

## CFD simulations of urban wind environment, practical applications

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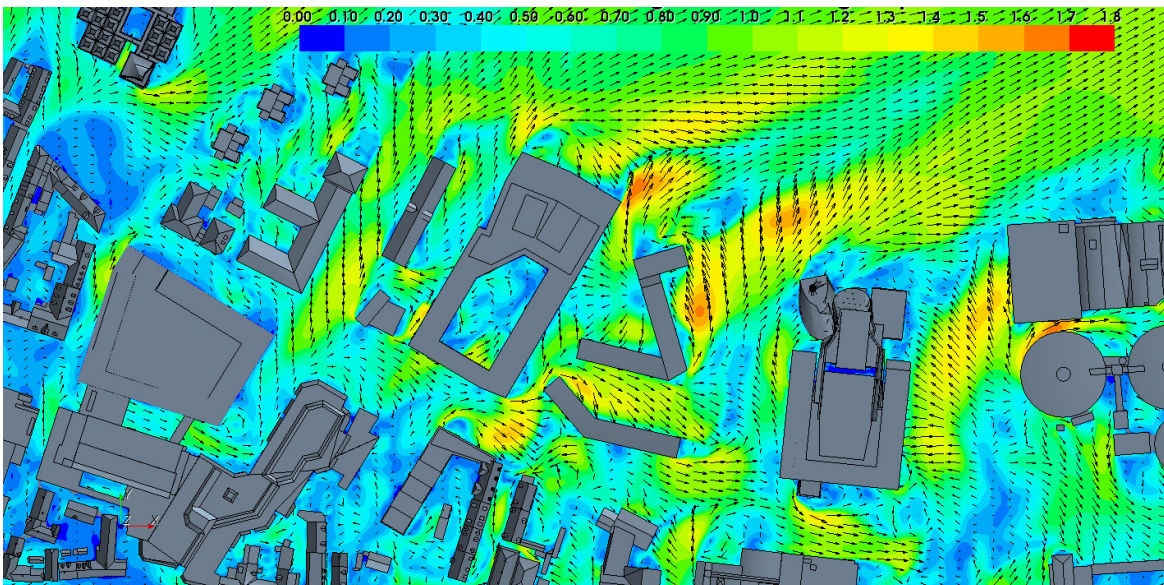
### Abstract

In Scandinavia we experience an increasing awareness that wind comfort problems in urban environments can be predicted and therefore avoided or at least mitigated. This has led the authorities to formulate much more specific requirements for awarding planning permissions and as a result there is an increasing demand for relatively detailed wind studies even for smaller projects. Typically, these studies (using commercial CFD codes) are carried out for the architect or the contractor as part of the design process with the purpose of obtaining planning permission or input to public hearings. CAD models to build a CFD model from are therefore often preliminary and subject to changes or, in some cases, not yet existing.

Another issue is that development plans and tender documents often require CFD simulations of the wind environment to be carried out but does not provide much in the way of guidelines as to what shall be the outcome or what can be accepted. As the wind studies are often carried out in the earlier stages of a project, there is often not allocated many resources either. The limited resources will of course place limitations on what can be carried out and the role of the consulting engineer is to work within these limitations while still seeking to provide the interested parties with the information they need.

The past five years, COWI has carried out a number of wind environment studies using CFD simulations. They have ranged from preliminary assessments of the wind environment around a building in a harbour front development, over more specific problems where well-defined design alternatives are evaluated to detailed before-and-after studies.

The paper will describe some of these cases in more detail and invite to a discussion on wind comfort criteria and the best way to carry out such studies given the practical limitations often imposed.



*Relative wind speeds in a harbour front development, red and yellow areas indicate significant pedestrian wind discomfort.*