

Effect of Mega Shear Fractures / Strike Slip Faults on Entrapment Mechanism in Sulaiman Fold Belt, Pakistan

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Mega shear fractures (MSF) / strike slip faults are frequently distributed in Sulaiman Fold Belt and have resulted in dislocation of the axial traces of some of the folded structures. These are conjugate sets of shear fractures with dominant NE and NW strike, developed during folding phenomena, those were subsequently affected by strike movement provided by wrench tectonics related to transform fault zone at western terminus of Indian Plate and southward movement of Sulaiman Fold Belt relative to Sibi trough in southwest and Punjab platform to east. MSF are easily interpretable on both satellite imagery and seismic lines oriented along the axis of folds. Significant displacement, observed along MSF in Sulaiman Fold Belt, might have caused breaching of traps related to folding due to nonexistence of lateral seal across MSF, however it may create compartmentalization of this structure if it is laterally sealed by different rock unit due to complex juxtaposition across MSF. Mega Shear Fractures, being younger than folding and penetrated to significant depth, could damage the entrapment mechanism for hydrocarbon accumulation in traps associated with folding. A mathematical relationship has been derived to assess quickly the risk of structural breaching associated with Mega Shear Fractures/strike slip faults. Integrity of lateral seal across the MSF depends on thickness of the seal, lateral displacement along MSF, dipping angle of strata (inclination of limb) and angle between axial trace & strike of the MSF. Maximum risk is associated with traps having thin seal, huge displacement along MSF, steepness of the strata and high angle between axial trace & strike of the MSF. A number of structures from Sulaiman Fold Belt have analyzed by using derived mathematical relation which shows satisfactory results.