

# **ROAD SURFACE CONDITION INFORMATION SYSTEM FOR THE WINTER SEASON**

## **Yoshitaka Motoda**

Professor, Iwate Prefectural University  
Sugo 152-52, Takizawa, Iwate, JAPAN 020-0193  
Tel:+81-19-694-2732 Fax:+81-19-694-2701 E-mail:motoda@iwate-pu.ac.jp

## **Ken Fujishima**

Technical Officer  
Road Maintenance Division, Civil Department, Iwate Prefectural Government  
Uchimaru 10-1, Morioka, Iwate, JAPAN 020-8570  
Tel:+81-19-651-3111 Fax:+81-19-629-9124 E-mail:p17069@sv01.sg.pref.iwate.jp

## **Yukio Ogata**

Technical Staff  
Iwate Civil Engineering Technology Promotion Association  
Mitake 2-2-10, Morioka, Iwate, JAPAN 020-0122  
Tel:+81-19-643-8585 Fax:+81-19-643-8589 E-mail:info@I-doboku.com

## **SUMMARY**

For the drivers who live in snowy areas, it is necessary to know road surface condition before driving in winter season. However sometimes drivers feel difficulty to know real road condition because it varies place to place and to time to time. To solve this problem, the road surface condition information system for the winter season was developed. In this system, ITV cameras are installed at roadside of several paths. The road surface images are to be distributed through Internet homepage, and then drivers can get real time information. This paper shows outline of the system, user's opinion and future development. According to the opinion of users, most of them drive carefully if they notice the road condition is slippery through the system. However, the relation of the system and occurrence of traffic accidents was not clear.

## **INTRODUCTION**

Iwate prefecture is located in the northern part of the main island of Japan. Most of the prefecture areas are mountainous. Therefore there are many paths along the main roads in the prefecture. In winter season, the areas have much snow and temperatures with several minus degrees at those paths. Sometimes drivers have difficulties in passing such paths. There are many traffic accidents because the drivers are not prepared enough carefully to drive on snowy and icy roads.

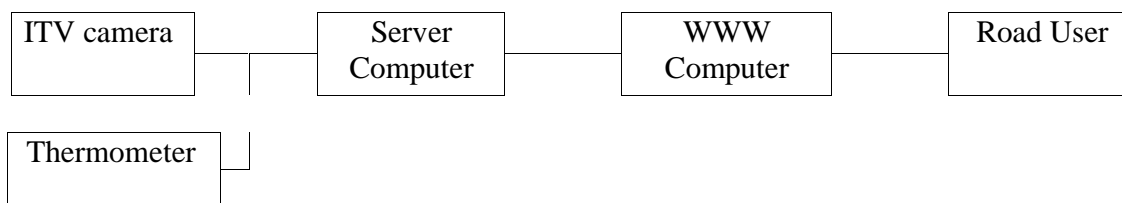
Therefore, it is necessary for the drivers to know the road conditions of these paths before driving especially in the winter season. In this connection, the Iwate prefectural government developed and deployed a road surface monitoring and information system throughout the prefecture in 1998. In this system, ITV cameras are installed at 55 sites in the prefecture. The images of the

roads at these sites and the temperature at the site are collected by the system. These informations are collected and processed at the central server. And the still image of each path and the temperature at the site are provided to the drivers through the Internet home page (<http://www.douro.com>).

Using this system, drivers can get correct information of the road surface conditions through Internet home page before driving. Then the drivers are able to take appropriate countermeasures such as having chained tires or detouring the routes. Approximately fifty thousand accesses to the system were recorded last season.

## SYSTEM

The system consists of the ITV cameras, thermometers, Internet system, and Internet servers (Figure 1). The ITV cameras are installed at the roadside of the main 54 paths of the National



*Figure 1 Road surface condition information system*

highway and prefecture roads that are administrated by Iwate prefectural government. These roads are trunk roads in the prefecture.

The ITV cameras collect the still road images. The still images are updated every hour. Also the temperature at the site is measured. The information is sent to the main server in Morioka City, the capital of the prefecture. Then the information is processed and sent to the Internet World Wide Web server in United States. Then the road information is distributed to the user through the Internet systems. The user can get the image of the road surface and the temperature when he clicks the point of the path on the map in the home page. A sample of the image is shown in Figure 2.



