Ready Mixed Concrete Association of Ontario

www.rmcao.org

CONCRETE PAVEMENT

Save your Money and the Environment

Many attributes of concrete can be tied back to a Sustainable benefit. Concrete is an excellent choice for Responsible Materials Procurement.

ECO CERTIFICATION

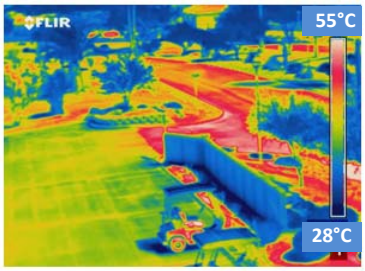
To address Responsible Materials Procurement, the RMCAO in consultation with Ontario Ministry of Environment, has developed the ECO Certification to provide Owners and Users with the highest degree of assurance that the concrete facility, company and products address sound and responsible Environmental and Sustainable Development Facilities management, operations and manufacturing practices that support their sustainable choice of concrete.

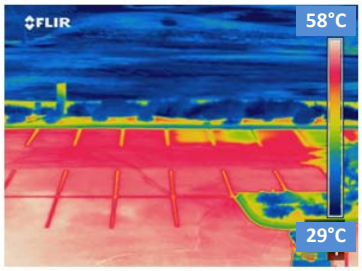
REDUCE, REUSE and RECYCLE

Concrete manufacturing recycles industrial by-products (Slag, Fly Ash, Silica Fume) that otherwise would have been sent to landfills. Non-renewable resources (aggregates) are reduced with the use of crushed concrete and potable water is conserved by reusing process water.

REDUCE HEAT ISLAND EFFECT

The image below (top left) is an infrared photograph of a flexible pavement leading into a concrete parking lot (the actual photo is directly below). Note the immediate transition from the flexible pavement (red) to the concrete overlaid parking lot (yellow green) at the driveway. The image on the top right (actual photo below) was taken of a flexible pavement parking lot adjacent to a golf course. Note the 29-32°C temperature of the grass and the 57°C temperature of the parking lot.





SAVING NATURAL RESOURCES and TAX DOLLARS

Concrete pavements help save money for taxpayers, businesses, and government agencies because it conserves resources, redirects materials away from landfills, and requires few repairs over its expected life span. Concrete offers important environmental advantages in every stage of manufacturing, construction, and use. Also because old concrete can be recycled, the cycle of environmental performance can continue almost indefinitely.

ENERGY and EMISSIONS SAVINGS

Concrete has natural Albedo, meaning that less light is needed to illuminate the concrete surface than a flexible pavement: for example 5% of falling light on flexible pavement will be reflected, whereas 27% of falling light on concrete pavement will be reflected.[2]

Concrete pavement night picture

Flexible pavement night picture

Concrete pavement lasts longer, which means less energy being used in construction, less motor fuels and oils for heavy machinery, and less energy (and emissions) required for motorists to navigate around work zones.

SAVES RESOURCES and LASTS LONGER

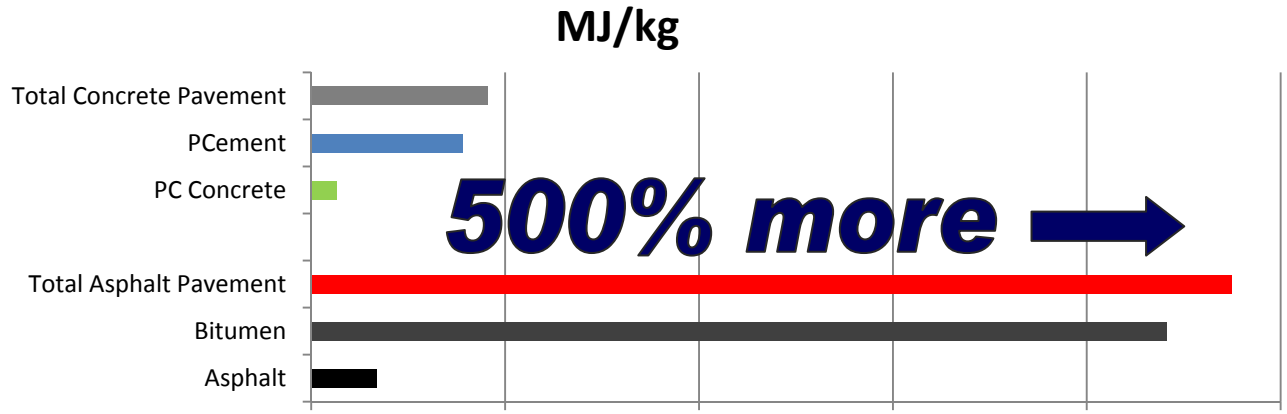
Concrete pavements are better for the environment in a way that few people recognize. They simply last longer than flexible pavements, which means they don't need rehabilitation or reconstruction as often.

