

Project of the Year Award – Public Use Building

Merit:

SHAW AUDITORIUM

HKUST



The HKUST Shaw Auditorium at the Hong Kong University of Science and Technology is a world-class performing arts venue featuring a highly flexible, acoustically sophisticated main hall and generous social spaces for the campus community. The sustainable architectural design is an inventive response to the local sub-tropical climate and the site's prominent location as the new nodal point connecting the University's southern and northern campuses. Its iconic, ring-shaped façade signals its artistic and cultural programming, while its elliptical floorplan with multiple entrances makes it a welcoming landmark. Designed to be full of life day and night, the Auditorium's pleasant classrooms, social areas and circulation spaces encourage students to meet, study and relax. The Grand Foyer's stepped seating also functions as a small-scale performance space. Therefore, the Shaw Auditorium is not only a destination for major events, but also a part of the campus's daily social fabric. The reconfigurable main hall has several modes that accommodate a wide range of events, including performing arts productions, lectures, and other large-scale events. The retractable raked seating can fit either 840 or 1,300 seats or be stored away to provide an open surface for conferences, open days, and exhibitions. The curved wall can also function as a 360-degree projection screen. With its varied requirements, performing arts venues seldom can

be sustainable, but the Auditorium achieved an impressive BEAM Plus Platinum rating.

Passive design using the extensive overhang structural design supporting the balcony provides significant reduction of solar irradiation to the building façades with over 70% of total solar heat blocked during cooling seasons. Daylight penetration into the atrium via skylights provides a good balance of daylight access and reflective interior surfaces around the atrium provide a well-lit environment that does not solely rely on artificial lighting. The high-performance building facade reduces solar heat gains further and demand controlled all air systems greatly reduce the building energy consumptions by more than 20% as compared to the baseline in EMSD Building Energy Code.

With more than 50% of total roof area installed with grid connected photovoltaic system for onsite power generation, the total building energy consumption is further offset by more than 2.5%.

HKUST and the project team considered using the existing HKUST main campus water-cooled district cooling system to serve this new building instead of installing new on-site chillers. This approach not only saved valuable plant space, but also addressed concerns related to noise and vibration controls as the Shaw Auditorium was designed to achieve stringent acoustics performance suitable for a variety of performances.



All air handling units were equipped with EC plug fans array for achieving lower fan power, better acoustics performance while providing enhanced system resilience. High performance filters are installed after flush-out and prior to occupancy to ensure the indoor air quality meets the Hong Kong Indoor Air Quality (HKIAQ) Certification Scheme "Excellent" Class with respect to various indoor and outdoor pollutants.

Smart demand control ventilation continuously monitors the indoor air quality via constant sampling of the air via air quality sensors and adjusts the fresh air provisions to the spaces while achieving energy savings.

Centralized Control and Monitoring System (CCMS) assisted HKUST Campus Management Office for monitoring the space temperature, air quality and energy consumption. Significant energy saving was achieved through set back of internal ambient condition, and daylight, motion, and time control of lighting. The annual energy consumption was 225MJ/m²/annum, which was at the top 10th percentile of the same building group in accordance with energy consumption benchmarking tools by EMSD.

Remarkable acoustics performance was achieved for this auditorium with designed NR20 spaces. All air terminal devices and ductwork were carefully sized to achieve low induct velocities complying with the NR20 requirements. Silencers and external cladding of air ducts on the main roof were provided to prevent noise impact from the external environment.

Theatrical system installations, audio visual systems, special effects from the indoor cyclorama around the auditorium were designed with precision for seamless coordination with the overall architectural, structural, MEP and the theatrical installations. A platform lift at the heart of the auditorium was a key feature allowing seating stored under floor to be lifted when required and hidden from view during a flat floor mode setting.

The HKUST Shaw Auditorium is fully covered with 5G network, high speed Wi-Fi and "Future Ready" LoRaWan infrastructure for working seamlessly with wireless smart sensors that could be implemented in future. For the external landscape areas, smart multipurpose lamp poles with built-in Wi-Fi would allow continuous uninterrupted connectivity of high-speed Wi-Fi even in the outdoor landscape areas.



