

Auburn University  
Department of Civil Engineering

# SEMINAR

## CONSEQUENCES OF VIBRATION FROM HIGH ENERGY CONSTRUCTION OPERATIONS INCLUDING IMPACT PILE DRIVING



**Professor Richard D. Woods, NAE**  
University of Michigan

Monday, February 27, 2017  
2-3pm  
Room 314 Ramsay Hall

Many construction operations result in the propagation of seismic waves in the ground surrounding the site of the operation. These vibrations are potentially damaging to nearby infrastructure either by direct impact of the ground wave causing distortion of the structure or by settlement caused by vibrations causing shakedown settlement of loose sands. To evaluate potential damage it is necessary to convert applied energy to ground motion (vibration) through some coupling mechanism and to trace the decay of those vibrations to whatever facility is of concern. The amplitude of the vibrations reaching the target facility must then be compared to a standard criteria for damage or for annoyance to people. Methods of converting energy to particle velocity and charts of scaled distance are presented to estimate ground motion at the source in the first place and at any distance from the source in the second place. Finally, some criteria for limits of tolerable vibration levels are presented for both structural and human response.

Dr. Richard Woods is Emeritus Professor and former Chair of Department of Civil and Environmental Engineering, University of Michigan. He received his BS and MS degrees from the University of Notre Dame and his Ph.D. from the University of Michigan, all in Civil Engineering. His research centered on foundation dynamics, vibration measurements, blasting and other vibration damage, measurement of dynamic soil properties, dynamic site characterization and applications of geophysics in geotech. He co-authored *Vibrations of Soils and Foundations (1970)*, NCHRP Synthesis, *Dynamic Effects of Pile Installations on Adjacent Structures (1997)*, and published over 150 papers. He was Terzaghi Lecturer of ASCE (1997), elected to the National Academy of Engineering (2003), made Distinguished Member of ASCE (2004) and a Diplomate of the Academy of Geo-Professionals (2009).