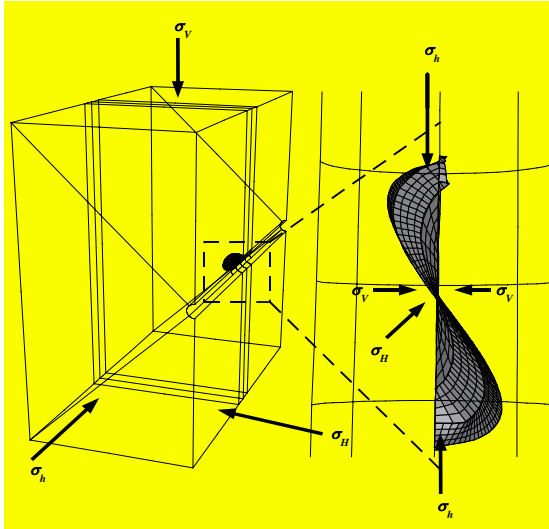
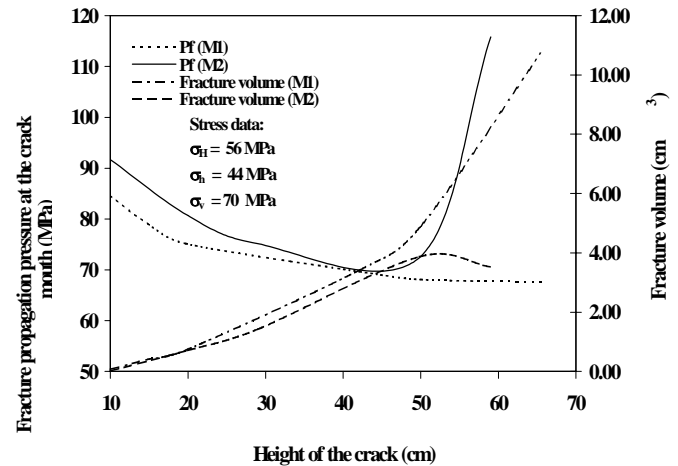


## Hydraulic fracture initiation and propagation in geologically complex fields

Although coplanar, long and wide fractures are desirable from production point of view, tortuous width-constricted short fractures are the result of many fracture treatments carried out in geologically complex fields. This project aims to understand the causes of and remedies for the near-wellbore fracture tortuosity as functions of in-situ stress conditions, wellbore orientation and perforation operations by complex analytical and advanced finite/boundary element modelling.



Fracture propagation simulation in geologically complex reservoir by HYFRANC3D



Fracture turning and twisting requires high propagation pressure but reduces the fracture volume, i.e. productivity.

### Selected Publications:

- Crosby, D.G., Rahman, M.M., Rahman, M.K. and Rahman, S.S., 'Single and Multiple Transverse Fracture Initiation from Horizontal Wells', *Journal of Petroleum Science and Engineering*, Vol. 35, No. 3-4, pp.191-204, 2002.
- Rahman, M.M., Hossain, M.M., Crosby, D.G., Rahman, M.K. and Rahman, S.S., 'Analytical, Numerical and Experimental Investigations of Transverse Fracture Propagation from Horizontal Wells', *Journal of Petroleum Science and Engineering*, Vol. 35, No. 3-4, pp.127-150, 2002.
- Hossain, M.M., Rahman, M.K. and Rahman, S.S., 'Modelling of Hydraulic Fracture Propagation by Boundary Element Method as Coupled Fluid Flow-Deformation Problems', *Proc. First Asian-Pacific Congress on Computational Mechanics*, Sydney, Nov.20-23, Vol. 2, pp.1341-1346, 2001.
- Rahman, M.K., Hossain, M.M. and Rahman, S.S., 'An Analytical Method for Mixed-mode Propagation of Pressurized Fractures in Remotely Compressed Rocks', *International Journal of Fracture*, Vol.103, No.3, pp.243-258, 2000.
- Hossain, M.M., Rahman, M.K. and Rahman, S.S., 'Hydraulic Fracture Initiation and Propagation: Roles of Wellbore Trajectory, Perforation and Stress Regimes', *Journal of Petroleum Science & Engineering*, Vol.27, No.3-4, pp.129-149, 2000.