



ONE DAY WEBINAR
ON
“ANALYSIS AND DESIGN OF
PRESTRESSED TRANSFER PLATE AND
ITS SHEAR CONCENTRATION EFFECTS
ON RC SHEAR WALLS”

SPEAKERS:
Ir. Dr. Low Hin Foo
Dr. Daniel Looi Ting Wee

10 DECEMBER 2021 (Friday)

9.00 a.m. – 6.00 p.m.

via ‘GoToWebinar Platform’

BEM Approved CPD/PDP Hours: 7.0
IEM21/HQ/444/C(w)

Closing Date: 06TH DECEMBER 2021 (Monday)

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Speaker 1 & Synopsis

Ir. Dr. LOW HIN FOO

PhD.Eng (Monash), B.Eng (Hons) Civil, PEPC, MIEM, MACEM, MIES, CEng MStructE, MIEAust CPEng, ASEAN Eng, APEC Engineer, IntPE(MY)

Ir. Dr Low Hin Foo graduated from University Malaya with an Honours degree in



Civil Engineering in 1999. He obtained his Doctor of Philosophy in Engineering from Monash University in 2020 with his research on the experimental and numerical studies of

a prestressed transfer plate subjected to staged casting and sequential stressing based on the actual prestressed transfer plate project in Kuala Lumpur.

He has more than 22 years of design and construction experience in of prestressed building structures as well as various types of long-span bridges both locally and abroad. He was the Technical Manager for international prestressing specialist contractor, *BBR Construction Systems (M) Sdn Bhd*; and he is currently the Principal Engineer of a multi-disciplinary consultancy firm, *OSD Consultants (M) Sdn Bhd*, as well as the Managing Director of *OS Alliance (Singapore) Pte Ltd*, and the Group Managing Director of *OSD Alliance Design Group*.

Ir. Dr Low has vast design experience in the detailed design, construction and costing of

prestressed structures for large commercial projects and high-rise towers, particularly in handling the design of prestressed flat slab or flat plate systems with irregular column grids, including prestressed transfer plates and raft foundation. Besides that, he has plenty of experience in the design and construction of integral bridges using precast girders made continuous, as well as long span bridges using precast and cast in-situ prestressed segmental box girders (SBG) and cable-stayed bridges. Throughout the years, Ir. Dr. Low has contributed to the development of our nation by participating in numerous major infrastructure projects, including the detailed design of MRT stations and long-span crossings for KVMRT line 1 and line 2, elevated bridge viaducts in DASH and SUKE highways, as well as serving as the Independent Checker Engineer (ICE) for the structural design of the entire elevated guideways and viaducts of LRT3 and RTS.

He completed his research project with Monash University Malaysia on the experimental and numerical studies of a prestressed transfer plate subjected to staged casting and sequential stressing based on the actual prestressed transfer plate in Kuala Lumpur. Beside consultancy works, Ir. Dr Low has also actively involved in seminars and training courses for engineers and undergraduates conducted by IEM, IES, and various local universities and abroad on the design of bridges and prestressed building structures.

TOPIC : Analysis and Design of Prestressed Transfer Plate



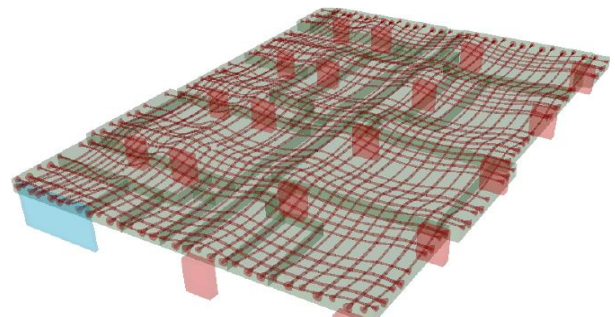
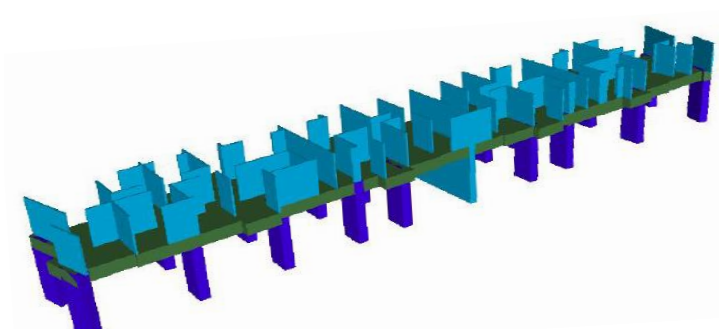
Prestressed concrete transfer slabs, or commonly known as transfer plates, have been widely used to support high-rise buildings in Malaysia, Hong Kong and China at the transfer level to transmit shear wall loads from the tower block to the wider column grids at the podium levels below. This talk will cover the prestressed transfer plate behaviour, as well as the analysis and design of this critical structure.

