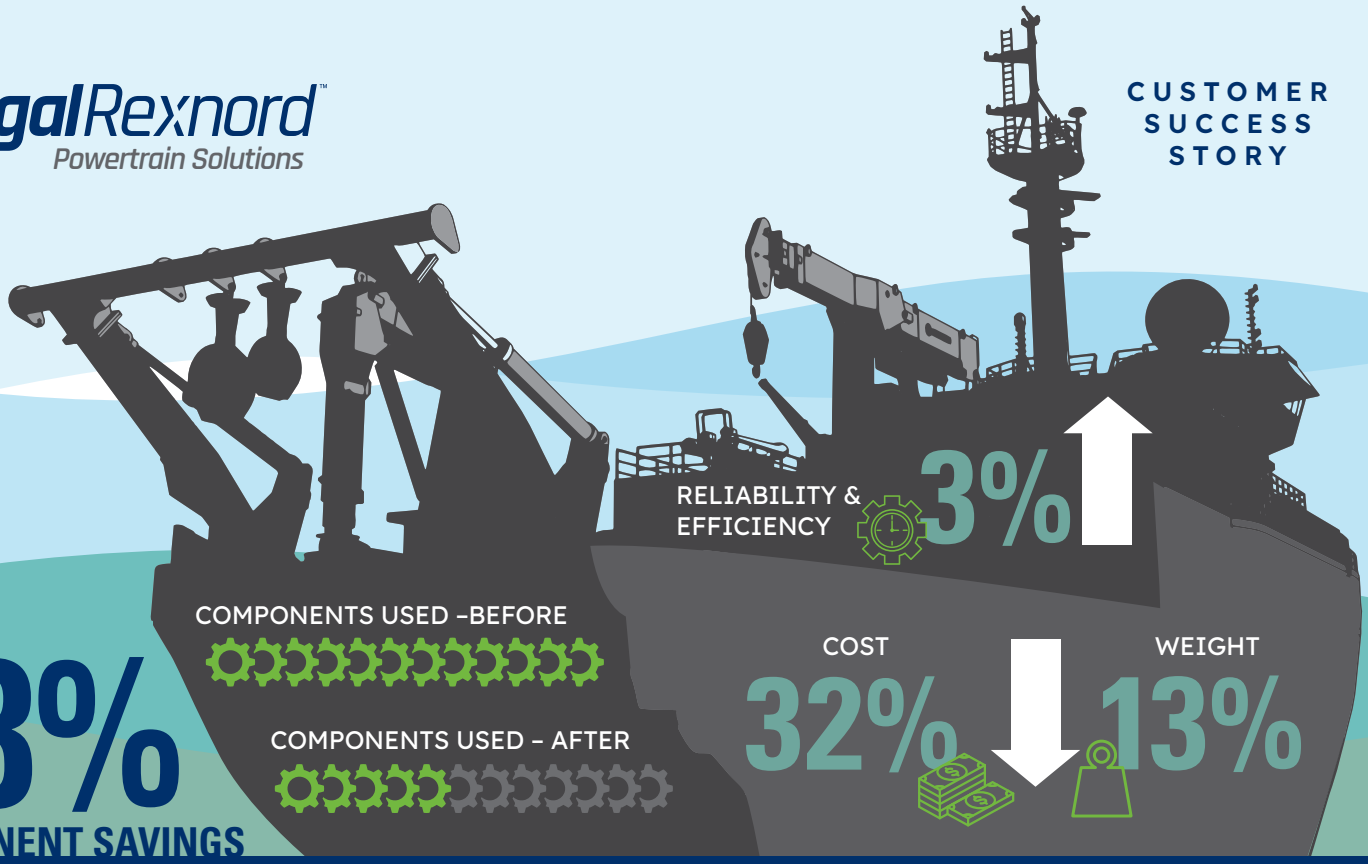
Regal Rexnord™ Powertrain Solutions

CUSTOMER SUCCESS STORY



Regal Rexnord™ Powertrain Solutions Marine Winch Design **Simplifies Components by 58%**

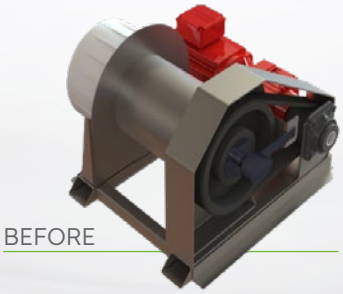
An international engineering technology company that strives to develop unique, innovative, sustainable products for their customers approached Regal Rexnord through our "Ask an Expert" feature on our Powertrain Solutions site. They asked for our assistance with designing a marine winch, a critical component in the marine industry, used for the control, lifting, and retrieval of remote operated vehicles (ROVs) on sea/ocean fairing vessels.

