

Event Title: Coastal Protection In Practice & Applications in Singapore

CPD:

STU (M&E) – 7 (approved & confirmed)

PDU (PE/CEng) /FSM / / STU (C&S – Safety) / PDU QECP – pending approval

Date: Thursday, 2 July 2026

Time: 9:00 AM – 6:00 PM

Venue: Amara Hotel Singapore

165 Tanjong Pagar Road, Singapore 088539

Programme Synopsis:

Singapore is entering a critical phase in the implementation of large-scale coastal protection measures following the introduction of the Coastal Protection Bill and the nation's increasing focus on long-term climate resilience.

This full-day seminar will bring together leading industry practitioners and subject matter experts to provide participants with practical insights into the planning, design, construction and implementation of coastal protection infrastructure.

Through a series of technical presentations and case studies, participants will gain a deeper understanding of coastal protection design principles, flood protection standards, climate adaptation strategies, construction technologies and the development of coastal protection structures.

The seminar is particularly relevant for engineers and professionals involved in coastal, marine and infrastructure projects who wish to enhance their understanding of Singapore's coastal resilience efforts and emerging industry practices.

Thank you!

Best regards,

Radin Atiqah (Ms)

Senior Executive, Technical Committee



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Organised By:
Civil & Structural Engineering
Technical Committee

COASTAL PROTECTION IN PRACTICE & APPLICATIONS IN SINGAPORE

THURSDAY, 2 JULY 2026

9.00AM - 6.00PM

AMARA HOTEL SINGAPORE
165 Tg Pagar Rd, Singapore 088539

Singapore is entering a critical phase in the implementation of large-scale coastal protection measures following the introduction of the Coastal Protection Bill in March 2026. As the nation strengthens its long-term climate resilience, the industry will see increasing demand for expertise in coastal engineering, marine construction methodologies, wave modelling, and adaptation strategies.

This seminar will bring together leading local and international industry experts to share practical insights, best practices, and real-world applications in the design, construction, and maintenance of coastal protection infrastructure. Topics covered include coastal protection design principles, hydrodynamic and wave modelling, construction technologies, and Singapore's evolving coastal adaptation strategies.

The seminar is particularly relevant for practising engineers, developers, contractors, project planners, researchers, and professionals involved in coastal and marine infrastructure works seeking to deepen their knowledge in this rapidly evolving sector.

[Register Here](#)



CPD:
STU M&E : 7 (approved)
PDU (PE/CEng)
STU(C&S)
BOA-SIA CPD
SGBC CPD
(All Pending Approval)

Price:
IES Members: \$185
CIJC Members: \$200
Non-Members: \$250
*All prices subject to 9% GST.

Speakers:



Lee Tuck Wai
Founder,
Upconverge



Laurens Bart
Senior Coastal and Flood Risk
Engineer,
Haskoning



Tan Jia Hann
Project Manager, Coastal
Engineer,
Jacobs



Matthijs Bos
Leading Professional Flood
Risk,
Haskoning



Yang Zi Qian
Managing Director,
Delta Marine Consultants Singapore
Training & Education Lead,
Singapore Water Association Coastal
Protection Chapter



David Chow
Deputy Director,
Coastal Engineering,
Surbana Jurong
Consultants Pte Ltd



Valen Rangga Gerina
Senior Coastal Engineer & Climate
Adaptation Specialist,
Haskoning



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TENTATIVE PROGRAMME:

Time	Activity
0815HRS	Registration
0900HRS	Opening Address by Er Reve Chin Deputy Chairman, IES C&S Technical Committee
0915HRS	Topic 1: Climate Adaptation Strategies Matthijs Bos
1000HRS	Topic 2: Coastal Protection Design Principles Valen Rangka Gerina
1045HRS	AM Teabreak
1100HRS	Topic 3: Defining Flood Protection Standards Laurens Bart
1145HRS	Topic 4: Practical Guide to Design of Coastal Protection Measures Tan Jia Hann
1230HRS	Q&A - Moderator: Er Reve Chin Jen Yee
1300HRS	LUNCH
1400HRS	Topic 5: Coastal Adaptation Strategies in Singapore: Constraints, Trade-offs & Decisions Lee Tuck Wai
1445HRS	Topic 6: Construction technologies in coastal protection Matthijs Bos
1530HRS	PM Teabreak
1545HRS	Topic 7: Construction and Completion of Tuas Port Phase 1 David Chow
1630HRS	Topic 8: Development of coastal protection structures, overview and recent advancement Yang Zi Qian
1715HRS	Q&A - Moderator: Er Reve Chin Jen Yee
1745HRS	Closing Address by Er Sharron Ng Chair, IES C&S Technical Committee
1800HRS	END OF EVENT



