

High Performance Tire Derived Aggregate (TDA) Use in Nova Scotia Projects



DIVERT NOVA SCOTIA - SUSTAINABLE PROCUREMENT SUMMIT - SEPTEMBER 21, 2018

DARTMOUTH, NOVA SCOTIA

JIM SIMMONS, P.ENG FEC – REPRESENTING HALIFAX C&D RECYCLING LTD



Sustainable Procurement Summit is focused on two *objectives*:

1. Increase the procurement of local recycled products/services in both provincial and municipal government.
2. Raise awareness of local companies that supply recycled products/services in NS and demonstrate how the specifications of the recycled products could meet governments needs.

▶ PAST TDA PROJECT PERFORMANCE

- ▶ What can you show us? Where have these materials been used? What are the outcomes? Why should we be thinking of TDA?

▶ (ENGINEERING) RESEARCH AND DEVELOPMENT

- ▶ What are the (technical) barriers? What's been done to advance the utility of TDA in civil engineering projects? How applicable is the research that has been done? Why does this work matter here?

Ragged Lake HRM Transit Connector Ramp Project 2012

EVERYONE SAID “YES”

Numerous Stakeholders:

- HRM (facilitator/builder)
- NSTIR (Owner)
- Genivar (Prime Consultant)
- Stantec Consulting (TDA Consultant)
- Halifax C&D Recycling Ltd (materials supplier)
- Brycon (Civil Contractor)

WHY?

- HCD knew it would be a success
- HRM commitment to sustainability and their engineering understanding of the TDA product
- NSTIR curiosity and trust of HRM to look after details
- Significant cost benefits
- It was the right project

CONSTRUCTION START MAR 2012



Ragged Lake HRM Transit Connector Ramp Project 2012



VERY EFFICIENT TRANSPORT

TDA delivered by live floor trailers
end dumped onto working area



VERY EFFICIENT PLACEMENT

1 cubic meter of TDA is 0.85
tonnes versus 2.02 tonnes for
borrow fill – so it fills a hole
quickly!



CONVENTIONAL CONSTRUCTION METHODS

All typical equipment – rollers,
excavators, dozers, and much
less fuel used because it is light –
so less work to move

Ragged Lake HRM Transit Connector Ramp Project 2012



Material Wrapped

Type 2 Fills (i.e. greater than 1 meter) requires a geotextile fabric to prevent fine materials from entering the fill mass



Large Project

Approximately 800,000 tires used almost one years worth of scrap material



> \$100,000 Saved

Undisputed benefits of the project is that it was less costly to build. Other benefits accrued as well.















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Dalhousie University - Dr.
Hany El Naggar

Geotechnical Engineering
Professor in the Centre for
Sustainable Infrastructure



Halifax C&D Recycling
QA/QC

TDA Type A and B materials are
manufactured to ASTM
D6270(08)- R12



TDA Type A - Chip

Manufactured from passenger
car tires and used in drainage,
insulation, vibration attenuation,
and Class 1 ASTM Fills

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Raw Material – Scrap Tires

The TDA is manufactured by shredding scrap tires to specified sizes pieces and “quality”



Direct Shear Strength Test

Using samples our Tire Shred, we developed relationships between shear loads and strength



Triaxial Strength Test

This sophisticated test (replicated 10s of times) provided invaluable data on the Modulus of Elasticity of our TDA – an important property related to elasticity

