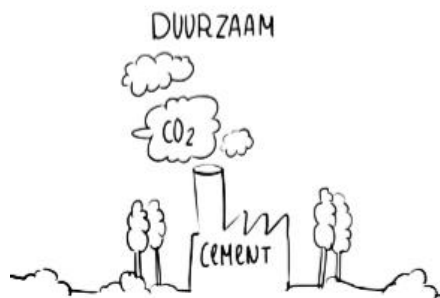


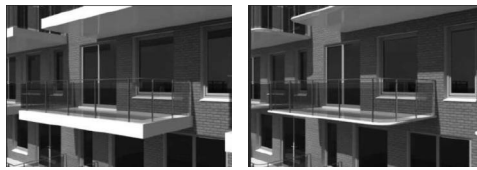
Opportunities of innovative concrete types in structural applications?!

Mladena Lukovic

Which types of innovative concrete do we have?



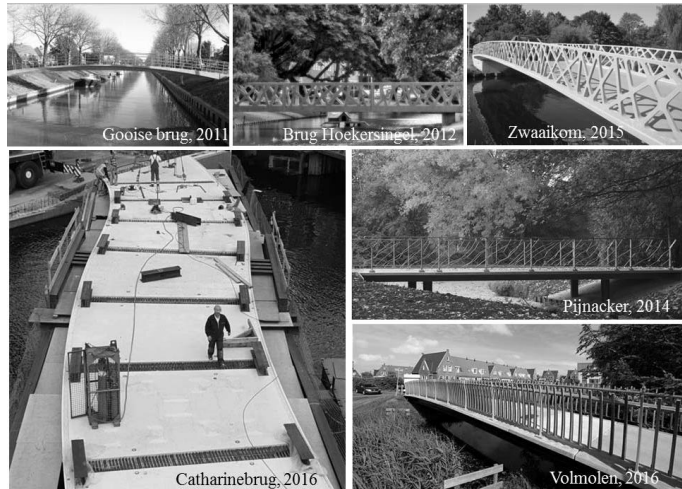
UHPC - Applications so far



300 mm → 60-70 mm



Poptahof, 2012/13



Road bridges?

1960s

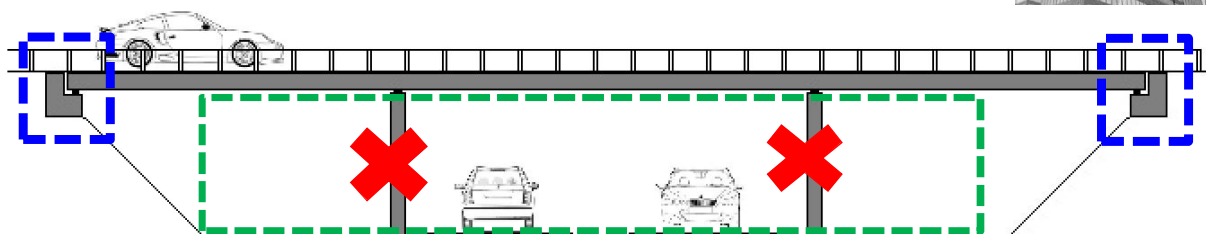
2020s



- Low construction time
- Freedom in space
- Keep construction height to minimize the additional ground work
- Keep existing foundations
- Minimize the weight of construction



