

**The Workshop
attracts 2 CPD Points**



Two-days Technical Workshop, 2011

The Principles of Concrete Bridge Design

University of Cape Town, Dept. of Civil Engineering

Cape Town (University of Cape Town):	November, 7 - 8	08:00 – 17:00
Johannesburg (Radisson Blu Gautrain Hotel, Sandton):	November, 10 - 11	08:00 – 17:00
Durban (Assagay Hotel & Conference Centre)	November, 14 - 15	08:00 – 17:00

Introduction

This workshop will cover various aspects of bridge design and analysis including conceptual design, material selection process, live loading and the design of structural components. The emphasis will be on highway, railway and pedestrian bridges in reinforced and prestressed concrete. The workshop will focus on fundamental engineering concepts and practical design approaches. Basic design procedures for reinforced and prestressed concrete bridges covered in the Eurocodes will also be briefly discussed.

Topics and Scope

- Introduction, history of bridge engineering
- Conceptual design of bridges
 - o Design objective and design basis
 - o Procedure of conceptual design
 - o Examples of good bridge design
 - o Load bearing systems and their using conditions (type selection)
 - o Pre-stressing of bridges
- Preliminary structural analysis of bridges
 - o Load models in Europe and South Africa
 - o Street-, railway-, pedestrian-bridges
- Modelling of concrete bridges
 - o Typical finite element models for different bridge types / cross-section types
 - o Modelling of movable loads
 - o Modelling of dynamic train loads
- Construction technology
- Concrete technology aspects
 - o Deformations (elastic deformations, shrinkage and creep): prediction and prevention, influence on structural design (e.g. prestress losses)
 - o Durability requirements for concrete bridges
- Structural condition assessment
 - o Non-destructive dynamic testing
 - o Verification of load-bearing capacity

Sponsored by



Presenters

Professor Steffen Marx (University of Hanover, Germany) (SM)
Associate Professor Pilate Moyo (University of Cape Town) (PM)
Dr. Hans Beushausen (University of Cape Town) (HB)
Edwin Kruger (South African National Roads Agency Limited)

Professor Marx, who will present the majority of the lectures, is a renowned bridge design engineer from Germany and has taught bridge design at various universities in Germany and the USA. He has been working for 10 years as a consulting bridge design engineer and was appointed Professor at the University of Dresden, Germany, in 2007. From 2010 to 2011, he was Visiting Professor at the University of California at San Diego, USA. In June 2011, he was appointed Professor and Chair of the Institute of Concrete Structures at the Leibniz University Hannover, Germany. Since 2007, Professor Marx has been the Executive Secretary of Advisory Board of Bridge Design of the Deutsche Bahn (German Railway).

His experience in bridge engineering links mainly to reinforced and prestressed concrete bridges (road bridges as well as railway bridges). During the last 3 years he was responsible for the design of two of the largest high-speed railway bridges in Germany (the Unstruttal Bridge with a total length of 2,6 km and the Scherkondetal Bridge with a length of 570 m). For the Scherkondetal Bridge, his design team won the prestigious Structural Engineering Price of Ernst&Sohn in 2010.

Associate Professor Moyo and Dr. Beushausen perform research and lecture in the fields of structural engineering, construction material technology, and structural condition assessment at the University of Cape Town.

Edwin Kruger, the Bridge Network Manager of the South African National Roads Agency Limited (SANRAL), is a practicing bridge engineer with over 30 years of experience. He is in charge of approving bridge design proposals submitted by consulting engineers working for SANRAL. His interest is in not only the economy of bridges but also the role engineers play in producing a better environment for the public at large by designing aesthetically pleasing bridges.

Value for engineers

Engineers who attended the workshop should be able to:

- Perform a conceptual design for various bridge types
- Select appropriate load-bearing and support systems
- Perform a preliminary structural analysis of concrete bridges
- Understand issues relating to the construction of concrete bridges and how these affect the design process
- Make informed choices of appropriate construction materials and specify relevant concrete properties
- Understand the principles of structural condition assessment of concrete bridges

Literature and Handouts

Printed and electronic material and handouts will be provided.

Programme and Timetable

Day 1

07:30 - 08:00	<i>Registration</i>
08:00 - 08:30	The ethical role bridge engineers play in designing bridges of aesthetic appeal (Edwin Kruger, SANRAL)
08:30 - 09:00	Introduction, history of bridge engineering (SM)
09:00 - 10:00	Conceptual design: design objective and design basis (SM)
10:00 - 10:30	<i>Tea and coffee break</i>
10:30 - 11:30	Conceptual design: procedure; examples of good bridge design (SM)
11:30 - 12:30	Conceptual design: Load bearing systems (SM)
12:30 - 13:30	<i>Lunch break</i>
13:30 - 14:30	Conceptual design: Prestressing of bridges (SM)
14:30 - 15:00	Concrete technology aspects (material selection and durability) (HB)
15:00 - 15:30	<i>Tea and coffee break</i>
15:30 - 17:00	Concrete technology aspects (deformations, prestress losses) (HB)

Day 2

07:30 - 08:00	<i>Registration</i>
08:00 - 09:00	Preliminary structural analysis of bridges: loading models (SM)
09:00 - 10:00	The South African loading code in comparison to the Eurocode (PM)
10:00 - 10:30	<i>Tea break</i>
10:30 - 11:30	Modelling of concrete bridges (SM)
11:30 - 12:30	Modelling of concrete bridges (SM)
12:30 - 13:30	<i>Lunch break</i>
13:30 - 14:30	Construction technology (SM)
14:30 - 15:00	Structural condition assessment: principles (PM)
15:00 - 15:30	<i>Tea break</i>
15:30 - 16:30	Structural condition assessment for concrete bridges (PM)
16:30 - 17:00	Discussion and closure

Registration fees

Delegates	R 5800
Full-time students	R 1600

Registration covers attendance of all sessions of the 2-day Workshop, teas and lunches, and one set of notes

Registration form

Two-days Technical Workshop

The Principles of Concrete Bridge Design

Venue (*please tick*)

Cape Town

Johannesburg

Durban

*Cape Town: 07.11 and 08.11.2011, Johannesburg: 10.11 and 11.11.2011
Durban: 14.11 and 15.11.2011*

Please complete the following section legibly

Title: First name: Surname:.....

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Payment may be made in one of the following ways (please tick to indicate method used):

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Hans.Beushausen@uct.ac.za

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