

ENERPAC APPLICATION INSPIRATION



- Buildings and Stadiums
- Bridges and Infrastructure
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- **Power Generation**
- Steel and Metal Production
- Oil and Gas, Petrochemical
- Shipbuilding
- Mining

Enerpac Application Inspiration



POWERFUL SOLUTIONS. GLOBAL FORCE.

With more than 50 years of experience, Enerpac has gained unique expertise in delivering hydraulic solutions for the controlled movement and positioning of heavy loads.

This expertise has been acknowledged by the world's leading industrial professionals and has contributed to the successful movement of a number of the most recognizable structures on earth.

In addition to providing the most comprehensive line of globally-supplied, locally supported Heavy Lifting products, Enerpac combines hydraulics, steel fabrication and electronic control with engineering and application knowledge, to design and manufacture solutions that ensure your projects are completed safely and efficiently.

Power Generation	Page
Transformer Installation with a Hydraulic Gantry	4
Skidding System for Transformer Outage Maintenance	5
Power Station Joint Assembly with Hydraulic Torque Wrenches	6
Turbine Lift and Load-in at Shipping Port	7
Turbine and Generation Installation at a New Power Plant in Libya	8
Transformer Lift and Weigh Saves Freight Cost	9
Generator Installation at the Owen Springs Power Station	10
Turbine Module Transportation at TS Power Plant	11
Foundation Created for Offshore Wind Turbines	12
Computer-controlled Hydraulics Lift Large Spherical Vessels	13
Lifting and Rotating Suspended Loads with a Strand Jack Gantry with Rotation Unit	14
Placement of 1140 ton Nuclear Plant Module with s SynchHoist System	15
Installing Offshore Wind Turbine Base Foundations with a SynchHoist System	16
Transporting Spent Nuclear Fuel Dry Storage with an SPMT	17
Installing a Turbine and Generator with a Jack-Up System	18
SKYFFOLDING™ Scaffolding and Lifting System Supported by Strand Jacks	19

Transformer Installation with a Hydraulic Gantry

Customer: Roll-Lift, Lower Colorado River Authority

Location: San Angelo, Texas

Challenge: Roll-Lift was tasked with transporting and installing a transformer at a sub-station in San Angelo, Texas. Transported to Texas by rail, the 330 ton transformer needed to be transferred from the drop deck railcar to a heavy haul truck in order to be delivered.

Solution: Roll-Lift utilized a hydraulic gantry to transfer the transformer from the rail car to the heavy haul truck. Upon arriving at the sub-station, the hydraulic gantry was utilized to install the transformer on its platform.

Product: SBL900, Telescopic Hydraulic Gantry



Skidding System for Transformer Outage Maintenance



Customer: Bonneville Power Administration

Location: Vancouver, WA, USA

Challenge: The Bonneville Power Administration needs to maneuver and replace transformers at their power plants and stations during outages. During an outage, the maintenance team often needs to replace a transformer. Their existing process for replacing a transformer required multiple workers operating different pieces of equipment in coordination. BPA was seeking equipment to simplify and improve the safety of their current process.

Solution: A custom hydraulic skidding system will provide the maintenance team with the ability to maneuver and transport transformers with physical access limitations. The skidding system is comprised of two custom RD-Series push pull hydraulic cylinders, two ZE4 hydraulic pumps and a low height skid track and support beams. Both power units are connected together to provide synchronous travel of the load. The skid track's support system reduces setup time by enabling spanning of unsupported gaps between crib stacks. The hydraulic system provides a single operator the ability to precisely, and safely position their heaviest transformers with a push button control.

Products: Custom Low-Height Skidding System (LH-Series)
ZE4-Series, Electric Pumps



Power Station Joint Assembly with Hydraulic Torque Wrenches

Customer: Medupi Power Station

Location: Lephalale, South Africa

Challenge: Building the cooling tower structure of the Medupi power station required bolting together hundreds of steel joints. Each bolt required the precise application to be torqued, which is both challenging and requires a significant amount of time with manual tools.

Solution: A S3000 hydraulic torque wrench powered by a ZU-Series torque wrench pump fastened the bolts on each joint in less than a half hour. A hydraulic solution provided the means to apply a precise amount of torque to each nut, eliminating re-torque work.

Solution: S3000, Square Drive Torque Wrench
ZU4T-Series, Electric Torque Wrench Pump



Turbine Lift and Load-in at Shipping Port



Customer: Sarilar Group

Location: Samsun, Turkey

Challenge: A Siemens gas turbine arrived at the Samsun Sea Port destined for a new 600MW natural gas combined cycle power plant in Samsun, Turkey. The 482 ton turbine needed to be lifted and loaded onto a SPMT in order to be transported to the Cengiz Enerji power plant.

