

Abstract Submitted
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Predicting Pressure Profiles of Cement Columns in Oil Wells Using a Thixotropic Model RAFAEL OLIVEIRA, FLÁVIO MARCHESINI, Halliburton — It is important to the oil and gas industry to provide proper well-bore isolation from the surrounding porous formations. This can be aided by predicting and preventing formation fluid invasion after primary cementing an oil well. In that regard, this work investigates the downhole pressure profile of a cement column placed in the annular space between the casing and the formation. The developed model takes into account the influence of (i) fluid loss to the geological formation, (ii) thixotropy and structure development during gelation, and (iii) compressibility and shrinkage of the cement slurry. This is a one-dimensional model where shear rates are estimated by the downhole velocity of the cement slurry and the annular distance. The thixotropic model recently proposed by de Souza Mendes and Thompson (Rheologica Acta, 2013) is used to calculate shear stresses, which are then plugged into the momentum equation. This equation is coupled with an equation for pressure evolution derived from mass balance and compressibility considerations. The model is under validation against large-scale cementing experiments, and application to current oil field data show promising results.

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