

CTIL FOCUSED WORKSHOP ON

APPLICATION OF HIGH-STRENGTH STRUCTURAL STEEL AND DEMONSTRATION OF ROBOTIC WELDING, QUENCH AND TEMPERING (QT) AND NON- DESTRUCTIVE TESTING (NDT)



**11 JUNE 2026,
8:30AM – 5:30PM**



**LECTORIAL 7 (E2-01-02),
BUILDING E2, LEVEL 1,
SIT@PUNGGOL (CAMPUS COURT)**

ORGANISED BY



SUPPORTED BY





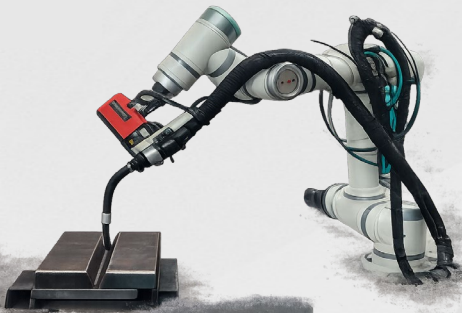
GUEST OF HONOUR

Er. Thanabal KALIANNAN **Commissioner of Building Control** **Building and Construction Authority**

Er. Thanabal KALIANNAN is the Commissioner of Building Control and Group Director (Building Resilience) at BCA. A registered Professional Engineer and Accredited Checker, he played a key role in Singapore's Eurocode migration and has led initiatives on structural resilience, including BC1 & BC3 guidelines, and the façade inspection regime. He serves on several national committees, including the Singapore Structural Steel Society (1st Vice President) and IES's Geotechnical Division. For his contributions to public services and the engineering community, he received the Public Administration Medals (Bronze, Silver), the Distinguished Partner Award from ESG, and NTU's Outstanding Alumni Award. He holds a BEng and MSc in Civil Engineering from NUS.

ABOUT THE WORKSHOP

This focused workshop brings together researchers, engineers, fabricators, regulators, and industry practitioners to explore the latest advancements in high-strength structural steel and emerging construction technologies. Organised by SIT's Construction Technology Innovation Laboratory (CTIL) and supported by BCA and LTA, this workshop features technical presentations, industry case studies, and live demonstrations covering robotic welding, quench and tempering (QT) processes, non-destructive testing (NDT), and material characterisation of ultra-thick steel sections in S460M, S550M and S690Q. Through knowledge-sharing and hands-on demonstrations, participants will deepen understanding of the key processes and latest technologies to ensure safety, quality and productivity, and will have the confidence to adopt more high strength steel construction in the built environment sector.



Robotic Welding Demonstration for High-Strength Steel Joints

This live demonstration showcases robotic welding technologies for Welding Procedure Qualification (WPS) tests involving butt (1G) and pipe (2F) joints. Participants will gain insights into automated welding processes, welding parameter control, and quality assurance considerations for S355 and S690.



Flexible Welding Robot for Site Welding Applications

A flexible robotic welding system will be demonstrated for site welding of circular column splice joints. The session highlights the potential of robotic welding in improving productivity, consistency, and safety for complex on-site steel construction works.

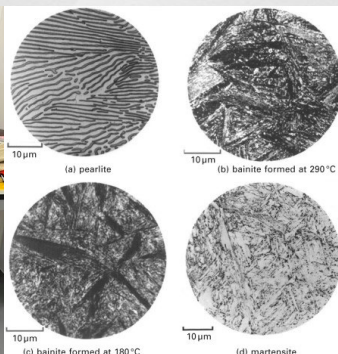
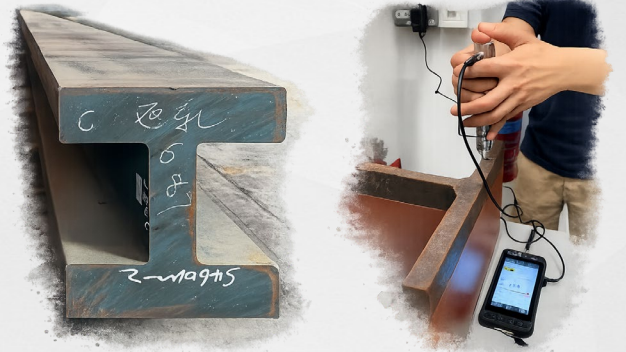
Non-Destructive Testing (NDT) of Ultra-Thick S690 Steel Sections

This demonstration introduces magnetic particle inspection and ultrasonic testing techniques for S690 built-up steel sections with thicknesses up to 100 mm. Participants will observe defect detection procedures, inspection methodologies, and practical quality control measures for high-strength steel fabrication.



