Trends towards sustainability for road construction in Europe

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“Sustainable roads towards 2050 carbon neutrality”
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Five megatrends driving our market

- Global population growth
- Urbanization and megacities
- Increased demand for better living standards
- Digitalization
- Increased demand for sustainable construction solutions
The strongest innovation capabilities in the industry

The global LafargeHolcim Innovation Center in Lyon (France) is the most sophisticated R&D facility in our industry.

A network of local Construction Development Labs and technical centers, close to our markets

We partner with leading academics, customers, start-ups and suppliers to jointly develop new technology-driven construction solutions for our customers.

Main R&D missions

Creating value for our end users and customers with innovative solutions

Anticipating trends and new technologies

Transferring innovation to local markets

1,500+ patents
Local road networks gets more durable with stabilized foundation: A new green deal?

- A global trend that reached Europe the last years
  More extreme climatic events

Soil stabilization is well installed in Europe

- FRANCE
- GERMANY
- ROMANIA
- BULGARIA
- BELGIUM
- SERBIA
- GREECE

And also solid trend out of EUROPE in RUSSIA, AZ, PHILIPPINES, EGYPT, US…
Road can use less natural resources with HRBs

A dedicated lab for R&D

Cement / Hydraulic Road Binders solutions for difficult soils
Solutions for clayey / wet soils
Solutions for sandy soil
Solutions for contaminated soils: sulfated soils, organic soils, heavy metals
Solutions for Full Depth Reclamation
Solutions for Deep Soil Mixing

Asphalt mix 23cm (6cm+8cm+9cm)

Asphalt mix 18cm (6cm+12cm)

Asphalt mix 10cm

Sub-base 35cm treated soil 5%HRB

Sub-grade 50cm unbound granular

Road base 33cm treated soil 8%HRB

Sub-base 35cm treated soil 5%HRB
Road Soil Treatment:
the best material is local on each jobsite...

- Develop customized solutions adapted to any soils conditions
  - Clayey,
  - Organic soils,
  - Wet soils
  - Non-cohesive soils…

- Similarly, road maintenance with full depth reclamation
  - Reuse local roads as foundations raw materials with retreatments in situ.

Sustainability benefits
- “Circular economy” - No excavation, no deposits
- Less natural resources consumption
- Longer service life time
- Less transport, less emission (80km)
- Preservation of side and access roads

Countries involved
- Actively used in 15 countries (France, Romania, Belgium, Ecuador, Poland, Azerbaijan, Serbia, Russia, US, Canada, Morocco, Algeria, South Africa, Nigeria, Uganda)
- under development in about 10 more Kenya, Ivory Coast, China, Germany, UK, Argentina, Brazil, …
What is a soil?

O (humus or organic)
A (topsoil)
E (eluviated horizon)
B (subsoil)
C (parent material)
R (bedrock)

Clayey sandy soil
Sandy soil
Silty soil
A global trend that reached Europe the last years

More extreme climatic events

Rigid and semi rigid structures are becoming popular

POLAND
GERMANY
CZECH REPUBLIC
AUSTRIA
BELGIUM

And also solid trend out of EUROPE in RUSSIA, INDIA, PHILIPPINES, EGYPT, US...
Next generation with low maintenance composite coating:
Combine comfort and Durability into one pavement system…

- An innovative coating for Roads:
  - Drive safer with high skid resistance for long duration
  - More comfortable (fast drainage, noise absorption)
  - More durable with low maintenance
  - Cost-effective compared to existing wearing course
  - Customized colors
  - Easy placement

Sustainability benefits
- Local raw materials optimization
- Low CO2 footprint
- Longer service life time

Countries involved:
France (full scale testings), Poland (pilot)
Potential next trials: Switzerland, Germany,
Rigid techniques can adapt to any needs:
A large range to meet local requirements:

- Roller Compacted Concretes
- Reinforced Concrete Pavement
- Diamond grinding
- Re Surfacing
- Two lift exposed aggregates
- Cement Bound granular Material
- Joint Plain Concrete pavements

Our industries are ready to serve a better future.
Durability “equals” sustainability

Anticipate solution for durability requirements

Durability tools
- Coupled transport-chemistry modeling
- Fast non-destructive method
- Durability indicators
- Service life predictions

Characterization
- Transport properties
- Hydric properties
- Mineral assemblage
- Volume stability

Controlled weathering
- Carbonation
- Alkali-silica reaction
- Freeze-thaw & Scaling
- Sulfate & Chloride attack

Natural weathering
- Outdoor exposure sites
- Long-term traceability
- Weather data processing

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Circular Economy is a reality, to be « augmented »

Roads are a natural partners for circular economy:

- needs for large volumes of materials
- Low risk on structures
- Less transport with local reemploys

Sustainability benefits
- Local raw materials optimization
- Less quarries
- Less transport
Advanced material engineering remployment with Waste Management for tunnels and drillings:

- Result of excavation usually a combination of
  - Contaminated material → potential reuse as alternative raw material in cement kilns or decontamination with special binders
  - Soil (silt, clay) → potential reuse as landfilling in sand & gravel pits or quarries
  - Mix of aggregates and soil or crushed stone → potential reuse as raw material to produce aggregates for concrete and/or asphalt

Sustainability benefits
- SDG #12: Responsible consumption and production (circular economy limits the material consumption of natural resources)
- SDG #9: Industry, innovation and infrastructure (circular economy increase efficiency of construction processes)
- SDG #13: Climate action (CO2 decrease)

Countries involved
Switzerland: several references in the past, especially in Gotthard base tunnel different lots and in urban rail tunnels, usually in consortium with other players (see picture)
France: in Grand Paris decontamination of soils rich in sulfates with a tailor-made binder
Italy: reuse of tunnel excavation material from Metro 4 line construction; in the past use of building excavation material as raw material to produce aggregates
We need to accelerate in order to meet our 2050 milestones
Because Road unefficiency is not a fatality!

Regulations are key to lead the transformation
Road construction sector has not progressed in last 20 years
Industries and technologies are ready!
Procurement rules can still evolve towards:

- Measurement
- Control
- Predictability
- Digitization
- Innovation

EUPAVE welcomes the European green Deal!