Self-Propelled Modular Transporters

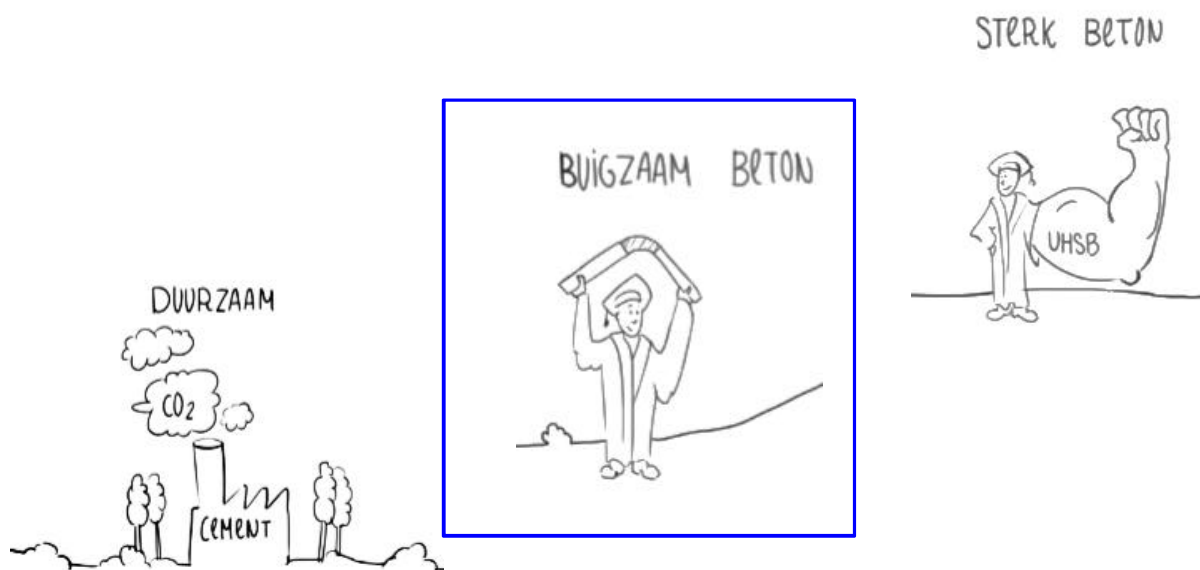


In Malaysia, since 2010 more than 100 UHPC road bridges!

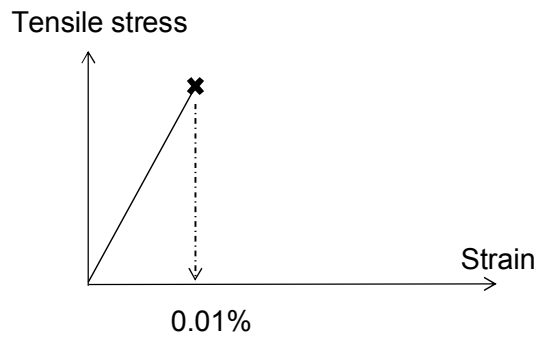


100 metre span
UHPC Batu 6 Bridge, Malaysia

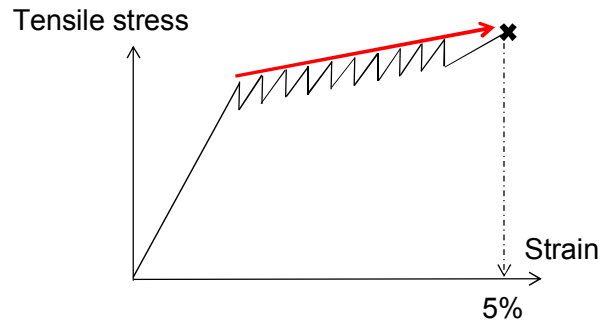
Strain hardening cementitious composite SHCC



Regular concrete
Brittle!

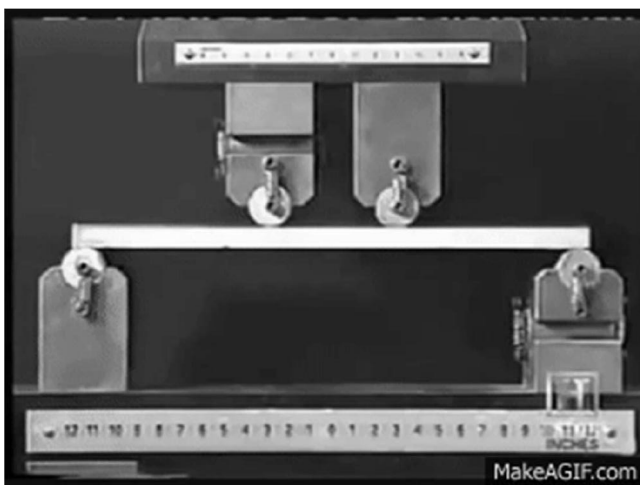


Bendable concrete
Ductile!

