Lars Forstén, Director, RDI,
Lemminkäinen Infra Oy / Technical Office

Estonian Asphalt Day 2017, Tallinn, 3.11.2017

Asphalt Concrete

Is this product still suitable in the 21st Century?

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Is the Product still suitable in the 21st century?

YES !

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Asphalt Pavements

Are Asphalt Pavements still the solution for the 21st Century?

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An Asphalt Pavement or an other pavement?

- **Do we have alternatives?**
- Different asphalt pavements
  - Asphalt Concrete is the main product
  - Asphalt Pavements for many different applications and objects
- Concrete Pavements
- Road stones
- Gravel roads

Roads before
Gravel roads

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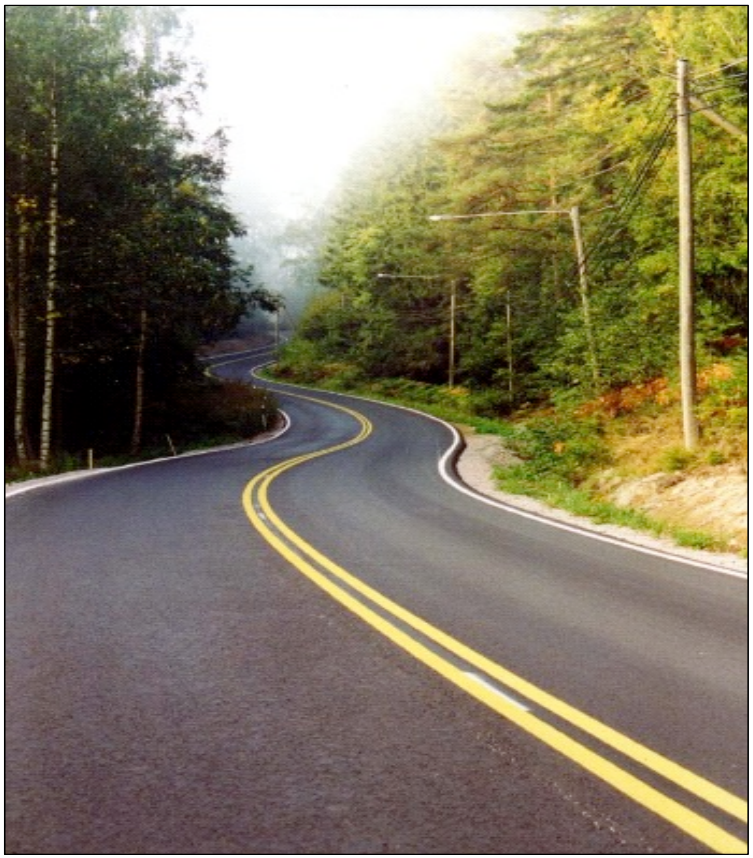
Roads today



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Now

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Gravel Roads

- Dusty gravel roads
- Frost heaves in the spring
  Damages
  Unusable in the spring

- **Gravel Roads**
  - OK in small roads in the country-side
  - not usable in densely populated areas

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Asphalt Pavements Advantages

- **Asphalt Pavements**
  - A broad product range
  - Pavements for different applications and objects
  - Pavement Structures for different loads and traffic-types
  - Solutions for different technical requirements
  - Solutions for different sustainable needs:
    * social
    * environmental
    * economical
- **There is an Asphalt Pavement or an Asphaltic Structure for practically all objects!**

Asphalt Pavements
Advantages / 1.

- **Economy**
  - cost-effective
  - economical solutions
    - Thin flexible pavements
    - Re-use
    - etc.
- **Re-use** and Recycling
    - saving raw-materials, transports and the environment
- **Environmental solutions**
  - dense, waterproofing // porous, water permeable
  - noice reducing pavements
  - clean environment

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Asphalt Pavements Advantages / 2.

- **Technical Solutions**
  - Thin / Thick
  - Stiffness / Flexibility
  - Surface characteristics
  - Experience / Dimensioning (design)
- **Aesthetics**
  - color / surface, etc.
- **Repair / refurbishment**
  - Many repair-methods
- **Maintenance**
  - Repaving is easy / new surfacing
  - Well known economical methods!
- From small pathways to motor ways!
- ***Practically no alternatives to asphalt!***

Asphalt Advantages

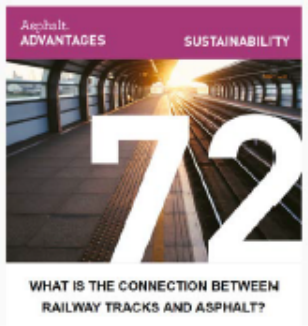
- Asphalt Advantages
  See EAPA´s homepage
  http://www.asphaltadvantages.com/en/

EAPA

Asphalt. ADVANTAGES

ACTIVITIES

- **EAPA-Eurobitume Task Force "Providing Evidence Asphalt Advantages"**
  - Website now in English, German, French and Turkish
  - Stakeholder consultation



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Asphalt In Europe
Volumes

- The Road-net (Road-Infrastructure) in the world is based on asphalt pavements.