Through-Thickness Hardness Testing of Jumbo Steel Sections

Participants will gain hands-on exposure to through-thickness hardness testing for S460 and S550 jumbo steel sections with thicknesses up to 140 mm. The session demonstrates testing procedures used to evaluate material consistency and mechanical performance in heavy steel sections.



Quenching and Tempering (QT) Processes

This demonstration covers the steel quenching process and observations of microstructures formed through tempering heat treatment. Participants will learn how cooling rates influence material properties and can examine typical metallurgical transformations using microscopes. This QT process is used by all steel mills, and the difference between Accelerated Cooling (AC) and Direct Quenching (DQ) processes to achieve strength will be illustrated.

DATE	HIGHLIGHT
8:00 AM	REGISTRATION
9:00 AM	Welcome & Workshop Overview Er. Prof. CHIEW Sing Ping, Head CTIL, Cluster Director (Engineering), SIT
9:15 AM	Opening Address by GOH Er. Thanabal KALIANNAN, Commissioner of Building Control, Building and Construction Authority
9:30 AM	Effective Use of S690 to S960 High Strength Steel in Construction: Research, Development and Innovative Applications Ir. Prof. CHUNG Kwok Fai, Founding Director of CNERC (HK Branch), The Hong Kong Polytechnic University
10:15 AM	Building Smarter with Steel - Insights from the CTIL Study Trip to Shenzhen and Chongqing, China Er. Willie CHAI, Senior Engineer, Building and Construction Authority
10:45 AM	MORNING REFRESHMENT BREAK
11:15 AM	Clifford Centre Re-Development (CCRD) Project – An Overview Er. Colin YIP, Director of Engineering, Woh Hup (Private) Ltd
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12:15 PM	Design Considerations for Use of HSS in CCRD Project Er. MAK Swee Chiang, Principal, ARUP Singapore Pte Ltd
	Fabrication of S690 Mega-Trusses and Kingposts for CCRD Project Dr. NG Yiau Heong, General Manager, TTJ Design and Engineering Pte Ltd
12:15 PM	NETWORKING LUNCH
1:00 PM	Live Demonstrations of Robotic Welding, Quench & Tempering (QT) Processes and Non-Destructive Testing (NDT) at CTIL Const Lab (E5-01-01)
3:00 PM	From 100mm Thick Plate to UC Section: Welding Ultra-Thick S690 Steel for AIGH Project Er. HO Kai Ming, Director, H-Tech Consultants Pte Ltd
3:30 PM	AFTERNOON REFRESHMENT BREAK
4:00 PM	Overcoming Welding Challenges in S690 Assoc. Prof. ZHAO Ming Shan, CTIL, SIT
4:30 PM	Innovations in Robotic Welding Asst. Prof. ZHANG Lu Lu, CTIL, SIT
5:00 PM	Q&A SESSION
5:30 PM	ADJOURNMENT FOR THE DAY



KEYNOTE SPEAKER

Ir. Prof. CHUNG Kwok Fai
Founding Director of CNERC (HK Branch)
The Hong Kong Polytechnic University

Ir. Prof. CHUNG Kwok Fai is the Founding Director of the Chinese National Engineering Research Centre (CNERC) for Steel Construction (Hong Kong Branch) at The Hong Kong Polytechnic University, established in 2015. He obtained his PhD in steel structures from Imperial College London in 1988 under a Croucher Foundation Scholarship. With extensive experience spanning academia and industry, he is a leading authority in structural engineering and innovative steel construction technologies, contributing significantly to global engineering practice, including authorship in the Steel Designers' Manual (7th Edition).

