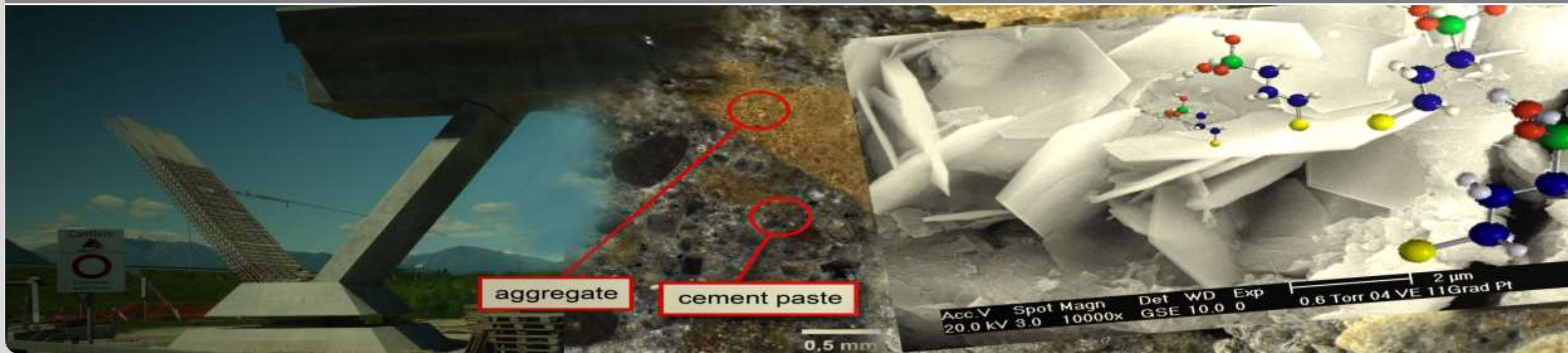


Technical Infrastructure – Resilience needs Durability of Physical Constructions

A. Gerdes, Scientific Director, KIT Innovation Hub Prevention in Construction



0 percent
improving labour productivity
over the last 20 years in Japan,
Germany and the USA*

40 trillion €
will be invested in infrastructure
worldwide from 2013-2030*

4 times
increase service life
through prevention

3 times
economic and
ecological damage
caused by repairs



80 percent
of companies in the main construction
sector have fewer than 20 employees



SUSTAINABLE DEVELOPMENT GOALS



Sustaining the Functionality of the Technical Infrastructure – Challenges of the 21th Century



„Megacities“



Globalization



Ressources



Climate Change

challenges & chances

Reasons for the bad current state

- Insufficient quality of construction materials
- Inadequate planning and execution
- Shift in usage
- Change of environmental impact

➔ **New and integrative approaches** are essential for a sustainable infrastructure

Infrastructure – Environmental impacts determine the service life ...



Airports



Sewage Plants



Highway bridges

... and lead to damages at the construction!



