

The Ultimate Project: INAI KENANGA

VULKAN Couplings supplies the largest MESLU clutches for one of the largest suction dredgers in the world



One of the largest suction dredgers in the world, Inai Kenanga, is to be launched by Inai Kiara SDN BHD, the Malaysian shipping company. VULKAN Couplings has supplied six MESLU clutches for the shift gearboxes of the powerful sand pumps - these couplings are the largest that the company has ever built.

The TSHD Inai Kenanga is designed for a capacity of 32,000 m³. In the standard configuration, two suction pipes at the end of the loading space of the suction

dredger reach up to a depth of 35 m. In fact, with extension pipes and additional pumps that are easy to install, the dredger can work up to a depth of 120 m.

The suction dredger is fitted with a double diesel engine that drives the propellers, the generator and the suction pump system. The controllable pitch propellers of the main drive are driven via the two main Siemens/Flender gearboxes directly from the flywheel side of the main engines. The generator for the electrical power supply is also connected via the PTO of the main gearbox with the main machine. The two suction pump systems are installed on the front side of the engines. In order to generate the maximum suction power, a special Siemens/Flender multi-speed gearbox is located upstream from each of the suction pumps. This special drive configuration ensures optimal loading and discharge process. The pumps can be connected in series for discharging the loading on land.

Two MAN 12V48/60B engines with a power rating of 13.250 kW each are used as the main engines.

As the solution provider, and apart from the MESLU clutches, VULKAN Couplings is also supplying all highly flexible couplings for both the main as well as the suction pump drive. RATO S 582Z have been installed in each of the main drive; meanwhile, highly flexible RATO R 473Z provide the necessary torsional vibration damping and compensation of the misalignment in the pump system on front side.

The benefit of this holistic solution for the customer: The complete drive system can be optimally adjusted with respect to torsional vibration as a result of all couplings coming from a single source. This leads to maximum system availability and contributes to minimising the operating costs.

The two Siemens/Flender 3-speed sand pump gearboxes of type GJZ 2250, however, posed a special challenge for the couplings specialist from Herne. For this purpose, VULKAN Couplings produced a total of six MESLU clutches, each one of size 540 for shifting the first gear, and two smaller MESLU 330 couplings for shifting the second and third gear.

In standard design, the MESLU clutch coupling is a pneumatically operated, dry-running double cone friction clutch with an internal bearing. This is characterised by the fact that the inside and outside parts of the coupling are supported each other so that there is a favourable wear pattern of the friction pads caused by the uniform distribution of forces. By arranging the friction drums as a double cone there is also automatic readjustment that takes place with gradual abrasion and wear of the friction pads. The pads are made of high-performance frictional material based on synthetic resin (without asbestos), very safely dimensioned and extremely wear-resistant so that even in cases of frequent gear shifting operations long service life is guaranteed. The outer friction drums provide a highly reliable shifting operation as a result of their good heat emission capacity. Moreover, the clutch coupling does not cause any axial forces, neither in engaged or disengaged condition.

However, based on the special shaft arrangement (Quill shaft) of the 3-speed pump gearboxes of the Inai Kenanga, it was necessary to modify the standard MESLU design. In this case the hollow shaft of the respective gear had to be connected with the outer part and the solid shaft lying inside with the inner part of the clutch. As a result of the solid and hollow shafts of the gearbox supported on one another, the inner bearing of the standard MESLU design could be omitted. However, the weight of the MESLU clutch in conjunction with the large distance of the centre of gravity to the bearing of the solid shaft on the gearbox side made it necessary to have an additional bearing support in the clutch coupling.

The VULKAN experts developed special pneumatic control units as well as a special monitoring system for the shifting logic of the gearbox with the gear blocking required.

The larger MESLU 540 is the ultimate coupling in this case: It has a nominal torque of 390 kNm at a diameter of 1.80 m and a total weight of 6.5 tons. However, the two "smaller" clutches do not need to be concealed: The MESLU 330 (each with 250 kNm nominal torque) has a diameter of 1.50 m and weighs 3.2 tons.