Rolling Bearings for one of the biggest Reels on the Pipe Laying Vessel “Skandi Navica”

FAG

Examples of Application Engineering

WL 21 508 EA

Pipe laying vessel “Skandi Navica”, operated by DSND

Photo courtesy of AKTRO in Norway

The oil extracted by drilling rigs in regions far from the coast is usually pumped through pipelines to transfer stations where it is transferred to tankers. Oil from oil fields closer to the coast is pumped directly to the shore through pipelines. These pipelines are laid on the ocean floor by special ships.

The conventional method of laying pipe in the ocean consists in welding 12 m to 24 m lengths of pipe together on board the pipe laying vessel and lowering them onto the ocean floor. With this conventional method not much more than one mile of pipe can be laid every day.

The shipbuilding company AKTRO AS Molde, Norway, built the pipe laying vessel “Skandi Navica” for the Norwegian company DSND. A long section of pipe can be unwound from a horizontal reel with a high laying speed.

Technical data of the pipe laying vessel:

Vessel length	108,5 m
Width	22 m
Tonnage	5 862 GRT

The reel has a diameter of 25 m. The spool has a load carrying capacity of 2 500 t.

Pipes with diameters ranging from 101,6 mm to 457,2 mm can be laid. For example, 42 km of pipe with a diameter of 203,2 mm can be coiled onto the reel and deployed continuously. The lengths of pipe are welded together on shore, inspected, coated and coiled onto the spool in the harbour. At the pipe-laying site, welding work is required only to join a new section of pipe to the pipeline or to close the end of a pipe.

The pipe is unreeled over a stern ramp.

Bearing selection

When selecting the bearings for this application, the fact had to be taken into account that the two bearings supporting the spool would have to compensate the misalignments and deflections resulting from the rolling motion and the deformation of the hull. This meant that self-aligning spherical roller bearings had to be used. The two large bearings supporting the hub were designed by our Mining & Processing Unit and produced in our Wuppertal plant. They are special spherical roller bearings FAG F-804636.PRL with machined brass cages. They have the same dimensions as the FAG standard spherical roller bearings 240/1120-B-MB, with a bore diameter of 1120 mm, an outside diameter of 1580 mm and a width of 462 mm. Each of the bearings weighs 2900 kg and is designed for a service life of more than 20 years.

Mounting and dismounting

The bearings are fitted on the shaft with p6 and in the housing – which was designed and produced by the customer – with H7. To facilitate dismounting with the hydraulic method, oil ducts and oil grooves are provided in the shaft. In addition, 6 holes (M12) are provided in the inner ring face for dismounting, and one hole is provided in the middle of the outer ring for a lifting eye bolt. So-called swivel load rings, that were also supplied by FAG, are used as lifting eye bolts.

Lubrication

The bearings are lubricated with grease. FAG has recommended the proven lithium soap base grease "Arcanol Load 220" with EP additives. The bearings are packed to capacity with grease (corresponding to a grease quantity of 73 kg) and lubricated once a year (corresponding to a grease quantity of 3–4 kg). At the customer's request, the bearings were made only with lubricating holes, without a circumferential groove, to permit direct relubrication.

Bearing selection

Spherical roller bearings
F-804636.PRL were selected:

Bore diameter	d =	1120 mm
Outside diameter	D =	1580 mm
Width	B =	462 mm
Mass	m =	2,9 t
Dyn. load rating	C_r =	20800 kN

In addition to the two original bearings, FAG also supplied 2 replacement bearings. Each bearing was delivered with extensive documentation, including the quality inspection plan, production progress report, measuring report and test certificate according to EN 10204-3.1B.

Premounted reel

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