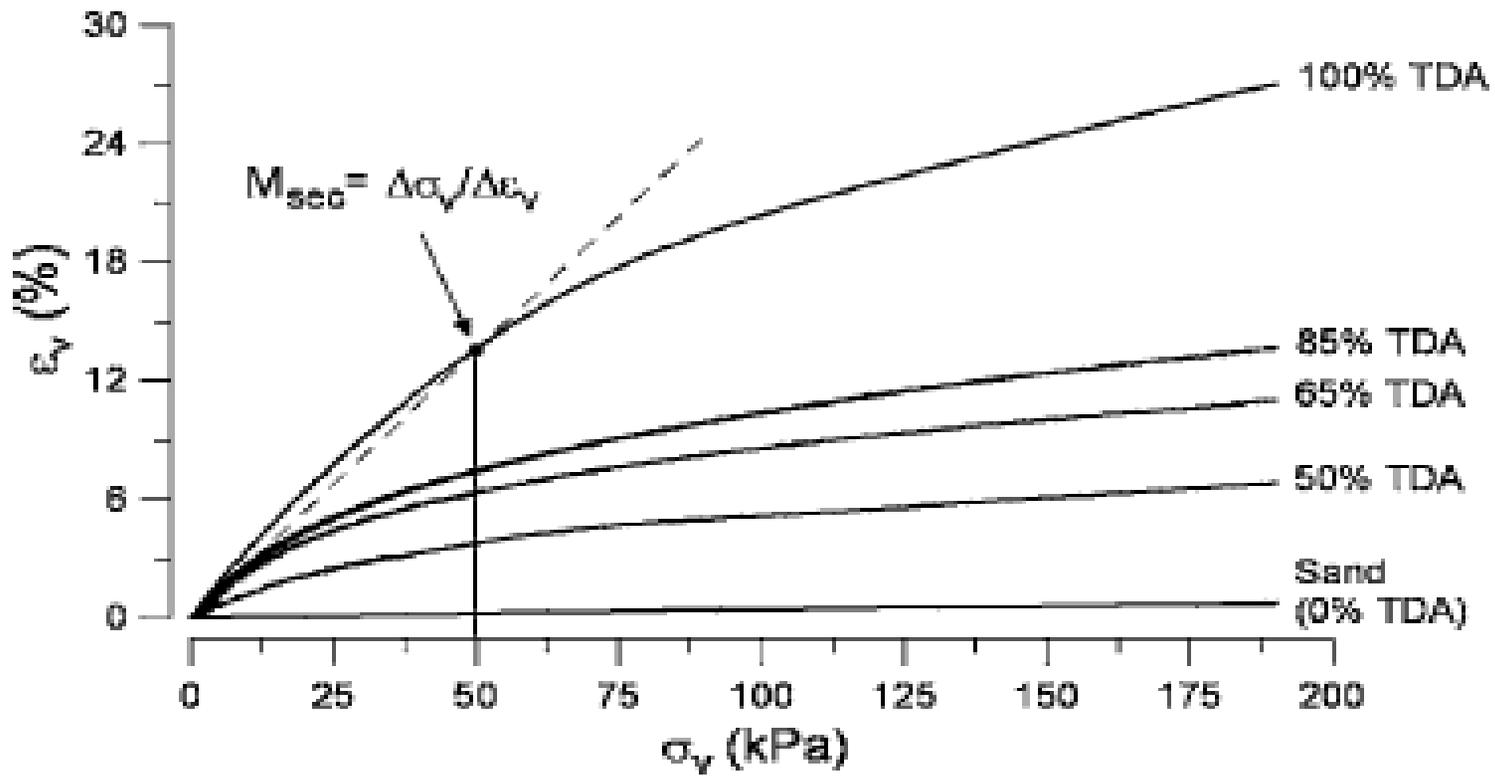


Fig. 8. Vertical strain (ϵ_v) versus stress (σ_v) for TDA specimens (tire chips) tested in the oedometer



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Dalhousie University Field Research

Purpose of the work was to show how TDA works as a stress reduction fill that has advantages over buried structures.



Instrumentation

We used pressure cells, strain gauges, and vertical displacement gauges to measure what happens under the TDA when we "load" it.



Material Placement

The TDA was compacted as in actual applications. Five test plots were constructed.

