



cosia[®]

Understanding flow characteristics of FFT during harvesting activities at different elevations of tailings ponds

Background

Management of fluid fine tailings (FFT) in oil sands operations requires harvesting it from tailings ponds and its subsequent pumping followed by chemical/mechanical treatment. One of the challenges during harvesting of FFT is cone formation between the clear water and tailings, which adversely affects the density of FFT and its consistent delivery to the tailings processing facilities. Oil sands industry is interested to understand the role of FFT characteristics (rheology, thixotropy, density and sand to fines ratio) on cone formation and potential mitigation methods.

This phenomenon has been studied in the mining industry [1] and one of the suggested mitigation measures has been use of caissons [2].

Statement of Research Opportunity

Improvement in harvesting a consistent flow of FFT by mitigating the effect of cone formation (using different methods, including caissons).

Desired Results

The proposed method should include modelling and potentially experimental study of cone formation in presence of a caisson, to address the following aspects:

- Fundamental understanding of the role of non-Newtonian behavior and thixotropy of FFT on cone formation in presence of a caisson;
- Methods to assess the extent of coning in presence of a caisson (e.g. computational fluid dynamics modelling; experimental laboratory study); and
- Other potential strategies that mitigate/reduce the effect of cone formation and allow consistent flow of FFT.

Works Cited

- [1] Ryland, D.K. and Shook, C.A. 1996. Coning of a slurry during withdrawal of a settled layer from a tailings pond, BHR Group Conference Series Publication. Mechanical Engineering Publications Limited. (Vol. 20, pp. 333-346).
- [2] Svorcan, R. 2015. Recovering mature fine tailings from oil sands tailings ponds. Technika Engineering Ltd. (U.S Patent: 9,127,427).