CIVIL ENGINEERING APPLICATIONS OF
TIRE DERIVED AGGREGATE
Road Construction

CuttingEdge Tire Recycling L.P.

With information provided by Dana N. Humphrey, Ph.D., P.E.
Professor of Civil Engineering
University of Maine, and
Alberta Recycling Management Authority

Cutting EDGE

Civil Engineering Standards

* ASTM (formerly American Society for Testing and Materials)
* ASTM D6270-08 – Standard Practice for Use of Scrap Tires and Civil Engineering Applications
* Guidelines to limit heating
* Water quality

Tire Derived Aggregate – *TDA*

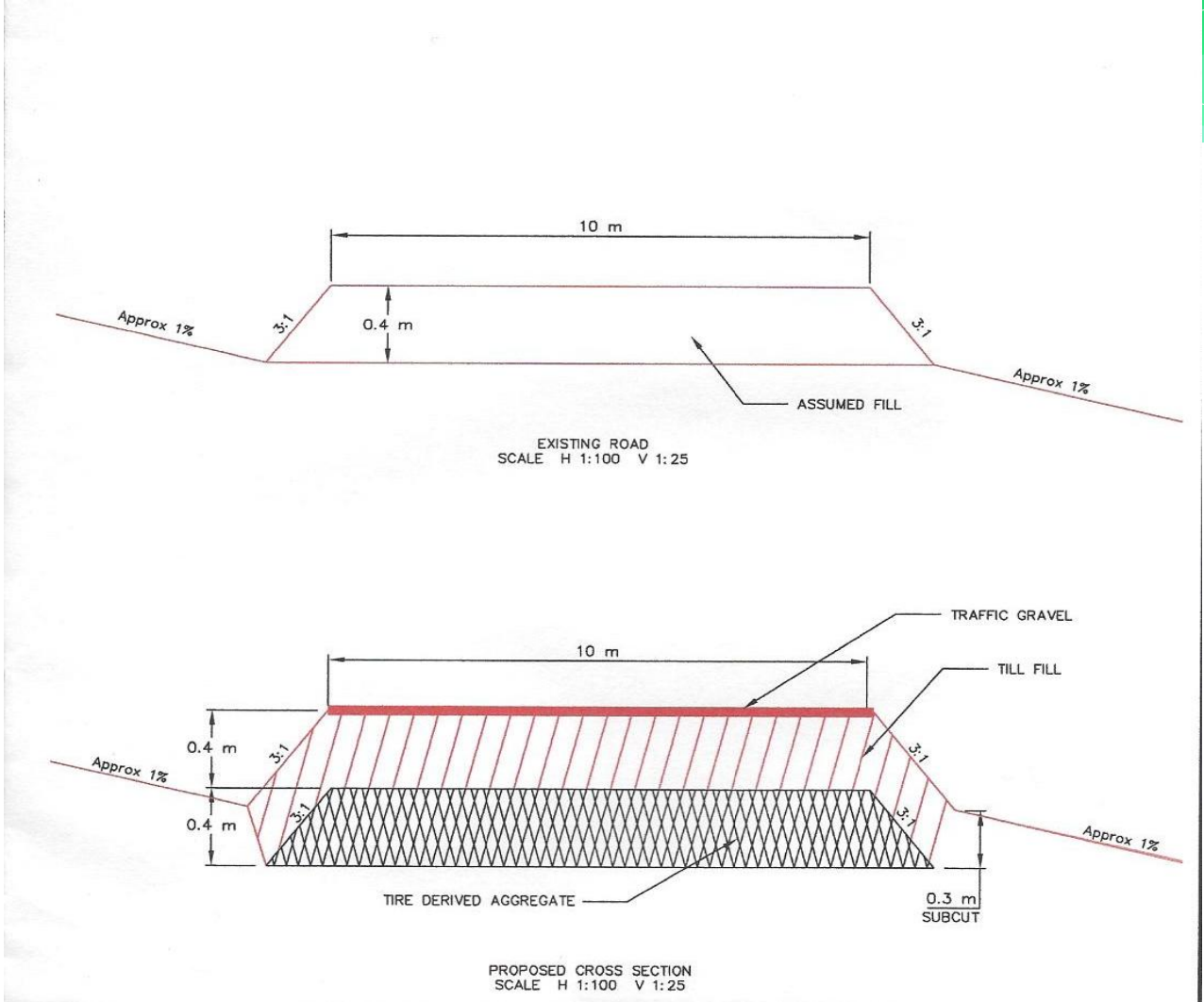
Why use TDA?

* Lightweight (1/3 soil)
* Low earth pressure (1/2 soil)
* Good thermal insulation (8 times better)
* Good drainage (10 time better)
* Compressible
* Vibration mitigation

Why use TDA?

