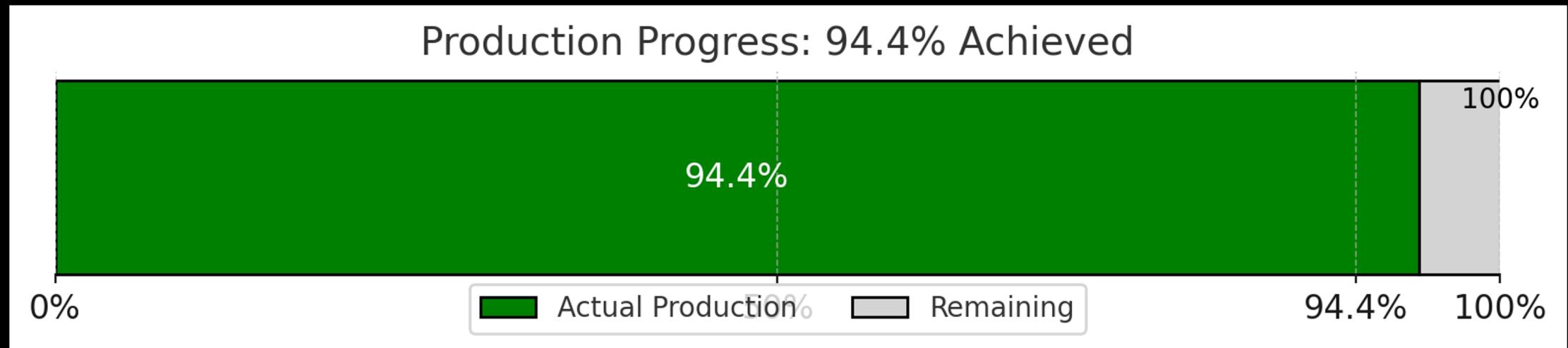
Downtime Costs



Machines fail unexpectedly.
Output drops. Deadlines
missed.

IMPACT

Efficiency Matters.



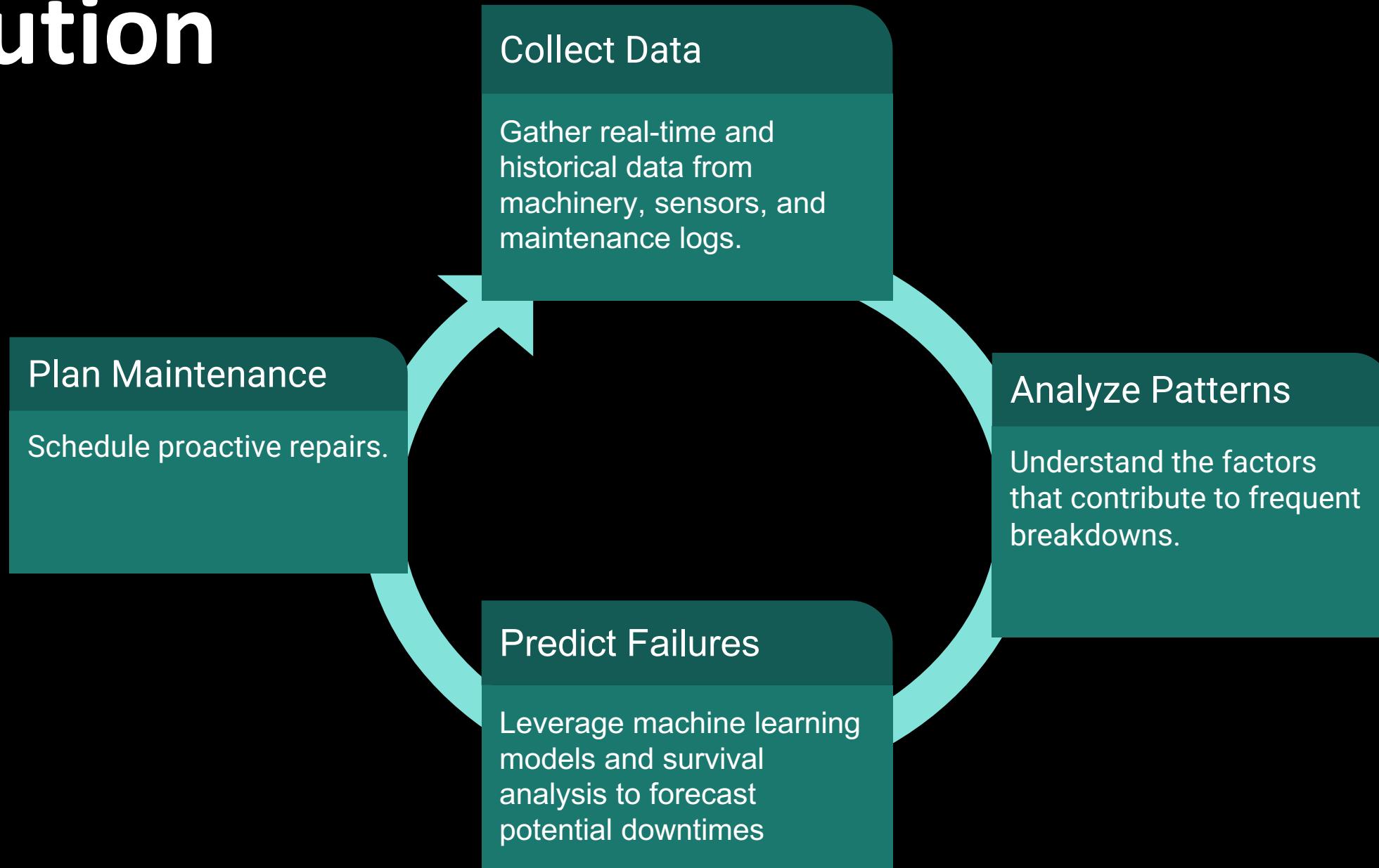
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What success looks like



