

# **Sustainable Construction with Concrete – Consolidating the Phases of Life Cycle in a Holistic Approach**

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## **Sustainable Construction with Concrete**

**How can engineers and architects  
fulfil the demands  
of sustainable construction ?**



## Sustainable Construction with Concrete



How can engineers and architects fulfil the demands of sustainable construction?

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## Sustainable Construction with Concrete



Energy-efficiency

Minimisation of impacts

Environmental compatibility

Safety

How can engineers and architects fulfil the demands of sustainable construction?

Adaptivity

Recycling

Durability

Minimisation of costs

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## German Committee for Structural Concrete at DIN (DAfStb)

Task: Enhance the application of concrete as a safe, durable, cost-effective and environment-friendly construction material

by

- Research and development: own promotion, coordination of research activities together with other promoters (e. g. government)
- Elaboration of DAfStb-Guidelines (e. g. SCC) and Standards in the field of structural concrete as acknowledged rules of technology
- Publications to support concrete technology

**Sponsors:** Building industry/building owners, building materials industry, engineering associations



## General aims of the Joint Research Project “Sustainable Construction with Concrete”

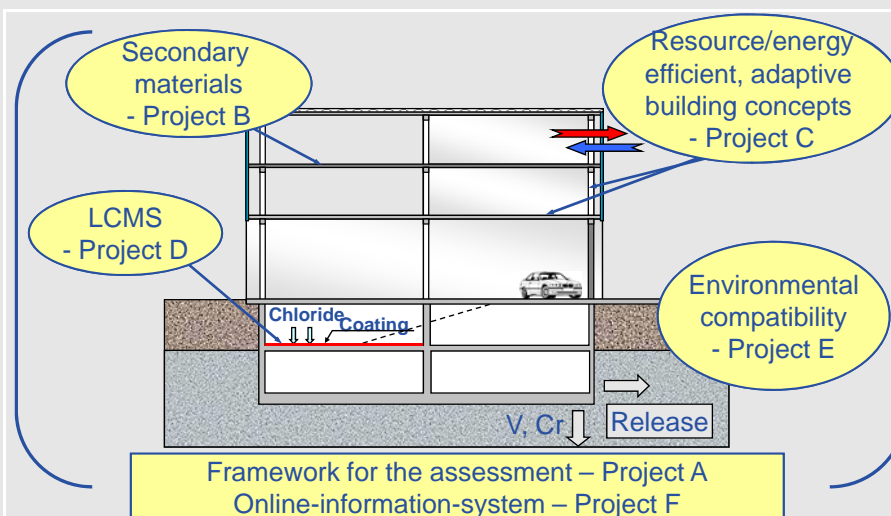
- Guideline „Basis of Sustainable Construction with Concrete“  
➡ EC0 „Basis of Design“
- Guideline shall support all partners in the concrete industry (designers, producers, executers) to implement aspects of sustainable construction with concrete
- Prescription for future standards and guidelines in the field of sustainable construction with concrete (based e. g. on ISO/CEN Standards under preparation)



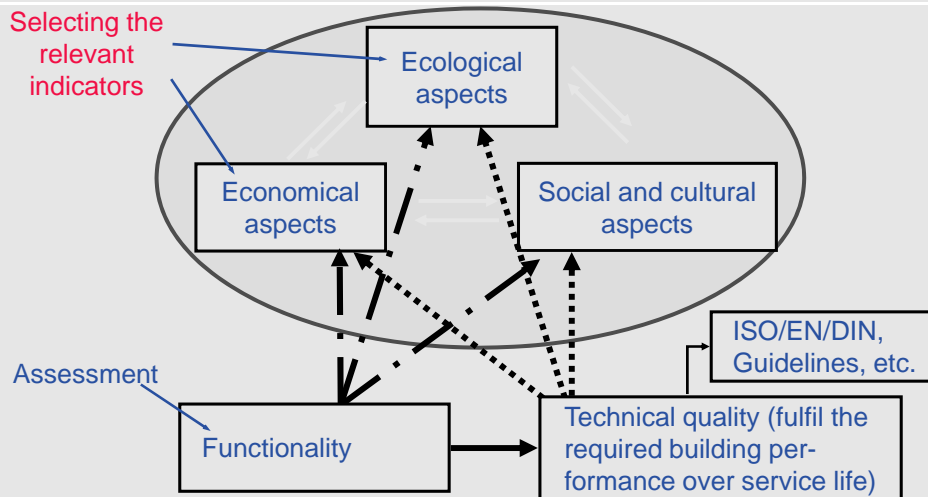
## Objectives of the Joint Research Project “Sustainable Construction with Concrete”

- General Recommendations shall be developed in order to integrate aspects of sustainability into design and execution
- Evaluation methods shall be tailored to the needs and boundary conditions of concrete structures
- Technical solutions shall be proposed that will contribute to sustainable development in particular at the interfaces of individual phases of life cycle of concrete structures
- Planning and information tools shall be tailored to the need of the various actors

## Projects of the Joint Research Project



## Project A – Framework for the Assessment



Source: ISO/DTS 21929 (2006)