His research focuses on the effective use of high-strength S690 steel, steel-concrete composite structures, sustainable infrastructure, and corrosion protection of structural steelwork. Prof. Chung has held key leadership roles, including Vice President of the Institution of Structural Engineers (UK) and Council Member of the Construction Industry Council of Hong Kong, actively promoting innovation and technology transfer. In recognition of his contributions, he was awarded the Medal of Honour by the Hong Kong SAR Government in 2023.

Keynote Presentation: Effective Use of S690 to S960 High Strength Steel in Construction: Research, Development and Innovative Applications

This presentation highlights recent advancements in the application of high-strength S690 to S960 steel in construction. It introduces innovative construction methodologies, advanced welding techniques that preserve material performance, and practical design approaches aligned with current engineering standards, together with emerging applications in building and civil engineering projects.

The use of S690 and S960 steel enables more efficient and sustainable construction, reducing material usage, construction time, manpower demand, and carbon footprint. Selected case studies, including the Cross Bay Link in Tseung Kwan O and the Circular Footbridge System in Fanling North, Hong Kong demonstrate the successful implementation of these innovations in practice.



Er. Prof. CHIEW Sing Ping
Head CTIL, Cluster Director (Engineering)
Singapore Institute of Technology

Er. Prof. CHIEW Sing Ping is a Professor of Civil Engineering, Cluster Director of Engineering, and Head of the Construction Technology Innovation Laboratory (CTIL) at the Singapore Institute of Technology (SIT). He previously served as the Head of the Division of Structural Engineering and Mechanics at Nanyang Technological University (NTU), Singapore from 2008 to 2014. He is currently a Member of the Land Transport Authority (LTA) Panel of Expert Advisors, Member of the IPA Appeal Advisory Board of the Singapore Police Force (SPF) as well as a Past President and an Honorary Fellow of the Singapore Structural Steel Society (SSSS). His research and expertise are related to structural steel and composite steel–concrete construction. He has delivered numerous industry and keynote lectures, authored six books, and published more than 200 refereed technical papers in international journals and conference proceedings.



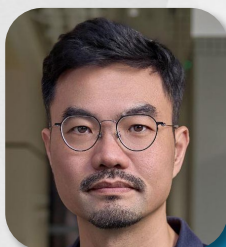
Er. Colin YIP
Director of Engineering
Woh Hup (Private) Limited

Er. Colin Yip is Director of Engineering at Woh Hup (Private) Limited who has broad range of structural design experience in Projects of various typology in Singapore, Netherlands and China. He has very deep interests in Building and Infrastructure design and has participated in significant Projects both local and abroad (Marina Bay Sands, Singapore Sports hub, South Beach Development, Clifford Redevelopment, Science Park Redevelopment, Loyang and Punggol MRT Stations and others). He believes in the future of amalgamating traditional engineering and architectural with digital or innovation use of materials while maintain rooted to the strong sense of giving back to the society by inspiring the next generation to aspire or dream and bring the profession to new frontier.



Dr. NG Yiau Heong
General Manager
TTJ Design and Engineering Pte Ltd

Dr. NG Yiau Heong is the General Manager of TTJ Design and Engineering Pte. Ltd., a leading structural steel contractor in Singapore. His expertise lies in the design and construction of structural steelwork, and he has been involved in numerous major steel projects across Singapore. He currently serves as a Council Member of the Singapore Structural Steel Society. Dr. Ng holds a Bachelor's Degree in Civil Engineering from the University of Technology Malaysia (UTM), as well as a Master's Degree and a Doctor of Philosophy (PhD) in Engineering from the National University of Singapore (NUS).