ROVs are used to explore the ocean floor without being manned by a crew. They are controlled via a joystick by crewmembers on the surface and have a small, mounted camera to send a video feed back to the vessel. They can also feature equipment to collect samples or run tests from the ocean/ sea floor. Some ROVs can be quite large and heavy, requiring a heavy-duty winch system to place them in the water and to bring them back up again.

The company discovered they could not find a winch solution that met all their objectives on their own. They had an initial concept in mind but wanted help reducing its complexity and potential maintenance. **By partnering with the Powertrain Solutions team, they were able to eliminate components from their original concept, while meeting the tough demands of a seafaring application**.

There were both physical and functional challenges to keep in mind when designing the marine winch. The physical needs of the winch were high corrosion resistance in the harsh salt spray environment, a simplified design to minimize potential failures and maintenance, and ensuring it was small enough to fit the limited enclosure size on the vessel. Functionally, the winch needed to meet the torque and speed requirements to have enough torque development to control, retrieve, and lift the ROVs, while also having dynamic braking to both let out more line for the ROVs and hold the brake to lock the line.

The Powertrain Solutions team partnered with the engineering technology company to come up with a design that **significantly reduced the complexity, cost, and weight of their original concept, while increasing its robustness**. The complexity was reduced by 58% by eliminating 7 components, such as the synchronous belt, sheaves, belt guard, and flange mounted bearing, and by combining the motor, brake, and encoder into one Kollmorgen™ servo motor. In addition to reducing complexity, these changes reduced the cost of the entire winch system by 32% and its weight by 13%. Reliability and efficiency also improved (by 3%) and maintenance could be reduced by removing the synchronous belt and sheaves, as they have a hard time standing up to the exposed saltwater environment.



BEFORE

AFTER

The Kollmorgen servo motor and VFD with resistive load bank allows the customer to dynamically brake by dumping power to the resistor bank and hold statically via an integrated holding brake inside the motor. Multiplying the motor braking through the gearbox ratio allowed a much smaller braking solution than the initial drum winder shaft-mounted brake that the customer used, resulting in a significant cost reduction. Finally, the customer was able to eliminate one of the roller bearings and bearing mounts that support the drum winder shaft by rigidly mounting the gearbox and using the gearbox's overhung load capability to support the drum winder instead.

While the individual components in the proposed design have a higher upfront cost, having fewer of them results in an overall lower total cost solution.

Additional benefits of the Powertrain Solutions winch assembly include:

- Simplified assembly with fewer components resulting in a 50% reduction in time.
- Reduced processing costs, fewer logistics hassles, and one partner for the entire system by using a single supplier.
- Faster response time (acceleration & braking) and redundant braking (motor dynamic braking and servo motor brake) with the improved design.
- Improved safety (load dropping if the belt fails) and reduced guarding required (lower cost) due to the elimination of the belt system.

COMPONENT COMPARISON

Existing BOM	Est. Price	Proposed BOM	Est. Price
VFD Control	$ 1,000.00	Servo Control	$1,900.00
Electric Motor (Induction)	$ 800.00	Servo Motor w/Brake & Encoder	$2,100.00
Concentric Gearbox	$ 1,200.00	Right Angle Gearbox	$3,300.00
Flange Block Bearing	$ 100.00	—	—
Driving Pulley	$ 290.00	—	—
Toothed Belt	$ 330.00	—	—
Driven Pulley	$ 830.00	—	—
Belt Guard	$ 300.00	—	—
Encoder	$ 600.00	—	—
Winch Frame	$ 2,500.00	Winch Frame	$2,000.00
Brake	$ 5,500.00	—	—
Assembly	$ 300.00	Assembly	$ 150.00
Existing BOM Total:	**$13,750.00**	**Proposed BOM Total:**	**$9,450.00**

You have challenges. **We have solutions.**

To solve your critical challenges, it is essential to partner with a **global company** with **local resources**, **reputable brands**, and a **proven history** of delivering cost-efficient solutions.

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