BMS 2022

YOUR CONNECTION TO CRANES, LIFTS AND MORE

EXCITING NEWS FROM
BMS GROUP OPERATIONS
AROUND THE WORLD

CONTINUED GROWTH IN A CHALLENGED MARKET

In many ways, I could choose to reuse my introduction from the 2021 BMS Group magazine for this edition, as the most recent 12 months have also been equally challenging due to COVID-19.

Notwithstanding, I am pleased to summarize 2021 and note that BMS Group is still in positive development. This is due to the confidence that a steadily increasing number of customers worldwide show us – and the fact that our employees are highly adaptable.

All employees have made a great effort and shown a very high degree of flexibility whilst abiding by COVID-19 restrictions. There is certainly reason to praise the people in the field for putting up with often significantly longer assignments, to address the very diverse constraints in the countries in which we operate.

Running an organization like BMS Group with success is about being well positioned through good management and extremely flexible employees. This is why we often have the right equipment and the right people available at relatively short notice for tasks around the globe.

The growth of BMS Group is not least due to BMS Heavy Cranes A/S, our company dealing with large, often quite complicated lifting tasks, globally. As of this year, they are represented on five continents.

Another contributing factor is our focus on further strengthening our position in Scandinavia. For several years, we have run a consistent and expanding business, Kranringen AS, with five branches in southern Norway. In 2021, BMS Group was invited to become co-owners of Crane Norway, which is Norway's largest crane company with a fleet of nearly 300 mobile cranes. Under the co-ownership of Crane Norway, we are now represented with around 2 0 departments and depots across the country.

This magazine is proof that the transport and erection of onshore and offshore wind turbines continue to be one of our core tasks. However, the companies within BMS Group solve an extremely diverse range of assignments – from critical infrastructure, industrial facilities and bridges to moving museum objects, construction of housing and the establishment of metro lines.

Regardless of the task, the safety of each employee is essential to us. As stated in our Health, Safety, Quality and Environment (HSEQ) Policy, we deliver a high level of safety and quality in our daily work and, consequently, strive to be an appreciated employer and business partner. Therefore, we continuously have focus on registering and controlling our health and safety impacts and, thereby, prevent both mental and physical work-related injuries. We are also committed to training and educating our employees , to be able to provide a higher level of safety and quality work.
As a result of the positive development and growth seen this year, we decided to move BMS Group's HQ. This way, we made more space for BMS Heavy Cranes administration and our expanding number of employees.

I hope you will enjoy reading about some of the projects that BMS Group has carried out this year and get a sense of the variety of tasks we do, but also what our company stands for.

We look forward to doing business with you.

Best regards,

Jens Enggaard
CEO

BMS Group on the International Cranes and Specialized Transport's IC50 listing of the world's top crane companies:

European rank	3
Global rank	6
Depots	45
Employees	1,500
Wheeled mobile cranes	540
Lattice cranes	54
Largest crane	Liebherr LR11350

SAFELY MOVING THE LONGEST BLADE EVER PRODUCED

// DENMARK
// OFFSHORE WIND

As a pioneer in the offshore wind industry, Siemens Gamesa Renewable Energy is passionate about pushing the limits of offshore wind technology development.

As the design and construction have a significant impact on the output and reliability, the blades play a crucial role in the performance of a wind turbine.

Since the first offshore turbines were installed at Vindeby, in Denmark, back back in 1991, the company has strived to develop the most optimal blades, built to perform under rough offshore conditions. Today, the longest blade ever produced is a reality, at a length of 108 m – the Siemens Gamesa B108.

BMS Krangården was entrusted with transporting three B108 blades to the National Test Centre in Østerild, where BMS Heavy Cranes took care of the installation on a SG 14-222 DD prototype. To transport the blades, BMS Krangården used its Goldhofer Transport PST/SL-E system to manoeuvre safely through the terrain.

It is far from the first large scale transport carried out in the National Test Centre in Østerild. For instance, in 2020, BMS Krangården participated in replacing 94 m blades with 97 m blades. Within three days, three old blades were driven to the port of Hanstholm, where a ship delivered the new blades.

For this assignment, BMS Group provided self-propelled modular transporters (SPMT), for transport, smaller cranes for loading and unloading at the port and the test facility, as well as 500 tonnes and 750 tonnes cranes for loading and unloading the ship.

Produced at the company's facilities in Aalborg, Denmark, the Siemens Gamesa B108 blade is the longest wind turbine blade ever developed. At 108 m, the blade is more than six times longer than the first offshore turbine blades installed at Vindeby three decades ago. Building on the experience of its predecessors, the B108 takes advantage of the IntegralBlade® technology, as well as the PowerEdge solution and lightning protection system.

TOTAL FACTORY RELOCATION

// SWEDEN
// INDUSTRY

When the Finnish publicly traded company Metso Outotec Oyj, faced an extensive relocation in Sweden, BMS Group was contacted. The assignment was to move approximately 2,500 tonnes of machinery and factory equipment. This resulted in a collaboration that stretched over 12 months. It involved eight riggers from the jacking and skidding department, hydraulic towers, spider cranes, trucks, mobile cranes, trailers and more. Indeed, it was among the largest and most comprehensive projects for BMS Heavy Lifting in Sweden.

The total factory relocation at Metso Outotec due to one of the company's factories was closing down. BMS Group was commissioned to take care of all rigging, heavy handling, logistics, oversize transport, international sea transport and freight to three destinations, including Asia and South America.