Er. MAK Swee Chiang
Principal
ARUP Singapore Pte Ltd

Er. MAK Swee Chiang is a Principal at Arup Structures, he is a Professional Engineer and has been involved in the design of several iconic projects such as Singapore Flyer, the Pinnacle at Sentosa, Singapore Sports Hub, Outram Community Hospital and National Cancer Centre including the associated major road diversion, expansion and realignment works. He has strong leadership skills and high technical understandings to deliver structural solutions not only in a methodical but also in a pragmatic manner. Within Arup, he is Building Structural Leader and the Geography Pillar Leader for Digital transformation. He uses technology to improve workflow, quality design and productivity in his team to achieve excellent engineering solution and outcome.



Er. Willie CHAI
Senior Engineer
Building and Construction Authority

Er. Willie CHAI is a Senior Engineer in the Bridges and Structural Steel Department under the Building Engineering Group at BCA. With over 15 years of experience in the built environment sector, he has developed expertise in building and infrastructure design, construction supervision, and regulatory compliance. At BCA, Willie has contributed extensively to regulatory and industry development initiatives, playing a key role in the development of technical guidelines and standards that enhance safety and engineering practices in Singapore's built environment. His notable contributions include the 2023 edition of BC1, guidance on the use of reinforced autoclaved aerated concrete, temperature-matched curing of concrete specimens, technical guidance on post-installed connections, and the use of reused steel in construction.



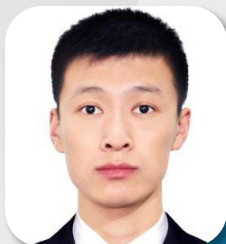
Er. HO Kai Ming
Director
H-Tech Consultants Pte Ltd

Er. HO Kai Ming obtained his Bachelor of Engineering from Nanyang Technological University (NTU) and Master of Science in Geotechnical Engineering from the National University of Singapore (NUS). With more than a decade experience in the built environment, he currently leads the engineering team at H-Tech Consultants, focusing on the design of steel strutting systems for underground infrastructure projects, including the Cross Island Line, North-South Corridor and various private developments. Prior to this role, he was involved in the structural design of high-rise, commercial and institutional buildings. His expertise spans both super structure and sub structure, with a strong emphasis on practical engineering solutions.



Dr. ZHAO Ming Shan
CTIL
Singapore Institute of Technology

Dr. ZHAO Ming Shan is an Associate Professor of Civil Engineering at the Singapore Institute of Technology, a Chartered Engineer with the Institution of Engineers, Singapore (IES), and the current Secretary of the American Society of Civil Engineers (ASCE) Singapore Section. His research focuses on structural optimization and the decarbonization of concrete construction, with emphasis on applied, industry-ready solutions. As Principal Investigator, he has secured over S\$10.6 million in competitive research funding and has co-authored more than 60 peer-reviewed technical publications. His research has generated multiple intellectual properties, five of which have been successfully implemented in actual construction projects in Singapore. Dr Zhao's contributions have been recognized through several prestigious awards, including the IES Prestigious Engineering Achievement Award (2024), IOM3 Sustainable Future Award (UK 2025), RICS Environmental Impact Award – Southeast Asia (2025), and the Singapore Concrete Institute Excellence Awards (2025).



Dr. ZHANG Lu Lu
CTIL
Singapore Institute of Technology

Dr. ZHANG Lu Lu is an Assistant Professor in Structural Engineering at the Singapore Institute of Technology. He obtained his PhD from Nanyang Technological University. His research focuses on high-performance steel structures, robotic welding, sustainable structural systems, and AI-driven structural design. He has published over 30 research papers in top-tier journals, with over 1000 citations, and his research has contributed directly to Eurocode. Before joining SIT, Dr. Zhang worked at Arup Singapore, contributing to major projects including Alexandra Hospital and Shaw Tower. He pioneered the application of 100 mm ultra-thick S690 high-strength steel through innovative built-up kingpost design.

