

Seismic category C1 and C2 tests on channel bolts installed in anchor channels

Channel bolts installed in anchor channels are a common fastening system for attaching highly loaded base plates of non-structural and structural components to the reinforced concrete structure. The reliability and sustainability makes this type of concrete fastener also popular for seismic designs. For concrete fasteners, two seismic categories, C1 and C2, are available for seismic qualification. While the seismic category C1 is well established for anchor channels for more than a decade, seismic category C2 only recently gained attention for anchor channels.

An advanced anchor channel type was tested according to both seismic categories to study each load-displacement behaviour. The advanced channel type combines hot forged anchors with extra-large heads and hot rolled channels. Hot formed steel promotes a ductile load carrying behaviour which is favourable particularly for seismic applications. Extra-large heads limit the displacements under cyclic loading and cyclically opening and closing concrete cracks to be anticipated during earthquakes.

Following the introduction of anchor channels in the context of seismic loading, some background information particularly with regard to seismic design and qualification is provided. Two test series carried out according to seismic category C1 and C2 are presented. Both test series demonstrated the robustness of the system for seismic applications which is founded in the mechanical interlock between bolt and channel as well as between the anchor and concrete.