

JCSS Continuing Education & Advanced School

Probability Theory, Risk Assessment & Structural
Reliability and Probabilistic Model Code

29 June – 4 July, 2019
Shanghai, China

Organized by

The Joint Committee on Structural Safety (JCSS)
Tongji University
Harbin Institute of Technology
Beijing University of Technology

Co-Organized by

Committee on Random Vibration, Chinese Society of Vibration Engineering
The Committee on Probability and Statistics in the Physical Sciences, the Bernoulli
Society for Mathematical Statistics and Probability

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Increased Interest in Risk and Reliability

Methods of reliability, risk and safety assessment are increasingly gaining importance as decision support tools in various fields of engineering. In order to utilize these methods and to exploit their potential in industrial applications, an understanding of the fundamental principles is necessary. The Advanced School aims at educating engineers and researchers to work more efficiently in supporting decision makers and clients for a sustainable societal development.

JCSS

The JCSS is a committee in the field of Structural related Risk and Reliability, acting on behalf of the Liaison Committee of the following six international professional associations:

- CIB International Council for Research and Innovation in Building and Construction
- ECCS European Convention for Constructional Steelwork
- fib International Federation for Structural Concrete
- IABSE International Association for Bridge and Structural Engineering
- RILEM Reunion Internationale des Laboratoires et Experts des Matériaux
- IASS International Association for Shell and Spatial Structures

The goals of the JCSS are:

- To improve the general knowledge and understanding within the fields of safety, risk, reliability and quality assurance, for all types of civil engineering and building structures, on the basis of sound scientific principles and with an open eye for the applications in practice.
- To take care that inter-associational pre-normative research in the field of Risk and Reliability is performed in an effective and adequate way.

JCSS Advanced School Description

The JCSS Continuing Education and Advanced School provides a deep and thorough insight in the latest developments in the concepts and tools for probabilistic structural reliability engineering and risk informed decision making. The advanced school consists of 3 courses which will be held consecutively:

Part 1: Probabilistic Modelling and Risk Analysis in Engineering (28 June – 3 July 2018, Tongji University, Shanghai, China)

Part 2: The JCSS Probabilistic Model Code (29 June – 4 July 2019, Tongji University, Shanghai, China)

Part 3: Risk Informed Decision Making and Decision Analysis (29 June – 4 July 2019, Tongji University, Shanghai, China)

Benefits

The participants benefit by becoming able to master the methods of reliability, risk and safety assessment for engineering projects. Furthermore, the participants can offer clients new services in the perspective of benefit and risk informed decision support.

Who should attend?

Engineers involved in probabilistic structural analysis, design and reliability assessment, as well as engineering supervisors and managers will benefit from this course. Further, master and PhD students and academics working in the field of structural risk assessment will profit from this course. Participants are expected to have basic knowledge on basic probability theory, statistics, linear algebra and elementary structural analysis (static/dynamic).

Information and course plan Part 2 & Part 3

Structural Reliability and JCSS Probabilistic Model Code & Risk Informed Decision Making and Decision Analysis

Time and Location

The course on Structural Reliability and JCSS Probabilistic Model Code & Risk Informed Decision Making and Decision Analysis will be held from the **29 June to 4 July 2019**. The course location will be at **Tongji University**.

Learning Methods and Activities

Learning methods and activities comprise lectures, practical exercises and self-studies. Self-study assignments will typically consist of calculations that develop understanding of the materials presented in class. Participants will be made familiar with the state-of-the-art computational methods and software in this field.

Evaluation and Diploma

Course Diplomas are issued by the JCSS on the basis of active course participation and a positive evaluation of the provided material by the participant.

Course Materials

Course compendium, books, selected research reports and papers from journals and conferences.

Costs and Registration

Due to the sponsorship of Tongji University a reduced attendance fee applies for all participants. The reduced attendance fee is **2400 RMB Yuan per person for regular participant and 1800 RMB Yuan per person for PhD/graduate students** and includes lecture materials. Tea breaks between the lectures are provided. Registration form is required via email to Mr. Jiashu Yang (E-mail: jiashuyang@tongji.edu.cn) by **25 May 2019**.