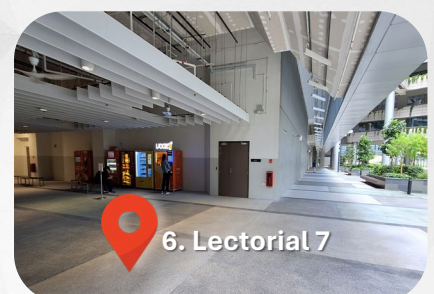
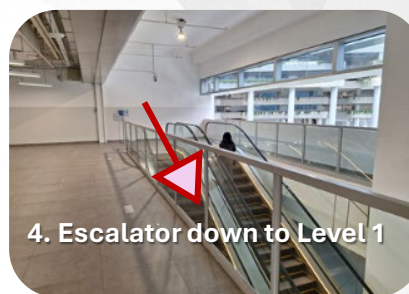
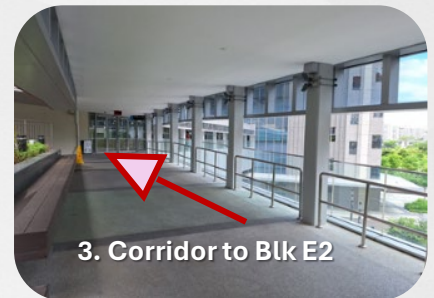
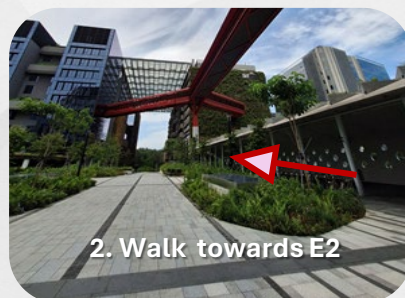
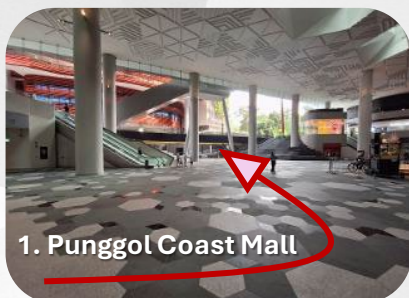


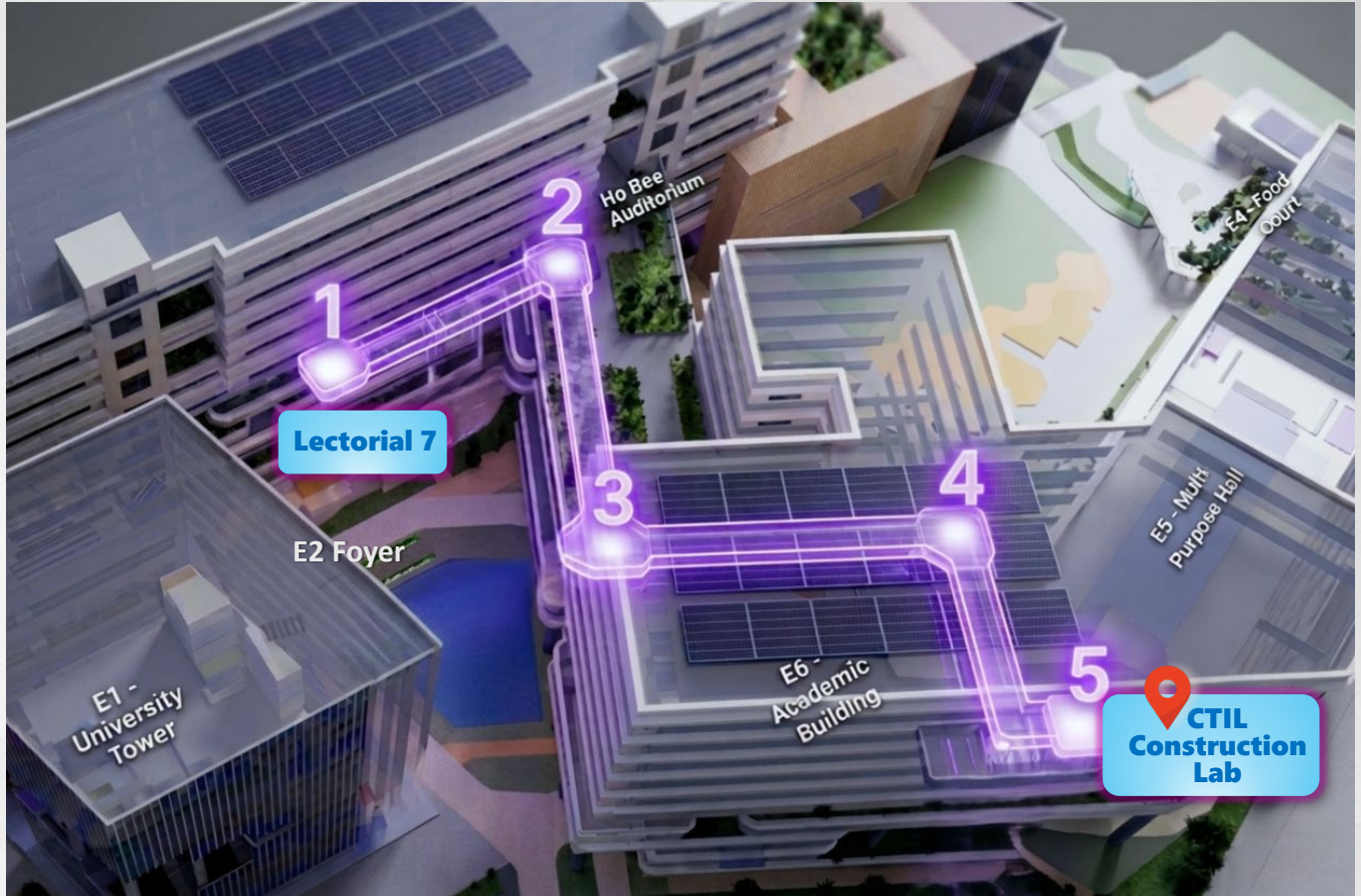
Lectorial 7, Blk E2, Level 1, Campus Court, SIT@Punggol