Solution: The Sarilar Group utilized a SBL1100 hydraulic gantry to lift the 482 ton turbine and lower it onto the SPMT. Once the turbine was lifted a SPMT was positioned under the hydraulic gantry. Using a wireless remote, a single operator was able to lift and lower the turbine. The process of transferring the turbine to the trailer was executed safely and with relative ease.

Products: SBL1100, Telescopic Hydraulic Gantry



Power Generation

Turbine and Generator Installation at a New Power Plant in Libya

Customer: Sarilar Group

Location: Khoms, Libya

Challenge: Çalık Enerji is constructing a new simple-cycle power plant with a 542 megawatt capacity in Khoms, Libya. The Sarilar Group was tasked with installing a GE gas turbine weighing approximately 280 tons and a GE generator weighing approximately 214 tons. Installation required lifting the turbine and generator over 5 meters high and lowering into position on a concrete foundation.

Solution: A SBL1100 hydraulic gantry was used to lift both the 280 ton turbine and 214 ton generator off an SPMT and position on the concrete foundation. The SBL1100 hydraulic gantry provided Sarilar Group the ability to maneuver the turbine and generator with precision; improving the safety and efficiency of the installation process.

Products: SBL1100, Telescopic Hydraulic Gantry



Transformer Lift and Weigh Saves Freight Cost



Customer: Machinery Movers Ltd.

Location: Whangarei, New Zealand

Challenge: Machinery Movers needed to know the exact weight of a transformer before it was shipped from New Zealand to India. A load in excess of the port's 110 ton maximum lifting capacity would require a special ship to be brought in which would incur significant freight costs.

Solution: A 12 point EVO-W Synchronous lift system and four RACL-Series aluminum lock nut cylinders were used to lift and weigh the transformer. Calibrated pressure transducers provided weigh data to the EVO system which was then downloaded from the system's USB port. After 5 weigh-ins, the average weight of transformer was certified at 109,4 tons. Verifying the weight of the transformer was under local shipping port weight limits saved the manufacturer significant freight costs.

Products: EVO-Series, Synchronous Lifting System
RACL-Series, Aluminium Lock Nut Cylinders



Power Generation

Generator Installation at the Owen Springs Power Station

Customer: Tutt Bryant Heavy Lift & Shift

Location: Alice Springs, Northern Territory, Australia

Challenge: Installing three 10.9 megawatt diesel gas generator and alternator sets at The Owen Springs Power Station near Alice Springs, about 950 miles inland from the nearest port or major city. Each generator and alternator set weighed several hundred tons and required precise alignment during installation. Constrained by permanent overhead structures, traditional cranes were not an option.

Solution: To undertake this precise exercise, the SBL1100, Hydraulic Gantry was deployed along with self-propelled trailers to unload and place the loads onto their respective foundations. The utilization of such specialized transportation and alternative lifting equipment allowed each of the generators and alternators to be unloaded and relocated all in a single operation, increasing the efficiency of the task. The SBL1100 patented foldable design allowed for easy transportation to the remote site, while the unit's quick 'plug and play' setup required only half a day.

Products: SBL1100, Telescopic Hydraulic Gantry



Turbine Module Transportation at TS Power Plant



Customer: Bigge

Location: Battle MT, Nevada, USA

At a coal-fired power plant, HSL-Series, Strand Jacks are used to lift power train turbine modules up to 250 tons, at a height of 14 meters. The self-propelled tank rollers of the SBL1100, Hydraulic Gantry traverse the turbine longitudinally, 70 meters along the elevated runway.

Products: SBL1100, Telescopic Hydraulic Gantry
HSL-Series, Heavy Lifting Strand Jacks



Foundation Created for Offshore Wind Turbines

Customer: BARD Engineering GmbH

Location: North Sea (100km NW German island of Borkum)

Enerpac's Synchronous Hydraulic Lifting System is used to create a support for offshore wind turbines with impressive precision and timing.

Solution: Enerpac would provide the solution for leveling the supporting cross piece with synchronously controlled hydraulic cylinders. The installation process was controlled using Enerpac's computer system, utilizing stroke sensors and an inclination meter. Once the supporting cross piece was level, it was locked in place together with piles by a 5m high concrete casing, with concrete being poured into a hollow space to make a 13cm thick ring against the wall of both the supporting cross piece and the piles. Enerpac also trained Bard employees who would be working with the Synchronous Lifting System. "The nice thing about this hydraulic Synchronous Lifting System is that it works completely automatically. Human errors when leveling manually, such as turning on the wrong valve are totally eliminated by the system," concluded BARD.

