



## EUPAVE Newsletter - April 2016

### Enhancing Concrete Life in Infrastructure through Phase Change Systems (ECLIPS)

ECLIPS is a multi-national project carried out by Arizona State University and University of California Los Angeles (in the US), Swiss Federal Laboratories for Materials Science (Empa) in Switzerland, Technical University-Delft in Netherlands, and TECNALIA in Spain.

The project is funded through the Infravation grant, an initiative of the Conference of European Directors of Roads (CEDR) and coordinated by the Dutch Ministry of Infrastructure and the Environment.

Infravation brings together funding from the Netherlands, Denmark, France, Germany, Iceland, Israel, Italy, Norway, Spain, Sweden, USA and the EU into one common transnational Call framework, in order to fund joint research projects in road infrastructure innovation.

EUPAVE (European Concrete Paving Association) and ACPA (American Concrete Pavement Association) are in charge of the dissemination of the ECLIPS project and main outcomes.



## ECLIPS

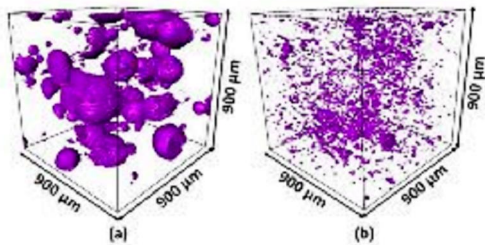
Enhancing Concrete Life in Infrastructure  
through Phase Change Systems

Early and late age thermal cracking in reinforced concrete elements and freeze-thaw related deterioration in concretes exposed to temperatures cycling around the freezing point of water are sources of concern to owners and managers of infrastructure assets around the world. This is a considerable issue with numerous transportation structures (pavements, bridges etc.) often requiring premature repair/replacement or incurring exceedingly high maintenance costs during their service-life.

**Enhancing Concrete Life in Infrastructure using Phase Change Systems (ECLIPS)** tackles this problem by incorporating phase change materials (PCMs) with a suitable phase transition temperature, enthalpy of phase change and degree of dispersion in the concrete.

PCMs are combined sensible-and-latent thermal storage materials that can be used to store and dissipate energy in the form of heat. The heat absorption and release response helps to maintain a constant internal system temperature until the phase-transition is completed.

The ability to incorporate PCMs into the concrete matrix has implications on enhancing concrete performance.



*3D view of the distribution of different sizes of PCM particles in the cement composite*

### **ECLIPS Main Goals**

- Select appropriate PCMs of suitable phase transition temperature, enthalpy, and formulate robust methods of delivery,
- Life cycle assessment (LCA) model to quantify the environmental and economic benefits of the technology that improves life of concrete in road infrastructure,
- Prototype concretes in different environments to evaluate the real-life performance.

**Click here to read the ECLIPS Newsletter Spring 2016**

**<http://www.infravation.net/projects/ECLIPS>**