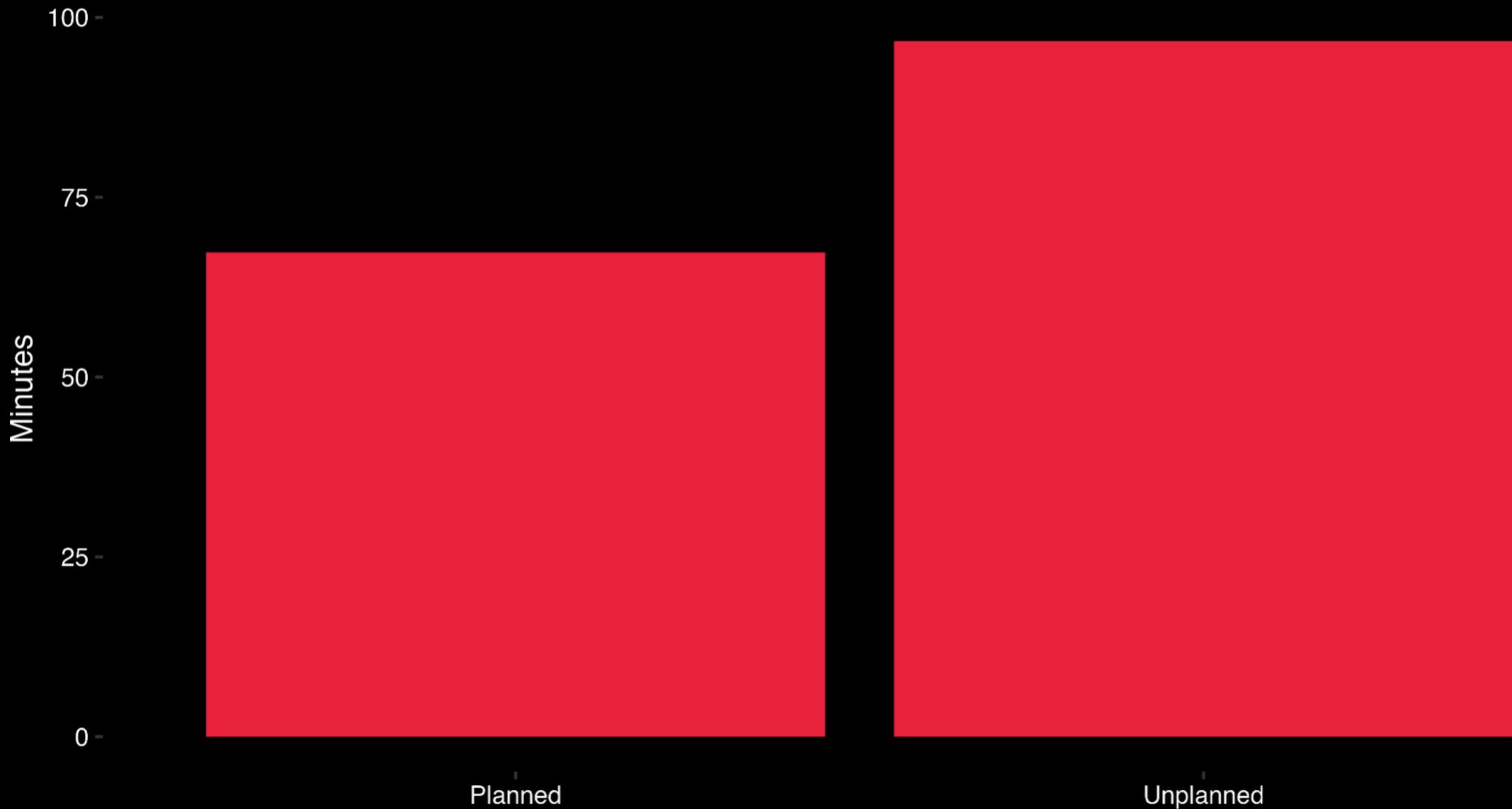
- Reliable: Machines running consistently without unexpected stoppages.
- Efficient: Maximized output with minimal delays.
- Scalable: A solution that grows with your production needs.

