

Work Request Follow-Up Report Vibration Analysis

Area 700 Power Generation G745A Liquid Ring Vac Pump

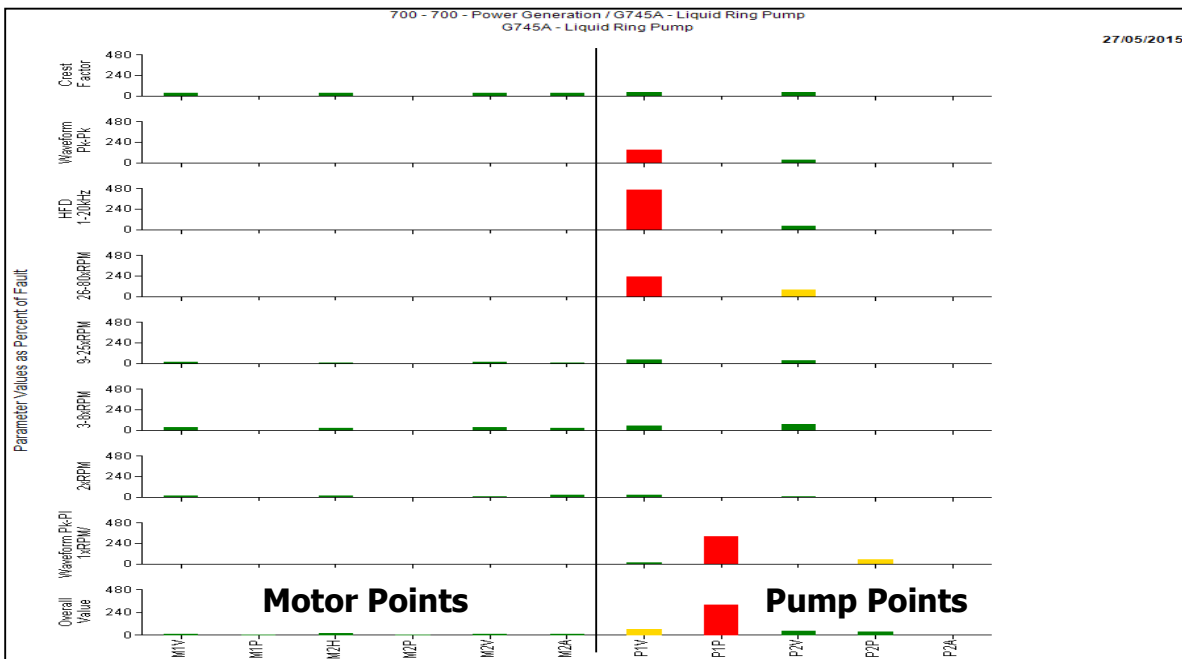


Pump DE bearing Damage
(Corrosion)

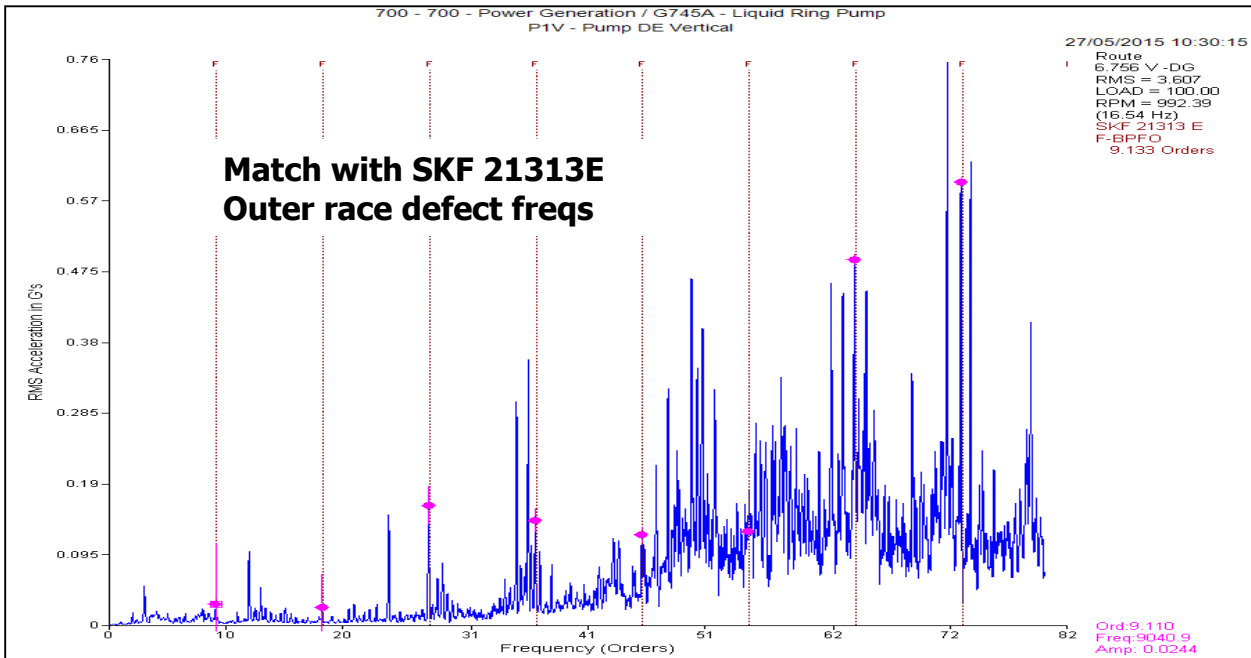
June 2015

Report compiled by TV1 RI Team

G745A Liquid Ring Vac Pump (Pump DE Bearing Damage)



