A non-isothermal consolidation model for gradient-based poroplasticity

Javier L. Mroginski*, Guillermo Etse†, Marianela Ripani‡

***** CONICET and Applied Mechanics Department
Faculty of Engineering, Northeaster National University
Av. Las Heras 727, Resistencia, Chaco, Argentina
e-mail: javierm@ing.unne.edu.ar

† CONICET and Center for Numerical and Computational Methods in Engineering (CEMNCI)
Faculty for Exact Sciences and Technology, Tucuman National University
Av. Roca 1800, (4000) Tucumán, Argentina
e-mail: getse@herrera.unt.edu.ar

‡ CONICET and Materials and Structures Laboratory, University of Buenos Aires, Argentina
e-mail: mripani@fi.uba.ar

ABSTRACT

In this work, the thermodynamically consistent non-local model for concretes subjected to high temperatures originally proposed by Ripani, et al (2014) [1] is extended, in order to evaluate the failure behavior of partially saturated quasi brittle materials like soils. This new formulation follows the gradient-based poroplastic theory proposed by the authors [2], moreover, introduces the temperature as an additional variable of the internal characteristic length. According to [3], the non-local effect is achieved assuming that the internal variables are the only ones of non-local character. Hence, both q and $q_{\alpha,i}$ will be considered as arguments in the free energy. On the other hand, in order to reproduce the softening behavior of partially saturated soils the saturation degree as well as the confinement level should be considered in the internal characteristic length calibration. Finally, the FE implementation of this enriched constitutive theory with selective C1 and C0 interpolation functions for the internal variables and the kinematic fields, respectively, is discussed.

REFERENCES

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