



colophon

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ON COVERSoilmec SR-100 CAP at work in Copenhagen for the Cityringen Metro Project

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Simone Trevisani, Managing Director.

Soilmec... solution provider

Soilmec was established in Cesena, in the Romagna region — the Engineering Heart of Italy. And this is not a coincidence! There is nothing random about the fact that Soilmec was founded in the Italian region that brings together the great names of Italian engineering. From Ferrari to Maserati, from Lamborghini to Bonfiglioli Trasmital, from Ferretti to Ducati, just to name a few; we are talking about companies that, besides leaving an indelible mark on the international market, share the same land, but also the same culture: an attitude towards continuous innovation in order to find new solutions for the customer. A gene that belongs to the DNA of this part of Italy which has

always been a reference point in the metal industry.

Soilmec works within this entrepreneurial tradition and it stepped forward to act as a Solution Provider in the field of technologies for special foundations. In other words, it means that in any action, operation and project that Soilmec carries out, the sole purpose is the satisfaction of customer's needs. Even the hidden ones. It 'an important commitment that requires significant investments. One of the very last examples is the development of new cutters capable of digging first up to 150 meters and then up to 250 m - we gave an extensive report in the previous issue of our journal about it.

We are currently getting ready to meet you all at the next Bauma 2013, where Soilmec will present lots of novelties. See you soon in Munich!

Simone Trevisani

news

New major orders for Trevi Group

The Trevi division, specialized in ground engineering services, has recently been awarded new contracts in the United States, West Africa and in Middle East.

TREVIICOS, a subsidiary of the Trevi Group in the USA, has been awarded as subcontractor a contract for special foundations works at a strategically important location of the U.S. Army Corps of Engineers in the State of **Nebraska**. Works will include ground consolidation & safety, installation of tie-rods for the construction

news

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Awarded new contracts Trevi division in the United States,

West Africa and in Middle East

of infrastructure and diaphragm walls. The equipment utilized will be that of the Soilmec division and in particular the innovative "Cougar" hydromill designed specifically for the execution of complex diaphragm walls. This new contract is one of the first carried out by TREVIICOS in the State of Nebraska and confirms the capability of the company to acquire technologically complex projects in new areas of the United States.

Trevi S.p.A. will perform civil works and special foundations for the construction of a bridge and the revamping of certain infrastructure in **West Africa**. The contract, in particular, provides for the execution of bored piles onshore and offshore to a depth of 70 meters and will involve the use of innovative equipment for special foundations produced by the Soilmec division.

In **the Middle East Trevi S.p.A.** has been awarded several contracts for infrastructural works relative to ground consolidation for a new railway line, refurbishment of a pier and construction of several viaducts.

The CEO of Trevi Group **Stefano Trevisani** stated: "The recent contracts awarded in the United States, which represents one of our key markets, confirm the appreciation of historical clients with respect to the Group and its ability to execute projects at the state of the art. West Africa and the Middle East, once again, prove to be areas of significant opportunities and during the course of the year we were able to acquire several small to medium size orders. We remain focused on exploring new important scenarios which can provide added value to the Group."

Petreven start drilling operations in Brazil

Trevi Group, through the **Petreven** division, specialized in the oil drilling services, has initiated with success the drilling activities in **Brazil** on behalf of the oil company Petra Energia. The drilling activities for exploration & production will be carried out with the Drillmec series HH-220 ton (1200 HP) Full Automatic drilling rig called "Hyper 1" and will operate in the concession area of São Francisco in the state of Minas Gerais. The assembly operations, testing and rig-up have been completed in last weeks and the drilling activities have been initiated following the rigorous safety checks.

This technologically innovative rig, with high mobile capacity to quickly move from area to area, will operate on a very large concession area that extends on a total surface of 143,231 square kilometers (the largest exploration area of the country). The oil drilling activities for exploration require to reach a targeted depth of about 3,500/3,600 meters.

The CEO of Trevi Group **Cesare Trevisani** commented: "The start of the oil drilling activities signals the Group's entrance in the Brazilian Oil & Gas market. Trevi Group with this important contract can offer to the market the most advanced oil drilling

news

Petreven initiates oil drilling activities in Brazil on behalf of the oil company Petra Energia

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rigs manufactured by Drillmec and at the same time the historical know-how of the Petreven division. It is the combination of two strategically advanced divisions in their sector at the service of an end customer who demands the highest quality standards. We are pleased to be a partner of this strategic framework agreement with Petra Energia and we are confident of a successful future together".





One of the largest projects there has ever been in Europe, in a modern, ecologically friendly city, the need to deal with really hard soil in the shortest time possible. This is the challenge that **CAP/CSP technology** has taken in Copenhagen.

Copenhagen is the capital of Denmark and its most populous city, with an urban population of 1.2 million and a metropolitan population of 1.9 million; its local transportation system consist of a number of different, but combined, train systems and several types of buses. In order to streamline the traffic and facilitate the access at the various neighborhoods of the old town, the Danish parliament approved the Cityringen Metro Project on the 1 June 2007. It consists of two new lines that will form a circle route running around the city center for 15.5 km and will serve 17 stations.

The greatest difficulties of this project are linked with the job site location and the soil conditions of the Danish capital. Due to the metropolitan area the need was to eliminate vibrations and disturbance to adjacent structures and produce minimal waste material with the Copenhagen soil; one of the toughest ever faced by Trevi. The stratigraphy revealed from the top soil to 20 m deep a glacial level composed of clay, silty sand and sandy gravel with random granite boulder (500/1,000 mm size range) followed by limestone (UCS value 3-40 MPa) with a relevant flint layers (UCS > 400-600 MPa) that ranged from cm to meters thickness.

Trevi S.p.A., who were awarded the most of the foundation work, choose to build the diaphragm walls, necessary to sustain the side of 14 stations, with the Cased Secant Pile technology, developed by Soilmec from 1993. For the remaining 3 stations, due to the depth to be reached exceeded the maximum depth possible with CSP,

Hydromill technology was adopted. With the **CAP/CSP method** it is possible to execute piles in contact with existing foundations, avoiding decompression of the surrounding soil and ensuring the accurate and precise positioning of the pile. In addition, the use of protection casing secures vertical drilling, with less than 0.7% deviation. With the



CAP/CSP method, piles are augered simultaneously with the driving of the protection casing into the soil. When necessary, using the double independent rotary system, augering may be carried on below the depth of the casing. Concreting is made through the auger shaft during auger extraction. Then, the reinforcement cage is driven into the fresh concrete, after which the temporary casing is removed. To construct secant pile diaphragms, the wall continuity is secured by secant primary and secondary piles overlapping. In this case, the guiding wall will secure the alignment of the diaphragm and guide the casing from the top.