Solution



Planned vs Unplanned Failures

Unplanned Work Orders Take Longer on Average



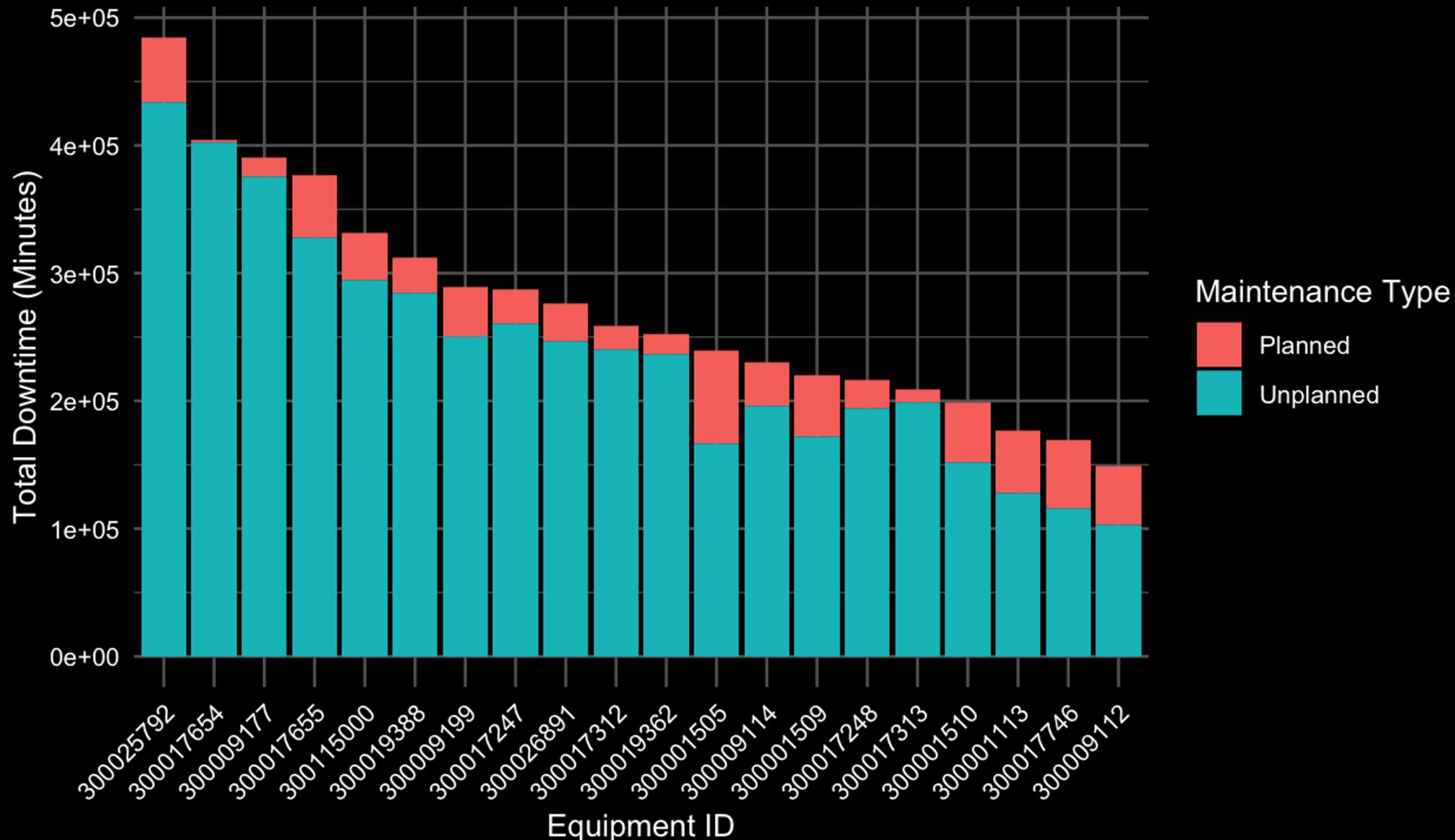
Failure Types Cont.

