Casings that make the difference

SIP&T casings at work in Switzerland for a large infrastructural project based on the execution of inclined boreholes diameter 700 mm – 15/24 m depth

The project in Horw is the foundation work for the construction of four big buildings that will mainly include apartments and it is expected to be completed in august 2020. A collection of unique residences individually designed to meet the needs of each resident embracing the best in Vier- waldstättersee architecture, art and culture. Project is based on design-build method, which applies two contemporary working phases and give the best control of time and budget. Once the soil geological report was analyzed and the loads involved were noted, the project choices were aimed at cased bored pile foundations being used, which is an element in common in most works. More than three hundred cased bored piles inclined of 8 degrees must be made with a diameter of 700 mm at an average depth of 20 m. Piles have very large reinforcing: iron H-beam HEB34 associated with steel cage diameter 30 mm. The contractor is producing the piles using last generation Europe- an rigs with high torque values up to 240 kNm. It should be noted how the stratigraphy of the subsoil of the works in question consists of various layers of metamorphic rock, some of them very hard and who see average compressive strength ranges between 20 and over 90 MPa. In addition, at 10 meters deep aquifers are found.

Gebr. Brun AG has been active in the construction industry since 1900. With the locations in Emmen and Erstfeld, the company is firmly anchored in Central Switzerland. They are active in the fields of building construction.
The core business is in building construction repairs, conversions and renovations, in civil engineering concrete construction and in special civil engineering drilling and ramming. The firm has many years of experience in all areas of foundation engineering. By using the most advanced technology, they guarantee individual and economical solutions for a wide variety of drilling conditions and construction methods.

Gebr. Brun has around 170 motivated, well-trained employees. With their own locksmith's shop, the efficient workshop and their modern and environmentally friendly vehicle and machine park, the group fulfills the highest demands of their customers.
In Horw, the utilization of casey drilling method application is obtained by driving a steel siding into the ground in order to protect the whole drilling operation; basically the rotary drilling tool during the working process, performs inside a mechanical protection made by the casing fixed into the ground.

At the end of the working process (including the steel cage and concrete) this protection is recovered to be used for another borehole. Casing pipe allows to work in any type of geological formation, especially with material not much solid and compact. Moreover this application allows to work without stabilization muds. There are many advantages such as the absence of a preparation and pumping plant for the muds or the lack of a separation and/or purification fluids process filled of suspension material. A further considerable advantage is re- lated to the absence of drilled materi- al pollution from the stabilization muds and it allows to dispose debris without finding a landfill. On the other hand, a disadvantage to take into account is due to the relevant casings column weight and as consequence the whole drilling and lifting up operations could be very challenging. The cased drilling process is long if compared to a drilling muds system.

Iwan Heinzer, Foundation Department Manager Gebr. Brun

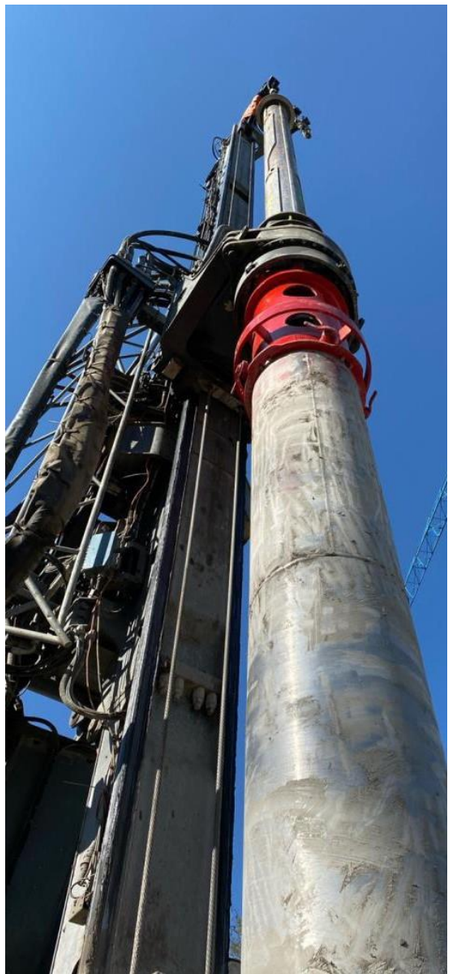
"Honestly speaking, at the beginning I was skeptical to go with SIP&T, mainly because my experience has been made using German products. Today, after using their casings and rotary tools I have to admit my satisfaction. SIP&T products are well designed, durable and are providing high performance especially in rock conditions. They use Betek equipment and it is a certain guarantee for me. Definitively, SIP&T is a reliable company, attentive, responding promptly to our specific requirements and we are considering them for all our new projects".