* ARMA offers full incentives for the TDA and for delivery of approved projects same program as when used in landfill leachate drainage applications.

Typical Cross Section



Unloading TDA

Spread with bulldozer

Compact with 10-ton roller

Alberta Projects

* City of Edmonton Waste Management Pilot Project (Coverbar Landfill entrance)
* Onion Lake First Nation Project

ARMA Pilot project
Stakeholders

* ARMA: Supply and delivery of TDA from local tire processors
* Alberta Transportation: Design Standards and Tendering
* City of Edmonton: Provision of test site, Traffic test vehicles, and Signs detailing the project.
* University of Alberta: Design of instrumentation, identifying locations for test equipment, and Monitoring and purchase of instrumentation
* ISL Engineering: Design/project management, Pavement structure design and geotechnical

Pilot Project

Pilot Project

Onion Lake First Nation

* ARMA
* CuttingEdge Tire Recycling, TDA Manufacturer
* CleanGen, General Contractor
* MDH Engineered Solutions, a member of the SNC Lavalin Group (MDH), Design and Engineering

Onion Lake First Nation
“The Problem”

Request for TDA from ARMA

#118 SAKASKOC-MAKIYAW #120
BOX 109 ONION LAKE, SK S0M2E0

November 13, 2012

Alberta Recycling Management Authority

1310 Scotia 1 Tower 10060 Jasper Avenue

Edmonton, Alberta T5J 3R8

Attention: Brad Schultz, Director of Operation

Dear Mr. Schultz,

RE: TDA for Civil Engineering Project

Please accept this letter as a formal request for **1350 m3** of tire shred as per the attached engineering report (which we understand converts to **675 tonnes**) from the Alberta Recycling Management Authority to be used as tire-derive aggregate (TDA) in the application also outlined in the attached report. As per our discussion with CleanGen, the General Contractor for this project, we understand that requirements for this project to proceed are simply the attached engineering report and this formal letter of request. Furthermore, we understand that we will receive this TDA material at **no cost** to us **FOB our site**.

CleanGen has informed us that it will take approximately **three weeks** from the time of your approval of this project to get the TDA to our site, and that the material will come from CuttingEdge Tire Recycling Limited Partnership based out of Ponoka, Alberta. With this understanding, it is our intention to begin construction as soon as possible once we receive confirmation that the TDA will be supplied as stated above. Our intention is to try to finish the project as quickly as we can to minimize the potential impact that winter months could have on our efforts.

We are looking forward to using TDA for this project. We understand that you aware of the history of the road, some of which is further described in the attached engineering report, and that this is a strategic project to assist with proving out the use of TDA in applications such as this. We also understand that this will also be the first distribution of tire shred by ARMA to an Aboriginal community. We are pleased to see ARMA making an effort to work with the Aboriginal communities more and also work with CuttingEdge and CleanGen, both of which are Aboriginal businesses.

Please be advised that with CleanGen's background in both road construction and their knowledge of tire shred, we are using them as the General Contractor for this project. Please accept this as our authorization for you to communicate with Albert Klyne, the President of CleanGen as the primary contact for the project.

Thank you for your assistance with this.

Sincerely,

Marvin Meesto
Public Works Director

Onion Lake First Nation
"The Solution"

1350 m3 of TDA to build up a 300m section of poor road

1. Remove existing fill (can be retained for use on side slopes)
2. Removing material to 0.3 m below existing fill and creating a smooth level surface for the TDA.
3. Placing 0.4 m TDA to a width of 10.0 m, compacting the TDA as it is placed.
4. Placing 0.4 m of fill on top of the TDA, compacting the fill as it is placed.
5. Covering the side slopes of the TDA with 0.4m of fill.

Town of Craik

* Jeff Murray – Town of Craik – 306- 734-2250
* Still working and willing to talk to people that are interested in knowing what they did and the results they have had

Town of Craik

Town of Craik

Incorporated August 1, 1907

P.O. Box 60
Craik, Saskatchewan
S0G 0V0
Phone [306] 734-2250

February 16, 2006

Shercom Industries
RR #4, Site 403
Box 313
Saskatoon, Saskatchewan
S7K 3J7

Dear Sir,

The Town of Craik had a couple of problem areas in streets within the Town. The water table is quite high in this area and as a result the ground becomes quite spongy and unstable during the spring, summer and fall. A number of years ago, we dug these areas up and put in large fill (2 to 3 inch stones). This seemed to solve the problem for a while. However, the next year, the problem returned. Two years ago, we dug these areas up again and filled them with tire chips. We are extremely pleased with the result. We believe that we have the problem under control.

Thank you for the load of tire chips and we just wanted to share our success story with you.

