Rail Weather System

Site-specific monitoring and forecasting
for fewer service disruptions

The Advantages of Site-Specific Monitoring and Forecasting

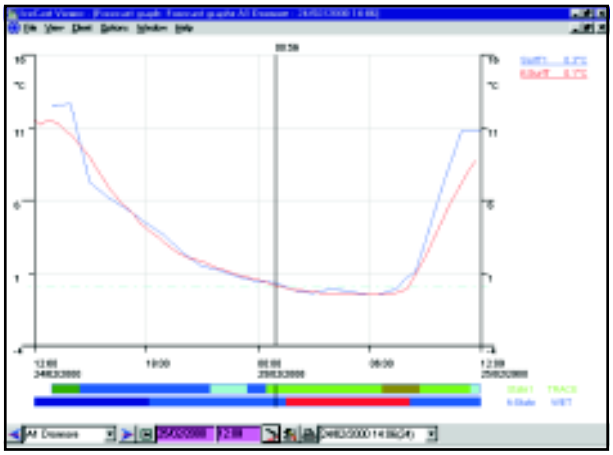
Has your rail, light rail or metro service ever been disrupted by high winds or icy conditions? Do you rely on Internet, faxed or national forecasting services to warn you of approaching bad weather? Vaisala can provide you with an alternative solution that is specific to sites located across your rail network. The result is site-specific monitoring and forecasting that is more accurate and relevant to your operations.

Know when to act

With the Vaisala Rail Weather System, you send out sacrificial and anti-icing trains to clear overhead wires and rails of ice only when really needed. Wind-related speed restrictions are limited to only those areas affected by high winds. Your service suffers fewer disruptions. In the long run, you save money.

Site-specific forecasting is more accurate

Data from strategically located Vaisala ROSA rail weather stations is used to generate localized, site-specific graphical forecasts. These are more accurate than general hazard warnings covering a wide geographical area, being both application-specific and specific to the weather conditions that threaten your operations. The system delivers both graphical and textual forecasts of temperature and state (ice, frost, snow, precipitation) for 3 to 24 hours ahead.

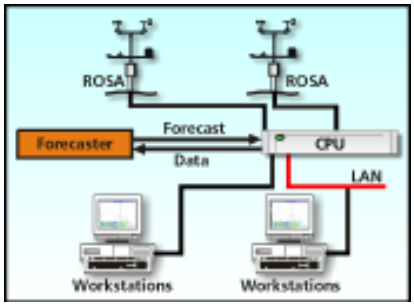


Be better prepared

The Vaisala Rail Weather System monitors disruptive weather conditions, predicts when they will occur, and warns you when they begin to threaten your network. You can adopt a more proactive approach to infrastructure management and rail operations, targeting scarce resources where problems are forecasted to occur. Resources are not deployed unnecessarily.

Long experience in the transport sector

Vaisala is the world's leading provider of weather observation and prediction solutions for highways, bridges and airports. We are now bringing our long experience and field-proven solutions to benefit the rail transportation sector.



RailCast system architecture with forecasting

Main benefits

The Vaisala Rail Weather System minimizes the risk of infrastructure damage, reduces service disruptions and saves money by allowing you to:

- Impose wind speed restrictions only on those areas affected by high winds
- Send out sacrificial/scraper trains to clear overhead wires of ice only when really necessary
- Target anti-icing trains to keep rails and third power rails clear of ice
- Develop realistic measures of performance for maintenance operations

Rail Applications

Ice on overhead contact wires

Winter weather often causes icing on overhead contact wires. This can lead to excessive wear of pantograph-mounted carbon conductors as well as electric arcing, resulting in delays in service.

The Vaisala RailCast ice system provides reliable short-term prediction and detection of icing on contact wires to give you time to take preventative measures – from sending out sacrificial /scraper trains, to warning train operators that the carbon conductors must be checked.

The Vaisala RailCast ice system offers:

- A specially designed non-contact sensor mounted close to, but at a safe distance from, the overhead contact wire. It accurately measures real-time wire temperature and state.
- NowCasting – Vaisala's fully automated short-term (3-hour) forecasting model, giving site-specific graphical forecasts of contact wire temperature and icing.
- Longer range (24-hour), site-specific graphical and text forecasts.

High winds

High winds and strong gusts can cause excessive swaying of overhead contact wires. The RailCast wind system generates alarms which are relayed to the Control Room when critical wind speeds are reached. These "localized" wind alarms allow you to impose sectional speed restrictions on only those affected line sections. Delays are kept to a minimum. Fewer disruptive and costly de-wirements occur.

Rail temperatures

Rails can suffer from the effects of extremes in temperature throughout the year. The Vaisala RailCast system provides reliable detection and prediction of rail temperature and state. It is a valuable tool in planning and scheduling maintenance for rails degraded by ice and snow, or for rails and switches that may suffer buckling and misalignment as a result of high or fluctuating temperatures.

