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Maintenance 2001 Project

1999-2000 : 4th Season

Maintenance 2001: "Integrating Technology for Winter Road Maintenance"

The Maintenance 2001 project is sponsored by the Ministry of Transportation and is being conducted by Owen Sound District and the Maintenance Office.

The objectives are the introduction of new technology, techniques and practices to:

- reduce salt usage and negative impacts on the environment
- maintain a more consistent winter maintenance level of service
- measure the performance of winter maintenance contractors to ensure safety and standards are met
- disseminate information on winter road conditions
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Test Site

Location

- a 27 km section of Highway 21, between Springmount and Southhampton;

includes the communities of Jackson, Alvanley, Allenford, Elsinore and Chippewa Hill

- a 14.2 km secondary site on Highway 6, between Springmount and Hepworth; includes the communities of Cruickshank and Shallow Lake

Geography

- the site is at the base of the Bruce Peninsula, and is subject to weather systems from Lake Huron and Georgian Bay
- the test area has the highest snowfall in Ontario, as well as a shorter winter thaw which allows for optimum test conditions
- annual average snowfall 2.5 to 3.5 meters, falling on 45 to 75 days per winter
- the area experiences a variety of snow and frost conditions that are representative of most severe winter areas of the province
- the topography and land cover of the site (rolling uplands, flat lowlands, forested and open areas and swamps) also ensure a variety of snow and ice conditions affording excellent test opportunities
- the site has moderate traffic levels and highway speeds which provide safer testing conditions than the more densely populated areas of southern Ontario

Test Sections

- 12 test sections in the main area, 4 test sections in the secondary area
- measurement site is located at the midpoint of each test section
- changes in snow cover and in surface friction over time will be closely monitored in these areas
- surveillance videos and street lights are located at six of the test sites
- recorded images are stored on a computer every 5 minutes
- cameras are focused almost vertically at the surface and are not intended or equipped for traffic surveillance

Trois domaines de programmes

- Decision Support Tools
- Advanced Winter Maintenance Procedures and Equipment
- Performance Standards and Quality Assurance Tools

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Summary and Results from 1998-1999 Season

1. Decision Support Tools

Advanced Road Weather Information Systems (ARWIS)

- ARWIS moving from testing phase to province-wide implementation
- two ARWIS will continue to be used in the project on Hwy 21; one is between Allenford and Elsinore, and the other is approximately 4 km south of Port Elgin
- these systems measure air temperature, humidity, wind speed, direction, precipitation, road surface temperature and the concentration of road salt on the surface, and provide a 24 hour forecast of surface freezing and snow accumulation
- ARWIS is being installed at 60 sites across Ontario's freeway system over the next two years

Infra-red Thermometers (IRT)

- the use of these remote sensing devices are being implemented province wide in vehicles operating out of all Ministry patrol yards this fall
- measure road surface temperatures as well as air temperature
- detect problems with icing on bridge decks and shaded sections of highway

De-icing Anti-icing Response Treatment Program (DART)

- a computer program which uses state-of-the-art knowledge of anti-icing and de-icing methods to guide operations personnel in selection of the most effective snow and ice control operations
- now a completely functional program
- the objective is to have a PC decision tool, with links to ARWIS, to assist in selecting the most cost-effective operation and chemical application rates for the conditions

2. Advanced Winter Maintenance Procedures

Pre-wetting System:

- **Liquid Controller (Compuspread)**
 - designed to be functional and user friendly in controlling the use of liquid anti-icing/de-icing chemicals
- **Brine Mixing Tank**
 - easy to operate
 - improvements to overcome earlier problems in loading, pump operation and leakage
 - during second year of operation tank's straight sides became bowed from pressure in brine compartment and were reinforced with steel beams

3. Performance Standards and Quality Assurance Tools

Norsemeter

- testing complete on the Norsemeter Surface Friction trailer and it is now being used to measure friction during de-icer and winter sand tests
- motorists will see the friction devices being towed by a test van, also equipped with infra-red thermometers, a Global Positioning System (GPS) unit and a video camera system

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1999-2000 Test Plan

1. Decision Support Tools

DART verification

- current research on DART has two objectives:
 - determine adjustments required to better integrate ARWIS and DART systems
 - evaluate the material application recommendations given by DART against ministry test results from last winter
- program output will be compared with the results of the anti-icing/pre-wetting evaluations and changed as required

- DART will be integrated with ARWIS during summer 2000 based on the results of this winter's tests

2. Advanced Winter Maintenance Procedures

Pre-wetting

- the objective is to reduce costs of winter maintenance and provide appropriate levels of service by better timing of operations, use of liquid and granular anti-icing/de-icing materials and appropriate variation in application rates
- the ministry will be initiating parallel operations of ministry contractors in the use of pre-wetting of road salt in several regions this winter

Alternative De-icer "Ice-Ban Magic"

- alternative de-icer being evaluated as a liquid de-icer and pre-wetting agent for salt and sand
- it is composed of the chemical $MgCl_2$
- used in the same way as sodium chloride brine
- tests will determine whether Ice-Ban Magic will reduce overall salt application loading (application rate x number of applications) or cost
- spreader will spray either liquid salt brine or liquid Magic which is a mixture of magchloride and harmless food processing by-product
- these products have little effect on vehicles, people or the environment as they minimize the use of road salt and impacts on cars and the environment

3. Performance Standards and Quality Assurance Tools

Snow cover on road surface

- objective is to evaluate the use of video as a method of measuring snow coverage, and to relate measurements to existing performance standards
- includes evaluation of analogue and digital technologies for video imaging and archiving, automated methods of measuring snow cover from video, and consideration of sampling requirements in space and time

Winter friction on road surface

- objective is to evaluate the use of surface friction measurements as a quality

- assurance tool, and to relate friction to existing performance standards
- includes evaluation of methods and equipment for measuring surface friction, relation between friction and snow cover, and consideration of sampling requirements in space and time

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Maintenance 2001 Open House!

An Open House was held December 7th, 1999, at the new test site for the Maintenance 2001 project, a 27 km stretch of **Hwy 21 between Springmount and Southhampton**. It was an opportunity for local media, provincial police, politicians, and municipal engineers to see up close some of the new winter maintenance equipment and to find out how winter maintenance operations may be changing. Here are some highlights!



An OPP officer looks at a spreader truck with Lindsay Busch, Supervisor of Operations at the site.



Guests had the opportunity to ask questions about the project, equipment and testing.



A plough truck complete with the new rubber blade.



An upclose look at the new rubber blade for the plough truck.
This rubber blade is one of the new pieces of equipment being tested this season.

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