

COMPANY

Hong Kong Housing Authority,
HKSAR Government

PROJECT

BIM-enabled Systematic Approach to
Foundation Design (BIM-SAFD) 2.0

LOCATION

Hong Kong

TYPE

Foundation Design, ELS, GI Works for Public
Housing Development

SCHEDULED TIME OF COMPLETION

Varies, from 2021 to 2023

“Just a few clicks!” - BIM Automations for Efficiency, Accuracy and Quality of Foundation Works



About Hong Kong Housing Authority, HKSAR Government

The Hong Kong Housing Authority (HA) is a statutory body established in 1973 under the Housing Ordinance to provide subsidised public rental housing to low-income families, and to help low to middle-income families gain access to subsidised home ownership. The Housing Department is the executive arm of the HA to help the Government achieve its policy objective on public housing.

AUTODESK PRODUCTS USED

Autodesk® AutoCAD®

Autodesk® BIM 360®

Autodesk® Dynamo

Autodesk® Navisworks®

Autodesk® Revit®

Autodesk® Robot™ Structural Analysis Professional

Generative Design in Autodesk® Revit®
Twinmotion for Revit

Project Description

Building upon the remarkable achievements of BIM-SAFD 1.0, HA's self-developed BIM-SAFD has advanced to version 2.0 this year.

BIM-SAFD 2.0 harnesses generative design, intelligent BIM elements, high-quality rendering and advanced visual programming, to enhance foundation design efficiency, accuracy and quality. Improved BIM integration with generative design and structural analysis software through API streamlines the design process, optimises foundation performance and facilitates early-stage drillhole location planning for pile design. This upgrade epitomises a significant stride in HA's incorporation of BIM-enabled design automations into foundation design practices.

Project Challenges

HA faces numerous challenges when striving to achieve housing production targets, including tight construction schedules and increasingly complex geological conditions at project sites. Furthermore, several additional issues compound these challenges:

1. Inadequate automated foundation design tools customised to HA's in-house design practices, which facilitate adaptable foundation design to accommodate the dynamic nature of building design.
2. Data fragmentation disrupts the seamless exchange of information between BIM models, generative design tools, structural analysis software and smart BIM objects.
3. Comprehending the interdependencies among pile design, existing structures, drainage reserves, founding materials, and other factors often proves to be highly intricate.

Solutions for Challenges

BIM-SAFD 2.0 offers the following innovative solutions for the challenges faced:

1. Automated Design Tools: Engineers benefit from visual programming and generative design tools, swiftly generating optimal pile designs that adapt to dynamic updating of building requirements.
2. Integrated Data Management: Utilising APIs of approved structural analysis softwares, BIM-SAFD 2.0 facilitates seamless data exchange among BIM models, generative design tools, structural analysis software, and intelligent BIM objects. This eliminates data fragmentation, promoting efficient collaboration and information sharing.
3. High-Quality Rendering: Advocating high-quality rendering, BIM-SAFD 2.0 enhances pile proposal visualisation, aiding in understanding their relation to surroundings and founding materials.

How does BIM benefit the project?

Advanced features of BIM-SAFD 2.0 bring several key benefits to projects:

1. Efficiency: Generative design tools and collection of visual programming scripts expedite the foundation design process, reducing design lead times and optimising resource allocation.
2. Accuracy: BIM-SAFD 2.0 prioritises precision, tailoring foundation designs to specific project requirements, such as geological profiles, building configurations and imposed loads. This minimises errors, ensuring structurally sound foundations while complying design codes and standards.
3. Quality: Top notch rendering enhances visual presentations, facilitating effective design reviews, and ultimately delivering high-quality foundation designs, which aligned with project goals and constraints.

