

# Unclogging Hydraulic Propped Fractures via Dynamic Stimulation as a promising solution for Increasing Hydrocarbon Production

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## Abstract

Accumulation of sediments in the cracks generated by hydraulic fracturing represents one of the main reasons for the loss of well productivity. Laboratory experiments have proven during the past years that a dynamic excitation of the system could allow an increase in the recovery rate of hydrocarbons by improving the flow from the drainage area. To better understand this mechanism, an experimental study is performed to investigate the unclogging process of a propped fracture previously clogged using a synthetic dynamic load. Such a stimulation aims to create pressure oscillations inside the fracture to flush out all the fine particles blocking the fluid flow path. A systematic set of experiments has been performed to explore the evolution of permeability after the dynamic stressing has been applied. Fractures are clogged with crushed natural sand. All the permeability measurements were performed under the vertical stress of 20MPa to mirror the real operating conditions. Freshwater and nitrogen gas have been used to measure the permeability at ambient temperature under atmospheric pressure. The experiments show the influence of various factors such as proppant size, fines density, frequency, and amplitude of the dynamic load on the unclogging process. X-Ray CT scans have been used to visualize the fractures at a different stage. The results show a significant increase in permeability, with a high recovery rate reaching up to 75% after the dynamic signal has been applied. The frequency of the signal plays an essential role in the speed of the unclogging process and thus on the mobilization of the motion of fines through the propped fracture.

## References

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