- Production **volume** of asphalt:

Europe	~280 Mtons
Finland	~ 6 Mtons
Estonia	~ 1,5 Mtons

The Asphalt Industry is large!

- **AC (Asphalt Concrete)** is the most used asphalt type in the world
  - in all countries

AC in	- surface courses	> 50 %
	- binder and base courses	main part
	- totally	~ 85 % (?)

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Asphalt Pavements Challenges

- Main challenges are
  - **rutting**
    - * abrasion from studded tyres (winter)
    - * deformation (summer)
  - **water**
  - **workmanship**
  - (economical resources / politics)

- ***Right pavement into the right place!***

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Asphalt Pavements Challenges

- **Rutting**
- On the ***highways*** (main roads)
  - 70 – 85 % of the rutting is due to the abrasion of studded tyres.
  - the rest is deformation (heavy traffic loads)

- In the ***communities*** (towns)
  - 30 – 70 % of the rutting is due to the abrasion of studded tyres
  - deformation might be the main reason for rutting in the towns (heavy traffic – slow speed)

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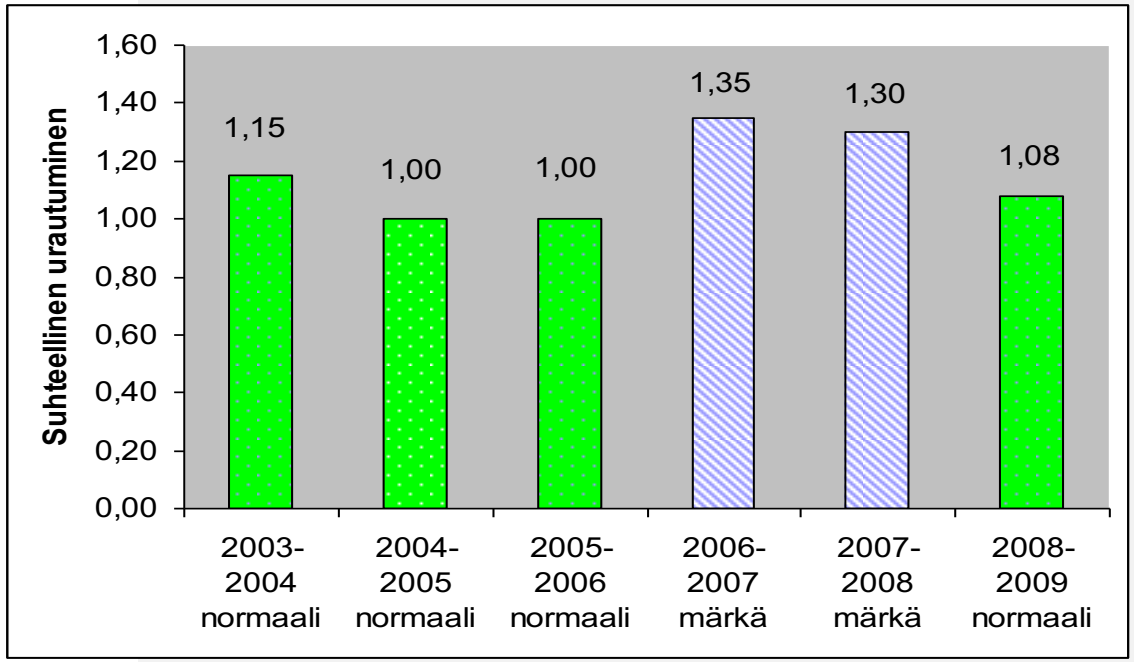
Asphalt Pavements Challenges

- **Rutting caused by abrasion**
  Against rutting caused by studded we need coarse good quality aggregate (stone)!
- **Rutting caused by deformation**
  - good mix design
  - good binder
- **Water**
  - The abrasion of the pavemant is much bigger, when the pavement is wet! (2-3 x bigger)
  - A wet winter causes much more rutting than a ”normal” winter.



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Asphalt Pavements Challenges

- **Workmanship**
  - experienced people
  - asphalt is made ”every” day

  We are not training! We are doing!

