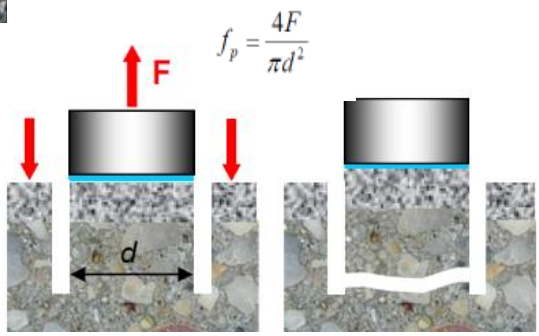
NDTitans in action

Case 6.1 BOND-TEST for evaluating runway joints, Anchorage, Alaska

To the discontent of the airlines operating the airport at Anchorage, Alaska, failures in the joints of the runway were observed, loosening pieces of concrete on the surface.

Repair had to be done. BOND-TEST, shown below, was selected for testing the tensile strength of the substrate, and subsequently the adhesion strength between the substrate and the new applied repair material.

Prior to the repair job, the tensile strength of "sound" concrete was measured, f_t= 3.3 MPa with failure at the bottom of the partially drilled core



The owner decided together with his consulting engineers to remove existing concrete around the joints in its full length by saw cutting 150 mm on each side, 150 mm deep, chip off the concrete in between to a rather smooth bottom surface and then use hydrojetting of the bottom surface, followed by casting a new concrete material in the channel.

BOND-TEST was used for testing the tensile strength before and after hydrojetting at the bottom of the channel, as well as the adhesion between the water jetted bottom of the channel and the new cast concrete. A significant difference in tensile strength was found in f_t before hydrojetting, 0.1 MPa to 0.8 MPa, while hydrojetting producing 2.0 MPa to 2.6 MPa tensile strength – the required adhesion strength being 1.7 MPa.

Saw cutting

Hydro-jetting

NDTitans in action

For testing at the bottom of the channel two heavy steel L-beams were used to elevate the BOND-TEST equipment to the surface level.

Preparation for the testing is shown below, first applying the GRA two-components adhesive in a thick layer, second

Planning of the adhesive perpendicular to the surface, gluing on of the disc to the planned adhesive (not shown) and finally coring of the partial core centric with centerline of the disc, using the CORECASE.

Notice: No planning of the substrate itself is done.

The BOND-TEST attacments are shown below, the centering piece, the coupling with pullbolt threaded to the glued- on disc, and the counterpressure

Testing in progress shown below with the BOND-TEST hydraulic pullmachine being loaded at a constant loading rate until rupture of the concrete, max pullforce recorded and saved and tensile strength f_t calculated

BOND-TEST Results		
Testing of	**Values**	**Failure**
"Sound" concrete	440 psi (3.0 MPa) to 550 psi (3.8 Mpa)	Bottom failure
Bottom of channel, before water jetting	15 psi (0.1 MPa) to 120 psi (0.8 MPa)	In concrete
Bottom of channesl after water jetting	290 psi (2.0 MPa) to 370 psi (2.6 MPa)	Bottom of partiel core
After casting of new joint	280 psi (1.9 MPa) to 380 psi (2.6 MPa)	80% in substrate 20% in adhesion

Summary of test results. As will be seen, the adhesion strength of the repaired joint exceed the requirement of 1.7 MPa regardless of the position of the failure.

The joints repair was accepted

Reporting by **NDTitan Claus Germann Petersen**