Airport - ASR-Reaction



Sewage plant – Sulphate attack

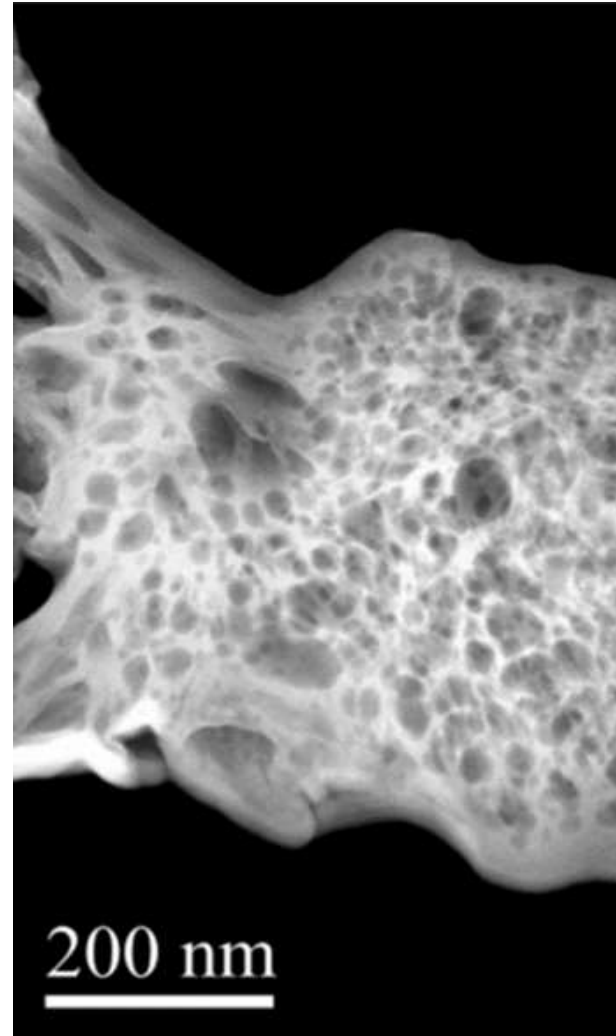


Bridge - Corrosion

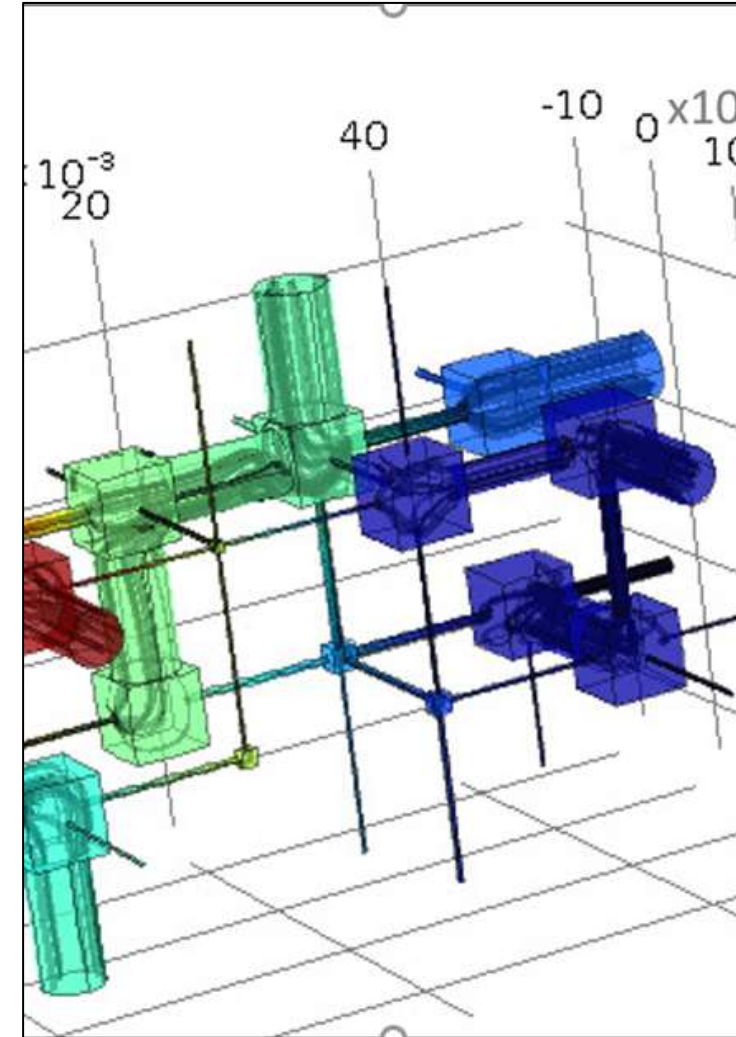
Physical properties of building materials determine durability!