For the assignment, BMS Heavy Lifting invested in a total of 12 hydraulic towers from Enerpac. While the eight Enerpac SL200s are hydraulic gantries with a maximum capacity of 200 tonnes on four legs, the four Enerpac SL400Ns are narrow-bodied gantries for heavy lifts in tight spaces. These hydraulic towers provide a maximum capacity of 400 tonnes. However, the new hydraulic towers come in handy in connection with many other tasks, as BMS Heavy Lifting in Sweden is currently in an expansive phase.

Metso Outotec was created by merging the companies Metso Minerals and Outotec in 2020. With more than 15,000 employees and a presence in 50 countries, Metso Outotec is a frontrunner in sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. Ranked 8th on the 2021 Global 100 list of the world's most sustainable companies, Metso Outotec helps customers improve efficiency, increase productivity but also reduce environmental and economic risks.

LIFTING VIKING HERITAGE

// DENMARK
// CULTURE

When one museum is about to rebuild, it can benefit another museum. An excellent example of such a stroke of luck is the Norwegian Viking Ship Museum on Bygdø, part of the Museum of Cultural History in Oslo.

As a new museum building is being built, the Danish Moesgaard Museum (MOMU) in Aarhus was lucky to expand its permanent Viking Age exhibition with a Viking boat on loan from the Norwegian Museum.

The Viking boat is part of one of the most famous and well-preserved finds of the Viking Age, as it was discovered on the deck of the large Viking ship "Gokstadskibet". From the end of the ninth century, this ship was found in a burial mound and excavated in 1880.

The transport task was placed in the hands of the company MTAB, who has 50 years of experience in transport, handling and storage of valuable or sensitive objects and technical equipment. When it came to get the precious cargo inside, MTAB chose to collaborate with BMS Kruse.

The assignment included lifting the boat from a tailor-made ramp and down on an existing landing. Then, the challenge was the landing's low carrying capacity and at the same time, there was limited access to get the lifting gear in place. In addition, the museum's interior design and exhibited objects had to be taken into account. The operation was successful, with the help of mini-lift towers, aluminium plates to protect the floor and a small electric truck with a crane arm to lift gear unto the landing. It took two special cranes and ten hours of focused work to get the boat in place in the exhibition.

As MOMU focuses on archaeology and ethnography, the Norwegian boat fits perfectly in the existing exhibitions. The boat is one of three found on the deck of the Viking ship "Gokstadskibet". These boats are similar to the large dragon ships of the Viking Age, only they are smaller. The boat on loan is 6.5 m long and has four oars.

Photos: Rógvi Nolsøe Johansen, Moesgaard Museum

ALWAYS SAFETY FIRST

In BMS Group's Health, Safety, Quality and Environment (HSEQ) Policy, under "Guidelines" it's stated that "the manager in charge must ensure sufficient instruction, training and education for each employee to make this person competent for the task." Furthermore, under "Objective" it says that "we are obliged to train and educate our employees into supplying a higher level of safety and quality work."

In practice, one example of this is BMS Group's development of a step-by-step contingency plan for emergency cases. It is to be used when it is not possible to get in touch with the employee working in the tower crane.

As a vital element of this plan, BMS Group conducts rescue training for all relevant personnel. The training includes employees from Emergency Medical Services and Rescue Services.

The pictures show how a rescue worker is lifted to the crane cab by a man lift. The employee, a training manikin in this specific case, is out of contact with colleagues on the ground and could be in a critical situation. By following and acting according to this particular contingency plan, it will be possible to extract the employee from the cab high up, in the best possible way, despite very difficult conditions and possible health issues.

The contingency plan has been developed in co-operation with active BMS crane operators and rescue experts.

The HSEQ Policy also states that BMS Group's purpose is to deliver a high level of safety and quality in the employee's daily work and, consequently, strive to be an appreciated employer and business partner.

THE LIGHT RAIL IS NO LIGHT JOB

// DENMARK
// PUBLIC TRANSPORT

Since 1947, the Danish capital , Copenhagen, has developed according to the so-called *Finger Plan,* which is an urban plan where the development goes from the centre towards the larger surrounding cities.

The plan has made it easy to get to and from the centre, but mobility across the *fingers* has not kept up. In other words, there is a great need for infrastructure to support the development across cities throughout the metropolitan area. As a result, Hovedstadens Letbane (The Capital's Light Rail Transit – LRT) is being built, as it will strengthen public transport and support growth and development in Greater Copenhagen. The LRT will link five S-train (hybrid urban-suburban rail) lines and regional train traffic and create a coherent, user-friendly public transport system in a region with significant mobility and congestion challenges.

One of the players in this process is BMS Group, who is tasked with installing several bridges as part of the infrastructure project. The customer is DANPRO Steel Construction A/S, and BMS Group is represented by Torben Rafn A/S, BMS Copenhagen and BMS Engineering.

The picture shows the installation of one of six bridges, of which four are 96 tonnes and mounted over roads, while the remaining two are 177 tonnes and placed over railway tracks.

Unloading of smaller bridge sections takes place at an assembly site, and after welding, the units are transported to the installation site. For the transport of the above mentioned four smaller bridges, Torben Rafn A/S used a tractor unit in front of an 11-axle heavy-duty trailer with a vessel deck as spacer. Two tractor units with 2 x 16-axle heavy-duty trailers with turntable were used for the two larger bridges. All transports were performed with Goldhofer THP/SL axles.

