FEATURE OF TECHNICAL SERVICE

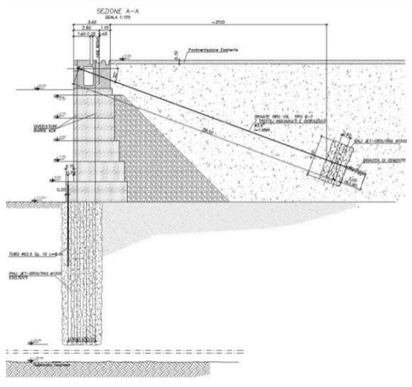
Subject	Executive design for the consolidation of the Levante quay for deepening the seabed - Ponte San Giorgio.	
Carried out by	SGAI Srl di E. Forlani & C.	
Client	INJECTOSOND for PORTS of GENOA	
Service length	2021	
Value of works	€ 9’409’000,00	
Categories value	V.02	€ 1’675’337,89
	S.05	€ 7’733,662,11

PONTE SAN GIORGIO QUAY - Design issues and their resolution

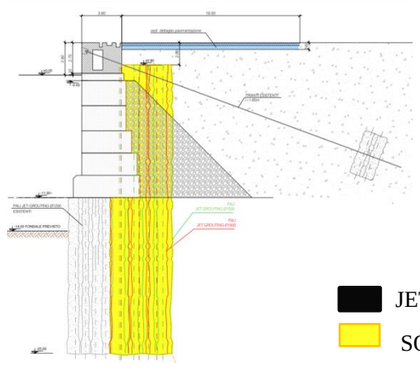
The Ponte San Giorgio quay is located at the eastern front of the port of Genoa and has a length of 300 m. This project includes the consolidation works necessary to make the quay stable compatibly with the lowering of the seabed from a depth of 11 to 14 m. The quay wall is currently made up of a stack of modestly sized boulders and already in the 90s a columnar treatment of jet grouting was carried out at the base of the foundation boulder and tie rods with steel strands were installed. The project in question involves the consolidation of the embankment at the side of the existing quay through columnar treatments with jet grouting. This solution will make it possible to reduce the horizontal thrust of the embankment close to the existing wall, making the rear part similar to a rock mass capable of resisting the thrust of the ground behind it. The analyzes were carried out with the Plaxis 2D finite element calculation program capable of simulating complex geotechnical problems according to various constitutive models relating to soils and rocks. The analysis consists first of all in a global rebalancing of the system in order to reconstruct the initial stress state and subsequently in the calculation of the deformation behavior of the model as a function of its geometric, physical and mechanical peculiarities. The calculation was carried out by retracing the various stages of execution of the work and determining the state of deformation and stress of the structure in each stage of execution, together with its degree of overall stability.
Upon completion of the intervention, the quay pavement will be rebuilt for a width of approximately 16.00 m.

