

# Modeling of packer influence on hydraulic fracture initiation in laboratory tests

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**ABSTRACT:** Longitudinal and transverse fractures were observed in two laboratory hydraulic fracturing experiments under similar loading conditions. In-depth data analyses showed that the difference might be due to the secondary stress field induced by the packers. A three-dimensional, non-linear module from a commercial numerical simulator (ABAQUS) was used to model the stress field in the tested blocks. It is found that when the packer is working properly, it transfers tensile stress concentration from the packer edge to the central section of the sealed borehole and forms a longitudinal stress concentration band. This band induces a longitudinal fracture initiated from the wall of the sealed section. On the other hand, if the packer malfunctions, high tensile stress concentrations will be induced at its edges. As a result, circular tensile stress concentration bands form which eventually initiate transverse fractures.