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Influence of Contact Phenomena on Structure–Subsoil Interaction: Finite Elements Method Analysis

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The contact between structure and subsoil is formulated by using 3D elasto-viscoplastic relationships incorporating pore pressure. Finite element implementation is then performed for the geotechnical structure, subsoil and contact relationships. Contacts elements with zero thickness are carefully developed, allowing for slip and stick. Solid isoparamtric elements are also developed. The novelty of the contribution consists of using elasto-viscoplastic model incorporating pore pressure for 3D contact. Using implemented spatial elements in the program HYDRO-GEO elasto-viscoplastic analysis of interaction between structure and subsoil was carried out. Earth dam interacting with concrete weir and excursion trough in one of Polish earth dams (Dobczyce) was analyzed. Simulation of deformation of structure and slide of soil on surface of the retaining wall was studied.

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