- **Summary**

  * Good aggregate!
    - *Take advantage of the existing good Aggregate (**Re-use**)*

  * *Well designed mixes*
  * *Water / Climate*
    - *Work against the **global warming** (Re-use and low-emisson pavement solutions!)*

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Alternative Pavements

- **Road stones**
  - Good in the private market and as an aesthetic pavement
  - Not so good on roads and streets
  - Expensive (compared to asphalt)
- **Concrete Pavements**
  - Good Stiffness and resistance against deformation
  - Thick pavement structures
    (difficult to make thin structures!)
  - Expensive (high investment-costs)
  - Difficult repair methods
  - High maintenance costs / Difficult to re-use

Experiences from Finland:

- The rutting of the Concrete Pavements is almost as big as for asphalt pavements!
  The studs (in the tyre) are ”eating” the aggregate in the concrete in the same way as in the asphalt.
- *There are no asphalt pavements in Finland any more! All have been paved with asphalt!*
- *Road Authorities have no plans to build concrete pavements! They are too expensive!*

Asphalt on Concrete Pavements

- ***Nurmijärvi concrete road, MW 3***; (ADT ~25.000 / 100- 120 km/h))
  (Concrete-pavement) was made by best available technique (Germans)!
  Asphalt pavement was made 2006.
  - crushed concrete
  - tack coat
  - AC 20 bin, 50 mm (?) +
  - SMA 16, 40 mm (?)
- ***Conclusions after 10 + 2 year long contract***.
  - Maintenance made 2-3 times Remixing
  - Some reflective cracking from the concrete pavement (< 50%)
  - No adhesion problems
  - Normal service life

Asphalt on Concrete Pavements / 2

- ***Tampere Ring Road, east***; (ADT >30.000 / 80- 100 km/h))
  The old concrete road was repaved with Novachip (=thin layer pavement) in 2006
- The old concrete pavement was rutted. Some of the ruts had been repaired with PMB-modified mastic asphalt in 2004 and 2005. (mastic asphalt had good adhesion to the concrete).PMB-mastic asphalt was abraded/rutted.
- Novachip was layed in 2006; Novachip 16 was laid directly on the concrete slabs. The abraded PMB-mastic asphalt was left in the ruts. Some potholes and damages were repaired with a AC-mix before the Novachip.
- Novachip was chosen because of economical reasons!
  The road authority did not have the money for “crushing” the concrete slabs.
  We were quite sure that reflective cracking would occur immediately!

- ***Conclusions after 10 + 2 year long contract***.
  - Maintenance was made once with **rut-Remixing** and later with 100 kg SMA
  - It took 2-3 years before the Novachip showed reflective cracking. In the end (12 years) there was a reflective crack on practically every concrete-joint
  - No adhesion problems
  - Normal service life

Reducing emissions (CO_2) Re-use and Recycling

- The carbon footprints (CO_2-emissions) are clearly reduced by using reclaimed asphalt in the production (Re-use).
  The CO_2-emission can easily be reduced by **5-15 %** (saving potential).
- Re-use save natural recources (raw-materials)
  - Unrenewable natural resources
    - aggregates (rock)
    - bitumen (imported oil)
  - Transports
- The quality of the Pavement containing reclaimed asphalt is similar to the quality of a pavement made from ”virgin” materials.

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Re-use

Crushing (Refining) RAP to RA
(waste to raw-material)

Cold Milling

Re-use on the factory
(RA as a raw-material)

Re-use on the road
(Remixing)

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Re-use and Recycling Methods

- **Re-use on the asphalt factory**
  (Utilization of old asphalt / RA is used as a raw-material)
- **Re-use on the road / In-situ re-use methods**
  (Lemminkäinen´s methods)
  - Remixing (REM)
  - Novaflex (MPKJ)
  - REMO
  - RutREM
  - REMplus
  - Novaflex-plus (MPKJplus)
  - RutREMO
- **Stabilization** (= Recycling)
- **Use of RA as an unbound material**
  (= Recycling) (*use of waste!?*)

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Re-use and Recycling
Benefits of Re-use

- **Saving of raw-materials**
  - **Aggregates**
    Extremely important in the Baltic States
    (imported hard aggregates)
  - **Bitumen** (oil)
- **Less transportation**
- **Reduced CO_2-emissions**
  - Reduction of total Energy Use /
    Lower fuel consumption (total process)

➡ **Economical Advantages**

- **Equal Quality and durability**
  (when we do Re-use in the right way!)
- **Less Waste**

