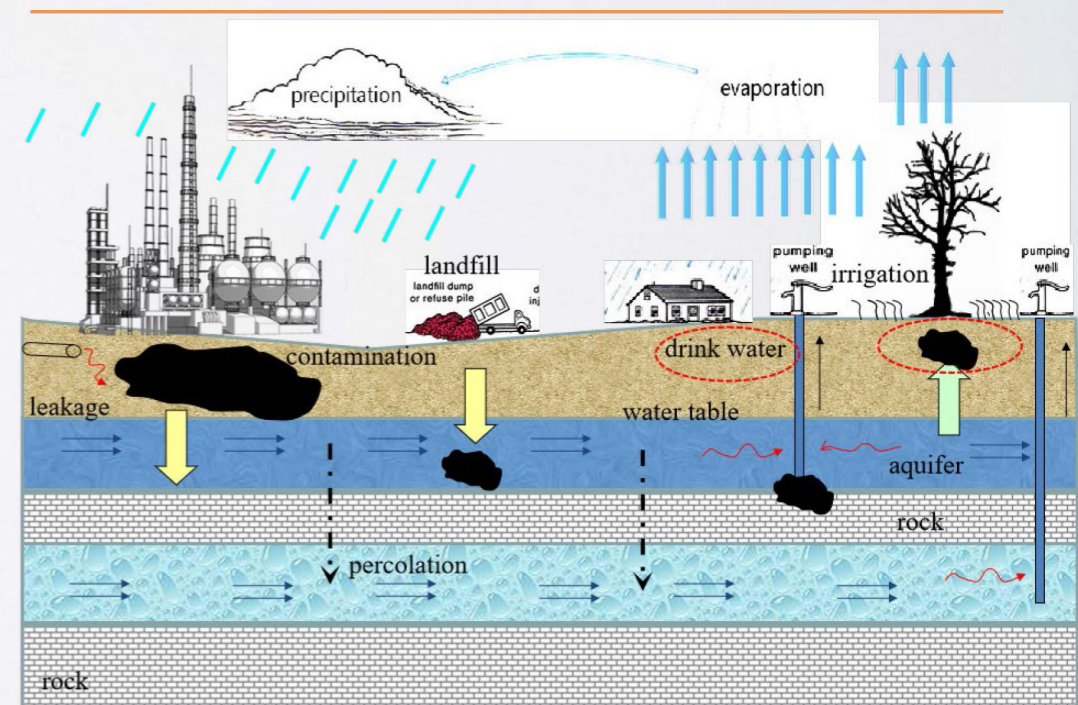


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# Influence of wet-dry cycles on vertical cutoff walls made of reactive magnesia-slag-bentonite-soil mixtures

## Key words:

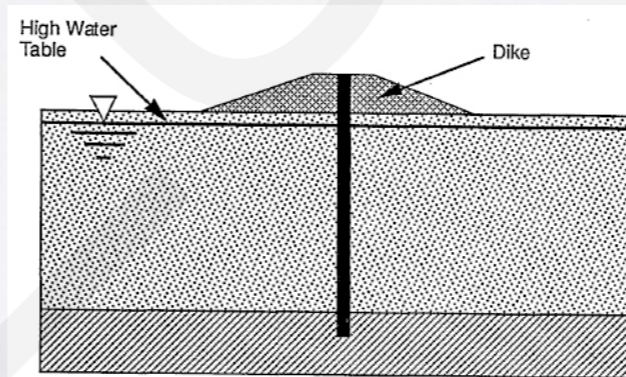
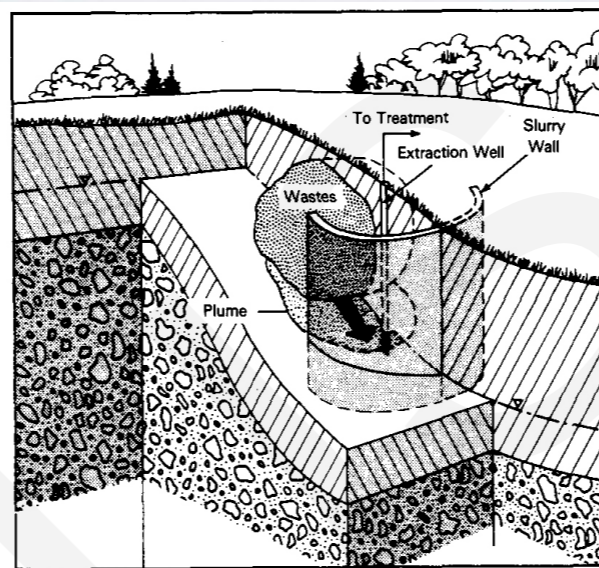
cutoff wall; reactive MgO-activated GGBS; durability; wet-dry cycles; carbonation