Due to its own weight the casings column can be deformed by the ground pressure if there are high depth and large diameter: this is the reason why a correct pipe thickness and joint dimension are strictly necessary along a casing clamp to hold sections during assemble and disassemble. In presence of relevant depth and diameter, the drilling rig torque could be not enough to drive or lift up the casings string, in that case a casing oscillator is required to work independently. In general, double-wall casings are used for stabilizing boreholes and avoiding po- tential damages on pile lateral surfaces. The main trouble is that the casing string blocks into the hole due to the excessive friction with the ground during the con- crete pumping or steel cage setting– up. Efficient rig operators could surely avoid these issues by proceeding in a slow and steady rhythm. The reinforcing cage is self-supporting and assembled by four joints before being installed. In addition, each steel cage is made by a metal plate support at the base of each pile in order to improve the quality of the concrete pumping phase. Being always a prominent represent- ative in the field of large diameter vertical drilling tool production

Christian Steinmann, Sales Manager Steintech

"We really like our experience with SIP&T being their distributor in Switzerland. They have precious knowhow in the construction of high quality Kelly bars and rotary tools. All of our clients have well noted the excellent ratio quality/price along short delivery time. Slowly, we are changing the Swiss mind set stronger focalized on German market. Best proof of our mutual benefit is, without doubt, the positive feedback we receive from different job sites. Clients have successful tested the items and I'm sure that in the near future we will increase our presence into local market".

SIP&T continues to stand out as a leading company, able to manufacture innovative Kelly bars compatible with most of worldwide drilling rig brands along all necessary rotary drilling tools to get the job done. When competition on the market gets increasingly fierce, innovating and renovating are funda- mental key words for manufacturer. To achieve these goals, however, is not easy and it presumes, availability to invest in research and development and, secondly, being able to count on consolidated skills and knowhow, are equally indispensable requirements. Every new addition on the market is, therefore, the result of a wise mix of these ingredients, whose outcomes depend largely – especially in a sec- tor as complex as foundations - on the ability to satisfy the needs of the final user, the best judge of a product's worth.



SIP&T casings are designed as solid welding construction out of high quality steel; casing joints are made out of alloy steel having high strength and resistance against wear. According to the rotary torque, we have avail- able two different casing line: standard and heavy duty, the second one uses a special steel that gives to the joints a very high value of yield point. Connection between joints is ensured by Betek conical bolts, threaded and conical rings. More than that all connections are water fight using O-ring seats. All different equipment used on the casing shoe is manufactured by Betek and it is customized according to the soil investigation and Client needs. Custom-built design is available on request. Together with casings Brun has purchased the casing drive adaptor and some rotary tools. Here is the biggest difference between the Italian company and all other suppliers. SIP&T can offer the casing drive adaptor both manual and automatic version. The Automatic Casing Drive Adaptor (Auto CDA) represents an interesting locking system for casings that can be used on all piling rigs and can increase the safety and productivity in the execution of cased piles, by avoiding any damages and time loosing caused by the manual locking phase.

It is an automatic casing connector system, its maximum advantage is the ability to increase both safety and productivity in foundation works, eliminating both the related dangers and the huge amount of time necessary for the for the jointing of the casing pipe that until now was often performed manually. This connection system represents an innovation in the cased piling construction and for this reason, it has been patented. It is widely used in job sites all over the world, its feedback is extremely positive and we can state that nowadays it is recognize as a must-have tool. To complete the picture, SIP&T provides hydraulic retaining clamp to guarantee a safe grip of the casing column while retracting the casing with the drilling rig. The safety clamps guarantee a safe hold of the drill pipes during pipe retraction. In addition, SIP&T has supplied some rotary tools, in detail rock buckets and progressive rock augers. The choice to supply these tools came from the fact that they are able to drill soil strata having a rock compressive strength in the range of 12.5/100 MPa. Thanks to SIP&T special design, Betek equipment within many others technical details, the penetration rate has resulted extremely good especially compared with the feedback of same tools bought from other suppliers. Main reported benefits have been less fuel consumption, a much more stable rig behavior, with less vibration during drilling operations and in general, less wearing increase in productivity, reputation on job site and return on investment.