FEATURE OF TECHNICAL SERVICE

Subject	Final design of the new Scafa bridge and the road network of the territory between Rome and Fiumicino.
Carried out by	SGAI srl di E. Forlani & C. (ATI 60%)
Client	ITALIANA COSTRUZIONI S.p.a. – Metropolitan Municipality of Rome
Service length	2017 - 2020
Value of works	€ 32'000'000,00
Category values	S.06€23'117'115,17S.05€5'109'328,00V.03€3'372'332,00D.02€1'058'998,00

Local seismic response analysis and structural design

The study of the local seismic response was conducted by elaborating a specific numerical model of the subsoil stratigraphy (carefully calibrated through the results obtained from the investigations) which made it possible to evaluate the seismic action at the foundation level. In this way the propagation and alteration of the seismic motion was evaluated starting from the compact rocky substrate, based on the dynamic characteristics of the soils involved. Based on the analysis of the results of the investigations and the local seismic response modeling, interventions were proposed to improve the characteristics of the soil up to a depth of 15m, in order to avoid the mobilization of gas pockets found at a depth of 23 ÷ 25m. The chosen intervention consists in the creation of Stone Columns (vibro replacement - stone column). This technique involves driving a tip into the ground by vibration and, subsequently, penetrates into the surrounding ground and granular material until is highly densified. Therefore, a new design solution was proposed for the bridge foundations, which involves the construction of a rectangular mesh of 2.1x2.1m stonecolumns with a diameter of 80cm and a length of 15m. In addition, a double ring of Jet-Grouting columns with a diameter of 1m and length of 37m is envisaged on the foundation wells of the central arch, made with CFA piles.

SCAFA BRIDGE ON TIBER RIVER – Geological and environmental survey and characterization

The work consists of the final design of the new Scafa bridge and the road network of the territory between Rome and Fiumicino. As part of the aforementioned route, the construction of a bridge over the Tiber river is planned with a lowered arch structure with an upper path with a total span of 285m, of which 175 m consisting of the central arch and 55m for each lateral half arch. Geognostic and Environmental campaigns were carried out for the characterization of the site. The presence of cohesive, compressible and low strength materials emerged from the research and study of historical and integrative surveys carried out. At various points in the succession, peaty organic intercalations were highlighted, with local presence of clay levels, even more compressible and with poor geotechnical properties. Especially in the Fiumicino side area, localized and widespread superficial manifestations of endogenous gas emissions have been reported. In order to support the study of design solutions and at the same time reconstruct the complex geological-geotechnical and seismic framework of the area, it was necessary to carry out an accurate supplementary informative campaign during which the localized phenomena of rising dangerous endogenous gases were investigated and RSL study (Local Seismic Response) were prepared. The supplementary survey campaign included continuous core drilling, SPT tests, static penetrometric tests, Lefranc tests. A geophysical (and laboratory) investigation was carried out based on seismic refraction with tomographic response on P and S waves. In addition have been performed: MASW-type seismic tests, DOWNHOLE seismic tests (Vp - Vs), HVSR passive seismic tests, dynamic type tests, such as cyclic triaxial and resonant columns, traditional deep reflection seismic.









Static low-chain scheme





27-Apr-18 9 S.G.A.I. s.r.I. di E. Forlani & C.

PLAXIS PONTE SCAFA - TUBO