Lecturers



Michael H. Faber, President of JCSS
Member of Danish Academy of Technical Sciences
Professor of Risk and Safety
Department of Civil Engineering
Aalborg University, Denmark



J. D. Sørensen, Former President of JCSS
Professor, Department of Civil Engineering
Aalborg University, Denmark
Member of Board of Directors, International Civil Engineering Risk and Reliability Association (CERRA)



Jie Li
Distinguished Professor
Director, International Joint Research Center for Engineering Reliability and Stochastic Mechanics (CERSM)
College of Civil Engineering, Tongji University, China
President of the International Association for Structural Safety and Reliability (IASSAR)



Jianbing Chen
Professor, College of Civil Engineering & State Key Laboratory of Disaster Reduction in Civil Engineering
Tongji University, China
Member of Board of Directors, International Civil Engineering Risk and Reliability Association (CERRA)



Dagang Lu
Professor, Vice Dean
School of Civil Engineering
Harbin Institute of Technology, China



Zhaohui Lu
Professor, College of Architecture and Civil Engineering
Beijing University of Technology, China



Yongbo Peng

Professor, Shanghai Institute of Disaster Prevention and Relief, & State Key
Laboratory of Disaster Reduction in Civil Engineering
International Joint Research Center for Engineering Reliability and
Stochastic Mechanics (CERSM)
Tongji University, China



Wei Liu

Research Professor, College of Civil Engineering, & State Key Laboratory of
Disaster Reduction in Civil Engineering
International Joint Research Center for Engineering Reliability and
Stochastic Mechanics (CERSM)
Tongji University, China

Course plan

07:30-18:00, 29 June 2019, Registration, Venue: Civil Engineering Building A101

| DAY 1, Saturday, 29 June 2019, Venue: Civil Engineering Building A101 | |
|--|--|
| Morning | |
| 8:30-8:50 | Opening Prof. Michael H. Faber, Prof. Jie Li |
| 8:50-9:30 | Overview Prof. Michael H. Faber |
| 10:00-12:00 | Uncertainties, probability theory and random variables Prof. Jianbing Chen |
| Afternoon | |
| 14:00-15:45 | Properties of random variables, Distributions Prof. Yongbo Peng |
| 16:15-18:00 | Presented exercises |

| DAY 2, Sunday, 30 June 2019, Venue: Civil Engineering Building A101 | |
|--|---|
| Morning | |
| 8:30-10:00 | Random processes and probabilistic model building –I Prof. Jianbing Chen |
| 10:20-12:00 | Random processes and probabilistic model building –II Including extreme value theory Prof. Yongbo Peng |
| Afternoon | |
| 14:00-15:45 | Regression analysis Prof. Dagang Lu |
| 16:15-18:00 | Presented exercises |

| DAY 3, Monday, 1 July 2019, Venue: Civil Engineering Building A101 | |
|---|--|
| Morning | |
| 8:30-10:00 | Structural reliability, including definition and time Independent Reliability Methods (FORM), etc. Prof. Dagang Lu |
| 10:20-12:00 | Time Independent Reliability Methods, including SORM, high-order moment methods, etc. Prof. Zhaohui Lu |
| Afternoon | |
| 14:00-15:45 | Time Independent System Reliability Methods Prof. Dagang Lu |
| 16:15-18:00 | Presented exercises |

| DAY 4, Tuesday, 2 July 2019, Venue: Civil Engineering Building A101 | |
|--|---|
| Morning | |
| 8:30-10:00 | Time Dependent System Reliability Methods, random vibrations – I, including first-passage problem Prof. J. D. Sørensen |
| 10:20-12:00 | Time Dependent System Reliability Methods, random vibrations – II, including probability density evolution method Prof. Jianbing Chen |
| Afternoon | |
| 14:00-15:45 | Time Dependent System Reliability Methods -III Applications to probabilistic design of wind turbines Prof. J. D. Sørensen |
| 16:15-18:00 | Presented exercises |

| DAY 5, Wednesday, 3 July 2019, Venue: Civil Engineering Building A101 | |
|--|---|
| Morning | |
| 8:30-10:00 | Global reliability of structures and systems Prof. Jie Li |
| 10:20-12:00 | System reliability of infrastructures and networks Prof. Wei Liu |
| Afternoon | |
| 14:00-15:00 | Probabilistic Model Code, Resistance, Loads, Safety assessment of existing Structures Prof. J. D. Sørensen |
| 15:15-16:45 | Codes Prof. Michael H. Faber |
| 17:00-18:00 | Robustness analysis of structures Prof. Michael H. Faber |

| DAY 6, Thursday, 4 July 2019, Venue: Civil Engineering Building A101 | |
|---|--|
| Morning | |
| 8:30-10:00 | System risks modelling-I Prof. Michael H. Faber |
| 10:20-12:00 | System risks modelling-II Prof. Michael H. Faber |
| Afternoon | |
| 14:00-15:45 | Risk analysis and decision making Prof. Michael H. Faber |
| 16:15-18:00 | Presented exercises/case studies/Discussions |

Map



Contacts

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