

Swire Coca-Cola

Predictive Maintenance Problem Statement

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Introduction:

Swire Coca-Cola is a major bottling partner of The Coca-Cola Company in the Western United States. Swire operates 6 production plants across 13 states which support distribution, marketing, and production of Coca-Cola products.

Problem Statement:

As the primary bottler of Coca-Cola products in the Western United States, Swire Coca-Cola's operational efficiency affects the entire distribution network. Despite achieving 94% mechanical efficiency, unforeseen machine breakdowns and inadequate predictive maintenance lead to significant downtime. This shortfall in meeting demand results in an annual loss of approximately \$60 million in uncaptured revenue. The current process—issuing work orders, waiting for parts, and making repairs—often lacks the foresight to prevent these downtimes, leading to extended production stoppages and impacting overall performance.

Benefit of a Solution:

By implementing a predictive maintenance solution, Swire Coca-Cola can reduce unplanned downtimes, improve production efficiency, and avoid costly interruptions. A solution would enable the company to:

- Anticipate machine failures before they occur
- Stock necessary parts in advance, reducing repair time
- Optimize machine usage schedules to balance output and machine wear
- Increase production output to meet demand

Success Metrics:

Stakeholders will judge the success of the project based on:

- ⌘ **Reduction in Downtime:** A decrease in both the frequency and duration of unplanned maintenance
- ⌘ **Cost Savings:** Reduction in maintenance-related costs, aiming to recover a portion of the \$60 million annual loss
- ⌘ **Predictive Accuracy:** Accurate prediction of breakdowns and reduced time-to-repair.
- ⌘ **Operational Efficiency:** Enhanced machine uptime and overall production efficiency

Analytics Approach:

Utilizing the data from Swire, the focus will be to develop a deep understanding of the data and develop actionable insights. Major focuses include:

- **Patterns:** Follow the methodology of Survivorship Bias - What failed and what didn't fail?
- **Statistics:** Exploratory data analysis to understand and visualize patterns between variables
- **Predictive Modeling:** Develop a model that predicts line failures to increase plant productivity

Scope of Project:

- **In Scope:**
 - Analysis of line downtime data and its impact on production
 - Recommendations for maintenance scheduling and parts inventory
 - Creative production strategies to manage downtime
 - Development of a predictive model for machine failures
- **Out of Scope:**
 - Analysis of machine sensor data
 - Issues unrelated to mechanical failures
- **Future Considerations:**
 - Potential integration with sensor data
 - Additional production line data

Details:

Team: The project will be executed by a team of students in MSBA from University of Utah.

Timeline: The project will be completed over a period of 3 months, with the following milestones:

- Weeks 1 – 3: Data exploration and preprocessing
- Weeks 3 – 5: Feature engineering and model selection
- Weeks 5 – 9: Model training and validation
- Weeks 9 – 12: Predictive maintenance pipeline development and dashboard creation
- Week 13: Final model testing and refinements
- Week 14: Presentation to business stakeholders and implementation recommendations