

Active structural acoustic control of road noise in a passenger vehicle

Author: Amanjot S. Dhaliwal, Gordon G. Parker, Jason R. Blough

Address: dSPACE, Inc., 28700 Cabot Drive, Suite 1100, Novi, MI 48377, USA. ' Department of Mechanical Engineering, Michigan Technological University, 815, R.L. Smith, 1400 Townsend Drive, Houghton, MI 49931, USA. ' Department of Mechanical Engineering, Michigan Technological University, 815, R.L. Smith, 1400 Townsend Drive, Houghton, MI 49931, USA

Journal: *International Journal of Vehicle Autonomous Systems* 2004 - Vol. 2, No.3/4 pp. 168 - 188

Abstract:

An active noise control system for a passenger vehicle is presented in this paper. The noise control method, Active Structural Acoustic Control, is discussed and a brief comparison is drawn with other popular methods of active noise control. The primary focus of the research was to develop a cost-effective active noise control system for passenger vehicles for the reduction of road noise. The approach relies on concentrating the controller and actuator effort in a narrower but significant region in the spectrum of the road noise, which contains frequency content mainly between 80 and 350 Hz. This improved the acoustic comfort within the vehicle cabin, while keeping the actuator and processor costs low. The paper presents different progressively developed control strategies that lead from a single tone controller to counter sine wave type excitation from a 50 lb shaker to a more practical controller that was demonstrated with the car on a chassis dynamometer.