Winter Road Condition Mobile Data Collection System

In Support of Alberta’s Traveller Information Services

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IBI GROUP
Presentation Overview

- **Project Background, Traveller Information Services & Providers**
- **Project Goals & Stakeholders**
- **System Functionality, Development and Implementation**
- **Usage, Interface and Statistics**
- **Successes and Lessons Learned**
In the province of Alberta, winter road condition information is made available to the public by the Alberta Motor Association.
Alberta Transportation’s unique private/public partnership with Alberta Motor Association facilitates winter road condition information submissions from Provincial contractors;

- **AT Highway Maintenance Contractors**,  
- **Parks Canada** contractors,  
- **Road Weather Information System** providers.
During Winter months Contractors are responsible for;

- Inspecting and maintaining **Provincial 1 and 2 digit** paved highways,

- Collecting highway information on **466 segments** totaling ~**15,000** kilometres,

- Providing highway conditions daily by **6:00 am** and **update** information as conditions change,

- Submit to AMA observed **Driving, Visibility, Lane** and **Weather** conditions.
Reported Conditions

Driving and Visibility
Good or Fair or Poor

Shoulder
Snow & Ice or Bare

Driving Lane
Bare & Dry, Bare & Wet, Bare Wheel Paths, Drifting Snow, Icy Sections, Snow Covered

Weather
Fog, Freezing Rain, Snowing, Strong Winds
AMA Road Reports®

Provides reported Winter Road Conditions and RWIS information to public through web and toll-free phone services.

www.ama.ab.ca

1-877 AMA-HWYS
Project Goals

Provide operational improvements

Replace the fax-based reporting system,
Reduce errors and improve quality of data,
Facilitate real-time submissions and updates,
Support increased frequency of reporting,
Maintain data for review and analysis of reported winter road conditions.

Improve safety on Alberta highways.
Replace Problematic Paper Fax System
Deploy a web-based collection and submission service for Road Reports

- Submissions from Mobile devices & Workstations
- Data accessible for updating, review & analysis
Project Stakeholders

**Alberta Transportation**
- AT Maintenance Contractor Inspectors
- AT Highway Maintenance Contractors

**Parks Canada**
- Maintenance Contractors

**Alberta Motor Association**
- AMA Road Reports Coordinator
- AMA IT staff
System Functionality

Secure

• Hosted & managed database & web service,
• Defined Agency & Contractor hierarchy,
• Password protected User interface.

Quality Control

• Data entry pick-lists & checkboxes,
• Single or multi-segment submissions,
• Data retention for review & updates,
• Data validation & final submission confirmation,
• Report generation tools.
Identified Concerns

**System design**

*Interface compatible with existing AMA service,*
*TMDD compliant for future provincial ATIS,*
*Data retention for updates & report generation.*

**System acceptance**

*Compatible with pre-defined mobile devices,*
*New technology & ‘Old’ users*

**System operations**

*Connectivity, connectivity, connectivity!*
System Development 2009

Define business rules, develop data collection, reporting and management interface

• Confirm User hierarchy & responsibilities,
• Define Shops & associated reported segments for highways,
• Streamline work flow processes & provide updating efficiencies,
• Develop web, mobile & database interfaces,
• Implement system support, training & manuals,
• Deployment for major highways in Fall 2009.
“ABRR.CA”

Initial Implementation

February 2, 2009

Expanded Highway Deployment

October 15, 2009
System Usage 2009 - 2010

Oct. 15, 2009 to Apr. 30, 2010

466 Highway segments over 85,000 submissions

<table>
<thead>
<tr>
<th>2009-2010 SEASON</th>
<th>ROAD CONDITION REPORTS SUBMITTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONTH</td>
<td>AMA</td>
</tr>
<tr>
<td>October</td>
<td>1,997</td>
</tr>
<tr>
<td>November</td>
<td>2,003</td>
</tr>
<tr>
<td>December</td>
<td>2,035</td>
</tr>
<tr>
<td>January</td>
<td>1,782</td>
</tr>
<tr>
<td>February</td>
<td>1,060</td>
</tr>
<tr>
<td>March</td>
<td>1,365</td>
</tr>
<tr>
<td>April</td>
<td>292</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10,534</td>
</tr>
</tbody>
</table>
Peak Reporting During Storm Days

HMC Reporting Volume

A school bus that veered off the road due to weather conditions, sits in a ditch outside Calgary, on Friday, Dec. 4, 2009.
Continuation of Reporting after Season

Winter-like weather slams Sask., Alberta

Regina Leader-Post, Edmonton Journal, Calgary Herald: Friday, April 9, 2010

Cold, miserable, winter-like weather was moving across the Prairies on Friday, toppling trees and trucks in Saskatchewan, and leaving treacherous road conditions in some parts of that province and Alberta.

Thousands of people were left in the dark in Saskatchewan as winds blowing up to 100 km/h knocked out power in some regions.

