

# Canadian Roofing Contractor & Design

WINTER 2017

**Retrofit Clip System**  
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Canadian Roadways  
**The Journey of  
Asphalt Shingle  
Recycling**

**Top 10  
Construction  
Hazards**



**W**hen discussing a process of development, *'journeying'* is defined as "a gradual passing from one state to another regarded as more advanced." In Canada the recycling of tear-off residential asphalt shingles – otherwise known as post-consumer asphalt shingles – has been just that – a gradual, slowly-changing industry. In fact, in some provinces, shingle recycling has reached a dead end.

The most common area where the value for this used material is perceived to be the greatest is in road construction or, more specifically, Hot Mix Asphalt (HMA) pavement. Recycling residential asphalt shingles into HMA has been happening in the United States for over 30 years. To date, nearly half of the U.S.'s 52 states are recycling residential asphalt shingles and utilizing this valuable material successfully.

RAS is created by grinding tear-off asphalt shingles and then screening the material to a certain size and consistency. This creates a "binder" that acts cohesively when incorporated with other pavement components. A more preferred RAS binder will have a very low moisture and deleterious material content, and a high asphalt cement content (a/c) with aggregate, sand or minerals that are a certain sieve (grain) size.

A different avenue for asphalt shingle recycling is found in pre-consumer as-

phalt shingles, manufacture rejects or Recycled Shingle Tab (RST). The tabs, overs or end cuts that are unsellable are easily ground and reused in HMA, as they haven't aged or weathered, and are still considered new and uncontaminated.

Another common product derived from tear-off asphalt shingles is known as RAS flake or fuel. Ground shingles are screened which separates the sand from the fibre. This asphalt-saturated fibre is used as an alternative fuel to generate energy in cement kilns.

Recycled asphalt shingles have also been utilized in cold mix or cold patch, which is used for road maintenance, as well as aggregate in road construction, dust suppression on private or rural roads, and new shingle manufacturing.

In the United States the Federal Department of Transportation (DOT) has taken an active role in the development and reuse of residential asphalt shingles, and is put-

A large hurdle to overcome is the perception that this second-hand material is "waste" or garbage. Yet the old, used asphalt shingles contain valuable, 100 per cent recyclable resources, namely asphalt, aggregate and fibre.



By HILARY HANNA, Vice President, Gemaco Sales Ltd.

# Canadian Roadways The Journey of Asphalt Shingle Recycling



ting in a new specification for the use of this material in HMA.<sup>1</sup> The DOT and various key players are working together to ensure the success rate increases.

In Canada the market is limited by a lack of municipal and provincial specifications. Interest and desire to utilize this recyclable material varies greatly provincially and municipally, as well as with the road engineers and hot mix producers.

A large hurdle to overcome is the perception that this second-hand material is “waste” or garbage. Yet the old, used asphalt shingles contain valuable, 100 per cent recyclable resources, name-

ly asphalt, aggregate and fibre. RAS binder contains approximately 30 per cent asphalt cement by weight.<sup>2</sup>

Asbestos is also a concern. Although not used in the production of residential asphalt shingles since the mid-1970s, there has still been a less than one per cent trace amount of asbestos found in tested roofing materials such as adhesive, mastic or coatings.

The variables involved in dealing with the combined RAS binder material can also create challenges. Paving mix

designs are very specific. The types of application (whether used in the base

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## ROOF RECYCLING

or as an overlay), region or geographical area and traffic volume will dictate the percentage of the various ingredients required. Each shovel-full, let alone each truck load, of RAS binder may vary greatly – from the amount of a/c, moisture and deleterious material content to the aggregate sieve size.

Costs are another factor. Since Canada is such a vast space with only dense populations covering small regions, transportation costs can be too large to get the RAS binder to an asphalt plant.

Additionally, for the asphalt producer, physically adding the material to

the reclaimed asphalt-coated sand and fibre can allow for paving companies to capture substantial cost savings, if challenges can be alleviated.

