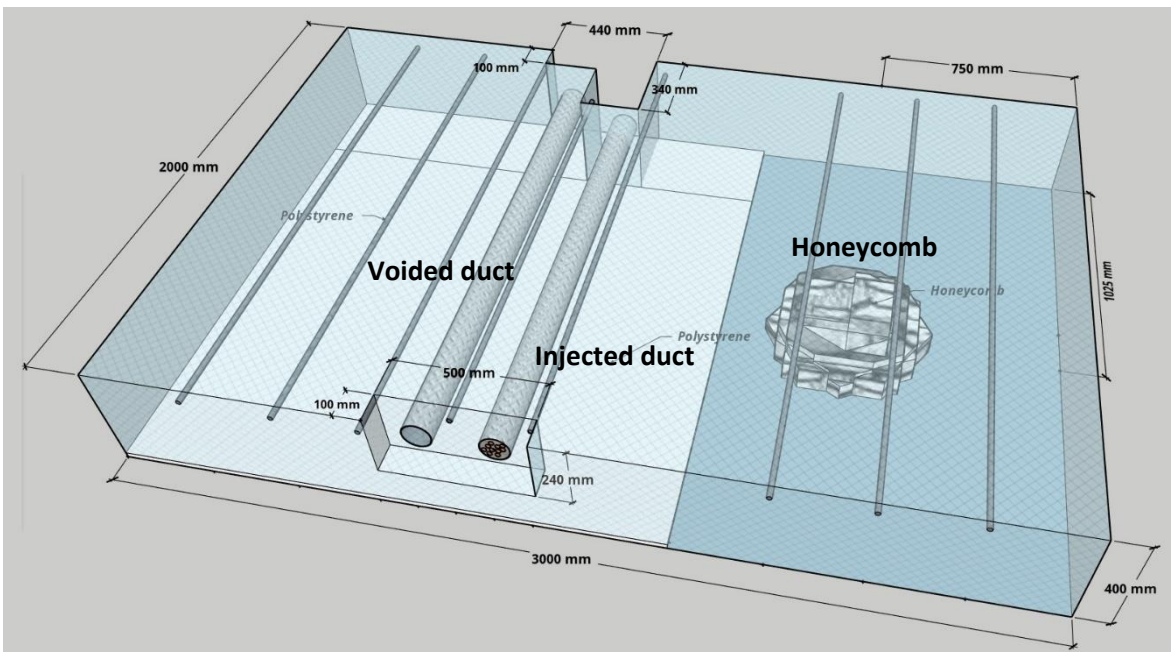# NDTitans in action

Training and implementation

1.Training at Germann Instruments

The training comprises of an introduction to the test system(s) in questions along with typical testing cases, followed by hands-on at Germann Instruments facilities in Copenhagen, or in Chicago, where specimens for testing are available.

