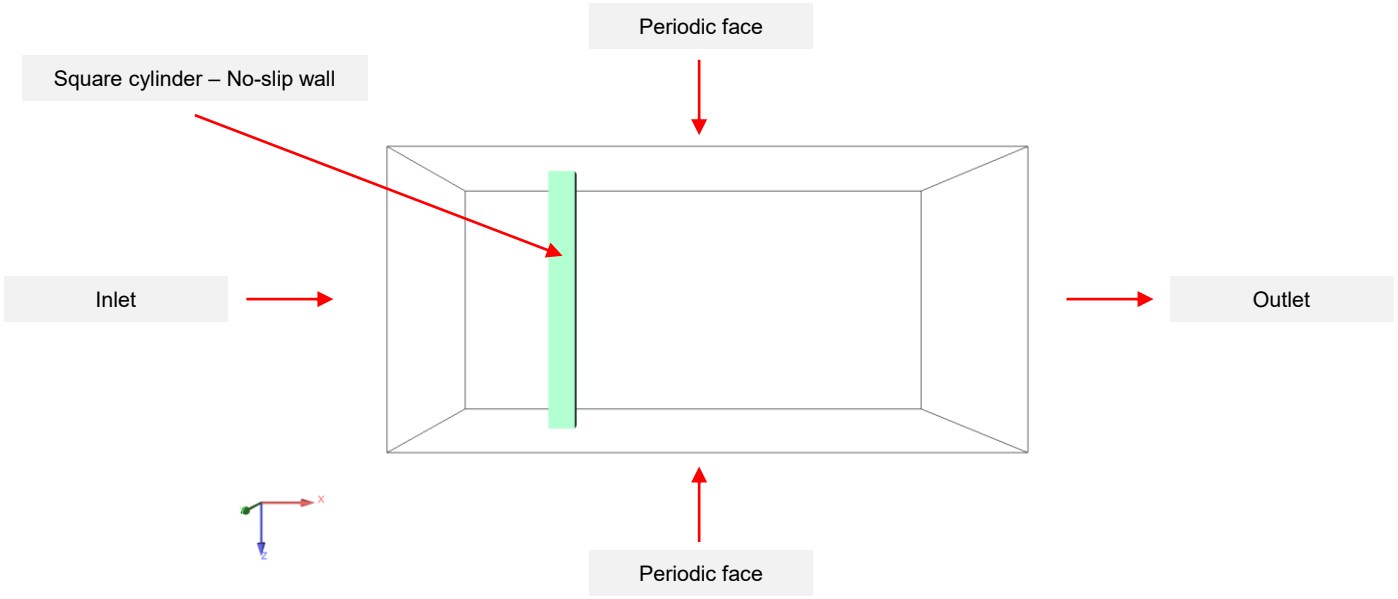
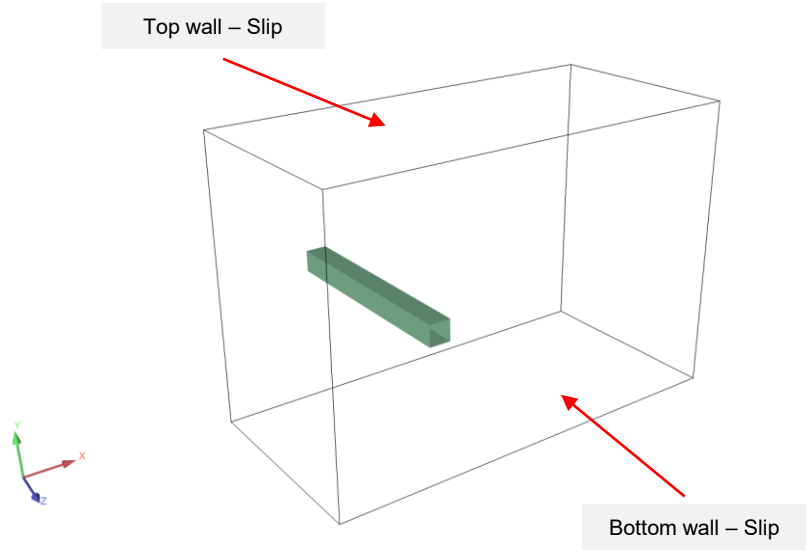
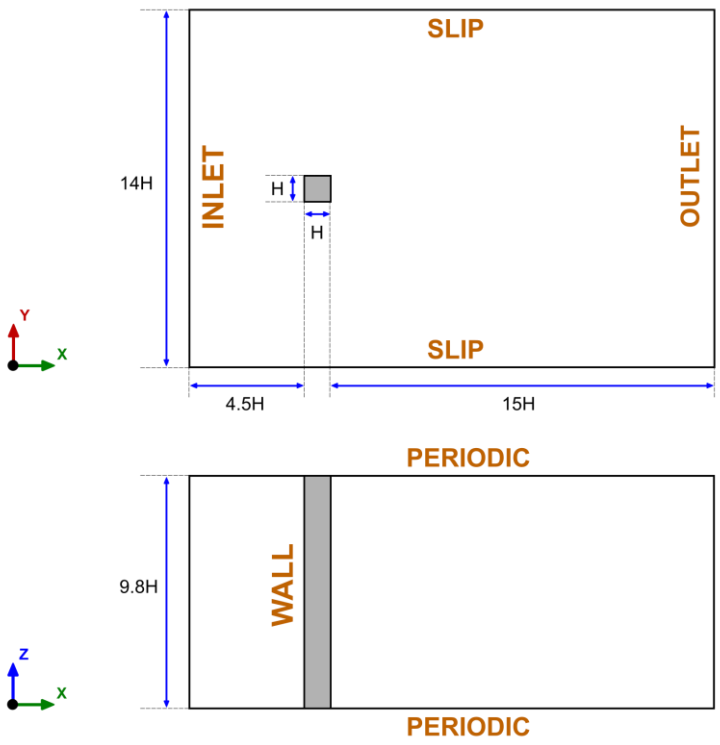
Square cylinder





