The Effect of Sound Absorbing Materials as Sound Absorber on Train

ABSTRACT

Train is used because it is easy, fast, and inexpensive compared to other public transport. However, the passengers are often disturbed by the noise produced inside the train due to its mechanism. The source of the noise come from underneath of the train where the bogie, gearbox and motor are placedto the train. Thus, the aim of this research is to investigate the effect of sound absorbing materials as sound absorber on train. In this research, three type of sound absorbing materials; soundP materials (acrylic), resonac m-damping and rubber with a thickness 1.5 mm, 3.0 mm and 4.5 mm is installed underneath the train. The train design prototype is drawn by using SolidWorks software, while the sound absorbing materials was analysed by using Finite Element Analysis (FEA) software to get the value of sound pressure level inside the train. All the value collected from the simulation is compared to evaluate the best sound reduction. Even though, resonac m-damping and soundP materials (acrylic) exceeds 65% sound reduction at 50 Hz, but soundP materials (acrylic) is more relevant to be applied because is much lighter than resonac m-damping. Selection of 4.5 mm as the best sound absorbing materials thickness is done depends on the noise level required by Railway Group Standard which is below 84 dB during a working day.