RECYCLING IN PEEL

Putting the Ash in Asphalt

It would be nice to think that a unique Canadian pronunciation had something to do with a new recycling program in the Region of Peel but in fact the motive was much more direct. The region wanted to find a way to reuse the bottom ash generated by an incinerator. The answer may well be "ashphalt".

About two-thirds of the solid waste collected in Brampton and Mississauga is incinerated at the Algonquin Power Energy-from-Waste facility - a clean and efficient operation that not only gets rid of the waste but also generates enough electricity in the process to provide power for up to 6,000 homes.

At temperatures in excess of 1,000ºC, most of the waste is vapourized but, just like burning wood in a fireplace, there is always some ash created in the combustion process. Not too much of a problem for a wood burning stove but a considerable problem when you are incinerating 18,000 truck loads of waste a year. The Algonquin incinerator has to find a home for about 40,000 tonnes of bottom ash annually.

"We do use some of the bottom ash," says Nathalie Henning, Peel's supervisor of processing and disposal contracts for the Waste Management Division. "After screening, about 30,000 tonnes of the finer particles are shipped to a landfill for use as daily cover to protect the waste from animals and keep odours down, but that still leaves about 10,000 tonnes of oversized bottom ash that has to be shipped to a Michigan landfill."

"We wanted to find a better use for the bottom ash and so for the last couple of years we have been aggressively searching for a better way to use the bottom ash that we are generating."

Peel is working with Brampton Brick to find a use for the finer material as a filler for brick and the ash is also being tested as an aggregate in low-strength concrete, but the most obvious and well-established application for bottom ash is as an asphalt aggregate - a use that has been popular for decades in Europe where incinerators are more prevalent.

Three years ago, Peel Region decided to do a trial. Based on a mix design developed by Trow Consulting and with clearance from the Ministry of the

Environment, the Region paved 340 metres of the eastbound lane on Derry Road between Millcreek Road and Argentia Road. The paving by Warren Bitulithic (now part of Lafarge Canada) was completed in November 2001.

"We used conventional mixes, HL-8 for the base course and HL-3 for the surface course, with about 10 percent bottom ash in the aggregate," says Simon Hopton, manager of capital works for Peel Region. "We also paved about half the surface course with a conventional HL-3 so that we could see if there was any difference over the next few years."

The contractor had to make some adjustments in the hot mix production to control the moisture in the bottom ash but, Hopton says, the paving went relatively smoothly using conventional equipment and techniques.

In total, about 35 tonnes of bottom ash were used in the trial section.

The next year, Trow Consulting went back to Derry Road and took some core samples. Based on the pavement condition, Trow reported that the performance of the hot mix asphalt with bottom ash was equal to that of conventional asphalt with no signs of distress or cracking.

Armed with the encouraging results from the test section, Peel Region did two more trials in August 2004, paving two community recycling centres, one in Brampton and one in Mississauga, with an HL-3 surface course incorporating about 250 tonnes of bottom ash.

Two more tests pavements are planned, one for Peel's Material Recovery Facility (a more demanding application due to the truck traffic) and one for a new waste management facility and transfer station that will be built next year.

That, Hopton reports, is just the beginning of a much more aggressive program.

"We just awarded a three-year contract to Fermar Paving to pave all our waste management facilities coming on-stream with a hot mix that incorporates the bottom ash," he says. "We are also asking all the other Region of Peel departments to use the mix for their parking lots and we will be paving a lane on Queen Street in Brampton between Gore Road and Highway 50."

"In total, our paving tests should use about 5,500 tonnes of bottom ash over the next three years."

Hopton recognizes that promoting the use of bottom ash will be an uphill battle. Despite the enormous quantities generated from coal fired power stations and incinerators across North America, bottom ash is not used extensively as an asphalt aggregate and paving engineers are often reluctant to turn roads into what they call, somewhat disparagingly, "linear landfills".

"When you go into a new market, you need to develop data over three to five years to substantiate your claims," he says. "These projects will help form that database so that we can approach the Ministry of Transportation and other municipalities with a degree of confidence."

"Given the test results so far, we are excited by the possibilities."

INSIGHT

Algonquin Power Energy-from-Waste Facility

Owned and operated by Algonquin Power Systems Inc.

- Located in Peel Region
- Processes 160,000 tonnes of waste a year from Peel Region
- Generates up to 9 megawatts of electricity
- By-products include 40,000 tonnes of bottom ash and 3,000 tonnes of fly ash

Bottom ash: a non-hazardous by-product of combustion. A glassy, sand like material of melted sand and lime, with smaller amounts of oxides.

Bottom ash and asphalt:

- used as an aggregate in hot mix asphalt base courses and wearing surfaces
- blended with other aggregates
- well graded but usually less durable than conventional aggregates
- used in hot mix since the early 1970s

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