The pile data required is extremely notable: 1,000 mm diameter up to a maximum depth of 28 m, excavation dimension which made necessary the use of really heavy duty rigs, experienced personnel and the most advanced technological solution. In addition the vastness of the project, in total 95,402.45 m of secant piles across the site, and the

<u>cover story</u>







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need to perform the work in a short time frame, in order to reduce congestion in the Copenhagen traffic in a sustained manner. These conditions made it necessary to send into the Danish capital ten drilling rigs, two SR-90's and eight SR-100's.

In particular **the SR-100 CAP/CSP version is the Soilmec feather in its camp**, a 150 ton class rig powered by a Deutz TCD2015V8 Diesel engine that delivers 480 kW rated power, equipped with the Soilmec double independent rotary system that gives 284 kNm torque to the auger and up to 384 kNm torque to the casing. The SR-100 crowd system can transmit a force of 400 kN and a max extraction force in the auger of 1140 KN, allowing the machine to reach a drilling depth of 28 m and 22 m cased.

Soilmec CAP/CSP technology: Simply the best, better than all the rest.









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In the world

The history of **Soilmec in Brazil** starts in the years 90, when this country faced a good epoch in the economy. At that time Soilmec did not have a branch here, but it was represented by a local agent. The rigs sold were mainly CM-48 and similar, RT-3 and similar, R-622, SM-400. The government of the country was different and value of the local currency, the Real, was very low. Here the first customer to buy our products have been Geofix (San Paolo), Geyer (Porto Alegre), Fundesp (San Paolo), Engestrauss (San Paolo); they are still there using our rigs.



Soilmec world

Soilmec do Brasil

A young branch that looks to the future with enthusiasm

Then the country faced many years of crises, the economy was very bad and this market was stagnant. Four-five years ago Brazil started again to work well and the economy entered in a very wealth condition. The value of the Real was much higher compared to old times and inflation went back to 6-8% per year, that was very low compared to the years 90. At this time Soilmec decided to make the investment and started Soilmec do Brasil in 2009. We have also to take into consideration that in 2014 the Soccer World Cup will be organized here and in 2016 the Olimpic Games will take place in Rio de Janeiro. The company is based in San Paolo, that is by far the most important industrial city





in Brazil and South America. Important issue is the presence of a production unit where locally a drilling rig is manufactured: the model is called SR-55.

This rig is mounted on Caterpillar base and can drill both in Large Diameter Pile or Continuous Flight Auger version. This equipment is very well accepted in the market, giving better quality compared to local manufacturers, that here have a strong presence and cheap prices. To compete against them





Purchase assistant.



Commercial Department.



the idea is to import from outside Brazil critical parts only, because this country has very high entrance taxes and so the value of the final products become very expensive. The branch is also organized to **provide Technical Assistance to all over the country**: do not forget Brazil has dimensions double than Europe and taking airplanes for internal movement is quite normal. In addition, in order to give a better service to the customer, there is a good spare part store, with the most common pieces used in local rigs. Import taxes are very high, even more for spare parts, but having a good stock helps the sales.

First unit produced locally.

Soilmec world



Technical Service Manager.

In these last three years Soilmec do Brasil has sold a little bit more than 100 rigs here, in particular the following models: SR-55, SM-14, SM-5, SM-20, BH-8 and also some hydraulic cranes. The focus was to increase the penetration in the market and establish a good brand in the country. To achieve this target the company participates in yearly technical expositions, makes advertising on specialized magazines, has a



The whole staff of Soilmec do Brazil at Concret Show 2012 in San Paolo.

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Soilmec SR-55.

Soilmec world

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specific website, makes direct visits to customers, etc. In order to give more help and information to our clients, a couple of technical courses for mechanics of hydraulic rigs have been organized, together with the local Association of drillers (ABEF). These courses are based on the model used in Soilmec S.p.A. in Cesena and adapted to local rigs characteristics and Portuguese language, with a part of theory and a part of practical exercises.



Inside view of the production unit.

In order to better serve the customer and sales, Soilmec do Brasil has also a partnership with the international bank De Lage Landen, here with its local subsidiary. This helps providing interesting financial support to the Commercial Department for sales.

Soilmec do Brasil is a young branch and is formed by 22 people, mainly with technical background and there are two locations, 20 km apart: the manufacturing unit and the commercial department.

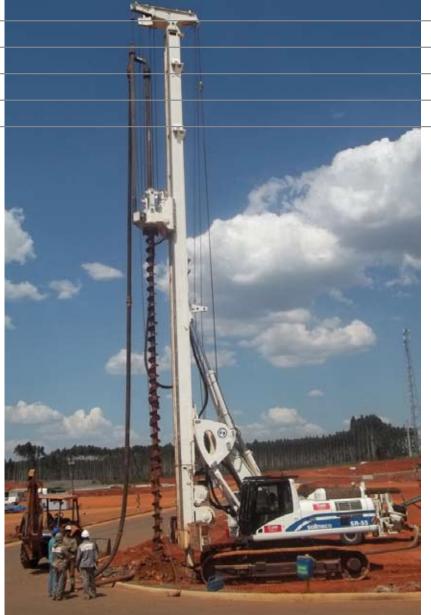
At the factory we have a Director for Production and the Manager for Technical Service. The latter manages three technicians travelling all around the country. At the commercial department there is a Financial Director and the Managing Director of the company with sales men.

Just to give some more information on this market the most used drilling technologies are vertical micropiles of diameter up to 500 mm, anchors, continuous flight auger, driven piles. In general light weight machines are preferred to heavy machines. In the future, when some more infrastructure works will come out, some more heavy rigs will be needed.

As we said **this branch is young** and still a lot of work has to be done in order to improve our organization. This gives us enthusiasm **to look forward to the future**.



SM-14 and SR-55 at work in San Paolo for a residential building project.