Actual Work Time in Minutes by Maintenance Activity Type



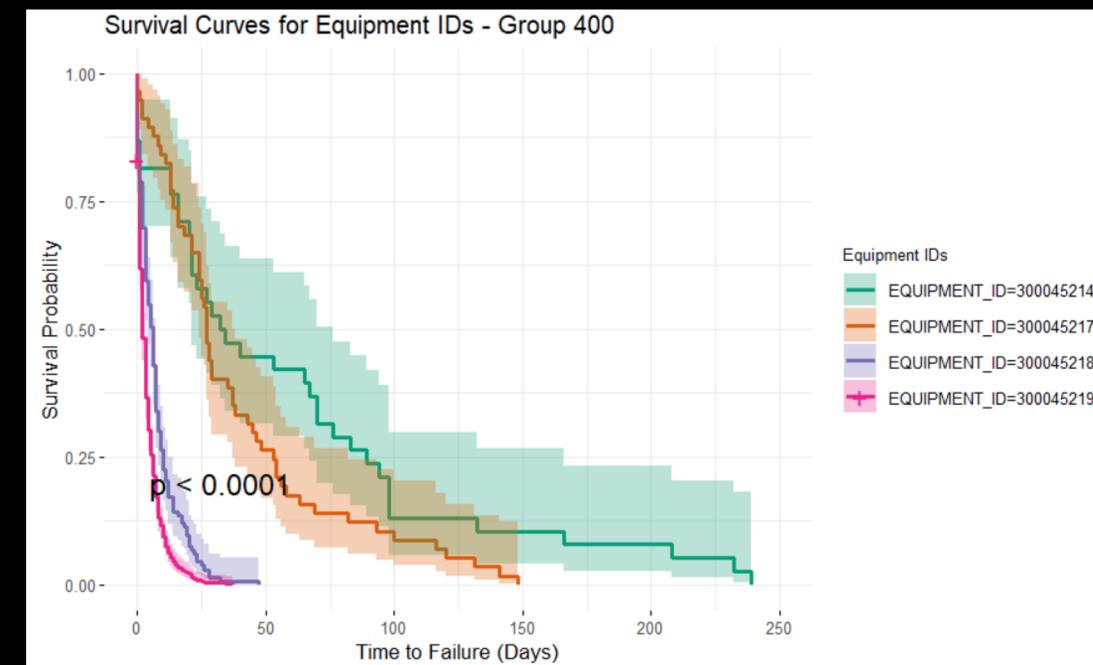
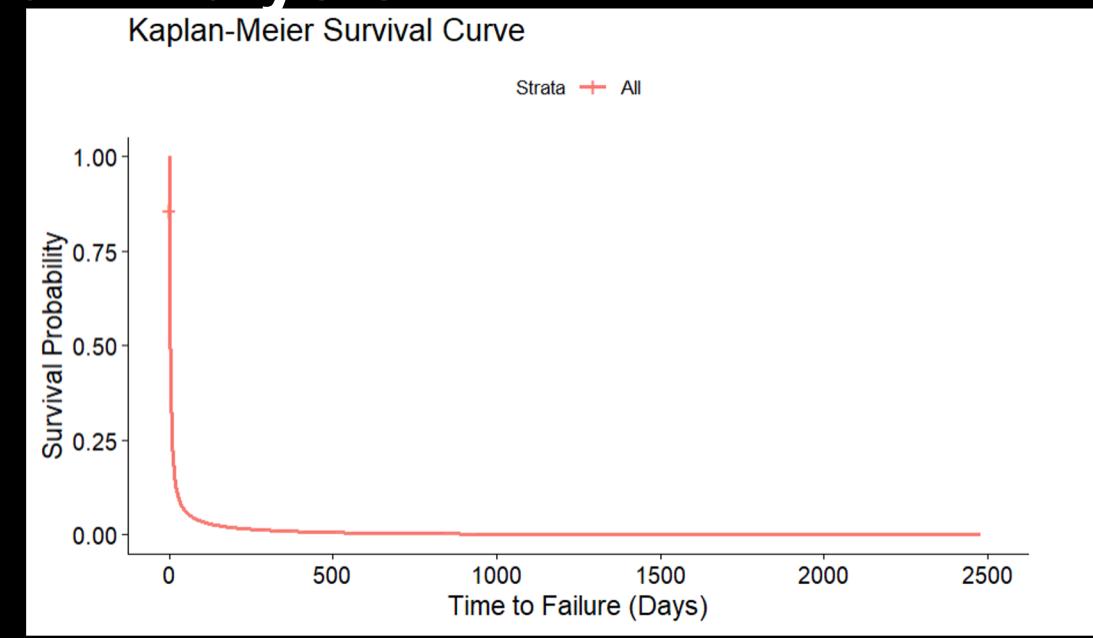
Equipment_IDs With Highest Downtime

