

## COMPANY

Hip Hing Engineering Company Limited  
Kai Tak Sports Park Limited  
Home Affairs Bureau, HKSAR Government

## PROJECT

Kai Tak Sports Park

## LOCATION

38 and 39 Shing Kai Road, Kai Tak, Kowloon,  
Hong Kong

## TYPE

Design, Build and Operation  
AECO (Architecture, Engineering, Construction,  
Operation)

## SCHEDULED TIME OF COMPLETION

2023

“Offering a world class destination for all interests, Kai Tak Sports Park is an exciting project with unprecedented scale of 28 hectares and multi-faceted collaboration among 63 companies from 8 different regions. Creating synergy is ultimately the key factor to secure safe and smooth operation. By unlocking the full capability of BIM, management of design, construction, quality control and data has been more effective and productive for all stakeholders. We believe the current BIM applications shall inspire us for the next game changers.”

## — Kenneth Ma

Director & General Manager  
(Business Development),  
Hip Hing Engineering Company  
Limited

Director (Design & Build),  
Kai Tak Sports Park Limited

## BIM PARTNERS

Leigh & Orange Limited

Populous Limited

Simon Kwan & Associates Limited

Ove Arup & Partners Limited

WSP (Asia) Limited

ADI Limited

isBIM Limited

ASM Global

STRI Limited

Lagardère Sports and Entertainment

Rider Levett Bucknall Limited

## AUTODESK PRODUCTS USED

3ds Max

Fabrication CAMduct

AutoCAD

Navisworks Manage

BIM 360 Design

ReCap Pro

BIM 360 Docs

Revit

BIM 360 Ops

Civil 3D

Dynamo Studio or Dynamo for Revit

# Kai Tak Sports Park For the People of Hong Kong



Main Stadium and Event Village  
Image Courtesy of Kai Tak Sports Park Limited

Hip Hing has been committed to staying at the forefront and adopting innovation and advanced technologies. BIM is an exemplary example. Since its first application in the Hong Kong Convention and Exhibition Centre (HKCEC) – Atrium Link Extension project, Hip Hing’s BIM team has evolved into a strong force to provide innovative solutions to deliver quality projects in the local city. To meet the needs of rapid business growth, Hip Hing’s BIM team has expanded 50% in 2019-2020, a Mainland China office has also been established to empower its in-house BIM development.

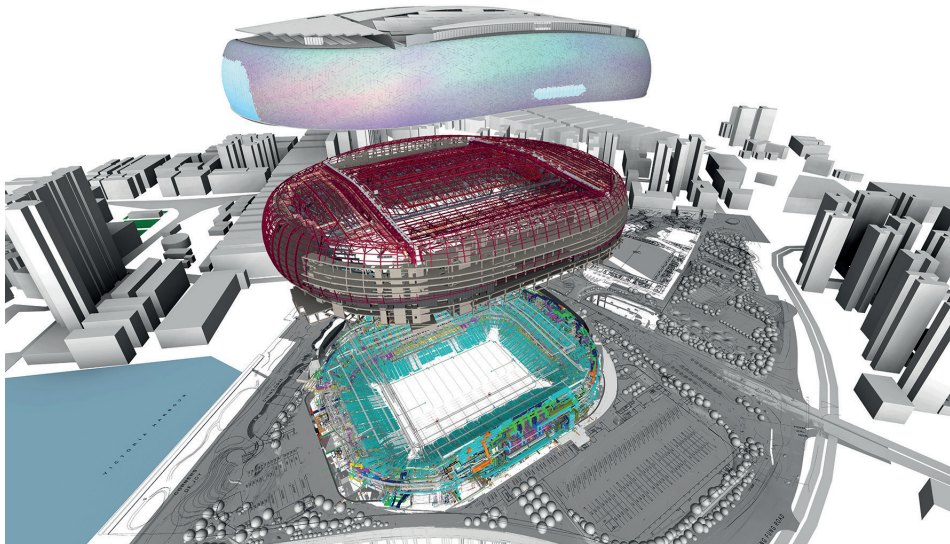
As a significant player to secure the smooth operation of the projects, Hip Hing has a set of sophisticated and comprehensive policies and procedures. In consideration of BIM’s benefits, BIM adoption is mandatory for all projects including ELS system and underground services in Hip Hing. With solid track records, it is proven that BIM helps the project teams leverage resources and create values for the clients and all stakeholders.

## Virtual Design Construction (VDC)

BIM features Virtual Design Construction



Indoor Sports Centre Main Arena  
Image Courtesy of Kai Tak Sports Park Limited



Main Stadium BIM Model Explosion  
Image Courtesy of Kai Tak Sports Park Limited and Hip Hing Engineering Company Limited

(VDC), which is an optimum platform to manage large-scale project in many different ways, by eliminating risks and minimizing reworks. Collaboration between teams is effectively enhanced for all project stages from design to operation, design discrepancies and information silos are thus eliminated. Moreover, all systems are vividly transformed into detailed models prior to operation, hidden issues and potential design conflicts can be identified and addressed.