Soilmec world

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from the site

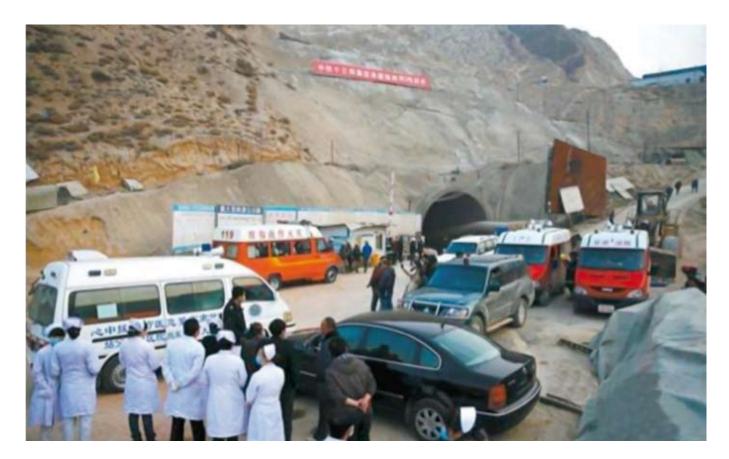
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China, Lan Yu railway, Tao shuping tunnel no.3 collapse, our company take part in the rescue

December 12th, 2012. Railway line from Lanzhou, the capital city of Gansu province, to Chongqing. At 2:50 P.M. Tao shuping tunnel no.3 collapse. At 3 P.M., Lan Yu company called our Lanyu project Dep. to take part in the rescue, Xiao Shengneng who is our project manager (also know as the deputy chief of Lanyu Railway company rescue group) arranged people and equipment to come to the scene. In 10 P.M. that night, our rescue group using Italy **Soilmec SM-14** to open up a rescue passage successfully.



SM-14 is ready to get into the tunnel to start recusing.



from the site

Great number of rescue headquarters at the scene. Soilmec heavy machine arrives the tunnel portal to rescue

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And though the rescue passage, we got in touch with the stuck workers and supplied them with air, water and nourishment, which made the 1st key step for later rescue and save the stuck workers. And this is provide the confidence and determination to the rescue staff, also get the highly compliment of the rescue headquarters at the scene.

From now on, our rescue headquarters are still working on rescuing.



The ambulances with the five workers trapped for more than two days leave the railway tunnel.



The transport infrastructure efficiency is today a business key factor. Especially in a country like Italy in which the geographical structure, like a boot, has compelled the construction of longs and narrows highway sections. **Trevi S.p.A.** has been chosen to works in the project to enlarge from two to three lanes the Adriatic highway in order to streamline the communication in one of the most congested infrastructure in Italy. In particular, inside this wide project, Trevi is involved in the execution of "Cavallo" tunnels. To satisfy the three lanes highway needs the tunnel has an excavation radius up to 9 m, an average 200 m² section and extends for an overall length of 510 m.

The site geology is mainly characterized by the presence of Plio-Pleistocene cohesive deposits. From a lithological point of view, the units interested from the excavation are clayey silts and silty clay with very few presence of silty sand small strata. Consistency increases from stiff to very stiff to hard with the depth. The track is very superficial due to a cover that ranges between 8 to 20 m. The dimensions of the excavation front, the poor mechanical characteristics of the encountered soils and the reduced cover would have prudently suggested the excavation be carried out via a series of partial excavations. Approaching the problem with the ADECO-RS approach (Analysis of COntrolled Deformations in Rock and Soils) and using the state of the art innovative system of soil improvement, allowed the full face excavation increasing in the same time safety , improving the schedule and reducing the costs. According to ADECO analysis, the behaviour category of the tunnel was classified as C type (unstable front), so it was necessary to stabilize the excavation front by means of proper soil improvement installed in advance to artificially produce the arch effect at the outline of the excavation.

To consolidate in advance a clayey-silt formation like the one present is a very hard problem. Trevi has proposed (and successfully completed) a patented jetting rotoinjection technique using a steel casing which is left in place as reinforcement of the arch. Moreover to be able to perform the jetting columns with the requested size, **ETJ (Enhanced Trevi Jet) system** has been used in the test field and applied in the following. ETJ systems foresees special monitors and other devices to focus the jetting energy, increase the desegregation of the jetting thus obtaining column diameters bigger 40% more of the standard. Fibreglass elements were used to reinforce the advance core.

The rig chosen by Trevi is the **Soilmec equipment for tunneling ST-120.** The ST-120 main feature is the presence of 2 different masts independently controlled and powered by two electric motors and supported by 2 telescoping cylinders. The

The mast placed against the excavating face.



from the site

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cylinders are connected to the main frame by means of 2 slewing rings. The main frame, powered by a diesel engine, is mounted on a crawler type undercarriage complete with 4 outriggers and sliding frame for positioning the slewing rings at different heights and levels in order to meet the requirements of the tunnel to be excavated. The two masts are equipped with a telescopic foot hydraulically controlled, that can be placed against the excavating face. This allows the use of rope operated crowd system/pull back to be applied to the drilling. Once the mast has been positioned as required, the consolidation treatment can be completed. This configuration allows drilling to be carried out through 180° directly connected to mast support. The rotoinjection technology requires the use of two strings which are simultaneously driven by two coaxial power swivels (double rotary).

One of the entrance of "Cavallo" tunnel.





The operator can control data piles and machine function by means the DMS.

from the site

Bukit Panjang is one of the **Singapore** districts, located in the central north-western part of the rich south-east Asian city-state. The Bukit Panjang area is essentially composed by a complex of residential and business housing, densely populated and a large green area, the Bukit Timah Nature Reserve. The urban area is under heavy development especially for the construction of buildings and new infrastructure. One of the major projects, the Bukit Panjang new town, aims to carry the buildings to 40,000 units in few years, a considerable increase compared to the current 29,500 units in the area.

The job site location in Singapore

The Scanpile Construction Pte Ltd has been awarded the participation at the foundation works for the enlargement of the neighborhood 5. The project consists of the construction of four residential blocks, 18 storey high and two blocks of 16 stories, giving a total of 682 units. In addition it was planned to build a multi-storey car park with gardens landscape community facilities.



The Singapore geological structure is really variable, with the presence of sedimentary rocks, igneous rocks and alluvial sediments. In particular the central part of the island there is a significant presence of granite derived from igneous activity related to tectonic movements of the Sumatra plate.

The soil stratigraphy revealed, from the top soil, a layer of stiff to very stiff sandy silt overlaying G2 granite bed rock. The piles had to be socket in RQD > 35% granite for 4 m. Because of the particular soil composition the contractor was required to prevent the lateral deviation and guarantee the piles verticality using steel casing up to 12 m deep.