This Course will explain the prestressed transfer plate structural behaviour subjected to bending, its interaction with the shear walls under gravity loads, and the effect of multi-stage casting and sequential stressing.

The participants will be introduced to the design approach for the transfer plate modelling and analysis along with some rule of thumbs for the prestressed transfer plate preliminary sizing.

The Course will also highlight the design requirements of prestressed transfer plate for bending, punching shear and interfacing shear

- Introduction to Prestressed Transfer Plate
- Special Considerations on Design & Construction
- Structural Behaviour of Prestressed Transfer Plate
- Prestress Transfer Plate Preliminary Sizing
- Prestress Transfer Plate Modelling and Analysis
- Prestress Transfer Plate Design
 - Allowable Stresses at SLS
 - Punching Shear Design
 - Interfacing Shear Design (Multi-layer casting)
 - Local Effects and Construction Joints between 2 Zones



Speaker 2 & Synopsis

Dr. Daniel LOOI TING WEE

PhD in Structural/Seismic Engineering (HKU), B.Eng (Hons) Civil (UM), MIEAust CPEng (Structural)

Dr. Daniel Looi is a Senior Lecturer and Course Coordinator at Swinburne University of Technology (Sarawak campus), Malaysia. He is a Chartered Professional Engineer (Structural) of Engineers Australia and a frequent speaker for local, national and international seminars.



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He specialises in the field of structural and earthquake engineering. He is a key contributor to the development of the National Annex to EC8 on the seismic design of building structures for Malaysia. He is a working group (WG) member for the Malaysian national code development in EC1-1-6 and he is currently chairing the WG for the Malaysian EC2-4: Design of fastenings for use in concrete.

Dr. Daniel's PhD was on the seismic axial collapse of short shear span reinforced concrete shear walls, where he had performed extensive experimental, numerical and theoretical investigations. Daniel has published 20 papers in top-tier structural engineering journals since 2015, 30 book chapters and conference papers in seismic engineering, concrete mechanics, modular building and fastening technology. His research in concrete structures was recognised by the HKIE Outstanding Paper Award for Young Researcher/Engineer (2015). His recent book is "Guide for Design, Installation and Assessment of Post-installed Reinforcements", published internationally by HKU Press, available in major online bookstores.

Daniel worked as a structural application engineer in a multi-national company, specialised in structural analysis and design computation for buildings and plant. He was trained by the late Ir. MC Hee in his early career as a structural engineer. He is an alumnus of the Civil Engineering Department, University of Hong Kong and University of Malaya.

TOPIC :

Analysis and Design of RC Walls for Shear Concentration Effects due to Interaction with Transfer Structure

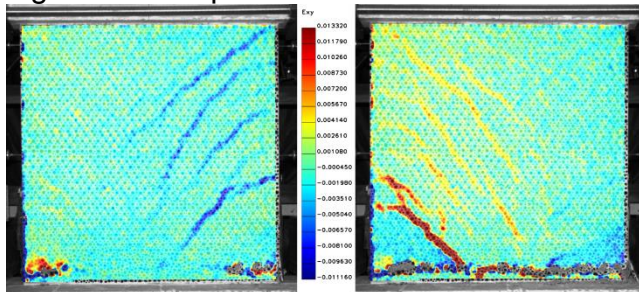
Transfer structures have been widely used to support high-rise buildings in Malaysia, Hong Kong and Singapore at the transfer level to transmit shear wall loads from the tower block to the wider column grids at the podium levels below (see figures below).



This talk will be delivered by Dr. Daniel Looi. He will raise the unique issue of incompatibility of shear walls adjacent to transfer structures when the transfer structures are distorted under gravity and lateral (seismic) actions, which led to shear concentration effects in the shear walls. The

shear concentration effects and the coupling of frame-wall interaction have resulted in a special class of short shear spans shear walls.

These non-seismically designed short shear span walls are highly stressed in axial load under gravity and lateral actions, and have limited deformability. Thus, there is a need for structural engineers in the low-to-moderate seismicity regions to re-examine the seismic performance of this special class of short shear span walls under a rare earthquake event. Figures below show the brittle failure modes of the RC walls under a high axial compression.

