OmikronKappa Consulting

HELIOS HOTEL COMPLEX

AGIA MARINA

Structural retrofitting and redevelopment

Addressing structural complexity across a major existing hospitality development in Attica.

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STRUCTURAL RETROFITTING AND REDEVELOPMENT

Our team is currently working on the structural retrofitting and redevelopment of the HELIOS Hotel Complex in Agia Marina, Attica. Covering approximately 34,550 m^2 and comprising 28 independent buildings across Plots A, B and C, this is one of the most extensive structural rehabilitation projects our team has undertaken.

Working on an existing development of this scale presents a unique set of challenges. We are not starting with a clean slate; we are interpreting decades of history embedded in the concrete, the structural details and the ground conditions.

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OUR INVOLVEMENT SPANS NEARLY EVERY STAGE OF THE STRUCTURAL ENGINEERING LIFECYCLE:

Establishing the baseline: Detailed structural mapping, condition surveys and pathology assessments of all 28 existing buildings to evaluate their structural adequacy.

Designing targeted interventions: Development of concrete rehabilitation and strengthening schemes tailored to the condition and structural characteristics of each building.

Integrating new structures: Geotechnical and structural design of new facilities, including swimming pools, water reservoirs and a wastewater treatment plant.

Coordination and supervision: BIM-based interdisciplinary coordination, combined with regular on-site technical inspections to ensure that the design intent is accurately implemented during construction.

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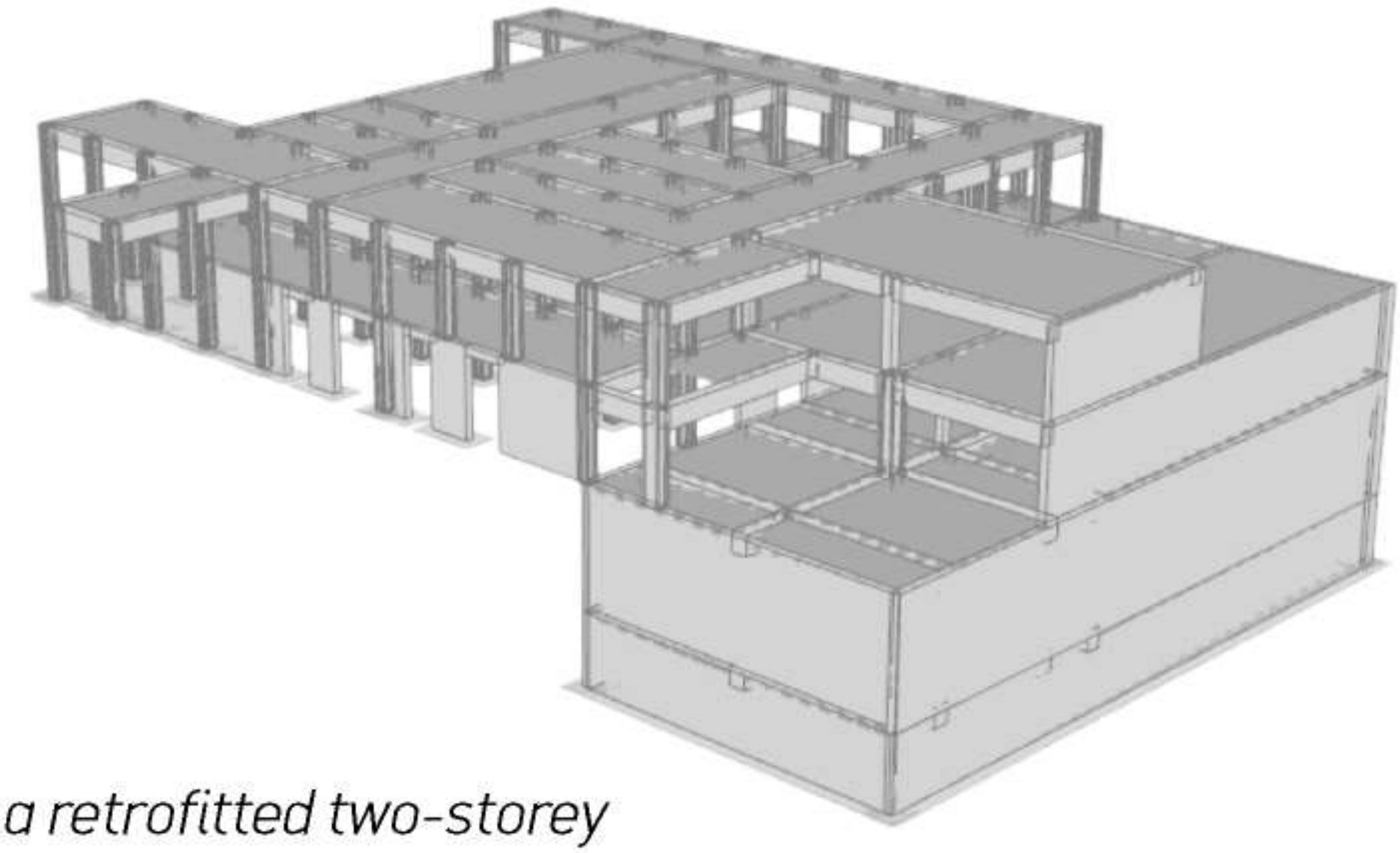
THE ENGINEERING PROCESS: FROM INVESTIGATION TO VERIFICATION

