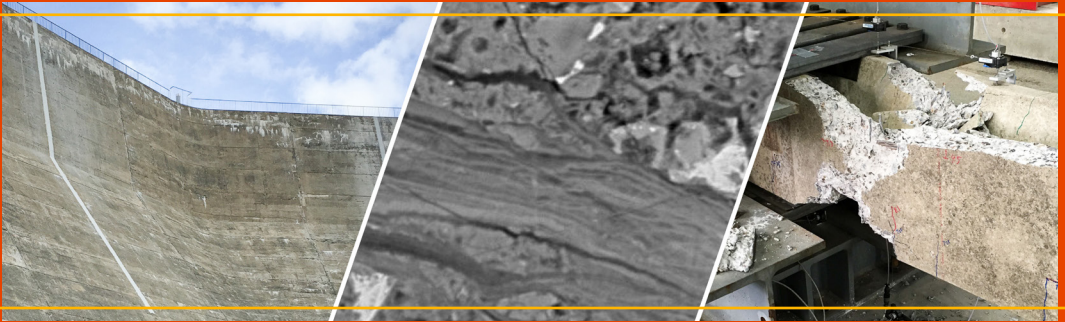


COLLEGE OF ENGINEERING

School of Civil and Construction Engineering

SERVICE-LIFE PREDICTION OF CONCRETE

3RD MEETING: THE CORVALLIS WORKSHOPS
In association with Cement and Concrete Research
July 16-19, 2017



Oregon State
University

SUNDAY, JULY 16

CH2M Hill Alumni Center

17:00-19:00 Opening Reception

MONDAY, JULY 17 (MORNING)

CH2M Hill Alumni Center

7:30 Registration and Continental Breakfast

8:15 Welcome, Opening Remarks and
Introductions
Jason H. Ideker

8:30 **Session 1: Service-Life Prediction Tools**
Session Chair: Kimberley E. Kurtis

25 min *Using Models to Predict the Service-
life Expectancy of Concrete Structures,*
Jacques Marchand, SIMCO

25 min *A Real-World Perspective about
Today's Practice and the Future of
100+ year Service Life Requirements,*
Oscar Antommattei, Kiewit

25 min *Forecasting the Time to Corrosion
of Reinforced Concrete Structures,*
Ueli Angst, ETH Zurich

15 min *Discussion*

10:00 Coffee Break

- 10:30 **Session 3 Service-Life Prediction: Design Implications**
Session Chair: Karen L. Scrivener
- 15 min ***Getting Back to Engineering: Advancing Concrete Mixtures for Performance***, Gina Ahlstrom, FHWA
- 25 min ***Performance-based Specifications and Control of Concrete Durability***, Hans Beushausen University of Cape Town
- 40 min ***Engineering and Sustainability Limit States for Reinforced Concrete Structures and Multi-Physics and Multi-Scale Modeling of Chloride Induced Reinforcement Corrosion***, Mette Geiker, Norwegian University of Technology and Science and Alex Michel, Technical University of Denmark
- 15 min *Discussion*

POSTER PITCHES

Toward a Mixture Design Methodology for Internally Cured Concrete that Considers Filling Specific Pore Sizes Caused by Self-desiccation, Luca Montanari, Oregon State University

In-situ Corrosion Damage Characteristics of Fiber-reinforced Cementitious Composites Using X-ray Micro-computed Tomography, Wilson Nguyen, Jacob F. Duncan, Paulo J.M. Monteiro and Claudia P. Ostertag, UC Berkeley

12:15 Lunch

MONDAY, JULY 17 (AFTERNOON)

CH2M Hill Alumni Center

- 13:15 **Session 2: Experimental Data for Service-Life Prediction Tools**
Session Chair: Michael D.A. Thomas
- 25 min ***Concrete Mixtures do not have a Service Life; Concrete Structures have a Service Life***, Doug Hooton, University of Toronto
- 25 min ***Durability Perspectives for Future Cements and use of Calcined Clays***, Karen Scrivener, EPFL
- 25 min ***Durability Assessment of Alternative Cementitious Materials: Ongoing Research for Service Life Predictions***, Kim Kurtis, Georgia Tech

POSTER PITCHES

- Assessment of Chloride Transport in OPC-Limestone-Calcined Clay (LC3) Mortars*, Hamed Maraghechi, EPFL
- Carbonation of Portland Limestone Cement (PLC) Concrete Systems*, Jose Garcia, University of Texas at Austin
- Linking Performance and Pore Structure to Probabilistically Assess ACI Provisions for Freeze-Thaw Exposures*, Scott Smith, Georgia Tech

- 15 min *Discussion*
- 14:45 Coffee Break

15:15 **Session 4: Non-Destructive Evaluation for Service-Life Prediction**

Session Chair: Anthony F. Bentivegna

25 min *How Can Electrical Imaging Modalities be used for Advancing Service Life Prediction of Concrete Structures?* Mohammad Pour Ghaz, North Carolina State University

25 min *Using Resistivity Measurements to Predict Service-Life of Reinforced Concrete Bridge Decks*, Burkan Isgor, Oregon State University

15 min *Ultrasonic Full Waveform Monitoring of Concrete Structures*, Thomas Schumacher, Portland State University

POSTER PITCHES

Real-time Evaluation of Durability Characteristics of Concrete via Time-Domain Reflectometry, Somayeh Nassiri, Washington State University

15 min *Discussion*

MONDAY, JULY 17 (EVENING)

