

The (Dutch) situation

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Warm Mix Asphalt

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- Many techniques available
- Quite a few trials - mainly at "lower" organisations
- Several meetings
- Lots of discussion
- Quite some promotion
- No widespread application
- Experiments with durability in contracts
- Energy or CO₂

Present status

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Understanding the status & future of warm mix asphalt

Things to talk about

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• Additives: waxes, zeolith, surface-active chemicals:	110 – 150 °C
• Foamed bitumen: LT Asphalt, LEAB Shell WAM process	90 – 110 °C 130 °C
• Emulsion: KonwEco ² Finfalt (tar free RAP recycling)	15 °C 80 °C
• Partial drying	80 - 90 °C
• Biobitumen	150 - 165 °C
• Higher RAP content	170 °C

Techniques: Energy = CO₂ = odour =?

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Aantal MJ besparing/ton asfalt als functie van % gerecycled asfalt in asfaltmengsel

Effect RAP on energy → CO₂

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- Lower temperature
- Less energy
- Less CO₂
- Less odour

But also :

- Same durability
- Higher stability
- Faster opening of road
- Less compaction effort
- Winter options

Waxes

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- Room temperature
- HMA quality
- Maximum energy saving

KonwEco2

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- Dry coarse minerals to 140 °C
- Dry (part of) sand to 140 °C
- Mix with bitumen → temperature ca. 140 °C
- Add wet sand + RAP → temperature ca 85 °C
- Foaming of bitumen due to water in sand & RAP
- Energy saving related to water content

Partial drying

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- Rapeseed needs 9 t CO₂/ha
- 1 ha yields 1,5 ton of oil
- Oil partially replaces bitumen

- CO₂ compensation: 15 kg/ton asphalt
- Lower production temperature
- Fewer emissions
- Less alteration

Biobitumen – CO₂ neutral asphalt production

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- Energy savings: 20 – 40% ; 80 – 100% (depending on reference)
- Reduction in emissions (present focus CO₂): idem
- Less ageing → potential lifetime increase
- Easier compaction → less fuel asphalt set
- Additional (non durability) effects

Effects

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- The impact of RAP on CO₂
 - > Energy-reduction covenant
 - > CO₂ emission trading system
 - > Higher Recycling rates
- Asphalt production is only part of the total chain
 - > Pre-production: 40%
 - > Production: 25%
 - > Hauling & laying: 16%
 - > Removal: 19%
- Bad weather ? → more heat !
- Energy in production vs other durability items

Effectiveness: the bigger picture

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Schiphol

Turijn

Milaan

What do we want ?

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- Contractor (production + placement)
- Government (legislation + ambition)
- Government (client)
- Private client
- Public



Stakeholders: who wants what at what cost?

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- Drivers
 - > Reduction in CO₂: 20 – 50%
 - > Prescribed in contracts
 - > Odour & other emissions
 - > promotion / imago / policy / HSE
 - > Additional benefits
- Stoppers
 - > Extra cost 2 – 3 euro / ton
 - > Uncertainty long term behaviour ?
 - > Extra guarantees asked
 - > Relativity of measures
 - > Investments
 - > RAP

Drivers & stoppers

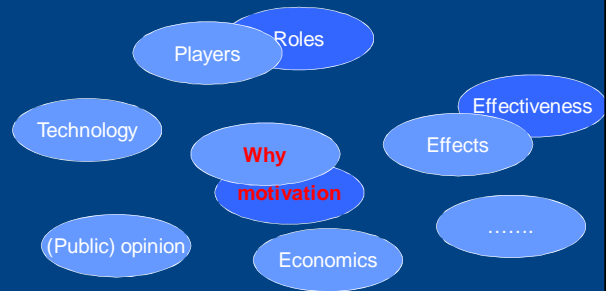
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- Technology is not the issue
- Effectiveness is an excuse to discard
- What do we (the world) think is important ?
- The real stakeholder has not yet been born
- Forget the sheep with 5 legs
- Grab what you can get

statements

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Things to talk about

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