Upholding the vision to boost productivity, enable traceability and enhance sustainability, Hip Hing is dedicated to implementing innovative construction methods and Research & Development on BIM. It includes Varadise (CDE platform) for Digitalization of Site Management, MiC approach for construction, Unreal for visualization of Design and Build projects, Hologens for site operation and management. The essence of the initiatives is to encourage engineers to carry out inspection, anywhere and anytime.

## KTSP – A World Class Sports Park

Kai Tak Sports Park (KTSP) is an appealing project covering 28-hectare. Its unique pearl shell design resonates Hong Kong's reputation as "Pearl of the Orient". The main stadium of KTSP will serve to hold a wide range of sports, entertainment and community events. It has a capacity of up to 50,000-seat, and possesses features such as a soundproof retractable roof and a flexible pitch system, creating an adaptable venue capable of hosting events of various scales; and an indoor sports centre with a 10,000-seat main arena, a 500-seat

ancillary sports hall, a 5,000-seat public sports ground and commercial facilities, all surrounded by extensive public open space.

In short-term, all designs are expected to be completed within two years through a single-source online platform. The mid-term goal is to complete the construction in the 5th year integrating the process of "Design, Build and Operate", and the ultimate goal is to create a new home for sports development that can be sustainable for the next 20 years and beyond.

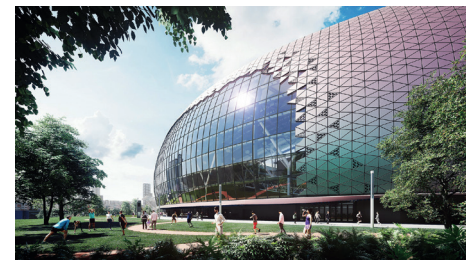
## Project Challenges

Collaboration among project stakeholders is one of the major challenges of managing such a large-scale project. In the KTSP project with more than 60 companies in multi-disciplines all around the world, Autodesk's BIM360 Design provides a favorable platform as a common data

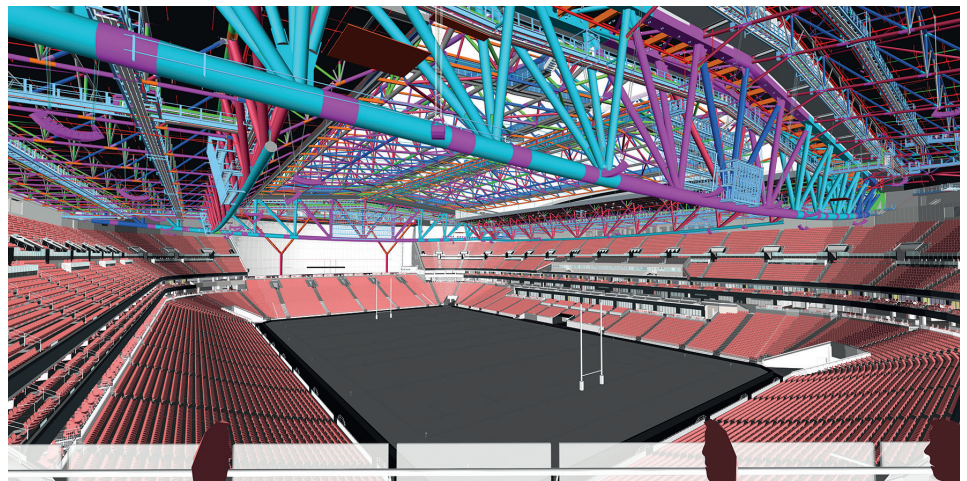
environment. It enables sharing of work, reinforces collaboration and leverage data management among teams beyond physical location and time zones. Riding on the benefits of BIM 360 collaboration, the design team was able to share models through portable devices, thus strengthening communication & allowing access to the project status interactively for project team members who even don't possess BIM techniques.

## Value of BIM to KTSP

Coordination, review and approval of over 50,000 2D design drawings can be completed at the single-source Autodesk's BIM360 platform. Take KTSP, a project scale of 28 hectares and 470,000m<sup>2</sup> of CFA as an example, DDA (Internal Design and Development Process) of such a project usually takes 2 to 3 years. BIM360 enables project team to bring forward the multi-disciplinary design coordination and systems integration, this ensures constructability concerns are taken into account.



