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Soil Mechanics

Rate effects, viscosity and creep behaviour in clay

Schytz, Sara Gottlieb; Hededal, Ole; Foged, Niels Nielsen; Krogsbøll, Anette

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Soil mechanics

Rate effects, viscosity and creep behaviour in clay



S. Gottlieb & O. Hededal

Department of Civil Engineering, Technical University of Denmark - DTU, Kgs. Lyngby,
sargo@byg.dtu.dk, olh@byg.dtu.dk

N. Foged & A. Krogsbøll, nf@byg.dtu.dk, akr@byg.dtu.dk

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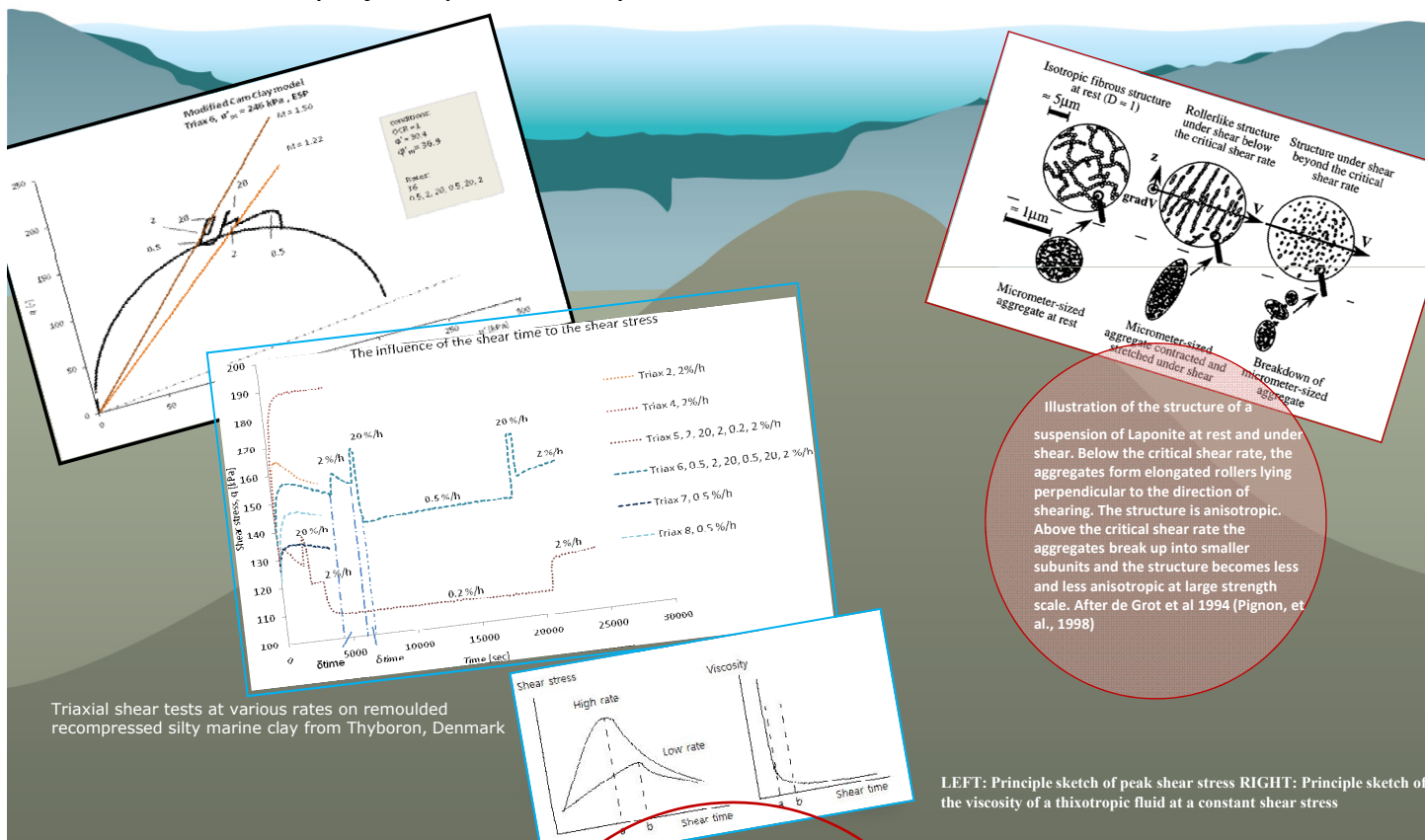


Illustration of the structure of a suspension of Laponite at rest and under shear. Below the critical shear rate, the aggregates form elongated rollers lying perpendicular to the direction of shearing. The structure is anisotropic. Above the critical shear rate the aggregates break up into smaller subunits and the structure becomes less and less anisotropic at large strength scale. After de Grot et al 1994 (Pignon, et al., 1998)

$$\tau_{xy} = G \cdot \gamma_{xy}$$

$$\tau_{yx} = -\eta \left| \frac{dv_x}{dy} \right| \Leftrightarrow \tau = -\eta \cdot \dot{\gamma}$$

$$\tau_{zz} = \tau_{xx} = -\bar{\eta}_1(\dot{\epsilon}, b) \cdot \dot{\epsilon}$$