The parameter profile above is a graphical representation of the vibration alarms which have been broken across the machine. Note the high levels on the pump DE bearing, recorded on the 27th May 2015, the first set of data collected.



Analysis of the standard spectrum above taken from the pump DE bearing showed a set of non-synchronous harmonics at 9.11 orders of turning speed. This matched the outer race defect frequency for the SKF 21313E pump bearing, other harmonics were also present related to the Inner race and roller defect frequencies. This indicated the bearing had multiple defect sites.

Analysis of DE Vacuum Pump Bearing – SKF 21313 E



Appearance

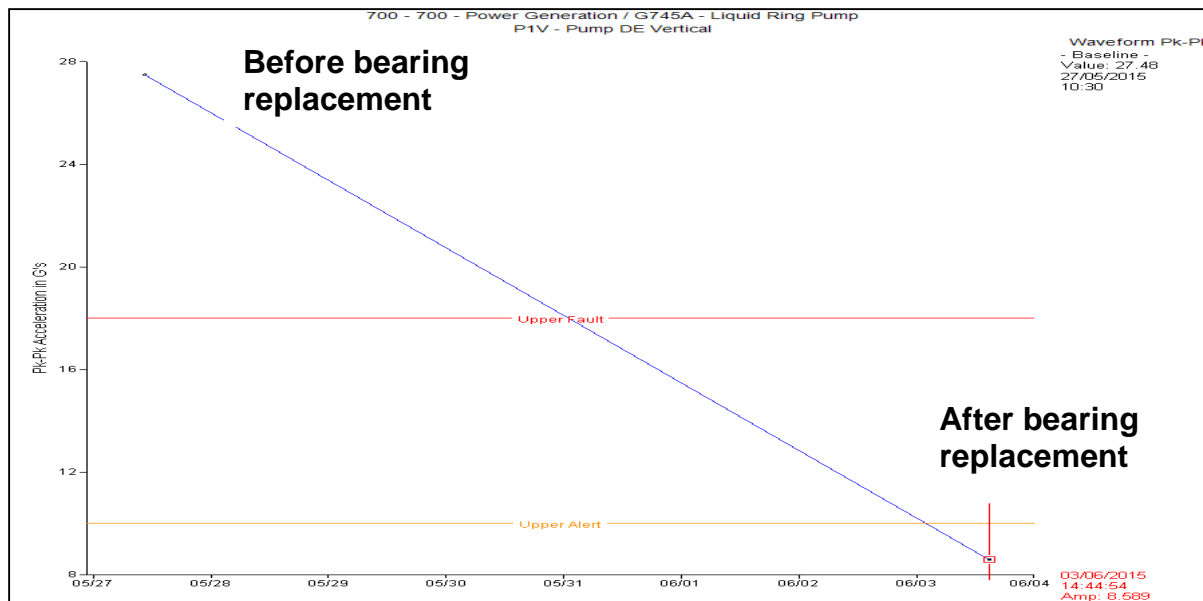
Greyish black streaks and marking on all rolling element surfaces, heavy pitting and cracking

Cause

Presence of water / moisture in the bearing over a long period of time.
Most likely due to poor pump storage before operation, lack of adequate seal arrangement at the DE is also a contributing factor

Action.

Store equipment in suitable a location before fitment and rotate periodically.
Consider modification of DE pump brg sealing arrangement.



The vibration trend above (Waveform PK-PK G's) shows a clear drop in G levels after the pump bearings were replaced in early June.

Estimated Avoided Cost Saving

Action Taken	No Action Taken
Actual work done to repair the pump.	Scenario: Secondary damage to the pump caused by the failure of the DE pump brg
Materials: New compressor bearings / parts £300	35% of ERV (Estimated Replacement Value) New Unit £60,000 = £21,000
Labour: To remove pump replace brgs Refit 3 days x 2men £39/hr £1872	Labour: To remove pump replace brgs Refit 4 days x 2men £39/hr £2496
Production Losses: None, standby available	Production Losses: None, standby available
Total Cost: £2172	Total Cost: £23,496

Estimated Avoided Cost: £ 21,324

Note: Pump G745B also had the same bearing problem as the A unit. The pump bearings were replaced on this unit giving a combined estimated avoided cost saving of £42,648

Stuart Walker (RMS)

24th June 2015