



PROPOSITION DE MASTER 2

TITRE : «3D Numerical Modelling of an active Soil Depressurization Systems for indoor air quality improvement in buildings»

This project is part of the Interorganism Research Program for better air quality (PRIMEQUAL), implemented by the Ministry in charge of the Environment and by the Agency for the Environment and Energy Management (ADEME).

Indoor air quality is a public health issue. In particular, the impacts on indoor air quality of anthropogenic soil pollution are still a subject little known to most professionals. In these conditions, buildings must be constructed with devices making it possible to limit the emissions of these pollutants to the indoor air. Among the constructive measures that can be implemented, the Soil Depressurization Systems (SDS) allow, by depressurizing the base to reverse the parasitic air flows between the ground and the indoor environment through the slab. Furthermore, when these devices are used, they are generally coupled to a geomembrane in order to limit the diffusive transfer of volatile pollution and also to compensate for any shortcomings of the depression generated by the SDS. There are no standards or technical guide (except for passive SDS) both in France and abroad so that professionals can size these systems.

Within the framework of this Master, we are interested in processes occurring at the scale of the draining system. A numerical model will be developed using OpenFoam in order to simulate in 3 dimensions the flows in the drains, the different ground layers and the geotextile. Different configurations will be studied (diameter of the drains, geometry of the strainers, inter-drain spacing) as well as the local interactions between drains, the impact of the compressibility of the gas, the turbulence phenomena in the different zones etc. The main objective consists in evaluating the resulting pressure drop, in order to model the system "drain + soil" as an equivalent porous medium, that can be used in future works for simulations at larger scales.

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Industrial Partners : Ginger (Burgeap), Terageos, Tera Environnement