Group Winery Dinner

Lumos Winery

17:45 Shuttle bus start to Lumos (every 15 min)

18:15 Last bus to Lumos

20:30 Shuttle busses start return to Hotels (every 30 min)

21:00 Last bus to Hotel

TUESDAY, JULY 18 (MORNING)

CH2M Hill Alumni Center

8:30 Registration and Continental Breakfast

9:00 **Session 5: Numerical Modeling**
Session Chair: Burkan Isgor

25 min ***Numerical Simulation of Early-Age Deformation and Cracking of RC Structures with Full-3D Multi-scale and Multi-Physical Integrated Analysis,***
Tetsuya Ishida, University of Tokyo

25 min ***Numerical Analysis of the Degradation Phenomena using the Coupled Thermodynamic Phase Equilibrium-mass Transfer System,*** Yoshifumi Hosokawa, Taiheiyo Cement and Kazuo Yamada, National Institute for Environmental Studies, Japan

25 min ***Statistical Tools and Estimation of the Service Life of Concrete Systems with Various Cementitious Materials, Corrosion Inhibitors, and Coatings,***
Radhakrishna Pillai, Manu Santhanam and Ravindra Gettu, IIT Madras

POSTER PITCHES

Mathematical Modeling based on the Evolution of Concrete Deterioration for Optimizing Concrete Service Life and Repair Schedules, Qingxu (Bill) Jin, Georgia Tech

The Long-Term Bridge Performance Program Bridge Portal, David Masceri and Nick Romano, State University of New Jersey, Aaron Strand and Matthew P. Adams, NJIT

15 min Discussion

10:30 Coffee Break

- 10:50 **Session 6: Service-Life Prediction in Field**
 Session Chair: Doug Hooton
- 25 min *Incorporating the Influence of Cracks on Service Life Predictions of Concrete Structures Exposed to Chlorides*, Jose Pacheco, CTL Group
- 25 min *Service-Life Prediction of the Maқтаquac Dam*, Mike Thomas, University of New Brunswick
- 15 min *Service- Life Assessment Based on site NDTs - Relevance and Real Cases*, Roberto Torrent, Materials Advanced Services Ltd.
- 15 min *Use of the Damage Rating Index as Input for Service-Life Prediction of ASR-Affected Concrete*, Fred Shrimmer, Golder Associates

POSTER PITCHES

Characterization of Concrete Affected by Delayed Ettringite Formation Using the Stiffness Damage Test, Atolo Tuinukuafe, University of Alabama

Effect of Environmental Conditions on the Propagation of Natural Carbonation, Fred Aguayo, Texas State University

The Transport of Chloride Ions in PC-Limestone Cementitious Materials, Shiyu Sui, Hamed Maraghechi, Karen Scrivener and Sun Wei, EPFL

15 min *Discussion*

Bag Lunch and Group Hike, Marys Peak

~12:30 Depart CH2M Hill Alumni Center

~16:30 Return CH2M Hill Alumni Center

TUESDAY, JULY 18 (EVENING)

Cocktails and Appetizers

The Vue, Downtown Corvallis

18:00 Shuttle bus start to The Vue (every 15 min)

18:30 Last bus to The Vue

20:30 Shuttle buses return to Hotels (every 30 min)

21:30 Last bus to Hotel

WEDNESDAY, JULY 19

CH2M Hill Alumni Center

- 8:30 Continental Breakfast
- 9:00 **Session 7: Service Life Prediction in Field and Marine Environments**
Session Chair: Jason H. Ideker
- 25 min ***Service Life Prediction: A Key Input for Future Department of Defense Asset Management***, Robert Moser, US Army Corps
- 25 min ***Durability of Concrete Structures in Marine Environments: Design, Assessment and Beyond***, Kefei Li, Tsinghua University
- 25 min ***Phase Diagrams, Volume Change, and Chloride Binding in the Ca(OH)₂-CaCl₂-H₂O System and Its Impact on Concrete Durability***, Jason Weiss, Oregon State University
- 15 min ***Service-Life of Concrete Containing Supplementary Cementing Materials in Marine Environment for 25 Years***, Ted Moffat, University of New Brunswick
- 15 min *Discussion*
- 10:45 Coffee Break
- 11:15 Discussion
Wrap-up, Cement and Concrete Research Special Publication Papers, next workshop dates and topic
- 12:00 Lunch and Departure

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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every sale, purchase, and expense must be properly documented to ensure compliance with tax laws and to provide a clear audit trail. This section also outlines the various methods for recording transactions, including the use of journals, ledgers, and specialized software.

The second part of the document focuses on the classification of transactions. It details how different types of sales and purchases should be categorized, such as direct sales, indirect sales, and returns. It also explains how expenses should be allocated to different departments or projects, ensuring that each cost is properly tracked and accounted for.

The third part of the document addresses the reconciliation of accounts. It provides a step-by-step guide for comparing the company's internal records with bank statements and other external sources. This process is crucial for identifying discrepancies and ensuring that the financial statements are accurate and balanced.

The fourth part of the document discusses the preparation of financial statements. It covers the calculation of net income, the determination of gross profit, and the preparation of the income statement, balance sheet, and cash flow statement. It also provides examples and formulas to help users understand how these statements are derived from the underlying transactions.

The final part of the document offers practical advice on how to implement these procedures effectively. It suggests best practices for organizing records, using technology to streamline the process, and conducting regular reviews to ensure ongoing compliance and accuracy. The document concludes by emphasizing the importance of transparency and accountability in financial reporting.



Oregon State University
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