James Parker, a spokesman for the provincial power utility, said at least two dozen communities had been affected by power outages as a result of the weather, which pushed semi trailers onto their side along Highway 11.
Province-wide Deployment

October 1, 2010

On-line Reporting and Review of 446 Highway segments submitted through the mobile data collection system

Accessible to;

AMA & 30 Contract Maintenance Areas
- 11 Alberta Transportation Districts; Ops Managers, Engineers & Inspectors
- 7 Highway Maintenance Contractor Companies
- Parks Canada Dispatch Centres
System Usage 2010 - 2011

Oct 1, 2010 to Apr 30, 2011

- **100** Shops reporting daily
- **7** Highway Contractors reporting
- Provincial **1, 2 & 3** digit highways

Banff and Jasper Parks Canada Dispatch Centers
City of Calgary and Edmonton Ring road Contractors

**Over 107,000 real-time submissions**
Volume of Road Condition Reports Submitted by Date

Total Segments to be Reported on Daily = 446
Total Number of Submissions = 107,014 October to April
<table>
<thead>
<tr>
<th>HMC Reporting Start Dates</th>
<th>Hwy Segments</th>
<th>% of Total Segments</th>
<th>HMC Reporting End Dates</th>
<th>Hwy Segments</th>
<th>% of Total Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Oct-10</td>
<td>42</td>
<td>9 %</td>
<td>15-Mar-11</td>
<td>249</td>
<td>56 %</td>
</tr>
<tr>
<td>10-Oct-10</td>
<td>21</td>
<td>5 %</td>
<td>10-Apr-11</td>
<td>21</td>
<td>5 %</td>
</tr>
<tr>
<td>15-Oct-10</td>
<td>147</td>
<td>33 %</td>
<td>14-Apr-11</td>
<td>36</td>
<td>8 %</td>
</tr>
<tr>
<td>1-Nov-10</td>
<td>43</td>
<td>10 %</td>
<td>15-Apr-11</td>
<td>140</td>
<td>31 %</td>
</tr>
<tr>
<td>15-Nov-10</td>
<td>193</td>
<td>43 %</td>
<td>30-Apr-11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>446</td>
<td>100 %</td>
<td>TOTAL</td>
<td>446</td>
<td>100 %</td>
</tr>
</tbody>
</table>
System Analytics

Usage and Diversity

These mobile devices sent 200 visits via 4 operating systems

<table>
<thead>
<tr>
<th>Site Usage</th>
<th>Goal Set 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits</td>
<td>Pages/Visit</td>
</tr>
<tr>
<td>200</td>
<td>6.48</td>
</tr>
<tr>
<td>% of Site Total: 0.82%</td>
<td>Site Avg: 14.49 (-55.31%)</td>
</tr>
</tbody>
</table>

24,449 visits used 6 connection speeds

<table>
<thead>
<tr>
<th>Site Usage</th>
<th>Goal Set 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits</td>
<td>Pages/Visit</td>
</tr>
<tr>
<td>24,449</td>
<td>14.49</td>
</tr>
<tr>
<td>% of Site Total: 100.00%</td>
<td>Site Avg: 14.49 (0.00%)</td>
</tr>
</tbody>
</table>

Browser | None | Visits |
--- | --- | --- |
1. Internet Explorer | None | 23,792 |
2. Firefox | None | 320 |
3. Safari | None | 157 |
4. BlackBerry9630 | None | 67 |
5. Netscape | None | 56 |
6. Chrome | None | 47 |
7. BlackBerry8900 | None | 5 |
8. BlackBerry8230 | None | 1 |
9. BlackBerry8350i | None | 1 |
10. BlackBerry9700 | None | 1 |

Connection Speed | None | Visits |
--- | --- | --- |
1. DSL | None | 11,069 |
2. Unknown | None | 10,923 |
3. Dialup | None | 1,186 |
4. Cable | None | 1,135 |
5. ISDN | None | 102 |
6. T1 | None | 34 |

Filter Connection Speed: containing
System Operations

Hello Winter
Maintenance & Reporting
Mobile Collection Interface

- Secure User log-in & account information,
- Specific Shop & highway segment pick-lists
- Efficient single or multi-segment reporting
- Retention of previous road conditions,
- Data entry validation & confirmation for required fields,
Review and Analysis
Daily Performance Monitoring Reports

AMA Road Reports®
Nov 9 2010 9:12
AMA-3 [Alberta Motor Association] | Log Out

AMA Road Conditions Report Filter
HMC
CAMI
Shop
Start
End
Back

AM/AT Road Conditions Report
AT Shop Reports
24hr AMA Summary Report
Highway Reports
Management Documentation

Daily Reports by Shop or Highway
**Reported Road Conditions Review**

### Winter Wallop Closes Some Southern Alberta Schools

Monday, February 7th 2011 07:15

This latest blast from Old Man Winter has closed a number of Southern Alberta schools.

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### Highways and city roads in rough shape as winter storm hits

Karyn Mulcahy, Global News: Wednesday, December 15, 2010

RCMP have now reopened Highway 16 after closing it on Wednesday morning due to icy conditions that forced multiple vehicles into the ditch. RCMP says conditions are still poor and are not recommended.

In the city, Edmonton police reported that they responded to 67 collisions between 6:30 a.m. and 6:30 p.m. Two people were taken to hospital with moderate injuries. Many roads had snow pushed onto the centers of streets, making a two-way driving task even more difficult.
Project Successes

- ‘Champions’ from Contractors who encourage additional enhancements,
- Able to easily accommodate early Fall & late Spring reporting needs,
- Increase in reporting frequency & in accuracy of information,
- Archived data accessible for review & analysis,
- System compliant for future ATIS.
Lessons Learned

-Staged deployment
  • Provided time for Contractors to become comfortable with technology,

-HMCs require alternatives for reporting during initial start-up and peak times
  • Dedicated phone line for Road Condition reports,
  • Train Contractor support staff to take field calls,

-Resources for IT support
  • Clearly define troubleshooting procedures and escalation process for IT & connectivity problems.
Acknowledgements

- Alberta Motor Association
- Alberta Transportation
- Transport Canada
- NRITS

Thank you