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EXPERIMENTAL PROCEDURES TO ASSESS THE STRUCTURAL COLLAPSE OF PYROCLASTS

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During intense volcanic eruptions, the magma forcefully expelled gives rise to pyroclastic materials, such as volcanic ashes and macro-porous rocks. This magma has the potential to shatter into small particles with a notably expansive surface area. Meanwhile, the solidification of larger magma fragments in scoriae and pumices results in a high gas content. Consequently, abundant voids and bubbles within the pyroclasts lead to high porosity and low density. The geomechanical behaviour of these pyroclasts is complex due to their internal structure and the bounding between their particles, which may break under relatively low confinements, producing a structural collapse that calls for a distinctive approach to tackling geotechnical challenges within these volcanic rock formations. This paper describes novel procedures to assess the structural collapse of various pyroclasts collected in the Canarias Islands (Spain). The outlined procedures cover sampling, laboratory handling and isotropic compression triaxial tests. Adhering to these recommendations ensures a reliable characterisation of the structural collapse of pyroclasts, which can be utilised to calibrate constitutive models and construct or design geotechnical structures.