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LIQUEFACT PROJECT

Recent events have demonstrated that Earthquake Induced Liquefaction Disasters (EILDs) are responsible for tremendous structural damages and fatalities, causing in some cases half of the economic loss caused by earthquakes. With the causes of liquefaction being substantially acknowledged, it is important to recognize the factors that contribute to its occurrence, to estimate hazards, and to practically implement the most appropriate mitigation strategy considering the susceptibility of the site to liquefaction, including the type and size of the structure. The LIQUEFACT project, funded by the EU within the H2020 – DRS 2015 call (Research Innovation Action), addresses the mitigation of risks to EILD events in European communities through a holistic approach. The project deals not only with the resistance of structures to EILD events, but also with the resilience of the collective urban community in relation to their quick recovery from an occurrence. The LIQUEFACT project sets out to achieve a more comprehensive understanding of EILDs, the applications of the mitigation techniques, and the development of more appropriate techniques tailored to each specific scenario, for both European and worldwide situations.

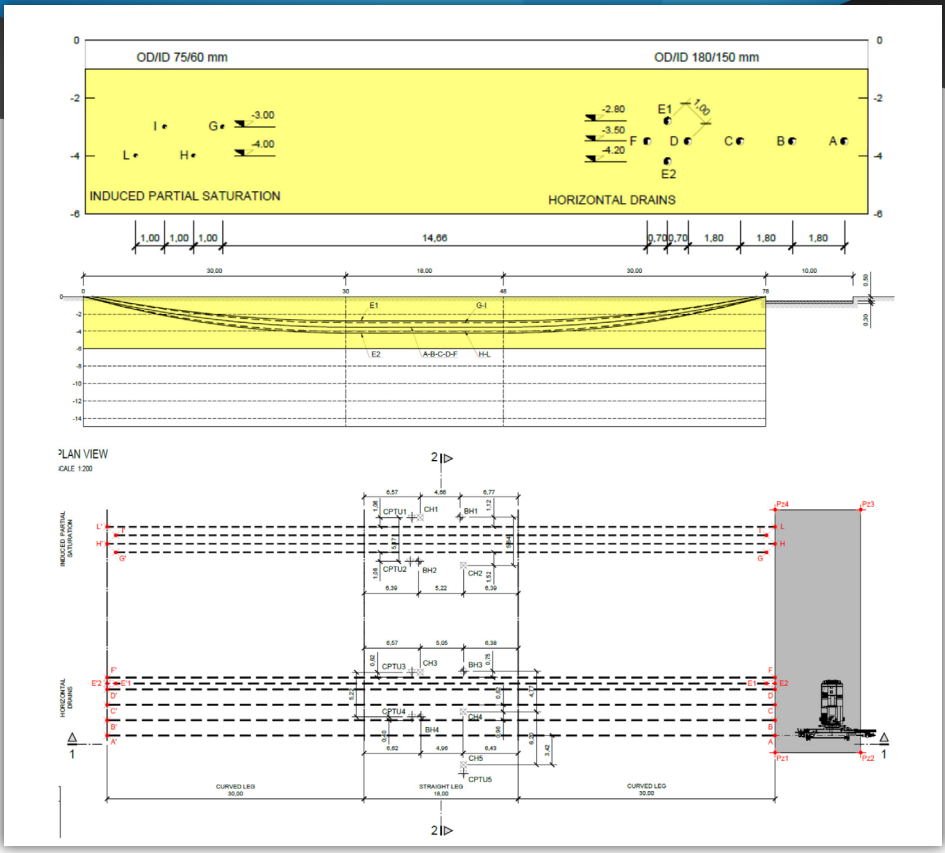
Field trial at the selected case study pilot testing site in Pieve di Cento (Italy)

One of the most important challenge of LIQUEFACT project is to achieve full-scale field trials in order to assess the effectiveness of the considered ground improvement technologies: Induced partial Saturation (IPS) and Horizontal Drains (HD).

