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Proppant Transport and Coverage in Rock Fractures –A Computational Modeling Approach

Wednesday, 1 June 2022 11:45 (15 minutes)

A pressurized liquid with proppants is injected into wellbores during hydraulic fracturing to create fractures in rock formations. After removing the high pressure, proppant (typically sands) are trapped throughout the passage keeping the fracture open. The extraction productivity from reservoirs is significantly affected by the distribution of proppants in the fracture. The goal is to have roughly uniform and high proppant coverage in the passage. Since the experimental investigations to examine the process are challenging and costly, in this study, computational modeling tools are used to provide significant insights into the process. Accordingly, a 4-way coupled Computational Fluid Dynamic and Discrete Element Method (CFD-DEM) using the Star CC+ and Rocky-Ansys-Fluent codes were used to simulate proppant transport into a numerically generated realistic rock fracture configuration.

A series of simulations with different proppant sizes and various fluid flow rates were performed. The corresponding fracture coverages for different proppant sizes and fracture apertures were evaluated and compared. It was also shown that the ratio of proppant diameter to the mean aperture size significantly affects the fracture coverage. The corresponding optimum proppant sizes for different fracture apertures were evaluated.

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Country

Clarkson University

References

Time Block Preference

Time Block C (18:00-21:00 CET)

Participation

Online

Primary authors: Mr ROUSTA, Farid; Dr MOFAKHAM, Amir (Clarkson University); CRANDALL, Dustin (US Department of Energy - National Energy Technology Laboratory); Prof. AHMADI, Goodarz (Clarkson University)

Presenter: Prof. AHMADI, Goodarz (Clarkson University)

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