

EXPERIMENTAL VALIDATION OF A CFD GAS RELEASE MODEL IN A WIND TUNNEL

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This paper presents the experimental validation process of an innovative CFD approach, called SBAM ("Source Box Accidental Model"), developed in ANSYS Fluent and aimed at a more efficient characterisation of accidental high-pressure gas releases in congested environments (e.g. offshore Oil&Gas, nuclear plants).

In this work, the experimental setup, methodology and a preliminary CFD-experimental data comparison are described.

The campaign has been carried out in the SEASTAR-WT wind tunnel, realized at the Environment Park in Turin (Italy) and completed at the beginning of October 2020. This subsonic, open-cycle tunnel with a total installed power of approximately 100 kW allows a range of air speeds between 0 and ~8 m/s in the test chamber. A 1:10 scaled Oil&Gas platform mockup, equipped with flow and gas sensors, was built and installed inside the wind tunnel, allowing to reproduce, through a custom scaling procedure, the conditions of dynamic similarity with the real cases. Preliminary tests were performed to calibrate the tunnel and be acquainted with sensors behaviour and accuracy. The core of the campaign has been devoted to a set of gas releases meant to validate the concentrations and velocities predicted by the CFD modelling.

For most of the case studies, first results have shown that normalised concentration profiles present a good consistency with CFD simulation results. New tests are ongoing to validate also absolute concentration values and improve the understanding of the physical phenomena in such a complex setup.

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