# Application of Cutoff wall

## Temporary

- Associated with remediation methods, e.g., S/S methods
- Control secondary pollution



## Permanent

- Setup in larger tailing zone and landfills
- Isolate pollution, which can not be treated immediately

# Guideline of MSB cutoff wall

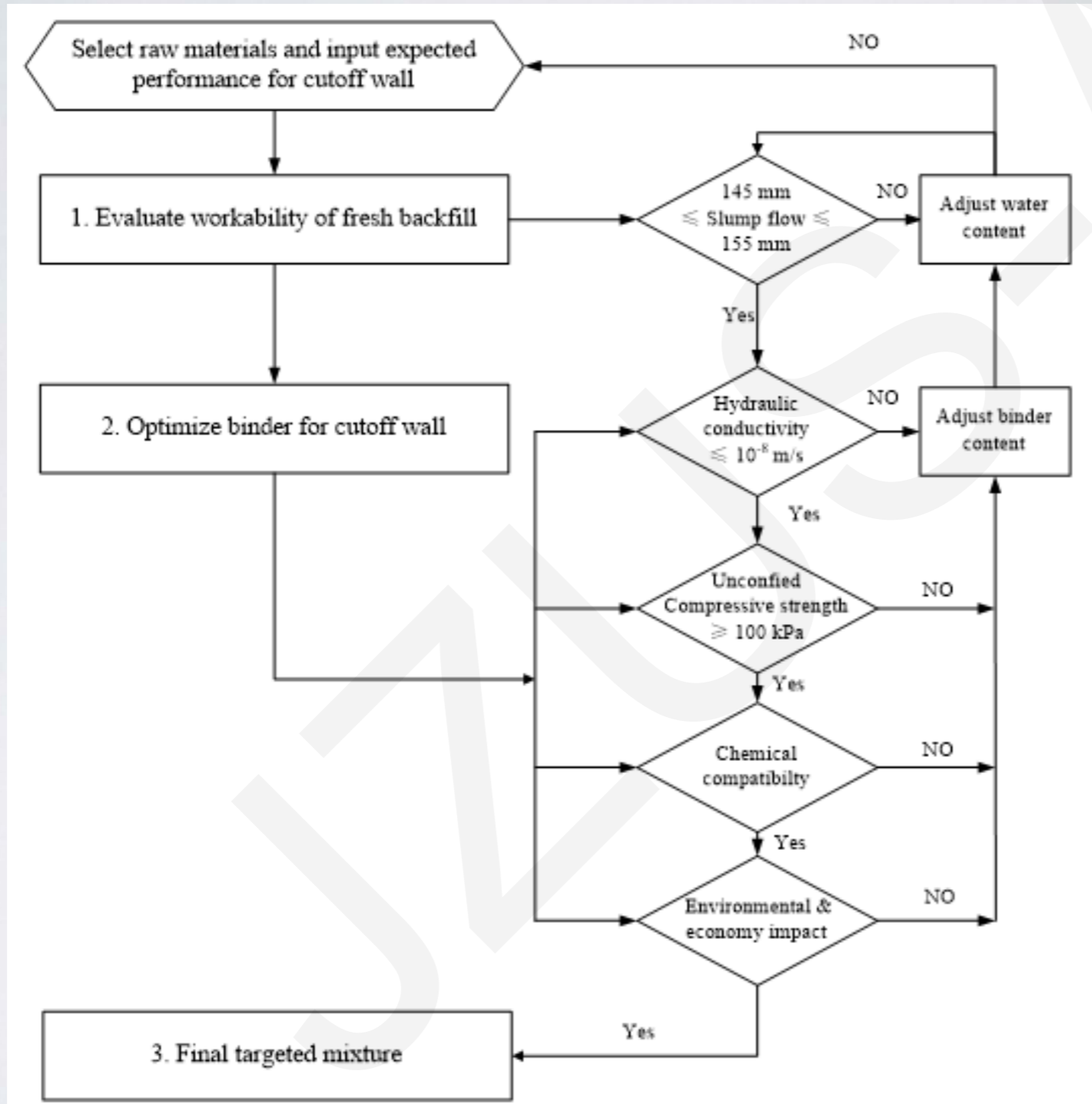


Fig. 1 Mix design guideline for cutoff wall backfills

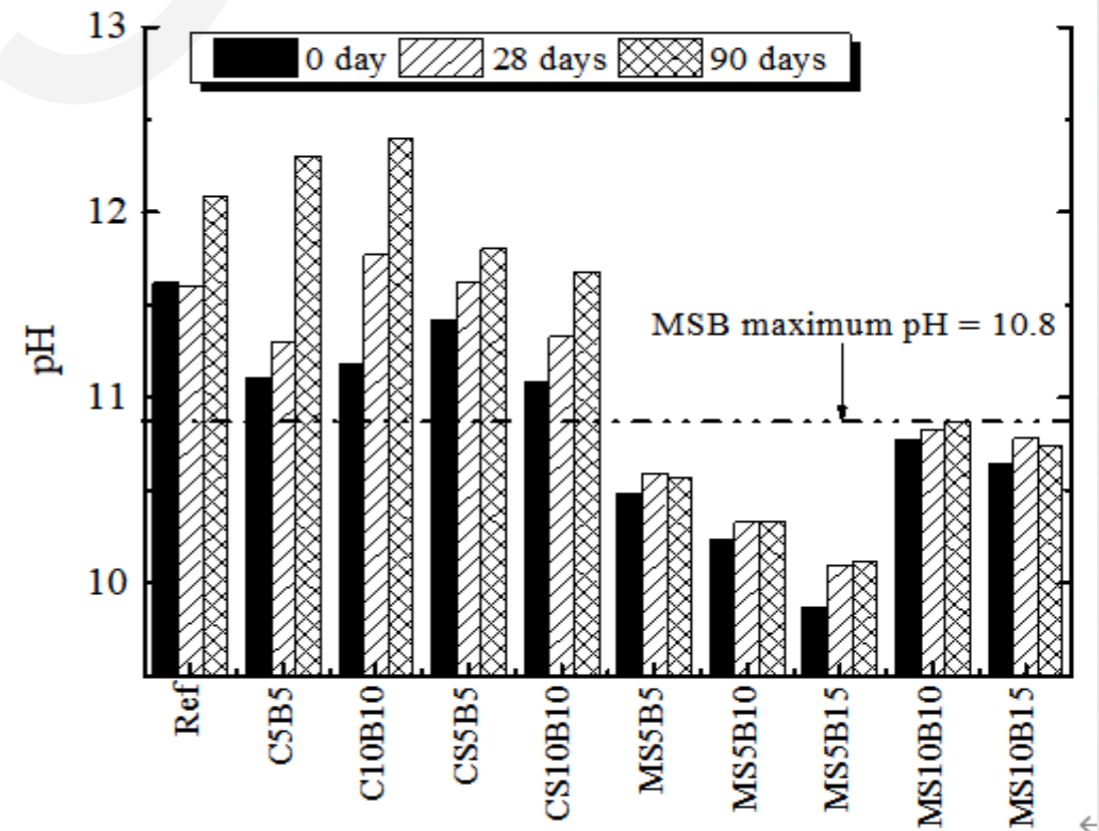
