SEMINAR LOCATION
Township of South Stormont
Municipal Office
2 Mille Roches Road
Long Sault, ON K0C 1P0
Pave-In Demonstration Site
Weles Rd. at Highway 401
Only 5km away from the
Township’s Office. (map on back)

WHO SHOULD ATTEND
This event is open to ORBA,
GAPC members, MTO, Municipal
partners, industry professionals
and invited guests.

FEE
$45 per person plus HST

THE FINE PRINT
In the event that the pave-in has
to be cancelled, please ensure
you provide an email address
for all your registrants when you
sign up.
In the event of rain, a secondary
date is set for August 23rd.

REGISTER ONLINE
at www.onasphalt.org

NOTE
For more information refer to the Carleton University Centre for Advanced Asphalt Research and Technology, https://carleton.ca/osart/

AMIR TRAK
ASPHALT COMPACTION TECHNOLOGY
DEMONSTRATION DAY
AUGUST 22
2019
Long Sault
South Stormont
Ontario

GAPC, Council of ORBA, MTO, R.W Tomlinson Ltd. and Carleton University have come
together to stage a pave-in to demonstrate the AMIR TRAK compaction technology,and Permeability Testing.

Join us on August 22nd, 2019 to get a sense of the unique attributes and capabilities
of the TRAK asphalt compactor, and permeability testing demonstrations.
THE AMIR-TRAK PROJECT

MTO-Carleton University-Tomlinson Group
Joint Research

By
Halim Abd El Halim
Carleton university
Questions

- When did we start use rollers to compact asphalt pavements? 1890
- How many asphalt mixes in the world were tried and used? More than 100
- What is the most common factor that remain unchanged for about 130 years?
- How long we have the same problems? 70 yrs
- What is new? ????????
INTRODUCTION

Permeability and Moisture Damage

- 34 out of 50 states (Hicks 1991) or 15 out of 24 states surveyed by Mogawer et al. (2002) have some pavements that suffer from moisture damage
- Reducing permeability may reduce interaction between water and pavement materials

Why Are We Here?

- Asphalt moisture damage is a widespread problem with distress mechanisms capable of stemming from multiple sources including materials selected, stockpile moisture content, plant production, and construction.
- Long story short, moisture damage is a major issue that we need to understand better.
- Speakers and panel discussions selected to cover as many relevant topics as possible.
- Feedback from and interaction with the audience is very important.
Potholes  ➔  Higher Permeability  ➔  Stripping  ➔  Thermal Cracking
Check-cracking: why does it happen?

(1) High pressure value
(2) Short time of contact
Solution:
(1) Lower pressure
(2) Longer contact time

\[ R = \left( \frac{E_1}{E_2} \right) \left( \frac{t}{a} \right)^3 \]
New Roller: AMIR
Asphalt Multi Integrated Roller

\[ R_{\text{overlay}} = \infty \]
\[ R_{\text{roller}} = \infty \]

At Point A:
- Contact time = 30 x 0.04 sec.
- Pressure = 0.03 x 1.4 MPa

New Pavement

Existing Pavement
AMIR IN AUSTRALIA
Compacting Sand

Vibratory in Australia compacting Sand
Few Issues were to be resolved:
• Steering
• Superelevation
• Economics
# Field Permeability Test Results

<table>
<thead>
<tr>
<th>Tier No.</th>
<th>Steel</th>
<th>AMIR</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. 1st Tier</td>
<td>8.432E-03</td>
<td>4.739E-03</td>
<td>180%</td>
</tr>
<tr>
<td>Avg. 2nd Tier</td>
<td>1.193E-02</td>
<td>6.258E-03</td>
<td>190%</td>
</tr>
<tr>
<td>Avg. 3rd Tier</td>
<td>2.273E-02</td>
<td>4.062E-03</td>
<td>559%</td>
</tr>
</tbody>
</table>

![Graph showing permeability test results](image)

- **AMIR**
- **Steel**
Field Permeability Test Results

<table>
<thead>
<tr>
<th>Compactor type</th>
<th>AMIR</th>
<th>Steel</th>
<th>Ratio: Steel/AMIR</th>
<th>Corrected due to thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>2.10E-03</td>
<td>5.6E-03</td>
<td>2.667</td>
<td>4.741</td>
</tr>
</tbody>
</table>

Measured Cores’ BSG

East Approach

<table>
<thead>
<tr>
<th>Core No.</th>
<th>AMIR Compact</th>
<th>Steel Roller</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>2.344</td>
<td>2.343</td>
<td>1.00</td>
</tr>
</tbody>
</table>

West Approach

<table>
<thead>
<tr>
<th>Core No.</th>
<th>AMIR compactor</th>
<th>Steel Roller</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>2.391</td>
<td>2.361</td>
<td>1.0127</td>
</tr>
</tbody>
</table>
Follow Up

<table>
<thead>
<tr>
<th></th>
<th>ITS (kPA) Holt Road Cores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AMIR</td>
</tr>
<tr>
<td>South End</td>
<td>914</td>
</tr>
<tr>
<td>North End</td>
<td>603</td>
</tr>
<tr>
<td>Average</td>
<td>768</td>
</tr>
</tbody>
</table>

Hwy 34, Steel after a year

Hwy 34, AMIR after a year
Hwy 520 Bridge in the North of Ontario Nov 16, 2016
Kanata, Ottawa

2017  2019
Did it Change since 1890s?
Advantages of AMIR-TRAK

- **Contractors:** Job Satisfaction, less units, less passes, savings on capital and operation costs
- **MTO:** Longer pavement life, open new opportunities for new roads and development
- **Car Owners:** Safer roads, better surfaces, less rehabilitation work and interruption
- **Public at large:** Good roads, good taxes investment, confidence and trust
- **Canada:** Provide the world with new technology
List of References

- Williams, R. Christopher, and R. Shaidur, 2015 “PREMATURE ASPHALT CONCRETE PAVEMENT CRACKING, Final Report-SPR 734”, Institute for Transportation Iowa State University, Oregon Department of Transportation, and Federal Highway Administration, pp182
Rolling (Metal Working)

Introduction-

The process of deforming a metal plastically (as is done in any metal forming process) by passing it between rolls (roll arrangement) is called rolling in simple terms. The friction and the squeezing action between the rolls decreases the thickness or changes the cross section and also help in imparting special properties to the material undergoing the explained process. In current scenario applications, rolling is one of the most important metal working operation. All metal products require rolling to be performed at some point of their manufacturing process. Most of the materials are subjected to rolling before they can be converted into proper raw materials.

Fig 1: A schematic of a basic flat rolling process. [9]

The ingot from the casting is not suitable raw material for any application since the columnar structure of the grains impart brittle nature to the metal hence is subjected to rolling which allows the grains to change into a wrought grain structure which is more uniform and equixed and can suitably be used as a raw material.
Thank You