ENGINEERING AWARDS 2017

GOLD AWARD OF SPECIAL MERIT

T Y LIN INTERNATIONAL SDN BHD

IB Tower

This development is located along Jalan Binjai, Kuala Lumpur with GPS coordinates of **3.159060N, 101.718526E**. It consists of a 60-storey building with 4 basements and a 5-storey podium located behind the tower block.

Generally, the superstructure is divided into three sections, a lower section of 29 office floors, a mid section of 17 serviced apartments floors and topping up with 2 levels of penthouse office floors. Sandwiched between these sections are the plant room floors, sky lobby and restaurant.

The IB Tower was carefully planned, coordinated and crafted from the onset of the project, from preliminary studies to detailed design and analysis until contract implementation and construction. In the process, due consideration was given to the client's requirement and the architect's, Foster + Partners' originality and innovative concept without compromising on the cost and constructability of the project. Sustainability was also a key component during the project implementation, with the building eventually achieving the coveted Green Mark Goldplus rating as well as the local Green Building Index (GBI) certification.

Working alongside Foster + Partners, the international studio for architecture, planning and design founded by Lord Norman Forster, was a great opportunity to explore new ideas and challenges.

Of all the unique features highlighted in this report, the biggest challenge was the design of the diagonal exoskeleton frames, which is one of the main features of IB Tower. Besides being the primary structural elements, they also express the prominent aesthetic feature for this iconic building.

The success of this project was based on the collective team effort of all the consultants and contractor working together to achieve both the client's and the architect's intention and requirements.

The subsoil classification at the site is generally of Kenny Hill formation. It consists of layers of hard to very hard sandy silt and sand layers.

For the tower, the floor loads from the building are brought down to the foundation through the cores and 6 main tower columns. The foundation for the tower is supported by a piled raft foundation of varying thicknesses of 4200/3500mm to 2800mm in combination with bored pile sizes of 2200mm diameter and 1000/1200mm thick barrette piles. As for the podium, bored piles of varying sizes from 900 to 1800mm diameter were utilized.

The depth of the barrette piles is approximately 45m below the cut off level and for the bored piles, the depth ranges from 22 to 46m below the cut off level depending on the size of the bored pile.

The retaining system is of diaphragm wall construction with a general thickness of 600mm. A semi top down construction was adopted utilizing the basement ring slab as horizontal strutting.

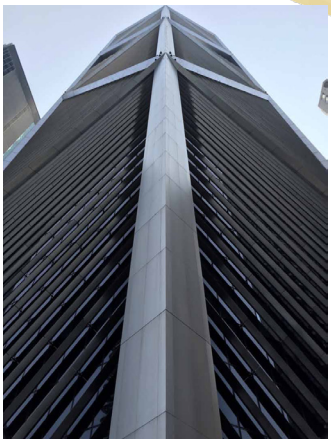
For the basement structure, a predominantly flat slab system with column drops was adopted with column spacing generally between 8.0 to 10.5m centres to maximize the ceiling height.

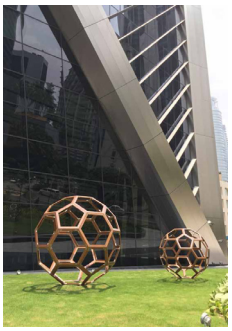
The office floors as well as the apartment floors in the tower are uniquely supported by a series of diagonal mega exoskeleton frames, which serve as the main transfer structural element for different vertical segments of the building. The mega frames are of post-tensioned concrete with size of 1800mm width by 2500mm depth. Apart from acting as a vertical load transfer structural element, the combination of the diagonal mega exoskeleton frames also act as a vertical truss, which increases the building stiffness in terms of lateral stability.

As for the tower office floor structure, reinforced concrete beam and slab system was adopted. A similar structural layout was also adopted for the service apartment floors. The typical beam size is 900mm by 700mm with a slab thickness of 175mm. At localised floors where long span structure was encountered, post tensioned beams were adopted.

There are also some unique hanging steel structures at the high atrium spaces above the ground floor and Level 37. A post-tensioned beam and slab system was adopted for the podium carpark.

The lateral stability of this building of approximately 274 meters height is provided by a combination of the centre core wall, framed action of the floor beams and columns which is further enhanced by having the external diagonal exoskeleton frame.





A wind tunnel testing using the force balance model was carried out by CPP and the results showed that the building satisfies the stability and deflection requirements as well as human comfort levels based the recommendations of relevant international codes.

A summary of the project team and their respective roles is shown in the table below.

ITEM	DESCRIPTION	
PROJECT NAME	**IB TOWER**	
CLIENT	**IB TOWER SDN BHD**	
ROLE OF THE FIRM	**TYLIN INTERNATIONAL SDN BHD** IS THE CIVIL & STRUCTURAL ENGINEER	
NAMES OF OTHER CONSULTANTS INVOLVED AND THEIR ROLES	PROJECT COORDINATOR	PLENITUDE BUILDERS SDN BHD
	DESIGN ARCHITECT	FOSTER +PARTNERS
	LOCAL ARCHITECT	SA ARCHITECTS SDN BHD
	M&E ENGINEER	JURUTERA PERUNDING VALDUN SDN BHD
	QUANTITY SURVEYOR	DAVID LANGDON & SEAH (MALAYSIA) SDN BHD
	ENERGY & SUSTAINABLE DESIGN CONSULTANT	G ENERGY SDN BHD
	WIND TUNNEL CONSULTANT	CPP WIND ENGINERING & AIR QUALITY CONSULTANTS
	FAÇADE & BMU CONSULTANT	MEINHADT FAÇADE TECHNOLOGY (S) PTE LTD
MAIN CONTRACTORS	SUBSTRUCTURE	GEOPANCAR SDN BHD (GPC)
	SUPERSTRUCTURE	DAEWOO ENGINEERING & CONSTRUCTION (DEC)