

Design Criteria for Scab Liners in SAGD Producer Wells

By Jose Henrique Bitencourt Zimmermann, Dr. Alireza Nouri

Department of Civil and Environmental Engineering, University of Alberta

Summary

Slotted liners can be damaged through (1) enlargement of slot apertures by erosion, (2) excessive stress buildup, and (3) liner perforations that open new flow paths with excessive plugging. The result can be massive sanding. Scab liners are tools employed to remediate these situations (below figure).

This research aims to develop design criteria for scab liners in SAGD producer wells. The intent is to keep the sand production below an acceptable limit.



Use of scab liners to reduce excessive sanding.

Methodology

Commercial sand mixtures, replicating particle size distribution (PSD) and fines content of McMurray formation oil sands, are utilized for the tests. Both single-phase and multiphase flow conditions are implemented in the tests. Modified sand retention test (SRT) facility in the below figure is used for the testing.

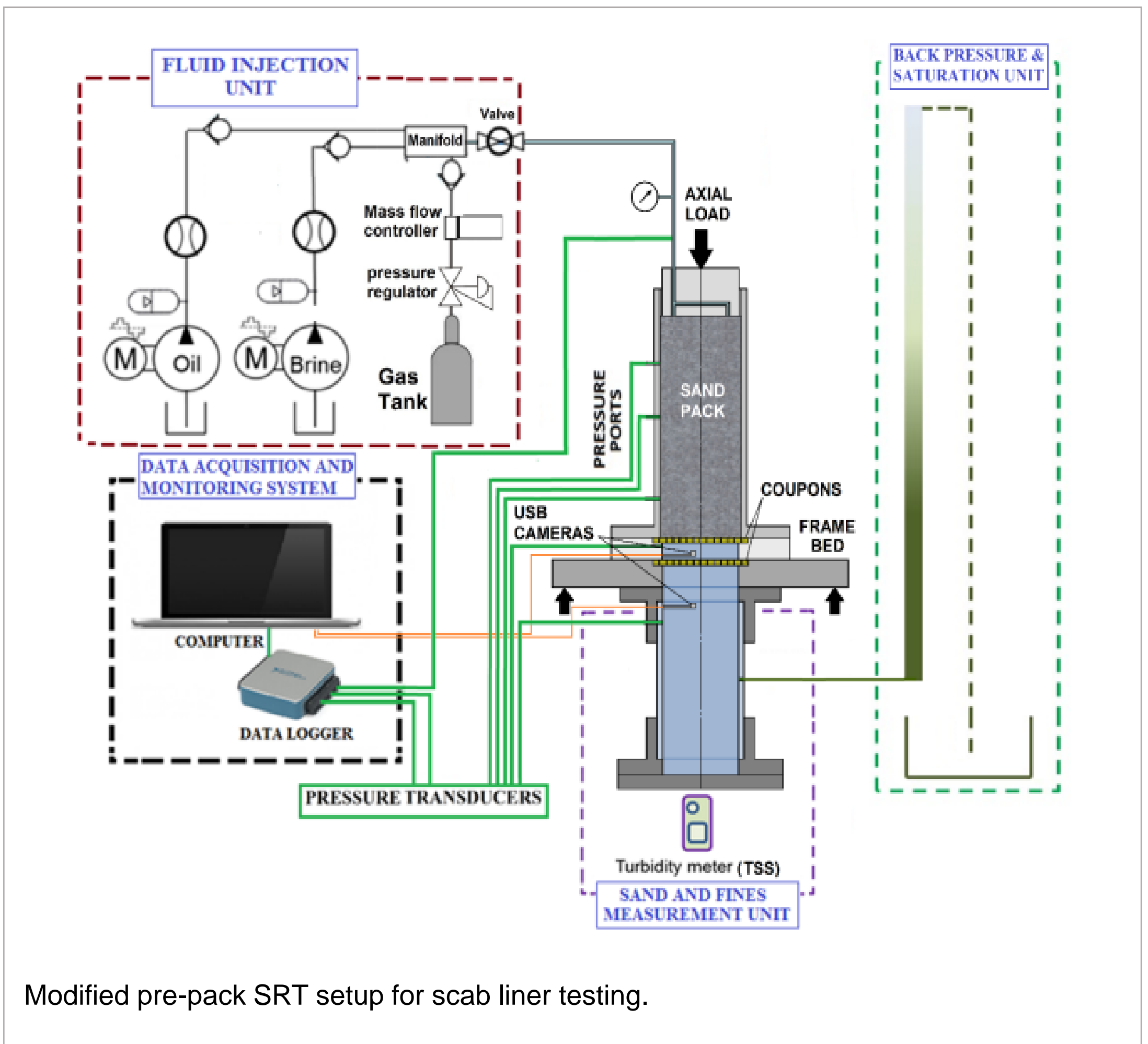
Two approaches are followed to simulate the slot erosion and the damage caused by perforations:

Damaged due to erosion

- Use two representative PSDs,
- Use slotted liner (SL) coupons with aperture sizes 0.022, 0.050, and 0.080 in. to represent damaged SL coupons,
- Adopt wire-wrapped screen (WWS) coupons to represent the scab liner,
- Use representative flow rates.