Concrete pavements can use up to 50% less aggregate in total than flexible pavements. This conserves our non-renewable resources and means less truck traffic. Less soil needs to be excavated for a concrete road (when compared to the flexible alternatives). This is a huge advantage with the increased difficulty in finding areas to dispose contaminated soils.

Equally important is that longer lasting concrete helps reduce traffic congestion and emissions because there are simply fewer construction zones slowing traffic flow.

EMBODIED PRIMARY ENERGY

The figure below is a comparison of equivalent concrete and asphalt pavement structures' embodied primary energy footprints. This shows concrete pavements' huge advantage in energy use and why it is the sustainable choice. As referenced in both ISO 14040 "Environmental Management: Life Cycle Assessment, Requirements and Guidelines" and The Athena Institute's 2006 Study "A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential".

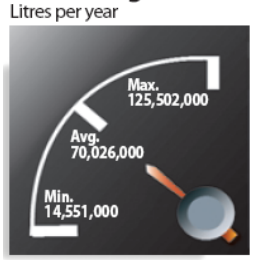


Reference: www.victoria.ac.nz/cbpr/documents/pdfs/ee-coefficients.pdf

FUEL and EMISSIONS SAVINGS FOR THE USER

Heavy trucks get better mileage on concrete pavements as concrete pavements offer less rolling resistance. Highly flexible pavements like asphalt absorb energy that otherwise is used to propel the vehicle forward. New studies are revealing that even cars can get better mileage on concrete.
Concrete can mean a savings as high as 6.9% less fuel in heavy trucks because its rigid surface allows negligible deflection. No wasted energy means no wasted fuel.[5]

Fuel Savings
Litres per year



This case study presents the range of potential fuel savings and reductions in emissions that could be achieved if a 183km section of highway was paved in concrete, rather than the flexible alternative. *This example is CAC using the findings from a 2002/06 a National Research Council Study, based on 2005 Ontario Ministry of Transportation data.* [5]

Cars off the Road
CO_2 reductions

According to the EPA, a reduction of 125,500,000 litres of fuel equals to a savings of 245,700 tonnes of CO_2, or 45,000 cars off the road annually.

	Results based on driving on rigid concrete vs. flexible pavement		
	Minimum 0.8% [6]	Average 3.85%	Maximum 6.9% [7]
Fuel Savings (litres)	-14,551,000	-70,026,000	-125,502,000
Dollar Savings ($)	$12,687,000	$61,056,000	$109,425,000
CO_2 Equivalent Reductions (tonnes)	-40,131	-193,132	-346,133
NO_x Reductions (tonnes)	-454.2	-2,185.9	-3,917.5
SO_2 Reductions (tonnes)	-57.4	-276.3	-495.2

Assumptions:

- ***Average bulk diesel fuel price for Toronto from Jan. 1/06 to Jun. 1/06: $0.87/litre***
- ***Fuel efficiency of heavy truck: 43 litres/100 km***

References:

1. Natural Advantage – 2006, American Concrete Pavement Association(QD016P)
2. A Better Choice for the Environment – 2006, American Concrete Pavement Association (QD012P)
3. Ouch! Hot – American Concrete Pavement Association (QD007P)
4. For the Long Haul – 2006, American Concrete Pavement Association (QD009P)
5. Concrete Thinking in Transportation Solutions – March 2007, Cement Association of Canada
6. Effects of Pavement Structure on Vehicle Fuel Consumption – Phase III, CST-HVC-TR-068, Taylor and Patten, January 2006.
7. Additional Analysis of the Effect of Pavement Structures on Truck Fuel Consumption, G.W. Taylor, August 2002.

PAVEMENT USER COST

Longer life with less maintenance and repair means fewer detours, road blocks, traffic congestion and car and truck exhaust emissions from slow driving or continued engine idling.

This means cleaner air quality and easier travel for people and goods.

THE COST OF OIL

Flexible paving prices are related to oil refining processes. As more refineries take advantage of Coker refinery processes, the cost of all products increase also meaning there is a global concern on future supply of bitumen.

LOWER FIRST COST WITH CANPav™

CANPav™ is a free, safe, secure website where users can quickly determine the cost advantages of using concrete as the paving material for municipal streets and roads and commercial parking lots.

If you would like to take advantage of the concrete savings, log onto www.CANPav.com and get your account today!

RMCAO

Ready Mixed Concrete Association of Ontario
#3 – 365 Brunel Road, Mississauga, ON L4Z 1Z5
(905) 507-1122 Fax (905) 890-8122
info@rmcao.org
www.rmcao.org