

KEEPIT DAM, GUNNEDAH NSW - POST-TENSIONING MONITORING

BACKGROUND

Construction of Keepit Dam began in the late 1930's but was delayed during WW2. Work was restarted after the war and only reached completion in 1960.

The mass concrete main dam and several rock-filled saddle dams give a storage capacity of 425000 megalitres. Keepit Dam has undergone recent upgrades, the most recent was to strengthen the concrete structure using post tensioned cables.

This work would ensure potential overturning effects during flood and/or earthquake events would be mitigated

HMA Geotechnical was contracted to supply large diameter Vibrating Wire load cells and logging systems to monitor the tensioning of the reinforcing cables and thereby the load in kN.



Figure 1- Keepit Dam flood gates

OBJECTIVE

- Supply five vibrating wire load cells.
- Supply data loggers for each vibrating wire load cell.
- Calibrate vibrating wire load cells
- Supervise tensioning sequence

CHALLENGES

- Handling 500mm diameter, 450mm thick vibrating wire load cells each weighing 300kg
- Calibration of vibrating wire load cells to 15000kN



Figure 2 – Vibrating Wire Load Cell and platens

SOLUTION AND OUTCOME

HMA Geotechnical supplied five vibrating wire load cells and five pairs of platens manufactured by RST Instruments (Canada)

Each cell consisted of an array of eight vibrating wire sensors located internally near the cell's perimeter. The sensors were read by a 10channel vibrating wire data logger configured as a load cell monitor.

Calibration of the load cells was carried out by IMTS in Melbourne who were capable of calibrating load cells of this size.

Calibrations were performed whilst an HMA Geotechnical Technician was present.

To assist with load distribution within the load frame, customised load cell platens were fabricated.



Figure 3 - Calibrating -Vibrating Wire load cell within load frame

INSTALLATION

Installation and post tensioning of the vibrating wire load cells was performed by SRG Global Limited.

The cells were placed upon the anchor strings located on the main abutments.

Data loggers captured the loading sequence whilst an HMA Geotechnical Technician monitored the loads on each sensor within the vibrating wire load cell. Plot shown in Figure 6.



Figure 4- VW load cell in place.



Figure 5, Post tensioning head

HMA GEOTECHNICAL STATEMENT

HMA Geotechnical have supplied bespoke monitoring systems and instrumentation to Civil Engineering projects for nearly 40 years, delivering the best possible solution for our customers.

As an Australian employee-owned company, we take pride in our work.

Given our experience, workshop facilities and product range, we can supply the following:

- Custom built equipment and wherever possible parts sourced in Australia to cut down lead time.
- Dataloggers custom built and programmed to client's requirements.
- Integration with multiple software packages/protocols to suit any on-site requirement. Output can be via a range of industrial protocols (Modbus, DNP3, SFTP, others).
- Flexibility to supply and install globally.

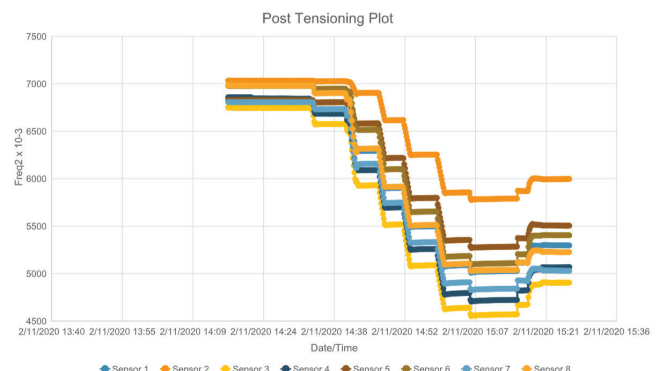


Figure 6 - Typical loading sequence of the vibrating wire load cell