In 2013 an agency of the Manitoba Provincial Government called Green Manitoba, joined with the University of Winnipeg Civil Engineering Department, to investigate the features and possible benefits of RAS in HMA. The study reported on field trials that the City of Winnipeg had done using three per cent of recycled asphalt shingles in HMA overlay. It stated that the performance of the RAS overlay was similar

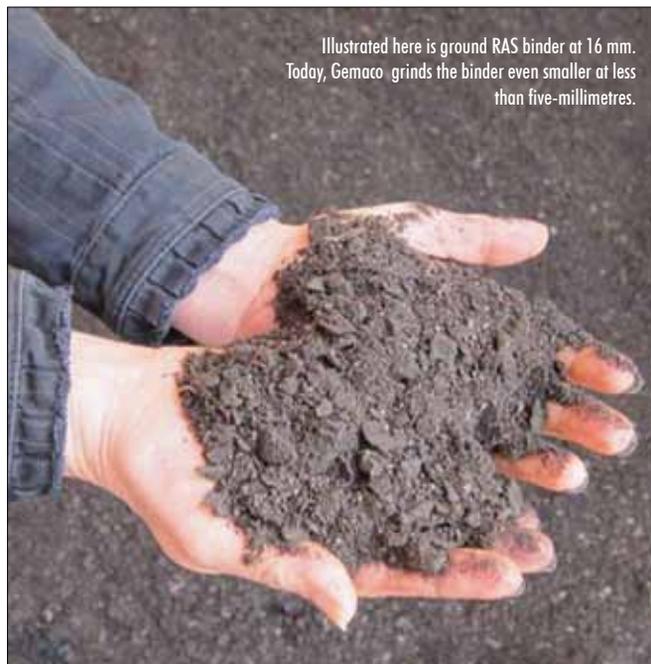
or better than the non-RAS overlays currently used by the city.<sup>4</sup> The final report determined that by incorporating three per cent RAS with 10 per cent Recycled Asphalt Pavement (RAP) in the HMA pavement, produced acceptable performance.<sup>5</sup> Test results continue to reveal invariable benefits over time as shown in various laboratory and field study reports. On American high-

ways, trails and pathways that have been monitored over time, the effect continues to show an increased stiffness of the asphalt, a decrease with cracking and susceptibility to rutting, no effect on moisture sensitivity and a decreased need for virgin asphalt cement.<sup>6</sup>

was great timing as the province of Nova Scotia also set out a mandate to be a leader in Canada with regards to waste recycling. The goal was to divert 50 per cent waste from going to landfills by 2000. Construction and demolition waste was identified as being 15 to 20 per cent of the waste going to landfill at that time. This was acknowledged and recognized as a great area for improvement. Specifications allowing up to five per cent of this material to be used in municipal and commercial applications permitted Halifax C & D to recycle 8000 tonnes of residential asphalt shingles in 2015, with volumes continuing to increase.<sup>7</sup>

The Quebec Department of Transport and Sustainable Mobility also has specifications that allow for a certain per cent of recycled material – including pre- and post-consumer shingles – to be utilized in hot mix designs. Up to three per cent for surface course mixes and up to five per cent for base course mixes, are specified for both types of shingles. The transportation department considers 40 per cent of the binder of pre-consumer shingles to be effective, and 25 per cent of post-consumer shingles.<sup>8</sup> The flake is also utilized as an alternative fuel in cement kilns.

Ontario has various specifications. Recycled Shingle Tab (RST), or what is specified as Manufactured Waste usage, is contained in both the Ontario Provincial Standards – standard spec, and the Ministry of Transport's (MTO) Non-Standard Specific Provision that is used in the majority of contracts. Both specifications allow 0.1 per cent replacement RST for each one per cent Recycled Asphalt Pavement with, usually, a 20 per cent RAP maximum. Both allow a maximum of three per cent RST in Stone Mastic Asphalt (SMA) mix designs, which is only tendered on certain highways.



Illustrated here is ground RAS binder at 16 mm. Today, Gemaco grinds the binder even smaller at less than five-millimetres.

incorporate RAS binder into a HMA mix design is also an expense. An asphalt plant will usually have to upgrade or retrofit their systems to allow for the RAS binder to incorporate with the current process. The binder material is a mixed combination of aggregate and fibres coated with asphalt, whereas virgin materials are integrated separately. A softening or rejuvenating agent will also have to be utilized as aged or weathered asphalt on the shingles will be stiffer or “oxidized” compared to virgin asphalt.