Top 20 Equipment IDs with Downtime (Planned vs. Unplanned)



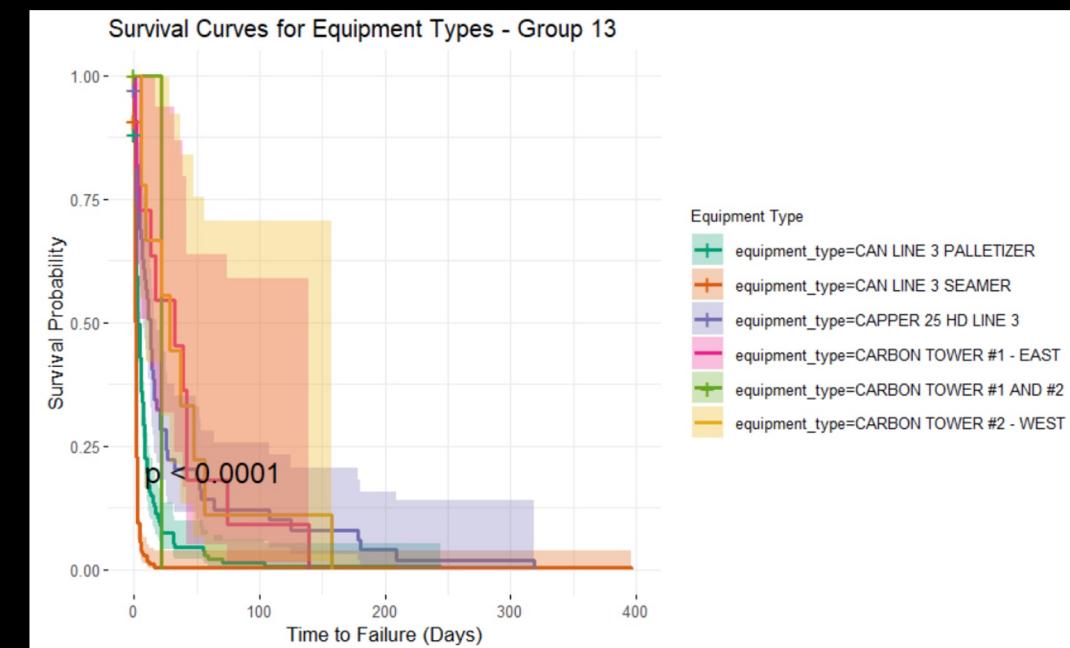