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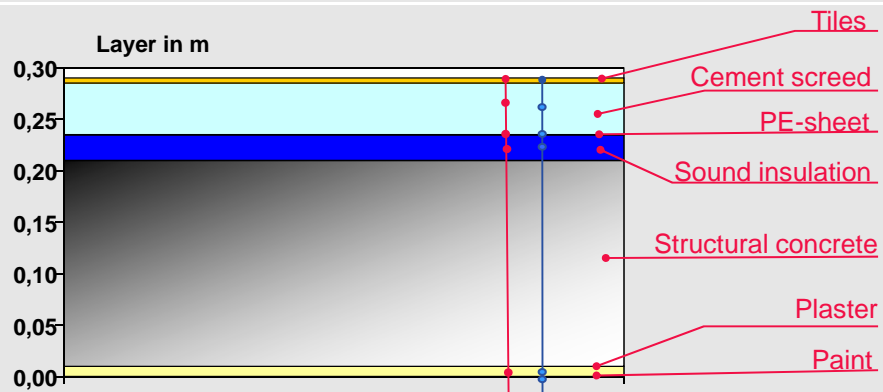
## Relevant Indicators

| Environmental Indicators   | Economical Indicators  |
|--|--|
| <ul style="list-style-type: none"> <li>▪ Acidification potential (AP)</li> <li>▪ Eutrophication potential (EP)</li> <li>▪ Global warming potential (GWP)</li> <li>▪ Smog formation potential (PCOP)</li> <li>▪ Ozone depletion potential (ODP)</li> <li>▪ Depletion of non-renewable energy / use of renewable energy</li> </ul> | <p>Life cycle cost:</p> <ul style="list-style-type: none"> <li>▪ Planning/design</li> <li>▪ Erection</li> <li>▪ Use</li> <li>▪ Maintenance/repair</li> <li>▪ Demolition</li> <li>▪ Disposal</li> </ul> |
| <p>Assessment:<br/>Life Cycle Assessment</p>   | <p>Assessment:<br/>Life Cycle Costing</p>  |
| <p>Development of CEN/ISO-Standards and national codes will be regarded !</p>  |  |

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## Example – Floor Construction



Scenario A: 0 to 80 years; after 50 years exchange

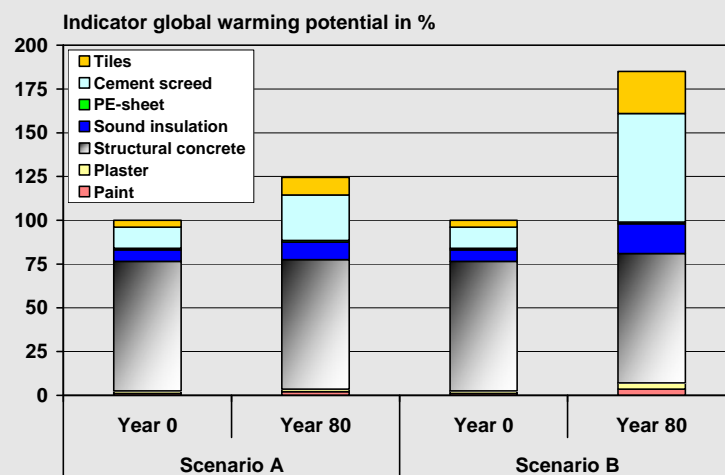
Scenario B: 0 to 80 years; after 25, 65 years exchange

Source: Graubner et al.

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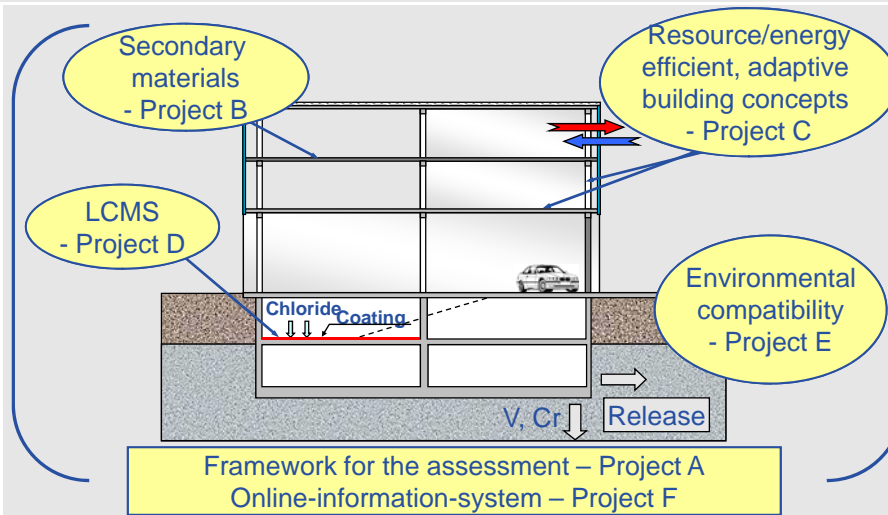
## Example – Global Warming Potential



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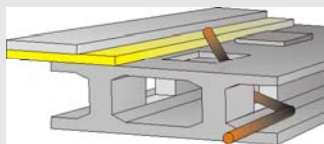
## Projects of the Joint Research Project



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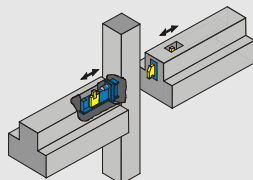
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## Project C – Load Bearing Systems



Section design

- Load bearing
- Technical building equipment
- Finishing craft



Detailing (exemplary)

- Easy to assemble / disassemble
- Technical building equipment
- Without consoles

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