



CUSTOMER CASE STUDY

Data drives maintenance for SNCF

SNCF - www.sncf.com/en
Industry - Transportation, Rails

Challenge

- Limit impact of maintenance activities on rail traffic, improve assets surveillance, and anticipate maintenance incidents

Solution

- Use the PI System™ as the foundation for more field data analysis and increase deployment of field monitoring

Result

- Improved asset knowledge, improved visibility of asset conditions, and growing predictive maintenance ability

When ridership of the French railway system grew by 50% over a decade, SNCF Réseau faced daunting logistical challenges. SNCF Réseau oversees management and maintenance of the Société Nationale des Chemins de Fer Français (SNCF), the French National Railway Corporation. SNCF Réseau manages 30,000 kilometers of French railway line and keeps 15,000 trains running daily. To meet the demands of a growing ridership, SNCF Réseau saw that it was time to optimize the maintenance of railway lines and equipment. Operators in the field needed to catch time-consuming equipment failures before they occurred, and SNCF Réseau wanted to give its workers more digital tools to do so. The company aimed to improve visibility on real asset conditions and use its data to provide smarter, predictive maintenance.



Fixing assets before they break

More than a decade ago, SNCF Réseau invested in remote sensors and monitoring systems to deliver data on track equipment, motors, and other assets in the field. The company built a system that fed this sensor data into a supervision system capable of generating telephone alerts for maintenance personnel.

The system worked, but not perfectly. Sensors were not always accurate. As a result, the system generated a tremendous amount of data and alerts on equipment performance and incidents, but railway operators did not always trust the alerts they received.

The system was capturing data, but it was not creating insight that the company fully trusted and acted on in order to anticipate and avoid equipment failures. As a result, operators often waited until there was a problem to go into the field and fix it, or they performed maintenance on equipment according to a schedule. “We need to anticipate and reduce the maintenance footprint,” said Stéphane de Paris, chief data officer at SNCF Réseau. “We need to act at the right time at the right place, before the incident.”

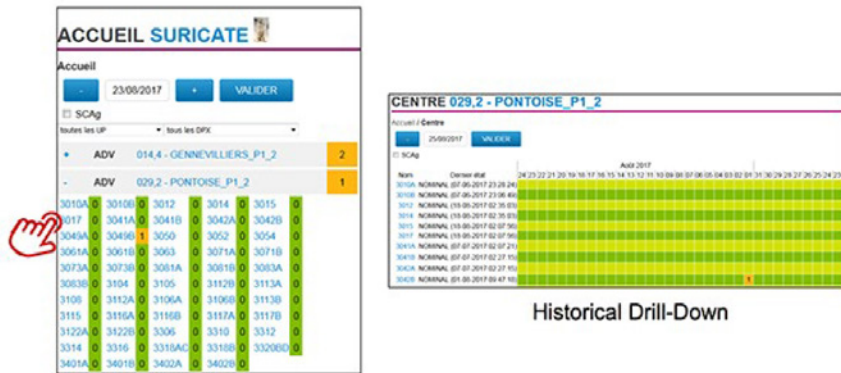
With better data and analytics, SNCF Réseau has made the shift to condition-based maintenance. Maintenance staff use sensor data to determine which equipment performance is degrading and most likely to fail. It can then prioritize maintenance accordingly.

According to de Paris, the key to the PI System project’s success was that it was not a top-down initiative. Maintenance staff drove the initiative using tools designed and configured by and for maintenance operators. Today, SNCF Réseau operators and maintenance crews have digital tools and handheld devices that can give them trusted data and insights almost anywhere in real time.

“The beauty of the system is that it can be used for any type of time series: vibration, temperature, pressure, etc. . . Potentially speaking, there’s no limit to the type of field time-series data that can be incorporated within the system.”

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Thomas Oriol,
Co-Founder of Datapred

Structuring data with scalable architecture



SNCF's maintenance dashboard shows the condition of assets at a glance.

Harnessing sensor data for machine learning

Ultimately, SNCF Réseau is moving toward predictive maintenance. With predictive-maintenance analytics, operators know the real-time condition of equipment in the field. The analytics predict when equipment will need to be maintained even before it begins to degrade.

To do this, SNCF Réseau is investing in machine learning. It already has a trove of legacy data – more than a decade's worth of field observations collected from remote sensors, weather stations, equipment, and personnel. Recently, the company partnered with Datapred, a French company that specializes in machine learning. Using SNCF Réseau data collected and organized by the PI System, Datapred algorithms comb time-series curves for statistical anomalies that might indicate and predict equipment failure.

The Datapred algorithms are capable of sequential machine learning, meaning that data need not be entered in a batch and analyzed all at once, but can be analyzed continuously in real time as it arrives in the system. Datapred's modeling engine draws data directly from the PI System via the PI Integrator for Azure. The engine feeds results back into the PI System so that machine-learning insights are available to operators and asset managers in a single location. When high-quality data is fed to Datapred's powerful algorithms, SNCF Réseau can use machine learning to discover patterns and insights into unknown unknowns. In other words, SNCF Réseau will find not just problems it is looking for but also problems it never even knew existed.

For more information about SNCF and the PI System, [watch the full presentation here.](#)