

A Soft-Sensing methodology for assessing Acoustic Comfort in buildings

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ABSTRACT

Despite being an important concept in engineering, acoustic comfort is vaguely defined and explored in literature. In addition, acoustic comfort is not yet one of the main drivers in buildings' renovation design because of the lack of assessment reference protocols. The research shows the development and application of a methodology for assessing acoustic comfort in buildings due to the building envelope protection against external noise. The proposed approach is based on a soft-sensing system which provides a support during the decision-making process in renovation design. Acoustic comfort is assessed by means of Key Performance Indicators (KPIs), which also make possible the comparison among performance due to different renovation scenarios of existing buildings. In particular, two KPIs have been developed: the "objective KPI", which assesses building acoustic comfort with normalized value for simplified quantification of acoustic performance, and the "subjective KPI", which is based on the assessment of the occupants' rating. A case study is used to demonstrate the exploitability of the methodology, using in-field measurements and simulated data combined and processed through calculation models. The application of the methodology has shown promising results in the identification of the best retrofit strategy.

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