

10:25

3aNCc3. Product audit for heavy duty diesel engines in production environment. Sanghoon Suh (Cummins Tech. Ctr., Cummins Inc., Columbus, IN 47202) and Jim Beresford (Jamestown Engine Plant, Cummins Inc., Lakewood, NY 14750)

A product audit at manufacturing plants has become more important due to the customer's requirements on product quality. Noise and vibration performance have been a primary concern for gas engines and small size diesel engines. Lately, more interest has been shown by truck manufacturers about engine noise for heavy duty diesel application. It has been regarded that acoustic measurements requires dedicated measurement environment for detailed study. This case study shows that acoustic measurements can be performed at performance cell without any dedicated acoustic treatment at the manufacturing plant to identify some of the noise characteristics with proper preparation. Order tracking and loudness were used to identify two different characteristics related to front gear train in heavy duty diesel engines. In addition, the coordination between technical organization and manufacturing plant for the data acquisition and analysis is discussed.

10:45

3aNCc4. Hand transmitted vibration measurement using experimentally simulated hand-arm rig. Rahul Kadam, Marty Johnson, Jorge Muract, and Ricardo Burdisso (Vib. and Acoust. Labs, Virginia Tech, 143 Durham Hall, VA 24061-0238)

Hand transmitted vibration (HTV) is one of the most common hazards faced by workers in the construction industry. A major source of HTV is hand held percussion tools, such as pneumatically driven chipping hammers and rock drills. This paper presents a new approach to measuring the vibration from these tools using a mechanically simulated hand arm model

to which the tools are attached. The simulated hand-arm model has been designed to have similar dynamic characteristics to that of a human hand-arm system. This approach addresses the issue of repeatability as HTV measurements suffer from variability between cases and from user to user. Different percussion tools ranging from a small chipping hammer to a rock drill, from two major construction equipment manufacturing companies, were used to conduct the vibration tests. The goals of these tests were to measure the vibration levels and to determine the most dominant modes of vibration. Comprehensive data analyses of the tests results are presented. Further, the paper discusses potential vibration control methods and expected performance levels.

11:05

3aNCc5. Vibro-acoustic prediction of low-range planetary gear noise of a automotive transfer case. Ravi Narayanaswamy and Charles D. Glynn (BorgWarner TorqTransfer Systems, 3800 Automation Ave., Auburn Hills, MI 48326)

This paper discusses a practical approach to predict low range planetary gear noise in an automotive transfer case using commercial numerical codes. Dynamic responses of the planetary gear set are calculated using a 2D finite element/contact mechanics model. These responses are used as boundary conditions to calculate surface velocities on the transfer case housing using model frequency response analysis. Subsequently, the surface velocities are used in a vibro-acoustic model to predict acoustic responses of the transfer case. The predicted acoustic responses are compared to experimental measurements conducted in a hemianechoic chamber. It is shown that the predictions are in reasonable agreement with the experiments and the approach enables designers to obtain required information on acoustic responses of the transfer case in a timely and cost-efficient manner.

WEDNESDAY MORNING, 19 OCTOBER 2005

SALON C, 9:45 TO 11:05 A.M.

Session 3aNCd

NOISE-CON and Noise: Measurement of Product Noise Emissions I

Matthew A. Nobile, Chair

IBM Hudson Valley Acoustics Lab., Boardman Rd. Site, 2455 South Rd, Poughkeepsie, NY 12601

9:45

3aNCd1. Use of existing standards to measure sound power levels of powered hand tools—necessary revisions. Charles S. Hayden (Natl. Inst. of Occupational Safety and Health, 4676 Columbia Pkwy. C27, Cincinnati, OH 45226) and Edward Zechmann (Costella Group, Cincinnati, OH 45226)

At recent NOISE-CON and Acoustical Society of America meetings, noise rating labeling was discussed as a way of manufacturers providing full disclosure information for their noise emitting products. The first step is to gather sound power level data from these products. Sound power level data should be gathered in accordance with existing ANSI and/or ISO standards. Some standards, such as ANSI 12.15, may not define true operational noise emissions[r1] and thus may provide inaccurate information when that information is used to choose a hearing protection device or used to make a purchasing decision. A number of standards were systematically combined by NIOSH researchers to provide the most accurate information on sound power levels of powered hand tools used in the construction industry. This presentation will detail some of the challenges of existing ANSI 12.15 (and draft ANSI 12.41) to measure sound power levels of electric (and pneumatic) powered hand tools.

10:05

3aNCd2. Consumer oriented product noise testing. Les Blomberg (Noise Pollution Clearinghouse, P.O. Box 1137, Montpelier, VT 05601-1137)

This paper explores the need for product noise measurements and how best to meet that need in the near future. Currently there is only a small market place for quieter consumer products. This is not because of lack of interest. No one really wants to announce to everyone in their house that they just flushed the toilet, few really want the entire neighborhood to know they are mowing their yard, etc. The small market place is primarily due to a lack of regulations on product noise, a lack of information easily available to consumers about which products are quieter, and market consolidation resulting in fewer manufacturers, most of whom are unwilling to emphasize their quieter products at the risk of eroding sales of their noisier ones (that currently have greater market share). In the absence of the EPA fulfilling its statutory requirement to regulate and label product noise under the Noise Control Act of 1972, and with the unwillingness of most industries to voluntarily publish accurate product noise data, there is a significant role for "Consumer Oriented Product Noise Testing." This