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**Effects of ROP on selected foam properties in vertical wells**

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This paper's objective is to illustrate how foam properties and rheological parameters can be affected by the rate of penetration (ROP) while dealing with vertical wells. The method followed in this paper is to graphically represent each of the annular pressure drop, velocity, density, flow power and consistency indices, Reynolds number and friction factor versus the annular depth at variable values of the ROP. The graphical representations are followed by detailed discussions illustrating reasons for the different profiles. Particular attention is paid to trend and profiles that might, at the beginning, look anomalous. From the obtained results, it is concluded that foam annular velocity, quality, density, power index, Reynolds number and cuttings concentration all increase proportionally with the increase of the ROP. It is also concluded that annular surface pressure, effective viscosity, consistency index and friction factor all decrease inversely with the ROP. Foam Reynolds number is directly proportional to the foam velocity and the friction factor has the opposing tendency. Flow consistency and power indices are functions of, among others, foam quality. Therefore, for the particular case histories in this paper, foam quality is directly proportional to the ROP, and hence, the flow consistency and power indices have opposing behaviors. The proposed developed model does not rely only on purely empirical correlations, but recent analytical-physical approaches and laboratory-experimental conclusions have been considered. The model average errors were less than 2.6% and 11%, respectively, when run and tested on two real wells drilled underbalanced with foam in the Middle East.

**Biography**

Seydou Sinde has completed his PhD at Cairo University. He has worked as Sample Catcher, Mud Logger, Data Engineer, Pressure Engineer, Operations Supervisor and Field Support. He has also occupied the position of Training Instructor and Training Chief Instructor in Petroservices-GmbH; Egypt Branch for four years. Since September 2016, he has joined IUGB and has been working as an Assistant Professor in the School of STEM. He has attended three international petroleum conferences where he has also published three conference papers. He also has one journal paper in press.

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