A Liebherr LTM1450-8.1 mobile crane (450 tonnes) was used to unload the smaller sections, while two mobile cranes of the same type were used for mounting the welded bridges.

As in all projects of this size, there were significant requirements for security and documentation, in part due to many parties involved in the project. In addition, requirements for the distribution of the outrigger's load on existing structures had to be considered. Also, there were strict requirements for transport due to passage with high axle load on existing bridge structures.

Hovedstadens Letbane (The Capital's Light Rail Transit – LRT) will be put into operation in 2025. With 29 stations and a route over 28 km, it will link existing public transport in Copenhagen together from north to south.

THE WORLD'S FIRST RENEWABLE POWER SUPPLY FOR OFFSHORE OIL AND GAS

// NORWAY
// OFFSHORE WIND

Hywind Tampen has a central role in Norway's efforts to reduce total greenhouse gas emissions. In operation by the end of 2022, the plant will reduce the annual CO_2 emission by 200,000 tonnes, equivalent to the emissions of 100,000 cars running on fossil fuels.

In 2021, BMS Group became the co-owner of Crane Norway, Norway's largest crane company with a fleet of nearly 300 mobile cranes, truck-mounted cranes, and transport equipment.

For several years, BMS Group has run a steadily expanding business with five branches in southern Norway. Under the co-ownership of Crane Norway, the company is now represented in 20 departments and depots across the country. For Crane Norway, it is essential to be part of the progress of society, which is on par with the strong focus many customers have on the development in various disciplines. For example, expertise and equipment are in demand in connection with Hywind Tampen, a pioneering project in offshore wind. It is the world's first renewable energy source for offshore oil and gas operations.

Hywind Tampen includes eleven Siemens Gamesa SG 8.0-167 DD wind turbines with a capacity of 88 MW. Mounted on floating concrete substructures, the turbines are estimated to meet about 35 % of the annual electricity power demand of the Snorre A and B and Gullfaks A, B and C oil and gas operation platforms.

The level of innovation of this project can provide excellent opportunities for the Norwegian industry, as the development of floating offshore wind technology can provide the supplier industry unique experience, as well as, crucial expertise in a strongly growing global market for offshore wind.

The focus is on developing and improving testing of larger turbines, installation methods, simplified anchoring, concrete structures, and integration between power generation systems for gas and offshore wind.

After the initial work on the concrete foundations in the Kvaerner Stord dry dock, the constructions are transported to Dommersnes in Vindafjord, where the casting takes place. The wind turbines will be assembled at Gulen industrial harbour in Fensfjorden, before they are towed to an area between Snorre and Gullfaks, some 400 km out into the North Sea.

OVER THE CANAL

// DENMARK
// CONSTRUCTION

In the government quarter in the heart of Copenhagen, you will find two spectacular buildings on either side of the Frederiksholm canal. One is King Christian IV's old brewery, built in 1608, which today houses 384 royal sculptures from the 16th to the 18th century. On the other side, and as an architectural opposite, stands cubist building BLOX from 2017, which is home to the Danish Architecture Centre, the Danish Design Centre and an interdisciplinary innovation environment for sustainable urban development with 500 open office spaces.

BMS Engineering has not yet had the pleasure of working at the former brewery. However, when the glazier company, SnoerGlas, had to replace large glass panes at BLOX, they called on BMS Group to help with the delicate the job.
The panes measured 244 x 414 cm.

Due to the extremely cramped space and because both works of art and pavements had to be considered, therefore, it was necessary to lift the panes with a balance yoke over the water. Since the glass had to be replaced under eaves, this could only be done using the balance yoke. In addition, special consideration had to be given to the location, erection and dismantling of the crane and, of course, the traffic in an often-hectic part of Copenhagen. The removal of the existing glass panes and installation of new ones was carried out by placing the crane on the opposite margin of the canal where BLOX is located, as there was more space to establish a work area, and thus the lifting could be done across the water.

A Liebherr LTM1450-8.1 mobile crane (450 tonnes), a Libro 2,500 kg balance yoke and a Kappel 1,500 kg vacuum suction were used to solve this extraordinary task.

I SEE A SEA OF GREEN, CLOUDS OF WHITE

// UNITED KINGDOM
// OFFSHORE WIND

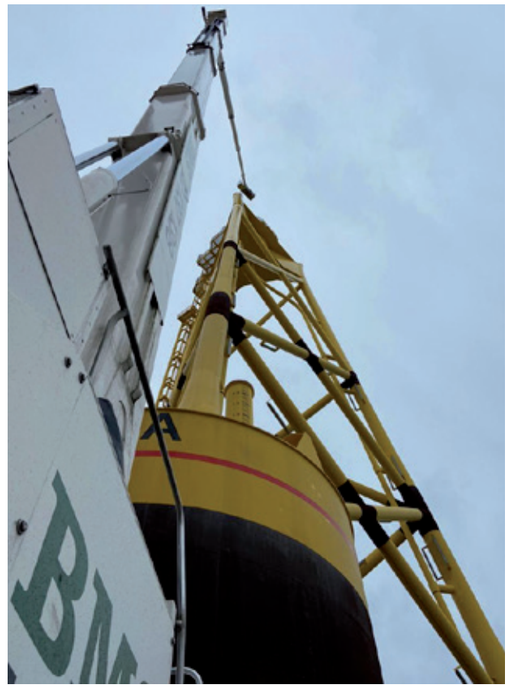
The Seagreen Offshore Wind Farm turbines will displace over 2 million tonnes of CO2 from electricity generated by fossil fuels every year, similar to removing more than a third of all Scotland's annual car emissions.

