

The Ministry of Transportation's Bilingual Strategy for Variable Message Signs

On January 20, 2015, the Ministry of Transportation (MTO) announced a strategy for the deployment of bilingual variable message signs (VMS) in provincial areas designated under the French Language Services Act. The work leading up to the announcement was significant for the ministry. At the time of the French Language Services Act introduction in 1986, the technology available made it impossible to display French messages on VMS. Older VMS could not display letters with French accents and there was not enough physical space to provide both English and French messages. In addition, human factors testing recommended highway messages be displayed on a single phase because large messages with more than one phase could become a driver distraction.

The ministry was granted an extension for compliance of bilingual message implementation on VMS due to these safety and technological challenges which warranted further in-depth studies.

Making bilingual VMS a reality involved many years of work on the part of ministry staff and consultants who worked diligently to roll out the strategy in 2015.

Background – French Language Services Act

When the French Language Services (FLS) Act was introduced, bilingual road signs were installed in French-designated areas. The MTO Bilingual Signing Policy was developed in accordance with the Act. Under the Act, provincial highways located in French-designated areas require bilingual signs.

The current MTO policy sets guidelines to provide uniformity and consistency of signs along provincial highway routes located in 26 French-designated areas.



A sample of Ontario's new variable message signs displaying recognizable graphics and bilingual messaging for seat belt use.

New Signs, New Capabilities

Over the past few years, the ministry has begun to acquire new full matrix signs to replace current variable message signs as they reach the end of their lifecycles.

The new signs offer a great deal more flexibility than the old signs. They support hundreds of colours, French accents and pictograms. They also offer more flexibility with the positioning of pictograms and text.

The use of pictograms on road signs significantly reduces the amount of text required to convey messages. These capabilities have been important components of moving forward with the province-wide strategy.

Public Consultation for Highway Messaging in French Designated Areas

In 2004, an initial study was carried out by MTO, who retained IBI Group, a firm offering urban design and planning services, to develop both an English and French message library. The consultant partnered with Human Factors North, a human factor specialist firm and together they conducted a study that involved the development of pictograph concepts

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through a public consultation process with Anglophone and Francophone drivers, a jurisdictional scan, and an internal design team.

During the consultation, test candidates were given multiple traffic incident scenarios and asked to draw pictures that represent the various highway traffic situations. For one particular highway scenario, the majority of participants responded by showing schematic type drawings representing the highway and proposed conditions via arrows and 'x's as shown in the examples in Figure 3. This trend was observed through all language groups providing the initial ideas for developing the draft set of messages to be tested for comprehension.

Based on this initial round of consultation a complete draft library of graphics were developed and tested confirming the extent to which the messages were understood by all tested language groups. Messages with a high degree of comprehension were advanced to the final list of messages.

When messages were misunderstood, participants were asked to suggest potential improvements. These improvements were made and the updated messages were then subject to a second round of testing.

The initial consultation prompted the ministry to look further into existing well-recognized graphics used on provincial static signs, GPS devices and generally on the Internet, to represent traffic or traffic conditions.

In 2010, the ministry undertook a second study building on the findings of the initial study. The timing of the second study provided an opportunity to incorporate technological advances made since 2004, such as larger full matrix signs, the ability to produce French characters, the use of hundreds of colors and flexible placement of both text and pictograms.

Public Session for Creating Common Symbols

As part of the second study, in 2011 two rounds of human factors testing were conducted in the cities of Toronto, Sudbury and Ottawa, and included extensive outreach to Francophone stakeholders in order to obtain a desired sample of 200 French-speaking drivers. The human factors testing scheduled for French-speaking drivers was conducted entirely in French.

