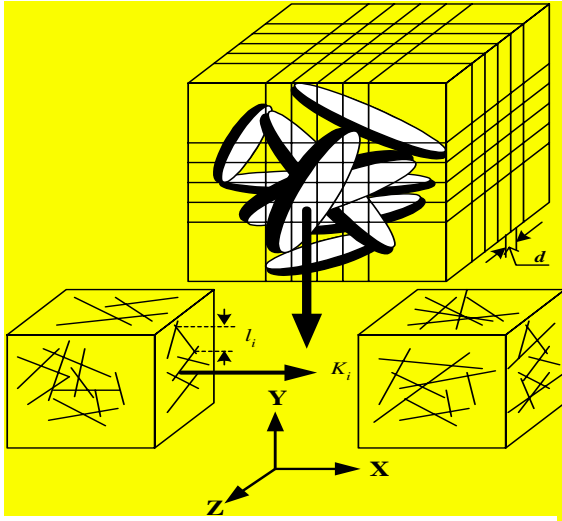
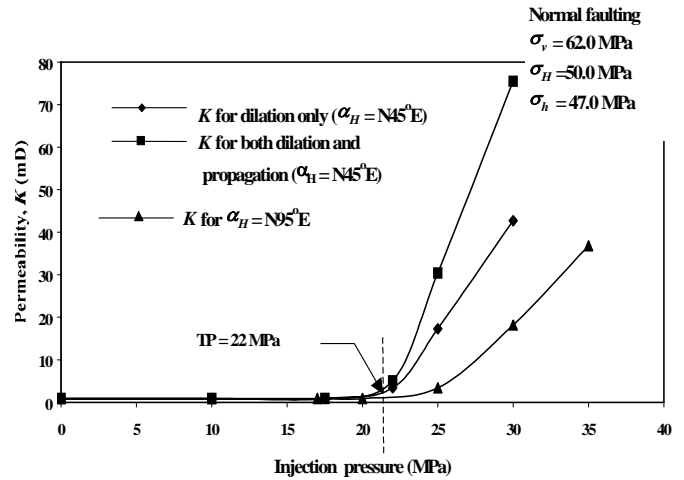


Naturally fractured reservoir stimulation

Conventional hydraulic fracturing is found to be ineffective in many naturally fractured reservoirs, such as tight-gas or Hot Dry Rock (HDR) reservoirs. Field execution of an alternative stimulation technique is known in various names such as low-proppant, no-proppant, proppant-free, waterfrac, or shear-dilation stimulation. The fundamental mechanism of this technique is to dilate the natural fractures through shear slippage induced by injected fluid pressure. This project aims to simulate the naturally fractured reservoirs based on characterized geological parameters, model the response of natural fractures to fluid pressure and to establish the critical stimulation pressure to achieve an economic production rate, thus optimising the overall treatment program.



Naturally fractured reservoir modelling



Permeability enhancement in naturally fractured reservoir by shear-dilation stimulation

Selected Publications:

- Hossain, M.M., Rahman, M.K. and Rahman, S.S., 'A Shear Dilation Stimulation Model for Production Enhancement from Naturally Fractured Reservoirs', *Society of Petroleum Engineers Journal*, pp.183-195, June 2002.
- Rahman, M.K., Hossain, M.M. and Rahman, S.S., 'A Shear-Dilation-Based Model for Evaluation of Hydraulically Stimulated Naturally Fractured Reservoirs', *International Journal for Numerical and Analytical Methods in Geomechanics*, Vol. 26(5), pp.469-497, 2002.
- Tran, N.H., Rahman, M.K. and Rahman, S.S., 'A Nested Neuro-Fractal-Stochastic Technique for Modeling Naturally Fractured Reservoirs', *Asia Pacific Oil & Gas Conference and Exhibition*, Melbourne, Australia, Oct.08-10, 2002
- Hossain, M.M., Rahman, M.K. and Rahman, S.S., 'Application of HDR Stimulation Technology to Develop Tight Gas Reservoirs', paper SPE 64484, *SPE Asia Pacific Oil and Gas Conference and Exhibition*, Brisbane, Australia, Oct.16-18, 2000.