Products: PLC-Controlled Synchronous Lifting Systems
Double-Acting Cylinders (3 per transition piece)



Computer-controlled Hydraulics Lift Large Spherical Vessels



Customer: ICA-Consorcio Industrial

Location: General Lazaro Cardenas refinery,
Veracruz, Mexico

Part of the massive modernization project at the General Lazaro Cardenas refinery in Minatitlan, Veracruz, Mexico involved erection of three large, spherical vessels intended for storage of liquefied propylene, butane, and butylene. One of the final fabrication steps required heat treating the 550-ton steel vessels in order to relieve welding-induced stresses.

However, heating the 16,2 m diameter spheres, each supported by 12 cylindrical legs, would have caused new stresses to the legs and their points of attachment to the spheres. It was clear that during heat treating of the spheres, the bottom ends of the legs had to be free to move in a horizontal plane so as to accommodate thermal expansion.

Products: CLL-Series, High Tonnage Lock Nut Cylinders
Synchronous Lifting System



Lifting and Rotating Suspended Loads with a Strand Jack Gantry with Rotation Unit

Customer: Power Generation Plant

Location: Africa

Challenge: One of the many challenges for logistics companies in the power generation sector is installation of new equipment. Loads are typically transported on trailers positioned parallel to the power plant, however, the equipment needs to be lifted and installed perpendicular to the trailer.

Solution: Enerpac has developed a 450 ton, lift and rotation strand jack gantry - the first of its kind to feature a rotating unit - enabling lift and rotation of large turbine equipment during power plant installation and maintenance.

The Enerpac strand jack gantry comprises four modular legs supporting an overhead skid track for an Enerpac SBL1100 gantry. A pair of 200 ton strand jacks is positioned on each gantry beam. The strand jacks are, in turn, connected by steel strands to a centrally suspended, custom made rotation unit and lifting beam. The lifting beam allows the load to be rotated by 90°, a unique feature for a gantry. The strand jack gantry and rotation unit are controlled via an Intellilift wireless control system.

The 450 ton, lift and rotation gantry is designed such that the entire gantry can be transported in multiple standard containers for ease of deployment at port logistics centers and power plants. It was developed and manufactured at Enerpac's Integrated Solutions facility in Hengelo in The Netherlands.

Products: Strand Jack Gantry with Custom Rotation Unit, Skidding System



Placement of 1140 ton Nuclear Plant Module with a SyncHoist System



Customer: South Carolina Electric & Gas Company

Location: Jenkinsville, South Carolina, USA

Challenge: South Carolina Electric & Gas Company (SCE&G), principle subsidiary of SCANA Corporation, and Georgia Power were both working on nuclear generation station expansion projects in their respective states.

SCE&G was tasked to place a 2,4 million pound CA01 module in the first of two new nuclear plants at the V.C. Summer nuclear generating station in Jenkinsville, South Carolina. Georgia Power was placing the same module for Unit 3 at the Plant Vogtle nuclear expansion. The CA01 module, a structural wall module designed to be filled with concrete fill after placement, marked the heaviest lift to date for both expansion projects.

Products: SHS-Series, SyncHoist – Synchronous Load Positioning System, consisting of an 800 metric ton SyncHoist Cylinder and two 400 metric ton SyncHoist Cylinders,



Installing Offshore Wind Turbine Base Foundations with a SyncHoist System

Customer: Tahkoluoto Offshore Wind Farm

Location: Pori, Finland

Solution: A Enerpac SyncHoist load positioning system has been used by Finnish wind power production company, Suomen Hyötytuuli Oy, for the installation of gravity base foundations. The Tahkoluoto Wind Farm is the world's first offshore windfarm designed for operation in ice conditions.

The Tahkoluoto Offshore Wind Farm includes 10 offshore wind turbines, each with a capacity of 4,2 MW. Following preparation of the seabed to provide a level surface, the hollow gravity base foundations weighing up to 500 tonnes were installed. During lowering through the splash-zone and positioning on the seabed, the SyncHoist system was used below the crane hook to ensure the foundation remained as close to vertical as possible. This prevented damage to the levelled seabed surface and facilitated the subsequent addition of the turbine tower.

To handle the foundation lift without distorting the transition piece flange used to connect the turbine tower, an X-frame lifting tool was developed that connected to the flange. It comprised a lifting frame with four SyncHoist, self-contained PLC-controlled, double acting, push-pull hydraulic cylinders at each corner, and diesel hydraulic powerpack with battery back-up.

High precision manoeuvring of the foundation by the SyncHoist system was performed wirelessly by an operator working alongside the foundation installation team. This allowed the operator to lift and lower each cylinder independently to balance, tilt and position the load in response to feedback from four levelling sensors on the foundation.

