

# TDM strategies during transportation disruptions and episodic events

## Overview

When municipal traffic systems are disrupted—by transit strikes, storms, major infrastructure reconstruction or power outages—an entire city can grind to a halt.

Episodic events such as smog days do not affect a city's transportation network in the same way, but can have extremely negative effects on health due to poor air quality.

Transportation demand management (TDM) can help to minimize such interruptions and events, and can also present unique opportunities to implement new transportation initiatives.

This issue paper reviews the types of disruptions and events that can affect communities, and provides examples of TDM initiatives that municipalities and other stakeholders have implemented during such transportation interruptions and episodic events. In addition, where available, results are provided on reduced congestion and emissions and the increase of sustainable transportation modes.

## Selected Resources

City of Ottawa, [Transit Strike Options](#).

Ontario Ministry of the Environment. [Smog Alert Response: A Municipal Guide to Action](#).

TransLink [Buzzer Blog](#).

Full references and resources can be found at the end of this issue paper.

## Context

We all rely on a transportation system that runs smoothly—to get from place to place and to distribute goods. When that system is disrupted, however, many people are left with fewer mobility options.

Transportation demand management (TDM) can help. TDM is a catch-all phrase applied to any set of strategies and programs that use transportation resources more efficiently to reduce traffic congestion and improve travel options. TDM strategies can include improved transit options, amenities and incentives for people to use active

and sustainable modes, and policy and institutional reforms.

TDM programs can be applied to situations in which traffic is disrupted, such as reconstruction projects, transit strikes or any other type of event that disrupts the normal flow of traffic. In fact, communities that have well-established TDM programs can often cope better with such disruptions because transportation alternatives are already in place.

For communities without TDM programs, transportation interruptions can be the ideal time to introduce such initiatives. When mobility choices are curtailed, people are often more willing to try new modes of transportation, and that switch—as a result of a transportation interruption or episodic event—can be translated into more sustainable long-term transportation behaviours.

### *Types of Disruptions / Episodic Events*

Some of the most common types of disruptions/events include:

- Infrastructure reconstruction, such as bridge replacement, road resurfacing or major highway construction.
- Regular maintenance of infrastructure.
- Strikes by public transit workers.
- Electricity outages or other utility interruptions, such as water main breaks.
- Weather-related interruptions, such as storms, tornadoes, earthquakes or floods.
- Smog days. In most cases, smog alerts are issued in Canada only during the summer months, but there have been incidences of smog warnings at other times of the year.

## Impacts

All of these types of interruptions or events can have both negative and positive effects. They can negatively impact businesses, worker productivity, social activities, and, in some cases, they can even endanger people's health.

For example:

- Transit strikes, reconstruction or weather events that reroute traffic can reduce foot, bicycle and vehicle traffic to local retailers, thus affecting their business. During the Ottawa bus strike (see *Transit Interruptions*), for example, commercial activity losses were an estimated \$400 million (City of Ottawa).
- A lack of transit can also result in missed medical appointments, lost jobs or a curtailing of social activities.
- Major reconstruction can affect the delivery of goods and how fast ambulances/firefighters can get to emergencies.
- Smog days can increase the likelihood of asthma attacks, heart attacks or other cardio-pulmonary events. The Ontario Medical Association estimated that, in 2005, approximately 17,000 Ontarians were admitted to hospitals with health problems related to air pollution exposure—a number that is expected to rise to 24,000 in twenty years.

On the other hand, transportation interruptions or events can be opportunities for municipalities to implement new TDM measures and for residents to try a new method of commuting.

For example:

- Transit strikes may prompt single occupant vehicle (SOV) drivers to begin using active transportation, carpooling or teleworking, habits that may continue once the strike is over and transit service resumes.
- Reconstruction projects can be an opportunity to implement TDM measures including bicycle lanes, wider sidewalks, HOV lanes, etc. Several U.S. states, for example, require TDM measures such as cycling lanes or improved sidewalks to be installed whenever roadways are reconstructed or resurfaced.
- Smog days may persuade more people to drive less and to cycle, walk or carpool more, not just on smog days, but throughout the year. During the 1996 Olympics in Atlanta, Georgia, the city leased 1,000 additional buses to improve non-driving travel choices. Such measures cut the number of cars in the morning rush hour by 23%, reduced smog concentrations by 28% and decreased hospital visits due to asthma attacks by 42% (Environmental Defense).
- Employers may use transportation interruptions as a springboard to implement TDM programs that include such things as guaranteed ride home programs, discounted transit passes, telework or flexible work hours, etc.

