

# **GEOSEMINAR**

## **Mechanism of Sand Production**

by

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### **Abstract**

Sand production is a production of sand particles with hydrocarbon from a sandstone formation during production of hydrocarbon. It may have both negative and positive effects on the production of hydrocarbon. Sand production may cause the erosion of equipment, loss of lateral constraint around a casing, and additional cost required to dispose the contaminated sand particles by hydrocarbon. In the mean time, several heavy oil fields in Canada experienced increase in production rate of hydrocarbon after allowing sand production. Thus, understanding of the mechanism of sand production is required to maximize the profit from the production of hydrocarbon.

In this work, series of large-scale laboratory tests are conducted to model the behavior of unconsolidated sand layer around a well. From the laboratory tests, meaningful features of the sand production phenomenon such as development of cavity and propagation of disturbed zone around a casing are observed. On the other hand, numerical analyses are conducted by modeling laboratory tests to investigate the phenomenon theoretically. Discrete Element Method (DEM) codes, PFC2D/PFC3D, are used to model the behavior of sand particles under fluid flow. From the numerical modeling, production of sand particles and formation of cavity due to fluid flow are identified.

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Jong-Won received his MS in CEE from Georgia Tech. in Aug. 2003. Also, he received ME and BE in CEE from Korea University in Seoul, Korea in 2000 and 1998, respectively. He worked as a research engineer in Center for Disaster Prevention Science & Technology in Korea University for six months after receiving his ME. He is currently pursuing his Ph.D degree in mechanism of sand production and characterization of underground cavern.