One of the main challenges in assessing existing structures is managing the uncertainties associated with their geometry, reinforcement detailing, actual material properties and environmental deterioration. In a coastal environment, particular attention must also be given to chloride ingress, carbonation and reinforcement corrosion. Before reliable analytical conclusions can be drawn, these parameters must be systematically investigated and documented.



Structural model of a retrofitted two-storey bungalow building with basement levels

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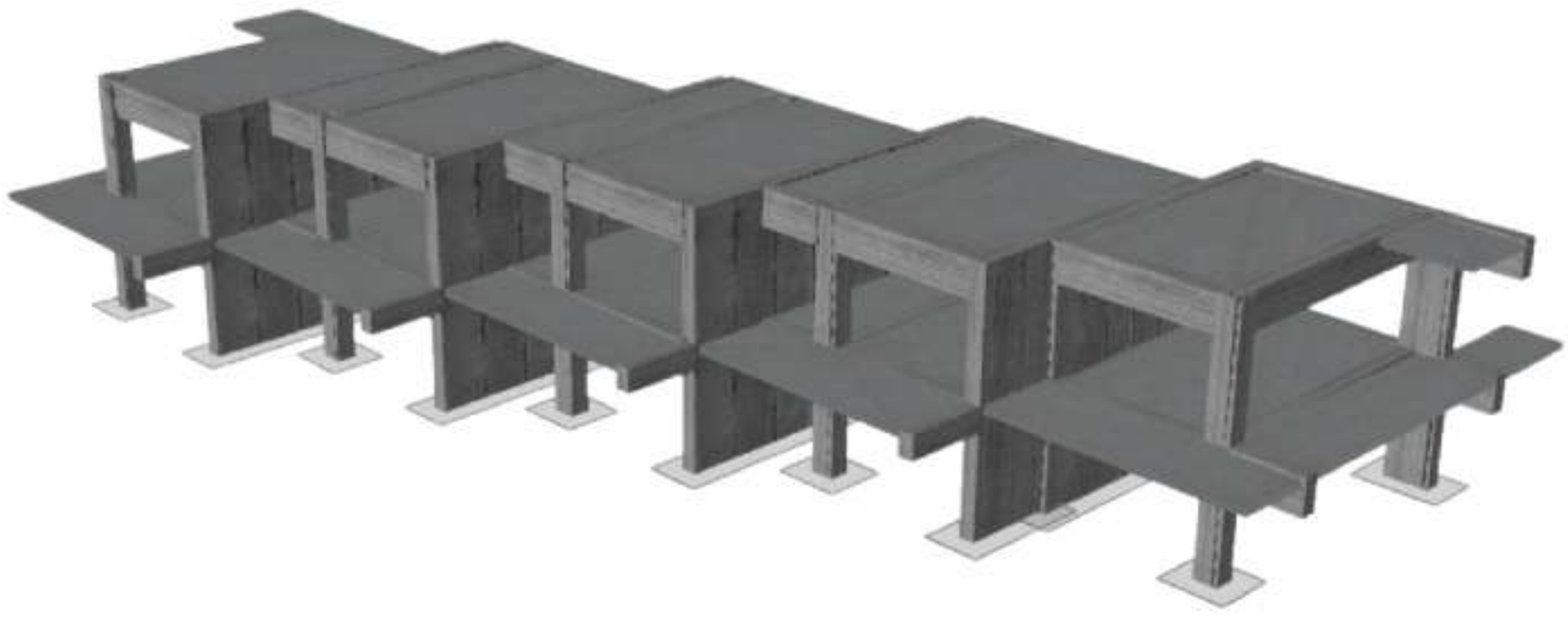
OUR TEAM HAS THEREFORE ADOPTED A RIGOROUS, STEP-BY-STEP ENGINEERING METHODOLOGY:

1. **Structural Investigation and Condition Assessment:** Detailed structural mapping, non-destructive testing (NDT), concrete core sampling, carbonation-depth measurements and corrosion mapping are carried out to establish the appropriate Data Reliability Level (DRL).

2. **Advanced Structural Modelling:** Analytical models are developed to accurately represent the as-built geometry, existing load paths, actual material properties and the reduced capacity of deteriorated structural members.