About 25 km off the coast of Scotland, by Angus in the North Sea firth, the 1,075MW Seagreen Offshore Wind Farm is being constructed. It will be Scotland's largest, providing enough green energy to power more than 1.6 million homes. Preparations for the wind farm are being made at Port of Nigg. Tucked away in the Highlands on a sanctuary inlet, the energy park is surrounded by rolling hills covered in pine trees with snow-capped mountains in the background, as the North Sea fills the landscape on the other side. In 2003, as the size of the saltmarsh increased, it started to attract pintails, pink-footed geese and wintering wigeons. This is where BMS Lifting Ltd. is working on the foundations for the Seagreen wind turbines. Assigned by Global Energy Group, BMS Lifting Ltd. supplies a 103 m Palfinger WT1000 platform for high-level work on the wind turbine foundations, otherwise known as jackets.

The project includes 114 jackets in sizes between 82 and 94 m. The platform is used to reach the top of the jackets, where various tasks and inspections are performed before they are installed at sea. Working twelve hours a day, seven days per week, duties include inspecting cranes and painting of the jackets, installing engineering equipment and making fabrication changes to handrails, gates and other metalwork.

The platform's ability to operate on high wind mode and its long reach has been an added value for the project's success.

A number of health and safety requirements were put in place by Global Energy Group before the job started. However, due to BMS Group's wealth of knowledge, experience and understanding of these types of projects, this process was easily managed. All operators have the required training in place, and BMS Lifting also conducted in-house refresher training before the equipment went to the site.



THE GIANT WAS SLAIN

// DENMARK
// ENERGY

One Sunday morning in late October 2021, the last visible evidence of Amagerforbrænding fell in southern Copenhagen. It is a decommissioned energy plant for incineration of waste and production of electricity and district heating to the Danish capital. It happened when the remaining 150 m high chimney was dismantled through controlled blasts. The timing of the blasts was kept secret to prevent people from gathering nearby to see when the giant was slain. While the actual blasting was quickly over – first at the bottom of the chimney and three seconds later at the height of 92 m – months of planning preceded the operation. The extensive preparations included coordination with the police and other authorities. Also, meticulous calculations were made to ensure that the chimney would fall in the right direction and not damage surrounding structures.

The task was performed by J. Jensen A/S, a full-service contractor and consultant in demolition. This company chose to collaborate with BMS Lifts, which with the help of a 103 m lift hoisted equipment and crew up to 92 m height to prepare for the blasting.

In the two weeks prior to the demolition, BMS also dispatched two 300 tonnes mobile cranes, to assist in the final preparations of placing explosives and heavy mats to protect from debris.

Amagerforbrænding was inaugurated in 1970 and, for more than four decades, handled non-recyclable waste from the capital's citizens and supplied them with electricity and heat. This task was taken over in 2017 by the new facility Amager Bakke, which ensures both higher energy production and cleaner air.

Although Amagerforbrænding's chimney is now history, parts of it live on as the concrete is being decomposed and recycled for new constructions in the Danish capital.

Chimney height:	151 m above sea level
Diameter:	14 m at the bottom and 5.5 m at the top
Estimated weight:	2,500 tonnes
Access to the top:	Internal elevator

THE FIRST OF ITS KIND IN SWEDEN

// SWEDEN
// EQUIPMENT

As activity steadily increases in Sweden, BMS Kranar AB has invested in more machinery. Among the purchases is a Palfinger PCC 115.002 Compact Crawler Crane – the first delivered to Sweden and most likely also the first one in the Nordic countries.

One of the first places the new crane has come to work is at the battery factory Northvolt 1. This company, which in 2017 announced the bold plan to enable the future of energy by developing the world's greenest battery cell and establishing a European supply of batteries, is expanding its facilities in Skellefteå, which is about 800 km north of Stockholm, BMS Kranar has about 15 men and several cranes, trucks, and other machinery in operation at site.

One of the reasons for choosing a Palfinger PCC 115.002 is its divisible chassis. This enables lowering the machine to only 2,6 m in height, allowing it to enter for instance business galleries and low-ceiling industrial buildings.

Thanks to a 7 tonnes counterweight, the crane has a full lifting rate of 360 degrees on half the support legs. A remote control ensures easy operation while keeping the load constantly in view for maximum safety and efficiency. The new BMS crane can run on two power supply systems: Diesel power from Caterpillar or entirely on green electricity. As it can be placed on a railway carriage, it can also perform tasks in tunnels and metros.

The crane has a maximum capacity of 1,300 kg at 34 m and it is equipped with a winch, with a capacity of 14 tonnes. As it has a Pick and Carry function, it can be moved with a load on the hook.

In addition to the new Palfinger PCC 115.002, BMS Kranar AB has several mini cranes. Among these are a BG Lift CWE 525, as well as, Maeda and Jekko mini crawler cranes.

CREATIVE THINKING IS A NECESSARY SKILL

// DENMARK
// CONSTRUCTION

Around construction sites, employees from BMS Group experience less and less space for erecting and lowering cranes. Therefore, it's often necessary to think creatively when space is tight – and in many cases, the Liebherr LR1130 crawler crane becomes the obvious solution.

