

CASE STUDY II – HF COMMON MODE CURRENTS

Bearing damage in vertical hollow
shaft motors used for water
treatment

With many thanks to
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The problem

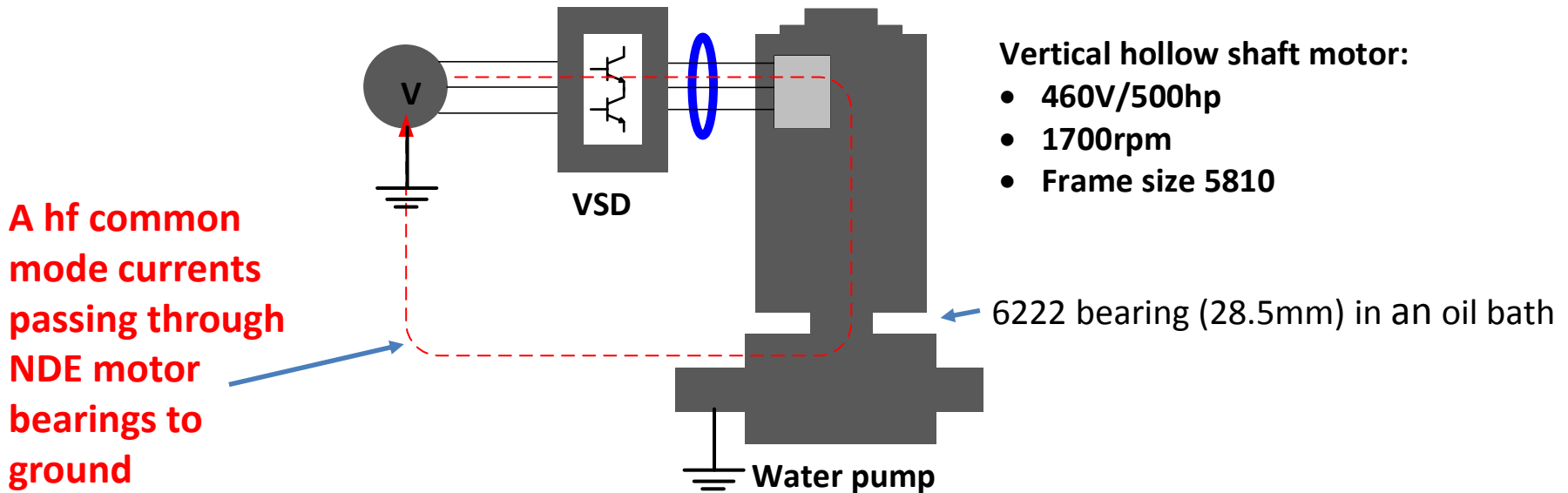
In a water treatment plant using high service motors driving pumps fed from VSD's, increased motor noise and vibration is observed within only a few months of operation.

The cause is high frequency voltages on the shaft resulting in common mode currents which flow through the motor bearings to ground.

These common mode currents can result in damage to the bearings often described as fluting.

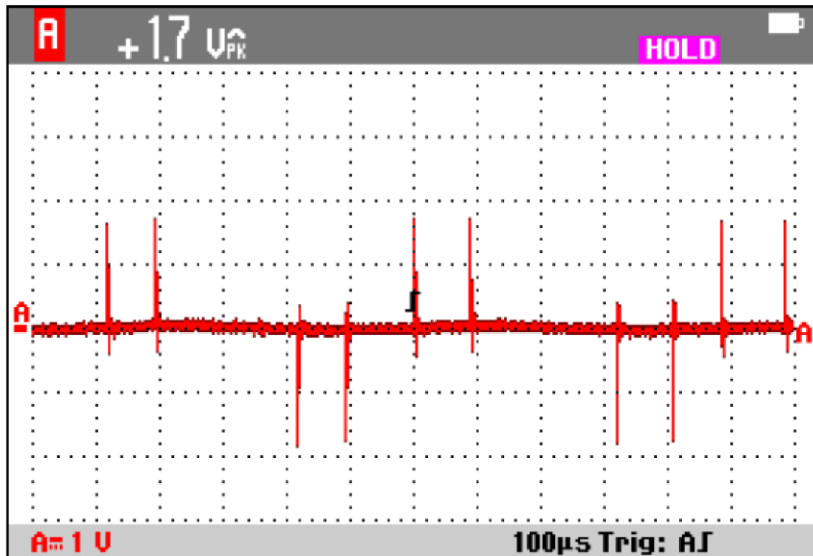


The water treatment drive train with position of the Rogowski coils shown as **blue ovals**



The Rogowski coil is positioned around all three phase terminal leads. In this position the Rogowski coil will measure the high frequency currents which were not returning to the inverter through the terminal leads (common mode currents) .

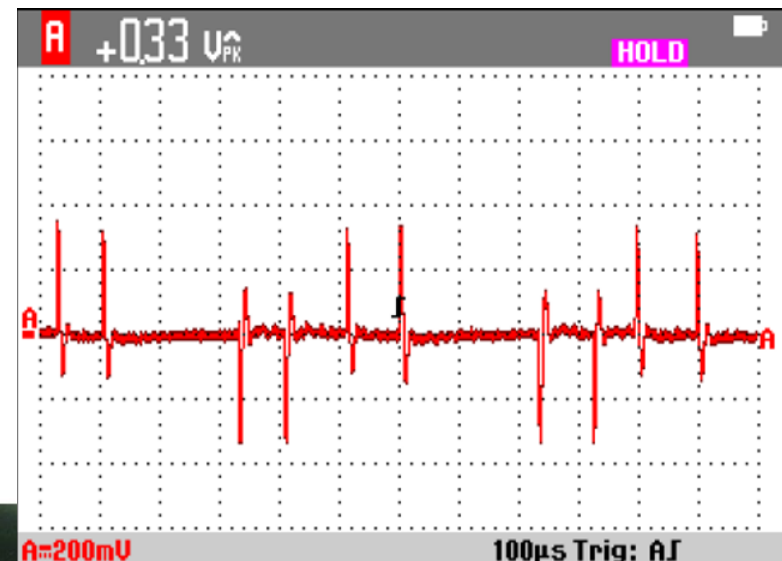
In this instance the water company were fitting CoolBlue® inductive absorbers around the T-leads to divert common mode currents.



Initial common mode current measured around T-leads

- 1.7V_{peak} = 34A_{peak} (50mV/A)
- This amount of current is sufficient to cause the bearing damage

Fluke 190-204, 200MHz scopemeter



Measurements after CoolBLUE cores were fitted

- 0.33V_{peak} = 6.6A_{peak} (50mV/A)
- The reduction in current would extend the life of the bearings