The piles data had a various range of depth, up to 36 m maximum deep and 900 mm diameter. The choice were to drill them with a **Soilmec SR-90** hydraulic drilling rig equipped with multi-locking Kelly bar and winch crowd system.

Due to the characteristic of the soil it was necessary to use heavy duty rigs, the SR-90 a 110 ton class machine powered by a Deutz TCD2015 V08 that can reach a rated power of 440 kW. The unit used in Bukit Panjang is equipped with a rotary



In order to facilitate the granite block discharge the operator used a H-stud sticked on the ground.

table spin-off type able to reach a nominal torque of 333 kNm at 35 MPa, and a crowd winch system that can transmit 400 kN pull up and pull down nominal force. On this job site the SR-90 was equipped with different tools, a bucket during the drilling of the first layer composed mainly of silt and a special roller bit core barrel for the granite zone. The high power of the rig proved crucial during the use of the core barrel because the tool had to penetrate a rock mass with an UCS value ranging from 25 to 150 MPa, overcoming the granite strength and the vibration caused by the drilling friction, and managed to complete the pile with a satisfactory production time.

The SR-90 is usually appreciated for its multifunctionality, able to perform various technologies CFA, CAP and TJ. In Singapore it has establish itself has a reliable machine with high performance for the very hard bored piles.





Some of the G2 granite blocks drilled in Bukit Panjang.

SR-20 Hydraulic Still compact, higher performance



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Soilmec has designed a rig able to meet the demands to those customers who needs a nimble and manoeuvrable machine, able to be ready to drill upon arrival at the job site

The baby of the Soilmec family has grown up! The SR-20 hydraulic rig maintains all the dynamic and design features that contributed to its success, but it has been enriched following Soilmec long-lasting philosophy of high performances and technological innovation.

SR-20H

soilmec@

47 i	1200 mm	Max pile diameter
131 1	40 m	Max pile depth
54454 8	24700 kg	Operating weight (w kelly 4x9)
159 HP @ 2200 rpn	119 kW @ 2200 rpm	Engine (Cummins QSB4.5)
73756 lbf*f	100 kNm	Rotary Drive max torque @ 31 Mpa
125 rpn	125 rpm	Spinoff speed
27876/15287lb	124/68 kN	Crowd cylinder system force pull up/down
23380 lb	104 kN	Main winch line pull (1st layer) nom.

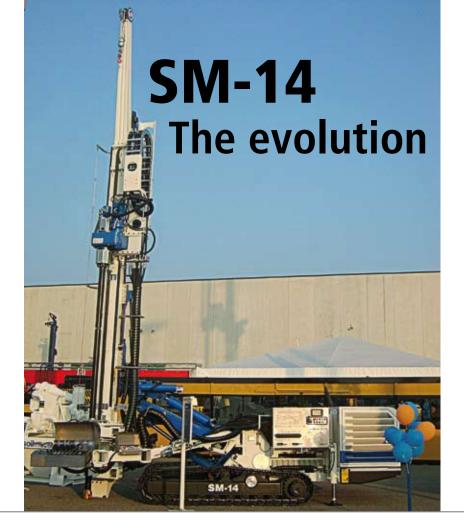


The SR-20 hydraulic rig has been specially designed to ensure quick rigging-up and start-up thanks to the 24,7-ton weight (including the Kelly bar) and the possibility to transport it ready assembled.

Special emphasis has been placed on safety and comfort, as great care has been paid to safety devices and the high quality of operator's cab and canopies. Performance has been significantly improved thanks to the experience gained over the years spent on jobsites, which led to a fully hydraulic rig carefully designed in all detail. Design is the focus. Winches have been enhanced: main winch line pull 104 kN, service winch line pull 56 kN and crowd cylinder 124/68 kN. As a result the work phases are easier and faster. The rotary head features a max torque of 100 kNm at a pressure of 31 MPa powered by a Cummins QSB4.5 diesel engine that can delivers a power of 119 kW at 2200 rpm.

As a result of these innovations, the SR-20 hydraulic rig can perform LDP piles with max diameter of 1,200 mm (800 mm cased with rotary) and max depth of 40 m, as well as CFA piles with 750mm diameter at a depth of 18.3 m. The new Soilmec SR-20 hydraulic rig is in line with the Trevi legacy; specially designed to be dynamic, safe and performing, together with the Soilmec technological innovation, it is a reference for those looking for a small but highly performing machine for bored piles.





new products

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More flexibility, more performance and a better environmental impact: these are the key points of the new restyling of the most versatile rig for micro/mini drilling

The new SM-14 results from the experience gained over time (last spring, the 1000th machine was manufactured), and the ongoing technological research aimed at implementing an established and appreciated product.

The rig is powered by a Cummins QSB 4.5 turbocharged and water cooled, the new motorization satisfies the standards needed in the market (both Tier III and Tier IV are

available), the engine delivers 119 kW at 2300 rpm, while ensuring at the same time a low environmental impact due to reduced noise, fuel consumption and emissions. In order to improve this "green target" the Soilmec technical department have designed a new type of cover giving the SM-14 further noise reduction.

The major innovation of the new SM-14 can be found in the parallelogram system that meets the demands of the market, with no limitations when it comes to anchors, tie-backs, micropiles and jet grouting. The thoroughly studied innovative 90° mast articulation ensures the features that made the SM-14 a bestseller, while increasing operation performance in harsh environments. The rig can be equipped

SM-14

Operating Weight	14300 kg	315262
Diesel Engine (Cummins QSB 4.5 Tier III / Tier IV)	119 kW @ 2300 rpm	159 HP @ 2300 rpm
Feed stroke, range:	4000 - 7000 mm	157 - 276 ir
Max feed force	89 kN	20008 lb
Max hoist pull	45 kN	10116 lb
Rotary range max torque	up to 2500 daNm	up to 18439 lbf.fr
Clamp & breaker range diameter	50-415 mm	23-16
Extractor device	100 kN	22481 lb
Jet Grouting max treatment depth (in single passage)	18 m	59 E



new products

23



with a large range of masts, including modular with a new crowd system ranging from 4,000 to 7,000 mm stroke, also the clamp and breaker group has been improved thanks to the possibility to install an extractor device that provides a force of 100 kN. Appreciated, since the first units, as a first-rate machine for consolidation works, the new SM-14 has improved to perform jet grouting treatment up to a depth of 18 m in a single pass. Especially designed to ensure the operator's safety, the new control panel featuring hydraulically-operated drilling controls and the new crawler/parallelogram control system guarantee high performance on the jobsite.