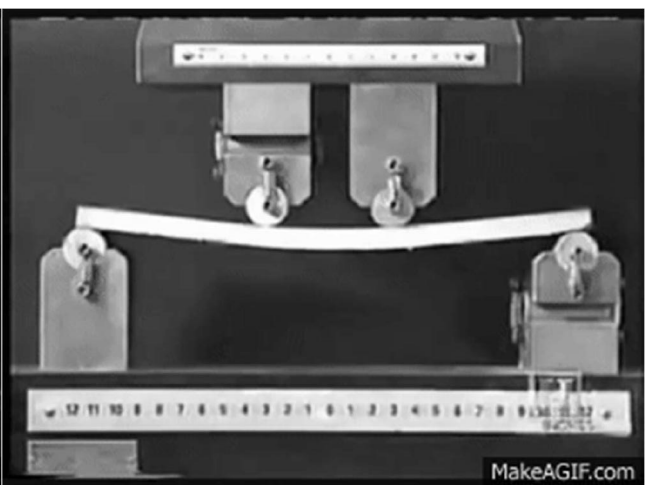


Regular vs. bendable concrete

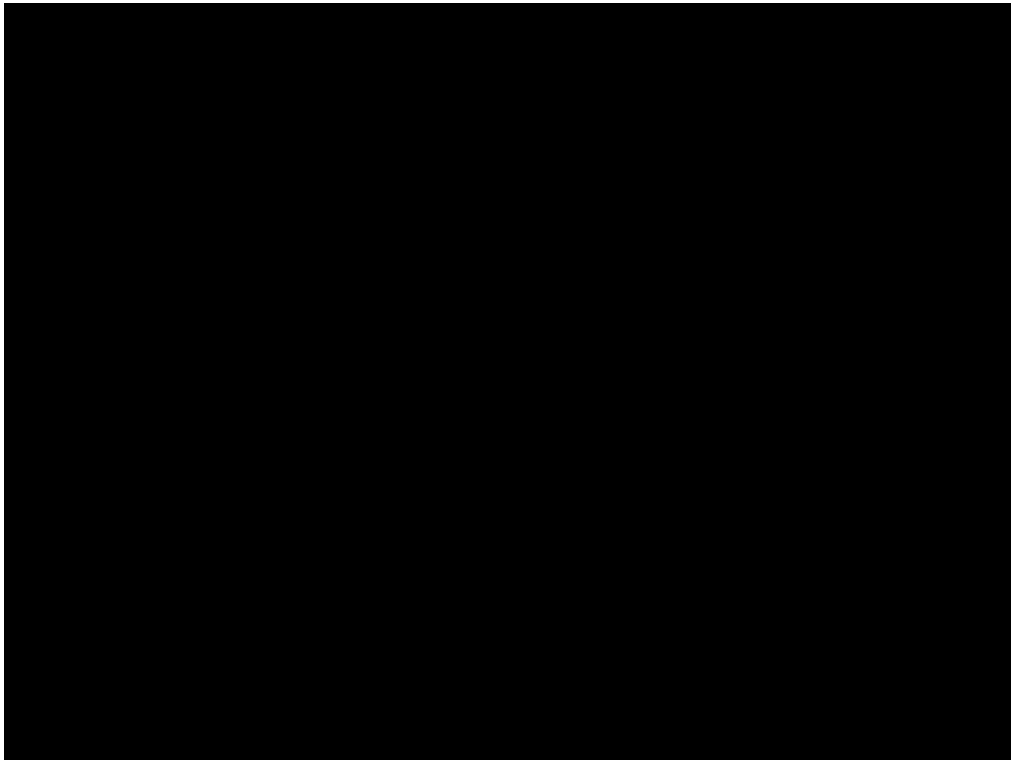
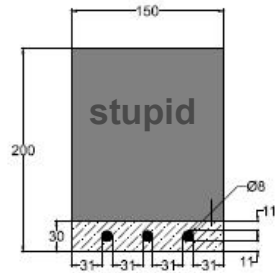
Brittle



