Second Announcement

JCSS Joint Committee on Structural Safety

Danish Association of Consulting Engineers FRI

International Workshop on

Uncertain Climate Futures

A New Reality for Structural Design and Integrity Management

June 16-17, 2025

Industriens Hus
Copenhagen, Denmark



Organized by:

NIRAS RAMBØLL COWI

Objectives of the workshop

To ensure resilience, safety and reliability of infrastructure systems in the face of the uncertain climate futures – a new common rationale for decision support is urgently needed (see also the section on background). This rationale should be generic yet adaptable to specific local climate conditions and their temporal variations.

It is in this light that the Danish Association of Consulting Engineers (FRI) and the Joint Committee on Structural Safety (JCSS) have taken the initiative to conduct this workshop with the objectives to:

- **Provide awareness** - bring the challenge of climate change in the context of planning, design and integrity management of infrastructure systems and structures to the attention of relevant public authorities, owners and operators, as well as consultants and contractors.
- **Align perspectives** – exchange knowledge on the challenges of climate change in its various dimensions for infrastructure systems, and discuss potential approaches on how to cope with the associated very large knowledge uncertainties.
- **Join forces** – achieve consensus on how to move forwards in establishing a rationale for dealing with climate changes in the context of structures and infrastructures, and to set directions on how to implement this – within an adequately short time horizon.

Concept and structure of the workshop

The workshop will take place over 2 full days, and will bring together professionals from different parts of the world, including; i) climate scientists, ii) owners, operators, contractors, consultants and regulators, and iii) experts in structural reliability, risk informed decision making and pre-normative and normative work.

On the first day the scene will be set by presentations from climate scientists who will provide an overview of what they know and don't know about the future global and local effects of climate change. After this, short appraisals of the challenges of climate changes will be provided from the perspectives of owners of structure and infrastructure systems, operators, regulators, contractors and consulting engineers. This will surely define the themes for discussions at the workshop dinner.

On the second day, experts from the domain of structural reliability, risk informed decision making, pre-normative and normative work, will give their ideas and perspectives on the principal effects of climate changes that should be addressed – and also on how the substantial knowledge related uncertainties, that are associated with the future climate may be accounted for.

Finally, at the end of the workshop we will jointly establish a consensus on how to proceed in developing decision bases for development and integrity management of structures and infrastructure systems.

Registration

The workshop will take place on June 16-17, 2025. A preliminary program for the workshop is enclosed in the present flyer. The final version of the program will be distributed about 1 month ahead of the workshop.

The workshop will be organized as a non-profit event and the registration costs and attendance of the workshop dinner will be limited to around 400 Euro per person in total.

The registration and payment of the participation fee, including lunch on both days and the workshop dinner must be made on the following link (bank transfers and credit card payments are possible). (to be filled out in a few days).

Due to a significant interest in the workshop and limited space at the venue, there may be limitations to attendance. Therefore if you are interested in attending, you are encouraged to register early.

Venue and logistics

The workshop will take place at Industriens Hus, the premises of the Danish Association of Consulting Engineers (FRI).

Industriens Hus is located in the very center of Copenhagen, just next to the Tivoli and the main rail and metro stations with direct connection to Copenhagen Airport only 20 minutes away. There is a very wide selection of hotels within walking range of Industriens Hus.

Tentative program

Day 1 - June 16			
8:30am	Registration		
9:00am	Opening	Welcome and why climate change is important for FRI	Henrik Garver, managing director of the Danish Association of Consulting Engineers (FRI)
		The Joint Committee on Structural Safety	Professor Jochen Köhler, President of the JCSS, Department of Civil Engineering, NTNU, Norway.
		Infrastructure, climate change and sustainability	Professor Jim Hall, President of the Institution of Civil Engineers, the Environmental Change Institute, Oxford
		Free slot - 10-15 minutes	
		Motivation, objectives and structure of the workshop	Professor Michael Havbro Faber, NIRAS A/S, Denmark, Civil Research Group, Lusòfona University, Portugal.
10:30am	Coffee break		
11:00am	Status and perspectives from climate science	On present knowledge and modelling of global climate change	Professor Sebastian Mernild, University of South Denmark, main author of the 6th IPCC report
		On the possible collapse of the Atlantic Meridional Overturning Circulation (AMOC)	Professor Peter Ditlevsen, Niels Bohr Institute, University of Copenhagen
12:30pm	Lunch - meal in a box		
13:30pm	Perspective of infrastructure stakeholders	Perspective of infrastructure owners and operators	Frederik Fisker, Sund & Bælt
			...
		Perspective of consulting engineers and contractors	NIRAS, xxx
			Ramboll, xxx
			COWI, xx
			...
			...
		Perspectives of professional associations and (pre-)regulatory bodies	Joint Research Centre, Ispra, Italy
			Jennifer Goupil, ASCE SEI & NIST project on Forward Looking Codes and Standards
			Tina Vejrum, President of IABSE
			CEN TC250 - Structural Eurocodes, name to be confirmed
			...
			...
15:30pm	Coffee break		
16:00pm	On the present ratonale for ensuring safety, reliability and decision making for structures and infrastructures	Safety and reliability requirements in standards and codes	TBD
		On the present basis for ensuring safety and reliability in design codes - the JCSS PMC	Professor Ton Vrouwenvelder, TNO, the Netherlands
17:00pm	Closure Day 1		Inger Birgitte Kroon
19:00pm	Dinner		