This choice is partly because this type of crane achieves very fast working cycles, and its continuous proportional control allows for simultaneous movements. Moreover, load charts are calculated online during operation, thus ensuring optimal use of the crane. The flexible boom configurations offer a wide range of lifting applications, and thanks to the proven jack-up and self-assembly system, it can quickly be set up without the need for an assist crane.

There are numerous examples of construction projects in Denmark where BMS Group's Liebherr LR1130 crawler cranes and highly skilled employees have played a crucial role in solving complicated tasks.

In connection with the construction of dormitory apartments in Denmark's second-largest city, Aarhus, there were not only cramped working conditions on the construction site itself. It was also necessary to request permission from the authorities to establish roadblocks, as the crane had to be laid out through a traffic light on one of the major access roads to the city centre. Naturally, this kind of assignment must take place when there is minimal traffic, thus the employees were at work from 6 p.m. to midnight.

BMS Group's Liebherr LR1130 was at another residential building in Aarhus, but when it had served its purpose, there was no longer sufficient space to take it down, due to the constructions around. Therefore, the dismantling had to take place on a public road, which placed extraordinary demands on both crew and equipment.

The third example is from Vallensbæk in western Copenhagen, where a Liebherr LR1130 was used to construct apartments. An 8-axle Liebherr LTM1450 mobile crane hoisted the crane into what would later become the construction's parking basement. From there, it performed all its tasks – with the boom laid down on the roof of the parking basement.

LIEBHERR LR 1130
Maximum load capacity: 137 tonnes
Maximum hoist height: 126 m
Maximum radius: 78 m

ARID, SCORCHING AND SANDY

// AUSTRALIA
// ONSHORE WIND

The Port Augusta Renewables Energy Park is located in South Australia, between the Spencer Gulf and a mountain range. It's placed at the start of the desert heading into the Australian outback and eventually across the Nullarbor Plain.

"This means conditions are generally arid, scorching, and sandy with over 40 degrees centigrade and large lightning storms moving in quickly up the gulf. Being so remote, there is plenty of local wildlife including emus, kangaroos and snakes", says Project Manager Luke O'Neill, BMS Heavy Cranes Australia Pty. Ltd.

Luke O'Neill is relatively new to BMS Group, having joined in early 2021 after years with a large engineering firm where he worked in the mining, oil, and gas sectors. Port Augusta is his first project. Changing to a company such as BMS Heavy Cranes Australia, which is in the renewables sector, has very different challenges compared to his previous occupation:

"The size and scale of the sites and the cranes themselves are massive. The logistics in mobilising these cranes to such remote sites, then being able to break down the cranes and relocating them between hardstands in almost a single day is exceptional. Our crews on site are a big part of our ability to succeed on projects like Port Augusta. Watching the team work together on relocating and setting up the Liebherr LG1750s, they demonstrate extraordinary skill and awareness of safety which is fantastic. The autonomy to run a project how you want, knowing you have the support from BMS management to make your own decisions, has been refreshing. BMS Group has a very good reputation for being professional, skilled and diligent in our work, both on the cranes and in the office.

All feedback from the customer and their client at the Port Augusta site has been very positive. Overall, it has been a great decision to join BMS Heavy Cranes Australia, and also work in an industry that is helping address the impact of growing energy consumption, climate and environmental issues for the future."

The Port Augusta Renewables Energy Park comprises 50 Vestas V150 4.2MW wind turbines. To solve the task, BMS Heavy Cranes Australia has provided two Liebherr LG1750 cranes and operators, plus assist and pre-assembly cranes and operators.

The project owned by the Spanish multinational electric utility company, Iberdrola SA, is a combination of wind and solar energy in Australia's largest hybrid renewable energy farm.

"Knowing the projects we work on have a direct positive impact on the bigger issues around climate change and emissions is something we can celebrate and be proud of. This goes especially for Australia, still being somewhat behind much of Europe. So future opportunities and growth for BMS Group here in Australia are pretty exciting", says Luke O'Neill.

The Nullarbor Plain (from Latin nulla 'no', and arbor, 'tree') is part of the flat, almost treeless, arid, or semi-arid country of southern Australia, located on the Great Australian Bight coast with the Great Victoria Desert to its north. It is the world's largest single exposure of limestone bedrock and occupies an area of about 200,000 km^2.

NO ROOM, NO PROBLEM

// DENMARK
// ENERGY

HOFOR – Greater Copenhagen Utility – supplies 1.1 million customers in the Copenhagen metropolitan area with drinking water, district heating, district cooling, town gas, and wastewater disposal. HOFOR also climate-proof the metro area against torrential downpours, erects wind turbines, and owns the Amagerværket power station, producing electricity and district heating. To counteract climate change, HOFOR is working to make the energy supply CO_2-neutral and reduce urban energy consumption through various initiatives – from energy consultancy to the reconstruction of waterworks and power stations.

When a 49 tonnes cooling pavilion had to be hoisted into place at HOFOR Fjernkøling A/S' cooling centre in southern Copenhagen, Denmark, several departments of BMS Group collaborated to create a plan.

A Liebherr LTM1450-8.1 from BMS Copenhagen was chosen to solve the lifting task, while the colleagues from Torben Rafn A/S were responsible for transporting the cooling pavilion on an 8-axle Goldhofer trailer. The task was complicated, as the cooling centre is built on an area with water on two sides and extensive piping and tanks in the ground on the other two. As an 8 m high fence surrounds the cooling centre, it was best to place the crane inside the centre yard. However, space was minimal and not exactly designed for a large mobile crane.

