The Need for Traffic Calming in Montreal

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PROBLEM

In Montreal, the number of injuries caused by road accidents increased from 10,926 to 12,806 between 1999 and 2003.[1]

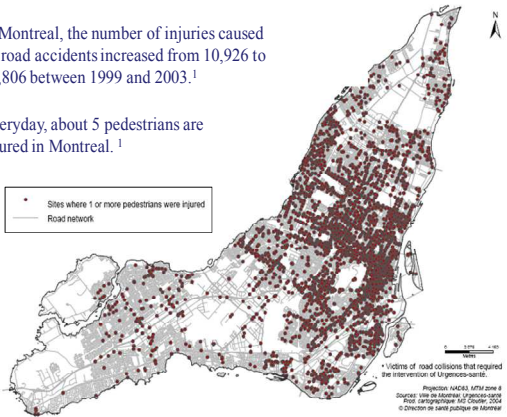Everyday, about 5 pedestrians are injured in Montreal.[1]

Figure 1: Locations of injured pedestrians on the island of Montreal (1999-2003)

EXAMPLES IN MONTREAL

A Montreal street without traffic calming (Photo: Miaux, S.)

Curb extension – Davaar street (Outremont)

Textured pedestrian crossing – Laurier street (Outremont)

Speed hump – Jeanne-Mance street (Ahuntsic-Cartierville)

Enlarged sidewalk – Bernard street (Plateau Mont-Royal)

Pavement markings and flower pots – Laurier street (Outremont)

Figure 7: Traffic calming measures in Montreal

MAJOR CAUSES

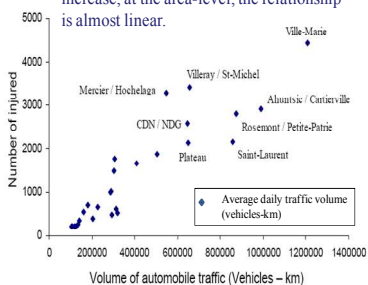Road injuries increase as the traffic volumes increase; at the area-level, the relationship is almost linear.

Figure 2: Road injuries vs. traffic volume of Montreal boroughs

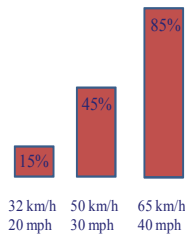Higher speeds lead to greater chance of serious injury & death

32 km/h 20 mph	50 km/h 30 mph	65 km/h 40 mph
15%	45%	85%

Figure 3: Likelihood of injury & death vs. vehicle speed

FRAMEWORK

BUILT ENVIRONMENT

From many studies, changing the built environment is the most effective way to improve traffic safety. The built environment, including land use and transportation infrastructure, influences traffic volumes, operating speed of a vehicle, traffic conflicts, and pedestrian-collision frequency and severity.[2] Traffic calming through geometric road design is a passive traffic safety measure in that drivers will react instinctively towards it.[3]
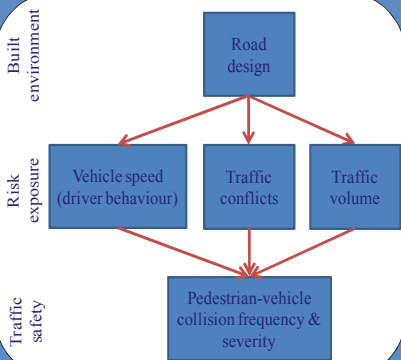

Figure 4: Relationship between built environment, risk exposure, and traffic safety

SOLUTION

DEFINITION

"Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." [4]

OBJECTIVES:

• To improve safety for pedestrians, cyclists, and other road users
• To improve quality of life of local neighbourhood
• To reduce noise levels
• To reduce pollution

BY MEANS OF:

• Reducing vehicle speeds
• Reducing traffic volumes

HISTORY

The exponential increase in cars during the 1960's was accompanied by an increase in the circulation of cars in arteries and local roads. This made it unsafe for pedestrians to walk and for children to play. In the Netherlands, local residents filled the streets with tables, benches, and sand boxes to force drivers to slow down – called woonerfs. In the United States, the city of Seattle, Washington, experimented with full street closures and diagonal diverters which "created indirect trips for the neighbourhood's own residents." [5] and were later changed to half street closures and traffic circles.

