



Hitachi Predictive Maintenance for Fleet Operations

Using Artificial Intelligence to Unlock Operational Insights on Asset Performance

Modernize Fleet Operations

The ability to efficiently manage and operate a large fleet of on-road or off-road assets is a challenge that organizations, from construction to manufacturing to utilities, work hard to navigate. Market competitiveness, rising fuel prices, and complex emission-based regulation is forcing fleet operators to focus on driving efficiencies across their business operations, where maintenance costs can account for 15-20% of total fleet costs.

To maintain these vehicles, fleet managers typically rely on periodic maintenance schedules with limited visibility of the actual asset health or performance. For example, some vehicles are scheduled for maintenance even if they don't need it, while others perform inefficiently or breakdown onsite and disrupt service. With more complex and sophisticated transport assets added to the fleet every year, maintenance costs continue to rise.

Companies risk efficiency leakage or unplanned downtime that increases operational costs.

Hitachi Predictive Maintenance for Fleet Operations, powered by Google Cloud, utilizes internet of things (IoT) data, reliability-centered maintenance (RCM) methods, and artificial intelligence (AI) technologies to deliver significant improvements in fleet maintenance efficiency and asset reliability and useful life. Our solution leverages augmented reality (AR) on mobile and Google Glass, to provide real-time guided inspections and repairs. We analyze and evaluate IoT sensor data across individual assets and enhance with external data sets, such as weather data, before using purpose-built machine learning algorithms to provide fleet management monitoring, asset health and performance, and predictive maintenance alerts for mission-critical fleet assets (i.e. vehicles, rail cars, buses, airplanes, maritime, trucks).

Total Maintenance Optimization and Automation

Capitalizing on data is not new; the difference now is diversity, scale, and speed. Modern big data technologies make it possible to capture, store, and process all types of data - unifying isolated insights and extending the reach to previously untapped data, such as:

- Predict the need for preventive maintenance of heating, ventilation and air conditioning (HVAC) systems and of preventive brake maintenance
- Prioritize asset renewal and replacement based on real-time understanding of asset condition and performance
- Perform efficient, AR-guided inspections and repairs
- Indicate operations risk scores

By predicting and preventing failures, the solution reduces operational maintenance costs and downtime while improving quality management, and safety, and extending the useful lifetime of fleet assets.

Why Hitachi and Google Cloud?

**HITACHI**
Inspire the Next

- Rich industrial heritage
- IoT and operational technology leader
- Dedicated IoT data science research lab
- Experience with deploying sensors to gather real-time data from workers and transportation assets

 **Google Cloud**

- Enterprise-scale solutions
- Combines data storage, analytics and ML to track and predict performance
- Uses edge processing for immediate response
- Continuous ML to drive higher accuracy

Together, Hitachi and Google Cloud offer a unique predictive maintenance solution tailored to your requirements.

Reduce Maintenance Costs, Increase Uptime and Extend the Life of Fleet Assets

Hitachi Predictive Maintenance for Fleet Operations on Google Cloud Platform

Challenge	Solution	Benefit
<ul style="list-style-type: none"> Operational maintenance costs are increasing as fleet assets become more complex Traditional maintenance models that rely on operators to detect failures can't keep up Routine scheduled maintenance is sometimes unnecessary and often inefficient With no insights into the health of fleet assets, unplanned and emergency maintenance is disruptive and costly 	<ul style="list-style-type: none"> Delivers insights into the health of assets to prevent unplanned and emergency maintenance Monitors equipment in real time by ingesting IoT-generated data from fleet assets Uses Google machine learning to create a trainable model to classify and predict potential failures Leverages Hitachi AI solution cores to accelerate model development Provides AR visualizations via Google Glass and Android Delivers an end-to-end predictive maintenance platform that integrates IoT AI, and big data technologies 	<ul style="list-style-type: none"> Reduce maintenance costs by up to 10% to 20% by adopting predictive maintenance practices Provides real-time visibility into asset health to avoid unplanned or emergency maintenance, increasing revenue by up to 10% with improved asset uptime Reduces operational and capital costs by prioritizing asset renewal, replacement and maintenance requirements Provides ideal operating envelope recommendations to extend the useful life of assets

Built with Google Cloud



Cloud IoT Core



Cloud ML



Dataflow



Kubernetes



Compute Engine



Cloud Pub/Sub



Cloud Datalab

Contact Hitachi Consulting

Hitachi Consulting provides consultants, data scientists, engineers, and transportation specialists to work hand in hand with you and to co-create a predictive maintenance solution to solve your specific problems. We contribute our experience, tools, methodologies and development environments, while you provide in-depth knowledge of your transportation business. Using Google Cloud and IoT technology, we bring our industrial expertise to help global fleet management teams strive for operational excellence.

Through collaborative creation, we bring thinkers and doers together to innovate for a smarter future.

Contact us to get started:
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About Hitachi Consulting

Hitachi Consulting is the global solutions and professional services organization within Hitachi, Ltd., a global innovation leader in industrial and information technology solutions and an early pioneer of the Internet of Things. Hitachi Consulting is a consulting-led solutions company for the IoT era and a catalyst for digital transformation. To learn more, visit www.hitachiconsulting.com.