Live train crossing information
We believe in a world with seamless mobility and no railway crossing fatalities.
“Why can’t anyone tell me when a railway crossing is blocked?”
Detect

Proprietary trackside sensors

Analyze

Patented, machine learning algorithms

Share

Smartphone, web map, database, TMC
Prioritize investments
Select improvements
Manage traffic
Respond to public

Improve safety
Support public services
Support ancillary services
Future preparation
Monitor Pedestrian and Cyclist Activities and Behaviours at Blocked Railway Crossings

Project Stakeholders

Montréal
CITY OF VANCOUVER
Winnipeg
MORR TRANSPORTATION CONSULTING
Monitor Pedestrian and Cyclist Activities and Behaviours at Blocked Railway Crossings

Project Objectives

Identify if crossings with more frequent train stopping, shunting and switching movements increase dangerous behaviours and activities of pedestrians and cyclists.
Monitor Pedestrian and Cyclist Activities and Behaviours at Blocked Railway Crossings

Project Methodology

Train Detected → Camera Activated → Recordings Sent to Cloud → Pedestrian, Cyclist, and Train Activities Analyzed

Pedestrian, Cyclist, and Train Activities Recorded
Monitor Pedestrian and Cyclist Activities and Behaviours at Blocked Railway Crossings

**Key Metrics**

- Number of pedestrians and cyclists who pass through stopped trains
- Frequency of irregular train movements by time of day, day of week and type of movement
- Pedestrian and cyclist dwell time before dangerous movement or behaviour
- Distribution of dangerous behaviour or activity by time of day and day of week
## Project Sites

<table>
<thead>
<tr>
<th>Location</th>
<th>Blockages Per Day</th>
<th>Average Blockage Duration</th>
<th>Number of Blockages &gt; 10min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver</td>
<td>15</td>
<td>8 minutes</td>
<td>2</td>
</tr>
<tr>
<td>Winnipeg</td>
<td>5</td>
<td>8 minutes</td>
<td>N/A</td>
</tr>
<tr>
<td>Montreal</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- **Vancouver**: Venables St.
- **Winnipeg**: McGillivray Blvd.
- **Montreal**: Rue de la Commune O
Monitor Pedestrian and Cyclist Activities and Behaviours at Blocked Railway Crossings

Preliminary Findings Available In October 2017
TRAINFO Applications

V2X at Rail Crossings

Project Stakeholders

Project Stakeholders

[Logos of NRC-CNRC, Winnipeg, and MORR]
Project Objectives

- Evaluate human factors in receiving V2X communications from rail crossings
- Define the SAE J2945 standards for a Basic Safety Message (BSM) at rail crossings
- Reference existing crossing safety standards in the design of V2X deployments at rail crossings
- Investigate implications of BSM propagation through Vehicular Ad-Hoc Networks (VANET) and message relay devices
TRAINFO Applications

Project Methodology

V2X at Rail Crossings

Literature Review → Prototype Development ← Field Tests → Integration Testing → Standards Development
V2X at Rail Crossings

Project Status

- Broadcast train crossing state using V2X communication
- Engaged vehicle CAN to feed an onboard display
- Evaluated numerous VANET and message propagation methodologies
Quantifying Congestion at Rail Crossings

Project Stakeholders

Winnipeg

MARR
TRANSPORTATION CONSULTING
Project Objectives

Quantify the impact of blocked rail crossings from a congestion perspective in terms of person time lost.
TRAINFO Applications

Quantifying Congestion at Rail Crossings

Project Methodology

Bluetooth Sensor

TRAINFO Sensor

First Ave

Main St

Second Ave
Quantifying Congestion at Rail Crossings

Project Methodology

Old Way

AADT (T)

Trains

Hour-of-Day

0:00 12:00 24:00

TRAININFO Way

Hour-of-Day

0:00 12:00 24:00
## Project Findings

**CN @ Waverley St**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Old</th>
<th>TRAININFO</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gate down time per train (min)</td>
<td>2.7</td>
<td>5.4</td>
<td>+111%</td>
</tr>
<tr>
<td>Average trains per day</td>
<td>35</td>
<td>38.0</td>
<td>+9%</td>
</tr>
<tr>
<td>Vehicles delayed per day</td>
<td>1,864</td>
<td>4,277</td>
<td>+129%</td>
</tr>
<tr>
<td>Hours of delay per day</td>
<td>53.2</td>
<td>286.6</td>
<td>+437%</td>
</tr>
<tr>
<td>Total delay cost per year</td>
<td>$510,000</td>
<td>$2,750,000</td>
<td>+437%</td>
</tr>
</tbody>
</table>
Prioritize investments
Select improvements
Manage traffic
Respond to public

Improve safety
Support public services
Support ancillary services
Future preparation

TRAININFO Applications
Contact Neil.Ternowetsky@TRAININFO.ca or go to TRAININFO.ca for more details