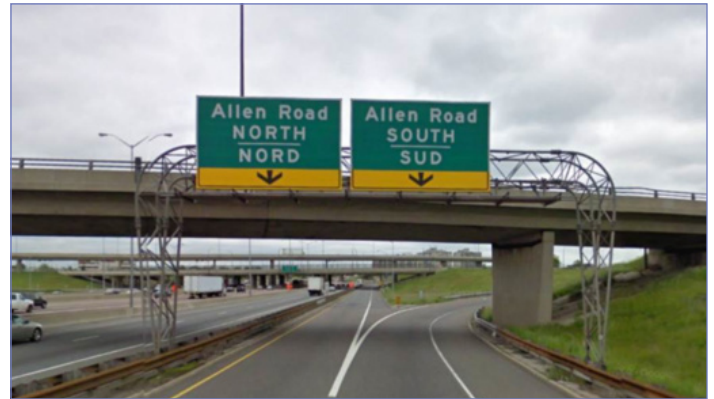


Figure 1: Bilingual static signing in Ontario

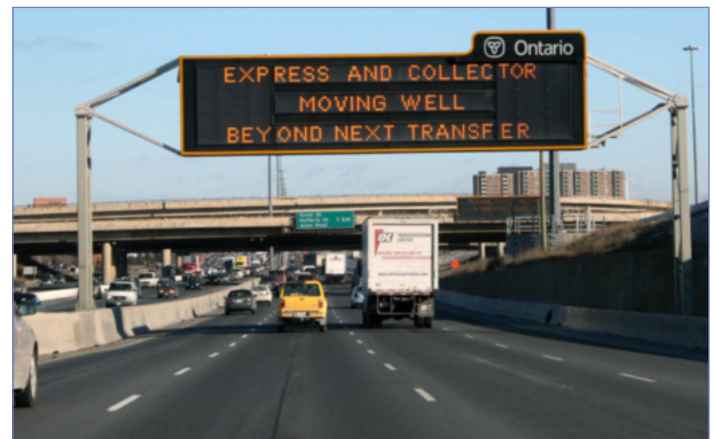


Figure 2: Typical VMS located on Highway 401 in Toronto. The sign is limited in space, cannot display bilingual messages and because of high driving speeds, the sign policy prohibits the use of two-phase messaging on these full-size signs.

By the end of the study, approximately 600 regular commuters were involved in the human factors testing. Participants were classified as either French as first language (those who have knowledge of French and use it at home), English as a first language or Other as first language, with an even split between the three groups. Over 200 participants identified themselves as speaking French as a first language.

Participants also ranged in terms of age into three separate categories: 25 years old and younger, 25 years to 55 years old and 55 years old and older, representing common highway driving demographics.

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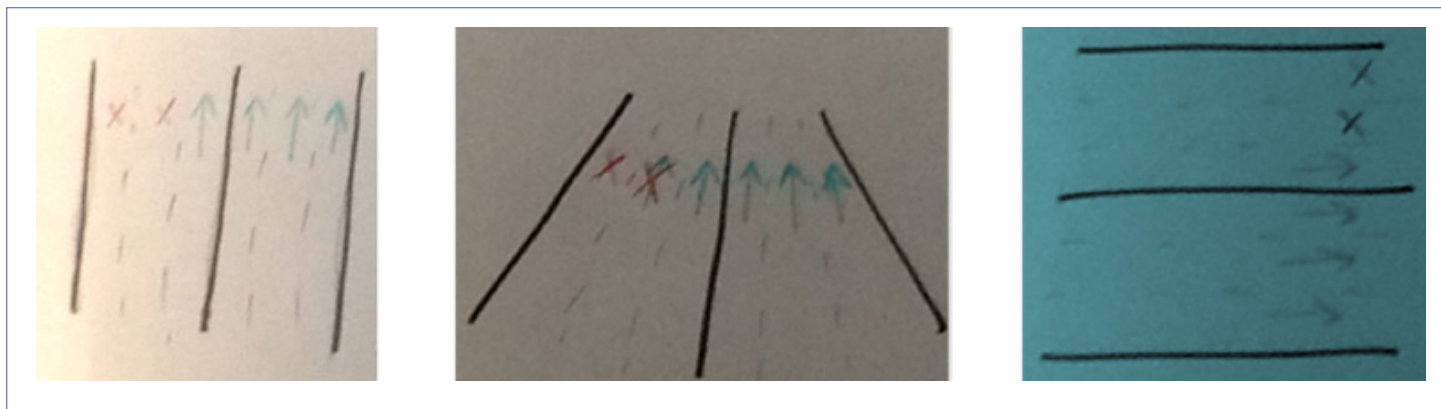


Figure 3: Samples of traffic incident scenarios drawn by Anglophone and Francophone test candidates depicting two left lanes blocked.