AREA-WIDE TRAFFIC CALMING

To reduce the total number of road injuries in a neighbourhood, traffic calming must be implemented on a macro level, not on a street-by-street basis.
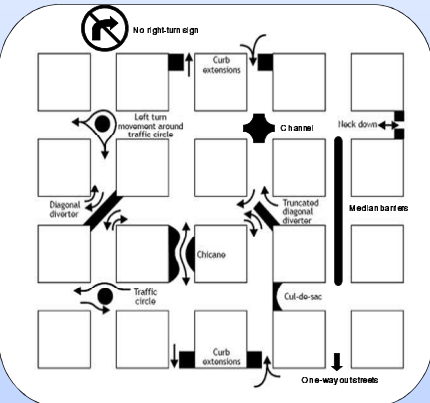

Figure 5: Example of area-wide traffic calming [6]

Channel forces right turns and prevents through traffic.

Chicane forces drivers to slow down to manoeuvre around it.

Cul-de-sac prevents entries to and exits from neighbourhood.

Diverters force all traffic to turn at the intersection.

Median barriers prevent left turn entries to the neighbourhood or traffic on local street from crossing one neighbourhood to another; offer pedestrians a protected area or a refuge.

One-way out streets prevent cars from entering but allow exits from the neighbourhood.

Traffic circle gives the impression of street discontinuity which forces drivers to slow down to go around it.

…and many more!

TRAFFIC CALMING ON ARTERIES "TRAFFIC TAMING"

Arteries pose a greater risk than local roads due to high speeds and high volumes. However, there are ways that we can "retrofit" the road to protect pedestrians, cyclists, and the community.

MEASURES

Narrower travel lanes enforce drivers to travel slower.

Road diets, which has shown to improve safety, refers to reducing the number of lanes on a road. With multiple lanes, it is possible to pass other cars which means that the high-speed vehicles set the speed. On two-lane roads, it is harder to pass other cars so the safe drivers set the speed.[2]

Tightening corner curb radii will compel all cars to slow down when turning[7]; reduce pedestrian crossing distances.

Raised medians narrows the road and provides a refuge for pedestrians crossing.

Curb parking act as a barrier between traffic and pedestrians and reduces the road width.

Curb extensions narrow the street, slow traffic, prevent parking near the intersection, and increase visibility. It also reduces the risk exposure to pedestrian injuries by shortening pedestrian crossing times and distances.
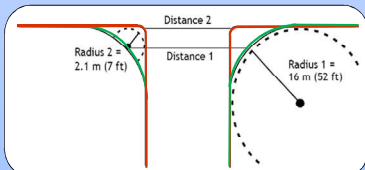

Figure 6: Comparison of two different turning radii [6]

1 Société de l'assurance automobile du Québec. Bilan 2003: accidents, parc automobile, permis de conduire. Quebec: Direction des études et des stratégies en sécurité routière, 2004.
2 Ewing, R. & Dumbaugh, E. The Built Environment and Traffic Safety: A Review of Empirical Evidence. Journal of Planning Literature, 2009,23, 347-368.
3 Peek-Asa, C., Zwerling, C. Role of Environmental Interventions in Injury Control and Prevention. American Journal of Epidemiology, 2003, 25, 77-89.
4 Lockwood, I. ITE Traffic Calming Definition. ITE Journal, July 1997, 22-25.
5 Ewing, R. Traffic Calming: State of the Practice. Chapter 2: Brief History. ITE/FHWA, August 1999, 11-16.
6 U.S. Department of Transportation, Federal Highway Administration. (2007). Lesson 20: Traffic Calming. Retrieved August 4, 2009, from www.tfhrc.gov/safety/pedbike/pubs/05085/chapt20.htm
7 Laplante, J. & McCann, B. Complete Streets: We Can Get There from Here. ITE Journal, May 2008, 24-28.