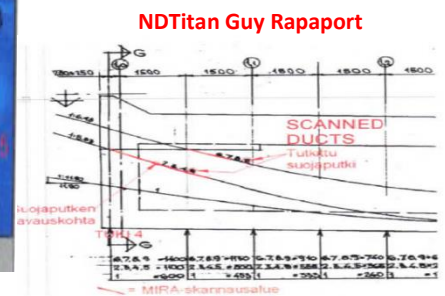
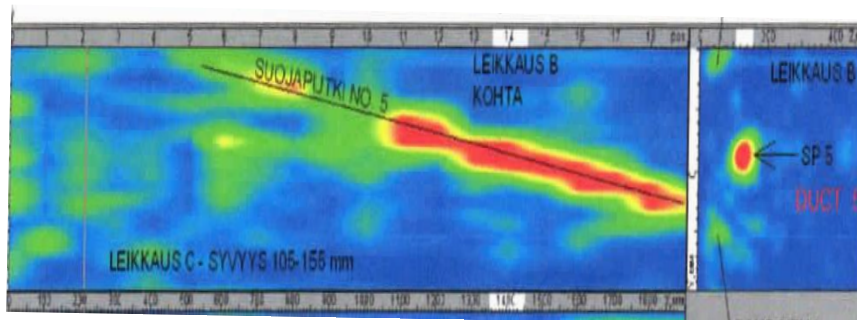


Case 9.1 Injection quality of existing cable ducts tested by ultrasound tomography and impact-echo, Finland

Evaluation of prestressing duct's condition (Ramboll Finland Oy) at various locations along the bridge, mostly at the anchoring zones and mid spans was performed by using the MIRA ultrasound tomography and Impact-Echo on the Leiviö over bridge in Finland for the Finnish Road Administration. The bridge constructed in 1971 is a continuous prestressed concrete box girder bridge 102 m long.



At several investigation zones intensive and continuous reflections were detected at the locations and depths of the ducts (red color). Accordingly, similar findings were made with Impact Echo investigations (dominant peaks at depth of ducts). At one location it was decided to open the suspicious duct at a distance of one meter from the head of the anchor holding the strands, carried out by coring to the corrugated tube, which was opened as well. The findings are illustrated below.



The duct was empty of injection grout and the strands were severely corroded, yet only mildly pitted. In comparison, in another area, where the MIRA did not show intensive reflections (red color), but only slightly green/yellow color (non-suspicious), another similar opening was made. As seen, the strands were fully encapsulated by injection grout, well protected. The strands are in good condition with no signs of corrosion. The case shows how important it is to evaluate the injection of the ducts during and after completion, e.g. with MIRA and DOCTer Impact-Echo, including verification of the results by invasive means.