Easy transportation within a container, flexibility, reliability and safety on the jobsite characterise the new SM-14 making it a multifunctional and versatile rig, offering the best technological solution for micro/mini drilling.



A single drilling solution for waterwells and geological surveys

new products

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The G33 is designed for rotary drilling with direct and reverse circulation with mud, water circulation, down-the-hole hammer drilling and soil investigation

Drillmec Water Division is an Italian manufacturer of drilling rig packages for waterwell drilling and geological surveys, offering a wide range of drilling solutions developed according to the specific needs of its customers granting them the best products and services available on the market. Thanks to the worldwide network of branches and service points, Drillmec Water division ensures a quick and prompt service and spare parts supply relying on highly specialized personnel able to provide their valuable support for commissioning, training and technical assistance. The close contact with the customer and the high level of customization are the cornerstones of the corporate philosophy, and also of paramount importance in the development of new solutions and products.

The increasing need for flexible products able to cover an extended range of applications led Drillmec Water Division to the development of the brand new G33 drilling rig. The G33 is an innovative product designed for rotary drilling with direct and reverse circulation with mud, water circulation, down-the-hole hammer drilling and soil investigation. The G33 is able to provide a 33.000 kg maximum nominal pull-up capacity and features a simple to use control system for all set-up, making it possible to operate the rig safely and economically with an extremely small crew. The mast is able to operate from vertical up to 45° slant position.

The electrical and hydraulic systems have been completely reviewed, using up-to-date products and components, in order to ensure a high work reliability.

Beside the European version, designed to comply with the CE restrictions, a special version for heavy use in arid, sub arid and desert conditions has also been engineered.

The new rig is able to drill up to 600 m with 12"1/4 rock bit, covering the 80% of the borehole range for water research.

Rotary drilling rigs fitted with double rotaries head can drill piles at a bigger depth than the std cased depth using an extension sleeve assembled on the auger top. This is already taught by a Soilmec patent of 1994.

In this case the auger has an outer diameter less than the internal passage of the casing, for this reason the extended drilled depth with the auger is characterized in having a smaller diameter in the extended portion (approx. 10 cm).

The design of the foundation has to take into account of this diameter variation: the smaller diameter located at the base of the pile can be problematic for the strength of the foundation nor can imply the execution of a greater diameter above, along all the cased pile, requiring greater quantity of concrete.

The basic idea is to eliminate the step of the diameter along the pile leaving the possibility to extend the drilling below the casing.

new technologies

Eccentrical Auger Tip for CAP

25

The smooth pile and the uniformity of the diameter obtained allow significant reduction in manufacturing costs since because the total excavated volume is less and less is also the poured concrete.

The underexcavation is obtained using a special auger tip, EAT, that is able to drill inside the casing for all the cased depth and can protrude diametrically out of the casing for all the auger drilling extension.

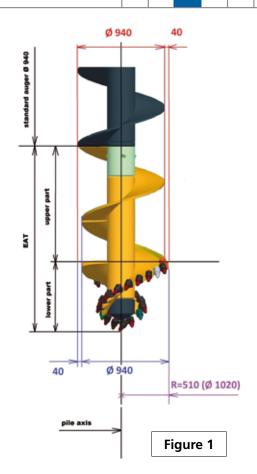
Figure 1 shows the EAT tip studied for and underescavation of \emptyset e 1,016 mm tube, in combination to a \emptyset 940 mm auger.

The internal passage of the casing is only around 955 mm and no any internal element greater than 940 mm can pass trough it, taking account of the internal play a real dimensions of the parts.

EAT (in yellow) is composed by a lower and a upper part.

In the preferred embodiment the shaft of the auger tip is coaxial to the auger. The spiral are assembled in an eccentrical way in order to partially protude over the 940 mm diameter.

The upper part is composed by special auger shaped as moon slice for linking up to the bottom part. For this reason the upper and the lower parts are vatangiously eliptical shaped, having a max diameter of 940 mm and a minimum diameter of 900 mm.



This eccentricity brings the more external tooth (in orange) at a distance of about 510 mm from the shaft axis, abling the excavation at \emptyset 1,020 mm, similar to the casing diameter.

A 940 mm diameter auger tip is so able to excavate a 1,020 mm hole. Varing the design of the eccentrical value is possible to obtain several increased diameters of excavation.

The **Figure 2** shows the different features:

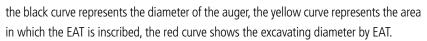


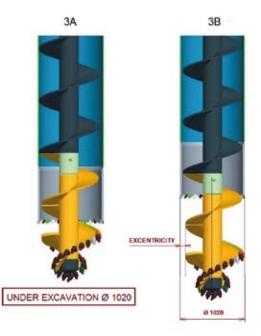
Figure 3 shows different sequences of drilling phase:

- 3A: std drilling when auger is inside the casing (cased depth)
- 3B: tip is protruding off the shoe of the casing and takes an eccentric configuration in which the EAT axis became coincident with the pile axis (tip is guided by the shoes, preferably by three contacting sector)
- 3C: under excavation (augered depth)



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The main benefits in using EAT are very impressive: reduction of cost (smaller drilling rig can be used to perform deep piles, less concrete, smaller diameter excavated for all the cased depth), applicability to all the existing rigs, energy saver (less power required for the execution of the pile implying less fuel consumption), reduced time for the pile execution, simplify the designing of the foundations.



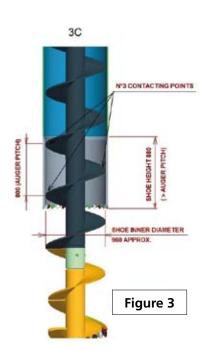


Figure 2



Davide Panzavolta, Soilmec Colombia General Director.

Soilmec Colombia is born

network news

Soilmec strengthens its presence in the South-Central

America territories lands from Caribbean sea:

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the newborn Soilmec Colombia



Soilmec strengthens its presence in the South-Central America territories. The new branch, Soilmec Colombia S.A.S., was established on March 20th and the headquarter office are located in Bogota, the capital of

the Colombia and one of the biggest city in Latin America. The Soilmec Colombia proposal is to offer the best Soilmec customer care in the territories of Colombia, Panama and Costa Rica, for this reason its structure was planned to satisfy all customer needs from the rig sales to the after sales service.

