

# CFD analysis of flow past staggered tube array using 2D RANS turbulence models

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## Abstract

The aim of this project is to utilize periodic boundaries to simulate flow past a staggered tube bank array using the open source CFD package OpenFOAM. Periodic boundary condition will be applied in both transverse and stream-wise direction and geometry will be modelled as a "unit cell" consisting of one tube in the centre and parts of four tubes in the surrounding.

The objective is to simulate flow past staggered tube bank array utilized by Simonin and Barcouda[2] using different 2D RANS model and validate it against their experimental results and computational results obtained by N. Kulasekharan and B. Prasad[1]. Experimental results have been taken from the ERCOFTAC (European Research Community on Flow Turbulence and Combustion) database. All flow parameters are same as those of the experiment.

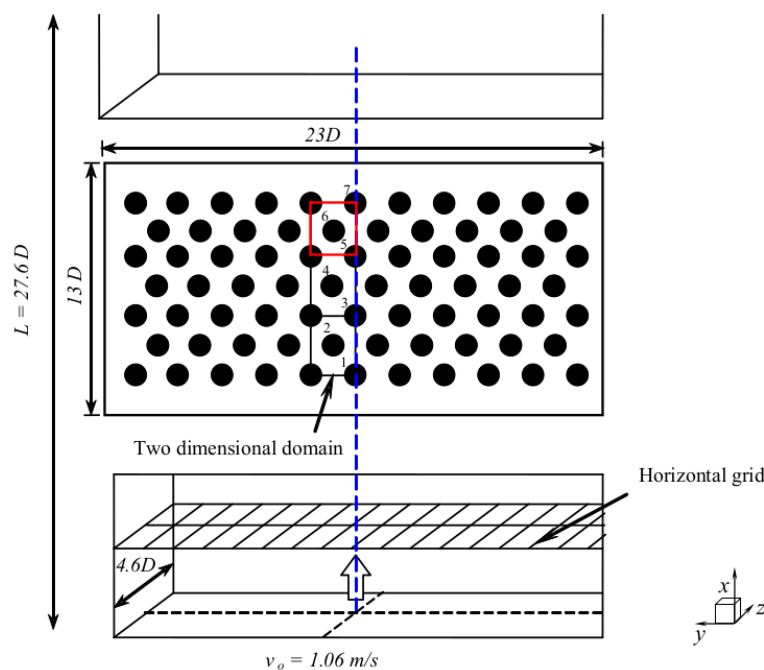


Figure 1: Experimental domain of Simonin and Barcouda[2]

## References

- [1] N. Kulasekharan and B. Prasad. Performance of 2-d turbulence rans models for prediction of flow past a staggered tube bank array. *Engineering Applications of Computational Fluid Mechanics*, 3(3):386–407, 2009.
- [2] O. Simonin and M. Barcouda. Measurements and prediction of turbulent flow entering a staggered tube bundle. In *Proceedings of Fourth International Symposium on Applications of laser anemometry to fluid mechanics (1988)*, 1988.