

Vibration Design of Floors and Footbridges

University of Cape Town, Department of Civil Engineering

27 – 28 July 2017: Birchwood Hotel, Johannesburg

31 July – 1 August 2017: Sports Science Institute, Cape Town

Applications close on 7 July 2017

2 CPD points, ECSA Validation No: UCTVDF17

Background

There is a growing trend to use slender structural forms in the design of elegant civil engineering structures such as footbridges, floors and grandstands. This slenderness combined with more onerous dynamic loading leads to increased susceptibility to excessive structural vibrations. As this increased slenderness is a trend which is likely to remain in civil and structural engineering, it is necessary to develop reliable and efficient means for the vibration serviceability design and assessment of the slender structures.

The purpose of this course is to equip engineers with the state of the art on practical design and assessment of floors and footbridges for vibration serviceability. The course will be presented by leading experts in the field of vibration serviceability, Professors Aleksandar Pavic of the Vibration Engineering Section (VES) at the University of Exeter (UK) and Professor Pilate Moyo of Concrete Materials and Structural Integrity Research Unit (CoMSIRU) and the University of Cape Town. VES has been developing tools for design and assessment of civil structures for vibration serviceability for over 20 years. Some of their work has been incorporated design guidelines: The Steel Construction Institute, UK, (2007) *“Design of Floors for Vibration: A New Approach”*, The Cement & Concrete Institute, UK, (2006) *“A Design Guide for Footfall Induced Vibration of Structures”*, The Concrete Society, UK, (2005) *“Post-Tensioned Concrete Floors - Design handbook”*. Institution of Structural Engineers, UK, (2002) *“Dynamic testing of grandstands and seating decks. Advisory Note”*. Institution of Structural Engineers, UK, (2001) *“Dynamic Performance Requirements for Permanent Grandstands Subjected to Crowd Action. Interim guidance on assessment and design”*.

Course objectives

The course aims to provide participants with:

- State of the art on vibration serviceability.
- Brief theoretical basis for vibration serviceability.
- Practical design for vibration serviceability, including interpretation relevant codes of practice.
- Practical assessment of existing structures for vibration serviceability.
- Practical remedial strategies for vibration serviceability problem

Course Programme

Day 1

08:00 - 08:30 Registration

08:30 - 09:00 Introduction to vibration serviceability.

09:00 - 10:00 Brief review of theory of vibration.

10:00 - 10:30 Teak break

10:30 - 12:30 Brief review of theory of vibration.

12:30 - 13:30 Lunch break

13:30 - 15:00 Sources of vibration excitation, Design, Criteria, Design process.

15:00 - 15:15 Tea break

15:15 - 17:00 Design process –FE modelling, modal mass, response analysis

Day 2

08:00 - 10:00 Design of floors for vibration–steel floors, concrete floors, hospital floors.

10:00 - 10:30 Teak break

10:30 - 12:30 Design of floors footbridges

12:30 - 13:30 Lunch break

13:30 - 15:00 Dynamics testing for vibration serviceability.

15:00 - 15:15 Tea break

15:15 - 16:45 Retrofit & remedial strategies.

16:45 - 17:00 Closure

About the Presenters

Professor A. Pavic, *CEng, MStructE, UK*, is currently Professor of Vibration Engineering at the University of Exeter and heads the Vibration Engineering Section. His particular expertise is in vibration serviceability of slender civil engineering structures, such as longspan floors, footbridges and grandstands, which are occupied and dynamically excited by humans. His contribution has been recognised in state-of-the-art design guidelines which are currently used in the UK and internationally when checking vibration serviceability of floors and footbridges. He is a recipient of the prestigious 5-year Advanced Research Fellowship funded by the UK Engineering and Physical Sciences Research Council (EPSRC) to work on a novel *Stochastic approach to human-structure dynamic interaction*. He has authored and co-authored more numerous publications and reports. Professor Pavic is a member of International Standardisation Organisation Working Group ISO/TC98/SC2/WG9 which updated ISO 10137 guidelines on serviceability of buildings against vibration in 2007.

Professor P. Moyo, *PrEng, MSAICE, MIABSE*, is Professor of Structural Engineering at the University of Cape Town. He is the convenor of the course on Vibration Serviceability. His research is on structural health monitoring, condition assessment, vibration serviceability and repair strategies for civil structures. His research is focused on developing structural assessment technologies integrating finite element modelling, full scale testing, and advanced data analysis algorithms. He has published widely in these areas.

Course Information

Who should attend?

The course is intended for structural and civil engineers involved in the design, construction and management of building structures and footbridges. The course will be relevant to engineers at all levels of professional development.

Format

Course is presented as 2 days of formal lectures.

Registration fees

The standard delegate fee for this course is R7200.00. The fee for full-time students is R3600. Registration covers attendance of all sessions of the 2-day workshop, teas and lunches. Payment details will be sent on completion of an application form.

Certificates and CPD Points

A University of Cape Town certificate of attendance will be awarded to participants who attend the full course. This course is registered with the Engineering Council of South Africa for 2 CPD points. The ECSA course code is UCTVDFF17.

Participants can also request a formal university transcript, which will show this course as part of a Professional Development Career.

Application and cancellation

Application forms are available on the website www.cpd.uct.ac.za/cpd/applications

In order to ensure a place on the course applicants must complete and return a signed application form to the course administrators.

Confirmation of acceptance will be sent on receipt of an application form.

Applications close on 7 July 2017

Payment is due one week before the start of the course.

Cancellations must be received 1 week before the start of the course, or the full course fee will be charged

Administrators

Heidi Tait or Sandra Jemaar:

Phone: 021 650 5793 Email: ebe-cpd@uct.ac.za