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# **Impact of Geometric Variations on the Flow and Generated Sound**

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A large amount of the total noise in our daily life is generated by turbulent flows (e.g. airplanes, cars, air conditioning systems, etc.). With the increase in traffic, noise pollution is becoming a more and more relevant topic. The sound generated by flow around cylindrical objects are present in many engineering applications like pantographs of trains, high-rise buildings, car antennas, beams, fences, supports in internal and external flows.

The objective of our contribution is to investigate the influence of changes in geometry of a wall mounted square cylinder in cross flow onto the generated aerodynamic noise. The flow and acoustic field of several geometries are numerically computed and their interaction is analyzed. These investigations indicate that a reduction of both pressure based drag and turbulent kinetic energy does not necessarily lead to a reduction of tonal noise sources that are associated with vortex street formation as well.

The obtained results have also been confirmed by measurements in an aeroacoustic wind tunnel. Therewith the major influence of the roof vortex on the stability of the vortex street and thus the resulting sound can be identified and shown in measurements of the wall pressure and its axial correlation.