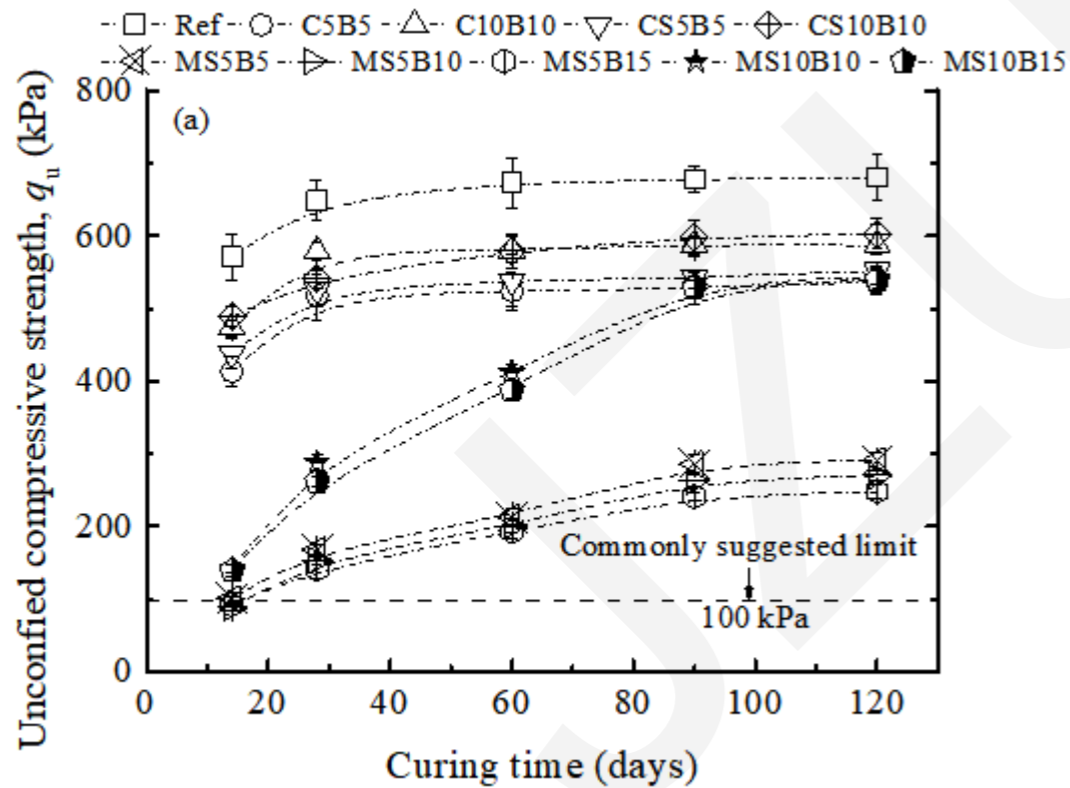
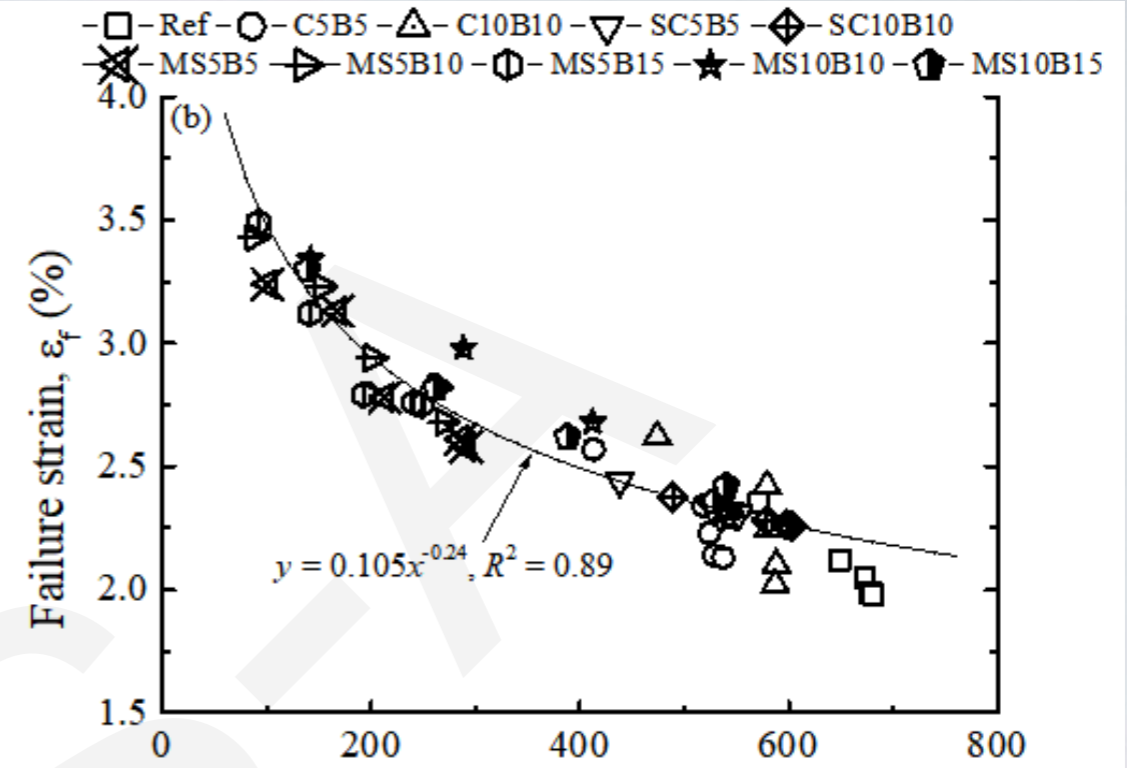
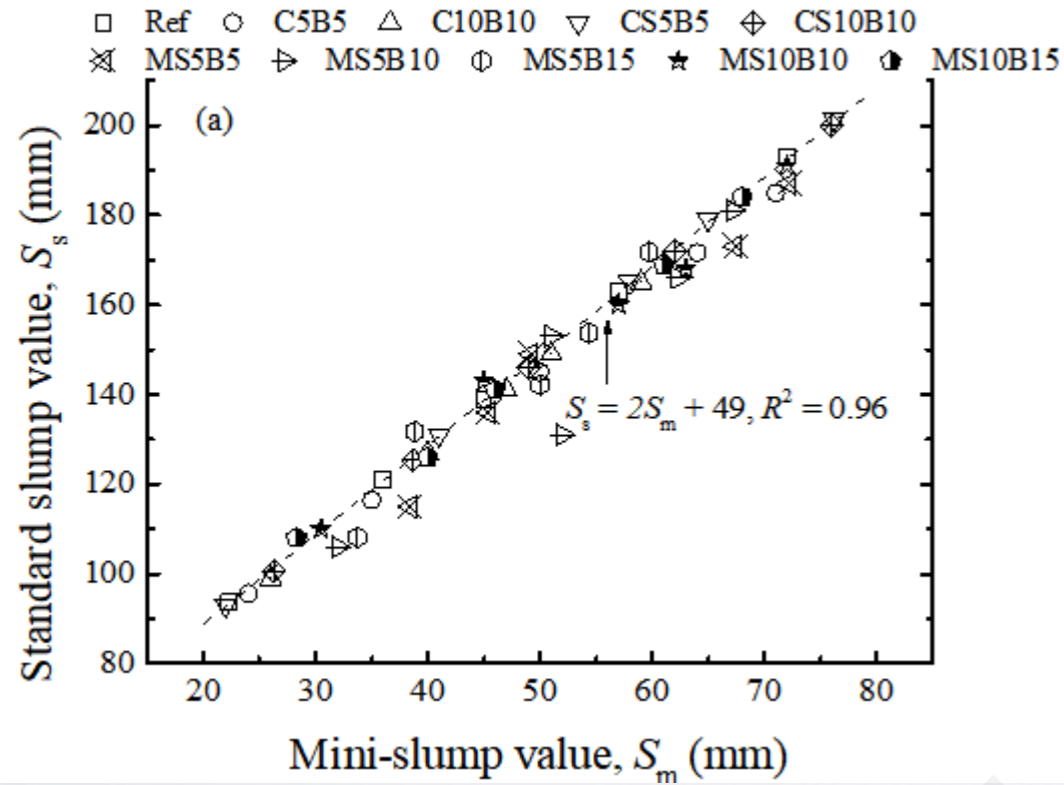


