NTU-CEE Seminar Series

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

VSL A member of Bouygues Construction

You are cordially invited to the seminar organized by **VSL Singapore Pte Ltd**, **Protective Technology Research Centre** & **CEE Seminar Committee**.

One Day Seminar on
Durability & Maintenance of Post-tensioned Bridges

Date: 23 May 2024 (Thursday)

Time: 9:00 am to 5:00 pm (Registration at 8.30 am)

Venue: Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798
Lecture Theater 8 (LT8) [see map]

PDUs: 5

Programme

Time	Event	Speaker
8:30 - 9:00	Registration	
9:00 - 9:15	*Introduction* • Fib Bulletin 110 *Video Presentation featuring Bridge Repair*	Mr. Edo Vonk
9:15 - 10:15	*Prestressing in Bridges* • General background of prestressing design for bridges • Evolution of prestressed bridges in Singapore over the years (types of super-structures) • Evolution of design requirements for PT bridges in Singapore (BS 5400 1978 to BD 37 to Eurocode, LTA CDC) especially regarding durability and serviceability • Evolution of the Prestressing system used in Singapore projects.	Er. Surya Kusuma
10:15 - 10:45	*Morning Break*	
10:45 - 12:00	*Durability, maintenance, repair, risk assessment of PT bridges* • Around the World • In Singapore An overview of the current local requirements for inspection & strengthening of PT bridges will be presented.	Mr. Edo Vonk Er. Surya Kusuma
12:00 - 13:00	*Lunch Break*	
13:00 - 14:00	*Inspection and investigations of PT bridges* • Minimum requirements • NDT methods	Mr. Edo Vonk
14:00 - 14:45	*Demonstration* *Afternoon Break*	
14:45 - 15:45	*Interventions on PT bridges* • repair methods • replacement of PT tendons • Possible strengthening methods	Mr. Edo Vonk
15:45 - 16:15	*Case Study* A52 Clifton Bridge in the UK *Conclusion*	Mr. Edo Vonk
16:15 - 17:00	*Question & Answer*	Mr. Edo Vonk/Er. Surya Kusuma

NTU-CEE Seminar Series

One Day Seminar on
Durability & Maintenance of Post-tensioned Bridges

Abstract

One of the issues worrying the entire modern world is the increasing number of bridges in bad or disrepair condition, which is raising questions about the safety and reliability of our infrastructure in the upcoming years. Within the entire stock of bridges, the post-tensioned concrete bridges are a specific group, which requires special attention. During their first applications in the post-war period, the post-tensioning technology was only in the developing stage. Deficiencies in the technology of prestressing and grouting led to shortened service life of these bridges and in some cases even to their sudden collapses. Nowadays, many post-tensioned bridges built in the 1950s, 1960s, and 1970s are reaching the end of their service life, which is reflected in their reduced load-bearing capacity and the necessity of adequate measures to be taken for their further safe operation. Massive reconstruction or complete rebuilding is unavoidable in many cases.

Special problems also arise during the inspection of post-tensioned bridges. If the tendons are not grouted, the corrosion occurring even at a small location along the tendon leads to a loss of prestressing force on the entire un-grouted section. Corrosion of un-grouted tendons is often invisible at first glance. The reason is, that there is enough space for corrosion products in the duct and thus the concrete cover layer, being the most unmissable indicator of steel corrosion, does not fall off. Another reason is the fact, that the decrease in the prestressing force is not followed by significant deformations of the structure, even in advanced stages. For example, in the case of segmental precast girder bridges, which had some pre-camber at the time of assembly, small deflections will mean only the loss of the camber and the girders would seem to be straight even after a significant loss of prestressing force. Cracks, that indicate a serious problem of deteriorating prestressing tendons, are often just of hairline width and visible only from a close distance. From all these points of view mentioned above, it is clear, that extra attention should be paid to the post-tensioned bridges and especially to the segmental structures, during their inspection, diagnostics, and reconstruction.

This seminar aims to cover current practices, inspections, investigations, and interventions in managing post-tensioned bridges to address their durability issues. If a problem is detected at an earlier stage, repairs can be made to maintain the intended service life of the structure.

This seminar should be of interest to bridge owners/managers, consultants, and contractors, for the current state-of-the-art technology in the field of post-tensioned concrete bridge management.

Registration is FREE

(tea breaks & buffet lunch provided)

Registration Link
(valid until 9 May 2024 and while seats last)

https://wis.ntu.edu.sg/pls/webexe88/REGISTER_NTU.REGISTER?EVENT_ID=OA24040210102330

NTU-CEE Seminar Series

One Day Seminar on

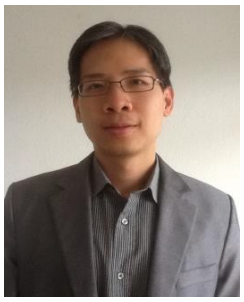
Durability & Maintenance of Post-tensioned Bridges

Date: **23 May 2024 (Thursday)**

Time: **9:00 am to 5:00 pm (Registration at 8.30 am)**

Venue: **Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798**
Lecture Theater 8 (LT8) [see map]

ABOUT THE SPEAKERS



Speaker 1: Er. Surya Kusuma, Director, H&T Consulting Engineers Pte Ltd

Er. Surya Kusuma obtained his bachelor's and master's degrees from NUS and ETH Zurich respectively. He has over 24 years' experience in design and detailing of prestressed concrete bridges including in-situ and precast segmental constructions. He was involved in many local and overseas bridge projects, including the Hong Kong-Zhu Hai-Macao Link Road.

Apart from bridge construction, Er. Surya has extensive experience in the design and review of prestressing system, and in depth knowledge of system specifications. Er. Surya had been involved actively in R&D and innovation whilst he was working with VSL International and was a key contributor to three patents.

Er. Surya has significant expertise for inspection, maintenance, repair and strengthening works of prestressed concrete structures, including stay cable, and bearing replacements.

Speaker 2: Mr. Edo Vonk, VSL Technical Centre Manager, Switzerland

Challenging technical problems, especially related to bridges, motivate Edo Vonk. Almost twenty years of experience have given him an excellent design background but with a very practical approach. Edo Vonk has worked in international companies such as VSL and Arup in infrastructure projects, mainly regarding tunnels and bridges, both in steel and concrete.

Graduated with honours in Civil Engineering (MSc) from University of Technology Delft, Netherlands, Mr Edo Vonk is Technical Manager for Repair Business for VSL International from 2018. He had been involved in numerous bridge projects such as the Jakarta MRT, Temburong Brunei Cable stay bridge, the Australian North-West Rail and Singapore's Bukit Brown Flyover. It is worth mentioning that Edo co-authored the Fib Bulletin 110 "Management of post-tensioned bridges", a state-of-the-art report for the international construction community in 2023.