# Soil treatment with non-traditional stabilizers – Introduction & State-of-the-art

- The basic idea of stabilization with non-traditional additives (soil treatment) is not necessarily to increase the stiffness or (shear) strength of the material, but to make it less susceptible to the harmful effects of excessive moisture that results from heavy rains or thawing of seasonal frost
- A large number of different products for non-traditional stabilization are available on the market
- Lack of published, independent studies; scepticism on the results provided by the material suppliers
- Lack of confidence in appearing, disappearing and changing names of the products and suppliers

# Soil treatment with non-traditional stabilizers – Contribution to sustainable pavement solutions

- Enables more extensive use of poor or marginal quality local materials
  → less material transport
- In connection with renovation of road structures enables more extensive re-use of existing pavement materials
  → less material transport and use of non-renewable natural resources

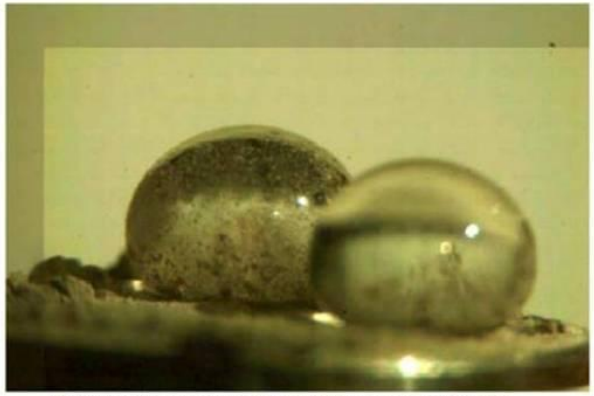
- In comparison to the traditional stabilizers at least some of the non-traditional stabilizers are produced using renewable biological raw-materials
  → less use of non-renewable natural-resources (bitumen) and/or
  → less use of energy and lower $CO_2$ emissions (hydraulic binders)

# Soil treatment with non-traditional stabilizers – Current gaps in knowledge

- Fundamental understanding on the influence mechanisms;
  - large variation in the product types (polymers, enzymes, ionic treatment agents, lignines, resins, combined treatment agents etc)
  - respectively, the effects are different (binding of the particles together, covering of the particle surfaces, making the particle surfaces hydrofobic etc)
  - the materials to be treated have a large variety in properties (grain size distribution, mineralogical composition, type of fines, plasticity etc)
- Related to the above, lack of simple enough laboratory test methods for predicting the field performance of the treated material
- Lack of the long term experience on field performance (service life)
- Uncertainty concerning possible harmful environmental effects at least partly also due to inadequacy of the information provided by the suppliers (e.g. chemical composition of the treatment agents)

# Soil treatment with non-traditional stabilizers – Key research questions

- Understanding of the influence mechanisms based on the particle level electro-chemical phenomena; what really happens on the particle surfaces and pores of the treated/ stabilized material, especially concerning interaction between water and mineral surfaces?



Water droplets on polyroad treated Yass pavement material.
Base reference - mid point of mount to edge is 6.35mm.
Image by M. Greaves CSIRO, Clayton , Vic.

- What are the simple and quick enough laboratory test methods that can be reliably used to predict the field performance of a treated pavement material i.e. to select the correct non-traditional stabilizer and the required dosing?

# Soil treatment with non-traditional stabilizers – Key research questions

- Well-documented and monitored trial sites in different local conditions are needed to get more confidence on the long term performance (service life); also need for harmonized monitoring methods to help shearing of the experiences more efficiently?

- Appropriate laboratory and in-situ test methods to assess the environmental effects of soil treatment with non-traditional stabilizers; well documented long term monitoring of trial sites are in a key role also here.