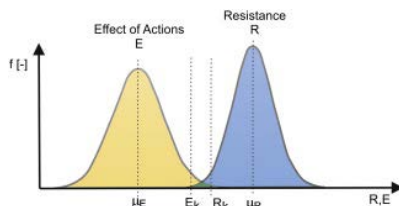


Joint Committee on Structural Safety

Continuing Education & Advanced School

Structural Reliability and JCSS Probabilistic Model Code

4 – 11 April 2018, Stellenbosch University, South Africa



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. The JCSS Continuing Education & Advanced School is intended to be world leading in the field of risk analysis. A deep understanding of the fundamental principles of structural reliability is provided; application is foreseen to a number of realistic cases in practice. The Advanced School helps engineers to better play the important role they have for society in establishing the basis for decision making.

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 five 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

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
- To strive for coordination between the interassociational prenormative research and normalization activities in ISO, Eurocode etc.
- To provide appropriate support and technical co-ordination for the work of the Member Associations

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.

Who should attend?

Engineers directly involved in probabilistic structural analysis, design and reliability assessment, as well as engineering supervisors and managers responsible for such projects will benefit from this course.

The educational offers are also directed towards PhD students and academics working in the field of risk assessment of structures. Participants are expected to have a solid knowledge on basic probability theory and statistics, including necessary prerequisites on linear algebra, corresponding to the themes included in the course on statistics and probability theory. Moreover the participants should be trained in elementary structural analysis (static/dynamic).

Learning methods and activities

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 an active course participation and a positive evaluation.

Course materials

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

Course leaders and teachers

Leaders: Raphaël Steenbergen, Robby Caspeelee, Celeste Viljoen

Teachers:

- Prof. A.C.W.M. Vrouwenvelder (TNO),
- Prof. J. D. Sørensen (Aalborg University),
- Prof. A. der Kiureghian (Berkeley; American University of Armenia),
- Prof. R. Caspeelee (Ghent University),
- Prof. R.D.J.M. Steenbergen (TNO and Ghent University).

Location

Stellenbosch University
South Africa
www.eng.sun.ac.za

Course plan

Start: 4 April 10.00 h
Finish: 11 April 12.00 h

DAY 1 Wednesday 4 April

Morning 10.00-12.00

Raphaël Steenbergen

- Introduction
- Basic aspects of structural safety, safety formats and partial factors
- Life-cycle optimization and target reliabilities
- Probability theory, distribution types, extreme value distributions

Afternoon 13.00-18.00

Robby Caspeele

- Time Independent Reliability Methods
- Level III calculations (numerical integration, various types of Monte Carlo)

Exercises

DAY 2 Thursday 5 April

Morning 09.00-12.30

Robby Caspeele

- Time Independent Reliability Methods
- Level II calculations (FORM, SORM)
 - Simplified level II calculations

Exercises

Afternoon 13.00-16.00

Ton Vrouwenvelder

- Reliability analysis of structural systems
- Time Dependent Reliability Methods,
 - Ferry Borges-Castanheta model
 - Outcrossing approach

16:00-17:00

Celeste Viljoen

Case study introduction

DAY 3 Friday 6 April

Morning 09.00-12.30

Ton Vrouwenvelder

- Resistance modeling, probabilistic model code
 - Concrete
 - Steel/Fatigue
 - Timber
- Fire
- Probabilistic modeling of deterioration

Afternoon 13.00-17.00

Raphaël Steenberg

- Loads, probabilistic model code
- Life loads
 - Impact loads
 - Wind loads
 - Snow loads
 - Traffic loads

Work on Cases

Evening:
Course dinner at Wine Farm



DAY 4 Saturday 7 April

Morning 09.00-12.30

John Sørensen

- Level I calculations, partial factors, combination of actions

Afternoon 13.00-17.00

John Sørensen

- Code calibration

Sunday 8 April: Tour

Morning 07.30 – 13.00:

*Optional activity (+70 euro):
Trip to Grabouw – zipline
through world heritage fynbos
gorges. capecanopytour.co.za
Voted 2nd best new activity in the
world by Lonely Planet (2015).*



Afternoon 14.00 – 20.00:

*Round trip to Cape Town:
Table Mountain,
V&A Waterfront,
Chapmans Peak &
Boulders Beach.*



DAY 5 Monday 9 April

Morning 08.30-12.00

Armen der Kiureghian

Time Dependent System Reliability
Methods, random vibrations

- Introduction to random processes
- Spectral analysis
- Time domain analysis

Afternoon 13.00-15.00

Armen der Kiureghian

- Probabilistic seismic hazard analysis
- Performance-based earthquake engineering

15.00-17.30

Presentation cases by the groups

DAY 6 Tuesday 10 April

Morning 09.00-12.30

Armen der Kiureghian

Bayesian Parameter Estimation
and Reliability Analysis Under
Parameter and Model
Uncertainties

Afternoon 13.00-22.00

13h30 – 15h00 Transfer to Aquila
Game Reserve

16h00 – 22h00 Safari Game viewing
drive, Buffet dinner, Star gazing and
marshmallow roasting around the
fire.



DAY 7 Wednesday 11 April

**Optional early morning safari game viewing drive 06.00 – 08.00*

Morning 09.00-12.00 Raphaël

Steenbergen, Robby Caspeele

- Safety assessment of existing structures
- Robustness analysis of structures

*Transfer back to Stellenbosch or
Cape Town International Airport;
If participant schedules allow take
the scenic route around Montague,
stop for wine tasting in Robertson.*

Laptop

Participants are kindly requested to bring their own laptop with MS Word and Excel installed. Exercises will be provided for which Excel is needed. Also small reliability programs will be provided on the spot to install.

Catering

Coffee, snacks and lunches will be provided to the participants.

Hotel

Hotel accommodation is not provided by the organization. Participants are kindly requested to arrange this themselves.

Book accommodation in Stellenbosch from Wednesday 4 April up to and including the night of Monday 9 April.

Accommodation for Tuesday night 10 April is provided at Aquila Safari Game Reserve and is included in the seminar fee.

Fee

1950 Euro for regular participants and 950 Euro for PhD students.

This fee includes accommodation for Tuesday night 10 April at Aquila Safari Game Reserve, the course dinner and transfers.

Discounts

The following discounts are offered to both regular participants and students, additive up to a maximum of 40%.

Early bird registration by 15w February 2018: 10 %

Delegates from developing countries: 20 %

2nd delegate from a single organization: 10 %

3rd delegate from a single organization: 20 %

4th and additional delegates: 30 %

Registration

For registration email your details to jcss-school@matrisk.com

- Participants will receive a separate email with details regarding payment of the course fee.

Contact persons for enquiries

- General details: <https://jcsseducation.wordpress.com/>
- Payments: Matthias Schubert jcss-school@matrisk.com
- Logistics (Stellenbosch): Janine Myburgh civilcourses@sun.ac.za
- Aquila Game Reserve (for booking of additional nights or companions): Elzanne Chambers corporate@aquilasafari.com