Design and Assessment of Mine Waste Structures
Thursday, May 3 to Tuesday, May 8, 2018
DRAFT Schedule and Outline

Thursday, May 3 (8:00 am to 5:00 pm) (ICE Bldg.)

8:00 am   Introduction (Ward Wilson)

8:20 am   1. Tailings Dam Failures that Influenced Canadian Practice (Bryan Watts)

9:50 – 10:10   COFFEE BREAK

10:10 am   2. Engineering Properties of Mine Waste (Nick Beier)
            Geotechnical Properties of Tailings and Waste Rock
            Segregation
            Sedimentation/Consolidation
            Depositional Characteristics

12:00 – 1:00 pm   LUNCH

1:00 pm   3. Surface Tailings Disposal (Ward Wilson/Nick Beier)
            Conventional Tailings Dams
            Oil Sands Tailings
            Mass & Water Balances
            Thickened, Paste Tailings and Filtered Tailings
            Storage Volumes. Site Selection, Terrain, Geology

2:50 – 3:10   COFFEE BREAK

            Design Principles
            Material Selection
            Foundation Conditions
            Seepage Control
            Consolidation Processes
Friday, May 4 (8:00 am to 5:00 pm) (ICE Bldg.)

8:00 am  5. Geochemical Characteristics (Ward Wilson)
         ARD/ML
         Chemical Stability
         GARD Guide
         Prevention, Control and Mitigation
         Water Road Maps
         Closure

9:50 – 10:10  COFFEE BREAK

10:10 am  6. Seepage Analysis (W. Wilson)
          Saturated/Unsaturated Flow
          Soil Property Functions (SWCC)
          Filters and Drains
          Piping
          Control and Maintenance of Saturation
          Enhanced Stability

12:00 – 1:00 pm  LUNCH

1:00 pm  7. Hydrology and Groundwater (Ward Wilson)
          Climate Regimes
          Surface Flux Boundary Conditions
          Groundwater

2:50 – 3:10  COFFEE BREAK

3:10 pm  8. Dam Safety and Inspection (Andy Robertson)
          Primary Risks
          Risk Assessment and Mitigation
          Operations, Maintenance, Surveillance
          Records & Documentation
          Reporting
          Roles of:
          - The Engineer of Record,
          - The Independent Safety Inspection Engineer
          - Review Boards
          - The Regulator

Tutorial TBA
Saturday, May 5 (8:00 am to 5:00 pm)  ICE Bldg.)

8:00 am  9. Oil Sands Tailings Dam Design and Construction (Scott Martens)
          Geology
          Design Criteria
          - Factor of Safety
          - Liquefaction
          - Parameter Selection and Design Cases
          External Tailings Facilities
          - Tailings and Tailings Storage Facilities
          - Construction and Operation
          - Design Issues
          - Closure of Tailings Facilities
          In-Pit Dykes
          - Configuration
          - Seepage Control
          - Construction Procedures

9:50 – 10:10  COFFEE BREAK

10:10 pm  10. Water Balance and Management in Surface Impoundments
          (Dirk van Zyl)
          Site Climatic Information
          Design Storm Events
          Tailings Impoundment Water Balance Evaluations
          Effects of Site Climate and Tailings Management Options on Overall
          Water Use and Storage Requirements
          Overall Mine Site Water Balance

12:00 – 1:00 pm  LUNCH

1:00 pm  11. In-situ Characterization, Testing and Monitoring (Peter Robertson)
          Drilling, Piezometers and Slope Indicators
          Concepts and CPT Methods
          Analysis and Interpretation

2:50 – 3:10  COFFEE BREAK

3:10 pm  12. Seismicity and Dynamic Analysis (Christina Winckler)
          Build from Static Stability and go to Dynamic Stability
          Mechanical Responses/Stress Paths
          Contractive and Dilative Behavior
          State Parameters
          Density/SPT
          Pore Pressure Characterization
          Dynamic Response
          Seismic Deformations

BANQUET
Monday, May 7 (8:00 am to 5:00 pm) (ICE Bldg.)

8:00 am  13. Stability Analysis (Norbert Morgenstern)
          Limit Equilibrium Analysis
          Factor of Safety
          Material Types
          Probabilistic Analyses

9:50 – 10:10  COFFEE BREAK

10:10 am  14. Deformation Analyses (Bill Chin)
           Introduction to FLAC
           3D Limit Equilibrium and FLAC Analysis
           Case Study – Alameda Dam
           Application to Oil Sands Embankments

12:00 – 1:00 pm  LUNCH

1:00 pm  15. Waste Rock Impoundments (Richard Dawson)
           Design
           Operation
           Case Histories
           Additional topics may include: tailings dam foundation design (focus on
           lacustrine clay issues) and/or remediation of tailings structures at
           Samarco, Brazil

2:50 – 3:10  COFFEE BREAK

3:10pm  16. Mine Waste Management for Arctic Regions (Don Hayley)
           Overview of Hazards Unique to Arctic Engineering
           Design and Construction of Dams in Regions of Permafrost

FREE EVENING
Tuesday, May 8 (8:00 am to 5:00 pm) (ICE Bldg.)

8:00 am  17. Failure Mechanisms and Case Studies (N. Morgenstern)
          Classic Failure Modes
          Stava, Los Frailes, Mt Polley, Chilean Upstream Quake

9:50 – 10:10       COFFEE BREAK

10:10 am  18. Landform Design (Gord McKenna & June Pollard)

            Mine reclamation primer and current state of practice
            Landform design
            Understanding natural and mining landforms
            Designing at difference scales and times over 10 to 100+ years
            Effective closure planning at the lease/landscape scale
            Landform-scale designs to support mine and tailings operations.
            Preparing detailed designs and IFC drawings
            Construction, decommissioning, and reclamation
            Preparing the as-built report
            Preparing and conducting OMM (Operation Monitoring and
            Maintenance)
            Relinquishing the land

12:00 – 1:00 pm      LUNCH

1:00 pm  19. The AER Dam Safety Program (Tim Eaton)

            Regulatory Requirements and AER Dam Inspections
            Inspection of tailings dams
            The Role of the Operator in Notable Dam Failures
            The Elements of a Dam Safety Management System and the AER DSMS
            Audit Process
            Tailings Dam Decommissioning

2:50 – 3:10       COFFEE BREAK

20. Tailings Dam Decommissioning (Panel Discussion)

END OF COURSE