

# CONCRETE THINKING

## IN TRANSPORTATION SOLUTIONS

This case study presents the range of potential fuel savings and reductions in emissions that could be achieved if a 100 km section of a major urban arterial highway in Canada were to be paved in concrete. This example is based on latest available data from the Transportation Association of Canada Geometric Design Guide. It is assumed 1,095,000 heavy trucks per year travel on this section of roadway, based on 20,000 vehicles per day at 15% heavy truck traffic.

### Fuel Savings and Reductions in Emissions

### Canada: Major Urban Arterial Highway

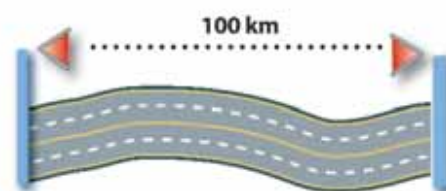
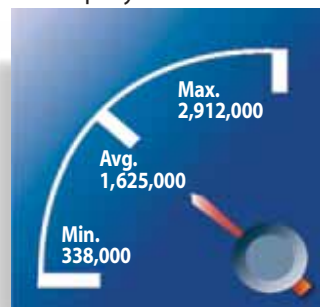
#### Fuel Savings

Litres per year



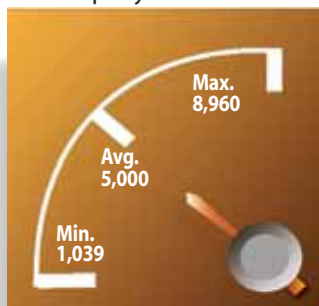
#### Dollar Savings

Dollars per year



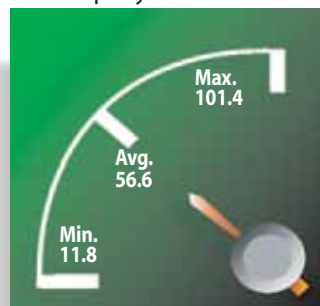
#### CO<sub>2</sub> Emissions Reductions

Tonnes per year



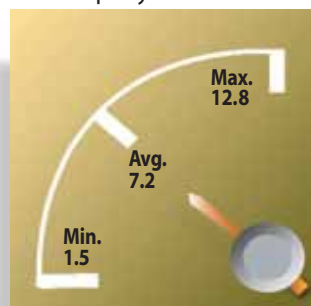
#### NO<sub>x</sub> Emissions Reductions

Tonnes per year



#### SO<sub>2</sub> Emissions Reductions

Tonnes per year



### Annual Savings and Reductions for Major Urban Arterial Highway

	Results based on driving on rigid concrete vs. flexible asphalt pavement		
	Minimum 0.8% [1]	Average 3.85%	Maximum 6.9% [2]
Fuel Savings (litres)	377,000	1,813,000	3,249,000
Dollar Savings (\$)	338,000	1,625,000	2,912,000
CO <sub>2</sub> Equivalent Reductions (tonnes)	1,039	5,000	8,960
NO <sub>x</sub> Reductions (tonnes)	11.8	56.6	101.4
SO <sub>2</sub> Reductions (tonnes)	1.5	7.2	12.8

#### Assumptions:

Average Bulk Diesel Fuel Price for Major Canadian Urban Centres from Jan. 01/06 to Jun. 01/06: 0.90 \$/litre

Fuel Efficiency of Heavy Truck: 43 litres/100 km

CO<sub>2</sub> Equivalent (carbon dioxide + methane + nitrous oxide): 2,758 g/litre

NO<sub>x</sub> (oxides of nitrogen): 31.22 g/litre

SO<sub>2</sub> (sulfur dioxide): 3.95 g/litre

References: [1] Effects of Pavement Structure on Vehicle Fuel Consumption - Phase III, CSTT-HVC-TR-068, Taylor and Patten, January 2006.

[2] Additional Analysis of the Effect of Pavement Structures on Truck Fuel Consumption, G.W. Taylor, August 2002.



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