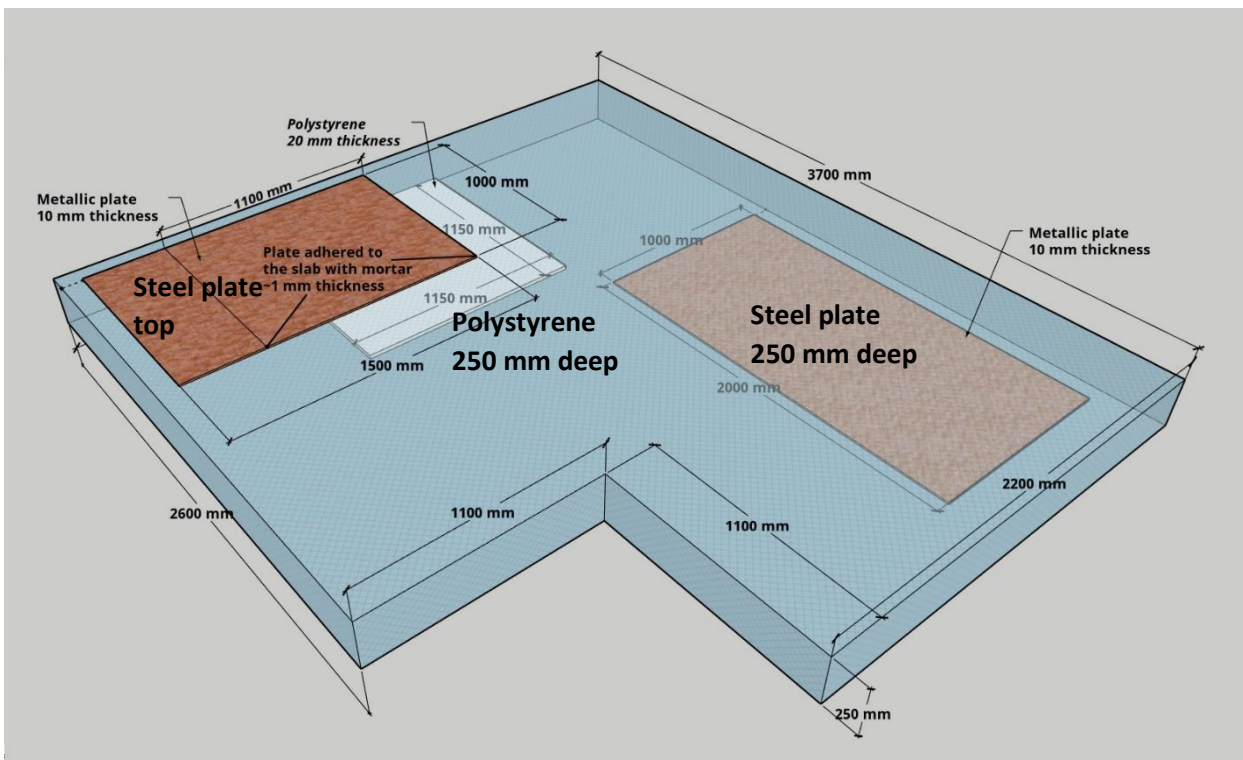Slabs S1 and S2 with known defects:

Slab S1:

Slab S1 For DOCter Impact-Echo, MIRA tomographer, s´MASH Impulse Response and GPR

NDTitans in action

Slab S2

Polystyrene
20 mm thickness

Metallic plate
10 mm thickness

1100 mm

1000 mm

3700 mm

1150 mm

1000 mm

Steel plate top

Plate adhered to the slab with mortar -1 mm thickness

Metallic plate
10 mm thickness

1150 mm

Polystyrene 250 mm deep

Steel plate 250 mm deep

1500 mm

2000 mm

2600 mm

1100 mm

1100 mm

2200 mm

250 mm

**Slab S2** For DOCter Impact-Echo, MIRA tomographer and s´MASH Impulse Response

Training on the slabs, in Copenhagen and in Chicago

In addition, five 100 cm x 100 cm x 35 cm large specimens are available with different concrete qualities for demonstration of CAPO-test, BOND-TEST, DOCter Impact-Echo and GPR, as well as cubes with LOK-test inserts, ready to be tested for pull-out strength.

2. Training on-site, examples
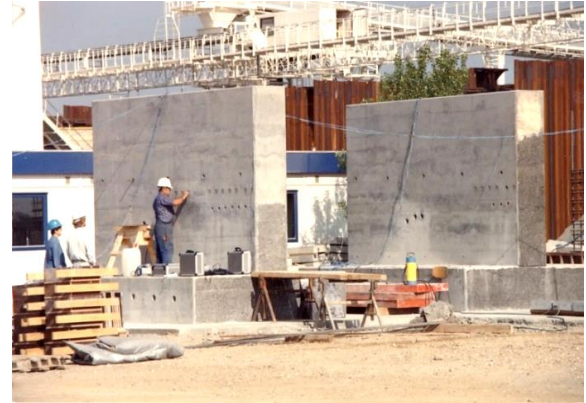
Training course at the Danish Great Belt Link in LOK-test and CAPO-test for production control of the GBL strutcures