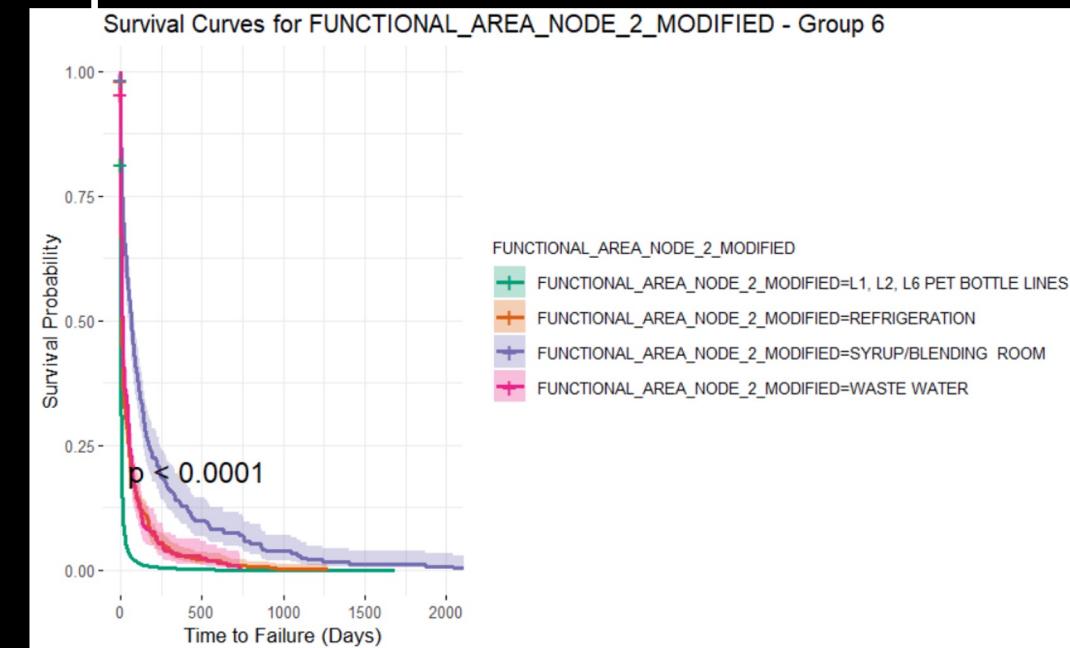
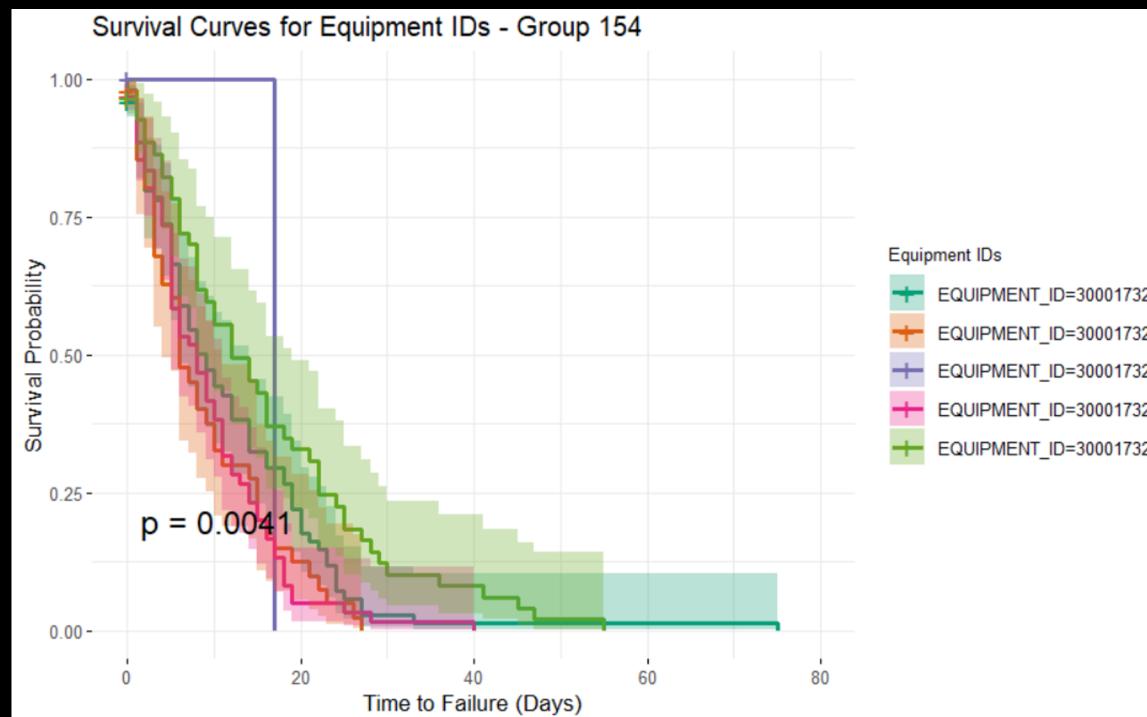
Our Solution: Survival Analysis