Permeability

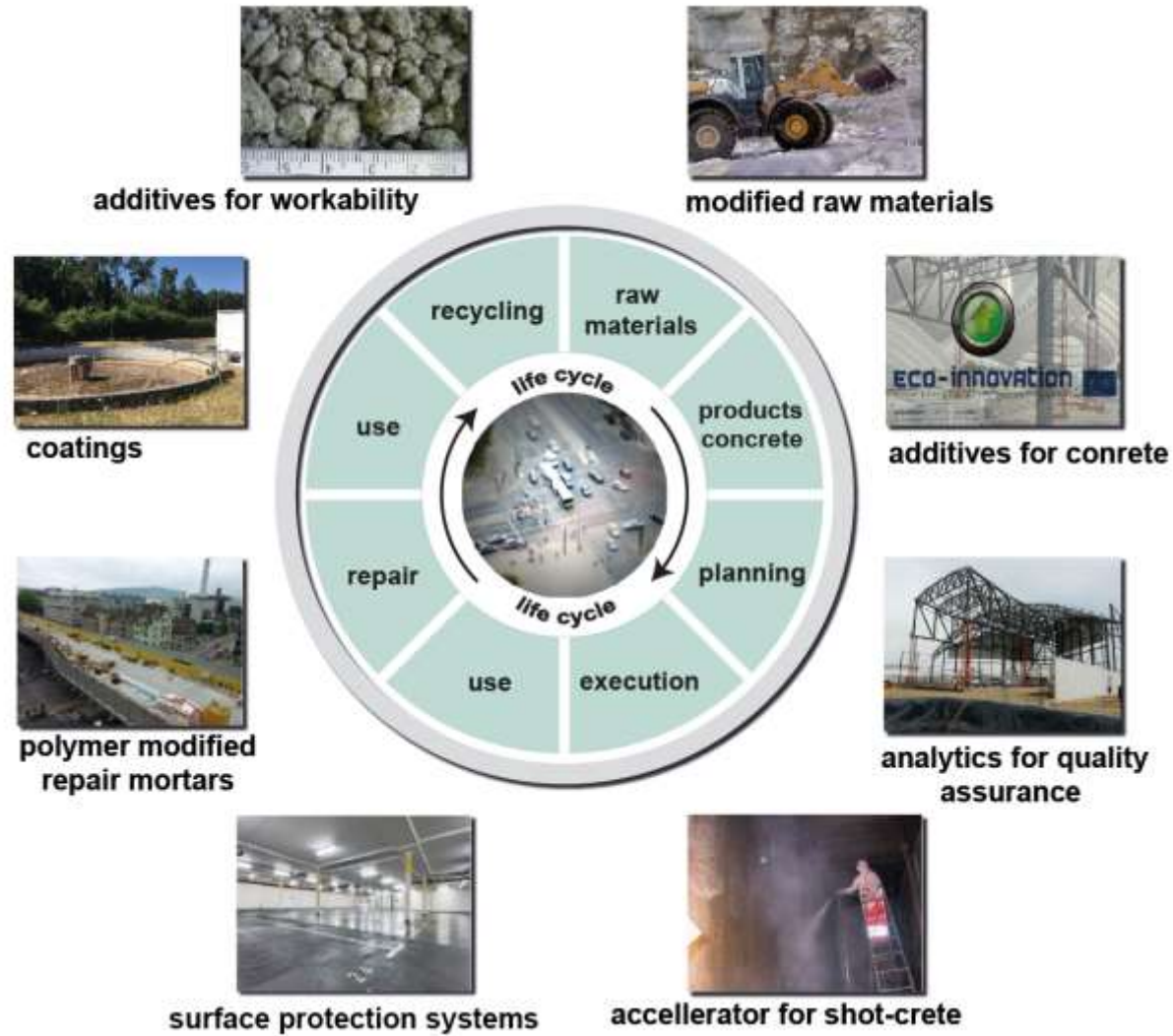


Nanostructure of CSH



Reactive Transport

Strategy: Increasing the real service life to the planned service life



- The consequences of megatrends such as climate change will also place higher demands on cement-based materials in respect of performance and durability.
- The restoration-free service life of structures can be extended in a very efficient way by the application of preventive measures during the service life which also leads to a significant reduction of economical and ecological burdens.
- The establishment of Foresight Processes in the construction sector is crucial for the development of a sustainable infrastructure and the international success of construction companies.
- New offers for the academic education of young researcher and courses for experts working already in practice, representatives of the public administration and politicians must be developed
- New formats must be developed to achieve an intensive communication between all stakeholders who are acting along the supply chain of building materials and/or the life cycle of a structures.