The pilot testing site is located in the northern border of Pieve di Cento municipality, in the metropolitan city of Bologna (Italy), close to a bend of Reno river. The area is marked by a young and shallow sand deposit which was strongly affected by liquefaction phenomena during the **2012 earthquakes in Emilia-Romagna region.**

At first, a massive geotechnical characterization was carried out with innovative Gel Push Sampler (GP-s), Cross-Hole sections, Tomography sections and electrical ERT sections with measurement of resistivity and chargeability.

Afterwards, the geometrical layout of draining pipes, varied in diameter and spacing, was defined through an innovative design approach. TREVI Horizontal Directional Drilling (THDD) was the applied drilling technique for drilling



according to the “U” shaped path, then each hole was reamed withdrawing the drilling rods, and finally replaced in place by the final piping. The installation sequence was properly studied in order to maintain relatively “virgin” ground conditions on site.

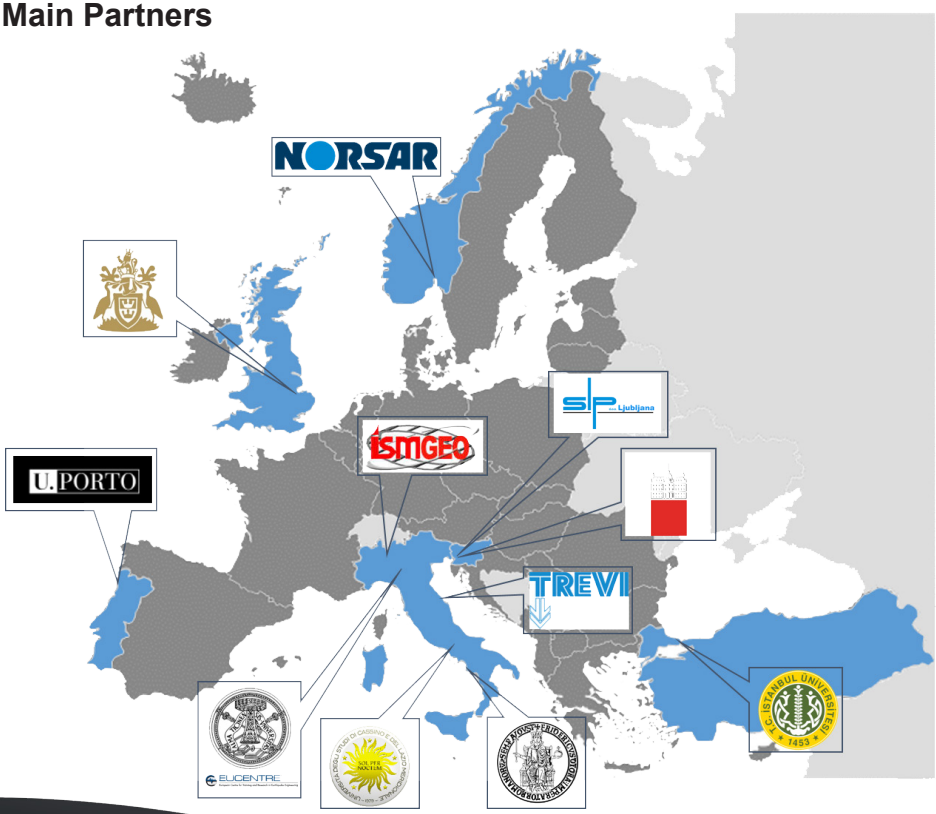
An innovative high-density polyethene (HDPE) well screen, designed to minimize flow resistance by offering greater porosity compared to conventional well screens, have been installed. This technology provides up to 40% higher porosity uniformly distributed along the well.

Shaking tests with Mega-Shaker will be performed in three (3) main areas: one on the virgin ground, one in the area treated with HD, the last one in the area treated with IPS.

Till October 2019 the LIQUEFACT project partners will continue to work collaboratively to address; liquefaction hazard mapping, structural resilience and vulnerability assessment methodologies, comparative mitigation measures, community resilience and planning, the creation of liquefaction mitigation planning software, regional case study validation approaches and the development Eurocode recommendations.

Supporting improved research, development and innovation on EILDs worldwide

Main Partners



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