The input received from the Francophone community was invaluable to the study, giving the ministry good insight into which graphic images were most effective. Feedback also provided clear direction for deciding when to incorporate text or simply a concise stand-alone graphic on signs. The Francophone respondents also provided input that assisted the development of policies for pictogram signing. Figure 4 shows an example of a safety message and graphic that had undergone two rounds of testing. This example scored a very high level of comprehension among all three language groups, as shown in Figure 5.

VMS Fonts and Legibility

Based on the Human Factors North study results, some messages require both French and English text to supplement the graphic to enhance comprehension. However, the amount of text is significantly reduced.

A new font was also developed for new VMS support text. The new font and letters with French accents were brought into the human factors testing to ensure their legibility to the Francophone audience. This new font was then incorporated into the final set of pictogram messages where required.

A finalized library of messages and message templates were developed for all messages shown to be well understood by all three language groups.

After extensive consultation and human factors testing with both Francophone and Anglophone participants, the ministry opted for a strategy that relies heavily on the use of



Figure 4: A new safety message with text and graphics that was tested in public consultation and understood by multiple language groups.

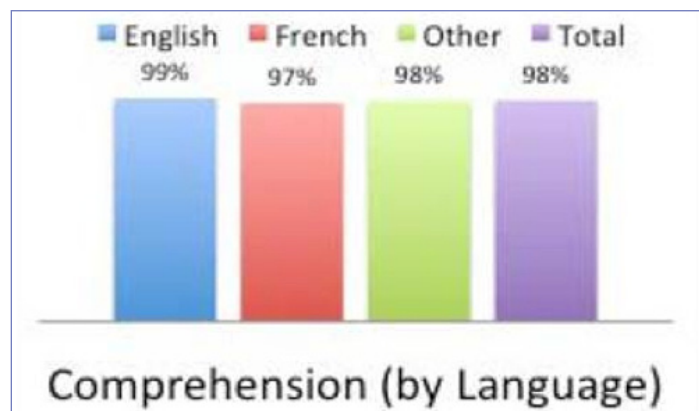


Figure 5: Comprehension of the tested 'Safe Distance' variable message sign by various language groups.

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pictograms. Pictogram messages are typically comprised of easily recognizable graphics reducing the requirement for text. Through the use of pictograms and shorter text messages the ministry can now display both French and English messages when the pictogram requires the addition of text for enhanced message comprehension.

Bilingual Variable Message Sign Implementation

The implementation of the bilingual Variable Message Signs occurred in two phases due to the complexity of the road safety messages and the size of the sign structures in Ontario's regions. In 2010, the government completed the first phase in the implementation of bilingual messages on signs in northern Ontario. The second phase of the project involved the development of a new library of combined symbol and bilingual text messages for larger VMS in other parts of the province. The use of graphics in these messages reduced the dependency on text and allowed messages to be easily understood by all drivers regardless of their first language. The ministry undertook significant human factors testing to ensure that the new messages were understood by drivers and easy to read at a distance.

Each stage throughout the project led to the modification of the central sign control software. Once the pictogram library was approved federal-provincial funding was secured for an education campaign. A provincial VMS policy was developed and publicity of the study across government transportation and transit agencies, consulting firms, industry vendors and software developers took place. The ministry presented the public consultation findings to 250 delegates at the Association of Francophone Municipalities of Ontario's Annual Conference in New Liskeard, Ontario, and to 300 delegates at the Intelligent Transportation Systems Annual Conference in 2013.

The culmination of this work was unveiled on January 20, 2015, when, Steven Del Duca, the Minister of Transportation, rolled out the strategy for bilingual variable messaging to the media. The use of colour, along with internationally-recognized images and symbols using less text allows drivers to easily interpret important road safety information and respond to traffic conditions accordingly. To date, more than 40 new electronic signs have been introduced in Ontario with bilingual variable messaging capability. Older VMS across the province will gradually transition to the new sign type as they reach the end of their lifecycle.

Best practices from around the world combined with regional research and public input have assisted the ministry to create signs designed for Ontario drivers. This is the first bilingual image-based sign plan developed and executed province-wide in Canada. •



Figure 6: Arrive Alive, Don't Drink & Drive pictograms, easily recognized by multiple language groups.

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