

Effect of micro-cracking and self-healing on long-term creep and strength development of concrete

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Propositions

accompanying the dissertation

EFFECT OF MICRO-CRACKING AND SELF-HEALING ON LONG-TERM CREEP AND STRENGTH DEVELOPMENT OF CONCRETE

by

Wenjuan LYU

1. Concrete becomes stronger if loaded at low or medium stress levels or weaker at high stress levels, compared to load-free concrete. This is a result of the competition between hydration, micro-cracking and self-healing.
2. Micro-cracking reduces the strength and causes the failure of concrete under sustained load, but it also gives the possibility for self-healing to occur, which could recover the strength, postpone the failure and even give an extra strength.
3. Self-healing could improve the durability and sustainability of normal-weight aggregate concrete, but it may increase the degree of heterogeneity of lightweight aggregate concrete and induce more micro-cracks.
4. Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful. (George E. P. Box)
5. Every PhD "cracks" while doing research, but will gradually be "self-healed". This is the learning process.
6. Science may set limits to knowledge, but should not set limits to imagination. (Bertrand Russel)
7. The attitude of the population is crucial in managing an epidemic and determines how realistic the proposed measures by the government are.
8. The conclusion that we draw from the information or evidence we gather, does not represent a universal truth.
9. Democracy is not simply the rule of majority, but a process of compromise and negotiation among parties with different goals, interests, and perspectives.
10. The greatest gifts which ensue from the doctoral research are, besides new knowledge, the ability to cope with constant ups and downs, success and failure and reward and disappointment.

These propositions are regarded as opposable and defensible, and have been approved as such by the promotor prof. dr. ir. K. van Breugel.