*Figure 2 A sample of the image (figure indicates temperature at the site, -002:7 means -2.7 degree)*

Looking at the image of the ITV, the amount and the quality (e.g.: wet or dry) of the snow on the road is identified. Because of the purpose of the system, the system is only in service in winter, that is in December, January, February and March.

### **ACCESS AND OPINIONS OF USERS**

The number of accesses of the users to the system is displayed in Figure 3. During the last season (from December 1, 1998 to March 31, 1999), there were 48,998 accesses from users. The heavy snowfall days are marked ( ↓ ) in the figure. It is clear that the number of accesses increased on such heavy snow fall days. This means that the drivers are interested in the road surface condition especially when it snows.

Most of the users have positive opinions about the system. Not a few opinions demand an extension of service term. Because of the purpose of the system, this road information service is available only in winter season. However, these people want to use the system throughout the year for tourism. The pictures from the system are useful to see the colors of the leaves. There are a few accesses from outside of Iwate prefecture. Some of the access users do not only want to know the road surface conditions for driving but also want to see the scenery of their home town.

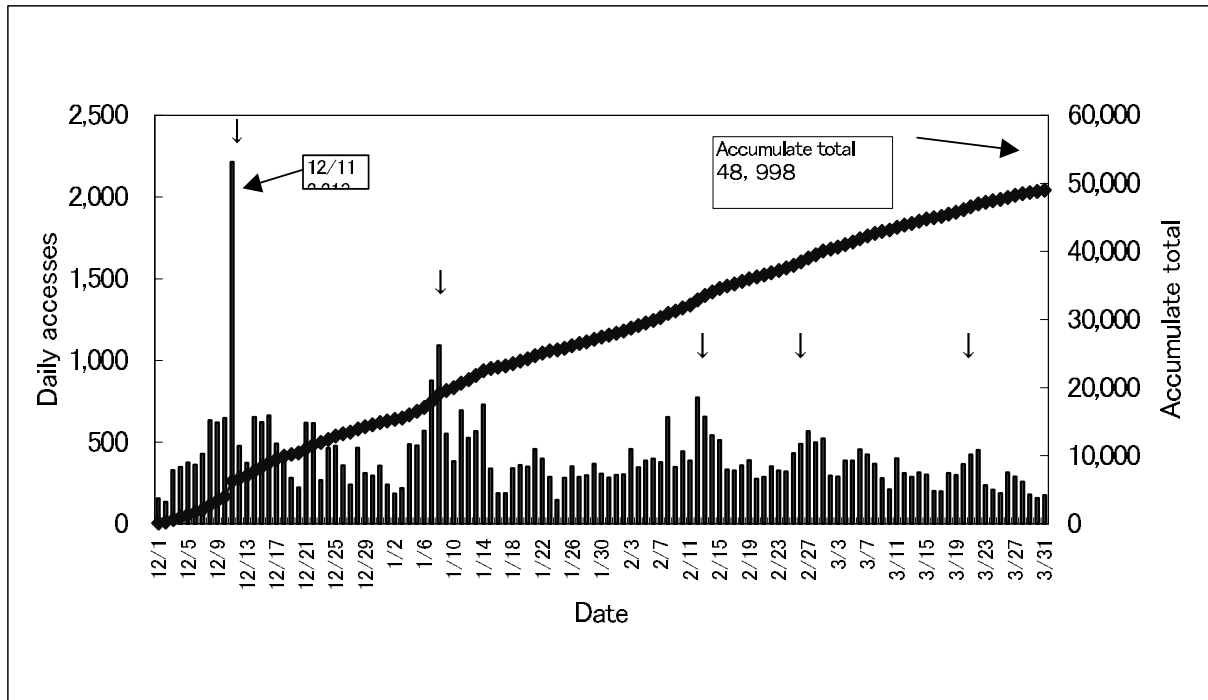


Figure 3 Number of Accesses ( ↓ means heavy snowfall day)

## CONCLUSIONS AND FUTURE DEVELOPMENT

The system for monitoring and providing information of the road surface conditions in the winter season is the first and the biggest one in Japan. Up to now the system is successfully operated and used among the drivers without any major trouble. We are planing to increase the number of the observing points and have Internet link to the other road information systems outside the prefecture and to other roads administrated by the National Government and the Japan Highway Public Corporation. We are examining to improve the system, such as providing moving picture, depth of snow, temperature of road surface, the existence of frozen roads.

Besides providing the road surface condition, the system can be used in other ways. For example, monitoring the road traffic, monitoring the scenery for the development of the tourism are considered.