Day 2 - June 17			
8:30am	Registration		
9:00am	Opening	Short recap of the objectives for Day 2	Søren Randrup Thomsen, Ramboll
9:10am	Perspectives on how to deal with uncertain climate futures	Uncertainties and decision making for structures and infrastructure systems	Professor Daniel Straub, Technical University of Munich, Germany
		Recent and ongoing developments in the USA and Canada	Professor Fabio Biondini, Politechnico di Milano, Italy
10:30am	Coffee break		
11:00am	Recent and ongoing research 1	Probabilistic multi-systems decision making	Professor Yaohan Li, Hong Kong City University, China
		Developments and perspectives from Brazil	Professor Andre Beck, University of Sao Paolo, Brazil
		A regional climate-driven probabilistic carbonation model for service bridges in China and corresponding corrosion map under different climate scenarios	Prof. Decheng Feng, Southeast University China
		Evaluation of resilience enhancing interventions for transport systems exposed to hydro-meteorological hazard events with epistemic uncertainty	Professor Bryan Adey, ETH-Zurich, Switzerland
12:00pm	Lunch break		
13:00pm	Recent and ongoing research 2	...	...
		Extreme preticipation - new developments on adaptation and mitigation	Signe Schløer, NIRAS
		...	...
		...	COWI
		...	...
		Storm flood protection of Copenhagen	Marianne Skov, Ramboll
14:30pm	Panel session 1	How to deal with uncertain climate futures	Selected participants (around 8)
15:30pm	Panel Session 2	How to move forwards?	Selected participants (around 8)
15:00pm	Coffee break		
15:30pm	Conclusions and next steps	Presentation and discussion of workshop consensus	Inger Bifrgitte Kroon/Søren Randrup Thomsen/Michael Havbro Faber
		Comments and discussions	All participants
16:00pm	Closure		Henrik Garver, managing director of the Danish Association of Consulting Engineers (FRI)

Background - the climate challenges for societal infrastructure systems

Climate change is a new reality for the global community. It is new in the sense that over the past tens of thousands of years we have prospered from a stable climate, sufficiently predictable and benign for civilization to develop the welfare we enjoy today. However, according to the best available knowledge the climate futures we are presently looking into may not have these qualities. The global temperatures are increasing rapidly and the local climate conditions are becoming progressively volatile, hostile and onerous.

Researchers from the natural sciences are doing a tremendous effort to build up knowledge on what we might experience in terms of climate conditions over the next decades and centuries. However, the global and local climate systems are hugely complex to model and as a consequence, the climate futures we must deal with in societal decision making in the present, are associated with very substantial – knowledge - uncertainties.

For the case of Denmark, as an example, climate models are being discussed that suggest climate changes towards 2100, ranging from climate conditions that resemble those that are presently common in Paris, to climate conditions resembling those that are typical on the mid-west coast of Greenland. Both scenarios, and others are possible, but we do not know which scenario will take place. Clearly, this poses a very substantial and critical challenge for society.