Despite the size of the selected crane, it was precisely the possibility of variable support legs and ballast, which were retractable, that ensured just enough space for the crane on the available area.

There was an additional challenge in that a 3 m deep plastic well, with a diameter of 2 m was located right where the front left support leg should stand. For the well not to collapse, it had to be filled with gravel. In addition, four pressure-relieving mattresses were laid out to distribute the 100 tonnes of pressure from the support leg.

Moreover, a traffic-light system on the access road to the cooling centre had to be removed, as neither the crane nor the low-loader could pass the narrow residential streets to the work area. Last but not least, it was also necessary to dismantle a section of the wall above the gate, for the crane to be rigged up inside the yard.

A total of 86 lifting gear with a weight of 3,855 kg was used to lift the cooling pavilion supplied by Eurocon Stålindustri ApS and Svedan Industri Køleanlæg A/S.

65°46’47.8”N
13°10’39.7”E

// NORWAY
// ONSHORE WIND

For those not entirely familiar with geographical coordinates, we can disclose that 65°46’47.8 ”N 13°10’39.7”E is quite far to the north in Norway. About 100 km southwest of Mo i Rana, or 900 km north of Oslo, you will find Øyfjellet Wind Farm. This is where BMS Heavy Cranes has been on crane and installation duty. The customer was Nordex Group, one of the world’s largest wind turbine manufacturers. The installation company was FairWind, a leading provider of one-stop solutions for installing and servicing of onshore and offshore wind turbines.

The task was to install 72 wind turbines of the type Nordex N149/5.X TS105. This is truly an extensive project, as the site stretches 30 km from the access road the last wind turbine is reached.

To solve the job, BMS Heavy Cranes used three Liebherr LG1750 for the main installation, while one Liebherr LTM1750 was used for pre-installation. In addition, nine auxiliary cranes – from 130 to 250 tonnes – as well as trucks, trailers and wheel loaders were used.

In any project, the particular circumstances must be considered when creating a plan. In this specific case, ice, snow and the hilly terrain were the main factors to consider, together with restrictions and quarantine days, brought on by the current pandemic.

Øyfjellet Wind Farm features N149/5.X TS105 turbines manufactured in the Nordex production facilities in Europe. In addition, the 1,000th ever-produced nacelle of the Delta4000 series was delivered to Øyfjellet Wind Farm from the Nordex factory in Rostock, Germany.

The wind turbines have a hub height of 105 metres and a rotor diameter of 149 metres. Øyfjellet Wind Farm will produce 1,200 GWh annually, which is about one-third of the aluminium producer Alcoa’s electricity needs. Alcoa has bought all the power produced for 15 years.

TUNNELLING UNDER THE CAPITAL

// DENMARK
// PUBLIC TRANSPORT

When metros are built, it calls for hefty equipment. Usually, these constructions occur in cosmopolitan areas, where buildings surround the site. Copenhagen is no exception, where a large metro expansion has been taking place, since 2009.

In connection with the metro construction at Ny Ellebjerg station in southern Copenhagen, the tunnel boring machines *Inge* and *Olivia* have drilled the necessary underground access and BMS Group has once more been responsible for hoisting the tunnel boring machines into the shaft, as well as, transporting them between stations and to the port after the drilling work was completed.

At Ny Ellebjerg station, BMS Copenhagen, BMS Project Sales and BMS Engineering have jointly planned and carried out transport and lifting of tunnel boring machines. The picture shows one of the machines on its way out of the shaft, where it is turned by two cranes in a tandem lift, a Liebherr LTM1450-8.1 mobile crane (450 tonnes) and a Grove GMK5250L mobile crane (250 tonnes). One of the special challenges with this project has been minimal space and extraordinarily high demands for documentation and safety. In addition, the lift included very heavy units with a weight of up to 122 tonnes each. Finally, there were exceptional requirements for the distribution of pressure from the support legs, as it was necessary to locate the cranes on the absolute edge of the shaft.

Copenhagen's metro consists of four lines, M1 to M4. The first part of the M4 was inaugurated in 2020 and, in 2024, another five stations will open on this line. The metro transports more than 73 million people in the Greater Copenhagen area annually.

FOLLOWING THE GREEN MOVEMENT

Earth is permanently affected by industrial and economic development and it can no longer fend for itself. Therefore, everyone must be accountable, responsible and active in managing the globe. That is what the United Nations' Sustainable Development Goals (SDGs) are about.

The SDGs were adopted in 2015 by all 193 UN member nations and, since then, more and more countries, municipalities, both public and private companies have embraced these goals and implemented them in different ways in their everyday lives. This also applies to BMS Group, where the SDGs are incorporated into the Health, Safety, Quality and Environment (HSEQ) Policy.

HSEQ Policy 's purpose clause states that BMS Group shall be seen as a responsible employer and business partner, regarding both climate and environment.

Specifically, HSEQ Policy focuses on the importance of following the green movement and on the environmental efforts, referring to both BMS itself and the suppliers. Furthermore, the Policy emphasizes the need to develop technical solutions favouring the environment and resource consumption in cooperation with the suppliers. Also, BMS Group is committed to reduce CO_2 emissions by focusing on improvement of planning/logistics, idle time on equipment and other actions that can make the difference.

For BMS Group, the SDGs are about concrete action. This is reflected in ever-increasing purchases of electrically powered equipment, which contributes to reducing CO_2 emissions. The latest green investments include a variety of electrically powered equipment, such as crawler cranes, tower cranes, pick and carry cranes, and forklifts.