Damaged due to perforations

- Use two representative PSDs,
- Use perforated solid coupons to simulate perforation of severely plugged liners,
- Adopt WWS coupon to represent the scab liner,
- Use high flow rates consistent with drainage area of a perforation.

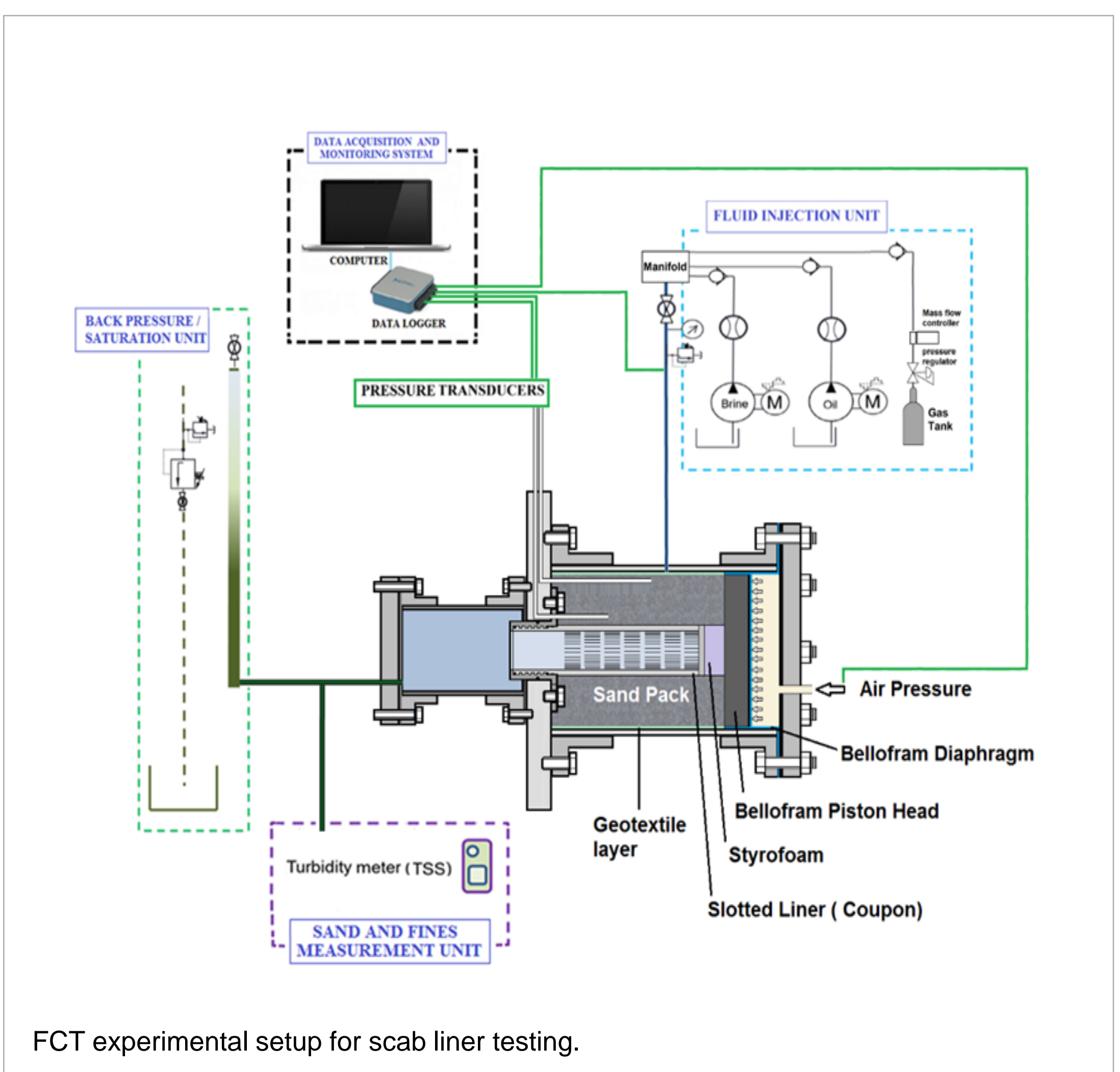


Modified pre-pack SRT setup for scab liner testing.

Conclusions and Future Work

As research is still underway, we expect final results by the first quarter of 2019. Utilizing full-scale completion testing (FCT) experimental setup to further investigate the design criteria for scab liners in the full-scale scenario.

Validation of design criteria for scab liners developed based on SRT testing with full-scale testing using damaged liners.



FCT experimental setup for scab liner testing.