Today the team is composed by five people: a sales man, an administrative, a technician, a secretary and a general director who will be relying on spacious and comfortable offices, a 400 sqm workshop for rigs maintenance and spare parts store, also a 400 sqm external area deputy to rigs stock.

The value of this structure was underlined by Mr. Davide Panzavolta, the Soilmec Colombia General Director: "To date the market response is truly positive. The possibility to have a direct contact with customers, a quick and efficiently spare parts supply, thanks to our warehouse, and a careful after sales service through a specialized technician have made a real difference in this six month of activity has already been sold eleven equipments: three micropiles, three continuous flight auger and five large diameter drilling rigs."



Soilmec and Drillmec at Geofluid

Piacenza, October 3-6th 2012

Thanks to the full support of the market leader companies and the high professional profile of its visitors, Geofluid confirmed its consolidated leadership in the international drilling and foundation industry and has definitely become a not-to-miss event for the sector operating companies and operators. Over the past few years, Geofluid has constantly grown in terms of exhibited product range and highly qualified visitor attendance.

Soilmec/Drillmec booth at Geofluid has been the perfect location to have a 360° view of the "Drilllmec World", enabling the visitors to gain a preview of the new high quality drilling rigs that Drillmec developed to be always more active on the international drilling industry.

Geofluid hosted the launch of the brand new **Drillmec G33** drilling rig (see article on page 24), allowing all visitors to test the high quality of Drillmec Water Division products: skilled Technical and Sales Department personnel have been at visitors and clients' disposal, demonstrating how Drillmec investment has been empowered to confirm its leadership in the water well drilling industry.

Geofluid also hosted the launch of the brand new **Soilmec SM-10** microdrilling rig. The new SM-10 is fitted with one of the most powerful engines in its class, giving high performance to the large range of efficient rotaries available. Its smart compact design allows fast rig assembly and ease of transport together with reduced operating costs. The large, low speed rated diesel engine, ensures low fuel consumption and a long life span, offering substantial power availability to suit various drilling technologies. The rig has low maintenance requirements due to the use of high quality components.

New Drillmec G33 drilling rig.

Beside the European version, designed to comply with the CE restrictions, the configuration for heavy use in arid desert or humid tropics conditions has also been engineered.

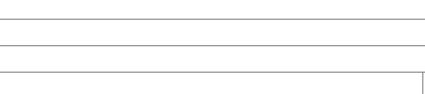
The new rig will be able to drill up to 600 m with 12.1/4" bit diameter, and then, to cover the 80% of the borehole range for water research.

On Thursday October 4th, Mr. Paolo Scaroni, CEO of ENI, after participating in an important meeting at Piacenza Expo, has cular attention to Drillmec/Soilmec booth where

visited the exhibition, with a particular attention to Drillmec/Soilmec booth where he was welcomed by Mr. Davide Trevisani (Trevi Finanziaria Industriale President) and Mr. Claudio Cicognani (Drillmec President); a prototype of Drillmec/Soilmec rig was given as a present to Mr. Scaroni.

Drillmec representatives also welcomed an important Ethiopian delegation from the Somali Region, which was visiting also Drillmec premises with Drillmec local agent Mr. Anteneh Kassa from Tensae Int. Business Enterprise.

network news







Drillmec hydraulic Top Drive, able to work at very low temperatures up to -45°, is definitely one of the products gaining more and more success in Russia. Over the last year Drillmec has sold 4 standard and 5 compact Top Drives, thus reaching a total of 15 Top Drives sold on the territory plus an option of 2 for first quarter of 2013. Drillmec clients include important names such Weatherford, Gazprom, THK-BP, Integra and Usinsk Geoneft.

Drillmec Top Drives can be mounted on Drillmec Rigs or they can also be mounted on masts manufactured mainly by Russian and Chinese Companies. In order to enhance the performance of drilling, more and more customers are turning to Drillmec to upgrade their rig using our Top Drives. For Drillmec customers the Compact Trop Drive is advantageous to be used as it is quick and easy to assemble and it does not require any modification to masts bought from other manufacturers. Drillmec is also organized in the Russian territory with 2 warehouse for spare parts and technicians to assist customers during commissioning and operation.

The attractive technological innovations of this product are:

Option for the fast moving: with this option, the Top Drive during transport rig up/down is not removed from the mast with a consequent reduction in NPT (non-productive time); B version of Compact Top Drive: Drillmec is developing the engineering, this version will also include a compact torque wrench that will achieve the levels of make-up and brake out torque the same as those of the standard Top Drive. This version, retain all the advantages of the compact Top Drive, will also be very useful should the customer drill wells with a drill pipe of large diameter.

The HH Series makes its entry in Turkey

On September 15th, the first HH Series Drilling Rig was successfully delivered to Turkey. In the wake of the increasing success of the hydraulic technology applied to drilling machines, Drillmec is consolidating its reputation as one the world leaders.

The HH-102 will be working in Aiden and has been chosen for its high flexibility in both oil and geothermal wells and for the outstanding results in terms of drilling performance and less cost per foot drilled.

The considerable automation of machine, which is equipped with automatic tong, slips and top drive is able to ensure a high safety standard and a quick operations sequence. The reduced footprint together with the trailer configuration guarantee a fast movement from well to well. Nonetheless the possibility of manipulating range 3 pipes with the semi-automatic handling system ensures a good drilling capability.

The Data Acquisition System installed on the machine is capable of monitoring and recording the most important drilling parameters satisfying the actual market request. The HH Series Rigs have proven to be an exceptional achievement of electronics and other advanced technologies, applied to a very traditional and conservative field of activity, such as the land drilling industry.

network news

New Off-shore drilling packages contract in Russia

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Drillmec has been recently awarded the supply of one complete off-shore drilling package for application on fixed platforms in Russia. Drillmec client is Caspian Energy for Lukoil. The client has chosen Drillmec for its solid background in the oil and gas industry, the high level of technology of its products together with competitive prices, reliable delivery time and 24/7 after sales assistance. These contracts will allow Drillmec to strengthen its presence in the Off-shore market worldwide.



In the picture, Yuri Parnivoda (Drillmec Russia General Manager) signing the contract for LSP1 Platform in Astrakhan for the Vladimir Filanovsky oil&gas field, one of the biggest by oil reserves discovered in Russia in the last 20 years.



network news

Drillmec HH-102 drilling rig.

