

Straßenzustands- und Wetterinformationssystem (SWIS)  
Germany's Road Weather Information System (RWIS)  
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## 1 Introduction

Germany's Road Weather Information System is the result of a project under the leadership of the Federal Ministry of Transport, Building and Urban Affairs, the road authorities of the federal states (Laender) and the Deutscher Wetterdienst (DWD). The project was started in 1991 and fully completed in the middle of the 1990s.

The task of the Laender in the project is to co-ordinate the winter maintenance services including the maintenance of RWIS stations equipped with sensors for road and weather conditions while the DWD in its capacity as Supreme Federal Authority has the task to collect and save the data sets and to produce forecasts.

Various companies are also taking part in the RWIS project, each of which had its own software for data set presentation. Some of the Laender used more than one system. The road maintenance authorities also wish to receive information on the road conditions in the neighbouring areas. This situation gave rise to the need for an integrated data exchange and presentation system which is independent from firmware.

For this reason, the DWD has at its disposal both, the technical standard for the data exchange, the so-called 'Technische Lieferbedingungen für Streckenstationen' (technical delivery conditions for section stations, not only RWIS) and a standard code for the RWIS data sets, the so-called SH70, which refers to the content. It is a numerical code similar to the WMO FM12 format. In recent years, a change to table driven BUFR code has set in.

## 2 Road weather data sets

In Germany, there are about 750 road weather stations that are used for RWIS and situated along the motorways. The DWD has given and continues to give help with the choice of locations that are optimally suited to record the most dangerous winter conditions and to fulfil the technical conditions, i.e. electricity.

The direct monitoring of the measured data takes place at the local road master's office; data sets are also transferred to the RWIS centre of the respective Land. Here, the data sets are coded into uniform SH70 code and/or the BUFR code. Today, all data exchange takes place in a uniform code independent from firmware at HH:00, HH:15, HH:30 and HH:45 24-hours a day throughout the whole year (not only in winter time).

Via the DWD's Regional Forecast Centres, the data bulletins are introduced into the DWD network and are thus available in all necessary data pools like GLOBUS server for decoding and displaying with NinJo presentation system or MIRAKEL database for archiving. The data sets (and road weather forecasts, too) are distributed via the DWD's Internet user groups and a special software, called JavaMAP3. This way, all customers can also see the neighbouring data, independent of the firmwares used in the own maintenance systems.

In addition, the DWD exchanges road weather station data with the CHMI.

At first, all 15-minute data sets are displayed in the DWD data presentation systems such as NinJo, MAP, JavaMAP and Internet user groups.

Furthermore, these data are used together with weather forecast data sets as input for the DWD Energy Balance Model (EBM). The so called AutoSWIS software manages the data input, data processing, run of EBM and data output.

### **3 RWIS Forecast**

The most important task of the DWD in the German RWIS is to produce a wide range of special forecasts and warnings.

Once a day, long-term forecasts for up to 7 days ahead are produced to help with planning and co-ordination activities.

Four times a day, a medium-range regionally-limited forecast for up to 3 days ahead is produced, i.e. for the total territory or half the territory of a large Land. If necessary, amendments are made.

The third type of forecast is the so called detailed road weather forecast. It is a 24 hour table of several weather elements such as air temperature, present weather data sets, the road surface temperature and the condition at six different positions (main and side road, shadowed road, city area, bridges and rail road). Table forecasts are produced for places and areas with similar climatological character. This forecast is the most important for the direct management of winter maintenance.

Radar data extrapolated for next three hours are also very helpful for decision making.

And last, but not least warnings are issued depending on the current weather conditions and developments. Then, as a matter of course, there is also the possibility to have a consultation with a meteorologist 24 hours a day.

### **4 Data Presentation**

The RWIS information is made available via different ways. The main way of distribution is ftp download from the Internet.

In addition to displaying the data as a part of the used firmware, the DWD operates two independent solutions: JavaMAP3 software and the Internet user group. The customers can find here all observed data (road weather and DWD stations), satellite and radar images (with liquid and solid being distinguished), model forecast fields and also all text and table forecasts. Short Message Service (SMS) and fax complete the offer.

### **5 Contact and Training**

The DWD Sales and Service Divisions are in close contact with the RWIS customers. Their service ranges from consulting to training for road maintenance staff. The DWD RWIS co-ordinator has the task to manage all activities. He is also a member of important organisations and working groups in the context of RWIS.

Once a year, the DWD holds the RWIS user conference.

January 2007

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