

Basic Gear Noise Short Course Covers Fundamentals



More than 1,350 engineers and technicians from more than 320 companies have participated in this basic course, which The Ohio State University's Gear Dynamics and Gear Noise Research Laboratory (GearLab) has conducted for more than 29 years. Gear designers and noise specialists with little to no knowledge of noise analysis learn about the mechanisms of gear noise generation, the methods used to measure and predict gear noise and the techniques for reducing vibration and gear noise.

Engineers and technicians who analyze, manufacture, design specs and use gear systems in industries such as automotive, transportation, machine tool, process machinery, aircraft, appliance and general manufacturing will study how to reduce transmission error, dynamic friction forces. Some companies that have attended in the past include Caterpillar, John Deere and General Motors, according to Dr. Donald Houser, Emeritus Professor and founder of the GearLab. Houser has organized the course since its inception and lectures on gear noise measurement and modeling. Dr. Rajendra Singh also instructs the course.

Even perfect gears make noise, and this is the basis for the first day's lectures. Qualitative and quantitative terms are used to describe how design factors and manufacturing mistakes play into the noise equation. Houser and Singh

teach attendees how these details can help predict transmission errors. Demonstrations of the GearLab's custom-made equipment and software occur throughout each day. "We run a very accurate spur gear set that is in an offset gearbox of a UH-1 helicopter," Houser says. "It is a demonstration of how a tremendously accurate gear can be tremendously noisy."

"We do a lot of signal processing demonstrations of how you look at the data in different ways using spectrum analysis to view different properties of the signal. We can compare predictions of noise with measurements of noise," Houser says.

Past attendees have commented on the practical nature of the curriculum. The workshop aims to discuss real-life problems of gear noise and dynamics. The highlight of this goal is a case history workshop that takes place on the third day. The attendees are asked to present issues of gear noise they've come across, and the group responds by offering possible solutions to each problem. This segment of the program typically takes up two or three hours, but there is no limit.

"We spend sometimes as much as a half a day just talking about problems they bring to class," Houser says. "They make a brief presentation of their problems, and then everyone sits down and discusses; what they're doing, what they need to do, ask them questions. It's kind of a brainstorming session on how do we go about solving this problem."

The course is continuously being modified to reflect new technology. The analysis techniques in particular are constantly changing, Houser says. Some material is added to a two-day advanced course offered every other year, which is designed to follow up the basic short course.

The advanced course will be offered in 2009. Information will be available on the GearLab website (www.gearlab.org). It is designed for people who attended the basic course or work at a more advanced level.

For companies with more than a few interested attendees, Houser has offered the course at individual companies. This allows for more flexibility because it can take place a day at a time over the course of a few weeks depending on what the company prefers. Bringing the course directly to a specific company also allows Houser to customize it, and feature information that applies directly to the company's needs. "Last year we were up at Ford. We gave this course over six days, two days at a time," Houser says.

The 2008 Basic Gear Noise Short Course is being held September 16–18 at The Ohio State University, Columbus, OH. For registration, contact Jonny Harianto at (614) 688-3952 or harianto.1@osu.edu. To inquire about a customized version of the course, contact Dr. Donald Houser at houser.4@osu.edu. For general information, visit www.gearlab.org.