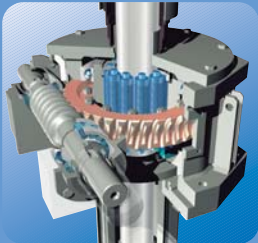
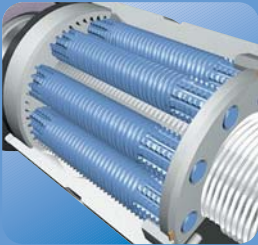


Canting keel mechanical actuators

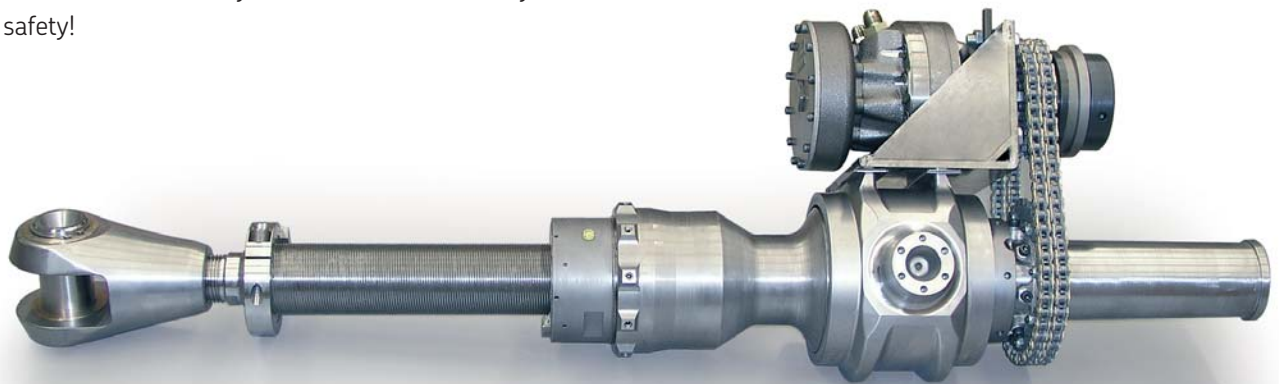
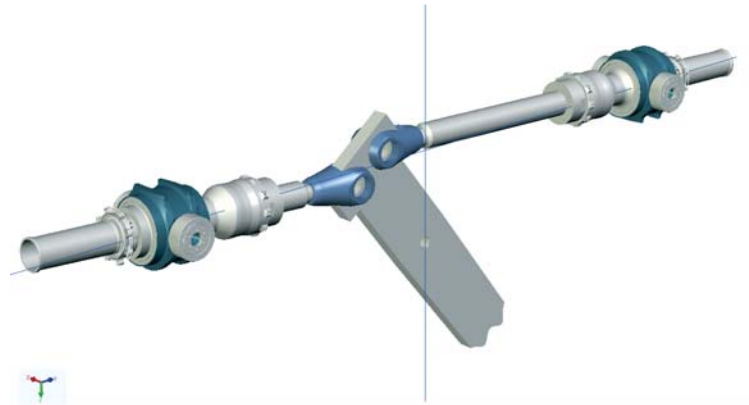


Solid power

The clear industrial trend to replace hydraulics to achieve cleaner, safer and more energy effective actuation function has now gained even more terrain.

During the preparations for Volvo Ocean Race 2006 SKF has caught the need of a better solution for the canting keel drive. Based upon our long experience from the industry, we have now created a concept based on the SKF planetary roller screw.

Using the full range of SKF knowledge in bearing and material technology, it has been proved that a mechanical actuator can deliver sufficient weight savings compared to the hydraulic cylinder solution. Even if weight seems to be the crucial point for the canting keel application, the main reason for SKF to enter this arena is our ability to offer increased reliability and safety!



Hydro-mechanical system

Features

- ▶ Planetary roller screw drive
- ▶ Optimised spherical roller thrust bearing unit
- ▶ Electrical or hydraulic power drive
- ▶ Mechanical overload protection
- ▶ Mechanical emergency drive
- ▶ Mechanical brake

Benefits

- Clean and efficient
- Reliable
- Safe failure modes
- Easy to control
- Low and easy maintenance

SKF knowledge

By using SKF planetary roller screws the mechanical actuators can be made for any dynamic drive force up to +200 ton. The static load ranges up to +500 ton.

