

The Role of Geophysical Borehole Logging for Dam Sites



CASE STUDY

The risks due to ground conditions invariably represent the biggest unknowns for any dam construction project. Proportionate to the size and scope of the project a programme of rotary core drilling will usually be undertaken to mitigate these risks.

Further drilling programmes will often be periodically undertaken throughout the lifetime of dam as part of routine inspection or following events such as overloading. Drilling may also take place into the dam structure itself for inspection purposes with CCTV and televiewer images providing an indisputable record of dam condition.

Rotary core drilling produces rock samples which can be subjected to a battery of laboratory tests to ascertain physical properties. However, in-situ televiewer logging provides valuable further information on bedding and fracture planes. As core recovery can be less than 100% the televiewer can fill in any gaps in the formation column. Televiewers remain the only definitive method for orientating core samples.

In-situ small strain rock strength can be determined from density and sonic logs. From the resulting bulk density and sonic velocities (P & S) critical parameters can be easily derived i.e. Poisson's Ratio, Bulk Modulus, Shear Modulus and Young's Modulus.

Characterisation of the local hydrogeological conditions is a vital part of the safe construction and operation of dams. Borehole logging can provide key information to characterise the local subsurface conditions by measuring resistivity, conductivity, porosity (free, bound and capillary), permeability and flow patterns.

For the safety critical structures associated with dams borehole logging and especially televiewers provide a permanent and legally binding record of condition.



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