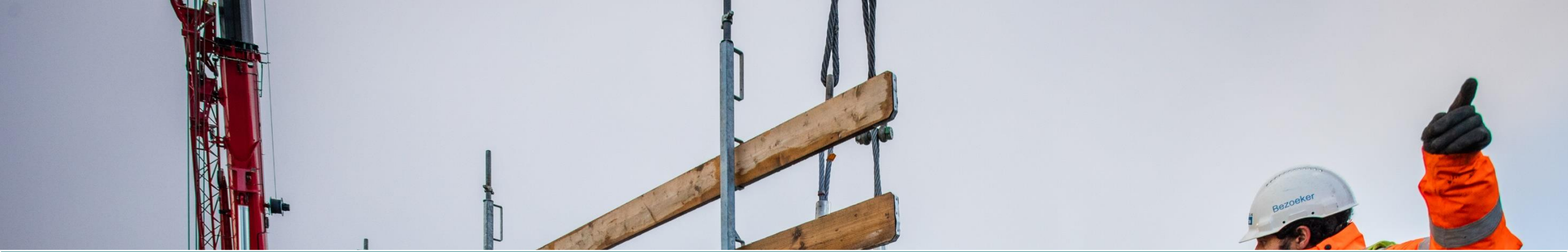

#EUCircularTalks

Closing infrastructure material cycles through European cooperation

Biobased asphalt in the European context

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HOLLAND CIRCULAR HOTSPOT sharing innovation

Rijkswaterstaat
Ministry of Infrastructure and Water Management

DGNB

European Circular Economy Stakeholder Platform

Status technology of biobased asphalt binder

Test road Bergen op Zoom 2021 (NL)

- Technology 50% lignin-bitumen binder proved at TRL 6-7 (patent AKC-WR): > 30 demonstrations roads in NL
- Technology 50% lignin-bitumen binder proved at TRL 3-4 (patent TNO)

- 100% biobased asphalt binder *under development*
  - TKI AF project 2021-2023
  - CHAPLIN BBM program 2022-2024
  - EU proposal *submitted* (2023-2027)

Biobased asphalt binders

- Biobased sustainable alternative for bitumen binders in asphalt
  - Independence of fossil resources and geopolitical effects on supply of bitumen → secure of supply
  - Trend for sustainable roads for the future
  - Mitigation of biogenic carbon through long term storage

- Selection criteria
  - Large supply of biobased raw materials
  - Preferably side streams
  - European context
  - Compatibility with recycling
  - Sound/lower environmental footprint

Biobased asphalt binder – lignin/bitumen

- In The Netherlands in 2012 R&D started to test lignin
- 1st demo road of 70 m with a 50/50 lignin/bitumen binder (2015)


- Anno 2022: > 30 demo roads
- 2 Patented technologies
- 35-70% lower CO_2 eq per ton of asphalt
- Currently, cost competitive

Proven technology lignin based asphalt binder at TRL 6-7; recycling possible

- CHAPLIN projects: Realisation of 6 demonstration roads
- AC 11 Surf mixtures with 30% RAP; lignin in new binder
- 1 road in October 2020 with 3 layers bio-asphalt
  - Top layer, bind and base layers
- Lengths 300-600 meters each

- Kraft lignin as bitumen replacement, but also biorefinery lignins
- On labscale, recycling of lignin-based asphalt (removed from older road paved in 2015) was successfully tested

Closing infrastructure material cycles through European cooperation

- 11 M tonnes of bitumen used in EU
- Large side streams of lignin and other biobased ingredients
  - >70 M tonnes lignin
  - Predominantly from Kraft pulping, but other biorefinery factories are starting
  - Other side streams from pulp & paper, agri & food industry
- Recycling rate of pavement is increasing in EU
  - Maintain materials cycles by compatibility of novel and old binders
  - Transition to more sustainable binders
  - Secure of supply
- Need for harmonization of development, validation and implementation of new binders
  - Need for novel protocols, exchange of information, test mix design in different (EU) climates
  - Need for monitorings data in the user phase by demonstration roads
  - Further validation of technology

Biobased asphalt binders: further development

- We are looking for:
  - partners to further expand the technology in different countries
  - partners to perform monitoring of the roads paved with this technology

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