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SPEAKER PROFILE & SYNOPSIS



Matthijs Bos

Leading Professional Flood Risk,
Haskoning

Matthijs Bos is a Leading Professional at Haskoning Singapore, specializing in flood hazard modelling, climate adaptation investment strategies, and the design of coastal protection measures. Matthijs has a key role in several significant climate adaptation projects, including the Site-Specific Studies for City-East Coast (APA1) and Northwest Coast (APA6), the Coastal Barriers Feasibility Study (CBFS), and the Risk Optimisation Study. His work on the development of Singapore's Coastal Protection Code of Practice contributed to defining the design requirements and environmental conditions for future hydraulic infrastructure.

With experience spanning the Netherlands, Southeast Asia, the UK, and the US, Matthijs has led flood protection initiatives for the World Bank, the Port of Rotterdam, and various government bodies. He is the originator of the Global Flood Risk Tool (GFRT), a cloud-based platform to assess flood risk and plan mitigation investments.

Climate adaptation strategies (45 mins)

Climate change is increasing flood risks globally, and Singapore, as a low-lying coastal city-state, is especially vulnerable to rising sea levels and more intense rainfall. In response, a range of flood adaptation strategies are commonly applied worldwide, including protection measures, managed retreat, and both localised and centralised interventions, as documented in various adaptation catalogues. Different countries adopt these strategies in ways suited to their local conditions; for example, the Netherlands applies an integrated approach combining large-scale flood defences with spatial planning and adaptive design, while other countries implement varied combinations of structural and non-structural measures. In Singapore, flood adaptation strategies are organised across multiple Adaptation Pathway Areas (APAs), guiding the planning and implementation of coastal protection works, with Haskoning contributing technical expertise and recommendations to support resilient and effective solutions.

Construction technologies in coastal protection (35 mins)

Coastal construction presents a range of technical and operational challenges, including constrained marine access, tidal and weather-dependent construction windows, variable ground conditions, and stringent environmental constraints. Construction methods must therefore be tailored to the type of intervention, whether for land reclamation and ground improvement, seawalls and revetments, breakwaters, or flood barriers and gates, with clearly defined construction sequences and quality control checkpoints. Material selection and durability are critical in the marine environment, requiring careful consideration of concrete mix design and cover, steel protection systems, rock armour gradings, geosynthetics, and long-term management of biofouling and corrosion. Increasingly, digitalisation supports coastal construction through the use of BIM, construction monitoring systems, and instrumentation to enhance coordination, quality assurance, and performance monitoring. These engineered solutions are often complemented by the integration of nature-based solutions, which enhance coastal resilience while delivering environmental and ecological benefits.



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SPEAKER PROFILE & SYNOPSIS



Valen Rangga Gerina
Senior Coastal Engineer & Climate
Adaptation Specialist,
Haskoning

Valen Rangga Gerina is a coastal engineer and climate adaptation specialist with over ten years of professional experience in physical coastal engineering and oceanography. Based in Singapore, he holds a significant role in the coastal engineering design and solutioning for major climate adaptation initiatives, including the Site-Specific Study for City-East Coast (APA1) and the Risk Optimisation Study. In his work on the development of Singapore's Coastal Protection Code of Practice (CPCOP), he contributed technical expertise to define the regulatory standards and environmental and hydraulic design considerations that will guide future coastal protection efforts.

Beyond his work in Singapore, Valen has delivered large-scale coastal and environmental engineering projects across Southeast Asia. His portfolio includes supporting infrastructure for power and LNG facilities, industrial developments, and maritime infrastructure through complex hydrodynamic, thermal, and dispersion modelling. Valen's expertise integrates coastal protection and flood risk with environmental analysis, underpinned by extensive experience collaborating with government agencies and international institutions to deliver practical, site-specific coastal solutions.

Coastal protection design principles (45 mins)

Coastal protection design begins with the clear definition of potential failure mechanisms, including structural failure, erosion, instability, and functional failure such as excessive wave overtopping, for which acceptable overtopping performance requirements can be established based on risk and asset vulnerability. A sound understanding of coastal conditions underpins this process, requiring the analysis of metocean data, numerical and physical modelling, and statistical techniques such as Extreme Value Analysis (EVA) and Joint Probability Assessment (JPA) to characterise extreme events. Based on these inputs, the required coastal protection level is defined by considering the combined effects of key components such as extreme sea levels (ESL), sea-level rise (SLR), wave action, and allowance for uncertainty. Increasingly, coastal protection is designed as multi-functional infrastructure, integrating flood defence with urban, recreational, ecological, or transport functions, supported by successful examples from international projects worldwide.