Better with BIM

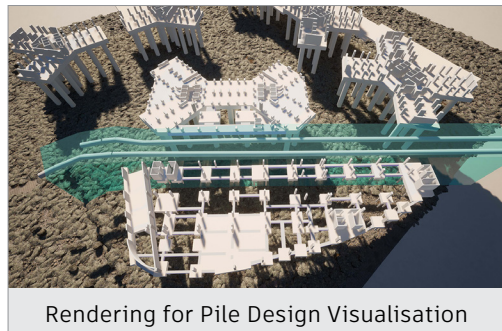
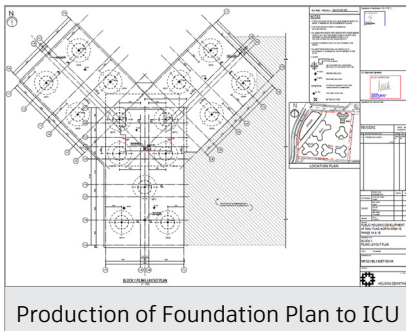
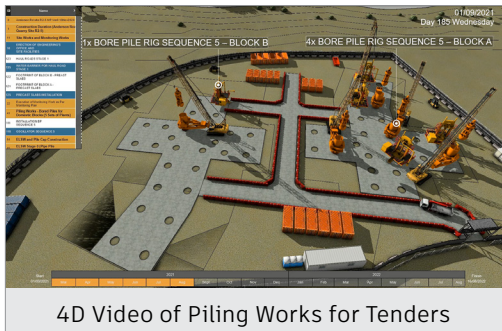
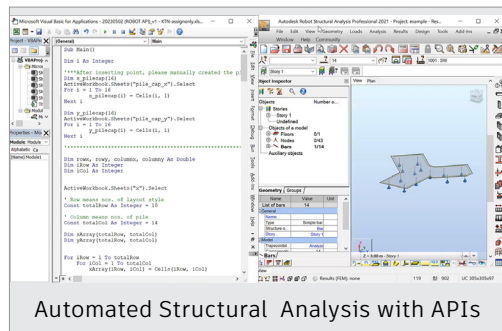
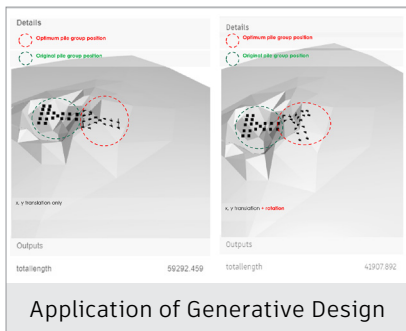
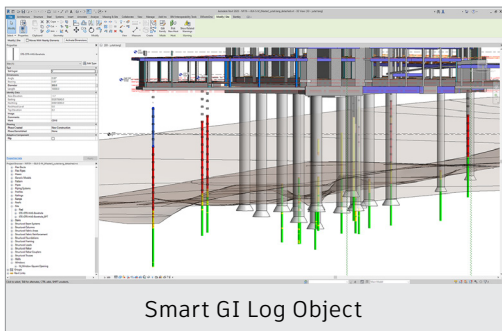
BIM-SAFD 2.0 achieves a profound enhancement in collaboration and efficiency of foundation design by streamlining coordination and facilitating seamless design data sharing among stakeholders, promoting teamwork and reducing design discrepancies.

Through comprehensive BIM-enabled design automations, generative design and high quality renderings, BIM-SAFD 2.0 optimises foundation design, resulting in significant resource savings for timely project completion. Engineers also benefit from the computational power and artificial intelligence, enabling well-informed decision-making.

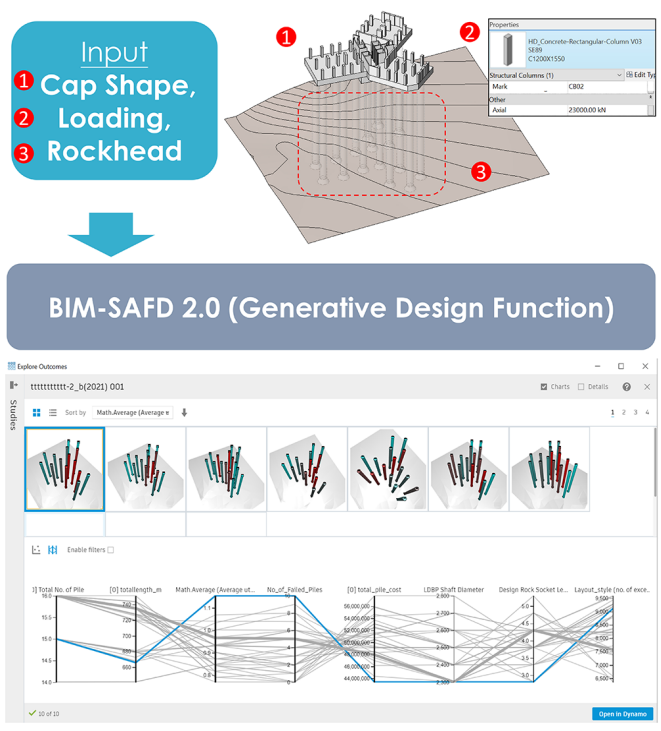
With just a few clicks, BIM-SAFD 2.0 generates foundation designs exemplifying efficiency, accuracy, and quality. This represents a unique BIM-enabled design automations for foundation works, pioneered by HA.

BIM-enabled Systematic Approach to Foundation Design (BIM-SAFD) 2.0

Applications to FULL Project Life Cycle for HA's foundation works



Application of BIM-SAFD 2.0 to full project life cycle for HA's foundation works
Image Courtesy of Hong Kong Housing Authority, HKSAR Government



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