



Experimental investigation and damage assessment in a post tensioned concrete beam

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This paper presents the results of an experimental campaign carried out on a prestressed concrete beam in the realm of the project SIPRIS (Systèmes Intelligents pour la Prévention des Risques Structurels), aimed to develop intelligent systems for the prevention of structural risk related to the aging of large infrastructures. The specimen was tested in several configurations aimed to re-produce several different phases of the 'life' of the beam: in the original undamaged state, under an increasing loss of tension in the cables, during and after cracking induced by a point load, after a strengthening intervention, after new cracking of the 'repaired' beam. Damage was introduced in a controlled way by means of three-point static bending tests. The transverse point loads were applied at several different sections along the beam axis. Before and after each static test, the dynamical response of the beam was measured under sine-sweep and impact tests by an extensive set of accelerometers deployed along the beam axis. The availability of both static and dynamic tests allows to investigate and compare their effectiveness to detect damages in the tensioned beam and to reliably identify the evolution of damage.

The paper discusses the tests program and some results relevant to the dynamic characterization of the beam in the different phases.