The power range depends on the drive system. A 24 VDC based electromechanical drive sets a practical limit at around 20 kW. Higher power will require either higher voltage or an engine driven hydraulic motor system.

An all-electrical drive system has the largest weight saving potentials.

Using the SKF knowledge and known technology of today a system weight reduction of 25-40 % is within reach, compared to a hydraulic ram system. And still giving you a much safer journey!



Example: VOR 70 class

Base requirements

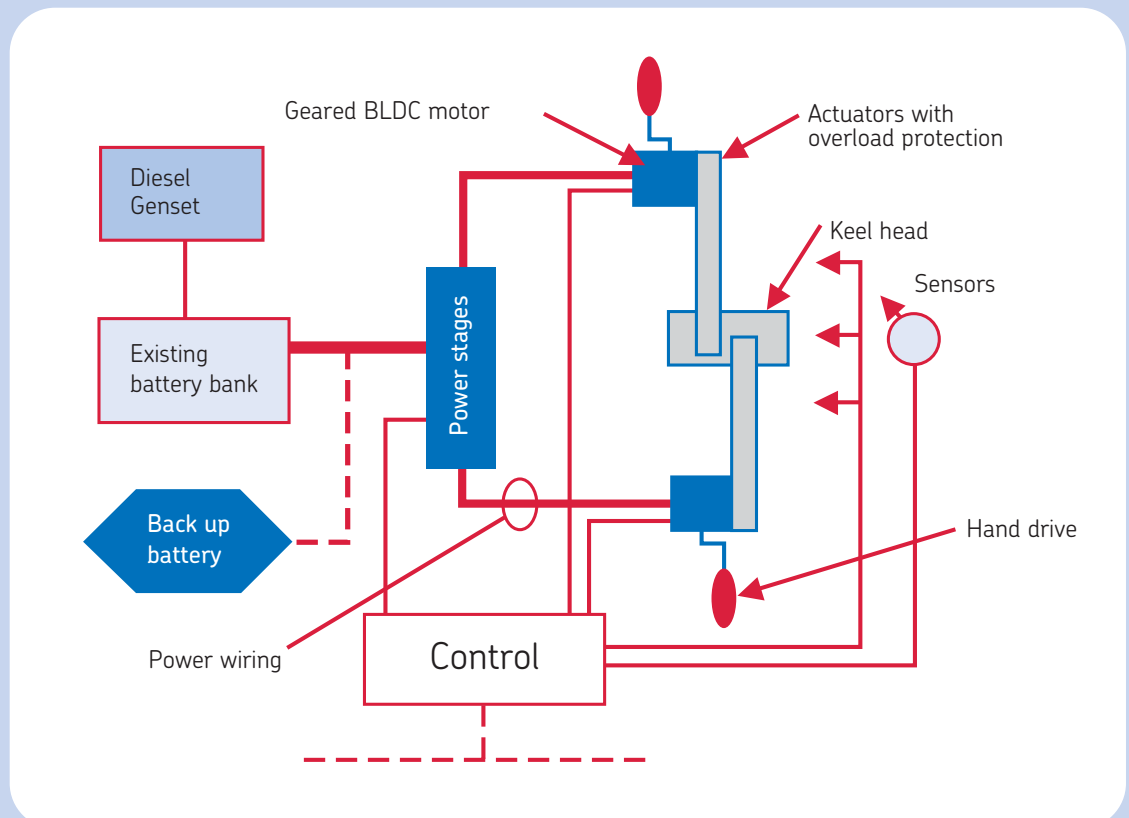
- Tacking time 15 s -40° to 40°
- Yield safety factor > 3 for single system
- Overload protection
- Two redundant systems, each capable to lock the keel in any angle in case of single system failure.

Solution

- 2 x planetary roller screw actuators, SRC 80x18R6
- Static load capacity: 1585 kN
- Dynamic load capacity: 553 kN
- Dynamic drive force: 420 kN (push-pull)
- Mechanical weight: 90 kg (all steel version)
- Hydraulic motor and brake unit: 20 kg (production standard)

The use of small hydraulic motors and the fact that pressure is only present during the tacking cycle itself, results in a very small and lightweight system with minimal oil content.

Electromechanical system overview



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