When establishing decision basis for the development, design and integrity management of infrastructure systems and structures, we actually do have a strong tradition and knowledge basis for dealing with uncertainties related to climate effects; temperatures, precipitation, sea water levels, storm surges, ground water levels, winds, waves, snow, floods, wild fires, etc. This is materialized in regulations, codes, standards and best practice guidelines, and the JCSS has contributed substantially to this over more than 50 years. However, in the face of the changing climate the present best practices for dealing with such uncertainties are no longer adequate. For many locations and climate effects around the world they may be misleading and even wrong. A major reason for this is, that in the past we have had only to manage uncertainties within a relatively well understood and stable climate scenario – for which we have had the possibility to learn and adapt from observations over long periods of time. From now on however, when we are deciding on how to design or maintain infrastructure projects – typically looking 100-150 years ahead – we do not know which climate scenario we are dealing with, and we have no observations that we can learn from.

In summary, climate change is a global challenge with strongly diverse local effects and variations over time – of which we know only little. Infrastructure systems are critical for societal functionality within nation states but also across borders. The professionals in the sector of infrastructure systems – at international level – must join forces to ensure that the infrastructure of the future is fit to serve society as it has been in the past.

Organization

The organization of the workshop is supported by a local organizing committee and an international scientific committee. The local organization committee is comprised by Michael Havbro Faber (NIRAS), Inger Birgitte Kroon (COWI) and Søren Randrup Thomsen (Ramboll).

International Scientific Committee

An international scientific committee with the objective to ensure a broad geographical engagement of stakeholders and an adequate representation of the presently available knowledge on the main topic of the conference has been formed. At the present time the international scientific committee is comprised of:

- Adamantia Athanasopoulou (European Commission, Joint Research Centre, Ispra, Italy)
- Alan O'Connor (Member of the JCSS, Trinity College Dublin, Ireland)
- Andre Beck (Member of the JCSS, University of Sao Paolo, Brazil)
- Arzhang Alimoradi (NIRAS, Denmark)
- Bruce Ellingwood (Member of the JCSS, Colorado State University, USA)

- Carmen Andrade (Member of the JCSS, Polytechnic University of Catalonia, Spain)
- Celeste Viljoen (Member of the JCSS, University of Stellenbosch, ZA)
- Colin Caprani (Member of the JCSS, Monash University, Australia)
- Dagang Lu (Member of the JCSS, Harbin Institute of Technology, China)
- Daniel Straub (Member of the JCSS, Technical University of Munich, Germany)
- Dimitri Val (Member of the JCSS, Heriot-Watt University, UK)
- Eleni Chatzi (ETH-Zürich, Switzerland)
- Eloi Figueiredo (Lusófona University Lisbon, Portugal)
- Emilio Bastidas (La Rochelle University, France)
- Gian Paolo Cimellaro (Politecnico di Torino, Italy)
- Jianbing Chen (Member of the JCSS, Tongji University, China)
- Jianjun Qin (Shanghai Jiao Tong University, China)
- Jie Li (Member of the JCSS, Tongji University, China)
- Jim Hall (University of Oxford, UK)
- Jochen Köhler (President of the JCSS, Norwegian University of Technology and Science, Norway)
- José Guadalupe Rangel Ramírez (Member of the JCSS, Tecnologico de Monterrey, Mexico)
- Junho Song (Seoul National University, Seoul, South Korea)
- Marc, Maes (Member of the JCSS, University of Calgary, Canada)
- Marco Broccardo (Member of the JCSS, University of Trento, Italy)
- Maria Pina Limongelli (Member of the JCSS, Politecnico di Milano, Italy)
- Mark Stewart (Member of the JCSS, University of Technology Sydney, Australia)
- Miroslav Sykora (Member of the JCSS, University of Prague, Czech Republic)
- Niels Peter Høj (Member of the JCSS, Høj Consult, Switzerland)
- Paolo Gardoni (Member of the JCSS, University of Illinois Urbana-Champaign, USA)
- Pedro Castro Borges (Centro de Investigación y de Estudios Avanzados del IPN Unidad, Merida, Mexico)
- Peter Tanner (Member of the JCSS, The Eduardo Torroja Institute for Construction Sciences, Spain)
- Raphael Steenbergen (Member of the JCSS, TNO Delft, the Netherlands)
- Robby Caspele (Member of the JCSS, Ghent University, Belgium)
- Sebastian Thöns (Member of the JCSS, Lund University, Sweden)
- Signe Schløer (NIRAS, Denmark)
- Sven Thelandersson (Lund University, Sweden)
- Tina Vejrum (COWI, Denmark)
- Ton Vrouwenvelder (Past President of the JCSS, TNO Delft, the Netherlands)
- Yaohan Li (Hong Kong Metropolitan University, China)
- You Dong (The Hong Kong Polytechnic University, China)