Interacting inclined strike-slip faults in a layered medium

KRISHANU MANNA and SANJAY SEN*

Salukpara NSUP School, Salukpara, Naul, Shyampur, Howrah – 711 312, India
*Department of Applied Mathematics, University of Calcutta, 92, A.P.C. Road, Kolkata – 700 009, India

(Received 29 August 2016, Accepted 20 February 2017)

e mail : krishanu.manna@gmail.com

ABSTRACT. Two inclined, interacting, strike-slip faults, both buried, situated in a viscoelastic layer, resting on and in welded contact with a viscoelastic half space, representing the lithosphere-asthenosphere system, is considered. Solutions are obtained for the displacements, stresses and strains, using a technique involving the use of Green’s functions and integral transforms, for three possible cases - the case when no fault is slipping, the case when one fault is slipping and the other is locked and the case when both the faults are slipping.

The effect of sudden movement across one fault on the shear stress near the fault itself and near the other faults has been investigated. Some situations are identified where a sudden movement across one fault results in the release of shear stress near the other fault, reducing the possibility of seismic movements across it. Other situations are also identified where a sudden movement across one fault increases the possibility of seismic fault movements. A detail study may lead to an estimation of the time span between two consecutive seismic events near the mid points of the faults. It is expected that such studies may be useful in understanding the mechanism of earthquake processes and may be identified as an earthquake precursor.

Key words – Viscoelastic, Aseismic, Strike-slip faults, Sudden movement, Mantle convection, Stress accumulation, Earthquake precursor.