## Planning & Implementation Opportunities

This section includes examples from several North American municipalities that have successfully used TDM programs (or TDM elements) to mitigate the impacts of traffic disruptions.

### Infrastructure reconstructions

Infrastructure reconstructions can include planned and unplanned construction projects or events.

#### *Highway 101 Reconstruction, California*

As part of a three-year program to reconstruct Highway 101 in central California, the City of San Luis Obispo developed a series of TDM strategies to enhance mobility during and after the reconstruction period.

In partnership with *Ride-On*, a local transportation management association (TMA), the city increased commuter bus service and promoted vanpooling. In addition, it also offered subsidies and carpool incentives to residents. For example, commuters who use alternative transportation earn “lucky bucks” that they can cash in for movie tickets, gift certificates and other prizes.

A post-reconstruction evaluation of all of these programs showed that traffic volumes were reduced by 12% during the construction period and that 300 fewer cars were now traveling the highway, eliminating about 12,875 kilometres (8,000 miles) of daily vehicle travel. The evaluation also showed that the carpool incentives were the most cost-effective means for removing cars from the highway.

#### *T-Rex, Denver*

With a total budget of close to \$1.7 billion, the Transportation Expansion, or “T-Rex” project in Denver, Colorado, was one of the largest reconstruction projects ever undertaken in the United States. Construction began in the late 1990s and was completed in 2007.

T-Rex was designed to reconstruct a portion of Interstates 25 and 225 and to extend the region’s light rail corridor. Early in the process, the Colorado Department of Transportation (CDOT) opted to include additional TDM measures such as:

- Subsidizing transit passes (Eco Pass) to commuters. The passes are available through *Trip to Work*, a program run by the South I-25 Urban Commuter TMA.
- Creating and marketing an online information network for alternative transportation.
- Subsidizing the provision of new vanpools for I-25 commuters.
- Bicycle lockers, racks and pedestrian access bridges at every station. Bicycles can also be taken on the trains.

The reconstructed corridor serves about 230,000 commuters every day. It includes 30.5 kilometres of light rail, 13 new rail stations, five new parking structures and 6,000 new parking spaces.



*T-Rex light rail system. Photo courtesy of the Colorado Department of Transportation.*

Once construction was finished, transit officials reported that the daily ridership on the new portion of the light rail system was just over 62,000 people, nearly double CDOT's original estimate.

### **Unplanned Reconstruction**

#### *Laval Bridge Collapse*

Many will recall the news images of the collapse of a portion of the Papineau-Leblanc Bridge in Laval in September 2006. About 57,000 cars cross the bridge each day and the collapse forced an immediate reconstruction of the bridge.

The event spawned not only various TDM and traffic management measures to deal with the immediate issue, but prompted the city to expedite new (and permanent) transit services and other TDM measures.

Following the collapse of the bridge, the Agence Métropolitaine de Transport (AMT) contacted other local agencies to prepare a contingency plan for commuters. Immediate actions included shutting down a portion of the highway and providing drivers with alternative driving routes. AMT stressed that drivers should only use those routes if their jobs required them to use a car, emphasizing that the only true solution to the crisis would be offered by the transit system.

All of the agencies involved—AMT, the Quebec Ministry of Transport and the cities of Laval and Montreal—quickly

swung into action with a wide-ranging mitigation plan. Those initiatives included:

- Adding an additional departure on the commuter train between Blainville and Montreal. AMT rented a GO Train (8 cars and one locomotive that could accommodate 1,400 additional riders) from the Government of Ontario for the service. The service operated between October and November 2006 and resulted in an 8.7% increase in transit use.
- Opening up 600 new parking spaces by creating park-and-ride lots at the Guzzo theatre complex. This measure was such a success that it was kept open until the opening of the Laval subway station in April 2007.
- Offering several new shuttle services that linked transit riders from park-and-ride lots to the Montreal subway station and commuter train stations. These shuttle services were offered free of charge throughout the month of October 2006. One of these shuttle services allowed commuters to reach the Montreal subway system from the park-and-ride facility in approximately 10 minutes (a trip that normally takes about an hour by car). Twelve hundred passengers used the service while the highway was closed.

In April 2007, with the completion of the extension of the Montreal subway system to Laval, AMT was able to discontinue most of these measures.

