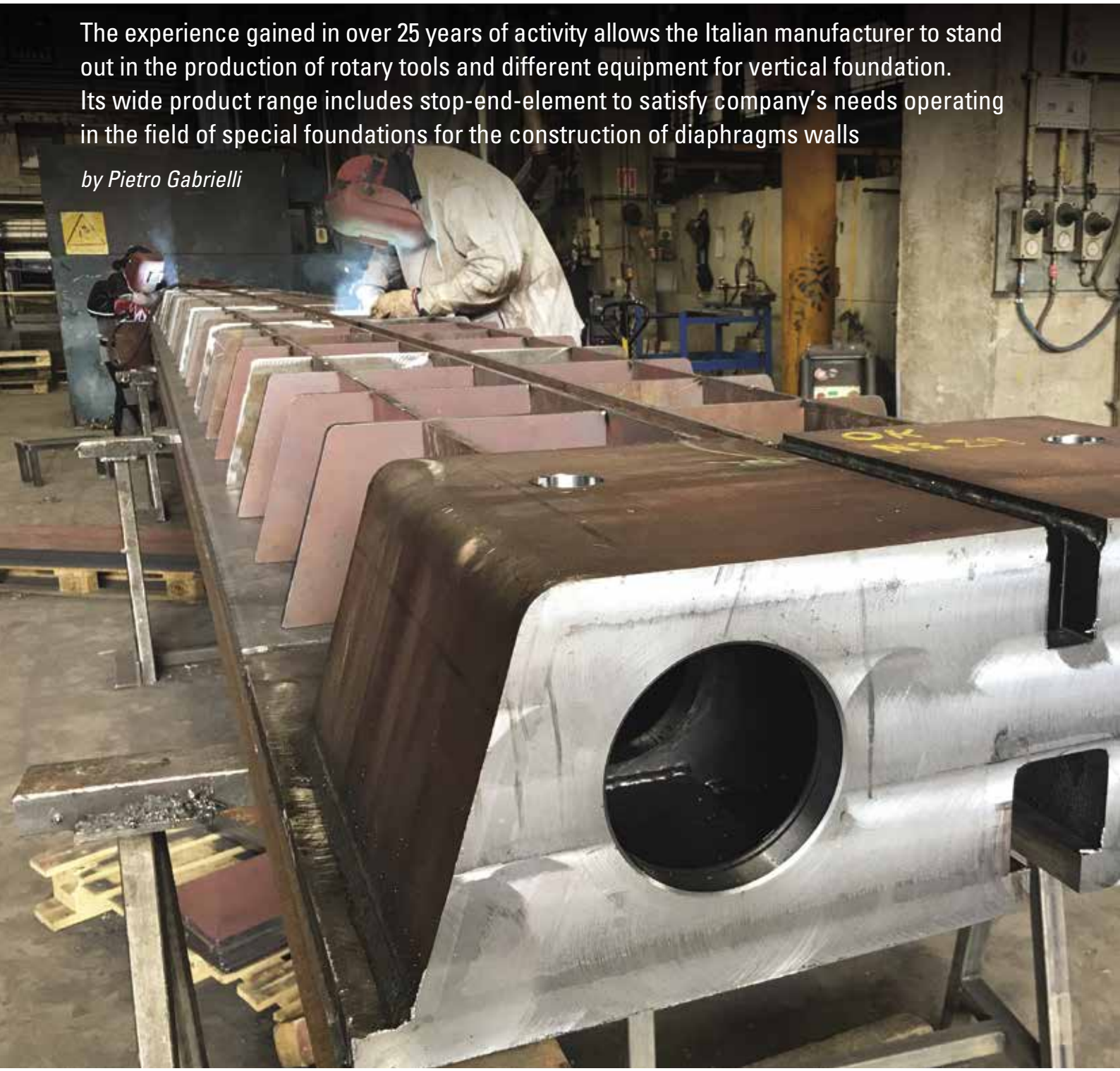
SIP&T

“We support diaphragm walls”

The experience gained in over 25 years of activity allows the Italian manufacturer to stand out in the production of rotary tools and different equipment for vertical foundation. Its wide product range includes stop-end-element to satisfy company’s needs operating in the field of special foundations for the construction of diaphragms walls

by Pietro Gabrielli



Diaphragm walls are concrete or reinforced concrete walls constructed in slurry-supported, open trenches below existing ground. Concrete is placed using the tremie installation method or by installing precast concrete panels (known as a precast diaphragm wall). They can be constructed to depths of 100 meters and to widths of 0.40 to 1.50 meters.

Diaphragm wall construction methods are relatively quiet and cause little or no vibration. Therefore, they are especially suitable for civil engineering projects in densely populated inner city areas.

Due to their ability to keep deformation low and provide low water permeability, diaphragm walls are also used to retain excavation pits in the direct vicinity of existing structures. If there is a deep excavation pit at the edge of an existing structure and groundwater is present, diaphragm walls are often used as the most technically and economically favorable option. They can be used for temporary supporter as load-bearing elements of the final building, they can be combined with any anchor and bracing system. Diaphragm wall panels are also used in deep, load-bearing soil layers as foundation elements to carry concentrated structural load in the same way as large drilled piles do. These foundation elements are known as "Barrettes". If diaphragm are socketed into impermeable soil layers of sufficient thickness or if they are combined with seal slabs (grout injection or tremie concrete slabs) almost waterproof excavation pits are created. After reducing the initial groundwater level within the excavation, only small amounts of residual water will penetrate.