Square cylinder



$$\mathbf{H} = 0.04\,m$$

$$\mathbf{U}_{in} = 0.535\,m/s$$

$$Re = 21400$$

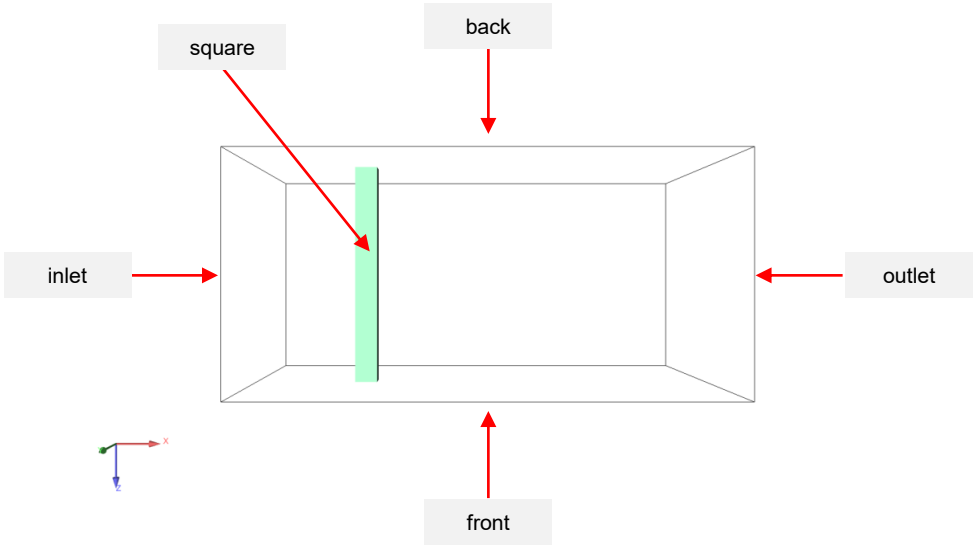
- Inlet velocity: 0.535 m/s
- Working fluid: water.
- Reference area to compute the force coefficients: 0.01568 m^2 (frontal area).
- Use SRS models – LES and DES.
- Initialize the solution starting from a RANS simulation.
- Interpolate the solution from a coarse mesh to a fine mesh.
- Do the standard post-processing and identify the vortical structures.
- Compute the integral length scales and ratio of integral length scale to grid length scale and determine the goodness of the mesh for a LES simulation (for the coarse and fine meshes).
- Sample the solution at different points and compute the turbulence energy spectrum.
- Compute the descriptive statistics of the time signal of the forces.
- Compute the shedding frequency and Strouhal number.
- Compute the flow statistics.
- Run with and without periodic boundary conditions and compare the outcome.

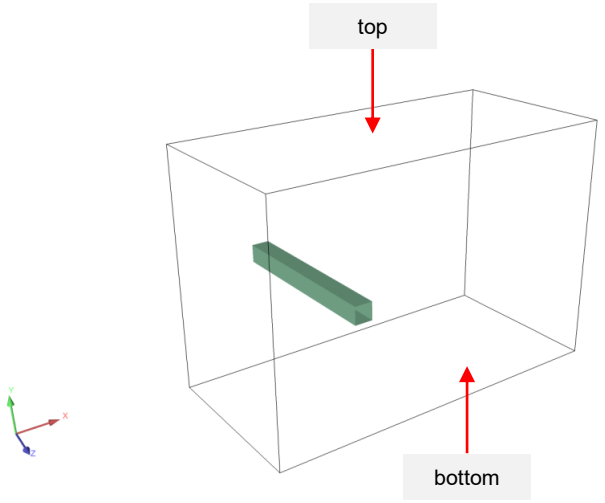
References:

D. A. Lyn and W. Rodi. “The flapping shear layer formed by flow separation from the forward corner of a square cylinder”. *J. Fluid Mech., 267, 353, 1994.*
D. A. Lyn, S. Einav, W. Rodi and J. H. Park. “A laser-Doppler velocimetry study of ensemble-averaged characteristics of the turbulent near wake of a square cylinder”. *Report. SFB 210 /E/100.*

Square cylinder

- If you use the setting files to automatically setup the case, rename the boundary faces as follows:





- Rename the boundary faces before reading the setting file.
- The names are case sensitive.