

Road Surfacing & Materials

An update for 2018

Hot Rolled Asphalt
Getting the best outcome
Transport Infrastructure Ireland

Edward Winterlich BSc(Eng) Dip Eng NCEA Dip Eng CEng MIEI MIAT

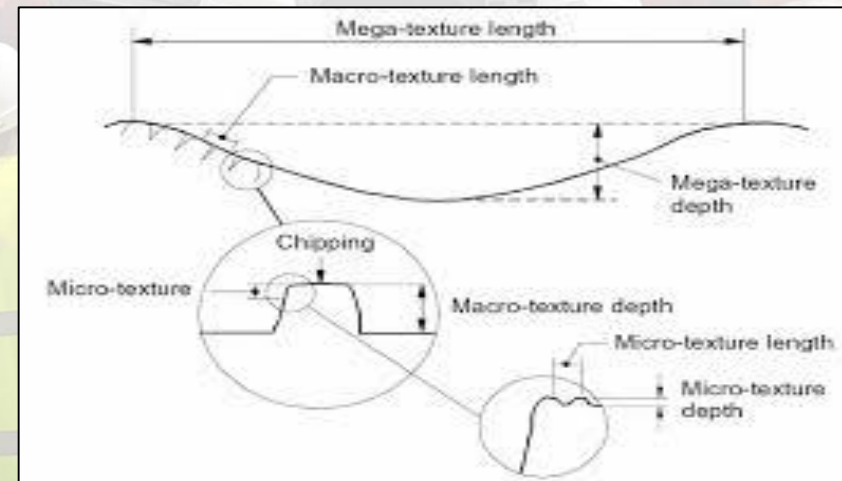
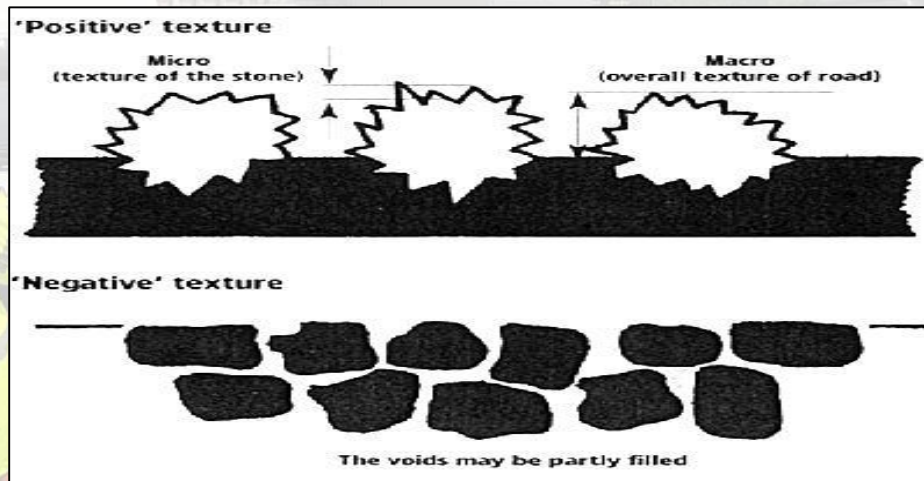
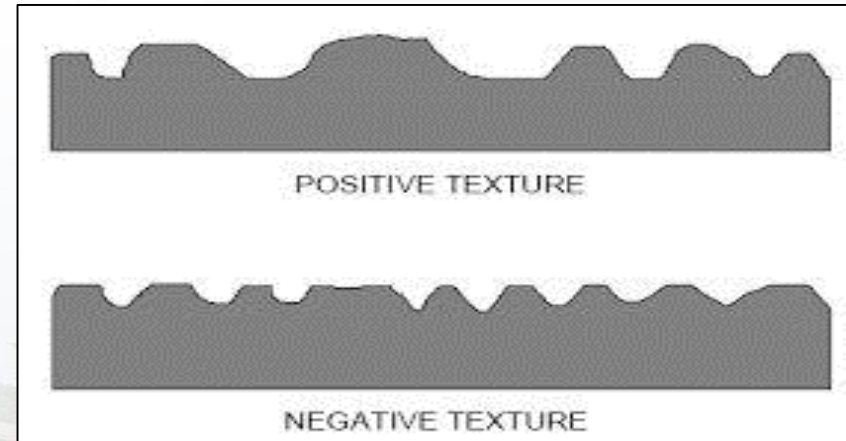
What is HRA ?

