Introduction to Ice Road Setting Warning and the Application of Automatic Spraying System in Highway

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Abstract. In recent years due to the winter road traffic accidents caused by snow, ice, cause adverse effect on the economic development. Winter driving safety problem is a terrible road operation management departments at various levels. Road ice condensation warning and automatic spraying system is a kind of through the study of the early warning of road ice condensation situation, according to different road conditions ahead of disposal, in order to ensure the roads are not clot ice intelligent device [1]. The equipment in recent years in solving the problem of condensate ice in winter.

Introduction

“Intelligent transportation, green transportation, safe transport” is a direction in the development of transportation in recent years. Road ice condensation warning and automatic spraying systems through to the pavement sensor and expressway road weather stations collect real-time environmental information, through analysis of the environmental information data model, forecasting road pavement ice condensation occur probability, to the road and the expressway management department to set all easy clot ice road automatic spraying equipment send warning signals. Automatic spraying systems sprayed with different concentrations on the expressway pavement snow melting agent solution, reduce the road the freezing point of water supply, in order to achieve the effect of preventive treatment of [2]. To road coagulation ice warning and automatic spraying system in the application of an expressway in Yunnan region, for example, a winter from December to February road ice condensation cycle, compared before and after the installation in snowmelt agent usage, due to road traffic accidents caused by condensation of ice, because the roads are closed condensate ice a traffic time, analysis of the device's role in the winter road use.

Equipment

Ice road setting warning and automatic spraying equipment of the system can be divided into: the road coagulation ice warning systems and automated disposal system of two parts. Road coagulation ice warning system equipment includes: road sensors and weather stations and image acquisition equipment, information transmission system. Automatic spraying system equipment includes: automatic spraying system control equipment, automatic spraying terminals, pressure control system, snowmelt agent solution storage devices.

System Operation

Installed the highway road setting ice warning system 1 set of 12 sets with automatic spraying systems.

Cycle, after the installation of the first coagulation ice road setting has issued coagulation ice warning system early warning signal on the screen 15 times per second. In order to check the road table the accuracy of the temperature sensor, the temperature thermometer and early warning system for collection of 371 sensors compare the temperature value, deviation in 0-0.5-356 °C, 95.96%; Deviation in 0.5 to 1.0 °C in 11 (2.96%), deviation in 1.0 1.5 °C has three, accounted for 0.81%, one deviation of 1.5 to 2.0 °C, 0.27%.
System Using Effect

Road Traffic Closed and Closed Time Shortened

Before installing the road due to road ice condensation problems, 13 times, sealing time 130 hours; After installing the road due to road ice condensation problems sealing sections of 3 times, closed time up to 18 hours. Before the installation way in all have occurred throughout the day, after installing sealing way mainly in 3 a.m. to 9 o'clock in the morning the next day.

Due to Road Traffic Accidents Caused by Ice Condensation Reduced

According to the statistics section of road management department, the section of a condenser ice period after installation due to road traffic accidents caused by ice condensation 17, before installing the sections of a condenser ice period due to road traffic accidents caused by ice condensation, a total of 46.

For easy setting of ice road traffic accidents caused by tsa facilities, comparing the damage repair of installation after coagulation ice warning and automatic sprinkler system, repair of damaged facilities are reduced by 55.3%.

Snowmelt Agent Usage Reduced

Not installed condenser ice warning and automatic sprinkler system, frozen snowmelt agent directly by the artificial cloth to the pavement. System after installation, snowmelt agent with concentration of 20% aqueous solution, spray evenly to the road. Concentration is the choice of analysis of data collected according to the simulation test, snowmelt agent solution concentration range in 10 ~ 15%, can make the road freezing point drop in 6 ~ 9 °C; Concentration was 20%, can reduce pavement freezing temperature 14.1 °C. The use of snow melt agent solution concentration was 20%.

More than the traditional artificial and snowmelt agent is at 3 am to 10 PM the next day, road maintenance personnel to have condensed sections of snow and ice snow melting agent, artificial snow melting agent and zabbud due to different staff proficiency, spraying quantity there is a big difference; Coagulation and road ice warning and automatic spraying system is ice on the road has not been set, the preventive spray snowmelt agent solution, snowmelt agent usage is more scientific and reasonable. Before and after the installation of the snowmelt agent sections of usage down about 41%.

Conclusion

Ice road setting warning and automatic spraying systems on a good effect to solve the problem of condensate ice in winter. In the protection of the roads, improve highway capacity, reduce traffic accidents and save maintenance cost advantage is obvious. Scientific and reasonable use of snowmelt agent, to reduce salt content on along the roads and Bridges and Ann facilities corrosion, decrease the snowmelt agent on the vegetation, water, soil from damage. Road ice condensation warning and automatic spraying system is “wisdom” green traffic transportation, safe transportation, a good practical new technology environment.
Reference
