

Using urban morphology and urban green to improve noise and air quality

Air pollution and noise still cause many premature deaths in the world such as cardiovascular diseases and disturbed sleep. Until today, studies regarding air quality and noise are conducted separately rarely including the combined health effect. These issues also cause costly interruptions in planning and building processes.

In urban environments road traffic is the greatest source of both noise and air pollution and is still not showing positive trends, despite cleaner vehicles. Further, in most of the world, there is a rapid urban densification primarily to decreased climate gas emissions but also assumed to improve air quality. However, urban densification often leads to environments with high buildings and narrow street canyons, where air pollution risk to increases five times, only due to the building structure. At the same time more people are living and working in these environments, resulting in an increased risk of exposure. Compact urban planning may also influence the spreading of noise in both positive and negative direction depending on the structure. Many of these issues is assumed be prevented by using smart urban design integrating both aspects of noise and air quality. When integrated early in planning processes, both aspects can be considered in measures of spatial form, urban morphology and urban greening, working iteratively to identify the most optimal solution. The measures will then be integrated into urban planning and design resulting in more sustainable and efficient building process.

The goal of the project is to develop recommendations for planning, where the effect of urban morphology on the exposure of humans to air pollution and noise is studied. In addition, the effect of green surfaces such as low vegetation, bushes and trees is also included. The results will be presented and discussed with representatives from both the local environmental protection board and the city planning office.

A more extensive dissemination of results would hopefully contribute to better environment in urban areas and to give a smoother building process and simultaneously COWI will become more visual handling these difficult and complex urban environmental issues.

The project is a cooperation between COWI, Sweden and Chalmers University. The municipality of Gothenburg is included as a reference group.

The project is led by Marie Haeger-Eugensson together with Christine Achberger, COWI/Sweden and Jens Forssén (assistant professor division of Acoustics at Chalmers Technical University).