Study area

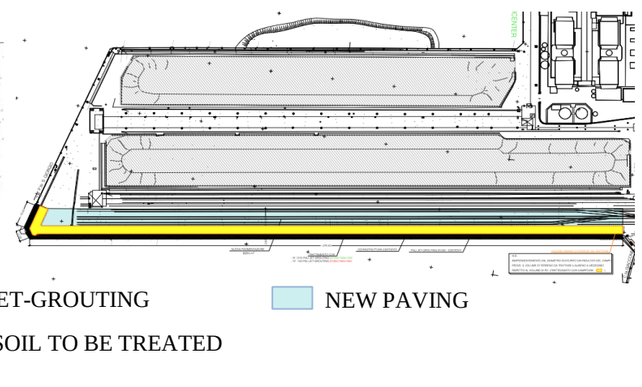
Current quay



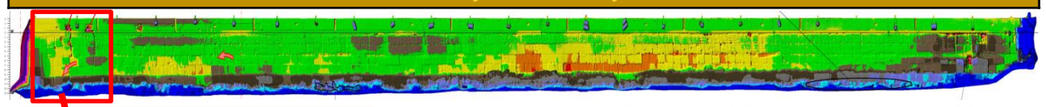
Design quay

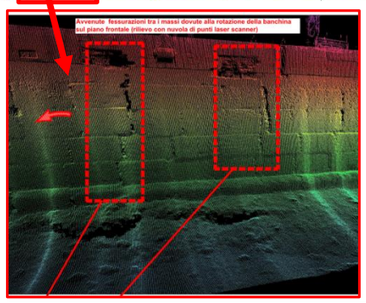


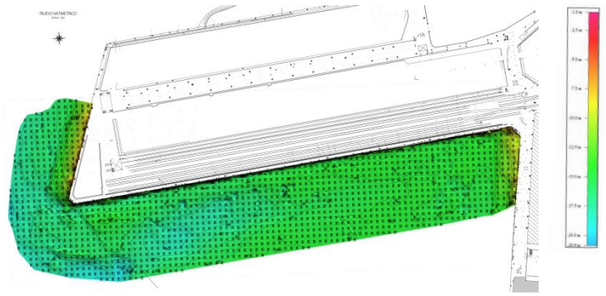
General plan



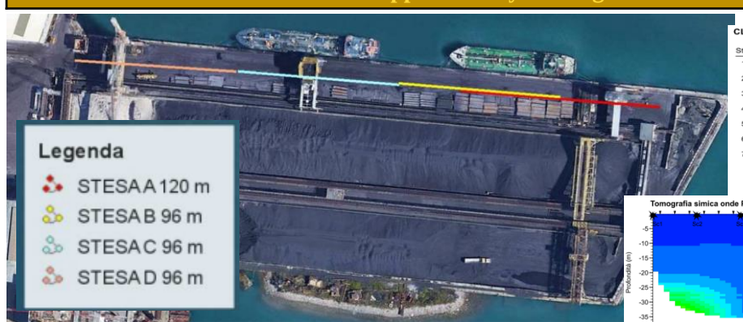
Bathymetric survey





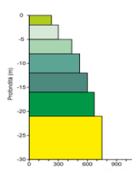


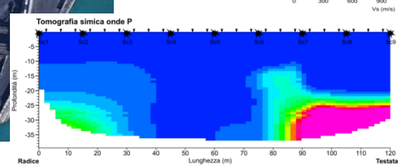
Supplementary investigations



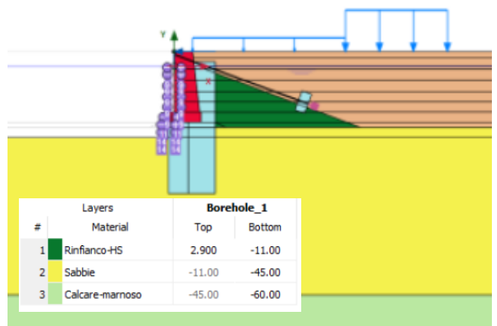
CLASSIFICAZIONE SISMICA

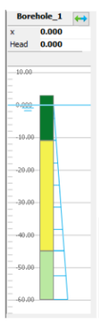
Strato	Profondità (m) da	a	Vs (m/s)
1	0.0	-2.0	230
2	-2.0	-5.0	300
3	-5.0	-8.0	440
4	-8.0	-12.0	520
5	-12.0	-16.0	600
6	-16.0	-21.0	670
7	-21.0	-30.0	750

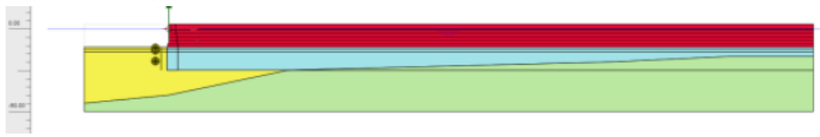


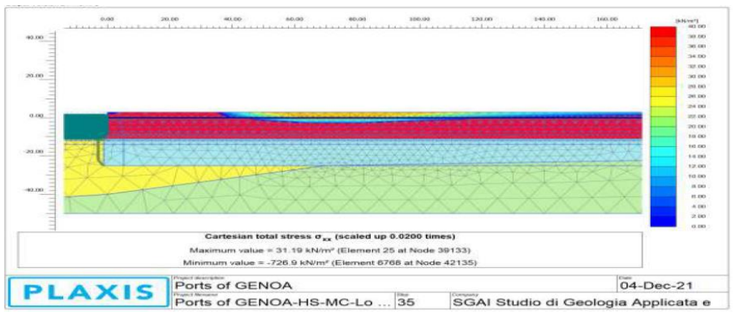


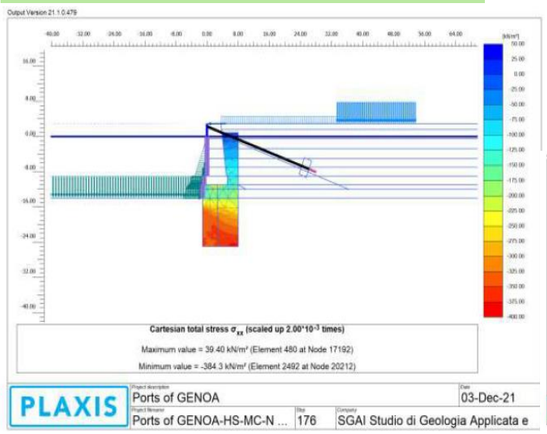
Calculation model

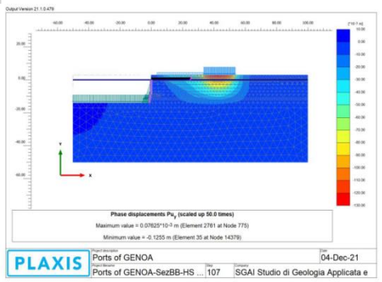


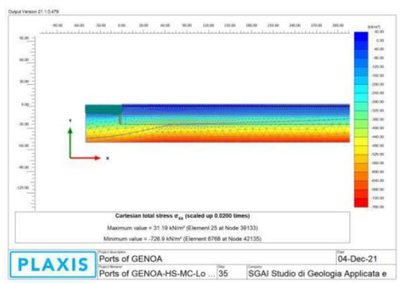












GEOTECHNIC AND SPECIAL FOUNDATIONS