Case Study - Audit

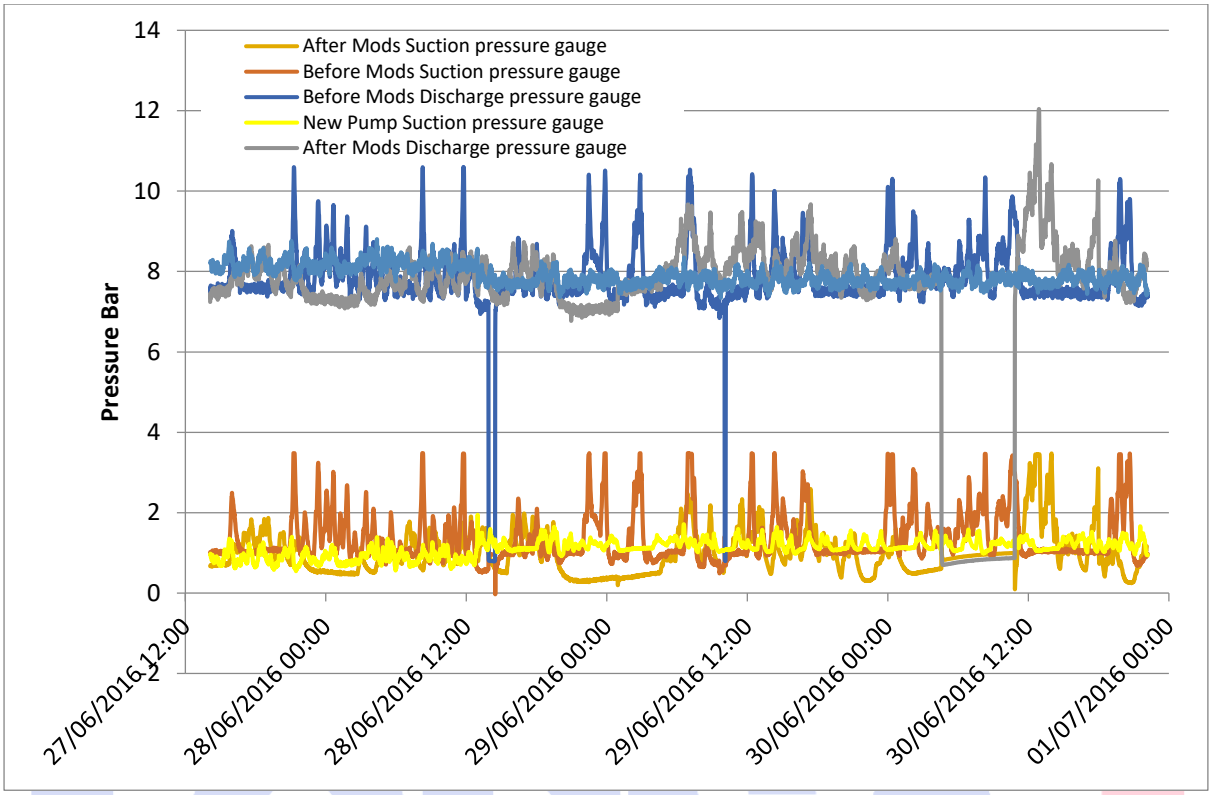
Lifting of relief valves on cooling circuits.

ERIKS were asked to assist in an investigation as to why at certain times relief valves were being lifted due to over pressure on a cooling circuit 1 and not on cooling circuit 2 and why the motors on each of the pumps were overloaded. The cooling system consisted of four number end suction pumps fitted with 110 kW motors, two pumps for circuit 1 and two pumps for circuit and the water was passed through a fin and tube cooler and a couple of the sections had suffered frost damage. ERIKS and the client discussed how to conduct the investigation.

It was agreed that the suction and discharge pressures were measured and recorded over a period of a week for each circuit after the tests were completed and the results analysed the reason for the relief valve lifting was established and this was due to increase in suction pressure over successive heat treatments. The cause of this was due to incorrect installation and management of the pressure vessel. Rectification work was carried out by the client on the system and tests repeated and the results analysed, and it was reported that there had been no further instances of the pressure relief valve lifting. Next ERIKS investigated the reason why the motors were overloading and running hot. When the pumps were first installed, they were controlled via inverters and this limited the maximum speed the pumps could operate and there was also a change in cooling circuits which meant a change of impeller to a larger size.

The inverters failed and a decision was made not to replace them as they did not offer any automatic control function. ERIKS supplied four number bares shaft pumps which the client installed onto existing baseplates the replacement pumps were selected to do the required duty and not overload the motors. Installing new pumps, the client potentially saved £40,000.00 on energy costs and motor failures were reduced.

The chart below shows the suction and discharge pressures before and after pressure vessel modifications and test conducted after the new pumps were installed.



ERIKS established that the existing installed pumps were sized correctly for the installation, however site needed to ensure that the larger dynamometers received the correct flow and pressure by altering the control valve position as all the control valves were set to supply the correct flows and pressures for the smaller dynamometers.