

Slurry Wall

Leigh Reservoir

NEAR TAUNTON, SOMERSET, UK



Sealing small leak through shoulder of dam embankment

Introduction

Bachy Soletanche Ltd., were employed by Wessex Water as main contractors to carry out remedial work to seal a small leak through the shoulder of the dam embankment at Leigh Reservoir in Somerset. From monitoring data compiled over the last 12 months it was possible for the Clients Representative, Babtie Group, to ascertain the main source of the leak and therefore plan remedial works to mitigate the problem.

Design

After lengthy discussions between BSL and Babtie Ltd which focussed on satisfying the requirements of the Client, Wessex Water, the conforming design using a cement-bentonite slurry wall was adopted. Of primary concern was that the depth of the wall had to be sufficient to penetrate the clay core in the embankment so as to provide an impermeable seal through the problem zone which was located above.

Ground Conditions

Due to the nature of the existing embankment the ground conditions encountered were



Excavation progressing along dam crest

CLIENT:	Wessex Water
MAIN CONTRACTOR:	Bachy Soletanche
CONSULTING ENGINEER:	Babtie Group
DURATION OF WORKS:	5 weeks

WORKS QUANTITIES

Excavation	600 sq.m
Slurry	412 cu.m
Land Drain	55m
Manhole	5 No.



Remediation of Bachy Soletanche working compound



Completed remediation of dam crest

relatively uniform. Typically through the centre line of the embankment a top 0.5m of grass and top soil overlaid a 3m thick layer of silty clay, which in turn overlay a thick inner core made out of impermeable clay.

Construction

Two main types of activities were involved in the contract. Primarily a cement-bentonite cut off wall was constructed to act as an impermeable membrane through the centre of the earth embankment while secondary works to provide adequate drainage channels and a means to measure the flow through these channels was constructed concurrently.

The work area was surrounded by a privately owned estate which called for a substantial environmental risk assessment and subsequent control measures on site. Of particular concern was ensuring that our day to day operations did not affect the life of hundreds of cattle who grazed in and around our site.

The construction of the cement-bentonite slurry wall posed numerous difficulties. Firstly the narrow crest on top of the embankment would only permit relatively small, narrow tracked excavators leaving very little room for the machine and dump

truck to manoeuvre and limited the operating weight to 13t. Secondly to prevent any spillages of slurry into the water the excavator was only permitted to slew away from the water and a protective screen and earth bund erected in the immediate vicinity of the dig. Throughout the excavation period no spillages were recorded on the reservoir side and only minor spillages occurred on the downstream shoulder of the embankment, which were relatively straightforward to clean up.

The excavation of 600 sq. m of wall was completed in 5 working days after which a clay capping layer was placed and compacted to further enhance the impermeability of the cut off.

In order to meet stringent performance specification imposed on us under the contract in terms of strength, permeability and in particular strain at failure, a non-standard slurry mix was adopted. Continuous testing of the slurry on site ensured a mix of both high quality and consistency was delivered to the trench for the excavation. Further laboratory testing proved that all of the performance criteria stipulated on the specification were achieved.

Ancillary work installing an adequate

collector drainage system with manholes and a flow measurement chamber were also completed successfully, as was the remediation of the entire site to a condition similar to that found prior to our mobilisation.

Conclusions

The project was completed both within time and budget and to the satisfaction of all concerned parties, in particular South West Water and the local landowners. The project has proved that work close to an extremely sensitive environmental can be completed efficiently and with minimal risk of contamination provided that sufficient control measures are instigated and managed at site level.