Figure 2. An overview of slump value, unconfined compressive strength, failure strain and pH with backfills type.

# MSC cutoff wall with lower hydraulic conductivity and strength

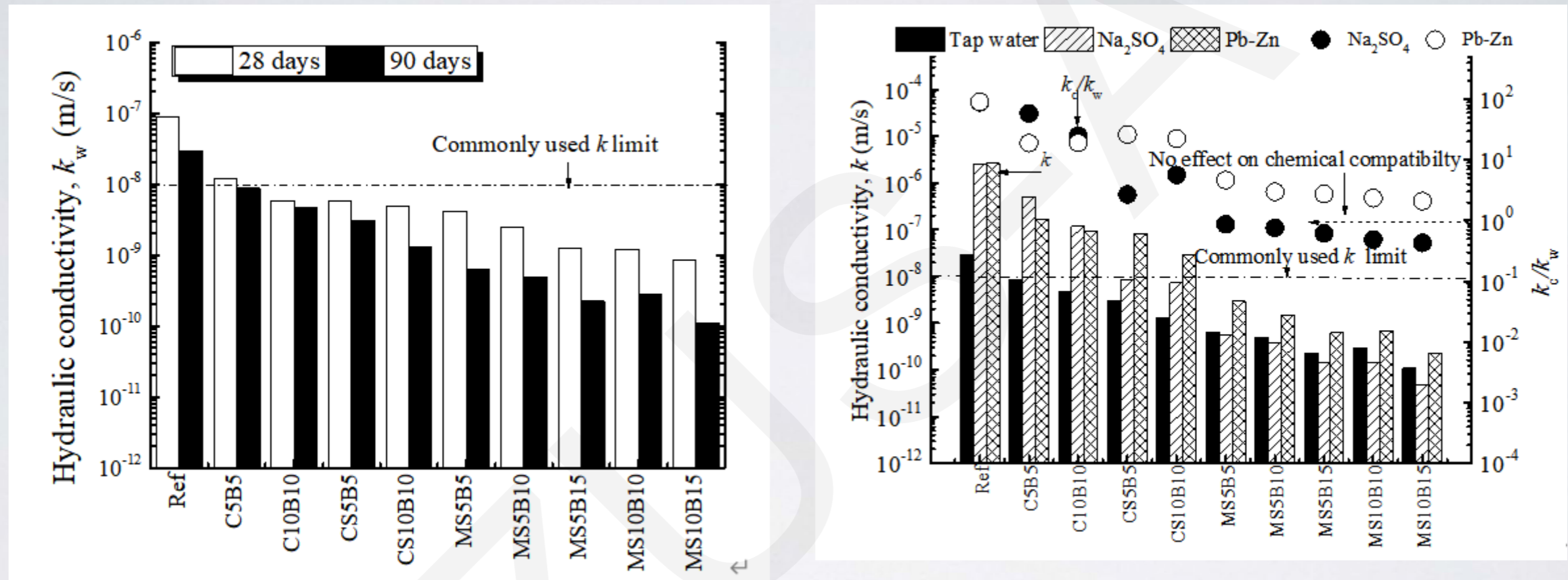


Figure 3. Measurement of hydraulic conductivity for the cutoff wall specimens exposed to sodium sulfate and Pb-Zn solution

