Novel shear capacity testing of ASR damaged full scale concrete bridge - DTU Orbit
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**Novel shear capacity testing of ASR damaged full scale concrete bridge**
A large number of concrete bridges in Denmark have to undergo wide-ranging maintenance work to prevent deterioration due to aggressive Alkali Silica Reaction (ASR). This destructive mechanism results in extensive cracking which is believed to affect the load carrying capacity of the structure. However, sufficient knowledge concerning how it influences the structure's load carrying capacity and stiffness is still lacking. In particular, more knowledge concerning the shear capacity of concrete slabs without reinforcement is needed. Often ASR deterioration result in demolition of the affected concrete bridges with considerable economical expenses as a consequence. A novel ASR test and measurement method, which can be used to perform shear testing locally on concrete bridges, is presented in this paper. Shear capacity testing is performed on a three span concrete bridge and several material test samples were taken from the test areas on the bridge deck. In addition, the test method is used to directly predict the shear capacity without disturbing the traffic significantly. Verification of the load carrying capacity of the bridge was the ultimate goal of the tests. A test rig, which could easily be moved between the slab test specimens, was constructed and the test areas were made in a way which enabled simple repair of the damaged areas after testing. In general, the novel test method worked very well since it provided an on site test method, which efficiently provides an evaluation of the load carrying capacity of the tested bridge. In addition, testing and monitoring provided important information concerning the shear behaviour of ASR deteriorated concrete. The results provided sufficient information to conclude that demolition of the bridge was not necessary and consequently significant savings related to the rehabilitation costs were obtained.

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