



DOWN THE ROAD

Reconsidering Infrastructure Norms

By Shayna Wiwerski, DEL Staff Writer

Every day, tens of thousands of vehicles drive along Saskatchewan's 26,000 kilometres of roads and highways. Including municipal roads, the province's total road surface is 160,000 kilometres. That's enough to circle the equator four times. And it's a massive amount of infrastructure to build and maintain. But it's vital to our resource-based economy and sparsely populated province.

Of paved roadways, the overwhelming majority are made with asphalt – a sticky, bitumen petroleum product used as glue and mixed with aggregate material to create road surfaces. However, there are other options and in times of transformational change it makes sense to look at when and where those other options may provide value.

One municipality in the province has switched to concrete and seen some benefits. Yorkton, home to just shy of 16,000 people, has recently been invested in concrete roads. The Saskatchewan Ready Mixed Concrete Association Inc. reports that in 2015 Yorkton city council unanimously voted for

concrete to be the material of choice in the reconstruction of Highway 10 between Highway 9 and Mayhew Avenue, with another section to be paved in concrete along Mayhew Avenue as well. Sherry Sullivan, Director of Transportation & Built Environment for the Cement Association of Canada, says that Yorkton allowed both concrete and asphalt bids for these projects and found that concrete made economic sense.

"A long time ago, concrete was the first material that would have been chosen to build roads, but then asphalt became less expensive and the go-to product," explained Sullivan. "Concrete is known for durability; it requires less maintenance over a 50-year period than asphalt. For example, a recent study by Applied Research Associates (ARA) for Ontario found that over a 50-year life, a concrete road needs only a third of the maintenance of an asphalt road."

So why do we use asphalt if concrete is so much more durable? The answer comes down to the strengths and weaknesses of each material. Asphalt is flexible so it can withstand

imperfections in underlying surfaces and will bend and groove rather than breaking. It's relatively simple to lay down and when it does break, it is simple to repair. On the other hand, no one claims asphalt lasts as long or provides as powerful a surface as concrete which matters in high heavy-traffic corridors.

Sullivan says that in places like Ontario and Manitoba, a procurement process that allows for competition (both asphalt and concrete design bids) is becoming increasingly popular with provincial and municipal authorities because it lowers prices and improves quality, both of which help stretch their budgets. She says that the Ontario government has used this process for several years now. Concrete proved to be an economical enough option over the life cycle in some projects that the government saved \$45 million on 10 suitable projects.

Although there will always be a need for both materials, Sullivan points out that concrete is a viable option. Concrete is a local material produced in communities in Saskatchewan, as the industry contributes around 65,000 direct and indirect jobs in the Prairies. Concrete is ideal for high-volume highways, streets, local roads, roundabouts and intersections; parking lots; airport runways, taxiways and aprons; and heavy industrial facilities.

Concrete pavement needs less maintenance, as it is more resilient to extreme weather and harsh conditions, meaning less potholes. Concrete is also environmentally friendly, requiring a third less energy to install and maintain and three quarters less resources (stone, sand and gravel) to install. Concrete is completely recyclable and studies have shown that concrete roads also increase the fuel efficiency of traffic by up to seven percent, yielding potentially significant reductions in carbon emissions – up to 12,000 metric tonnes per lane kilometre over the life cycle of the pavement. This effect is because as a flexible paving material, asphalt will deflect more under wheel loads requiring additional fuel to overcome.

Of course, there are also many advantages of asphalt pavement as well. Asphalt can be less costly upfront. It takes less time to pave an asphalt road, as the asphalt dries faster, although new innovative approaches like the use of precast concrete pavement and fast-curing concrete can minimize road closures to a few hours in areas that need to be opened more quickly. Further, asphalt is a recyclable material, meaning that it can be used many times, and repairing it is a simple matter of relayering overtop of the damage. Both are good in the Saskatchewan winters.

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Services Inc. in Red Deer, says that asphalt is good to use for roads that don't experience heavy traffic. He mentions a recent project they worked on, a large roundabout located at 67th Street and Johnson Drive in Red Deer, which experiences very high traffic counts and lots of truck traffic.

"The City of Red Deer was concerned about the performance of asphalt in this scenario because of the heavy truck traffic. It's also the entrance to Edgar Industrial Drive and the Flying J Truck Stop, which is the largest truck stop in Central Alberta,"

says Bouteiller, who mentions that the design they put in to the city for the project has a 40- to 50-year life cycle span. "They were visionary because they had the foresight to do an RFP for asphalt and concrete although they didn't have a concrete specification; they also allowed a design-build. As well, they took into consideration life cycle costing."

Bouteiller says that anywhere there are heavy trucks stopping, starting, and turning, concrete is a good option and should compete on a life-cycle cost basis. He also mentioned

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Anthony Henday Drive, a 77-kilometre freeway that encircles Edmonton, mostly built with asphalt except for one-quarter, which was built with concrete pavement as they knew they were going to have a lot of heavy traffic on that road.

Both Bouteiller and Sullivan say that both materials have their pros and cons and that municipalities and provincial governments should take the long-term view, weigh all options and consider life-cycle performance before making a decision.

“We haven’t done a thorough analysis in Saskatchewan, but elsewhere we are finding that on first costs, concrete is typically competitive,” says Sullivan, who adds that looking at life-cycle costs that include maintenance and rehabilitation costs over a longer period (i.e. 50 years) is the only way to get a true measure of the cost of the road.

“Asphalt is the main road structure for most roads across the prairies,” says Bouteiller. “We’re not going to replace asphalt anytime soon, as it’s the leading material used in road construction. But concrete has a place.”



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