Directions to Lectorial 7

From Punggol Coast MRT Station, please exit via **Exit 2** and take the escalators up to **Level Two**. Walk along the pathway, keeping to the **right**, towards **Block E2**. Then, take the escalator down to **Level One**.

Make a **U-turn** and continue walking **straight ahead**, keeping to the **left**. You will find **Lectorial 7** on your **left-hand side**. Signage will be placed at key points along the route to assist you.

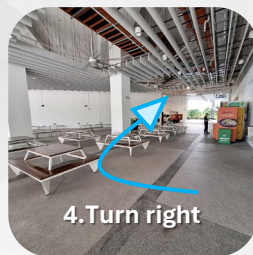
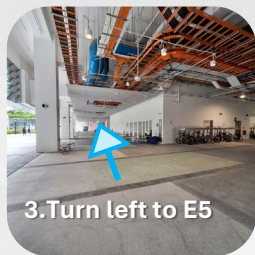
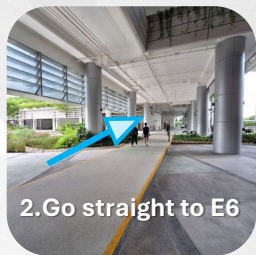
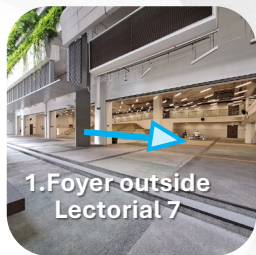




CTIL Construction Lab
E5-01-01, Campus Court, Level 1, Campus Court, SIT@Punggol

Directions to CTIL Construction Lab

From the **foyer outside Lectorial 7**, go straight and turn right before **Block E3** (Ho Bee Auditorium). Walk along the linkway to the **Block E6** Academic Building, then turn left to **Block E5** and **keep right**. You will find the CTIL Construction Lab in the corner **near the loading/unloading bay**.



WORKSHOP FEE:

SGD \$120* (Excluding GST)

**Fees include refreshments & lunch.*

Registration Closes on 5 June 2026



PDU Points: Pending Approval

REGISTER NOW!



ENQUIRIES

You may contact Construction Technology Innovation Laboratory (CTIL)

Email: CTIL@singaporetech.edu.sg

Website: <https://www.singaporetech.edu.sg/innovate/ctil>