

Stress Distribution and Failure Mechanism
for Pop-Out in Concrete

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(Summary by AALBORG PORTLAND)

SUMMARY

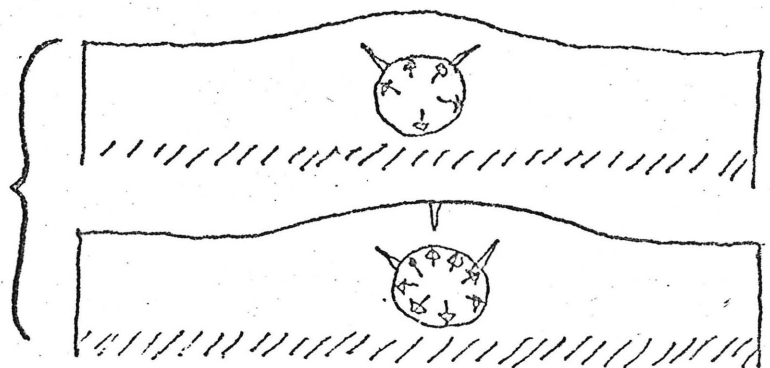
Professor Ervin Poulsen described his tests on stress distribution and failure mechanism for pop-out in concrete. He pointed out that even when a theory had been formulated for the mechanism of alkali-silica reactions, these reactions would still occur. The theory could not prevent alkali-silica reactions.

The reactions would lead to stresses and a state of equilibrium or non-equilibrium would arise - the latter leading to cracks.

Tests were necessary in order to arrive at a reasonable method of calculating the critical stress field. E. Poulsen formulated rupture theories on which to base such work and pointed out that every test method was encumbered with error on account of the size of the test specimen.

E. Poulsen then described stress-optical tests for use in evaluating the stress field in the case of pop-outs. Pop-outs will occur if forces can be introduced in the cracks occurring in a stressed zone. If these stresses do not arise, cracks will develop to a certain depth around the zone. Under continued loading, the transfer of stresses will be prevented at the crack, and a rearrangement of the stresses will result, leading to surface cracking at the zone in question.

Effect without forces in cracks



Effect with forces in cracks