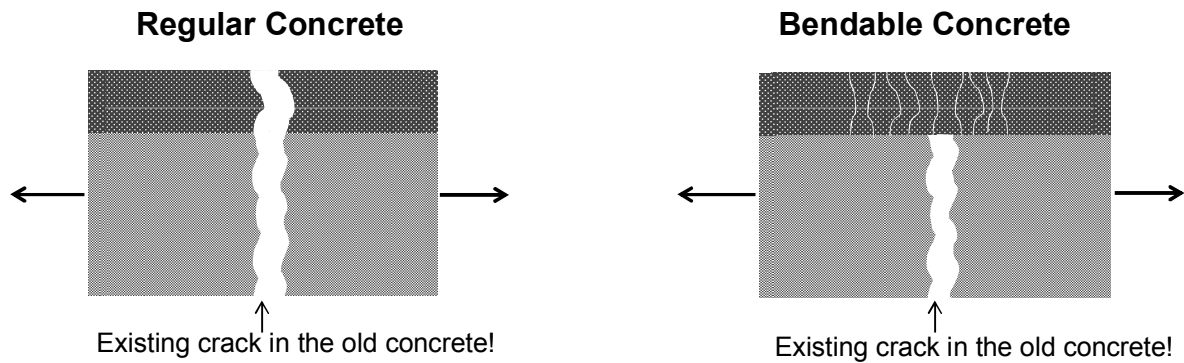
Ductile



SMART + STUPID CONCRETE CRACK WIDTH CONTROL



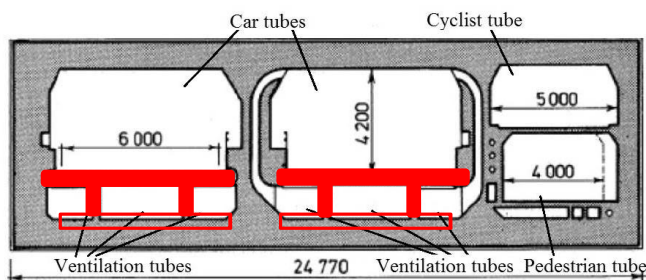
For repair



Small crack widths much better for durability!

For repair... Maastunnel

- Europe's first immersed tunnel
- **Historical treasure to be preserved!**



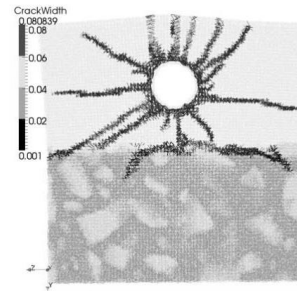
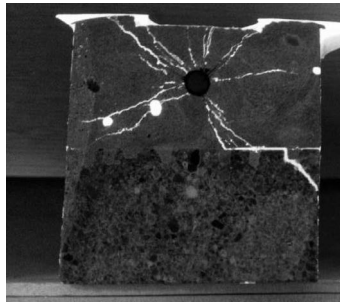
Damage in ventilation tubes, 2015



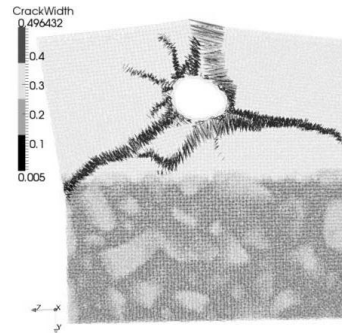
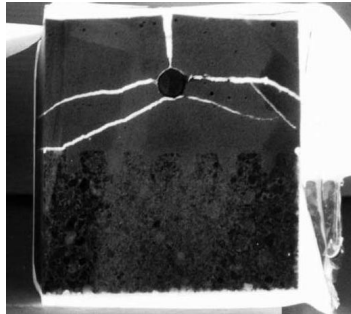
Experimental

Numerical

SHCC



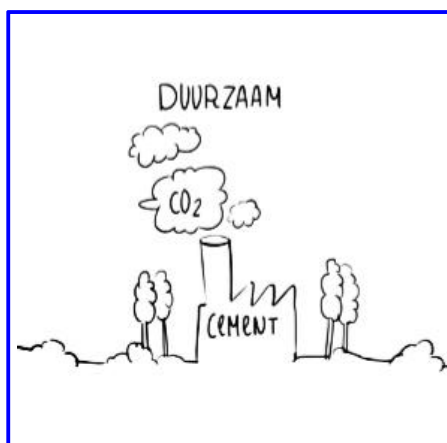
Commercial mortar



- Reduced crack widths and reduced corrosion rate

Grubb et al. (2007), Jen and Ostertag (2016)

Geopolymer concrete

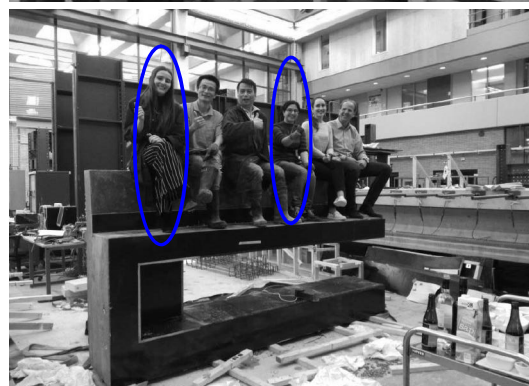


Sustainability is becoming an increasingly important issue!

Investigate the structural capacity and durability of
“green concrete”



Geopolymer canoe



Conclusions

Numerous opportunities for innovative concrete types!

We have neither codes, nor experience, nor reliable models for these materials!

If we want to be ready for future demands, **research has to start now!**