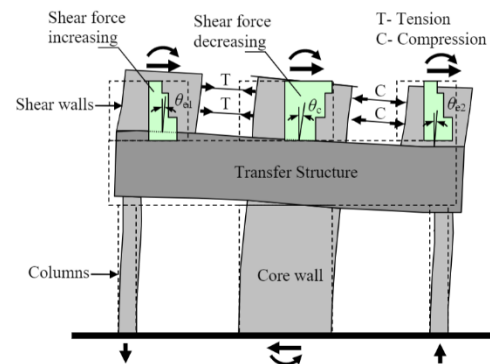
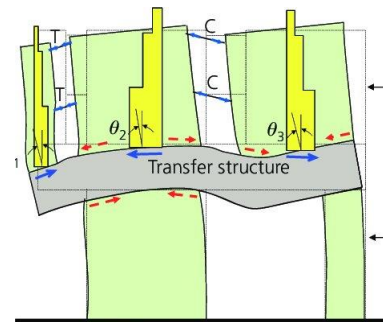


The course will also showcase the axial collapse capacity associated with the out-of-plane buckling failure of these non-seismically detailed shear walls subject to lateral seismic action. Insights such as the use of rigid floor diaphragm, limiting the axial load ratio and the use of behaviour factor in seismic analysis will be shared.



The highlights of this course are:

- Shear concentration effects of the transfer structure (see the two figures in the following)



- Seismic axial collapse capacity of short shear span shear walls (see the references)
- Proposed analysis and design considerations (see the references)

References:

- Looi, D.T.W.; Su, R.K.L.; Cheng, B. and Tsang, H.H. (2017). "Effects of axial load on seismic performance of RC walls with short shear span", *Engineering Structures*, 115, pp. 312-326.
- Looi, D.T.W. and Su, R.K.L. (2020). "Seismic axial collapse of shear damaged heavily reinforced shear walls experiencing cyclic tension-compression excursions: A Modified Mohr's Axial Capacity Model", *Journal of Earthquake Engineering*, 24(10), pp. 1602-1623.
- Shan, Z.W.; Looi, D.T.W.; Cheng, B and Su, R.K.L. (2020). "Simplified seismic axial collapse capacity prediction model for moderately compressed RC shear walls adjacent to transfer structure in tall buildings", *The Structural Design of Tall and Special Buildings*, 29(12).
- Mehair, Y.; Looi, D.T.W.; Lam, N.T.K. and Wilson, J.L. (in press). "Seismic Response Modification Factors for buildings featuring a gravity transfer system by Incremental Dynamic Analyses", *Journal of Earthquake Engineering*.

PROGRAM :

ONE DAY WEBINAR ON “ANALYSIS AND DESIGN OF PRESTRESSED TRANSFER PLATE AND ITS SHEAR CONCENTRATION EFFECTS ON RC SHEAR WALLS”

10TH DECEMBER 2021 (Friday)

TIME	PROGRAMME	SPEAKER
0830 – 0900	Registration of Participants – Please log in using the IEM’s Invitation Email Link that will be emailed. (NO sharing of link as ‘invitation link’ designated for REGISTERED EMAIL ONLY)	
0900 – 0905	Welcome Address by Moderator / Session Chairman Introduction of Speakers	CSETD
0905 – 1015	Session 1 (part 1) : Analysis and Design of Prestressed Plate	Ir. Dr. Low Hin Foo
1015 – 1045	Q & A Session 1 (part 1)	
1045 – 1100	Morning Break	
1100 – 1245	Session 1 (part 2) : Analysis and Design of Prestressed Plate	Ir. Dr. Low Hin Foo
1245 – 1300	Q & A Session 1 (part 2)	
1300 – 1430	Lunch Break	
1430 – 1530	Session 2 (part 1) : Analysis and Design of RC Walls for Shear Concentration Effects due to Interaction with Transfers Structure	Dr. Daniel Looi Ting Wee
1530 – 1545	Q & A Session 2 (part 1)	
1545 – 1600	Afternoon Break	
1600 – 1700	Session 2 (part 2) : Analysis and Design of RC Walls for Shear Concentration Effects due to Interaction with Transfers Structure	Dr. Daniel Looi Ting Wee
1700 – 1715	Q & A Session 2 (part 2)	
1715 – 1800	Closing Session:	Both Speakers
1800	End of Webinar	

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