

## Re-anchoring of the cut wires of a grouted seven-wire strand: experimental and numerical studies

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When inspecting external prestressing tendons, damaged strand wires can be observed. However, a grouted prestressing tendon tends to conserve its tension when some wires or strands are damaged due to the re-anchoring phenomenon. For security issue, it is important to know the acceptable damage that a tendon can suffer before being replaced. While re-anchoring of strand is well studied, there is still little literature on wire re-anchoring. Thus, we propose to experimentally and numerically study the re-anchoring of the cut wires of a grouted seven-wire strand.

To study the influence of wires breakage on the integrity of cables, wire cutout tests have been conducted on a test bench on 50m-long grouted tendons made up of a single strand with seven wires. Strain gauges are installed on the sheath of the tendons and, before grouting, on the strand wires at different locations along the cable. The gauges are located in the re-anchoring area to study the strain distribution during and after wire cuts. The wires are cut until the tendon is completely ruptured. The results shows that the stress of the broken wire increases according to the distance from the cut position and that the tendon sheath is bent and twisted.

Moreover, a finite element model has been developed to reproduce the re-anchoring of wires. In this 3D model, a Coulombs friction law including sliding governs the contact interface between the strand and the grout. Finally, the numerical results are compared with those obtained experimentally.

## REFERENCES