

ACOUSTICS2008/2621
Influence of time-varying booming noise on automotive comfort

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Noise level reduction is the main preoccupation for acoustic engineers in the automotive industry. Huge progresses were made during the past decades thanks to the use of acoustic materials and specific intake or exhaust silencers. In the future, vehicles will have to be lighter and engines optimized to ensure very low energy consumption. This sets new compromises between mass, performances and acoustics, in particular for booming noise that can be very affected by mass reduction or exhaust modifications. Acoustic specifications must therefore be optimized to guarantee customer's comfort in spite of these new constraints. In this paper, we study the impact of time-varying booming noise on customer's comfort on acceleration sound samples. We performed several customer tests to evaluate the impact of different time-varying booming profiles on comfort and to find out an acceptability threshold for booming.