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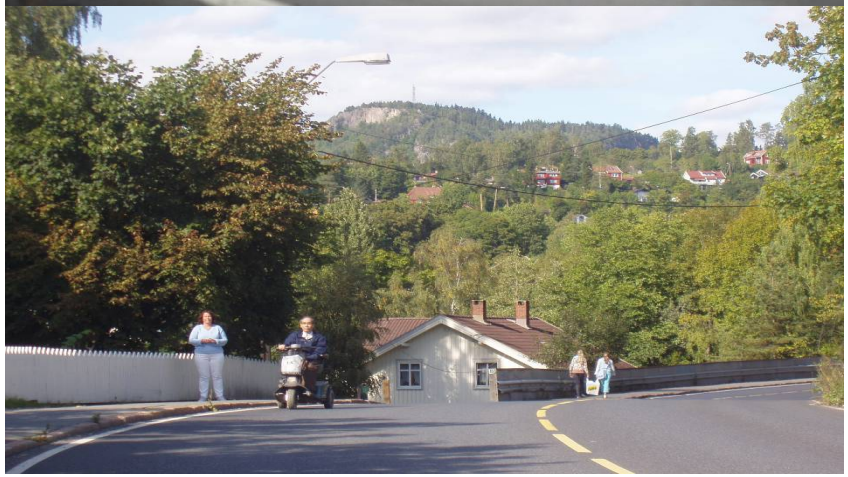
Sustainability

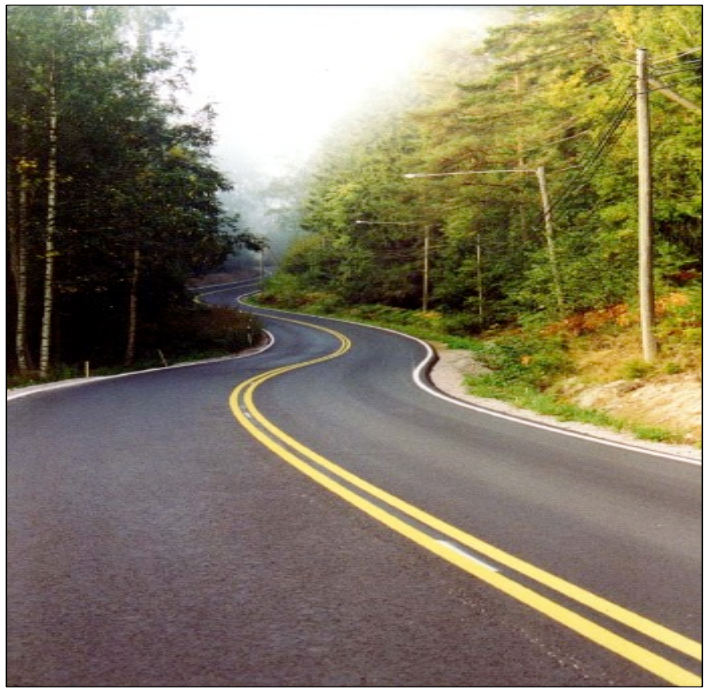
Sustainability / Corporate Responsibility

- **Economical Impacts**
  - cost-effective pavements
  - long life time
  - LCA
- **Environmental Impacts**
  - Re-use
  - LTA, low temperature asphalt
- **Social Impacts**
  - clients, employees & nabours
  - according to the law / reliability
- **Durable pavements**
  Right pavement into the right place!

Sustainability – Social impacts – Mobility - Transports



Sustainability – Social impacts
Aesthetics



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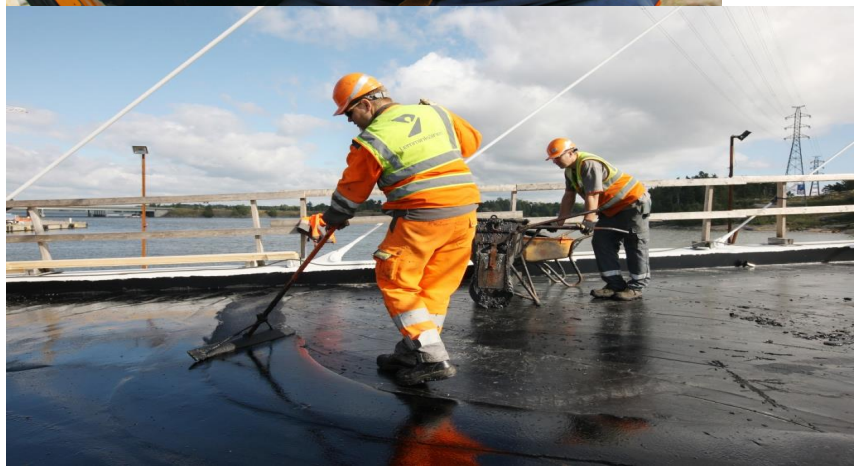
Sustainability – Social impacts – excercise & sports

Sustainability – Social impacts – Not only for cars

Sustainability – Social impacts – Work - Employment



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The Asphalt branch
Social and Environmental Responsibility

- Earlier only:

Black is Beautiful !

Now also:

We are ”green” and responsiblea

Thanks!

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