- Hot rolled asphalt is very dense mixture containing a mortar of fine aggregate, filler, and bitumen. Coarse aggregate up to 35% is added to bulk out the product
- In addition Pre-coated Chippings are spread and rolled into the surface to give a **TEXTURE** necessary to provide friction for Skidding Resistance

Nature of the texture

- A **positive texture** is an inherent characteristic of the product
 - positive texture is characterised by sharp points jutting up from the reference surface
 - negative texture is characterised by a relatively flat top with texture consisting of troughs below the reference surface
- At the same texture depth a positive texture has a higher coefficient of friction and a slightly lower speed dependency of the coefficient of friction than a negative texture does

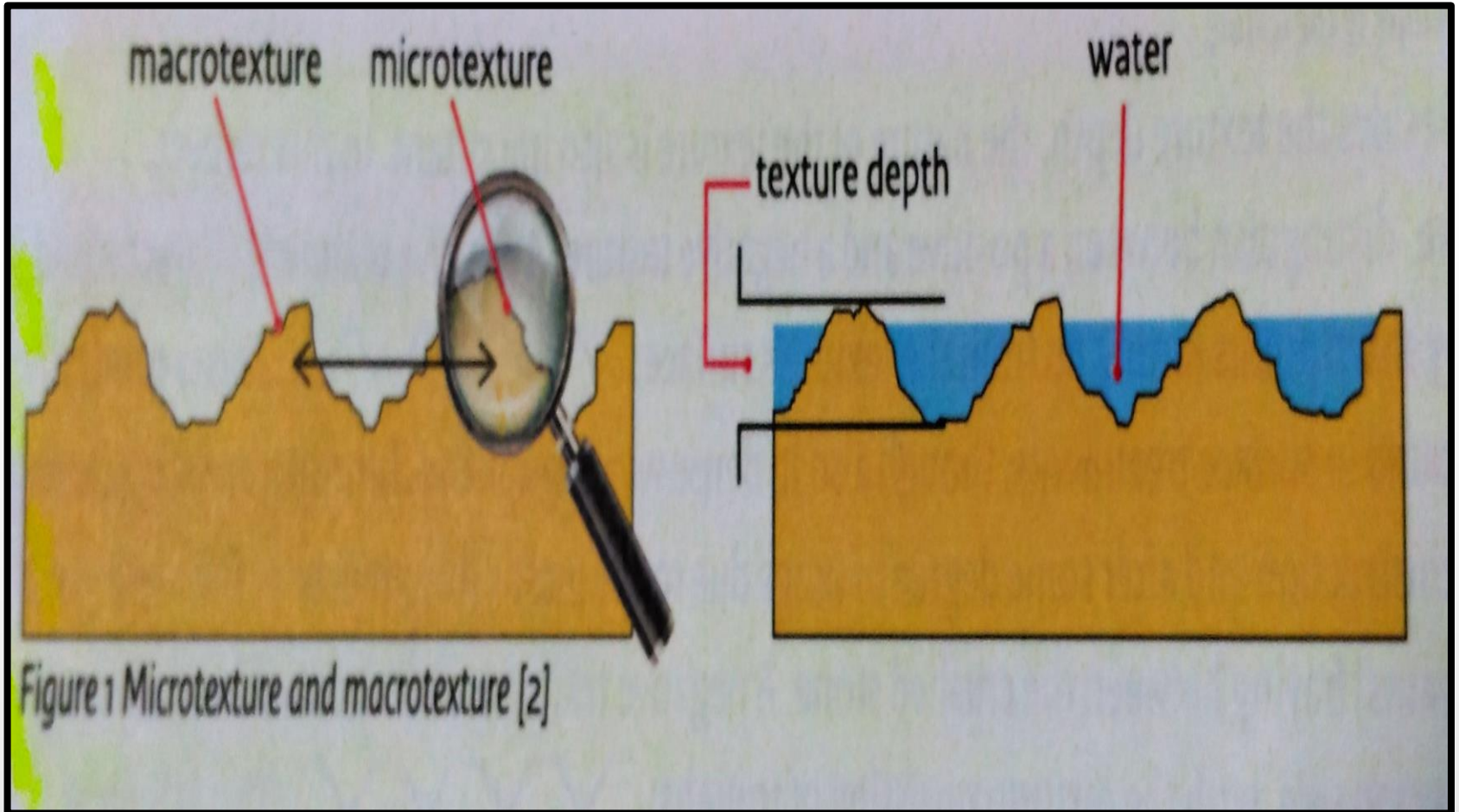
Positive / Negative Texture





Why is Positive Texture important

- The friction between tyre and road surface is made up of three processes
 - Adhesion – Molecular attraction between the rubber tread of the tyre and the road
 - Hysteresis – The deformation of rubber over the bumps in the road
 - Energy losses due to wear to tyre particles



PAVEMENT FUNCTIONALITY.

Basic Requirements for Construction Works

Fit for their intended use
and
Durable for their expected life

What is its intended use !