As a result of the event, however, AMT opened a new commuter train station ahead of schedule to ease traffic at the other stations and has retained one of the shuttle services, which services about 600 commuters daily.

### **TDM Regulations**

Some U.S. states require, by law, that TDM measures be implemented whenever roadway work, such as road resurfacing or new road construction is performed. Other municipalities use existing bicycle or transportation plans as a way to implement cycling infrastructure whenever roadwork is to be performed.

#### *Oregon's Bicycle Bill*

Oregon's Bicycle Bill was adopted in 1971 and requires that pedestrian and bicycle facilities be added whenever a highway, road or street is constructed, reconstructed or relocated. The statute also requires that Oregon's Department of Transportation spend at least 1% of its share of state highway funds on pedestrian and bicycle facilities.



*Tom McCall, Oregon's governor, signs the Bicycle Bill into law in 1971. Photo courtesy of Portland Transport.*

In 2006, a complete inventory of cycling and walking facilities was conducted along all urban highways. Of the approximately 2,736 kilometres (1,700 miles) reviewed, cycling facilities have been added to approximately 1,505 kilometres of roadways.

#### *Cycling lanes in Chicago and Toronto*

As part of the Chicago Bike Program, a bikeway technician regularly reviews the city's bicycle network and recommends where cycling lanes can be added when the city resurfaces roads.

Of the approximately 120 kilometres (75 miles) of roads resurfaced each year, Chicago adds or upgrades 8-16 kilometres of cycling lanes (5-10 miles). To date, the city has established approximately 160 kilometres (100 miles) of cycling lanes.



*Bike lane next to parking. Photo courtesy of the Chicago Department of Transportation.*

Similarly, the City of Toronto has also taken advantage of road resurfacing projects to add cycling lanes as part of its *Toronto Bike Plan*. The plan's goal is to build a 1,000+ kilometre Bikeway Network by 2012 and, when completed,

the Network will include approximately 500 kilometres of bicycle lanes.

One example of the plan in action is the addition of cycling lanes along a major arterial road. When a section of The Queensway (which runs through Toronto and Mississauga) came up for reconstruction, staff saw the opportunity to extend the existing bicycle lanes from Claude Avenue to Windermere Avenue and incorporated them into the plans.

At a cost of about \$40,000, the Queensway was reconstructed at a width that now accommodates two traffic lanes and a bicycle lane in each direction.

#### **Event Opportunities**

Cities that have hosted the Olympic Games can attest to the challenge of managing traffic during the games.

As the host of the 2010 Winter Olympics, Vancouver estimates that some 17,000 visitors will visit the Olympic venues each day.

To deal with the influx of people, while continuing to offer services to residents, TransLink, Vancouver's regional transit authority, is taking steps now to avoid traffic chaos. Some of those steps include:

- Implementing a communication outreach program for local residents, major tour operators and visitors to provide them with information on alternative modes of transportation. TransLink will use its own website and its "Buzzer Blog" to get these messages across, as well use other websites such as YouTube.
- Applying parking capacity restrictions and road closures at least a week before the Games begin. TransLink believes that these restrictions will encourage residents and visitors to use alternative options such as carpooling or public transit.

In addition to these mitigation measures, TransLink believes that telework holds some of the greatest potential to help ease traffic during and after the Games.

For several years, TransLink has been studying how it could implement a telework program for local businesses. Two studies, one in 2004 and the other in 2006, found that there was substantial interest in the Vancouver business community for telework opportunities. In the 2004 study, for example, TransLink found that if a telework program were available at their place of employment, more than 50% of the 900+ adults surveyed would use it, cutting an average of four single-occupant vehicle trips per person per week.

JoAnn Woodhall, TDM Officer with TransLink, says that the Olympics is the catalyst for the telework program, but that "it will also have a long-term effect on transportation behaviour."



Frankie Kirby, TDM program manager, explains that TransLink has been piloting a telework program with local companies since 2008 and has also developed telework tools and resources to support the businesses involved.

“We piloted the program with three companies,” she says. “The information from the pilot will give us the information we need to promote telework to other companies, particularly during the Games.”

Each company involved spent six months using Teletrips, a software tool that tracked the number of vehicle kilometres not traveled, GHG emissions avoided, and the cost savings to employees and to the company.

The pilot program ended in March 2009. Ms. Kirby reports that TransLink is currently analyzing the results and will make those results, along with all of the materials developed for the pilot, available on a new website devoted to the issue at the end of May 2009.