Tan Jia Hann
Project Manager, Coastal Engineer,
Jacobs

Tan Jia Hann, is a certified Project Management Professional and a Chartered Engineer (IES, Singapore) with over 12 years of experience in the field of coastal engineering, port consulting and climate resiliency, including about 5 years as a senior coastal engineer with the Public Utilities Board. He has led multidisciplinary teams on coastal protection and port projects across the region.

Jia Hann possesses extensive expertise in breakwater design, port layout planning, berthing and mooring analysis, navigational design, and nautical studies. His capabilities are further enhanced by his proficiency in structural design, as well as a strong understanding of coastal modelling and drainage systems.

Practical guide to design of Coastal Protection Measures (45mins)

Jia Hann will talk about a general understanding of wave conditions, before moving on to show how it would shape and define coastal protection measures, such as the different types of breakwaters, beaches, and scour protection.



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SPEAKER PROFILE & SYNOPSIS



Laurens Bart

Senior Coastal and Flood Risk
Engineer, Haskoning

Laurens Bart has nine years of experience in coastal engineering and flood risk. He executes flood hazard and risk analyses for major climate adaptation initiatives, including the Site Specific Studies for City East Coast (APA1) and Northwest Coast (APA6). For the Risk Optimisation Study, he led the development of a risk based cost-benefit framework covering all coastal areas of Singapore, integrating flood hazards, damages, and adaptation measures under multiple climate and sea level rise scenarios. This work was implemented through a dynamic dashboard to support comparison of protection strategies and inform long term, economically robust adaptation pathways. Laurens has experience in the engineering design and assessment of coastal protection measures, including revetments, beach and foreshore concepts, embankments, and scour protection for maritime infrastructure. His work involves the derivation of hydraulic boundary conditions for coastal design under sea level rise and extreme events, and he has experience in typhoon modelling for coastal projects in the Philippines. He also serves as the development lead for Haskoning's Global Flood Risk Tool (GFRT).

Defining flood protection standards (45 mins)

Flood risk assessment is commonly structured around a five-step approach that progresses from the identification of flood hazards, through exposure and impact assessment, risk quantification, evaluation of risk reduction measures, and finally the development of a robust business case. Building on this foundation, a general risk optimisation approach is applied to identify the most effective combination of measures, drawing on lessons learned from flood risk management practices worldwide. Cost-benefit analysis plays a central role in optimising flood protection standards by balancing investment costs against avoided damages and residual risk. Optimisation increasingly considers incremental and adaptive implementation, enabling measures to be phased or upgraded over time as risks evolve. Given the inherent uncertainties in climate projections, socio-economic development, and system performance, flood risk assessments also incorporate uncertainty management techniques, including sensitivity analysis, to test the robustness of decisions and support resilient planning.



David Chow

Deputy Director, Coastal
Engineering, Surbana Jurong
Consultants Pte Ltd

David Chow has more than 15 years of experience in the planning and design, project management and site supervision of various land reclamation, coastal engineering and climate change adaptation projects. In addition to his projects on hand, David is the team lead for the Coastal Resilience and Sustainability Team (CREST) where he is currently overseeing the efforts of climate change adaptation, coastal resilience and environmental sustainability for the Coastal Engineering Division, with a multi-disciplinary team of passionate professionals.

Construction and Completion of Tuas Port Phase 1

The speaker shall present the practical application of construction technologies in coastal protection, with a focus on how complex projects are delivered under demanding marine and operational constraints. Using Tuas Port as a central case study, the session examines how large-scale coastal works are constructed, staged, and managed while maintaining safety, performance, and continuity of operations. Lessons from Tuas will be complemented by selected insights from other coastal projects to highlight similarities, contrasts, and transferable practices. The seminar will strike a balance between established construction methodologies and innovative technologies, showing how innovation is often driven by constructability challenges. Emphasis will be placed on project management, construction sequencing, risk mitigation, and execution strategies, offering participants a practitioner-oriented perspective on how construction decisions directly influence cost, schedule, durability, and long-term coastal resilience.