November 2016 saw asphalt selling for \$482 per tonne with prices as high as \$857 per tonne in October 2015.<sup>3</sup> The price of RAS binder is significantly less. Replacing new or “virgin” asphalt, sand and fibre in hot mix designs with

ways, trails and pathways that have been monitored over time, the effect continues to show an increased stiffness of the asphalt, a decrease with cracking and susceptibility to rutting, no effect on moisture sensitivity and a decreased need for virgin asphalt cement.<sup>6</sup>

In Canada the longest and most successful use of recycled post-consumer asphalt shingles is happening in Halifax, NS. Halifax C & D Recycling Ltd. developed a proprietary process where they are able to supply a hot mix asphalt producer with a product they call “asphalt sand.” Additionally, this firm supplies a local cement plant with the flake for cement kiln fuel.

Opening the only construction and demolition business in the area in 1995

pose a trial section with the inclusion of tear-off asphalt shingles into a contract they have been awarded. To date none has made a proposal.

In Winnipeg the desire and cooperation of various stakeholders is driving much needed local research, and has inspired greater use. The City of Winnipeg has specifications that allow three to five per cent RAS binder to be used in HMA designs. A local asphalt shingle collector in Manitoba, John Kruger of Greensite Recycling, recycled 6000 tonnes with the city and has met with local MLA's to continue working towards having it accepted province-wide. In Winkler, Penner Waste has been able to recycle 6000 tonnes from its two locations. The applications have been commercial use, driveways, pathways and dust suppression on gravel roads. Those volumes continue to grow.

Saskatchewan has no specifications for the use of post-consumer shingles in HMA, provincially or municipally. The City of Saskatoon does allow the use of pre-consumer shingles into an asphalt concrete mix.<sup>9</sup> Three per cent RAS was used in a trial job for the city in 2012 and, although the road is performing well, there have been no official reports performed yet.

Edmonton, AB, specifications allow a maximum of two per cent "shingle." However, it is not specified whether this is pre- or post-consumer shingles. The specification only pertains to some of the HMA applied on city roads.

Calgary, AB, has been more progressive with cooperation among stakeholders. Specifications allow three to five per cent shingle material, again not specified pre- or post-consumer. Used in HMA and cold mix, it is used in select city and municipal mixes, as well as most commercial mixes. It is also utilized in dust suppression.

In British Columbia's Vancouver and Lower Mainland there are no specifications for the reuse of post-consumer asphalt shingles. Area engineers have approved adding up to three per cent of pre-consumer shingles. The amount used varies depending on the type of work and the location of that work. The material used in various HMA is

accepted only in certain districts and municipalities. It is not being used in great volumes as a lot of municipalities and engineering firms have stopped allowing "shingles" – although pre- and post-consumer was not distinguished. In the past, development of different mix designs with this additive hasn't been appropriately controlled, thus resulting in lower volumes of the recyclable material being utilized.

Canada has nearly 900,000 km of

road. That is enough to circle the globe 22 times.<sup>10</sup> Ensuring consistency of the final product, education to manage the material and proper engineering, can potentially deliver a more cost effective alternatives to traditional road practices. Instead of burying these resources, taking up valuable land space and having to mine for more virgin materials, innovation, collaboration and motivation are all essential if we

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# PRACTICE SAFE ROOFING!



## WEST NILE VIRUS, LEGIONNAIRE'S DISEASE, LEAKS, LIABILITY AND LITIGATION, COSTLY ROOF REPAIRS, AVIAN FLU

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warm air can condense on interior surfaces and cause drips on the interior of the structure. By utilizing the Retrofit Clip system, condensation leaks are eliminated and building interiors are kept warmer in winter and cooler in summer.”

Wind uplift tested to ASTM D1761-60, the Retrofit Clip system has been installed on numerous projects including community centres, farm sheds, banks, retail facilities and schools.

Hazelridge Sports Complex in Hazelridge, MB, utilized the system to increase insulation on the facility’s roof and eliminate interior frost build-up and leaks from its 25,000 sq. foot roof.

“Since we installed the Retrofit Clip

system, our building is now warmer and no longer experiences frost build-up or dripping which presented issues with our ice quality,” said Arena Manager Derek King. “And, since it was so easy-to-install, we were able to remain open while work was being completed.”

Scott Schneider, treasurer of Benito Recreational Complex in Benito, MB, also turned to the system to address issues of frost condensation and ice damming which was occurring in his facility.