### Transit Interruptions

Prolonged transit strikes can have long-term, negative effects on transit ridership. Providing TDM measures both during and after a transit strike can mitigate those impacts and provide opportunities to encourage more sustainable transportation modes.

#### *City of Ottawa*

In December 2008, drivers and maintenance workers with OC Transpo, Ottawa’s transit authority, went on strike. The strike, which began just before the holiday season, lasted for more than 50 days during some of the coldest weather of the year.

At the beginning of the strike, the City of Ottawa launched a series of initiatives designed to help commuters cope with the loss of transit. Some of these initiatives, particularly those with respect to active transportation and carpooling, were already part of the city’s *TravelWise* program, which helps to reduce traffic congestion and make the most of the city’s transportation infrastructure.

These measures included:

- *Active transportation.* Primary walking and cycling routes were maintained to a higher standard of snow and ice clearing to accommodate active commuters. The city will maintain this higher snow and ice-clearing standard in future. A local ridesharing website, OttawaRideMatch.com, also modified its website to allow people to search for walking and cycling partners.
- *Carpooling.* The city discounted parking rates for carpoolers (3 or more people per car) at all of their municipal parking lots. They also heavily promoted OttawaRideMatch.com and erected new signage to mark meeting spots for carpools at park & ride lots and along bus-only lanes in the downtown. Anecdotal

evidence suggests that many former single-occupant vehicle (SOV) drivers have continued to carpool, but no data are yet available on the exact numbers.

- *Parking measures.* The city opened up 3,000 additional all-day parking stalls in previously one- to three-hour unmetered parking spots.
- *Services for those in need.* The city augmented its Paratranspo service to add more vehicles and drivers to assist the elderly or those with disabilities.
- *Traffic flow.* The city opened up a portion of a bus-only lane on Highway 174 to improve traffic flow from the eastern portion of the city.

In an interview conducted shortly after the strike ended, Councillor Alex Cullen, chair of the city’s transit committee, admitted that it is difficult to say whether the alternatives offered by the city during the strike will affect long-term behaviour change.

“People make decisions based on the availability of choice,” he said, adding that he does not believe that the strike will affect future transit use.

Indeed, when transit ridership resumed in February 2009, city and transit officials estimated that ridership would drop by about 15%. Transit officials compared the ridership and revenue figures for March 2009 to those of March 2008. They found that, although sales of monthly bus passes was down, cash and ticket sales jumped by 18% and ECOPASS sales were up by 6% compared to March of 2008.

### Smog and Heat Alert Plans

Over the past several years, several municipalities have implemented smog alert response plans (SARP). A SARP describes what actions the municipality, local businesses and individuals can take on days when a smog alert is called.

In most cases, municipal SARPs concentrate on what actions should be suspended during smog days (e.g. the use of landscaping equipment, painting, etc.), but the plans can also encourage municipal employees and residents to use alternative forms of transportation on smog days.

The Region of Niagara, for example, encourages employees to take alternative modes of transportation or telework on smog days.

In a 2003 report to the Toronto Board of Health, Toronto’s Chief Medical Officer of Health concluded that implementing the city’s corporate SARP had very few negative impacts on city operations. In support of that study, Toronto Public Health found that the most common pollutants were at lower levels during peak rush hours. Encouraging employees and residents to use active and sustainable modes of transportation on smog days can,

therefore, lower a person's risk of exposure to air pollution.

In Windsor, a pilot project in July 2003 provided residents with free transit on smog days. Four smog alerts were issued that month and the city and Environment Canada provided a total of \$60,000 to cover Transit Windsor's operating costs. City planners expected a 5% increase in ridership, but over the course of the four days, ridership increased by 50%.

Between June 1 and September 2, 2008, the Société de transport de Laval also offered an incentive to take transit during smog days, lowering fares to only \$1. It plans to continue this incentive through 2009, estimating that the move will remove about 1,500 vehicles from the road during smog days.

#### *Spare the Air, San Francisco*

Between June and October each year, ground-level ozone in the San Francisco Bay Area occasionally reaches unhealthy levels.

In the early 1990s, the Bay Area Air Quality Management District (BAAQMD) created *Spare the Air*, a program to curtail motor vehicle emissions in the region.

Working with several different partners, including employers, the media and schools, *Spare the Air* educates and informs residents on how to reduce emissions during smog days. Media announcements are made the day before a smog day is predicted and individuals who are registered with the BAAQMD are notified by phone, fax or email.