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SPEAKER PROFILE & SYNOPSIS



Lee Tuck Wai
Founder
Upconverge

Tuck Wai is the founder of Upconverge, a consulting practice dedicated to using climate innovation to amplify human potential and create ecosystem change. His projects, his clients & their businesses invest heavily into climate adaptation and climate resilience solutions. He partners them to advise, strategise and design these solutions, and helps them amplify their investments in their business offerings and team potential. Previously, he was Director of Consulting Services at Jacobs Solutions in Singapore and has over 25 years of experience in the water sector, consulting across the entire water cycle - from water resources and stormwater to drinking water, wastewater, NEWater, and desalination. Today, he focuses on climate resilience, working with multidisciplinary coastal adaptation teams including SJ, Jacobs, DHI, Imagine H2O Asia, and Alacrity Canada, while also engaging startups and SMEs on digital water and climate innovations. Beyond his core role, he mentors water technology startups as a Global Advisor, teaches as an adjunct lecturer at NUS's Environmental Engineering programme on "Sustainability in Practice," advocates for SMEs as a Council Member and Chair of ASME's Human Capital Action Group, contributes to capability-building through the Singapore Water Association's Coastal Protection Chapter, and mentors professionals as a Gallup-certified Strengths Coach.

Coastal Adaptation Strategies in Singapore: Constraints, Trade-offs & Decisions (45 mins)

Coastal adaptation strategies in Singapore are often understood through design solutions, but in practice, they are shaped by constraints, trade-offs, and critical decisions made early in the project lifecycle. This session begins by explaining how the coastal and flood resilience system works as a connected whole, where outcomes depend not just on rainfall, but on boundary conditions such as tide levels, storage, and discharge limitations. It then highlights Singapore's key constraints, including land scarcity, urban density, and rising sea levels, and how these factors narrow the range of viable options. The session focuses on irreversible decisions such as platform levels and coastal alignment, where early choices define long-term resilience. Building on this, the talk shows how these realities influence Singapore's adaptation strategies. It concludes with what engineers must know to engage effectively in such projects, with a focus on system behaviour, constraints, and decision-making under uncertainty.



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SPEAKER PROFILE & SYNOPSIS



Yang Zi Qian (Zi)

Managing Director, Delta
Marine Consultants Singapore
Training & Education Lead,
Singapore Water Association
Coastal Protection Chapter

Zi is the Managing Director of Delta Marine Consultants Singapore and serves as Training & Education Lead for the Coastal Protection Chapter of the Singapore Water Association. He holds a background in civil engineering with specialization in coastal engineering and maritime infrastructure. Zi began his career as a coastal engineer with Delta Marine Consultants, where he focused on the engineering design, analysis, and physical modelling of coastal structures. He has since progressed through key technical and leadership roles, including Coastal Engineering Team Lead and Design Manager, before assuming his current position.

With extensive expertise in coastal physical modelling, developed through both academic and industry experience. Zi completed his thesis research at the Water Research Laboratory at the University of New South Wales and has contributed to numerous large-scale physical modelling studies at Delta Marine Consultants' hydraulic laboratory in Gouda, the Netherlands. His professional portfolio spans coastal engineering design, hydraulic and functional design of maritime infrastructure, as well as advanced studies in hydrodynamics, metocean, dynamic mooring, and coastal processes

Zi actively contributes to advancing innovation in coastal engineering. Alongside his own academic pursuits, he is engaged in applied research projects as a co-investigator and collaborator, bridging theoretical research with industry implementation. In his current role, Zi combines strategic leadership with technical oversight, managing operations, guiding multidisciplinary teams, and advancing collaboration with clients and stakeholders. He is a strong advocate for coastal adaptation and knowledge exchange, and actively contributes to industry dialogue through professional platforms, including PIANC Singapore and the Singapore Water Association's Coastal Protection Chapter.

Development of coastal protection structures, overview and recent advancement. (45 mins)

modern coastal engineering has shifted toward soft engineering and nature-based solutions such as beach nourishment, dune stabilization, mangrove restoration, and wetland creation. These approaches work with natural processes, improving coastal resilience while reducing ecological damage, though they may require regular maintenance. Recent advancements focus on hybrid solutions that combine hard structures with natural systems, improving both structural performance and environmental compatibility. Progress in numerical modeling, remote sensing, and GIS has enhanced coastal process prediction and design optimization. In addition, innovative materials like geotextiles and eco-friendly concrete have improved durability and sustainability. Coastal protection has evolved from rigid, single-purpose defenses to integrated, adaptive systems that balance safety, environmental concerns, and long-term resilience.