



## Earthquake Engineering Short Course

January 25 & 26, 2018  
Kentucky Transportation Cabinet, Frankfort KY  
Early Bird Rate: \$100 / After 12/15/17 – \$150  
15 Professional Development Hours Available

The conference venue is limited to 50 people. If a high demand is received prior to the early registration deadline, then KGEK will consider finding another venue to accommodate additional participants. Registration is available via Constant Contact at [www.kgeg.org/course](http://www.kgeg.org/course). Boxed lunch will be provided.

### Purpose and Background

Earthquake design acceleration in Western Kentucky can be significant and control structural and geotechnical design considerations. Those considerations can result in significant cost increases for construction or rehabilitation of structures. The building codes allow for a reduction in the design accelerations and sometimes an improved seismic design category, provided certain site specific seismic studies are performed. In this course, different types of site specific studies will be explored as they relate to the design of structures.

### Who Should Attend?

This seminar should be of interest to geotechnical and structural engineers, or others who wish to extend their knowledge in the area of earthquake engineering.

For any questions, contact John Conway at [john.conway@vectorky.com](mailto:john.conway@vectorky.com) or 502-633-7585

### Topics to be discussed include:

- **Engineering seismology and characteristics of ground motions:** Seismic sources; style of faulting; ground motion predictive relationships; ground motion response spectrum
- **Site specific seismic hazard analysis:** Deterministic approach; probabilistic approach
- **Kentucky seismicity:** How does Kentucky's unique geology affect the ground motions predicted by the USGS website
- **Local soils effects on bedrock accelerations:** Soil amplifications, dynamic soil properties, and site response analysis (Shake), site seismic classification
- **Mitigation of liquefaction:** Fundamental of liquefaction behavior; consequences of liquefaction; mitigation of liquefaction hazard
- **Seismic slope stability:** Pseudo static method; Newmark method; seismic stability of embankments; stability analysis of liquefied soils
- **Foundation Design:** Foundation design to mitigated seismic hazards
- **Site Specific Seismic Analysis:** What is site specific analysis, and how can it improve your seismic design category
- **Building Codes:** Current building codes and future trends

*Participants agree to become KGEK members (free of charge) and receive emails from the organization. For ways to get involved, please contact an officer*

## Seminar Outline

### DAY 1 (8AM – 4:30PM)

Period 1 – Introduction and basic math considerations

- Wave forms
- Single degree of freedom systems

Period 2 – Earthquake event characteristics

- EQ magnitudes and recurrence intervals
- Acceleration records
- Attenuation functions
- Deterministic and probabilistic design
- Kentucky Seismicity

Period 3 – Local site affects

- Site amplification
- One-dimensional shear wave propagation
- VS testing methods/correlations
- Software - One-dimensional shear-wave propagation
- Strata.exe or others

### DAY 2 (8AM – 4:30PM)

Period 4 – Geotechnical earthquake considerations

- Liquefaction and mitigation
- Retaining walls and mitigation
- Slope stability and mitigation
- Foundation Design and mitigation

Period 5 – Site design

- Current Building Codes
- Site Specific Seismic Analyses
- Dynamic building analysis
- Proposed Modifications to the building code

## Instructors:

**Michael E. Kalinski**, Ph.D., P.E., is a Professor of Civil Engineering at the University of Kentucky. He specializes in geotechnical earthquake engineering, soil dynamics, vibration monitoring and engineering geophysics, including the application of engineering and geophysics in developing nations. He is a licensed Professional Engineer in Kentucky, Texas and California, and a Registered Geophysicist in California.

**Edward Kavazanjian**, Ph.D., P.E., D.GE, NAE, is the Ira A. Fulton Professor of Geotechnical Engineering at Arizona State University. Dr. Kavazanjian is co-author of the FHWA guidance documents on seismic design for structural foundations and transportation geotechnical features and served as chair of the recent National Academy of Engineering study on earthquake-induced liquefaction and its consequences.

**W. Mark McGinley**, Ph.D., P.E., FASTM, is a Professor, University of Louisville. Dr. McGinley is a structural engineer and building scientist with an excess of 30 years of research and forensic engineering practice in building systems. He is an expert in masonry building systems, in particular, masonry building envelopes. Dr. McGinley is actively involved as a committee member developing design codes and has been involved research into the seismic response of masonry and wood structures.

**Thomas D. Rockaway**, Ph.D., P.E., is an Associate Professor in the Civil and Environmental Engineering Department, and Director for the Center for Infrastructure Research at the University of Louisville. He is active in earthquake engineering and has performed numerous seismic analyses for buildings and sites.

**Zhenming Wang**, Ph.D., is head of the Geologic Hazards Section of the Kentucky Geological Survey.