Products: SHS-Series, SyncHoist System



Transporting Spent Nuclear Fuel Dry Storage with an SPMT



Customer: Holtec International

Location: Sizewell B nuclear facility in the UK.

Challenge: Spent nuclear fuel is sealed in Holtec-supplied double wall, multi-purpose canisters (MPCs) and placed within HI-STORM casks, overpacks which contain MPCs and are licensed world-wide. Holtec double wall MPCs stored within HI-STORM overpacks provide multiple barriers against threats and accidents of all kinds, and represent the state-of-the-art in the industry for long-term interim spent fuel storage.

The Sizewell B dry fuel store will enable safe, onsite storage of a lifetime's spent fuel. With this facility, the power station can continue to generate electricity until at least 2035, and potentially for a further 20 years beyond that, subject to life extension.

The Enerpac SPMT600 hauling transporter transfers the casks from the generating facility to the dry store. Its slim design and low height is ideal for operating in confined spaces. The SPMT provides 360-degree steering, as well as steer in crab mode. The steering angle of all wheel sets can be adjusted precisely, allowing the hauling transporter to make any desired movement.

The Holtec cask hauler comprises five trailers and two hydraulic power packs and, for safety reasons, is limited to a maximum speed of 0.8 m/s. In total, one trailer can support 60 tons load. The SPMT is controlled using the wireless Intelli-Drive Remote Controller, allowing one person to operate the transporter remotely, safely away from the load.

Products: SPMT600, Self-Propelled Modular Transporter



Installing a Turbine and Generator with a Jack-Up System

Customer: Collets & Sons Ltd.

Location: Hull, United Kingdom

Leading heavy lift and specialist transportation company, Collett & Sons Ltd, have completed their first project utilising an Enerpac JS250 Jack-Up system, installing a 100 ton Siemens steam turbine SST-600 and 60 ton generator at a new incinerator plant in Hull, UK. Working within tight space restrictions, the four tower Jack-Up system lifted the power generation plant equipment to a height of 4,5m, allowing it to be easily skidded into position.

Utilising Collett's SPMT capabilities, the steam turbine and the generator were manoeuvred on site within the plant and positioned above the Jack-Up units at each corner of the load. Following the 4,5m lift, Collett's skidding systems allowed for both the generator and the steam turbine to be skidded for 14m into final position.

"The Enerpac Jack-Up system is perfect for this kind of job," says Lincoln Collett, Technical Director, Collett & Sons Ltd. "We considered a gantry, but there was no space to move the gantry forward to position the turbine and generator.

The combination of the Jack-Up's synchronised lift and skidding worked very well." Collett's already wide-ranging heavy lift offering. Collett & Sons established hydraulic jacking & skidding services facilitate the manoeuvring, positioning, extraction and relocation of cargoes in confined spaces, and by employing the JS-250 new Jack-Up system allows them to offer an innovative solution for undertaking these movements at height.

Product: JS250, Jack-Up System



SKYFFOLDING™ Scaffolding and Lifting System Supported by Strand Jacks



Customer: KLES

Location: Korea

Enerpac supplied Korean based engineering company, KLES, with strand jacks for an innovative tower scaffolding system called SKYFFOLDING™ (Platform-supported Boiler in-Furnace Scaffolding and Lifting System). The Enerpac HSL1507 strand jacks support and lift the pendant-type, scaffolding system, as it grows, providing a safer working environment than traditional scaffolding during power plant boiler furnace maintenance.

The SKYFFOLDING™ lifting system involves the installation of a network of typically 20 Enerpac strand jacks onto a heavy girder at the top of the boiler. The strand jack wires are lowered and connected to uphold and lift a support platform, the uppermost support frame of the scaffold system. Robust wire ropes connected to the support frame used to support pendant scaffold platforms attached beneath at 2m intervals by with repetitively jacking up the platforms with the SKYFFOLDING™ lifting system. Each pendant platform features an integral staircase allowing easy of movement between each level. This allows the synchronised strand jacks to hold and lift the entire scaffolding as a single unit.

The synchronized SKYFFOLDING™ system is able to reliably and safely lift the scaffolds with an even load dispersion, keeping deviations in lateral and vertical directions to a minimum.

Products: HSL1507, Heavy Lifting Strand Jacks
SLPP-Series, Hydraulic Power Packs
SCC Smart Cylinder Control
Strand Guides and Strand Recoilers



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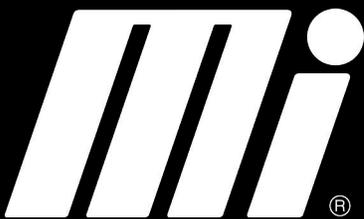
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