- To be able to resist permanent deformation
- To be able to resist cracking
- To be impermeable to protect the lower layers and to provide a mechanism to support the Pre Coated Chips
- To be durable, resisting abrasion of the mortar by traffic and other environmental effects
- To facilitate the drainage of surface water
- To provide a running surface with an appropriate frictional capacity
- To be workable during installation

Durable for its expected life !

- Mixture design
- Bitumen content
- Good quality constituents
- PSV of the pre coated aggregate
- Bond Coat
- Appropriate level of compaction
- Mixture Temperature
- Environmental conditions
- Competent operatives
- Suitable and well maintained machinery and equipment
- Competent supervision – Contractor and Client

And a plan!

TII Publications

- TII believe all of the critical elements required to get the best outcome for a HRA are well covered by TII Publication CC-SPC-00900 and associated TII documents
- Furthermore, we believe we have gathered sufficient evidence to demonstrate failure of some of these critical elements required to get the best outcome for a HRA
- Hence recent revisions to the Specification and associated TII documents

HRA issues

- Design – Incorrectly specifying the product in App 7/1
- Material – wet sand, PSV, performance
- Installation – depth of material, rate of spread, temp, non positive texture, chip loss

Its rarely just one thing

How is the best outcome achieved ?

- TII believe there are 3 elements that are critical to getting the best outcome for a HRA that is fit for its intended use and durable for its expected life;
 1. **Scheme design**
 2. **Compliant materials**
 3. **Installation workmanship**
- For the best outcome we need to hit all 3 elements.
- Failure to achieve in any of the above will impact on the outcome.

Everybody plays a part in achieving the best outcome

Scheme design

- GE-PAV-01006 (HD23) Use of Volume 7
- PE-SMG-02002(HD24) Traffic Assessment
- DN-PAV-03021(HD25/26) Pavement and Foundation Design
- DN-PAV-03074 (HD300) Design of Bituminous Mixtures, Surface Treatments, and Misc Products / Processes
- AM-PAV-06045 (HD28/11) Management of Skid Resistance
- AM-PAV-06049 (HD30/15) Pavement Asset Repair and Renewal – Scheme Approval
- AM-PAV-06050 (HD31) Pavement Asset Repair and Renewal Principles
- DN-PAV-03023 (HD36/15) Surface Materials for New and Maintenance Construction
- DN-PAV-03024 (HD37/17) Bituminous Mixtures, Surface Treatments Materials and Techniques
- DN-PAV-03075 (HD301/15) Approval of Specific Products Manual

The Specification for Roadworks CC-SPW-00900

Compliant Materials

Producer/Contractor

- CE Mark to AVCP +2
- Supported by a DoP
- Supported by a Type Test Report and FPC Cert
- Supported by an OCL Report
- Supported by FPC test results.

Client

- Retained samples for Market Surveillance Authority
- Independent testing of the works.
- All of the adjacent information.

Installation - workmanship

- Jointing / joint location
 - Material depth
 - Over banding
- Material Temperature
 - Cold material
 - Chip loss
- Over chipping, under chipping
 - Over embedment
 - Banding of chips
 - Inconsistent R.O.S
 - Weather
 - Uninformed Crew
- Inexperienced supervisors
 - Size of the Crew
 - Machinery

Case Study

- Network survey (SCRIM) indicating a particular location to be below the investigatory level
- Recommended treatment following inspection was to resurface using a Hot Rolled Asphalt



Case Study (cont'd)

- Following treatment and within 5 years the Network SCRIM survey is indicating the site has dropped below the IL
- LA complains to the “National Competent Body”
- TII launch a **FORENSIC** investigation of the site.



[illegible]


1. Scheme design

1. Independently checked and confirmed to be compliant

2. Installation – workmanship

1. Independently checked and confirmed to be compliant, and acceptable.



Layer No.	Top (mm)	Bottom (mm)	Thickness (mm)	Material	Layer Condition	
1	0	45	45	HRA		
2	45	95	50	AC		
				SD		
				AC		
				AC		
				Granular		Debonded
				Granular		



Case Study (cont'd)

3. Compliant Materials

- Client testing showed difference in a source sample PSV and the declared PSV.
- This testing was repeated on additional samples with similar variable results.
- TII referred the matter to the Market Surveillance Authority under the CPR 305/2011/EU and S.I. 225 of 2013.

Conclusions

- HRA surfacing is a PROCESS
- We need to consider all possible failure causes in advance of production
- and have sufficiently robust and responsive acceptance criteria throughout the supply chain
- discovering non compliance at the end of the process is not acceptable

It's too late, too costly and environmentally wasteful.

For the best outcome everybody must play their part.

*Thank You
for
listening*

?