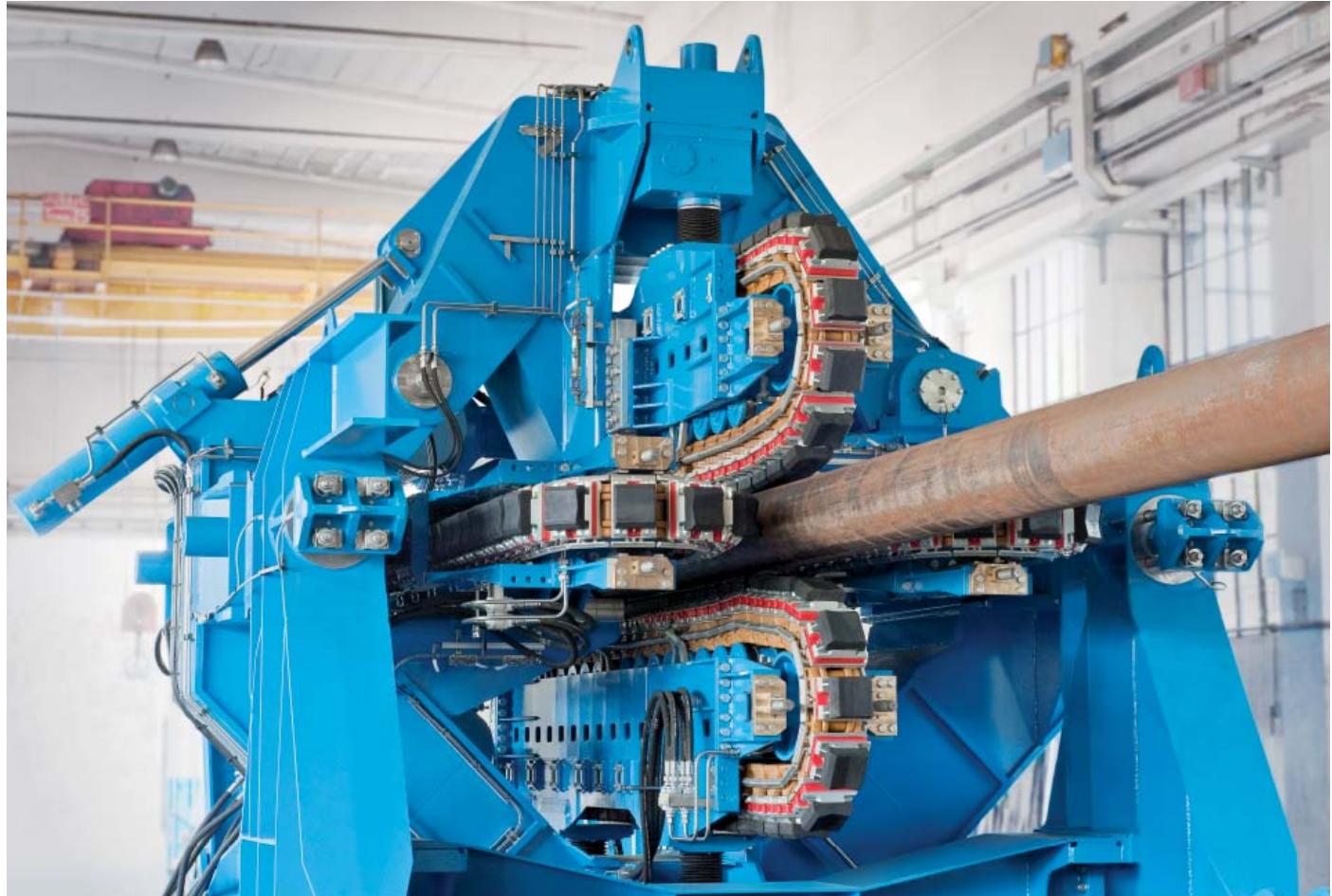


Case note

AC drives key to reliable offshore pipe-laying operations



Pipe tensioner for flexible pipes.

Reliability and environmental safety are prime demands placed on laying subsea pipelines that transport oil and gas. Italian company REMACUT S.r.l. specializes in this complex, demanding segment of marine engineering.

Offshore pipelaying requires precise control of tension as pipes are laid into the sea to prevent potential pipe buckling damage. To accomplish this, “pipe tensioner” machines aboard a modern pipe-laying vessel work together with thrusters that keep the ship on position. Proper tension must be maintained while compensating for the vessel’s speed, even under harsh wind and wave action. Pipe tensioners are custom-built machines that work at depths down to 2,000 m and operate around the clock.

Two types of pipes are involved in the laying process: large rigid pipes and smaller flexible pipes. Flexible pipes can include umbilical cable connections for controlling valves

under water. Most REMACUT tensioners handle both rigid and flexible pipes—a feature unique to its machines.

Simultaneous tension control and pipe release

ABB has supplied asynchronous motors and AC regenerative drives for REMACUT’s tensioners to power the roller tracks that lay pipe. Rigid pipes use two roller tracks spaced 180 degrees apart on the pipe’s periphery, with one motor and drive controlling longitudinal movement of each track. Radial positioning of the tracks clamps the pipe from two directions with high but cushioned force. Flexible pipes require four clamping directions to distribute the grip forces, which can reach around 150 metric tons for all four points. Here, four roller tracks 90 degrees apart provide pipe-laying tension, each controlled by an ABB motor and drive.

The drives are programmed to produce proper tension, which is different for each pipe type. Multi-block programming (part of a PC tool) allows users to optimize drive functions to their specific application. Programming is possible in several modes—including online, connected to the drive, with changes shown in real-time.

Direct torque control (DTC) in ABB drives offers fast torque response by eliminating the need for a modulator used in drives of other manufacturers. DTC is ideal for accurate tension control under dynamic load changes encountered in pipelaying.

Drives help vessel's weak power network

A pipe-laying vessel's relatively weak power network cannot tolerate significant voltage disturbances. With built-in harmonic filters and active front-end circuits, ABB drives have low harmonic content, which protects the network and ensures this application's success. In addition, the drives provide a good power factor and ride-through for short-term voltage disturbances.

Regenerative capability of ABB drives is another advantage because pipelaying runs 95% in regenerative mode (similar to a crane lowering), where power is returned to the ship's thrusters to reduce fuel consumption. Regeneration allows conversion of braking power into electricity rather than waste it as heat dissipated through braking resistors.

Ease of servicing is likewise a key benefit of ABB drives. Modular design with removable drive sections allows quick, simple replacement of a module as needed. Overall results are easier maintenance and higher availability. As REMACUT puts it, "ABB drives are reliable, easy to use and service thanks to the removable modules. Ease of servicing the drives is a major benefit in our harsh offshore environment."

Challenge

- Obtain accurate control of pipe-laying speed and tension without introducing harmonics on the vessel's power network
- Provide easy service/maintenance in severe application environment

Solution

- Cabinet-built regenerative AC drives equipped with an active supply unit, providing an extensive selection of built-in features and low harmonic content
- Drives regenerate braking power into electricity for feedback to the grid
- Drives' power supply side sufficiently robust to ride through short power disturbances
- Multi-block programming for fast system response

Benefits

- Energy savings through regenerated power
- Reduced maintenance cost, easy serviceability
- Low harmonics on the network
- Removable drive modules allow easy replacement
- Accurate control due to DTC, for fast machine response and ability to maintain tension in any operation
- Drives have marine type approvals

For more information please contact your local ABB representative or visit:

www.abb.com/drives

www.abb.com/drivespartners

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