ACQUIP Marine

CASE STUDY

Marine Cardan Shaft Alignment

PROJECT SCOPE

P&O Marine had a high vibration issue on a pusher tug. The vibration was so intense that the bearing supports were consistently damaged during operation. It was determined that the high vibration and damage was most likely caused by an alignment issue. To complete the cardan shaft alignment it is necessary to align multiple components, but it had to be done quickly so the tug could return to operation. A cardan shaft machine train alignment had to be performed to meet the requirements of the project.

HOW WAS ACQUIP INVOLVED?

ACQUIP was contacted to perform the cardan shaft laser alignment on the pusher Tug. We had to read each of the cardan shaft couplings and view the alignment as a whole. The axial spacing of each cardan shaft was checked. All cardan shaft positions and pedestal bearings were checked to compare to the shaft arrangement drawing. It is important that the axial spacing is within tolerance as well as the angles that exist at each cardan shaft knuckle. This is critical to ensure smooth operation of the cardan shaft machine train.

RESULTS OF THE PROJECT

ACQUIP Alignment Engineers determined that there was residual angle between the motor and Azimuth gearbox on both port and starboard drives. The cardan shaft drive system was modeled in the computer; a theoretical move was made on the pedestal bearings to simulate corrections. Once it was confirmed that corrections could be made to balance the angle at each knuckle, the chock fast was removed and alignment corrections were made while tracking the alignment at each of the 4 cardan knuckles. After the angles were balance and the bearings were chock fasted in place, sea trials were performed that confirmed the alignment dramatically reduced the vibration experienced on the pusher tug.

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