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Nota di contenuto	1. Structural performance of thermo-active foundations -- 1.1 Introduction -- 1.2 Thermo-elastic soil-structure interaction -- 1.3 Design criteria -- 1.4 Thermo-mechanical load transfer analysis -- 1.4.1 Assumptions and basic aspects of the model -- 1.4.2 Load-transfer curves -- 1.4.3 Mechanical load transfer analysis -- 1.4.4 Thermo-mechanical T-z analyses -- 1.4.5 Model evaluation: impact of temperature changes -- 1.4.6 Model evaluation: impact of boundary conditions -- 1.4.7 Model evaluation: head restraint effects -- 1.4.8 Results from thermo-active foundations -- 1.5 Final comments -- 1.6 Acknowledgments -- 1.7 References -- 2. Thermal analysis of thermoactive foundations -- 2.1 Introduction -- 2.2 Thermal modeling of TAFs -- 2.2.1 Description of TAF thermal modeling -- 2.2.2 Experimental validation -- 2.2.3 Sensitivity analysis -- 2.2.4 Impact of thermal piles on soil temperature distribution -- 2.3 Building foundation heat transfer -- 2.4 Thermal response of TAFs -- 2.5 Energy analysis of buildings with TAF systems -- 2.5.1 Application

of TAFs for office buildings -- 2.5.2 Application of TAFs to residential buildings -- 2.6 Summary and conclusions -- 2.7 References -- 3. Full scale geothermal energy pile studies at Monash University, Melbourne, Australia -- 3.1 Introduction -- 3.2 Site ground conditions -- 3.3 Instrumentation of full-scale geothermal energy piles -- 3.3.1 Single geothermal energy pile instrumentation -- 3.3.2 Instrumentation of group of geothermal energy piles -- 3.4 Heating test for single pile case -- 3.5 Mechanical tests -- 3.6 Dual pile system -- 3.6.1 Concrete curing temperature -- 3.6.2 Strains during concrete curing -- 3.7 Conclusions -- 3.8 Acknowledgments -- 3.9 References -- About the authors.

Sommario/riassunto

This monograph documents the current of state-of-art in Thermo-Active Foundations (TAFs) suitable for efficiently and sustainably heat and cooling buildings. TAFs, also referred to as thermal or energy piles, offer innovative and sustainable alternatives to ground-source heat pumps as well as other conventional heating, ventilating, and air conditioning (HVAC) systems to heat and cool commercial as well as residential buildings in several regions in the world. In summary, this monograph collects the latest multi-disciplinary advances in modeling, designing, and monitoring TAFs. Ultimately, it is hoped that this monograph will provide a comprehensive reference for both researchers and professionals interested in structural and thermal performance of TAFs and their applications in developing integrated and sustainable equipment and systems for the built environment.