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Delivered the first Drillmec HH Drilling Rig in Hungary which will operate in the Great Hungarian Plan

Drillmec is proud to announce the delivery on last October of the first Hydraulic Drilling Rig HH Series in Hungary. It is a HH-102 drilling rig, designed for fast moving and compact jobsite, equipped with a semi-automatic pipe handling system as well as with the last generation of electronic data acquisition and recording system (Drillmec DMS System). The rig will be engaged in a Geothermal drilling campaign as part of a larger project which will see the Hungarian company Geometrikus Beruházó Kft involved, as main Project's investor, in the use of Renewable Energy, especially in the Geothermal Energy. The HH-102 will work in the Great Hungarian Plan (named Alföld) where the Earth's crust in the zone close to the Carpathian Basin is characterized by a soil with high porosity bottom which produces an heating flow circulation 1,5 higher than that average value in the rest of the world.

The HH-102 rig solution has been chosen after a deep marketing analyses mainly thanks to its very limited footprint and low level of noise emissions that are mandatory features for the project due to the fact that Drilling activities will be in urban area. In its first two years of scheduled drilling activities, the HH-102 will drill in total 6 geothermal wells, 2 of them of about 2,000 m maximum depth; other 4 wells of a

depth between 1,300 m - 1,700 m.

With the HH-102 delivered for Hungarian market, Drillmec reaches 156 units of Drilling Rigs HH delivered in the world, that is a clear indication that the modern hydraulic technology of HH rigs is continuously increasing his fame and reputation in the drilling industry, especially in the Europe and in the category of rigs for medium-shallow wells in which hydraulic solution is step by step replacing the traditional mechanical solution.



Leading Russian, Belorusian authorities in the private and public sectors of Oil&Gas have gathered at Principe di Savoia Hotel in Milan, Italy, to analyze Drillmec productivity and competitiveness in Russian field. This was the first such gathering focused exclusively on showcasing Drillmec exceptional innovation on the drilling field.

The Seminar, which was managed by Drillmec S.p.A. and supported by Drillmec personnel in Russia, started on October 9th with a welcome dinner at Principe di Savoia acclaimed Acanto restaurant, where Drillmec Management welcomed the Russian guests.

On October 10th was held the Session 1 of the Seminar, which has reached 22 attendees from important Oil Companies and Drilling Contractors top ranking executives (to be named Lukoil, Eurasia, TNK-BP, Katoil, Ru-Energy Group, Caspian Energy Project, SSK, National Drilling Company, Seismotekhnika, Belorusneft and Drillmec partner in FSU, Piper International). The Seminar was introducted by a welcome message of Mr. Davide Trevisani, Trevi Group President.

Session 2 was focused on highlighting Drillmec role in the Russian and former Soviet Union market: bearing this in mind the presentation hosted by Diego Ferrandes, Sales Area Manager, gave an overview on Drillmec activities in the Russian country; Mr. Oleg Alampiev, Seismotekhnika General Director, followed with a keynote on the cooperation between Drillmec and Seismotekhnika in the Republic of Belarus. Mr. Yuri Parnivoda, General Director Drillmec Russia, gave a broad overview of Drillmec business in FSU.

network news

Drillmec Seminar

Milan, October 9/11th 2012

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The Seminar at Principe di Savoia ended late morning with Mr. Stefano Angeli (Drillmec Vice-President Sales) speech with an perspective on the Company's activity and future business opportunities worldwide. The Seminar was also attended by Mr. Simone Trevisani and Mr. Claudio Cicognani, respectively Managing Director and President of Drillmec S.p.A.

The attendees then moved to Drillmec S.p.A. premises in Gariga di Podenzano for a factory visit with representatives from the Sales and Technical department.





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ENI Ceo Paolo Scaroni visited our stand at Geofluid and met the President Davide Trevisani

Soilmec and Drillmec attended the last edition of Geofluid in Piacenza. Moment of particular satisfaction at the event was when **ENI Ceo Paolo Scaroni** visited our stand. The manager of the important Italian industrial Group was warmly received by the Chairman **Davide Trevisani**, who has honored with a Soilmec drilling rig model.



Soilmec renews ISO 9001 and ISO 14001 Certifications

Soilmec record on ENR website

The news about the slurry wall record with Soilmec hydromill appears on the homepage of the website of the prestigious international magazine ENR-**Engineering News Record**



Since the beginning Soilmec has developed reliable and innovative cutting-edge technologies, providing the construction industry a complete range of technical solutions, and Soilmec machines are used daily all over the world for the construction of bridges, viaducts, motorways, tunnels, subway lines and stations and buildings of all kinds. Steady investment in research and development, combined with a natural vocation for innovation, led Soilmec to grow significantly over the last 40 years, so as to be present in more than 70 countries with a network of subsidiaries and distributors.

Since 1990 the company is certified ISO 9001, and this compliance is not a final goal but as a starting point and a way to achieve higher quality standards. In 1994 Soilmec also obtained the ISO 14001 certification, proving its commitment to environmental protection.

Confirming and renewing these certifications, Soilmec puts quality, customer satisfaction and environmental responsibility on the basis of its growth plans for future challenges.

TÜV Italy congratulates Soilmec for their achievements.

<u>corporate</u>

Nigerian Oil Minister visit Drillmec stand at OTC 2012

Experts from the offshore energy industry around the world came together 30 April-3 May for the 2012 OTC-Offshore Technology Conference at Reliant Park in Houston, Texas. Attendance at the conference reached a 30-year high of 89,400, the third highest in show history and up 14% from last year.

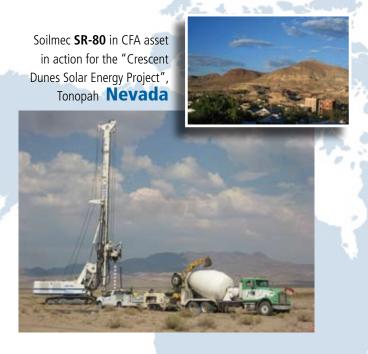
Bearing this in mind, the honourable Minister of Petroleum Resources in Nigeria, Mrs. Diezani Alison-Madueke, attended with her delegation the Offshore Technology Conference in Houston, Texas which took place from April 30th to May 3rd declaring open the Nigerian stand at the kick-off of the OTC.

