

**SERVICE DE METROLOGIE NUCLEAIRE**  
**INDUSTRIAL RISK**

**MASTER THESES**

Academic year **2022-2023**

**Review and sensitivity analysis of a Monte Carlo model for assessing risks of ice fall from wind turbines (in collaboration with Tractebel Engie)**

P. Geerinck ([pascal.geerinck@tractebel.engie.com](mailto:pascal.geerinck@tractebel.engie.com)), P.E. Labeau ([pierre.etienne.labeau@ulb.be](mailto:pierre.etienne.labeau@ulb.be)) (in collaboration with Tractebel Engie)

*For master thesis and internship*

**Context**

In the context of energy transition, the development of wind energy projects situated in an industrial environment or close to cities is a preferred option in regions with high population densities, since it represents some major advantages related to landscape and noise pollution, NIMBY (Not In My Backyard) and the availability of an electrical connection to the grid. On the other hand, it also represents a drawback in terms of safety during winter conditions due to the presence of people in the vicinity of the wind turbine where ice accretion on the wind turbine blades represents a major risk as ice fall may cause incidents, even lethal accidents. To be able to access this risk Tractebel developed a risk-based decision icefall-model using empowered by Monte-Carlo engine. This model contains a big number of stochastic parameters related to physical phenomenon's such as ice accretion, wind climate, ice shedding, trajectory model parameters, human exposure model parameters, etc.

**Objectives of the master thesis**

The objective of the master is to perform an in-depth sensitivity analysis of the available model (the model is fully described and runs under a Matlab environment). The aim is to have insight in those parameters which are critical in relation to the used risk measures and so need special attention in the modelling. It is proposed to use a 2-step approach: the first step would be a critical review of the developed model to have a clear insight of the different constituting components and eventually propose improvements, the next and main step is the detailed sensitivity analyses of the model. If needed an iteration can be performed towards step 1. Based on the result of these analyses it may also be an opportunity to optimize the Monte-Carlo sampling method that is the core of the modelling.

To have the possibility to be in close contact with the developers, have easy access to the code it is highly recommended to combine the subject of the master thesis with an internship in our offices in Brussels.