Furthermore, BMS Group offers customers the use of HVO (Hydrotreated Vegetable Oil) diesel made from 100% renewable materials resulting in up to 90% per cent lower greenhouse gas emissions when compared to traditional fossil diesel.

"So far, the 17 Sustainable Development Goals are the most explicit answer to how companies (...) should act and react when it comes to practical management – not up in the clouds and in the distant future, but now and here."

Steen Hildebrandt

REFLECTING ON A CHALLENGING TASK

// DENMARK
// INDUSTRY

It is rare for an industrial building to be constructed in a way, that makes it effortless to install a new large-scale production facility. NLMK DanSteel A/S in Frederiksværk, in Denmark, is no exception, as space was extremely limited, when a 49 tonnes *kick out* unit for pushing steel slab had to be put in place. The assignment was given to BMS Copenhagen, who used a 220 tonnes Liebherr LTM 1220-5.2 mobile crane. Installation had to be done right beside a production line processing red-hot steel slab. In addition, there were numerous restrictions at floor level and below, such as cable trenches and shafts. Multiple options were considered. One of them was to reverse a large mobile crane halfway into the building and lift the *kick out* into position. However, this did not work because of high outrigger loads on the floor, as well as height limitations. Another possibility was positioning the *kick out* using hydraulic towers, skates and skidding beams. The downside to this option was that it would require several days of work.

In the end, BMS Copenhagen decided that the best solution would be to enter the building with a 5-axle mobile crane and lift the *kick out*.

To ensure an adequate surface, the concrete floor was covered by thick 80mm steel plates. Despite the steel plates, the floor could not resist the outrigger loads at all locations. Outriggers had to be placed on top- or right side, beside the secant pile wall or existing foundations. To make this possible Liebherr's VarioBase system was crucial.

By placing the crane in the centerline of the two existing columns, there was barely any clearance between counterweights and stability bracing. Furthermore, BMS needed to ensure that the counterweight and the auxiliary winch could pass underneath cable trays and walkways. Also, it had to be assured that the counterweights did not collide with the column and track for the *kick out*.

By rotating the crane slightly, it was possible to place the right front outrigger on the new foundation, just next to the steel column supporting the *kick out* track, with only a few centimeters to spare. The left front outrigger was placed on the foundation just next to the column, to ensure we have enough lifting capacity to pick up the *kick out*. The left rear outrigger was placed on top of the secant pile wall and the right rear outrigger was also placed secant pile wall, right next to one of the cable trench – only 40% extracted. One of our concerns was that it wouldn't be possible the slew with full counterweight over an only 40% extracted outrigger.

Since the lift had to be carried out inside an existing building, we were also limited by the height restriction to the rafters, which in turn affected our minimum working radius. At the exact point of pickup, the crane boom was very close to the gantry crane installed in the building, as well as, the cable trays for the crane containing high voltage power cables. For safety reasons, the power to the gantry crane was cut, until operations could safely resume.

For the *kick out* to be positioned correctly, the crane had to be able to rotate the load underneath the boom. However, at the same time, the *kick out* had to be lifted over the newly constructed furnace. Therefore, a lot of effort went into calculating the correct SWL of the lifting lugs and its equipment, to ensure that we could use as short slings as possible, in order to end up with a 90-degree lifting angle at the hook. This was a helpful solution, since the crane was unable to telescope with the load attached.

NLMK DanSteel A/S produces hot-rolled structural steel plates for construction, bridge building, wind industry, offshore oil and gas, shipbuilding, boiler and pressure vessels, and transport. The production capacity is 550,000 tonnes of plates per year. The company is part of NLMK Europe, employing almost 2,000 people at production facilities in Belgium, Denmark, France, and Italy. NLMK Europe has an overall annual production capacity of 3.1 million tonnes of value-added steel products.

BRINGING TETRASPAR TO LIFE:

THE WORLD'S FIRST INDUSTRIALISED OFFSHORE FOUNDATION

// DENMARK & NORWAY
// OFFSHORE WIND

By moving beyond the 50 to 60 m depth limit of conventional offshore wind power, the accessible offshore potential is in expansion, elevating this kind of wind power to a global source of clean energy.

Indeed, the urgency to expand global clean energy capacity continues.

Therefore, floating wind power's moment has come, as the Danish company Stiesdal Offshore Technologies A/S has leveraged experience from decades of offshore wind engineering to create the Tetra concept, a radically innovative floating foundation technology.

Stiesdal has chosen the Danish company Welcon A/S as their main supplier of tubular braces for the Tetra foundations, while BMS Group is a significant partner when it comes to heavy transport, port handling, sea freight, mobile cranes, self-propelled modular transporters (SPMTs), truck-mounted lifts, loading for barge and wind turbine installation.

One of the tasks for BMS Group has been to loadout the floater and the keel section of 1,200 and 900 tonnes, respectively, which took place using 52 SPMT axles.

The parties involved from BMS Group have been BMS Krangården, BMS Engineering, BMS Lifts, BMS Heavy Cranes and Torben Rafn A/S.

Initially, the job was focused on the Tetraspar Demonstrator, the world's first fully industrialized floating offshore foundation. It was assembled in the port of Grenaa, Denmark, and towed to Norway in July 2021. The demonstration project achieved a range of world firsts, including the automated factory manufacturing of the foundation components and the welding-free assembly at quayside. The TetraSpar Demonstrator was also the world's first spar foundation deployed from an ordinary shallow-water port.