# The durability of MSB cutoff wall exposed to wet-dry cycles

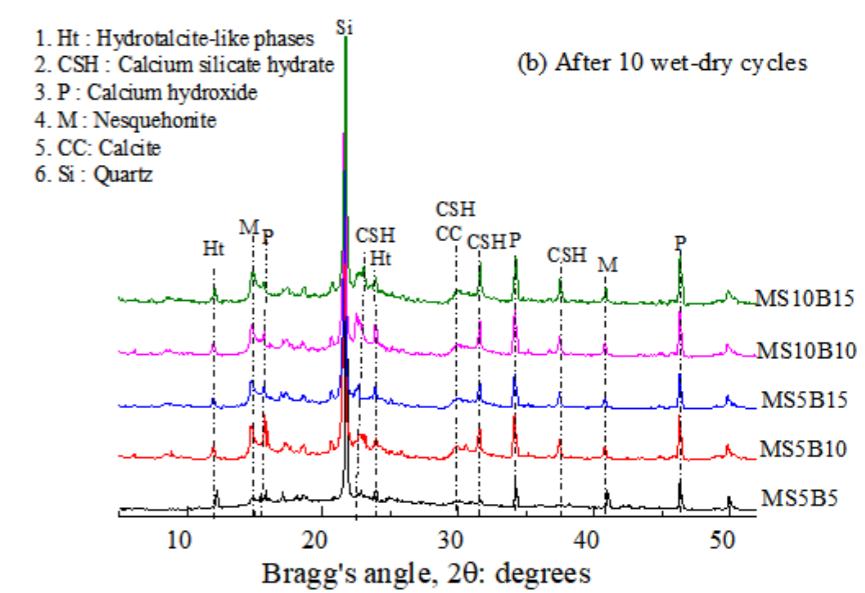
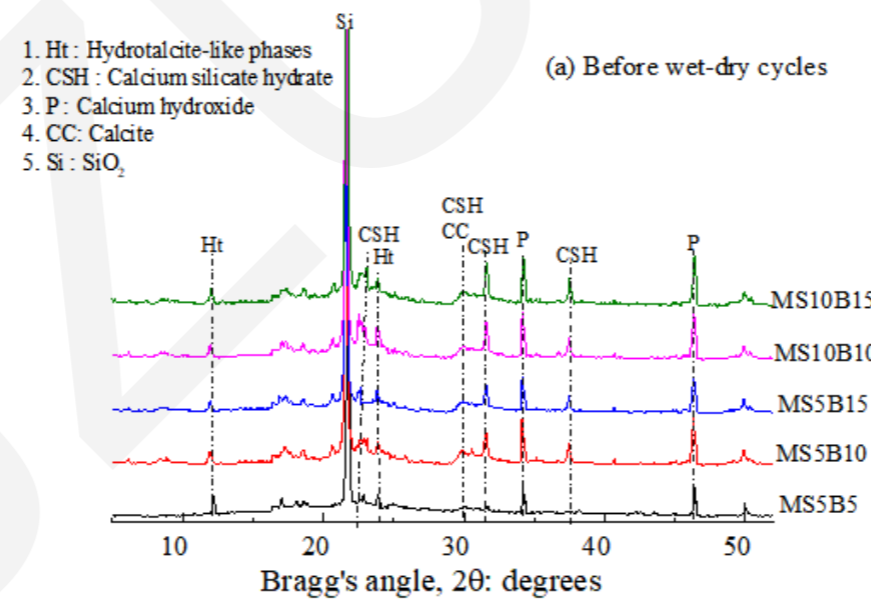
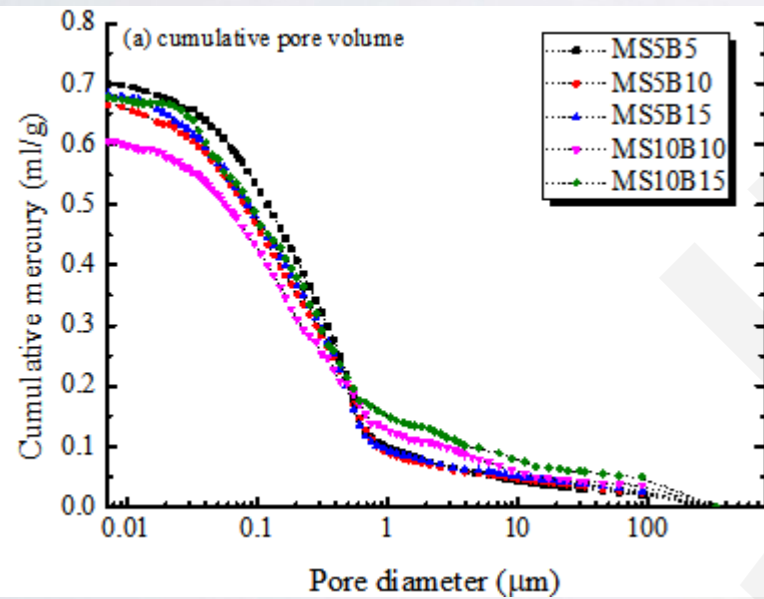
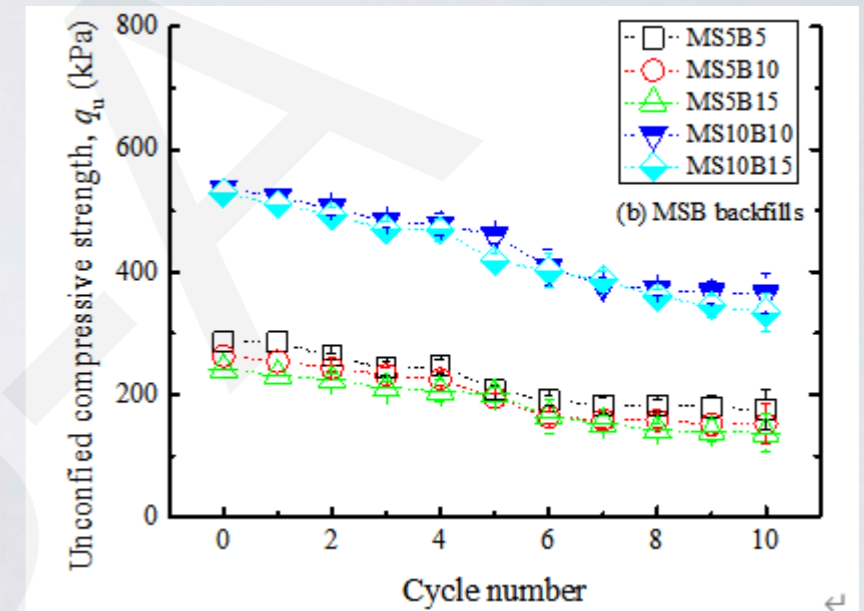
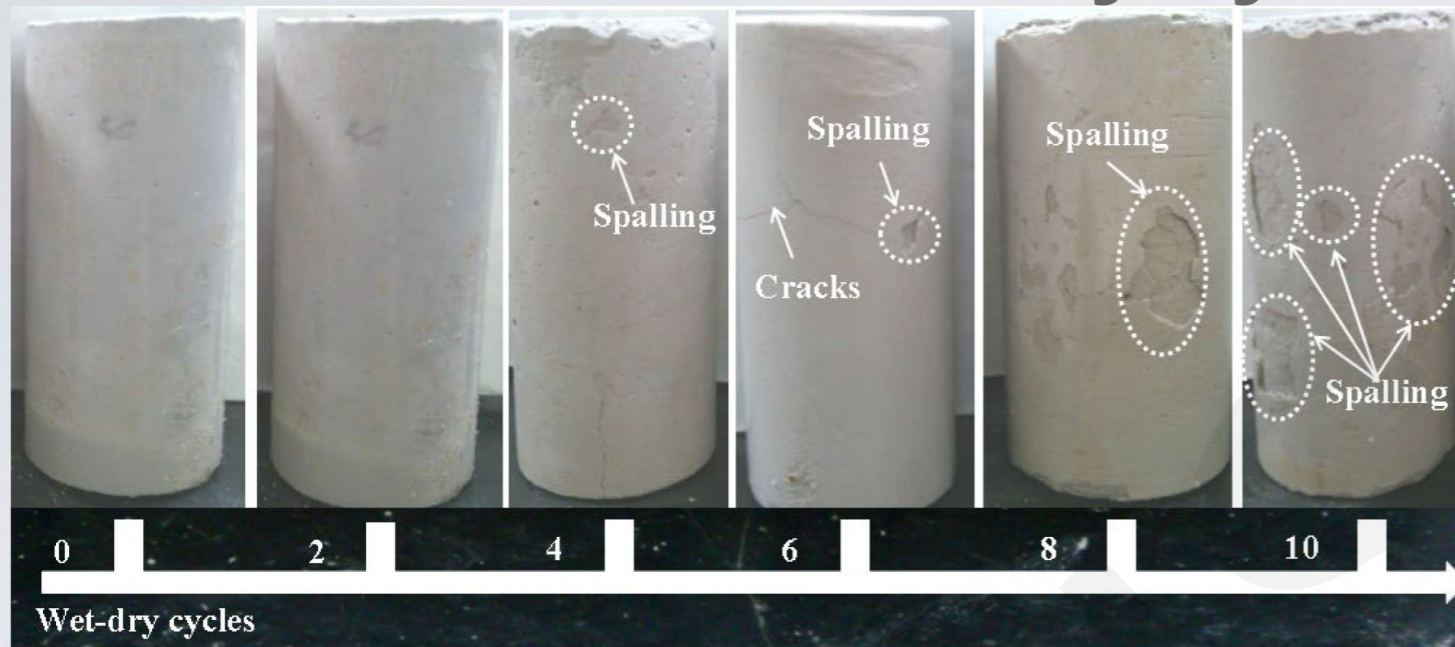


Figure 4. Cumulative pore volume and X-ray diffractograms of the 90-day cured MSB backfills before (a) and after (b) wet-dry cycle

# Research Priorities and limitations

## Research Priorities:

- The hydrotalcite-like phases and C-S-H were found to be the primary hydration products in the MSB back-fills both before and after the wet-dry cycles. The wet-dry cycles accelerated the leaching of earth alkali ions, which react with the dissolved  $\text{CO}_2$  from the atmosphere to form calcite and nesquehonite in MSB mixtures

Admittedly, for a full understanding of the long-term durability of the MSB backfills after wet-dry cycles, the wet-dry aging could be correlated with real-time for a quantitative simulation. Further investigations are warranted to elucidate the change of hydraulic conductivity, hydration products, and microstructures of the backfills under the various extreme environmental stresses that might be encountered in the field