TOOLS

SIP&T

Geovertical style

SIP&T rotary drilling tools are engaged in Calabria for the bored piles of the Straface Viaduct

by Pietro Gabrielli

The current state road 106 Jonica has some infrastructural limitations. The work in progress aim to equip this artery with modern and safety works. Geovertical is protagonist in the construction of the bored piles and because of the difficult soil stratigraphy it has involved SIP&T for the supply of equipment capable to complete the work in the right way and on time. Bored piles have been installed using two hydraulic drilling machines: Comacchio CH650 and Bauer BG36 Premium Line with respectively max

torque of 262/365 kNm, max drilling speed of 40/52 rpm, main winch pull of 250/376 kN, weight in working conditions of about 71/148 Ton. Geovertical has drilled piles arming and cementing them with steel cages. The activity involved the use of rotating tools all made by SIP&T. To guarantee the highest quality, Geovertical uses many verification methods including integrity test on the pile length, bidirectional load test on the bored pile and digital recording of the execution parameters. CH650 and BG36 used by Geovertical are equipped with instruments that monitor all piling aspects such as depth, correct rotary tools rotation, penetration and extraction speed.

Works and Geotechnical Framework

The Straface viaduct extends for a total length of 632 m. Project includes large bored piles Ø 1200 and 1500 mm up to a depth between 42 and 50 m. The soil stratigraphy is composed of terraced marine deposits, consisting of layers of gravel in a sandy matrix alternating with layers of silt-clayey sands. Surface deposits consist of current and recent stabilized alluvial deposits. Difficult stratigraphy, sometime very hard with presence of boulders with a grain size greater than 0.7 m. All this made some spots on the ground very difficult to penetrate.

The Importance of SIP&T Tools

Experts opinion is that SIP&T tools were crucial for the piles construction. Buckets and core barrels were supplied in the top of the range version with the equipment made by the industry leading company-Betek (Germany). The tool design is the evolution of years of experience in different construction sites in which the different performances have been collected and analyzed. The geometry of the cutting edges is optimized to achieve excellent drilling performance, tool length has been specifically designed to obtain the best loading/unloading characteristics of the material, suitability is thought for high torque. The optimized cutting geometry allows high drilling speeds

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with excellent breakout characteristics, blades inclination on which the Betek equipments are installed, increases or decreases according to the soil nature. Maintenance is reduced and simple: the wear plates are in hardox HB600 (or similar) easily replaceable and are highly resistant to wear, while the special angle allows the Betek chisels to sharpen as they turn, reducing significantly their replacement which is still extremely easy and fast. These tools have a high operational reliability: quality and design that came from 25 years of experience in the design and manufacture of rotary drilling tools. Casing are designed to be a solid structure in high quality welded steel; the joints are made of alloy steel with high wear resistance. Two different lines of casings are available: standard and reinforced. The second type (is the case of Geovertical), uses a special alloy steel that gives the joints a high mechanical yield value. The connection between the male and female joint is secured by means of conical bolts, threaded and conical rings manufactured by the German company Betek. Moreover,

all the connections are water sealed by o-rings. The different types of cutting teeth applied to the casing shoes are also produced by Betek and chosen according to the soil stratigraphy they work with. In any case, it is possible to customize design and type of equipment in accordance with the client need. Tremie pipes are used once the reinforcement cage has been installed to proceed with the casting of the concrete. The use of these pipes is necessary to prevent the concrete casting from breaking or in any case present discontinuities, and in particular to avoid contamination of the concrete when water and mud are used in drilling. Tremie pipes are made of drawn sheet metal in order to obtain strong and light elements. Those supplied to Geovertical were of two diameters: 254/219 and 310/273 mm. Tremie pipes model is with "wire cable", in order to speed up the assembly/disassembly of the elements during the casting phase. Two o-rings guarantee the sealing against water infiltrations. Due to the involvement of people during the casting phase, SIP&T draws its equipment with particular attention to safety. Non-slip surfaces, forced closures in the personnel maneuvering area and container lifting systems are some examples that make the equipment safe against accidents. This is a very important topic to SIP&T which also in the production of other items represents a reference for safety on site. The desired result is a high production despite a demanding stratigraphy. Geovertical has installed up to 4 piles per day with a diameter of 1200 mm and 3 with a diameter of 1500 mm at different depths up to 50 meters. The drilling phase for a single pile lasted about an hour and a half, while the pile completion phase with the laying of the metal cage and concrete with consequent extraction of the casings lasted about an hour. Excellent productivity and smart planning are leading to completion of the project on schedule. For these reasons, the management of Geovertical greatly appreciates the collaboration with SIP&T because it allows them to respect the project Gantt, the budget and the client satisfaction. ■

Project includes large bored piles Ø 1200 and 1500 mm up to a depth between 42 and 50 m

ITALIAN ABSTRACT

STILE GEOVERTICAL

Utensili SIP&T sono impegnati in Calabria per la realizzazione del Viadotto Straface, dove Geovertical è protagonista nella produzione di pali trivellati con perforatrici idrauliche Comacchio CH650 e Bauer BG36 Premium Line. Il progetto prevede pali Ø 1.200 e 1.500 mm fino a una profondità compresa tra 42 e 50 m. La stratigrafia del suolo è difficile talvolta molto dura con presenza di massi con granulometria superiore a 0,7 m. L'opinione degli esperti è che gli strumenti SIP&T sono stati cruciali per la realizzazione dei pali. Bucket, carotieri, tubi rivestimento e tubi getto sono stati forniti nella versione top di gamma con equipaggiamento realizzato dalla tedesca Betek. Un'eccellente produttività e una pianificazione intelligente stanno portando al completamento del progetto nei tempi previsti. Per questi motivi Geovertical apprezza molto la collaborazione con SIP&T, poiché le consente di rispettare il progetto Gantt, il budget e la soddisfazione del cliente.