Precipitation and visibility

Accumulated precipitation and reduced visibility are monitored by the Vaisala PWD11 Present Weather Sensor. This optical sensor allows precipitation type (precipitation, rain, snow and mixed) and amount, along with visibility, to be presented in easy to read graphical and tabular formats.

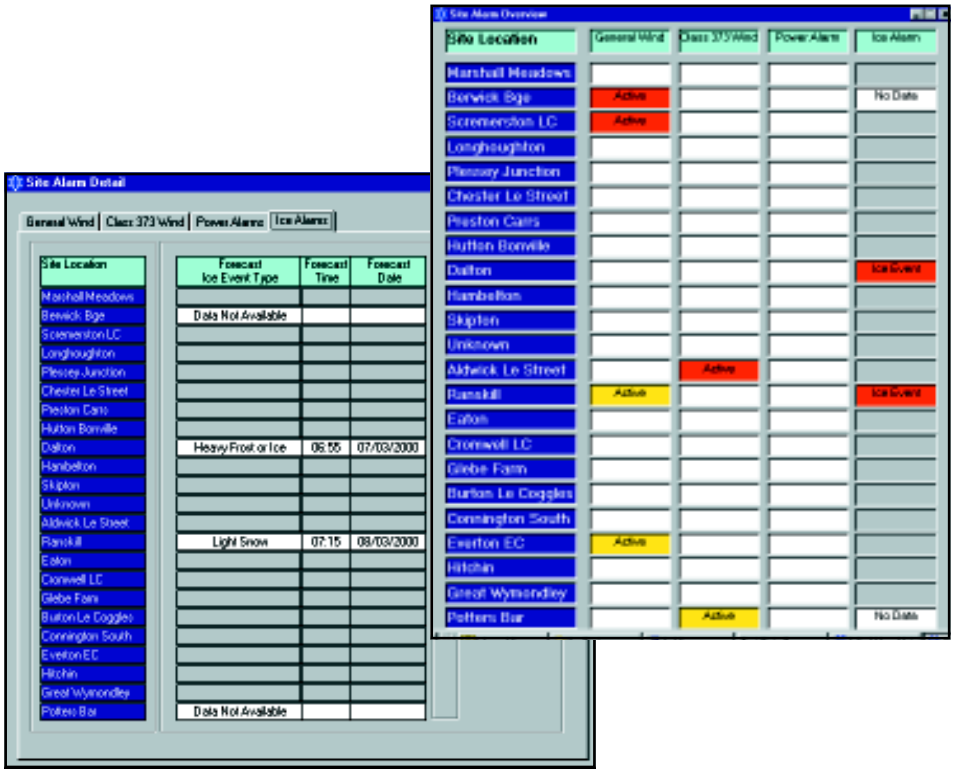
Data Display and Alarms

Modular system architecture

RailCast, the hub of the Vaisala Rail Weather System, is a modular suite of software which integrates data from the ROSA track-side weather stations with forecasts generated by either local forecast providers or Vaisala's NowCast software. The system can be configured for stand-alone or fully networked operation. RailCast provides highly configurable modules for:

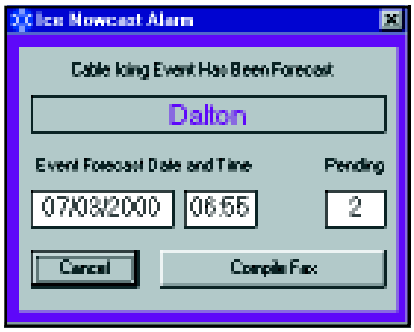
- Data collection of overhead line temperature and state (ice, frost, etc.), air temperature, relative humidity, rail temperature, wind speed, direction and gusts, present weather (precipitation type and amount) and visibility
- Data display (real-time and forecast)
- Data archiving
- Forecast models for rail and overhead wire temperature and state
- Warning/alarm generation

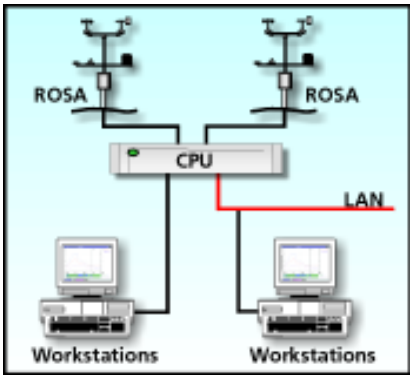
The user interface can be configured in your local language, time zone and display units (e.g. Fahrenheit vs. Celsius). The system is designed according to Open System principles, allowing it to be integrated with other systems.



Sound the alarm

To help control room staff with their monitoring duties, the RailCast Alarmer module tracks incoming alarms, triggers an audible alarm when necessary, and displays an alarm summary on the PC. Staff know when and where problems have occurred at all times. Supervisors can access more detailed current and historical alarm information in graphical, tabular and textual form.





RailCast system architecture

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