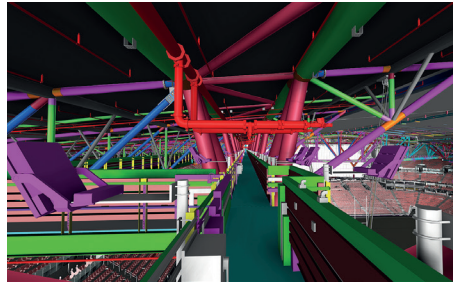
Main Stadium Façade  
Image Courtesy of Kai Tak Sports Park Limited



Main Stadium BIM Model  
Image Courtesy of Kai Tak Sports Park Limited and Hip Hing Engineering Company Limited



Main Stadium Seating Bowl  
Image Courtesy of Kai Tak Sports Park Limited



Main Stadium Gantry Details  
Image Courtesy of Kai Tak Sports Park Limited and Hip Hing Engineering Company Limited



Public Sports Ground External Overview  
Image Courtesy of Kai Tak Sports Park Limited



Dining Cove  
Image Courtesy of Kai Tak Sports Park Limited

Adopting Integrated Project Delivery approach has reduced design variations so as to shorten the project delivery process. As a result, the DDA stage of the KTSP project is effectively cut down to only 6 months; 70% construction reworks (design change and management) can be reduced comparing with traditional 2D Design and delivery approach.

Originally the Main Stadium Façade consists of 42,500 panels, however, with the adoption of the Design for Manufacture and Assembly (DfMA) for façade design, the amount of panels is greatly reduced to around 27,500, of 1,700 variations of exterior decorative surface. Taking this advantages of DfMA, the overall production time and cost are minimised.

The Main Stadium of KTSP presents

challenges as it requires over 25,000 steel structural components, weighing more than 15,000 tonnes in total. Precision for installation is one of the critical factors. Autodesk’s Navisworks enables integration of multiple formats of 3D models. Coupled with 3D scanning, discrepancies between the manufactured products and the BIM models can be quickly identified and solved, ensuring that a precisely-made product is delivered for installation. In addition, as the status of each component could be tracked in all stages, it minimizes the risk of improper installation while enhances overall workflow and final product quality.

### Innovative BIM Use

Virtual-reality (VR) via BIM CAVE technology facilitates communication between the client and design team with strong visual to walk-through the

model prior to the confirmation of design, this helps reach consents and reinforce collaboration.

By drone and photogrammetry application with Autodesk’s ReCap and Navisworks and BIM360, monthly update of site analysis is achieved, the project team can carry out inspection online, enhancing safety by virtual site visit and reducing the time of site inspection and recording.

### Sustainable Development

In addition to design and construction, the BIM model plays an essential role in supporting smart initiatives to realize the vision of sustainable development of Kai Tak Sports Park. By integrating different systems and technologies, BIM has created more flexible, productive and effective building management and ultimately will help shape a smart, and sustainable city.



Sports Avenue  
Image Courtesy of Kai Tak Sports Park Limited



啟德體育園有限公司  
KAI TAK SPORTS PARK LIMITED



民政事務局  
Home Affairs Bureau



Kai Tak Sports Park Overview  
Image Courtesy of Kai Tak Sports Park Limited

## About Hip Hing Engineering Company Limited

Founded in 1964, Hip Hing Engineering Co., Ltd. undertakes the design and construction of building and civil engineering works for public sector clients, and it is one of the members of Hip Hing Construction Group (“Hip Hing”). Over the past decades, Hip Hing has grown to become one of the leading contractors in Hong Kong, and has been trusted by our clients to construct many of the landmark buildings which define Hong Kong. Our experience and expertise in the design, procurement, engineering and construction disciplines enables us to provide comprehensive project delivery services. We have also been embracing advancing technologies to take our services to the next level, so as to meet our clients’ needs.

## About Kai Tak Sports Park Limited

Kai Tak Sports Park Limited (KTSPL) is the contracted party for the design, build, and operation of Kai Tak Sports Park. The KTSPL project team comprises of recognised local and global industry leaders with extensive experience in the design, construction and operation of large scale projects as well as the management of major sports venues. Key members include Hip Hing Engineering (contractor), Populous (lead architect), ASM Global (future operator) and Lagardère Sports (event and commercial sales consultant). KTSPL is a subsidiary of New World Development Company Limited (NWD) and NWS Holdings Limited (NWS).

## About Home Affairs Bureau, HKSAR Government

The Home Affairs Bureau (HAB) has set up a dedicated project team for the Kai Tak Sports Park. The team is responsible to oversee the construction contract, programme, expenditure, resources and quality standards of the project. Comprising of architects, landscape architects, building services engineers, civil engineers, structural engineers, quantity surveyors and leisure services managers, the project team led by the Project Director makes use of BIM and project document management system to examine and monitor the planning, design, construction and cost information of the project. Upon completion of construction, an HAB operation team will be set up to monitor the operation planning and the asset and facilities management of the Sports Park.