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Swedish National Road Administration

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VViS / RWiS Road Weather Information System

1. The outstations

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*630-640
stations
in Sweden ?*

SYSTEM

The RWiS (Road Weather Information System) in Sweden started to have great influence for winter road maintenance in the beginning of 1983.

Since the autumn of 1992, the core of the SNRA (Swedish National Road Administration) road weather information system is a central data collection- and distribution unit with regional and local presentation systems. These are PC-based with customised software for Windows 3.11 or NT. The system normally uses the same internal SNRA national data network for information distribution that is also used for other electronic communication within the Administration. In the event of a network mal-function, the distribution system can be contacted through a standard modem.

The level of accessibility of the system is more than 99.5 percent.

The different images can be opened in several windows simultaneously, which means that the user can view radar and satellite images and the information in the RWiS at the same time. The user can also obtain rapid sequences of radar and satellite images, making it possible to watch the actual movement of a precipitation front, for example. It is also possible to measure the speed of this movement, thereby enabling the user to make his own short-time weather forecasts.

THERMAL MAPPING

Thermal mapping of the road network is an essential feature of the road weather information system. The information provided by the thermal maps forms the basis for choosing the optimal sites for the field stations in terms of issuing early warnings on slippery road conditions.

In order to detect areas which are most prone to slipperiness, thermal mapping is performed under different weather conditions.

The use of thermal maps also makes it possible to integrate the information from RWiS into a local climatological model (LCM) to produce real-time information on temperatures along the entire road.

FIELD STATION

In 1997, the Swedish system consisted of 650 field stations and 200 information centres and served approximately 800 users.

The new Swedish RWiS field station (MS3) is based on a standard industrial PC. This opens the whole market of accessory equipment and add-ons that are available for personal computers. It also facilitates the potential expansion of the system with image or sound processing, with environmental impact and traffic measurements information, etc. The software in the station is based on OSI-levels, thus providing flexibility and extendibility. For communication between the central system and the field stations it is possible to use the public telephone network, radio, ISDN, LAN and WAN.

The oldest fieldstation (MS2) in the system, is build as a one card concept. We have approximately 400 of this type in the system.

We are now preparing to build a new MS2 called MS2 - GMS (General Measuring Station). Enator Telub AB helping us to get this concept reedy. This MS2 - GMS should be build so that is compatible with the old MS2 . The only modification we have to add in an external modem.

This MS2 - GMS is build with modern technique so this concept is much more powerful then the old MS2.

We also develop an total measuring platform called MS2000. This concept is build as a server to administrate almost every equipment you want to connect at the road site. MS 2000 is made on a rugged NT platform.

SENSORS

In all field stations we measure air temperature, relative air humidity and road surface temperature every half hour at vintner season. Approximately 350 of the field stations have sensors for wind direction, wind speed and precipitation (Optic Eye).

Optic Eye is also measuring precipitation intensity , and type of precipitation snow rain or slush.

FUTURE

In the near future we are going to perform a quality check on the data that we collect to the system.

3. Using the the data for winter road maintenance -

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PC presentation of RWiS data

User interface

Since 1992 Sweden has used a customized presentation system for Windows 3.11 or later, as user interface for presentation of weather data.

The PC presentation contains a mapping tool, so the users can produce own maps over the maintenance areas where they are located.

When the map is produced the users add field stations that the are interested to watch.

In the presentation the users then can study the progress of different weather data on those stations that they have selected.

Presentated parameters

The parameters that always can be observed in the presentation are, Air temperature, Road surface temperature, Humidity, Dewpoint, Whenever applicable the field station also deliver information about, Remote surface temperature, Wind direction, Max. wind , Mean wind, Precipitation type, Precipitation amount.

Forecast parameters

The central data collection- and distribution unit delivers Forecast values for the next 4 hours concerning Road surface temperature, Dewpoint, and Cloudiness.

Error codes

If there is a fault from a sensor the system shows an error code in the presentation.

Alerts

The presentation has two default alerts about Road surface temperature and Precipitation, but as a user you can make your own alerts on several of the parameters.

Meteorological information

Together with the information from the field stations the users can get information from SMHI, the Swedish meteorological and hydrological institute straight into their PC.

SMHI supplies the system with Weather and Radar forecasts , Radar and Satellite images and Cloud forecasts.

Comprehension of weatherdata and education

The Swedish RWiS provides an early warning when conditions become critical. The understanding of what the figures that are shown in the PC presentation actually signify, is the most important factor to success in winter road maintenance.

Every year SNRA and SMHI are involved in arranging courses for maintenance personal that aim at increasing their understanding to use the information supplied by the system .

Web application

The differens between client -server solution and WEB application is that selections of alerts are default in the system and not possible to change for an individual user. Apart from the alerts the difference will be almost none.

Development

The technical section at SMHI has developed the system for data acquisition and PC presentation in co-operation with the SNRA.

The WEB presentation is developed at SNRA with own personal