“Since we installed the Retrofit Clip system, we’ve seen a significant reduction in frost condensation, and we no longer have drips from ice damming occurring at the eaves,” Schneider said.

The 20,000 sq. foot Lasalle Com-

munity Centre in LaSalle, MB, has also dealt with its fair share of condensation issues. But these were quickly solved by installing the system.

“Ever since we went with the Retrofit Clip roof system, all of our issues have been resolved,” said community centre President Rick Forsyth. “The system improved our ability to keep our ice area at a constant temperature, thereby increasing the quality of our ice surface.”

If a building has cold spots, leaks or condensation issues, wrap it in warmth with the Retrofit Clip system.

For more information, please contact Joe Marshall at (800) 431-9661 or e-mail [retrofitclip@hotmail.com](mailto:retrofitclip@hotmail.com).

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want to make considerable progress in evolving this 100 per cent recyclable and recoverable material use.

#### ABOUT THE AUTHOR

A recycling enthusiast and entrepreneur Hilary Hanna owns Gemaco Sales Ltd. with her husband and business partner. Gemaco’s mobile shingle recycling process has been operating in British Columbia and Alberta since 2010.

Gemaco also supplies equipment supporting environ-



mental solutions for industries such as Forestry, Sawmill, Construction, Agriculture/Composting, Waste Management, Wood Products Manufacturing, Arborists, Co-Generation and Disaster Recovery. When Hilary is not working she enjoys spending time with family and friends, getting out and enjoying Mother Nature, reading, writing and travelling.

#### FOOTNOTES

(1) William Turley, Executive Director, CMRA Issues & Education Fund, [www.shinglerecycling.org](http://www.shinglerecycling.org).

(2) Shirley Jacqueline Ddamba (2011) “Evaluation of the Effect of Recycled Asphalt Shingles on Ontario Hot Mix Pavement” – <https://uwaterloo.ca/handle/10012/6285>

(3) Ontario Hot Mix Producers Association – [www.ohmpa.org/mtopriceindex/index.html](http://www.ohmpa.org/mtopriceindex/index.html)

(4) L. Kavanagh, PhD, P. Eng., A. Shalaby, PhD, P. Eng., “Best Practices for Recycling Post-Consumer Asphalt Roofing Shingles Waste Stream in Manitoba,” Department of Civil Engineering, University of Manitoba, Pavement Research

Group – [home.cc.umanitoba.ca/~shalabya/](http://home.cc.umanitoba.ca/~shalabya/)  
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(6) [www.shinglerecycling.org](http://www.shinglerecycling.org)

(7) Mike Chassie, Assistant Operations Manager, Halifax C&D Recycling Ltd.

(8) Hélène Gingras, Department of Transport and Sustainable Mobility – [www.transports.gouv.qc.ca](http://www.transports.gouv.qc.ca)

(9) Clifton Associates Ltd. (2012) “Utilization of Recycled Asphalt in Cold Mixes and Cold In-Place Recycling Processes Guidelines.”

(10) Government of Canada, Transport Canada – <https://www.tc.gc.ca/eng/road-menu.htm>

## The Journey of Asphalt Shingle Recycling

#### ACCU-PLANE Enterprises Inc.

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[www.accuplane.com](http://www.accuplane.com)

#### Firestone Building Products

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[www.firestonebp.ca](http://www.firestonebp.ca)

#### Never Leak Roofing

Outside Back Cover

[www.retrofitclip.com](http://www.retrofitclip.com)

#### Posi Slope

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[www.posislope.com](http://www.posislope.com)

#### Spar Marathon Roofing Supplies

Inside Back Cover

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### BUILT GREEN CANADA LAUNCHES RENOVATION PROGRAM

“The renovation program offers the consistent, clear approach Built Green’s other program have in terms of process, priority areas and options available,” said Mark Nowotny of My House Design/Build Team Ltd. “We’re happy to be participating and offering input into the program at this stage. Meanwhile, new renovator with Built Green Canada – A Cut Above Living – is nearing completion of their renovation

under this pilot.”

Built Green Canada welcomes industry’s continued input during this pilot phase. The program is complementary to the leadership efforts of the Canadian Home Builders’ Association’s and CMHC’s “Get it in Writing” initiative.

For more information, contact Built Green Canada at (855) 485-0920 or visit the company’s web site at [www.builtgreencanada.ca](http://www.builtgreencanada.ca).