Stiesdal Offshore Technologies A/S is a company within the climate technology group Stiesdal A/S, aiming to develop and commercialise technologies with a high impact on climate change mitigation.

DEVELOPING THE OPTIMAL SOLUTION TOGETHER

// DENMARK
// CONSTRUCTION

Fisketorvet Copenhagen Mall is one of Denmark's largest shopping centres with a unique location on the waterfront in the central part of the capital. The centre takes its name after Copenhagen's old fish market, located at the site from 1958 until 1999.

With a floor area of 58,000 m², 120 stores, 15 restaurants and cafés, as well as Denmark's only IMAX cinema, Fisketorvet Copenhagen Mall is extremely busy throughout the day.

When the centre, which opened in the autumn of 2000, had to replace two rolling pavements of 32 m each, one of the primary considerations was that it should be done with minimal inconvenience to the guests.

ThyssenKrupp, which was to supply the rolling pavements, chose BMS Group to carry out the task. This called for a classic collaboration between BMS Kruse and BMS Engineering. Together, they developed the optimal solution, which could be implemented after approval from ThyssenKrupp.

In addition to the consideration towards the many visitors, the challenge was that the original pavements were hoisted in with a mobile crane before the building was roofed. Therefore, other alternatives had to be considered. Also, it should be taken into account that there is a very limited load capacity on the deck at the upper landing of the rolling pavements. The solution was to place the largest burden under the pavements, rather than above them. By using a modular crane at the upper landing, the load could be transferred to the load-bearing beam. Apart from the modular crane and hydraulic mini-lift towers, a 5 tonnes electric truck and a custom-made frame were used.

Each of the two rolling pavements weighed 16 tonnes, but luckily, they could be split in two, which made the job easier, but not less challenging.

LIFTING THE BIGGEST JOBS TOGETHER

// DENMARK AND SWEDEN
// PUBLIC TRANSPORT

BMS Group and the Danish company Give Steel A/S have had a solid working relationship for several years now.

Give Steel is a leading producer of steel structures in Northern Europe. All steel structures are produced in Denmark and EPD-declared for accurate indication of the steel structure's climate footprint.

The company's mantra is DEVELOPMENT and Give Steel employs a total of 500 employees in Denmark, Germany and Poland. Under the strategy "We Grow People", Give Steel has a special focus on offering young people on the edge of the labor market an apprenticeship giving them an education and a good working life.

Give Steel delivers simple as well as complex steel constructions, steel structures and frames, welded steel rafters, steel rafters with welded wedge, trusses with small and large spans, column and beam constructions and the composite beams GSY BEAM® and GSY GREEN®.

Sustainability is in focus and today Give Steel presents some of the lowest carbon footprints in the market of Steel Structures.

The company's steel frames are used in constructions, in the public and private sectors – from technically complex steel structures to simple industrial and large logistic buildings throughout Europe.

The collaboration has given BMS Group assignments in Denmark, Sweden and Norway.

Recently, the companies have collaborated on a project in Ruddalen, approximately 10 km south of Gothenburg, Sweden, where they assembled a bandy hall of 80 x 128 m, consisting of 8,000 tonnes of steel. In addition, BMS Group handled roof trusses in four sections of 6.0 x 2.4 m and weighing 6 tonnes each. These roof trusses with a span of 80 m were put in place using four cranes. A total of two 70 tonnes mobile cranes, two 45 m mobile cranes and two 130 tonnes mobile cranes were used for this project. The entire task was completed in just 25 days.

The above project is just one example of the large scale projects where BMS Group and Give Steel are cooperating together.

Founded in 1974, Give Steel A/S has developed into a major producer of steel structures in Northern Europe. Currently, the main markets are Norway, Sweden, Denmark, and Germany.

From Give Steel's most recent history book

- 2021: Winner of the Cabis CSR People prize
- 2021: Launched GSY Green made of 98 per cent recycled steel
- 2020: Won a Tekla BIM Award for 3D modelling of Ilulissat Isfjordcenter in Greenland
- 2019: Received the European Steel Design Awards of Merit for KB Hallen, Denmark

YOUR CONNECTION TO CRANES, LIFTS AND MORE

// BMS A/S
Denmark
Group HQ: Aalborg

// BMS Krane GmbH
Germany
HQ: Harrislee

// BMS Heavy Cranes UK Ltd.
United Kingdom
HQ: Huntingdon

// BMS Heavy Cranes Green JSC
Russia
HQ: Moscow

// BMS Heavy Cranes Australia Ptd. Ltd.
Australia
HQ: Melbourne

// BMS Heavy Cranes A/S
Denmark
HQ: Nørresundby

// BMS Heavy Cranes Inc.
USA
HQ: North Carolina

// BMS Heavy Cranes Iberica S.L.
Spain
HQ: Madrid

// BMS Heavy Cranes Sp. Z.o.o
Poland
HQ: Gorzów Wielkopolski

// BMS Heavy Cranes Vietnam Co. Ltd.
Vietnam
HQ: Hanoi City

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// BMS Heavy Cranes Oy
Finland
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// BMS Heavy Cranes B.V.
Netherlands
HQ: Eindhoven

// BMS Heavy Cranes South Africa
South Africa
HQ: Johannesburg

// BMS Heavy Cranes Taiwan Ltd.
Taiwan
HQ: Taichung

// BMS Kranar AB
Sweden
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