AMAZON.COM, INC.

Dynamic Preventative Maintenance

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Amazon Logistics (AMZL) Reliability and Maintenance Engineering (RME) team oversees to lead a large maintenance team that is responsible for maximizing equipment uptime, ensuring equipment maintenance, and leading improvement projects in a fast-paced, dynamic work environment within Amazon Last Mile Delivery stations. AMZL network is growing rapidly at a pace of 89% YoY growth rate. This rapid expansion has led to increased complexity within the delivery station network which in turn has led to emergence of varied types of issues across RME operations.

The goal of the project is to create a logic and a process to optimize AMZL's current conveyance Preventive Maintenance (PM) Plan, as opposed to being at fixed intervals based on Original Equipment Manufacturer (OEM) recommendation. The current PM Plans can cause equipment to be under/over maintained, adversely affecting operational efficiency.

The Tauber team has proposed the Risk and Cost Minimizing Cadence (RCMC) model to optimize the PM cadence. Across AMZL, the savings from RCMC result in a 3-year Net Present Value (NPV) of $23.0M: coming from $7.9M of increased RME Technicians productivity YoY and breakdown reduction savings of $496.7k YoY. This optimization is based on a logic driven by risk of breakdown and costs associated with PMs and breakdowns. The RCMC is strategically customized to site-specific characteristics. Each RCMC Strategy is applicable to a subset of AMZL sites classified by factors like conveyance OEM and an average number of packages processed in a day at one site.

The proof of concept is being verified by piloting RCMC Strategies at 10 AMZL sites. The pilot is designed to be six months long due to the longitudinal (long-term effect) nature of this study. The preliminary result from the first three weeks is a statistically significant 45.5% reduction of breakdown rate (breakdowns per equipment per month) compared to the pre-pilot breakdown rate across the Pilot sites. To circumvent the time limitation, an analytical model was used to quantify the reduction in breakdown rate. The model predicts a 31.6% reduction in breakdown rate.