Optimization of architectural electroacoustics design for the interior mezzanines of vertical buildings

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Abstrak

The science that deals with the transformation of electrical energy into acoustic energy or vice versa, electroacoustics, generates an increased intensity and loudness of sound by mechanical and/or electrical means. It should be designed simultaneously with the consideration of room acoustics. A vertical building is usually designed separately from the architectural aspect and other technical considerations. An interior mezzanine has unique sound propagating characteristics because its balconies could be an element of the room acoustic reflectors and absorbers, shelters from noise and barriers to sound propagation. For optimum music and speech activities, a hybrid active design strategy using electroacoustics combined with a passive method is used. This research optimizes the room acoustic criteria of different building models as building systems integrated with loudspeakers. Ecotect Analysis and additional audio programming determine the overall process by simulating all potential variables. The results show that 5 m is the recommended minimum distance of column-loudspeaker placement for mezzanine floors. With the same loudspeaker power and frequency specifications, the vertical structure, as the armature of electroacoustic orientation, and the interior materials are the most critical variables in determining reverberation time optimization.