



# CONTINUING EDUCATION PROGRAMS

NORTHWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY



*safe workplaces,  
sustainable environments*



## ART AND SCIENCE OF SAFE TUNNELING

### REGISTER NOW

#### DATE & TIME

May 29 & 30, 2013  
8:00 a.m.—4:30 p.m.

#### LOCATION

UW Tower Auditorium  
4333 Brooklyn Ave NE  
Seattle, WA 98105

#### INFORMATION

206-543-1069 or  
800-326-7568  
ce@uw.edu  
<https://osha.washington.edu>

To request disability accommodation, contact the Disability Services Office at least 10 days in advance at:  
206-543-6450 (voice);  
206-543-6452 (TDY);  
206-685-7264 (FAX); or  
dso@u.washington.edu  
(e-mail)

Photos, l to r:  
MDoubraval/photos.com,  
Marc Beaudreau,  
Thomas Lammeyer/photos.com,

New technology is allowing tunnel construction through difficult terrain, leading to new or changing health and safety issues for workers, contractors, and regulators. In addition, modern tunneling methods potentially expose workers to previously unanticipated hazards, resulting in possible adverse health effects.

The purpose of this course is to provide information for owners, contractors, regulators, and health and safety professionals on best practices for safe tunnel construction.

#### COURSE OBJECTIVES

At the completion of this course participants should be able to:

- Discuss the scientific basis for safe tunneling practices and strategies.
- Review the current status of US and European regulatory approaches that support safe tunneling practices.
- Discuss emergency response strategies in tunneling environments.

#### INTENDED AUDIENCE

This conference is targeted towards owners, regulators (federal, state), contractors, H&S professionals, emergency response personnel, engineering staff, contractors, construction management, TBM manufacturers, and risk management.

#### ACCREDITATION

American Board of Industrial Hygiene Certification Maintenance can be obtained for this activity. See the ABIH website for CM credit criteria.

#### REGISTRATION

Register online at [osha.washington.edu](https://osha.washington.edu) or by calling the Northwest Center at 206-543-1069

Standard Registration:	\$250
<b>After May 10:</b>	<b>\$300</b>
Government Rate:	\$225
<b>After May 10:</b>	<b>\$300</b>

# ART AND SCIENCE OF SAFE TUNNELING

## AGENDA

### May 29, 2013

#### Science of Safe Tunneling

- 8:00–8:15 a.m. **Registration & Morning Refreshments**
- 8:15–8:30 **Welcome**  
Nicholas Reul, MD, MPH, *Senior Fellow, Occupational and Environmental Medicine, University of Washington*
- 8:30–9:15 **Geotechnical Conditions and Tunnel Design Safety Considerations**  
Robert Goodfellow, PE, *Senior Vice President, Aldea Services LLC*
- 9:15–9:30 **BREAK**
- 9:30–10:15 **Health Effects of Working at Pressures**  
Jake Freiberger MD, MPH, *Associate Professor of Anesthesiology, Duke Center for Hyperbaric Medicine and Environmental Physiology*
- 10:15–11:30 **Development and Use of Dive Tables**  
Richard Vann, PhD, *Assistant Professor Emeritus, Duke Medical Center and Divers Alert Network*
- 11:30–11:45 **Question and Answer Session**
- 11:45 a.m.–12:45 p.m. **LUNCH** (Provided)
- 12:45–1:30 **Pressure Vessels for Human Occupancy: Requirements and Design Considerations**  
Stephen Reimers, PE, *President, Reimers Systems, INC*
- 1:30–2:30 **EU and UK Approaches for Tunneling Hazards**  
Donald Lamont, BSc, MEng, PhD, *Director, Hyperbaric & Tunnel Safety Ltd*
- 2:30–2:45 **BREAK**
- 2:45–4:15 **US Regulatory Approaches for Tunneling**  
Panel Members: Stephen Hart, *Principal Safety Engineer, Cal OSHA*; Alan Lundeen, MA, *Senior Program Manager, Washington DOSH*; and Dale Cavanaugh, PE, *Assistant Regional Administrator, Federal OSHA, Region X*
- 5:30–7:00 **Tour of Alaska Way SR 99 TBM**  
(by pre-arrangement)

### May 30, 2013

#### Evidence-Based Best Practices & Lessons Learned

- 8:00–8:10 a.m. **Morning Refreshments**
- 8:10–8:30 **Welcome and Review of Day 1**  
Nicholas Reul, MD, MPH
- 8:30–9:15 **Tunnel Construction: Health Hazard Assessment**  
Marty Cohen, ScD, CIH, CSP, *Director, Field Research and Consultation Group, Department of Environmental and Occupational Health Sciences, University of Washington*
- 9:15–10:15 **Tunnel Construction: Safety Hazard Assessment**  
Anita Johnson, *Construction Safety Specialist, Sound Transit*
- 10:15–10:30 **BREAK**
- 10:30–11:15 **Exposure Assessment Considerations in Pressurized Environments**  
Michael Morgan, ScD, CIH, *Professor Emeritus, Department of Environmental and Occupational Health Sciences, University of Washington*
- 11:15 a.m.–12:15 p.m. **Safety Best Practices in Mining—Applications for Tunnel Construction**  
Jerry Powers, CMSP, *Administrative Faculty, Department of Mining Engineering, Colorado School of Mines*
- 12:15–1:15 **LUNCH** (Provided)
- 1:15–2:15 **Tunneling Accidents: Case Studies and Lessons Learned**  
Richard Sage, PE, CCM, *Director, Construction Management Division, Sound Transit*; and John Hutchison, *Industrial Hygiene Supervisor, Nevada OSHA*
- 2:15–2:30 **BREAK**
- 2:30–3:45 **Emergency Response Strategies and Training Concepts**  
Captain J.M. Havner, *Tunnel Rescue Team Manager, Seattle Fire Department*; and Ray Clouatre, *Safety Director, Frank Coluccio Construction Company*
- 3:45–4:15 **Q&A, Closing Comments, and Evaluations**  
Nicholas Reul, MD, MPH