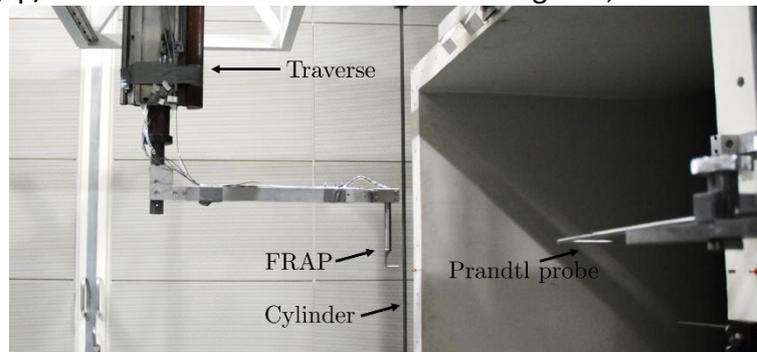


Experimental investigation of the near wake of a circular cylinder: Comparison of different measurement techniques

The flow around a circular cylinder is mainly described by three different flow regions of interest: the boundary layer on the cylinder, the shear layers demarcating the recirculation area and the wake. Depending on the Reynolds number Re_D , three flow regimes can occur - the laminar, transitional or turbulent regime. In the sub-critical Reynolds number range $Re_D = [4 \cdot 10^2; 2 \cdot 10^5]$, a transitional mechanism from laminar to turbulent flow can be observed. It is the main regime of interest for the measurements conducted in this work. The regular vortex shedding, called the von Karman vortex street, is described by the shedding frequency f_{vs} . In order to make measurements comparable, the non-dimensional Strouhal number St is introduced as $St = (f_{vs} \cdot D)/U_\infty$. In measurements with a hot-wire (2D and 3D) and a fast-response pressure probe different Reynolds number ranges should be observed and compared to data from the literature and from optical measurements (LDV). Furthermore, the influence of end disks should be investigated. In preliminary test, an attenuation of the actually measured shedding frequency in close proximity to the cylinder could be observed. A possible reason for this phenomenon are interference effects between the probe and the cylinder. Those gap/interference effects should be investigated, as well.



Preliminary work packages:

1. Familiarization with working principles of (multi-hole) probes and working in the wind tunnel (incl. Labview)
2. Hot-wire measurements
3. Fast-response pressure probe measurements
4. Influence of end disks
5. Investigation on the gap/interference effect
6. Comparison to experimental data from the literature and optical measurements (LDV)

If you are interested in this topic or you have questions, feel free to contact me.

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