Lastly, separate energy sub-meters for different individual building services systems greatly assisted the end users to understand their energy consumption. All the data and energy use patterns could be easily obtained and visualized via the CCMS for monitoring and targeting. It is anticipated that more energy savings will be achieved in future, which will be part of the HKUST strong commitment towards a net-zero carbon campus.

ORGANISATION:
HKUST

PROJECT ADDRESS:
Shaw Auditorium, HKUST, Clear Water Bay, Hong Kong

PROJECT TEAM:

Building Services Engineer: WSP Hong Kong Limited

Building Developer / Owner: The Hong Kong University of Science and Technology

Project Manager: Campus Development Office,
The Hong Kong University of Science and Technology

Quantity Surveyor: Rider Levett Bucknall Limited

Structural Engineer: WSP Hong Kong Limited

Architect: Henning Larsen Architects Hong Kong Limited

Sustainable Design Consultant: WSP Hong Kong Limited

MVAC Contractor: Meco Engineering Limited

Electrical Contractor: Alliance Contracting Co. Ltd.

Fire Services Contractor: Webster Engineers Limited

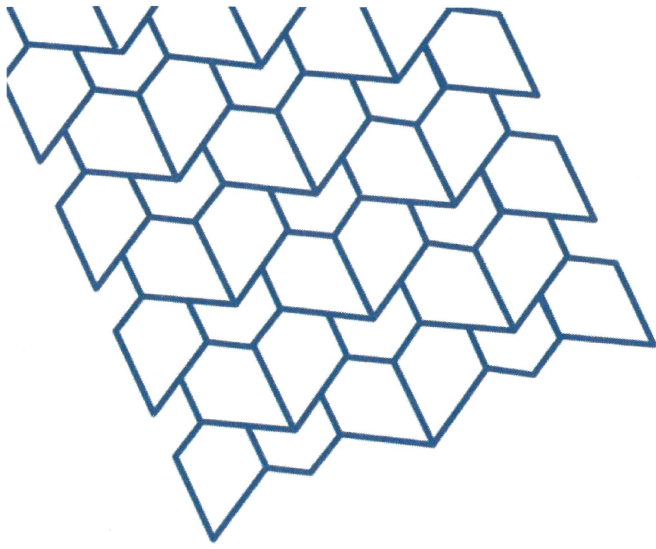
P&D Contractor: Speedy Engineering & Trading Co., Ltd.

Main Contractor: Build King Construction Limited

Facilities Manager: Campus Management Office,
The Hong Kong University of Science and Technology

O&M Agent: Campus Management Office, The
Hong Kong University of Science and Technology

Executive Architect: Wong Tung & Partners Limited



HONG KONG AWARDS

2023 BUILDING PERFORMANCE WITH
ENGINEERING EXCELLENCE

Applicant
HKUST

Project Team
Building Services Engineer
WSP Hong Kong Limited

Building Developer / Owner
The Hong Kong University of Science and
Technology

Project Manager
Campus Development Office, The Hong
Kong University of Science and Technology

Quantity Surveyor
Rider Levett Bucknall Limited

Structural Engineer
WSP Hong Kong Limited

Architect
Henning Larsen Architects Hong Kong
Limited

Sustainable Design Consultant
WSP Hong Kong Limited

MVAC Contractor
Meco Engineering Limited

Electrical Contractor
Alliance Contracting Co. Ltd.

Fire Services Contractor
Webster Engineers Limited

P&D Contractor
Speedy Engineering & Trading Co., Ltd.

Main Contractor
Build King Construction Limited

Facilities Manager
Campus Management Office, The Hong
Kong University of Science and Technology

O&M Agent
Campus Management Office, The Hong
Kong University of Science and Technology

Executive Architect
Wong Tung & Partners Limited

MERIT

Project of the Year Award –
Public Use Building

Shaw Auditorium

MR. GARY CHIANG
CHAIR (2023/2024)
CIBSE HK REGION

PROF. HORACE MUI
OC CHAIR OF
CIBSE HONG KONG
AWARDS 2023

8 December 2023

DATE

