SEI/ASCE Technical Council
Life-Cycle Performance, Safety, Reliability and Risk of Structural Systems

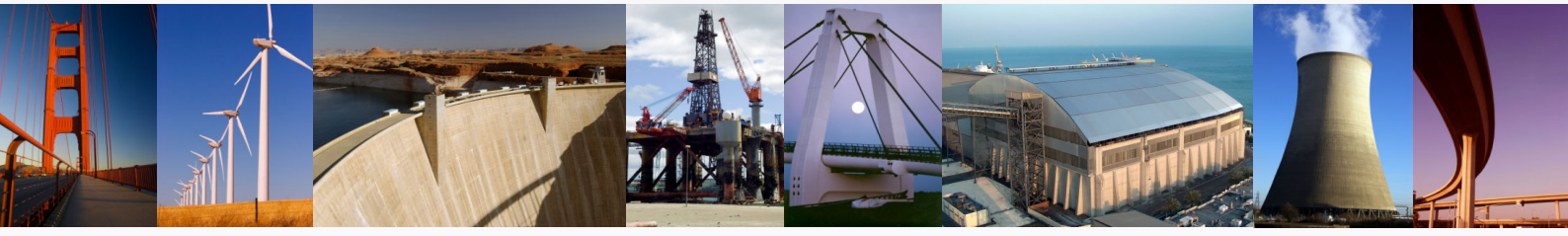
Task Group 2
Reliability-Based Performance Indicators for Structural Systems

International Workshop

Effect of Climate Change on Life-Cycle Performance, Safety, Reliability, and Risk of Structures and Infrastructure Systems

September 30th, 2022

ASCE Headquarters
American Society of Civil Engineers
1801 Alexander Bell Drive
Reston, VA 20191



Background

The economic growth and sustainable development of modern society rely on robust, resilient, and durable civil structures and infrastructure facilities that are able to sustain the effects of man-made as well as natural, including climate-related, hazards. Climate change will alter the environmental conditions to which structures and infrastructure systems are exposed over their life-cycle and progressively accelerate aging and structural deterioration processes, while increased climatic loads such as winds, floods, snow and ice may increase the risk of structural failures. These climatic hazards and their potential combinations will have significant impacts on the safety and functionality of structures and infrastructure systems and will affect their maintenance schedules, management strategies, and associated decision making processes. While the above mentioned issues are widely recognized, methods to address the effect of climate change on the life-cycle performance, safety, reliability and risk of structures and infrastructure systems are still in the very early stages of development.

Research and implementation of methods for assessing the life-cycle performance and effective design and management of structures and infrastructure systems considering the effects of climate change are promoted within the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) by the Technical Council (TC) on Life Cycle Performance, Safety, Reliability and Risk of Structural Systems, and its Task Group 2 (TG2) on Reliability-based Performance Indicators for Structural Systems.

To address issues related to the effects of climate change, TG2 has initiated a Special Project approved by the SEI Technical Activities Division. The outcome of the project will be an ASCE book that will provide a review of available information on climate change and identify methodologies and tools that would help structural engineers address the impacts of climate change on the life cycle performance, safety, reliability, and risk of structures and infrastructure systems. The book's recommendations will be informed by the outcomes of a Survey and a Workshop that are conducted as part of the project's activities.

Objectives of the Workshop

This International Workshop will gather over fifty leaders from industry, government agencies and academia with expertise in the projection and analysis of climatic hazards, the assessment and management of structures and infrastructure systems subjected to climate change and extreme weather events, and the development of structural design codes and standards.

The objectives of the Workshop are threefold: a) review available information on the effect of climate change on the safety and performance of structures; b) explore methods for assessing the life-cycle safety of structures subjected to changing climatic hazards; and c) propose procedures for considering the effect of climate change in structural design and recommend approaches for their implementation in design codes and standards.

We sincerely hope that this effort will further solidify SEI/ASCE's leading role in promoting the application of quantitative life-cycle performance metrics that incorporate emerging environmental issues in design practice; influencing the development of structural design codes and standards; as well as enhancing the state of the nation's infrastructure to help protect the safety of the public, enrich the quality of life and improve the resilience of our communities.

Fabio BIONDINI, F.ASCE, Zoubir LOUNIS, M.ASCE, and Michel GHOSN, F.ASCE

Technical Program

8:00 – 8:30 am — Registration & Breakfast

8:30 – 10:00 am — **Opening Session**

8:30 – 8:50 am — **Welcome, Workshop Background and Objectives**
Fabio Biondini, Politecnico di Milano
Michel Ghosn, The City College of New York / CUNY
Zoubir Lounis, National Research Council Canada

8:50 – 9:10 am — **WG1 – Climate Projection Models and Data**
Jason Giovannettone, Sisters of Mercy of the Americas

9:10 – 9:30 am — **WG2 – Impact of Climate Change on Infrastructure Performance**
Bruce Ellingwood, Colorado State University

9:30 – 9:50 am — **WG3 – Life-Cycle Risk-Based Decision Making in a Changing Climate**
Dan Frangopol, Lehigh University

9:50 – 10:30 am — **Preparation of Breakout Groups**

9:50 – 10:05 am — **Survey Overview and Results**
Fabio Biondini, Politecnico di Milano

10:05 – 10:15 am — **Breakout Session Topics and Objectives**
Zoubir Lounis, National Research Council Canada

10:15 – 10:30 am — Coffee Break

10:30 – 12:00 pm — **Breakout Sessions**

1 - Updating Climatic Hazards and Load Models for Structures
Moderator: **Jason Giovannettone**, Sisters of Mercy of the Americas
Rapporteur: **Teng Wu**, University at Buffalo
Secretary: **Graziano Fiorillo**, University of Manitoba

2 - Structural Capacity Modeling in a Changing Climate
Moderator: **Bruce Ellingwood**, Colorado State University
Rapporteur: **Paolo Bocchini**, Lehigh University
Secretary: **Georgios Tsampras**, University of California San Diego

3 - Life-Cycle Structural Safety Assessment and Management under Climate Change
Moderator: **Dan Frangopol**, Lehigh University
Rapporteur: **Ming Liu**, U.S. Department of Navy
Secretary: **Kostas Papakonstantinou**, Penn State

12:00 – 1:00 pm — Lunch

1:00 – 2:00 pm — **Breakout Sessions (ct'd)**

2:00 – 2:45 pm — **Group Reports**

2:00 – 2:15 pm — **Updating Climatic Hazards and Load Models for Structures**
Teng Wu, University at Buffalo

2:15 – 2:30 pm — **Structural Capacity Modeling in a Changing Climate**
Paolo Bocchini, Lehigh University

2:30 – 2:45 pm — **Life-Cycle Structural Safety Assessment and Management under Climate Change**
Ming Liu, U.S. Department of Navy

2:45 – 3:00 pm — Coffee Break

3:00 – 4:30 pm — **Closing Session**

3:00 – 4:20 pm — **General Discussion**
Moderator: **Michel Ghosn**, The City College of New York / CUNY

4:20 – 4:30 pm — **Closing Remarks and Farewell**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