Yours truly,

Shirley Eade
Administrator

"Friendliest Town by a Damsite"

Village of McLean

* Nadine Jensen – Village of McLean – 306-699-7279
* Just did another block this past summer
* Did a second project in 2010 and it worked out well other then one small spot at the end. Contractor feels the there was less shred used where the problem is.
* Street was terrible before the project back in 2005. Are VERY happy with the results and have not any problems since then.

Village of McLean

click here to go to shercomindustries.com

Village of McLean
OFFICE OF THE ADMINISTRATOR

BOX 56
McLean, Sask.
S0G 3E0

July 28, 2005

Shercom Industries Inc
R.R. #4, Site 403, Box 313
Saskatoon, Sask
S7K 3J7

Memo:

The Village of McLean is famous for its frost boils, last fall we dug up part of a street, removed about three feet of dirt, then applied 18 inches of tire chips, 12 inches of clay base and 6 inches of gravel on top. And now, almost a year later the road is looking good – it worked!

Thank You!

Yours truly,

Lyla Grad
Administrator

Town of Norquay

click here to go to shercomindustries.com

Town of Norquay

OFFICE OF THE ADMINISTRATOR
P.O. BOX 327
NORQUAY SK S0A 2V0
Phone: 594-2101 Fax: 594-2347

February 27,2003

Shercom Industries Inc.
RR#4, Site 403, Box 313
SASKATOON, SK.
S7K 3J7

Dear Shane:

On behalf of the Town Council I would like to extend a word of "thanks" for your helping hand in our efforts of controlling frost boils in the spring break up.

Norquay is one of the unfortunate municipalities that was built in a "convenient location" rather than settling on higher ground. Our soil here is likened to lake bottom and believe me when we go below ground level we are always reminded of that!

As a result of our location we have a continuous break-up of our streets. When you approached the Town to try your tire chips in the process of frost boil control, council felt anything was worth the try. What we did was remove about 30" of the top street layer and then place about18" of tire chips in and covered that with gravel. In one area we did this same procedure and on top of the tire chips we placed a sheet of the "Geotextile" material which is supposed to let moisture go through but not come up. The next spring when Council inspected both locations they both had come through the spring with no frost boils and a very hard surface. In fact we could not find the exact locations because there was no difference from the repaired to the untouched surface.

To say the least our Council was very impressed with the performance of the chips. It has now been three years since the pilot project and all is well!!! Council has said they would very seriously consider doing this again if we have any more areas of concern.

A big "Thank you" not only from Council for your provision of the chips but also from the many users of the street for having a good firm surface!!

Regards

Rodney C. Johnson
Administrator

Municipality of Corman Park

PROVINCE OF SASKATCHEWAN

111 PINEHOUSE DRIVE, SASKATOON, SK S7K 5W1
PHONE: 242-9503 FAX: 242-6965

Fax

TO:	SHERCOM INDUSTRIES	**FROM:**	RM of CORMAN PARK
FAX:		**PAGES:**	
RE:	SHREDDED TIRES	**DATE:**	

In the spring of 07 we had a gravel road on the out skirts of Saskatoon that had a very bad soft spot in it. This road has heavy light vehicle traffic as well as a cement and gravel company using it as a haul road. The soft spot was bad enough that the light traffic was going around it on the ditch slope and the heavy trucks were dragging bottom through it. After putting a couple loads of gravel in it and repeated bleedings, that did not seem to help we decided to try shredded tires. We dug the soft spot out about two and half feet deep. The material under the surface was so wet and soft that it almost flowed. We hauled in three semi loads of shredded tires, leveled it out with the loader (1 to 1 ½ feet deep). We covered the shredded tires with about the same thickness of gravel and wheel packed it. That fixed the soft spot, We then resumed our regular maintenance of every week and a half or so. I would have no problem recommending this product.

Maurice Denis

Dixon Landing Interchange

* PROBLEM: Embankment Constructed on Bay Mud
* SOLUTION: Use TDA for the core of the embankment
* CHEAPEST SOLUTION: Caltrans saved $470,000

Portland Jetport Interchange

* PROBLEM: Embankment Constructed on weak marine clay
* SOLUTION: Use TDA for the core of the embankment (1.2 million PTE)
* CHEAPEST SOLUTION: Maine Turnpike Authority saved $300,000

Livingston Street Reconstruction Tewksbury, Massachusetts

* Problem:
  * 4 m of fill compressed peat layer to 2 m thick!!!!
  * Up to 1 m of settlement in 24 years
* Solution:
  * Reconstructed 240 m section with Type B TDA
  * Used 200,000 tires
  * $220,000 cost savings

Conclusions

* TDA has properties that engineers need
* TDA is cost effective
* Another way to locally use Alberta recycled products
* Specifications and guidelines available
* Can be stockpiled like gravel and aggregate
* Safe and Environmental friendly
  * See http://useit.umaine.edu/materials/tires/articles.htm

PONOKA PLANT SITE