Stop-End-Element Main Features

During production of cast in situ concrete diaphragm walls, the most important factor, especially to achieve a watertight joint, will be the use of the right stop end elements. They contain the concrete on the lateral side meanwhile they create a particular casting profile that offers a high seal against water infiltration. Stop End Elements are coupled together through special steel shafts even better special "o-ring" ensure a perfect seal between the areas of the diaphragm. They are made of sheet metal welded and its special profile is achieved by a process of press bending and finally an internal reinforcing structure increases its strength and avoids the risk of deformation. The excavation of a follow-up panel is carried out by clamshell grab, with the help of a special flat chisel if needed, both guided by the channel in the pipe. While digging, these tools clean the exposed side of the pipe. The trapezoidal design of the Stop End Elements, and its constructive characteristics, allows a spontaneous

Element in Length 12000 mm and width 1000 mm

Trapezoidal shape with rubber seal (water stop) groove and clamshell grab guide channel

Elements are coupled together through special steel shafts

lateral movement after the excavation, making a delayed extraction very easy. The continuity of two following panels is guaranteed even in the presence of small vertical deviations, because the excavation is guided along the stop-end element. With this method as opposed to other working system, there is no urgency to remove the stop end element. It can be left in place for days or even weeks before extraction. A water stop can be added to the stop-end element to improve water tightness between joints. For this purpose, a special rubber seal will be mounted on the side of Stop End Element which will come into contact with the concrete. The lateral movement of the stop-end element during extraction leaves the water-stop fixed in the concrete. SIP&T can supply Stop End Elements in various widths, lengths and profiles. They are easily jointed each other through special steel connection pin. The Stop End Elements are composed with a head element that is used for their lifting and extraction, intermediate elements and element shoe (Starter). In addition, to facilitate the use of Stop End Elements, SIP & T manufactures a chisel cleaner kit (dedicated to the cleaning of the channel guide) and a Platform Suspension Jig/Clamping Devices (dedicated to the support of Stop End Element during installation).

ITALIAN ABSTRACT

SOSTENIAMO LE PARETI DEI DIAFRAMMI

L'esperienza maturata in oltre 25 anni di attività permette a SIP&T di distinguersi nella produzione di utensili per perforatrici di grosso diametro e di attrezzature per le fondazioni verticali. La sua gamma prodotti comprende soluzioni per soddisfare le esigenze delle aziende operanti nel settore delle fondazioni speciali per la realizzazione diaframmi, pareti in cemento armato costruite in trincee aperte e sostenute da liquame o da elementi meccanici noti come tubi spalla sotto il terreno esistente. Il calcestruzzo viene posato utilizzando il metodo di installazione tubi getto o installando pannelli prefabbricati in calcestruzzo (noti come diaframmi prefabbricati). I diaframmi possono essere costruiti a una profondità di 100 m e a larghezze da 0,4 a 1,5 m e sono adatti per progetti di ingegneria civile in aree urbane densamente popolate. Durante la produzione di diaframmi in calcestruzzo gettato in opera il fattore più importante, soprattutto per ottenere un giunto a tenuta stagna, è l'uso di adeguati tubi spalla che contengono il calcestruzzo sul lato laterale e offrono un'elevata tenuta alle infiltrazioni d'acqua. SIP&T è in grado di fornire tubi spalla in varie larghezze, lunghezze e profili, composti da un elemento di testa che serve per il loro sollevamento ed estrazione, elementi intermedi ed elemento finale chiamato "scarpa". Per facilitare l'utilizzo dei tubi spalla, SIP&T realizza poi un kit pulisci/scalpello (dedicato alla pulizia della guida del canale) e un dispositivo di bloccaggio dedicato al supporto del tubo spalla durante l'installazione. Non appena il calcestruzzo inizia a fare presa, gli estrattori idraulici progettati e prodotti da SIP&T estraggono i vari elementi. Gli estrattori possono essere usati per estrarre elementi larghi da 400 a 1.500 mm e lunghi fino a comporre una colonna di 100 m. Gli estrattori SIP&T sono azionati da una centralina indipendente composta da un telaio di base e pistoni idraulici. Come dotazione opzionale è disponibile anche un sistema a controllo remoto per il funzionamento dell'unità.

Platform suspension Jig/clamping devices

Hydraulic Extractor and Power Pack

As soon as the concrete begins to set, hydraulic extractors pull out the stop end elements. They have been designed for the extraction of diaphragm wall stop-end-element having a width from 400 to 1500 mm and length up to 100 meters. SIP&T unit is operated by an independent power pack and it is composed of heavy-duty base frame with two trapezoid sliding columns maneuvered by four hydraulic rams. The system is complete with locking system pins to ensure the stop end element to the sliding frames and to prevent dropping of the column. A remote control panel to operate the unit is also available as an optional supply. ■