As oil exploration moves into deeper waters, there is a requirement for equipment with ever-larger capacities. In response to this need, Aquatic has developed a new 500-te powered-reel drive system to support customers’ projects. The 500-te reel drive system, the AOPR-02G-500, is based on existing 400-te drive units but has had substantial structural upgrades to handle the extra capacity.

David Tibbetts, vice president of engineering, Aquatic, says, “Our design team believed it was possible to increase the capacity of the 400-te drive units. We did some calculations on the capacity and proof of performance. These were verified by an external design house, which confirmed that it could be done.”

However, there were several challenges for the engineering team to overcome. One of these was that the reel for the new system was 12.3 m in diameter. Tibbetts says, “Our previous reel capacity was 11.4 m. Even though the larger reel apparently represents only a 25% increase in the capacity of the system, the actual increase in loading was significantly greater.

“This is because the dynamic loadings generated offshore are multiplied by the distance from the point of action. The point of action on an 11.4-m reel is much smaller than it is on a 12.3-m reel. The further the lever is from the action point, the greater the force and the inertia and momentum generated. We needed to rework several of the functional aspects of the system, for example, by using stronger, more robust materials. We also made some subtle changes to the design and used several different processes to make it work.”

The size of the central axles of the machine also had to be increased, so specialist steels were used to ensure the appropriate safety levels. “We needed a different material for the central axles, and considered a range of materials including tool steels, which can be hardened over a much larger section,” says Tibbetts. “However, we discarded tool steels because they tend to be brittle, and we required the system to be particularly tough, bearing in mind the loading. Instead, we used a stainless steel that is hardened through precipitation. The metal is heated to a specific temperature at which the hardness increases chemically.”

Technip was one of the first customers to use the new system. Chris Bonetti, lead engineer for Technip Norge AS, says, “We required a solution that went beyond the existing industry benchmark. Aquatic provided a comprehensive service that enabled us to install our flexible products in more challenging subsea environments. Aquatic has demonstrated that it can fully support its customers through the application of expertise to solve specific project needs.”

Aquatic has also recently built a four-track 50-te tensioner to meet the deeper water and larger product requirements. The new tensioner, the AOTT-10C-50, is based on Aquatic’s fleet of four-track 40-te tensioners, and is already gone into service. Aquatic is confident that these two new pieces of equipment will extend its capabilities, particularly into deep water.