- A statistical approach to model the time until an event occurs e.g. machine failure
- Improves Maintenance Planning to reduce downtime and cost
- Identifies high risk Equipment that contributes to failure
- Kaplan-Meier Survival Curve to show survival probability across all 7 years
- p-value: <0.0001



Survival Analysis Across Multiple Granularities

- Survival Analysis at Varying Levels of Detail:
From Functional Area to Equipment Types
to Equipment IDs
- A total of 2956 Survival Curves were created
for each Equipment ID, limited p-value due
to the proportion of data available



Unplanned Work Orders Take Longer

Average Duration in Minutes

100

75

50

25

0

Planned

Unplanned

And There Are Many More Unplanned Orders

Count (in 2023)

150000

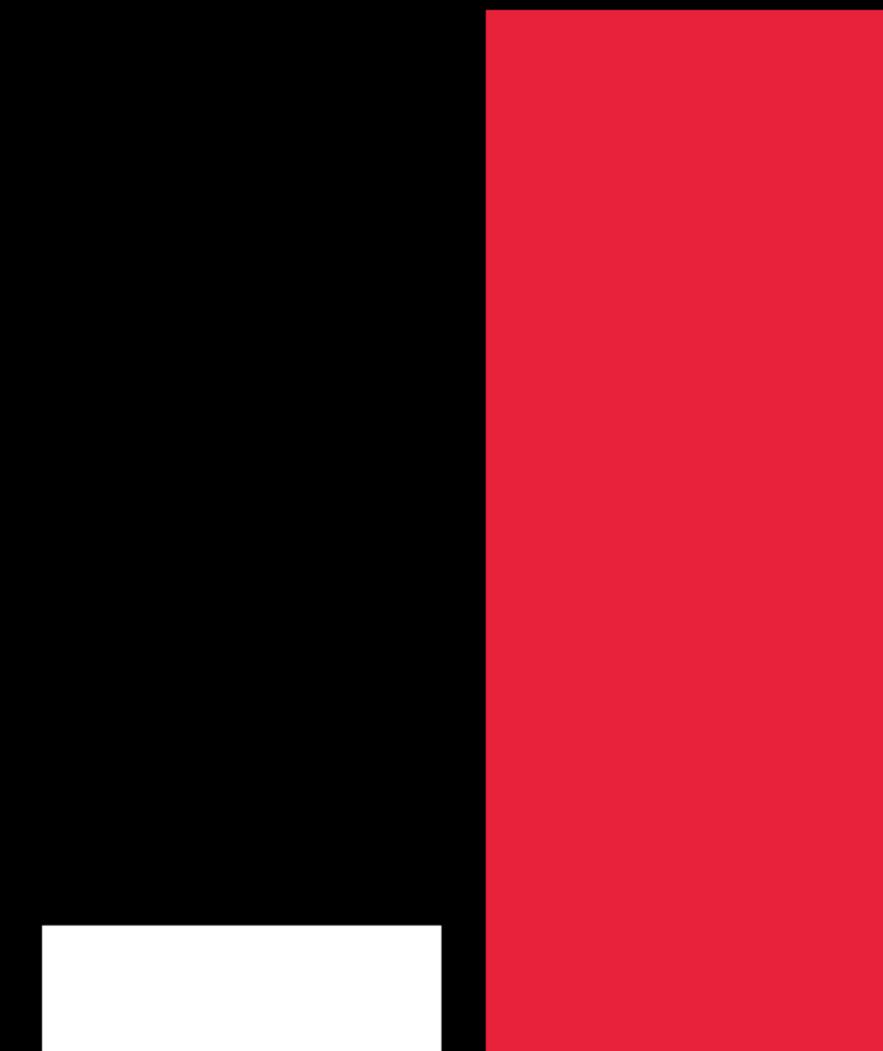
100000

50000

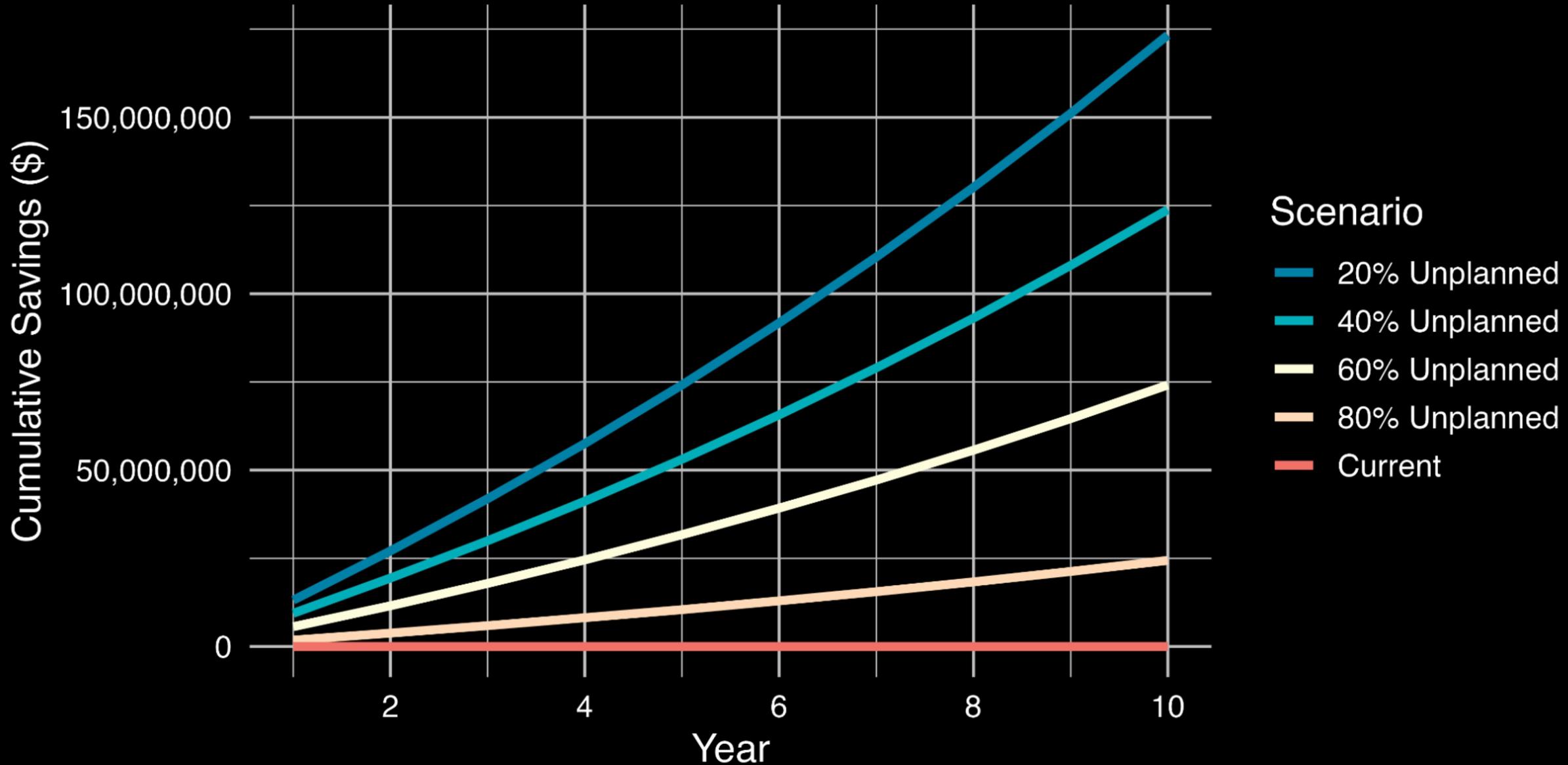
0

Planned

Unplanned



Cumulative Savings from Reducing Unplanned Downtime



Created using bootstrap samples from 2023 data, 6% interest rate, 200000 work orders per year, \$3.20 cost per minute of downtime.

Thank You!