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Lateral stress measurements in dense suspensions OREN PETEL, DAVID FROST, ANDREW HIGGINS, McGill University, SIMON OUELLET, Defence R&D Canada-Valcartier — Piezoresistive stress gauges are often used as a means of experimentally measuring the dynamic strength of materials. This procedure involves measuring the principal stresses in a material resulting from the uniaxial strain loading of a planar impact. The present study investigates the deviatoric response of dense particle suspensions consisting of silicon carbide suspended in ethylene glycol. The validity of the method is first shown in a pure liquid environment, recovering the hydrodynamic behaviour of the liquid experimentally, before it was applied to measure the response of the suspension. The deviatoric response of the dense suspension indicates that there is a shock-induced stiffening within the mixture. A meshless numerical approach (SPH) is used to investigate the shockinduced mesostructural deformation of the suspension. The measured deviatoric response of the suspensions is discussed in terms of the formation of inter-particle contact networks, which results from the shock-induced mesostructural changes in the suspensions.

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