Asphalt Development - What’s next?

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Contents of presentation

- A brief history
- Setting the scene in Ireland
- Standards & Specification
- Asphalt Development
- Installation
- Future Highways
A very brief history!

John Mc Adam  
Develops Macadam roads  
1816-1819

Edgar Hooley discovers  
Tar- Macadam  
Tarmac formed in 1903

- 1919 Asphalt Institute formed  
- 1933 RRL (now TRL formed)  
- 1962 First Analytical pavement design  
- 1966 IAT (UK) formed  
- 1986 IAT (Ireland) formed  
- 2006 EN 13108 published
1990’s- Asphalt Development

- Porous Asphalt
  - 20mm with 3.7% bitumen

- Recycling
  - In situ repave
  - Off site recycling

- Additives
  - Rubber, EVA, Sulphur, Resin

- Plant
  - Vibrating rollers, extending and compacting screeds, recycling plant

- The Future!
  - EN standards, performance mixes, full depth construction, HD overlay
Setting the Scene

Asphalt Plants in Ireland
- 38 plants
- 8 plants with Recycling
Asphalt Development
-What do we need to consider?

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Asphalt Development

- Specifications
- Recycled Asphalt
  - Including surface course
- Self Healing Asphalt
  - Use of steel fibres and induction heating
  - Dr. Amir Tabakovich - TU Dublin
- Porous Asphalt
  - SUDS developments
- Heavy Duty Surfacing
  - Mix design & bitumen technology
  - SMA - Eapa
- Warm Mix Asphalt
  - New technology?
Recycling Asphalt

Best use of RA is back into Hot Mix Asphalt

Automation
Versatility
Reliability
Data management
Performance
Capacity
Waste Directive
- Article 27
- End of Waste
### RECYCLING

**REUSE AND RECYCLING OF RECLAIMED ASPHALT IN 2017**

<table>
<thead>
<tr>
<th>Country</th>
<th>All available Reclaimed Asphalt in 2017 in tonnes</th>
<th>Hot and Warm Mix Asphalt Production</th>
<th>Half Warm Mix Asphalt Production</th>
<th>Cold Recycling **</th>
<th>Unbound Road Layers</th>
<th>Other Civil Engineering Applications</th>
<th>Put to Landfill / Other Applications / Unknown</th>
<th>Applied area in m² of hot reuse of existing asphalt pavement material in-situ / on the road (Remixing, Repaving, Reshaping, Road Train etc.)</th>
<th>The amount of “only” reheated (reused) asphalt material in-situ / on the road (Remixing, Repaving, Reshaping, Road Train etc.) in metric tonnes</th>
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Intelligent Compaction
Intelligent Compaction
Intelligent Compaction

On the tablet, a "compaction map" is developing with data on passes, temperature and the $E_{vib}$ value for asphalt stiffness.
Temperature Sensors

- High-precision GPS receiver integrated in the scanner for recording exact position
- Recording of influencing parameters for important analysis data, such as the base temperature before paving and weather data
- Data downloads to USB stick or VIA cloud with “paving package”
Back to the Future
“Where we’re going we don’t need roads”

Arup (2014) Future of Highways
Back to the Future

Arup (2014) Future of Highways
In Conclusion

• Asphalt is still developing
• Specifications becoming more onerous
• Asphalt mix design, manufacture and installation will continue to evolve
• Industry will need to embrace future trends

“The challenge is to stay cool enough to handle the pressure in the moment so that you can succeed in the future”

Jurgen Klopp
References

- **Re-Road** (http://re-road.fehrl.org/)
- Extensive research on the use of RA
- Kalman et al (2017), Re-Road Summary Report
- Focus mainly on RA in surface course
- The use of RA within bound asphalt compacted mixes presents no increased environmental risk in terms of leaching
- Significant LCA advantages to recycling to a bound material rather than unbound
- **Self Healing Asphalt**-Dr. Amir Tabaković, Strategic Research Proposal Coordinator amir.tabakovic@dit.ie
- Arup, (2015), Future of Highways
- www.Eapa.org