

**Title of Research:** Deformation and Hydraulic Conductivity of Cement-Bentonite Slurry Cut-Off Walls

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**Context:**

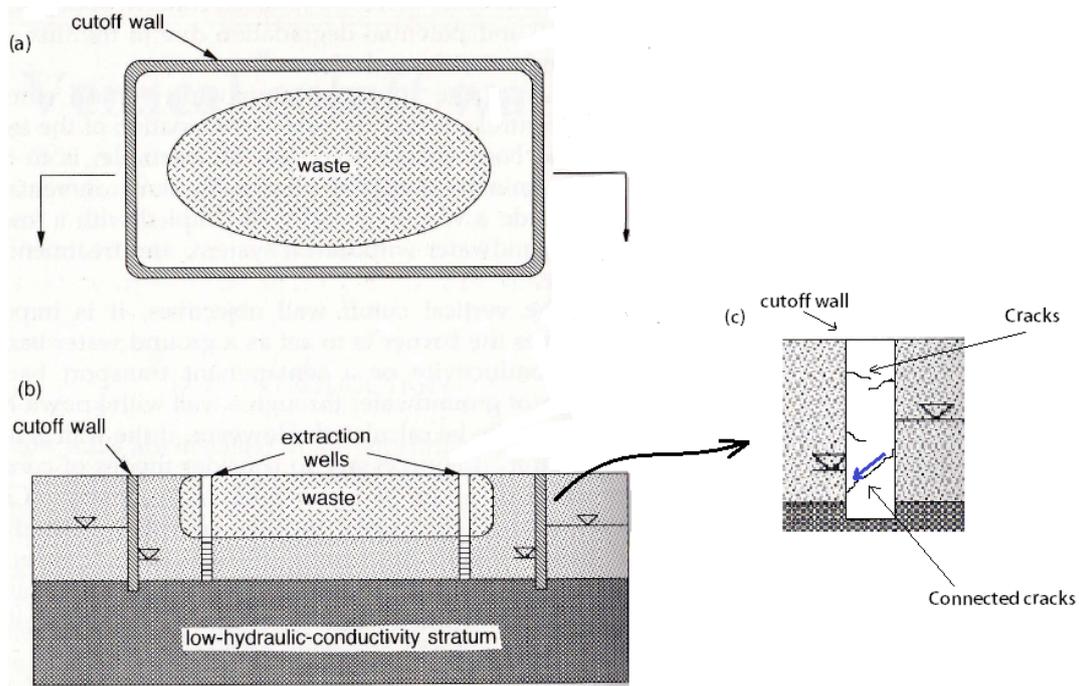
Cement-Bentonite slurry cut-off walls are low permeability vertical barriers that are used for cutting-off water flow in engineering groundwater facilities such as dams and levees, or containing waterborne contaminants in waste treatment systems (**Fig. 1** (a), and (b)). The facts that; there is no enough work undertaken to build full knowledge of the long-term performance of Cement-Bentonite (CB) slurry cut-off walls ,and the increase of their employment in United Kingdom and main Europe, have made them of great interest and importance to investigate. This investigation is ultimately required to get better awareness of long term behaviour of CB cut-off walls and determine their future liability ,as the sites contained after cut-off wall construction are likely to be redeveloped (Joshi et al, 2010).

The performance of the slurry is attacked by in-situ mechanical and physio-chemical mechanisms that are applied by earth/soil and hydraulic pressures and the chemistry of contaminants. Those mechanisms are expected to harm the wall material and directly affect the long term durability and performance.

Researchers interested in CB slurry cut-off walls such as Royal, Ghataora, Joshi, and Philip; agree that the CB slurry itself have variable and unclearly defined physical and mechanical properties. This might be due to variability of the mix design and ongoing chemical reactions of cement hydration. This variability leads to uncertainty in the deformation behaviour, which may have an additional detrimental impact on the main criteria of CB slurry walls (low hydraulic conductivity) (**Fig. 1** (c)).

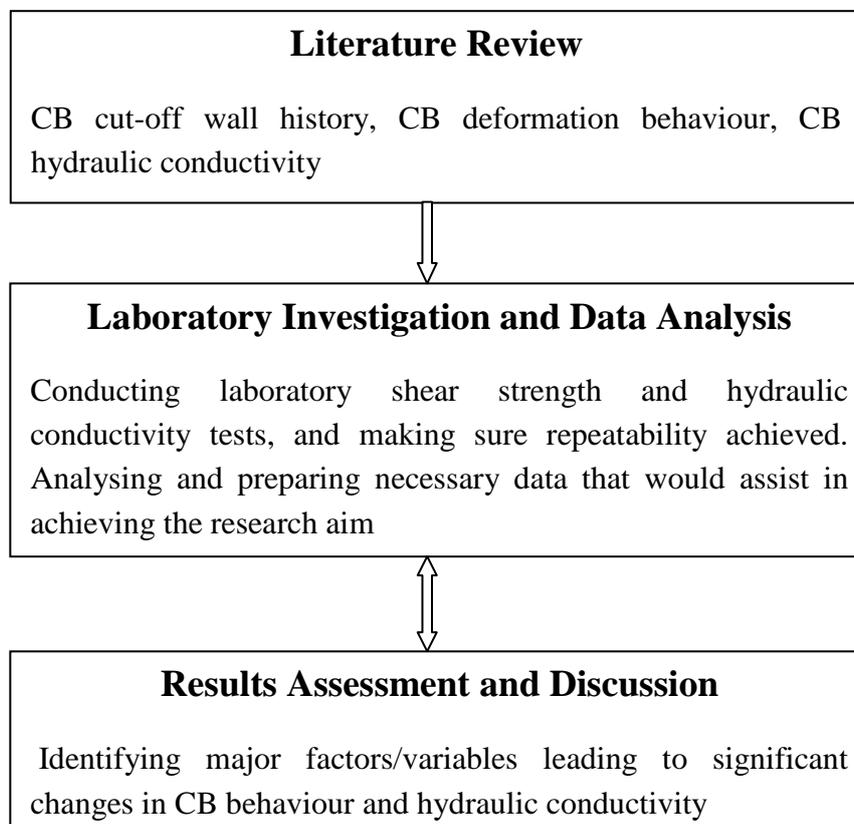
**Aim**

In this research an extensive laboratory investigation is aimed to be undertaken to scientifically evaluate the deformation behaviour and its impact on hydraulic conductivity at varying durations of curing and mix designs (using different cement replacement materials: GGBS ,and PFA).



**Fig. 1:** Schematic diagram of vertical cut-off wall configuration for typical site remediation project: (a) plan view and (b) cross-section (Evans, Daniel (edt), 1993). (c) Cut-off wall cross-section showing representative connected cracks through the wall.

## Methodology



## **References**

Joshi K, Kechavarzi C, Sutherland K, Ng MYA, Soga K, Tedd P (2010) Laboratory and in situ tests for long-term hydraulic conductivity of a cement-bentonite cut-off wall. *J. Geotech Geoenviron Eng* 136:562-572

Daniel DE (1993) *Geotechnical Practice for Waste Disposal*, 1<sup>st</sup> edn. Chapman & Hall, London. ISBN: 0 412 35170 6