Local businesses and public agencies promote the program and the cities and counties surrounding the Bay Area also provide incentives and services for commuters and employers. Such incentives include reduced transit fares, funding for bicycle parking and free carpool parking. By August 2000, 1,612 employers were involved in the program, up from 250 when the program was first initiated in 1992.

Between 1998 and 1999, vehicle trips were reduced by 209,760 and 258,656 respectively. As a result of these trip reductions, emissions fell by 2.92 tonnes in 1998 and 3.36 tonnes in 1999.

## Considerations for Stakeholders

In any transportation interruption or episodic event, important lessons are learned that can be used to improve future transportation planning. Based on interviews with the various municipalities and transit authorities profiled in

this issue paper, some of the key lessons are outlined below.

### Take advantage of the interruption

In many of the construction projects noted in this paper, municipal officials took advantage of the situation to introduce TDM measures. Denver's T-Rex project, for example, gave the city the opportunity to implement several new active transportation amenities. Resurfacing roads in Chicago and Toronto also afforded these cities the chance to add cycling lanes.

Ottawa Councillor Cullen also notes that, although the city did not actively promote telework, working from home or working flexible hours became common practice for many city staff.

"The strike let people look at telework as an alternative and experience it and that will make it more acceptable in the future."

### Communicate

Communication is critical, particularly in the first days or hours, or even in advance of an event.

In the case of Ottawa's transit strike, the city made full use of the media to get information to residents and kept residents up-to-date with newspaper advertisements and information on its website.

In the case of smog days, as the Region of Niagara notes in its SARP, early warning efforts not only ensure that community members who are most at risk from smog are alerted in advance, but that the media is often more responsive to extreme smog episodes. Keeping the media informed creates an opportunity for public education and outreach on what produces smog and what steps people can take to reduce emissions.

Stakeholders should also consider using emerging forms of communications. TransLink, for example, uses its "Buzzer Blog" and Twitter (a free social networking service) to keep residents updated on transportation changes.



*TransLink runs an online advisory panel to give people an opportunity to become directly involved in the future of the region's transportation network. Photo courtesy of TransLink.*

### Provide many options

Having several alternatives available to commuters is one of the keys to keeping

traffic flowing smoothly.

In the case of Laval, its swift action following the bridge collapse provided commuters with many different options including additional buses, commuter trains and park & ride stations.

Similarly, Ottawa not only provided tools to make it easier for commuters to match up for carpooling, but also added parking spaces and park & ride lots, performed a higher standard of snow clearing to ensure the safety of pedestrians and cyclists and provided up-to-date information to residents on a daily basis.

Councillor Cullen notes that the measures the city of Ottawa took were well received by the public. “Part of our strategy was to get out in front of the parking issues before they became problematic and to mitigate the impact on the most vulnerable people,” he says.

Many SARPs cover basic actions, such as suspending the use of gas-fired motors during smog alerts, encouraging employees to telework or use transit, and so on. Some, however, go much further and provide actions for specific municipal departments. The Region of Niagara, for example, breaks down each department’s regular activities into those that are suspended during smog alerts, what information departments should provide to employees and residents, and suggests alternative tasks and work options.

### **Draw on Past Experience**

Learning from past experience is often one of the best ways to move forward with TDM initiatives.

TransLink is drawing on its experience and research to minimize traffic disruptions and to offer residents transportation alternatives during the Olympic Games.

For example, for almost 20 years, Vancouver has held an annual fireworks festival that draws more than 200,000 people into downtown. TransLink mitigates the impact of traffic during the festival by adding transit service and using bike valets.

In addition, TransLink is encouraged by the initial results of its pilot telework program, which will not only help mitigate traffic during and after the Games, but will reduce emissions and provide flexible work arrangements for employers and employees.

### **Conclusion**

Traffic disruptions affect everyone—whether it’s the solo driver, the regular transit user or the active commuter. Although some disruptions may not have immediate or obvious long-term benefits in and of themselves, they can provide an opportunity for residents to try different commuting modes, habits that can become long-term behaviours.

As Councillor Cullen notes, Ottawa’s transit strike offered a “perverse” benefit. All residents—not just transit users—could see the traffic congestion that occurs when people don’t have a functioning transit system. “People are more appreciative now of how transit frees up capacity,” he says.

The municipalities and transit authorities interviewed for this issue paper all stress that, regardless of the type of disruption or episodic event, communicating, providing options and having a contingency plan can make for smoother traffic sailing for all commuters.

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