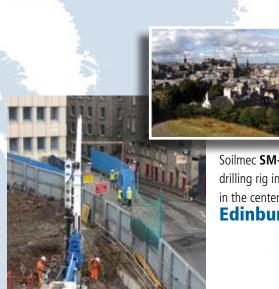
The whole Drillmec staff was on hand at the Drillmec Exhibition Stand at OTC to welcome her honourable Minister of Petroleum and her high-powered delegation, and Mr. Stefano Angeli, Drillmec S.p.A. Sales Director was pleased to present Drillmec stateof-art technologies. Discussions took place about Onshore oil well drilling requirements

and the incoming bid-round for marginal wells which requires Drillmec rigs in Nigeria. Despite the security challenges confronting the country, the Federal Government has vowed to continue with the aggressive reforms in the oil and gas sector. Mrs. Allison-Madueke's high-powered delegation included Mr. Austen Olorunisola the Director of the Department of Petroleum Resources, Eng. Ernest Nwapa, Executive Secretary of Nigerian Content Development and Monitoring Board (NCDMB).



Soilmec and Drillmec in action at...





Soilmec SM-14 drilling rig in action in the center of Edinburgh

click on site

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Drillmec HH-9 next to the highway near Falkirk, Scotland







Two Soilmec machines, (left)
SC-100 rig and (right) SC-120
"Cougar" hydromill, at work for
the Cityringen Metro Project in
Copenhagen

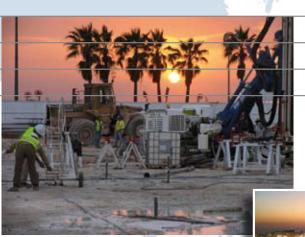


SM-8: jet grouting in **Germany**





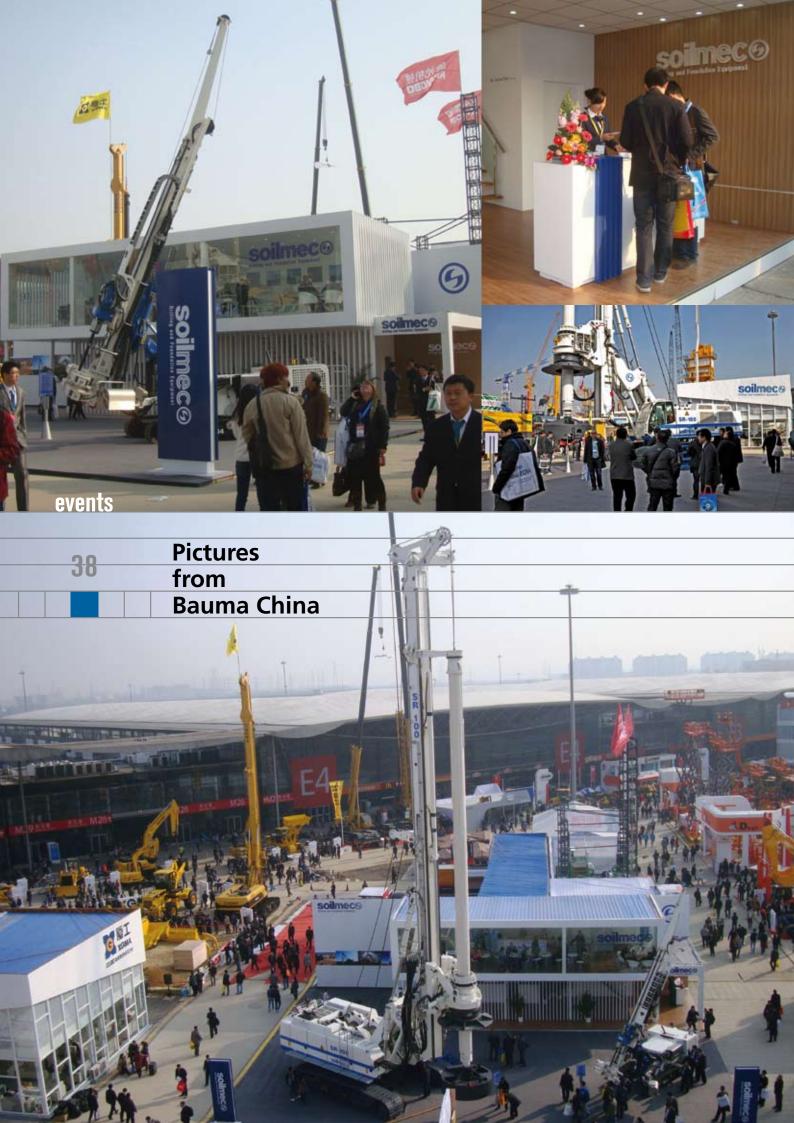
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Soilmec **SM-20** at work for the new Hotel Kempinsky foundations in Al Khobar, **Saudi Arabia**











BC India 2013 – the second edition of international trade fair for construction machinery, building material machines, mining machines and construction vehicles – provides the international construction industry with a professional platform for networking, investment and the exchange of ideas and information in the Indian area.

OMC-OFFSHORE MEDITERRANEAN CONFERENCE Ravenna (Italy)

Ravenna (Italy) March 20-22, 2013

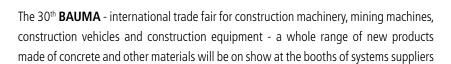


Since 1993, **OMC** has been working to disseminate offshore science and technical knowledge, to promote and support education for offshore, engineers and technicians and advance the development of tools and procedures required to explore, study, and further the responsible and sustainable use of the energy resources in the Mediterranean.

BAUMA 2013 Münich (Germany) April 15-21, 2013

events

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and components specialists, across the spectrum from newcomers to market leaders.

OTC 2013-OFFSHORE TECHNOLOGY CONFERENCE

Houston (Texas, USA) May 6-9, 2013



The **OTC** (Offshore Technology Conference) is the world's foremost event for the development of offshore resources in the fields of drilling, exploration, production, and environmental protection. OTC is organized and operated exclusively to promote and further the advance of scientific and technical knowledge of offshore resources and environmental matters.

CTT 2013 Moscow (Russia) June 4-8, 2013



CTT is the leading construction industry event in Russia, the CIS and Eastern Europe zone. CTT is a business platform for construction machinery, earth-moving machinery, building material machinery and building site plant, construction equipment and tools, road and railway construction machinery as well as accessories and equipment.