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Gravel Fill



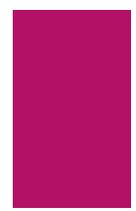
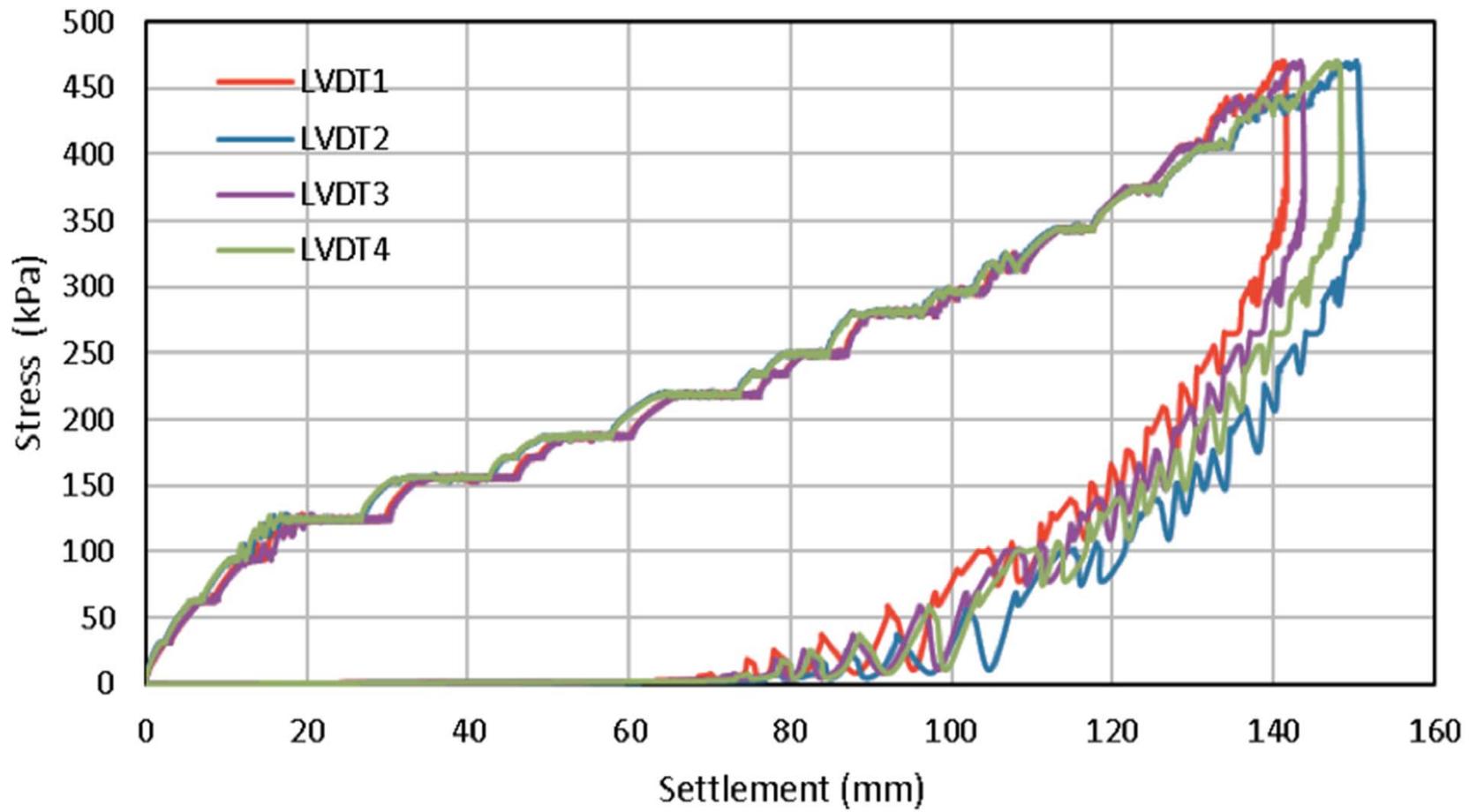
Concrete Footings



Reaction Frame



Loading and Data Acquisition



Questions:

