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Putzmeister

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Investment in German headquarters: The new test hall

Rely on us: Your global Putzmeister service network

Putzmeister at sea: Offshore wind farm EnBW Baltic 2

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▼ One of the four SPM 4210 WETKRET concrete spraying machines used in the large-scale project

Angola's largest hydro-electric power station under construction: Lauca on the river Kwanza

The Lauca hydroelectric power station is currently under construction on the banks of the river Kwanza in the Angolan province of Northern Kwanza. The project is being coordinated by GAMEK ("Gabinete de Aproveitamento do Médio Kwanza"), the state authority responsible for the utilisation of resources on the Kwanza.

Lauca will be the most powerful hydroelectric power station in Angola and enables the regulation of the river course as well as the river level, which will benefit all the power stations located downstream of Lauca.

The 1,100 m long and 132 m high dam will be constructed from concrete. On completion, the hydroelectric power station will be able to generate 2,067 megawatts of power.

Odebrecht is responsible for managing the Lauca project

Responsibility for managing the Lauca project was assigned to the Brazilian construction company Odebrecht, which operates in public and private building and civil engineering projects for housing, power, mining and transport infrastructure in Africa, the Middle East and Portugal. Odebrecht has been operating in Angola for 29 years and is the most important private employer in the country. More than 4,000 construction workers are employed in the Lauca project alone, of which 90 % originate from Angola. The first project phase was completed in August 2014 and involved redirecting the Kwanza river and constructing two irrigation tunnels.

Putzmeister SPM 4210 WETKRET DUAL DRIVE for tunnelling

In this project, Odebrecht is using four SPM 4210 WETKRET DUAL DRIVE systems with an integral air compressor that incorporates a pump and spray system powered electrically or by a diesel engine to guarantee operation independent from the electric power supply. The equipment is mounted on a heavy-duty chassis with articulated 4-wheel steering and 4-wheel drive.

The SPM 4210 WETKRET series has a spraying range of 10 m and a concrete delivery rate of 20 m³/h. The metering pump for liquid concrete additives is synchronised with the concrete flow to guarantee high-quality precision spraying results. The operator can regulate the concrete flow and the predefined setting for metering additives via remote control to respond flexibly to changes in the consistency, strength and stability of the rock. ■

➔ *Angola*

Following centuries of slavery and colonialism, Angola – a state in the south-west of Africa – adopted the status of a Portuguese overseas province in 1951. The dictatorship in the colonial state collapsed in 1974 after the Carnation Revolution in Portugal. Angola gained independence and simultaneously plunged into a 27-year civil war that only ended in 2002, but not before killing 1.5 million and displacing 4 million people.

For years, Angola's economy suffered from the consequences of decades of civil war. However, the country has enjoyed a significant economical upturn over the last few years due to an abundance of mineral resources (primarily oil). Angola is currently the fastest-growing economy in Africa yet it simultaneously occupies a place at the bottom of the UNO Human Development Index table.

The vast majority of the 19 million Angolans survive on subsistence farming across 1,246,700 square kilometres of land. Most food products have to be imported, however.

The average life expectancy is only 55 years and infant mortality is one of the highest in sub-Saharan Africa at 80 fatalities per thousand births.

Sources: wikipedia.de, CIA Factbook 2014 cia.gov

Offshore wind farm EnBW Baltic 2: Solid foundations on the sea bed using Putzmeister technology

▲ Two MX 32-4 concreting a foundation from the ship

After a planning and manufacturing period of three years, the first foundation for the new offshore wind farm EnBW Baltic 2 was laid in August 2013, marking the start of the construction phase.
Monopiles or three-legged jackets were used as foundations, depending on the depth of the water. During the first stage of construction, the monopiles and foundation piles for the jackets were driven into the sea bed by a ship equipped with a special ram. The joint venture consortium JV HGN (HOCHTIEF, GEOSEA and NORDSEE NASSBAGGER) selected concreting equipment from Putzmeister to carry out the subsequent injection process for connecting the piles to the vertical foundation structures (transition pieces and jackets).

Before the start of the project, Hamburg-based company Betonlift (a service provider with more than 80 concrete pumps, distributor booms and machines) carried out a series of tests together with Putzmeister Niederlassung Nord. Betonlift rented a total of four stationary booms to the consortium, including a MX 24-4 and two MX 32-4, and trained employees from JV HGN to operate the distributor booms. At the Port of Rostock, service staff from NL Nord installed the booms on the ships – the MV Goliath and MV Abis Duisburg. The Goliath is what is referred to as a jack-up vessel, which means that after sailing out to sea, it can be anchored to the sea bed via four stationary piles and then raised hydraulically above the water line. In order to ensure maximum safety at sea, all ships working on wind turbines must be jack-up vessels.

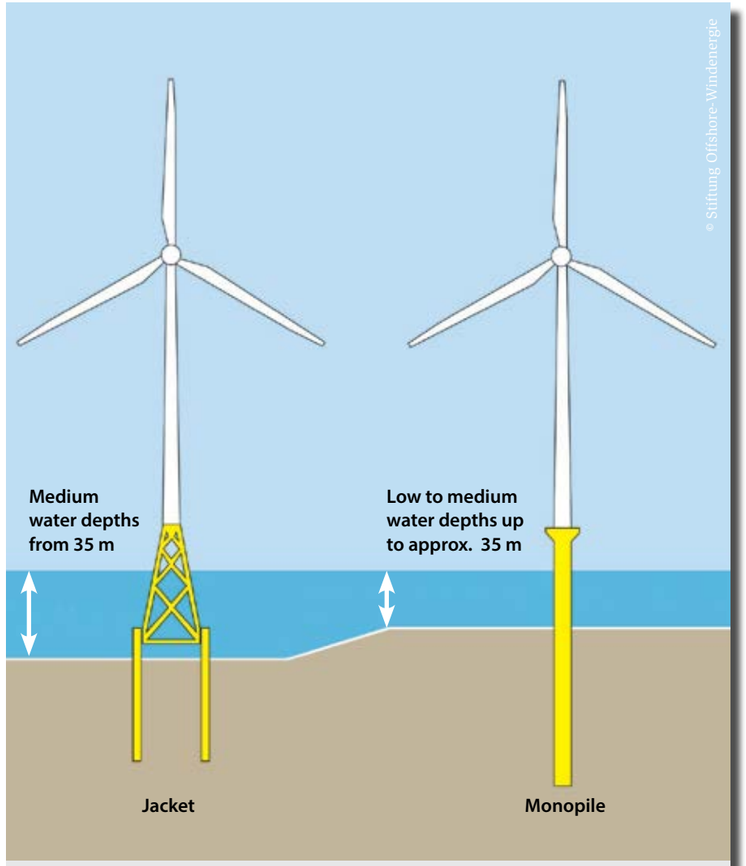
▼ The arm assemblies for the stationary booms were hoisted onto the ship in the Port of Rostock...

▼ ...and then secured safely to a girder

Special ultra high-performance concrete

As a leading manufacturer of UHPC (Ultra High-Performance Concrete) for foundations in the offshore sector, Danish company ITW Engineered Polymers (formerly Densit) supplied a total of eight type P 715 concrete pumps, a concrete mixing plant and raw materials for manufacturing concrete. The aggregate was delivered to the ships in flexible bulk containers called "big bags".

The two ships were each equipped with four concrete pumps, a DVH 5/2 transfer tube and distributor booms. Two of the pumps on each ship were intended as stand-by pumps. ››



➔ *The foundations*

At the location of the offshore wind farm EnBW Baltic 2, the depth of the Baltic Sea varies between 23 and 44 m. Depending on the depth of the water, the wind turbines are either mounted on steel piles known as monopiles (up to approx. 35 m) or steel truss structures known as jackets (approx. 35 m or deeper).

The first construction phase of the EnBW Baltic 2 involved the installation of the monopiles and the three foundation piles for the jackets. The position of the foundation piles for the jackets was determined exactly using large templates on the sea bed.

A ship transports six jacket piles from Rostock to the construction site, where a crane transfers them to the "Goliath" installation platform. A ram then drives the piles up to 55 metres into the sea bed.
In the second step, the jackets are positioned on the piles and secured in position using a special concrete.

The transition pieces that connect the foundation to the tower are pushed over the monopiles like a sleeve. Special concrete is used again here.

It can take as long as five days to install a foundation, depending on weather conditions.

◀ **There were a total of eight type P 715 concrete pumps on board the two ships**

Approx. 30 m of type SK 75 pipeline was laid between the P 715 and the distributor booms. A delivery hose with a 40 m long lance attached to the end was used instead of an end hose. During the injection process, a separate crane gradually withdrew the lance from the monopiles or foundation piles for the jackets. This process is called the "tremie method" – the outlet nozzle is located under the surface of the concrete at all times during concreting to prevent the fresh concrete from mixing with the water above. One special feature during subsequent cleaning: a catch basket attached permanently to the end of the lance.
The volumes of concrete required for each pile were different: The standard fill volume for the three jacket grout connections was 70 two-ton big bags or approx. 61 m³.
The fill volume for a monopile connection was 17 two-ton big bags or approx. 15 m³. The delivery rate was approx. 5.8 m³ per hour, limited by the minimum mixing time of the processed material. The delivery pressure ranged from 10 to 40 bar but also reached 60 bar on occasions.
The material used was Densit Ducorit S5, a concrete that quickly reaches a high strength and demonstrates good pumping characteristics and processing qualities. The compressive strength of the material with a grain size of 4-5 mm is approx. 130 N/mm² (average cube compressive strength of standard offshore cubes with edge lengths of 75 mm).

Special task: Cleaning the delivery line out at sea

Special attention was paid to the washing out process because it was imperative that concrete was not ejected into the sea. The delivery line was cleaned out in a forwards direction towards the placement location using sponge balls and water. The catch basket located at the end of the lance caught the sponge balls. Water escaping from a bore in the top section of the catch basket indicated that the pipeline was clean. A gate valve positioned between the delivery hose and lance was closed once the sponge balls arrived in the catch basket.

The foundation work was performed between mid 2014 and February 2015. ■

Technical data

Concrete pump P 715	
Output*	4 – 17,4 m³/h
Delivery pressure*	68 bar
Delivery cylinder	
Ø / length	150 mm / 700 mm
Strokes per min.	max. 27
Diesel engine	3 cylinder Deutz, 34,5 kW
Chassis	Skid frame
Weight (fuelled)	1,700 kg
Length	3,067 mm
Width	1,393 mm
Height	1,395 mm
Hopper volume	250 l
Filling height	973 mm
Max. grain size	16 mm

* max. theor, piston side, depending on material

Stationary boom MX 32-4 T	
Arms, folding type	4Z
Vertical reach	31.4 m
Horizontal reach	31.6 m
Reach depth max.	27.7 m
Delivery line	DN 125
Slewing range	365 °
Weight	
Arm assembly	5.7 t
Pedestal	2.76 t

Stationary boom MX 24-4	
Arms, folding type	4Z
Vertical reach	23.8 m
Horizontal reach	23.8 m
Reach depth max.	20.9 m
Delivery line	DN 125
Slewing range	365 °
Weight	
Arm assembly	3.9 t
Pedestal	2.7 t

➔ *EnBW Baltic 2*

- Total output: 288 MW
- Annual yield: 1.2 bn kWh
- Average wind speed: approx. 9.7 m/s
- Wind turbines: 80 Siemens SWT-3.6-120
- Around 85 km of submarine cable

The EnBW has been constructing the EnBW Baltic 2 offshore wind farm about 32 km north of the island of Rügen over an area of 27 square kilometres since mid 2013. On completion, the wind farm will contain a total of 80 wind turbines, making it the four times larger than EnBW Baltic 1 and generating six times as much electricity.
With an annual yield of around 1.2 billion kWh, the EnBW Baltic 2 wind farm will supply electricity to around 340,000 households per year.

The 11.9 or 14 cm thick submarine cables will not only convey electricity, but also exchange information and data between the turbines and the control room in Barhöft along highly sensitive optical fibres integrated in the cable.
The so-called export cable transports the electricity from the substation via EnBW Baltic 1 to the nearest transformer station on land, where the electricity will be transformed from 150 kV to 380 kV and fed into the German power grid.

© EnBW

▶ **Once the foundations are complete, the wind turbines are transferred from the Vidar installation ship, assembled and gradually started up. At the start of the year, EnBW celebrated the halfway point of the project with the connection of 40 turbines to the power grid. Overall completion of the project is expected in August 2015.**

© EnBW/Jens Meier

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Future of Putzmeister

Further investment at the headquarters in Germany: The new Putzmeister test hall

Construction of a new test hall at Putzmeister was completed at the end of last year. The company has invested more than 3 million € in the headquarters at Aichtal to create the perfect environment and the right conditions for conducting realistic trials and tests on innovations as well as accelerate development times considerably. This investment simultaneously represents a clear commitment to the headquarters in Germany.

Putzmeister creates the ideal environment for innovations

"The decision to construct a new building in Aichtal exclusively for the testing division represents an investment in our headquarters and of course in the future of the company", explains Dr. Gerald Karch, CEO of Putzmeister Holding GmbH. "We can only claim to have innovative strength and a technological edge on the market if we are able to test our innovations under the best conditions in a realistic environment. We believe that this is the best way to reward our customers' trust for many years to come in what we consider German engineering".

Modern construction meets practical and ecological criteria

More than 3 million € was invested in the construction of the new building at the Aichtal headquarters to improve overall infrastructure and provide modern test bench equipment. Putzmeister also relies on energy-saving technology such as heat recovery and district heating. Consequently, the new premises meet the latest standards for ecological design.

▲ The new test hall

▼ Extensive tests can be conducted over an interior surface area of 1,400 m²

Perfect working conditions for development engineers

An interior surface area of 1,400 m² and an additional 1,000 m² of outdoor space as well as modern test stands provide the perfect working conditions for around 100 development engineers. Projects such as the construction of lightweight machinery, extreme high-rise pumping or designing of machinery in line with market requirements, for example, can be successfully arranged and implemented there.
"The new test hall has given us the possibility of testing extremely large components and machines under the toughest conditions as well as conducting extended time tests to gauge life limits, assess overall operation and much more", reports Peter Mögle, Head of Testing at Putzmeister.

Ideal conditions for developing complex new innovations

The Testing department has occupied a central position at the Putzmeister since time immemorial. The decision of building state-of-the-art test facilities appears to be both sensible and logical in light of the rapid development speeds that are standard today. "Our work makes a decisive contribution to increasing the innovative ability of the company. Our innovations can reach market maturity more quickly and with a greater testing depth as a result of the quick, practical clarification of problems in all areas of development", emphasises Mögle. ■

▼ Left to right: Dr. Gerald Karch (CEO Putzmeister Holding), Peter Mögle (Head of Testing at Putzmeister); Dirk Jahn (MD of Putzmeister development business)

Project Linthal 2015: Limmern pumped-storage power plant in the Swiss canton of Glarus

Project Linthal 2015 is currently one of the Swiss energy industry's biggest construction projects. The heart of the project is the Limmern underground pumped-storage power plant, that pumps water from the Limmernsee at 1,800 m into the Muttsee, which is some 600 m higher, and generates electricity from this if required. The new plant, with a pump and turbine output of 1,000 MW each, will increase the output of the Linth-Limmern power plant of today by approximately 480 MW to 1,480 MW.
The contractor is Kraftwerke Linth-Limmern AG, a power plant company in Linthal in the Glarus hinterland.
The syndicate commissioned with carrying out the construction work is made up of Marti Tunnelbau AG, Moosseedorf, Marti AG, Zurich, Marti Technik AG, Moosseedorf and Toneatti AG, Bilten.
The first machine group will be commissioned by the end of 2015, the groups 2 to 4 by the end of 2016.

The A2 construction plot, for which the Kraftwerk Limmern syndicate is responsible, includes multiple main elements and therefore construction sites at different elevations:

- Building a machine cavern (150 m long, 30 m wide and 53 m tall) at 1,700 m for the pump turbines
- Building the transformer cavern (130 m long, 20 m wide and 25 m tall)
- Building the Muttsee dam at 2,474 m. The useful volume of the reservoir was previously 9 million m³ and will be 25 m³ after completion.
- Building the pressure tunnels

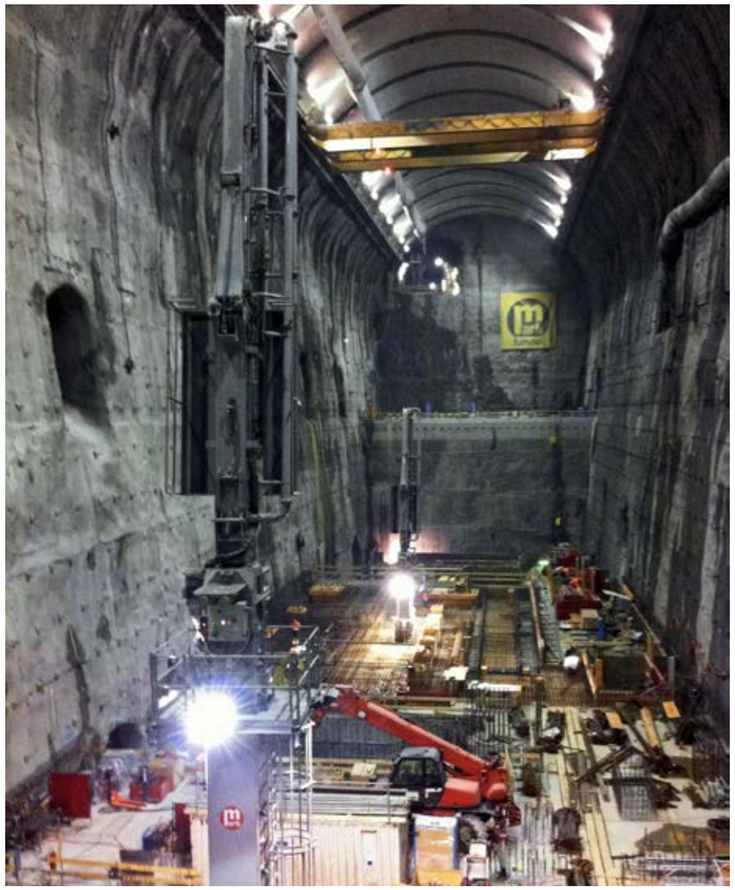
The new underground central power station lies at the foot of the current dam wall of the Limmernsee at approx. 1,700 m and around 600 m inside the mountain. It consists of one machine cavern and one transformer cavern. Two parallel inclined chutes connect the Muttsee with the central power station and two underwater tunnels, that are around 500 m long, connect the central power station with the Limmernsee. From Tierfehd onwards, access to the cavern is ensured by a new access tunnel, which is approximately 4 km long and fitted with a cable car.

Resource-conserving cycle: Raw material for concrete from excavated material

Two ultra-efficient gravel plants at different sites process the massive quantities of excavated material for the in-house concrete production. The dry preparation plant on the Muttenalp produced the aggregate required for the mass concrete for the dam wall; the wet preparation plant in Ochsentäfeli produced all other concretes (e.g. pumping concrete). ››

▼ Panoramic view of the Muttsee from the north during the dam wall construction phase. Left: Ruchi and Muttenstock; right: Nüschenstock and Rüchi.

Concreting of power plants



◀ The two stationary MX 32-4 placing booms in the machine cavern

▲ Sliper test to determine the pumpability of the concrete

The Swiss energy strategy 2050

The Swiss energy strategy focuses on the consequential optimisation of energy efficiency and on increasing the proportion of domestic renewable energies, such as hydropower and solar energy. According to a draft proposal of the Swiss Federal Council from 2013, this strategy is to be implemented by 2050 whilst phasing out nuclear power and cutting back on energy purchases.

For example, the additional electricity generated by pump storage power is to amount to 7.5 terawatt hours (TWh) by 2050. At the moment, three existing pumped-storage power plants are being built.

▲ The concrete batch plant is underground. The stationary concrete pump is placed under the mixer and pumps the concrete 450 m into the machine cavern.

High-alpine challenges

The special location of the construction site in the middle of the Glarus Alps presents an unusual challenge.

Geology:
The construction work mainly takes places underground with stones of complex compositions. This is largely Quintner limestone that was broken, displaced and folded multiple time during the formation of the Alps. Two large fracture zones, multiple shear zones and secondary reverse faults, as well as a well developed karst groundwater system make underground construction difficult.

Climate:
The construction site on the 2,500 m high Muttenalp is exposed to the adverse weather conditions that are typical in the high mountains, with strong winds, icy temperatures and snow deep into spring. This is no easy situation for the employees on the site!

Transport:
There is a height difference of 1,700 m between the valley bottom in the Linthal municipality, where the project is being coordinated, and the Muttenalp. To overcome this distance, two construction cable cars with a load capacity of 25 tonnes have been installed and these will be dismantled upon completion of the project. ■

▼ The BSA 2107 HPE stationary high-pressure concrete pump under the mixer

▼ The MX 32-4 in the machine hall sits on the X base and is fixed to the base plate with tie rods.

▲ The management of the construction sites from the Tierfehd valley station is only possible via cable cars.

Putzmeister machines:

Two MX 32-4 in the machine cavern as a satellite system (3 x tubular columns, MX boom is moved according to the requirements)

BSA 2107 HPE with hopper extension under mixer pumped concrete from the underground concrete batch plant to the two MX 32-4 in the machine cavern and filled the TBM (tunnel boring machine) starting shaft.
4,000 – 5,000 m³ of concrete were pumped over a distance of 400–450 m (110 bar pump pressure at 45 m³/h output).
In the machine cavern a total of 80,000 m³ concrete was placed.

Particularities of the project from Putzmeister's perspective:

Planning the concreting logistics

Execution of various sliper tests to determine the optimum concrete formulas for different delivery distances

Thanks to the good support of the construction site and the positive experience with the pumps (high performance and high availability), Putzmeister got a follow-up order to supply the equipment for the Nant de Drance project.

Concreting of power plants

Positive experiences thanks to Putzmeister expertise: Nant de Drance pumped-storage power plant in the Valais Alps

The project consists of the construction of a pumped-storage power plant in a rock cavern between the Emosson (sea level 1,930 m) and Vieux Emosson (sea level 2,225 m) reservoirs. Six turbine groups are intended to generate the production capacity of 900 MW; 2.5 billion kWh of electricity will be produced a year.

In 2013, the 60-year-old dam wall was increased by 21.5 m, therefore doubling the storage capacity. The caverns were also excavated in this year.
The first task was to begin a 5.6 km long access tunnel, which was completed in autumn 2012. The tunnel boring machine needed nearly three years to complete this.

The contractor in the construction of this pumped-storage power plant in the Valais Alps is the Groupement Marti Implenia syndicate.

During the project, Marti Tunnelbau AG once again called in Putzmeister machines and engineers. This decision was based on the positive experiences with the Putzmeister expertise, e.g. with the sliper test for determining the concrete characteristics during the previous project, Linth-Limmern.

The sliper was successfully used again in Nant de Drance to make the optimum concrete formula settings for the pump. Putzmeister developed the concreting concept as well as a cleaning concept and a concept for handling the resulting water.

A total of five stationary concrete pumps and two MX 32-4 booms from Putzmeister were in use: Two BSA 2107 HP E and the BSA 2109 E pumped the concrete into the enormous machine cavern. The headrace tunnel was concreted by the two BS 1408 E. ■

"Construction site of the century"

Over 400 workers, around 10 years of underground construction work in the high mountains, 17 km of tunnels and 1.7 million m³ of excavated stone: The Nant de Drance construction site is gigantic.
The result is one of the most powerful pumped-storage power plants in Europe. With an output of 900 MW, after its commission at the end of 2018, it will generate around 2.5 billion kWh of electricity per year.

In 2014 the project received the award "Major Tunnelling Project of the Year" from ITA AITES.
Source: www.nant-de-drance.ch

➔ ***www.nant-de-drance.ch***

Putzmeister involvement:

Machines:

2 x BSA 2107 HP E
1 x BSA 2109 H E
2 x BSA 1408 E
2 x MX 32-4 Multi incl. accessories

Planning/consulting:

Sliper tests
Modification of the concrete formulas for better pumpability
Development of a concreting concept
Development of the cleaning concept, dealing with cleaning water

Concrete:

Different concrete formulas
mostly C30/37, water-cement ratio 0.42, grain 0 – 22 mm

Facts about the construction site:

Beginning of the construction work:	2008
Planned completion:	2018
Builder:	Nant de Drance SA
Shell construction:	Arge Groupement Marti Implenia GMI (Marti Tunnelbau AG, Implenia Bau AG)
Number of workers:	400
Working hours:	332 days per year 7 days per week / 24 hours
Concrete volume:	360.000 m³
Total length	
Tunnels, shafts	17 km
Main access tunnel	5.6 km
Tunnel system	4.5 km
Pressure tunnels	2.5 km
Vertical pressure shafts	2 x 424 m
Machine cavern	32 x 52 x 194 m
Volume excavated	300,000 m³

▶ **Commissioning a BSA 2107 HP E**

Still at his best: Kjell Kristiansen in charge of the New Generation

Kjell Harald Kristiansen from Skien, 230 km from Oslo in Norway has been operating Putzmeister concrete pumps since the 1980s. Kristiansen founded Kristiansen Betongpumping AS in 1981 and has operated the company as a family business ever since.

Since then, his son Göran has become Chief Executive and owns a fleet of Putzmeister machines consisting of two PUMIs, two M 24-4 and three concrete pumps from the new generation: Two M 36-4 and an M 42-5.

Even though he has reached retirement age, 69 year-old father Kjell Kristiansen still hangs a remote control around his neck and pours concrete onto construction sites. Any machine model: Many years of experience with different types of pumps have given him a decisive edge.

➔ *Kristiansen Betongpumping AS*
www.betongpumping.com

The "Porsgrunns Dagblad" reported on Kristiansen's new acquisition in 1983:

1983: The first truck-mounted concrete pump in Grenland

BREVIK, DALEN: Suppose you had to undertake concreting work at a location inaccessible to the truck mixer – for example on the roof of an industrial building on the other side of a rather small reservoir or pond or in sliding shuttering right up high "beneath the clouds". Then you would need a truck-mounted concrete pump. There is one such machine in Brevik acquired by Kjell Kristiansen, who has been churning out ready-mix concrete for the company Norcem for many years.

[EDVARD SELVÅG]

A TRUCK-MOUNTED CONCRETE PUMP – what is that? It is a truck with a powerful pump that can convey concrete several hundred metres at high pressure. The perfect piece of equipment for anyone having to work under extreme conditions or wanting to make their work that bit easier.

The output of Kjell Kristiansen's truck-mounted pump is ideal for performing the most demanding of tasks. In an interview for the "Porsgrunns Dagblad" newspaper, Kjell Kristiansen states that the machine has a pump output of 140 cubic metres of concrete per hour – sufficient to perform most tasks easily.

This truck-mounted concrete pump is not only one of a kind in Brevik, but also in the wider surrounding area. It has a 22-metre placing boom that can convey concrete to quite considerable heights. Hoses several hundred metres in length can be connected to pump concrete horizontally.

In practice, the concrete is poured into a hopper from the truck mixer. The concrete pump then draws in the concrete and transports it further.

A large number of job orders have already arrived since Kjell Kristiansen acquired the truck-mounted concrete pump around a fortnight ago. He even concluded a contract with the company Norcem, where he operated truck mixers for well over a decade.

Good luck and success with a new acquisition that will certainly benefit the construction industry in the Grenland region.

Grenland har fått sin første sementpumpebil

BREVIK, DALEN: Hvis du skal foreta støpearbeider på et sted hvor du ikke når frem med sementbilen, for eksempel på toppen av industribygget, på andre siden av dammen eller vannet – om det ikke er alt for stort – eller om man ønsker å føre ferdigsement opp i en glidende forskalling opp mot «de store høyder», så få tak i en sementpumpebil. Det finnes nemlig en slik i Brevik, anskaffet av Kjell Kristiansen, som i årevis har kjørt ut ferdigsement for Norcem.

PD EDVARD SELVÅG

SEMENTPUMPEBIL – hva er nå det for noe? Det er en lastebil utstyrt med et kraftig pumpemaskineri, og som kan pumpe sementen flere hundre meter avgårde under stort trykk om nødvendig. En fortrinlig innretning selvfølgelig for den som har bruk for en slik under spesielle forhold, eller ganske enkelt for å gjøre det lettvint.

Kjell Kristiansens pumpebil har en betydelig kapasitet, og som skulle være tilstrekkelig selv der hvor det løpende behov kan sies å være særlig stort. Kristiansen forteller i en samtale med PD at pumpemaskineriet har en kapasitet på 140 kubikkmeter sementmasse pr time, noe som vel skal kunne være tilstrekkelig i de aller fleste situasjoner.

Sementpumpebilen i Brevik, som er den eneste i Grenlandsdistriktet og langt utover det, er utstyrt med en 22 meters kranarm, og som i utgangspunktet gjør det mulig å bringe sementmassen opp i betydelige høyder. Skal sementen bringes ut horisontalt, kan man om ønskelig koble til flere hundre meter slanger.

I praksis anvendes sementpumpen slik at selve sementbilen tømmer sementmassen i en silo eller trakt, og fra denne trakten suger så sementpumpen opp for transport videre.

Det er nå vel 14 dager siden Kjell Kristiansen anskaffet sementpumpebilen, og han har allerede godt om oppdrag. Kristiansen har kontrakt med Norcem, der han forøvrig har vært sjåfør på sementbil i 12-14 år.

Lykke til med nyanskaffelsen, som sikkert blir til stor nytte for byggeindustrien i Grenland.

Kjell Kristiansen, Brevik, med sementpumpe-bilen til høyre. Like bak en av Norcems sementbiler iferd med å tømme sementmassen i trakten der sementmassen mellomlander før den pumpes frem til forskalingen. Pumpetrykket kan bringe sementen opp i en høyde på 22 meter, takket være den høydrauliske kran-armen. (Foto: Helge Mikalsen).

LIUM AS

PM Nordic Norge AS = Lium AS

Lium AS is the Putzmeister dealer for Norway. Since it was founded in 1986, Lium has become a leading supplier of machines and plants for the concrete and civil engineering industry. The company is managed by owner Truls Lium.

The company is based in Lierskogen, 30 km from Oslo, and currently offers a wide range of products, including complete concrete factories, mixers, silos, telescopic conveyors and spare parts.

Egil Björnstad was responsible for concrete pumps at Lium. He retired in 2015. In 1982, he had started working as a mechanic for K.R. Oedegaard (former PM dealer for Norway).

▲ Liums service workshop in Frogner

Putzmeister mortar machines in Moscow residential building project

Moscow is a construction site that never stops moving! A program for the demolition of five-storey tower blocks is currently underway, whereby dilapidated buildings will be making way for modern residential blocks with social infrastructure.

At the start of the 1950s, the Soviet government set itself the target of developing mass residential buildings while simultaneously saving state funds. The idea was adopted from the French prefabricated construction method, where the kitchen was 5 – 6 m² in size, the toilet was located in the bathroom and the bedrooms were small.

Khrushchyovka - a resounding success

In 1953, a resolution was passed to construct 283 buildings containing these simplified residential units for labourers. The project was a success: Up to 1970, 400 million m² of living space were created in these five-storey Khrushchyovka buildings. In terms of construction speed, Moscow was one step ahead of all the major cities in the Western world.

Renovation work falters

The renovation of the Khrushchyovkas was planned for 1980 but was delayed due to the volatile political situation at the time. The restoration work finally started in 1999 and was scheduled for completion in 2010. The inhabitants of 1,722 five-storey buildings were promised new homes, while 6 million square metres of living space was scheduled for demolition. The initial plan was to construct a new building in the same district and then demolish the old building, at which point another new building was erected. Until 2007, everything was going according to plan, but the speed of construction slowed as the economic crisis deepened and all projects eventually ground to a halt following the approval of amendments to the Russian Land Code. The developers and construction companies were no longer able to meet their targets, which is why the government made the decision to finance the program from the municipal budget.

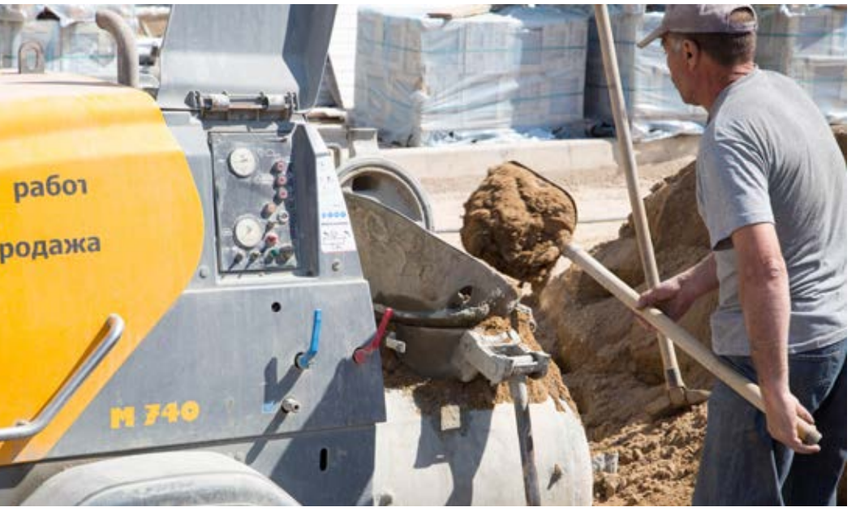
Putzmeister mortar machines – a guarantee for successful working

257 buildings are under construction at the present time. Almost all of them are being built using Putzmeister concrete pumps and mortar machines.

Just one example: A construction site in the northwestern administrative district of Moscow

The construction of the residential district was financed from the municipal budget and implemented according to the individual draft. The project was completed in 2014. The overall surface area is 35,000 m², of which 22,000 m² is habitable space. The four buildings (7, 9, 11 and 14 storeys) incorporated a total of 356 apartments. The developer is the administrator for civil construction.
This residential district is almost finished. Modern type M 740 D and M 760 DHB screed conveyors were used for the screed-laying work. Altogether, more than 9 mortar machines were involved in this project and sometimes had to overcome delivery heights exceeding 40 m.

▼ Manufacture of a screed mix (earth-moist sand, cement, water)



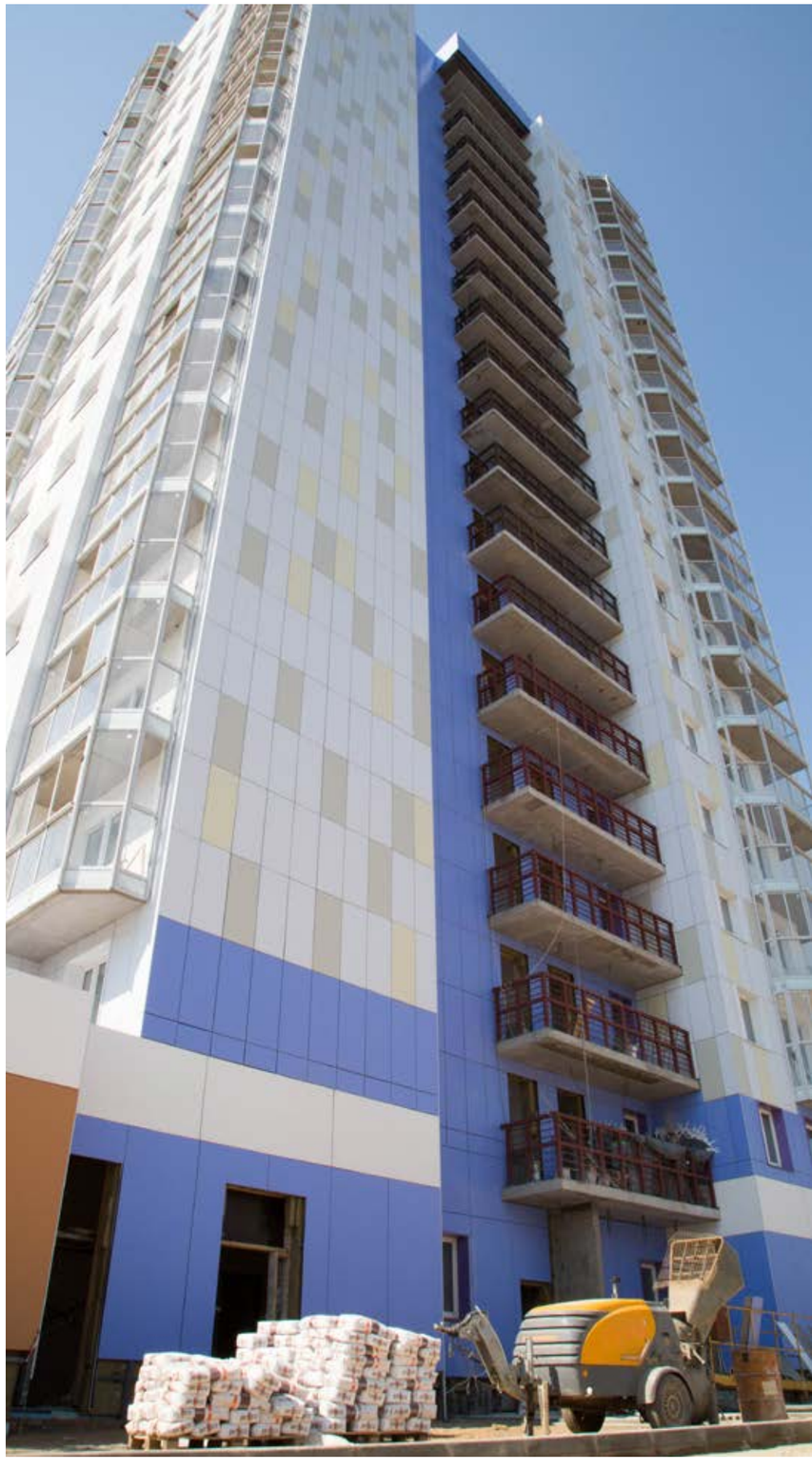
▼ Modernisation on a grand scale

The Mixokret M 760 is the most powerful Putzmeister screed conveyor and is used for mixing and conveying sand, gravel and fine grained concrete with a maximum grain size of 16 mm.
Putzmeister customers made a conscious decision to rely on quality "Made in Germany". All core components and assemblies of the Mixokret were developed and manufactured in Germany.
Putzmeister technology helps decrease construction times and reduce costs for materials and labour. The Putzmeister brand represents high resale values and good service.

The earth-moist screed laid in these residential districts has different functions. The screed creates a level surface, can withstand heavy loads and serves as a basis for the construction of additional floors. Screed also provides an insulating layer that guarantees additional home comfort in the winter. In many residential buildings in Russia, the tiles are laid directly on the concrete surface and there is a danger that cracks will form during freezing conditions.

According to feedback from our customers, they are extremely satisfied with the Putzmeister technology.
"Since arriving, the technology has operated flawlessly and without stopping" remarked one of the team leaders on the construction site. ■

▶ Mixokret screed conveyors are designed for maximum performance



MX boom used in an unusual capacity: Successful system generates 94 % fewer airborne pollutants at ports

In partnership with Advanced Emissions Control Solutions (AECS), Putzmeister America has developed a system for reducing the exhaust gases emitted by ships at anchor. Stricter regulations in California's ports require the implementation of measures to reduce pollutants.

The system was launched for the first time last summer at the Port of Long Beach. It consists of an MX 43-5 RZ stationary boom mounted on a barge, which can reach ships outside the port. Instead of a pipeline, the boom is fitted with an extraction pipe that is positioned over the exhaust pipe of the ship. The new system has already been approved by the government. It eliminates 94 % of the fine dust, carbon monoxide and sulphur dioxide in the exhaust gases of a ship.

"We have been working in close collaboration with AECS to develop this system solution for reducing exhaust gases emitted by ships" says Tom Redding, Putzmeister's Head of Sales for Western USA. "The new system is already extremely successful and we assume that it will be used in other Californian ports and perhaps even across the USA and other countries all over the world."

Putzmeister Mexico: The first truck mixer rolls off the production line

PM Mexico is a division of PM America Inc. and reached a significant milestone by starting to manufacture truck mixers for USA and Latin America.

The first example was presented at the last Mexican Ready Mix Association Convention in Cancun.
Putzmeister's production facility in Mexico is located in Monterrey, approx. 200 km from the American border. The new 5,000 m² factory building began operations in 2014 and started manufacturing at full capacity from spring 2015.

Putzmeister = quality

Marc Aguilar, Deputy Head of Sales for Latin America and the Caribbean: "We know that the market for truck mixers is extremely competitive but the Putzmeister brand represents machines of the highest quality. A good on-site After Sales Service and the prompt supply of spare parts make our truck mixers the first choice among customers."

Closer to the market with Putzmeister Mexico

"We had planned to start manufacturing in Mexico a long time ago" says Dave Adams, President & CEO of Putzmeister America. The central location brings us even closer to our customers based in Mexico and Latin America.

The central location makes it easier to transport machines both to America and ports in Mexico for export to Latin America.
Sebastian Vidal, a seasoned expert in the industry is president and CEO of Putzmeister Mexico. He has been actively involved in the business and responsible for various production, design and management activities in different companies in the concrete and construction industry for more than 25 years.

▶ Sebastian Vidal, President & CEO of Putzmeister Mexico

Camfaud Concrete Pumps Ltd. The largest fleet of concrete pumps in the United Kingdom

For the 30-year company anniversary, Camfaud Concrete Pumps based in Essex, UK organised a breathtaking photo shoot with its entire mobile fleet.

All Camfaud pumps originate from Germany (Putzmeister and Schwing) and are mounted on Mercedes Benz trucks. Camfaud also operates more than 20 stationary concrete pumps, 15 distributor booms and a small fleet of mortar pumps. According to the company, it is the largest fleet of concrete pumps in the United Kingdom.

Camfaud Concrete Pumps was founded by Dave Faud and his business partner Jim Campbell. In the early days, Dave paid out his partner and ran the company for several years together with his wife Theresa. Now it's the turn of the next generation: Tony, Peter and Lynn run the family business together with Lynn's husband Brendan Murphy.

M 38-5 New Generation at the UK Concrete Show

At the end of February, Camfaud presented the latest truck-mounted concrete pump in its fleet at the UK Concrete Show 2015 in Birmingham:

A new generation BSF 38-5.16 H mounted on a Mercedes Benz Arocs 26.40 Euro 6 chassis.
Camfaud recognises that this modern pump offers clear benefits in cities, where space is limited yet high performance is required.
The M 38-5 offers small support dimensions, quick set-up times, high safety with One-Side-Support and meets the latest Euro 6 emissions class.

▼ One Sunday, Camfaud assembled all 55 truck-mounted concrete pumps and operators at North Weald Airfield for a spectacular commemorative photograph followed by a parade

The new truck mixer P 9 UL: Transport concrete with ease

The low unladen weight of the P 9 UL is a crucial factor in its successful operation, time after time, since any reduction in weight increases the working load and reduces costs for fuel, tyres, charges and taxes.

To ensure a long service life, amongst other things, the outstanding wear properties, toughness, strength and hardness of Hardox come into play.

P 9 UL advantages at a glance:

- 3,350 kg body weight and thus a **weight saving of 20 % in comparison with standard truck mixers**
- **Low consumption and operating costs** thanks to components made from Hardox steel and fixtures made from aluminium
- **Optimised drum geometry** with a low centre of gravity, minimal construction height and a double drip-down ring
- **Enlarged platform with ergonomically shaped railing** provides optimum knee protection against spray
- **Large manhole** with a diameter of 580 mm for easy inspection and cleaning
- 1.45 m discharge chute for ease of access to the pump and crane bucket
- Closed mixer frame made of S500 steel
- **Underride protection with step** encourages ergonomic work
- **Closed rear as far as the truck chassis** reduces contamination
- Integrated storage compartment for safe storage outside of the driver's cab

Technical data

Nominal filling	9.0 m³
Water line	9.8 m³
Geometric volume	15.1 m³
Height	2.73 m
Weight	3,350 kg

▲ **The tools that are brought along can be transported safely in an easily accessible, integrated toolbox.**

◀ **Easier accessibility and greater clearance, even with short wheelbases, are provided thanks to the water line integrated in the ladder hook.**

◀ **The flexible universally jointed shaft cover is of high quality and can be removed in no time at all if maintenance work is necessary.**

The deepest waste water treatment plant in the world: Al Wathba in Abu Dhabi

At the end of 2011, the construction company Odebrecht International secured a contract to construct the world's deepest pumping station at the Al Wathba waste water treatment plant. The plant will be responsible for processing all of the waste water generated in Abu Dhabi. The population of the largest emirate in the UAE is expected to grow to approximately three million inhabitants by 2032.

With an investment amount of 362 million US dollars (approx. 318 million €), this contract is the largest in the history of the Abu Dhabi Sewage Company (ADSSC). Work on the pumping station started in March 2012 and will finish towards the end of 2015.
Located at a depth of 110 metres, the station has a diameter of approx. 50 m and a pumping capacity of 39 cubic metres of waste water per second. The station will pump an estimated 300,000 m³ per day.
The waste water is directed through an existing tunnel into two waste water treatment plants in Al Wathba. The pumping station is installed at the end of the 41 km tunnel, which starts at a depth of 24 m and slopes downwards to a depth of 80 m. The system is based on the principle of gravitational flow.

The concrete transport company Xtramix based in Abu Dhabi is supplying a total of 65,000 m³ of concrete for the project. The concrete is conveyed by two BSA 2110 HP D stationary concrete pumps located above ground and placed via two MX 32-4 T stationary booms on R 750 tubular columns.
The two BSA 2110 HP D units first pump the concrete to a depth of 110 m and then to the distributor booms. ■

▲ Stationary boom MX 32-4 in a depth of 110 m

Project highlights

The 41 km long underground sewer with a maximum internal diameter of 5.5 m leads from the existing main pumping station on the island of Abu Dhabi to the Al Wathba waste water treatment plant.

The entrance of the tunnel is 24 m below ground level and reaches a depth of 80 m at Al Wathba.

Eight large-diameter tunnelling machines are responsible for excavating the tunnel. Each tunnelling machine advances 100 m a week.

43 km of connecting tunnels between 0.8 and 3 m in diameter link the existing waste water system to the new sewer.

The new pumping station has a peak capacity of approx. 1.7 million cubic metres per day.

The gravitational flow principle in the new sewer system has replaced 35 old pumping stations

Source: www.adssc.ae

▶ The two BSA 2110 HP D pump a total of 65,000 m³ of concrete for this project

From the manufacturer: Used machines in excellent condition

Putzmeister Italia (PMI) based in San Clemente in the province of Rimini has been responsible for the purchase and sale of used concrete pumps worldwide since 2013.

PMI carries out all the restoration work on used concrete pumps such as essential boom inspections and the replacement of spare and wear parts. Support from an international team and machines technically reconditioned by the manufacturer give Putzmeister customers extra security.

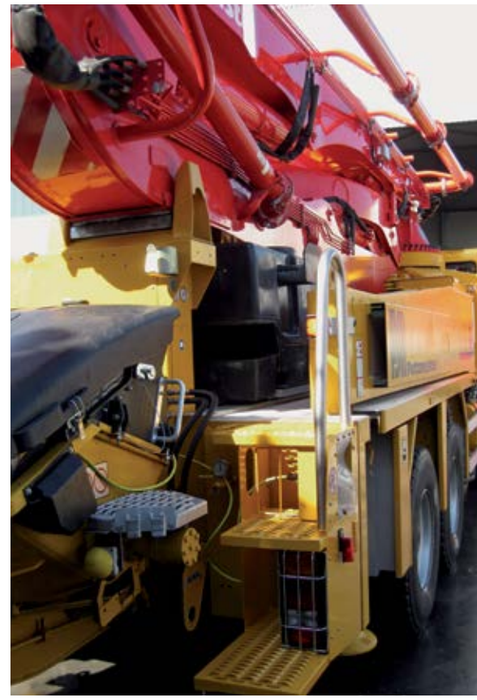
"We are giving Putzmeister machines and other leading brands in our sector a new lease of life", says Vinicio Lucesole, Operations Manager at PMI.
"We have a large, fully equipped factory and skilled technicians who can perform any type of test or repair. The central touristic location in Italy makes customers of all nationalities feel right at home. At the same time, we have the option of shipping machines from different Italian ports to any country in the world."

Used Machine Business International
Putzmeister Italia S.r.l.
47832 San Clemente (RN) / Italy

www.used-putzmeister-pumps.com

There are many good reasons for buying a used Putzmeister machine

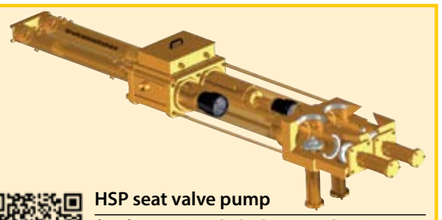
- The vehicle (MB, MAN or other) is tested at a specialist workshop and overhauled where necessary, and has technical inspection certificates (TÜV, AU, etc. where required).
- The concrete pump structure is inspected, including the inside and/or non-visible areas. This is the basis for the subsequent repair.
- Wear parts with more than 50 % wear are replaced (delivery line, spectacle plate, etc.)
- Operating materials are tested (hydraulic fluid check) and changed depending on their condition.
- Delivery pistons are generally replaced, drive cylinders sealed, radio equipment is tested, etc.
- Refits are carried out and technically compatible software is updated.
- Standard accessories are checked and supplemented.
- Final acceptance is carried out, similar to that of a new machine (manufacturer's inspection).



➔ *Tailings ...*

... are fine-grained residues from mining that usually come in the form of watery sludge. These residues are deposited in sludge lagoons ("sedimentation tanks").

Source: www.agw.kit.edu

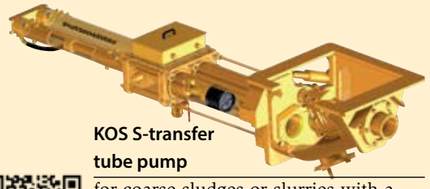


HSP seat valve pump

for fine grained sludges or slurries

Output up to 400 m³/h

Pressure up to 150 bar



KOS S-transfer tube pump

for coarse sludges or slurries with a high proportion of solids, up to 80 mm grain size

Output up to 400 m³/h

Pressure up to 150 bar

Conserving resources in the mining industry with Putzmeister pumping technology

The global increase in demand for metal raw materials has forced mine operators to search for deeper-lying deposits that are more difficult to access and produce more spoil.
The residues from ore processing (so-called tailings) are usually transported to a specific spoil dump located in the vicinity of the mine. The large quantities of processed material cover huge areas of land and place an ever greater burden on the environment. Water consumption is a particularly sensitive issue here since the mines are often located in parts of the world where water is a rare commodity. It makes sense to conserve this resource. Existing landfill methods must be improved by including more dry solids and less water in the conveyed material. Putzmeister high density solids pumps meet these important requirements and can easily take care of the job.

High density solids pumps can convey tailings with a high dry solids content, which means a considerable reduction in water and energy consumption and less land required for landfill.
In the past, processes for transporting tailings have often been intermittent, whereas today pumps and delivery lines are operated in a continuous process. The hydraulic transportation of tailings in a closed system is the most environmentally friendly and efficient method for conveying large quantities of material to the landfill site.

Material characteristics of tailings

The solids produced during processing have different properties depending on the material and the processing method. By-products that cannot be reused include mixtures consisting of solid and liquid components that have different weights, dry content, particle sizes and thixotropic, abrasive and adhesive states. Obviously not every type of tailing can be pumped. A pumpable solid must be saturated, i.e. the flow amount must have an adequate concentration of grit to ensure that the components come into contact with one another and produce an elastically malleable mass flow.
When tailings are pumped, the material must permanently retain its elastic properties and the carrier liquid and solids must not segregate. In order to pump solids with a low water content over long distances, "dewatering" must be prevented in the delivery line.

Using the right high density solids pump is the key

Several factors play a role in selecting the right pump:

- Properties of pumped material
- Dry content
- Particle size and water content

Centrifugal pumps wear quickly due to the high throughput and have a low efficiency rate of less than 60 %. Eccentric auger pumps are suitable for materials with a solids content of 20 % and can generate delivery pressures of 30 bar. They can convey aqueous or viscous tailings that do not contain coarse foreign particles.

Hydraulically powered high density solids pumps are the first choice

Hydraulically powered piston pumps are ideal for high-viscosity materials with a high solids content or extremely dry mixes.
Two types of Putzmeister pump are primarily used in the mining industry:

Seat valve pump – HSP

The HSP is a specialist for fine grained sludges or slurries with a maximum dry content of 70 %.
It can convey material at a maximum pressure of 150 bar and outputs of up to 400 m³/h.
The special PCF hydraulic control (Putzmeister Constant Flow) achieves a smooth, virtually continuous output flow rate.

Piston pump with S transfer tube – KOS

The KOS is the first choice for applications where seat valve pumps are limited because the material is extremely coarse, for example.
The operating principle of the KOS is the same as that of the S transfer tube concrete pump. Foreign particles up to 2/3 the size of the outlet diameter can be pumped. Fewer moving parts and low wear make them ideal for conveying large volumes of material.

Reduced water consumption

Environmental protection and the conservation of water resources have increased the importance of using high density solids pumps to transport tailings. In the past, the often huge volumes of water consumed by conventional pumps (ratio of 80 % water to 20 % transported solids) was accepted without a second thought, but much has changed over the last few years. Modern Putzmeister pumps convey materials with only 30 % water content.

For example: The Bulyanhulu Gold Mine in Tanzania

The Bulyanhulu Gold Mine in Tanzania went into operation in 2001. The mined ores are processed by a flotation plant and then transported to the disposal site as tailings. The soft material has a dry content of approximately 75 %. 80 bar of pumping pressure is required to convey the material over a distance of 2.5 km.

▲ Tailings plant at the Bulyanhulu Gold Mine, Tanzania

▶ Thanks to Putzmeister, fewer delivery lines with a much narrower diameter are required to transport tailings (red pipeline on the far right)
In comparison: Three conventional delivery lines with a large diameter plus one line for water runback

The Putzmeister seat valve pumps in Bulyanhulu achieve extremely high Miller values, such as 197 in this case, and even higher. Virtually no wear occurs in spite of the heavily abrasive material.
The two HSP 25100 machines (one on standby) operate in the tailing plant 24 hours a day, 365 days a year. 700,000 m³ of tailings are conveyed each year. ■

Rely on us: Service. Parts. Training.

What makes good service? Rapid assistance, outstanding consultation and reliable provision of original Putzmeister accessories and parts accompanied by the continuous qualification of all service technicians worldwide, a tight information network, state-of-the-art tools and consistent orientation towards the needs of our customers and their applications.

Our service technicians are equipped with the latest technology for accessing **all the relevant technical information about your machine** at all times so that we can provide outstanding support in the event of emergencies, repairs or preventive maintenance. Our service technicians, or for extreme cases, **the technical specialists at our company headquarters are on standby 24 hours a day** to provide backup.

If necessary, the Putzmeister Service Team can pay a **visit to the site** or you can take the machine to an affiliated **Putzmeister service workshop** where you will find all the equipment, machinery, software analysis tools and original parts needed to perform professional and expedient repairs.

We will make sure that all Putzmeister workshops as well as the workshops run by our international PM partners employ **qualified personnel** who are capable of performing manufacturer inspections and acceptance tests in line with requirements.

Needless to say, we always use **Putzmeister original parts in our workshops** because only these parts have a level of quality that is continuously tested and guaranteed, also in combination with other components. Only by using original parts can your machine reliably meet the tough requirements for pumping concrete as well as maximise the performance and the availability of your machine.

Putzmeister offers this range of services **in more than 120 countries all over the world**. At every Putzmeister support centre, you can expect assistance from a team of experienced, competent service staff who know exactly how to help you.

We are there for you: services@pmw.de

Putzmeister Service

Putzmeister service centres offer the following services:

➔ *Instruction at machine handover*

Correct approach right from the start.
Receiving correct instruction is the only way to prepare you and your machine operator for all the special features and innovations offered by the machine. Specially trained Putzmeister personnel will be happy to answer any questions you may have and listen to your suggestions.

➔ *After-sales service after 100 hours*

Avoid possible sources of error.
Technical after-sales service after 100 operating hours with a status report on the state of your concrete pump as outlined in the Putzmeister Service Plan. The after-sales service is conducted by experienced and continuously trained service engineers.

➔ *After-sales service after 500 hours*

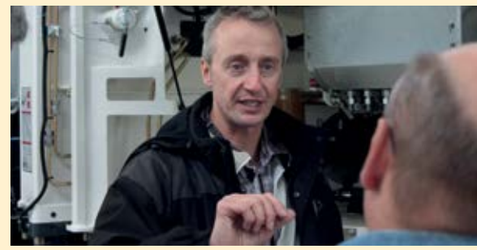
Guarantee reliability. Monitor wear. Retain value.
Technical after-sales service after 500 operating hours with a status report on the state of your concrete pump as outlined in the Putzmeister Service Plan. The after-sales service is conducted by experienced and continuously trained service engineers.

➔ *Boom inspection*

Maintenance costs can be calculated. But downtime costs cannot!
The obligatory boom inspection/manufacturer inspection is a visual and function check of safety-relevant components such as the frame, supports, boom pedestal, arms and hinges. The hydraulic system with cylinders, electrical system and core pump are also inspected.

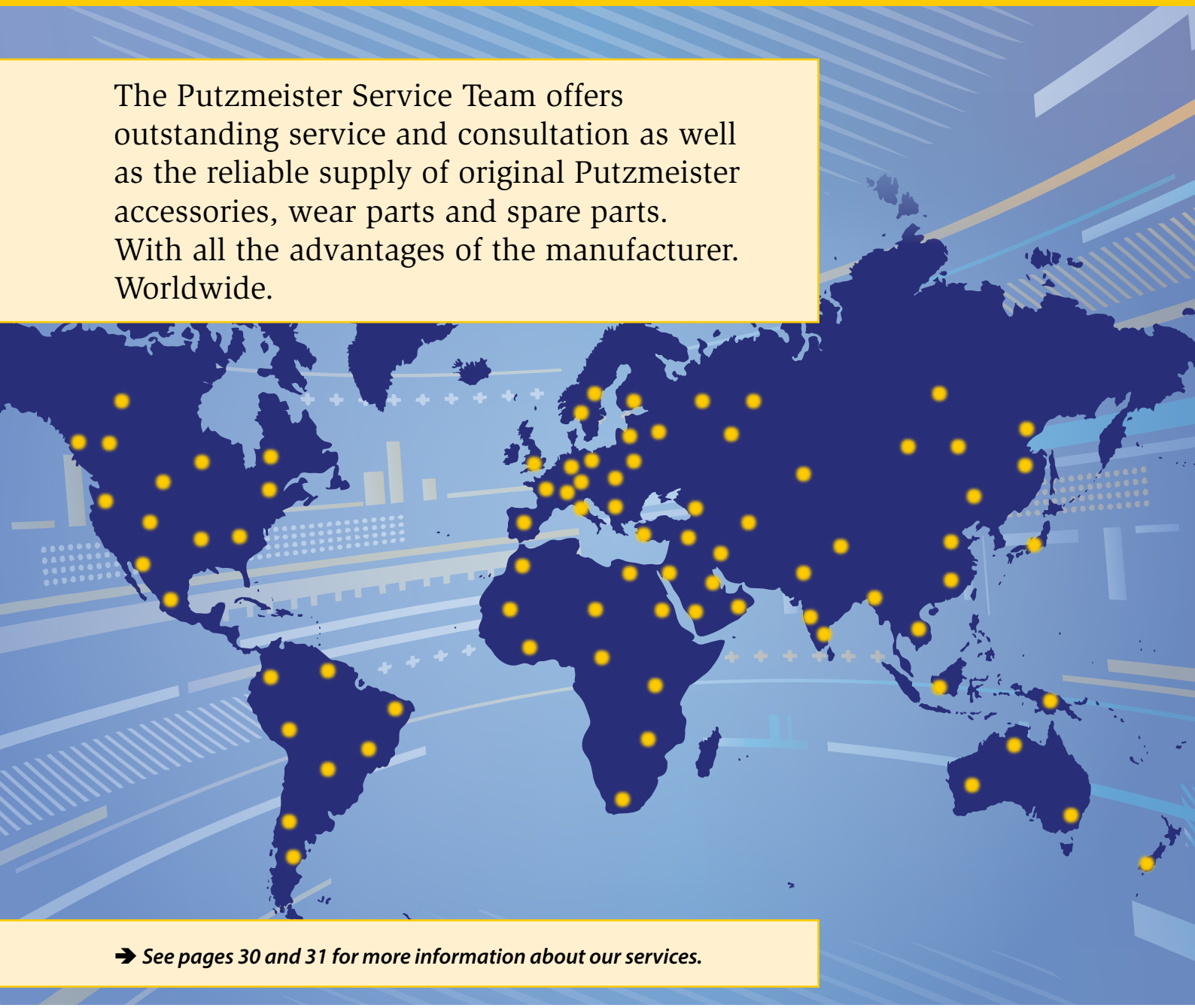
➔ *Customer training*

Benefit from professional knowledge!
Trained employees are valuable employees because knowledgeable personnel bring many benefits in a practical situation. Your employees will be able to master the machine and all of its special features, use it correctly, reduce operating costs and avoid operating errors.



A strong global team: Putzmeister service centres

The Putzmeister Service Team offers outstanding service and consultation as well as the reliable supply of original Putzmeister accessories, wear parts and spare parts. With all the advantages of the manufacturer. Worldwide.



➔ *See pages 30 and 31 for more information about our services.*

Putzmeister

Putzmeister Holding GmbH
Tel. +49 (7127) 599-0 · Fax +49 (7127) 599-520
www.putzmeister.com · pmw@pmw.de

PM 4609 EN