

Recent developments in winter service observations

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VAISALA

Topics for discussion

- Who is Vaisala?
- Who are our customers?
- Legislation and policy
- Traditional response
- Recent developments

Who is Vaisala?

- Environmental company established in Finland, 1936 by Dr. Vilho Vaisala
- Over 20 offices worldwide specialising in three broad business areas
 - Meteorology, Controlled Environment & Weather Critical Operations
- WCO serve road, airport, defence and wind organisations
 - Primarily concerned with the safety & effectiveness of their operations under all weather conditions
- We're not weather forecasters
- We provide decision support
 - Reduce uncertainty caused by weather phenomena

Who are our customers?

- Vaisala's Birmingham office specialises in road weather applications
- Centre of excellence supporting global customers:
 - All major UK & Ireland transport bodies
 - Most UK local authorities
 - Europe (France, Germany, Italy)
 - North America (Virginia, Idaho)
 - Asia/Pacific (China, New Zealand)
- Mostly (but not exclusively) deal with winter weather
- Products and services include:
 - Weather observation, monitoring and measurement equipment
 - Ice Prediction systems
 - Product life-cycle support



Challenges faced by our customers

- Challenges which affect their stakeholders
 - Keeping roads open
 - Keeping traffic flowing
 - Ensuring safe passage
- Underlying challenges
 - Resources
 - Budgets
 - Environmental targets
 - Accountability
 - Liability



Winter service legislation & policy

- Very few absolute guidelines
 - "... a highway authority are under a duty to ensure, so far as is reasonably practicable, that safe passage along a highway is not endangered by snow or ice." (Railways and Transport safety Act 2003)
- What is "reasonably practicable"?
- Lack of definition leaves service providers open to challenge
- Forecast providers are rarely held accountable for inaccurate forecasts
- Onus is on service provider's interpretation of forecast information and how this is applied to their defined policy statement
- Important to have defensible position
 - Even if wrong decision was made, evidence should be available to prove that it was made for the right reasons
- Forecast information needs to be applied to the specific needs of the user
 - Requires verification, monitoring, interpretation, reporting, archiving etc

Traditional response: Ice Prediction System

- Road weather stations around network
 - Provide atmospheric and road surface data
 - Used by forecast provider to help generate site-specific weather forecasts
 - Verify and monitor forecast accuracy
- Bureau services
 - Data collection, management, distribution, display, archive
 - 24/7 helpdesk support
- Life cycle support
 - Scheduled and reactive maintenance
 - Training
- Targeted application of resources
 - Thermal Mapping
 - Extends site-specific weather station information across a road network
 - Route Optimisation
 - Maximise performance efficiency of resources

Recent developments

- Ice Prediction System is still the benchmark
 - One of Vaisala's core services
- Recent trend is towards enhancement of this service by focusing on potentially high risk areas of the network
 - Bridges
 - Slip roads
- Provide real-time verification data for local conditions
 - Reduce uncertainty and enable effective response

The need for this information

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NEWS

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One dead in multiple M4 crashes

One person has died and two others were taken to hospital with serious head injuries after being struck by vehicles on the M4 in Berkshire.



A silver Renault Clio collided with roadside furniture on the slip road at junction 10 of the westbound motorway.

A motorist stopped his vehicle to help the stricken driver but they were both then struck by a VW Passat.

The crash victims were hit by vehicles on the A329M slip road of the M4

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Crash kills man, 35

A West Bromwich man killed in a motorway smash with a fire engine was today named as [redacted] aged 35, of New Street, Hill Top, died in hospital after the car he was travelling in hit a stationary fire engine dealing with a crash on the sliproad between the M5 and M42 near Bromsgrove.

Three vehicles had skidded off the carriageway and into the central reservation in separate incidents believed to have been caused by the icy conditions.

Non-invasive road surface measurement

- Two non-contact, non-invasive sensors:
 - DST111 “Cyclo”
 - DSC111 “Spectro”



Non-invasive remote sensors

- DSC111 “Spectro”
 - Non-invasive remote surface sensing
 - Individually identifies the presence of
 - Water
 - Ice
 - Slush
 - Snow or frost
 - Unique measurement of friction
- DST111 “Cyclo”
 - Surface temperature measurement
 - Air temperature and humidity measurement

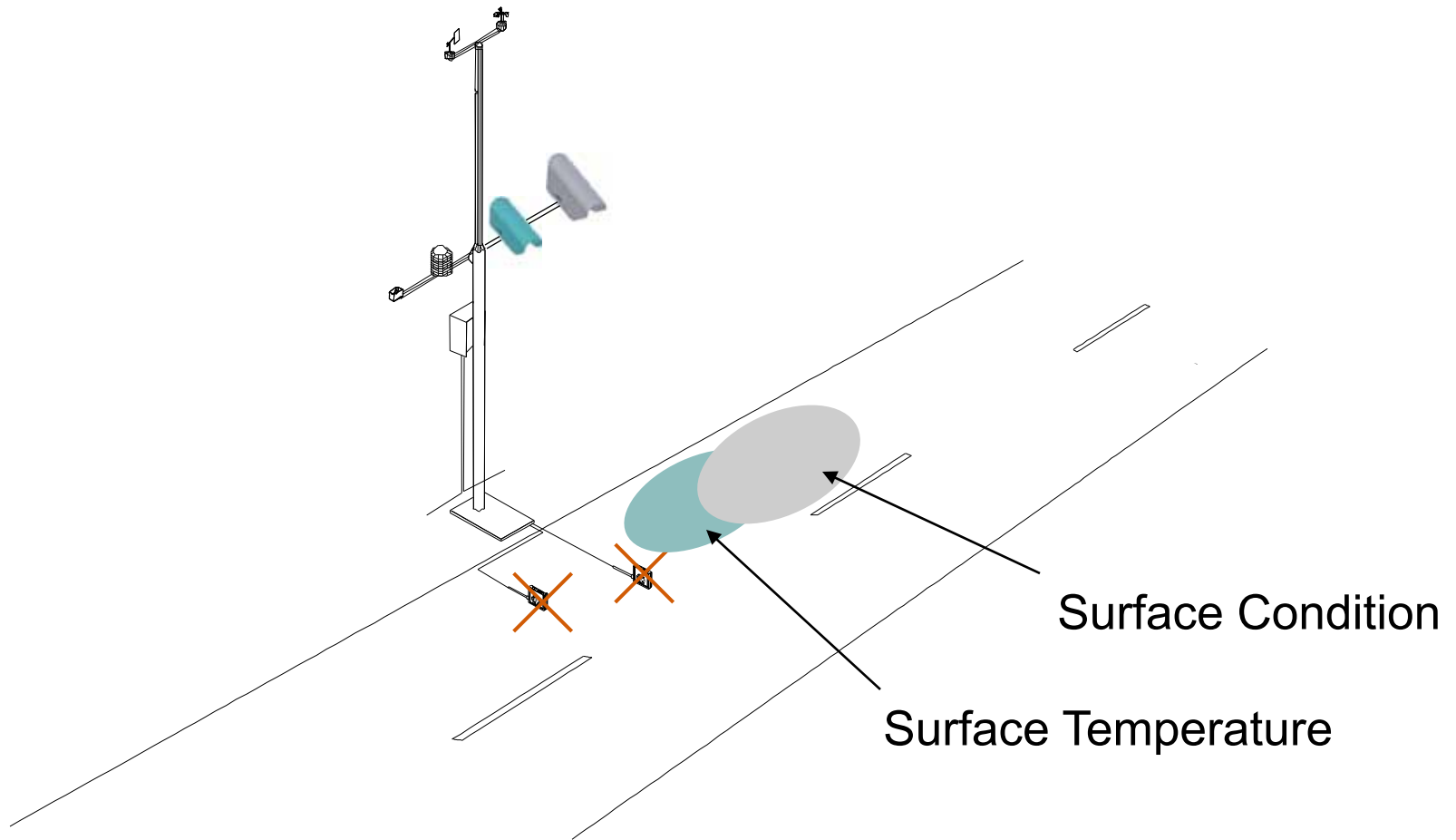


Road weather stations

- Road weather stations provide location specific atmospheric and surface observations
- Atmospheric observations include:
 - Precipitation
 - Air temperature
 - Humidity
 - Dewpoint
 - Wind speed/direction
- Surface measurements traditionally made using embedded sensors



Road surface measurements



Operational benefits of non-invasive sensors

- Easy installation
 - Easily installed on existing infrastructure
 - No cutting of road surface
 - No need for lane closure/traffic management
- Lower ongoing maintenance and service costs
 - Reduced installation costs
 - Not affected by resurfacing
- Can be used stand-alone for monitoring purposes
 - Ideal for remote/high risk locations
 - Slip roads
 - Bridge decks

Cost-effective enhancement

- Ice Prediction System is a long-term investment
- For networks with distinct microclimates or at-risk areas, it has often been difficult to expand their established system in a cost effective way
- Non-invasive sensors make this a much more affordable option

Examples

- Chicago
 - Installed at four key bridge locations around the City
 - Mounted on light columns
- Highways Agency
 - Monitor sections of their network with pre-identified microclimates
 - Monitoring ATM hard shoulder sections of the M42
- Install base
 - Nearly 100 sensors installed in the UK
 - Over 500 installed in 19 countries worldwide



No Ice Prediction System?

- Traditionally, these monitoring sites have been tied into existing Ice Prediction Systems
 - Enhancement of existing service
- Not everyone has an Ice Prediction System
 - Cities
 - Ports
 - Shopping centres/retail parks
 - Energy infrastructure
- Non-invasive sensor technology makes it easy to supply a standalone road weather information site that is:
 - Affordable
 - Convenient
 - Easily self-installed and relocated
 - Virtually maintenance free
 - Expandable
 - Fully supported

Guardian

- Bundled package of equipment and services
 - Instrumentation
 - Cyclo (surface temperature)
 - Spectro (surface condition)
 - Day/night camera
 - All associated housing, comms, bracketry etc
 - Bureau services
 - Centrally managed data collection and distribution
 - Web site hosting
 - 24/7 helpdesk support
 - Self installation
 - Largely plug and play
 - Just needs infrastructure & power
 - Can be easily relocated



Mobile measurement of surface condition

- Spectro measures the presence & amount of water, ice and snow
 - Interprets and reports this data as a “friction” coefficient
 - Scaled between 0 and 1
- Scale represents the friction of a typical road surface and an average car tyre
 - For a dry road friction varies around 0.8
 - If there is hard ice present, friction may drop to about 0.1 – 0.2
- Mobile solution means that it is possible to quantify levels of surface friction across a road network



Applications

- Patrol routes
 - Quantify local knowledge
- High risk structures
 - Bridges, elevated sections, slip roads etc
- RTA investigations
 - Provides reference data if levels of service are challenged
- Active traffic management
 - Assess appropriateness of opening hard shoulder to the public

Summary

- Forecast information alone isn't enough for the service provider
- Traditional Ice Prediction System concept is still the benchmark for delivering an effective winter service
- Developments in non-invasive technology allows for affordable enhancements to this service
- Targeted monitoring sites provide real time observation data
 - Incorporated into existing services
 - Standalone
- Mobile measurements of surface condition make it possible to quantify levels of friction across a network

Thank you

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