Modeling the beginning of expansion acceleration due to alkali silica reaction in concrete.
Part 2- Comparison of model estimates with experimental data

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Abstract.

This paper compares expansion model estimates and experimental data. In an earlier paper, a diffusion controlled topochemical model fitted to isothermal curves yielded kinetic parameters (induction time and kinetic constant). Linear regression of their Arrhenius plots modelled the constants dependence on temperature, allowing to predict induction times at given temperatures and times in laboratory. Comparing expansions thus estimated with experimental values at 37 ºC in mortar-bars immersed in 1M NaOH solution ASTM C 1260 adapted test, the expansion start matched the modelled induction time. The experimental and modeled expansion after that time follow different patterns. The model may use known correlations for correcting for different alkalinities and humidity's,.

The model possibilities were checked with published data on ASR-affected concrete . The estimates matched real values despite high errors in statistical processing and environment data. Improvements are proposed for reducing errors, in modeling major factors , and application to other cases.

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