Training course for the Ministry of Transport (MOT), Hanoi, Vietnam

CAPO-test training for theRoad & Bridge Administration, Wroclaw, Poland

Training course at AUD, American University in Dubai

CAPO training at Dubai Technical University

NDTitans in action

3. Implementation assistance on-site at the client´s premises, examples

3.1 CAPO-test and LOK-test, implementation examples
https://www.youtube.com/watch?v=AwgeQbCp4sQ

Implementation of CAPO-test for testing of columns to be further loaded, Houston, USA

Implementation of CAPO-test on joints before loading of a bridge deck, Kentucky, USA

Implementation for testing in-place strength

Left, CAPO-testing of shotcrete, uranium mine, Canada

Right, LOK-testing of tunnel slab, Denmark

NDTitans in action

3.2 DOCter Impact-Echo, implementation examples

Implementation of DOCter Impact-Echo for detection of voids in cable ducts, Belgium

DOCter Impact-Echo Implementation

Left, testing for delaminations of sour pipes loaded to early during production causing slippage of the reinforcement in the pipes. Denmark
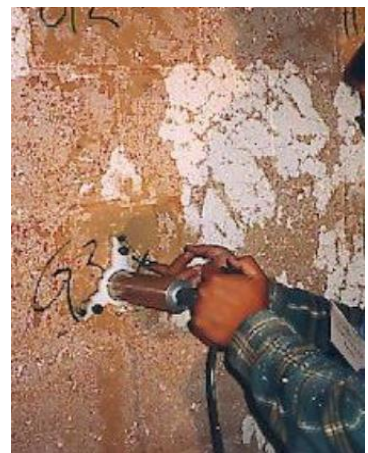
Right, testing for depth of surface opening cracks in ceiling of a fire damaged transformer room, Holland

DOCter Impact-Echo Implementation

Left, testing for thickness of tunnel lining, Germany

Right, testing for adhesion of tiles and delaminations of the interior of tank for pulp production, Canada

3.3 MIRA ultrasound tomographer, implementation examples

Courtisy of Rambøll OY, Finland

Implementaion of MIRA´s for detection of voids in cable ducts, Finland

Implementaion of MIRA for detection of ungrouted element joints, Denmark

Implementaion of MIRA for detection bridge deck delamination, FHWA, Illinois, USA

3.4 s´MASH Impulse Response, implementation examples

Implementation of s´MASH Impulse Response on bridge deck for defects, West-Virginia, USA

Implementation of s´MASH Impulse Response on tunnel for voids in the injection behind the tunnel elements, Denmark

Implementation of s´MASH Impulse Response for detection of terracotta panels cracking, Chicago, USA
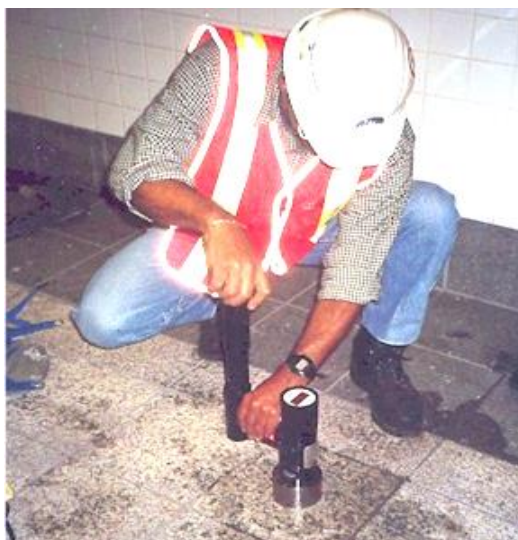

Implementation of s´MASH Impulse Response for detection of lack of anchoring of granite panels, New York, USA

NDTitans in action

3.5 Miscellaneous implementation examples

Implementation of **BOND-TEST** for adhesion of tiles in New York Metro subway, USA

Implementation of **BOND-TEST** for adhesion of joints in runway, Anchorage Airport, Alaska, USA

Implementation of **AVA** for air void structure of fresh concrete, FHWA, Topeka, Kansas, USA