

Vibration & Condition Monitoring in the Water Industry



Lake Eildon Dam

Noise and Vibration can be an environmental problem as well as the cause of potential damage to valuable assets.

Vipac Engineers & Scientists have been called on to assist in ascertaining the cause of vibration and noise within the water infrastructure and coming up with innovative solutions.



Pump Station, Werribee

In the cases highlighted here, a howling noise and severe vibration was occurring on a water outlet at the gate opening when the water reached certain levels.

Vibration measurements were taken to determine the cause and assess the structure for damage.

Major Findings:

As water flowed past the bottom gate, vortices were created giving rise to periodic force being exerted on the structure. When the vortex shedding frequency matched the resonant frequency of the gates, the vibrations are amplified until the gates operating conditions change.

Vipac recommended that the water pass through the gate rapidly at a certain water level or avoid setting the gate within a certain range to minimise the vibration.



Pump Station, Yering Gorge

Another investigation involved noise and vibration on pumps in a Pumping Station in Werribee.

Major Finding:

Audible noise occurred when the pump was running at a fixed speed and was coming from the pump housing. Adjusting the speed of the pump did not affect the vibration or noise. The noise & vibration was determined to be caused by cavitation.



Water Treatment Plant, Chelsea

During operation testing, it was found that vibration was occurring to some parts of the water outlet structure during selected water flow rates of various water levels. The vibration occurred around 80%-90% of valve opening and caused looseness/breakage of the hold down bolts of the backlash plate.

The evaluation of the vibration level in relation to the concrete structure and the access of the orifice plate, determined that breakages were caused by the orifice resonance vibration generated by the water inflow turbulence and exposure to long hours with this condition.



Vertical Pump Bearing Wear by the Pump Resonance