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3. Seismic Assessment and Analysis:

- **Linear dynamic response-spectrum analysis** is performed to evaluate the seismic response of complex building configurations.
- **Nonlinear static pushover analysis** is used to assess structural behaviour beyond the elastic range, evaluate deformation capacity, identify yielding sequences and locate potential structural vulnerabilities within a performance-based assessment framework.
- **The assessment** is carried out in accordance with the Greek Code for Structural Interventions (KANEPE), the Eurocodes and the applicable national provisions.

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4. **Targeted Strengthening and Rehabilitation:** Strengthening solutions are designed specifically for each structure. These include reinforced concrete and shotcrete jacketing, new reinforced concrete shear walls, CFRP strengthening systems and active corrosion-mitigation measures.

5. **Integrated Infrastructure Design:** Our scope also includes the geotechnical and structural design of supporting facilities, such as new swimming pools, water reservoirs, a wastewater treatment plant and numerous retaining structures.

6. **BIM Coordination and Field Verification:** BIM is used to coordinate the structural design with the other disciplines, while ongoing construction-stage inspections verify that the proposed interventions are accurately implemented on site.

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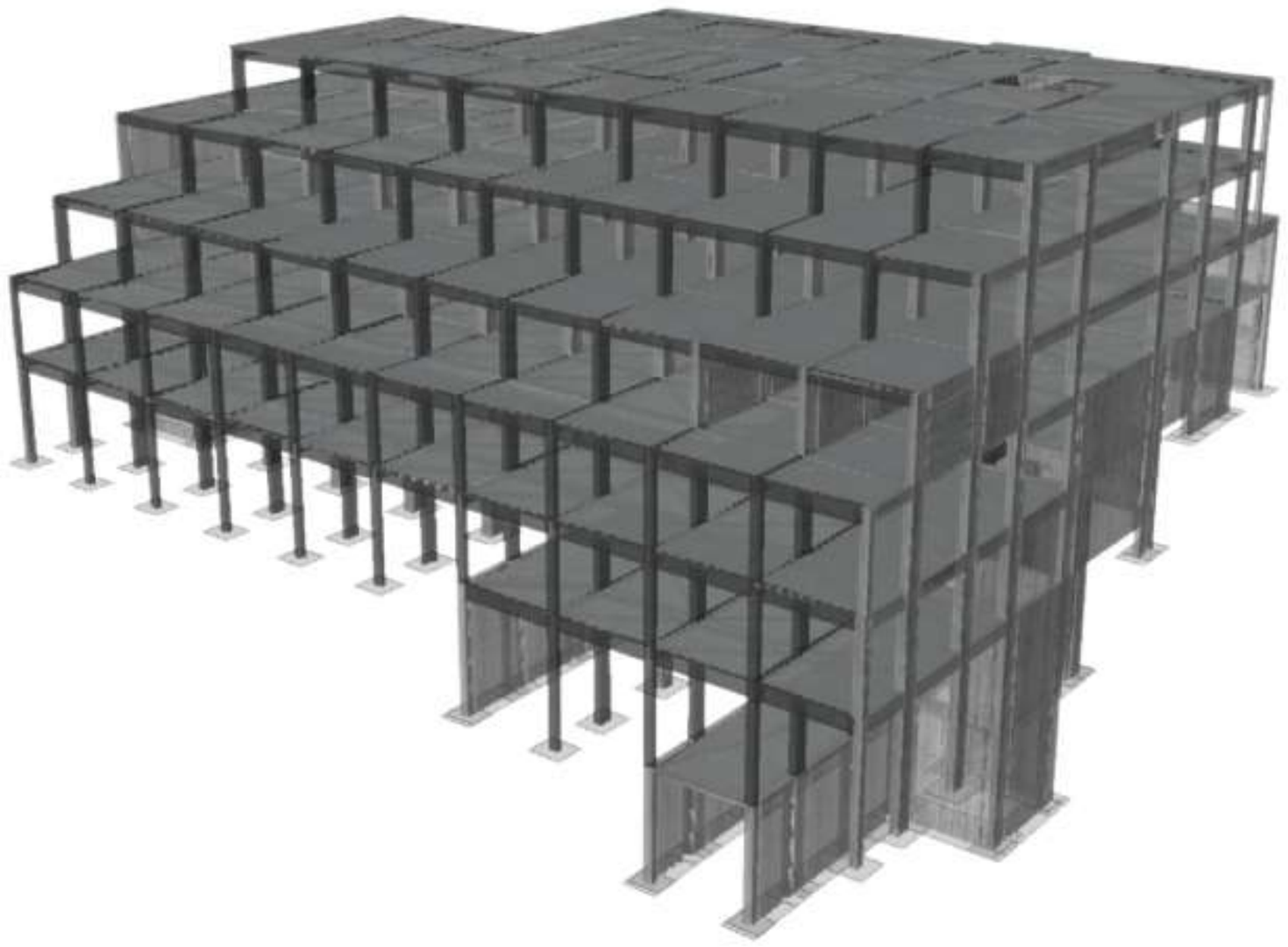
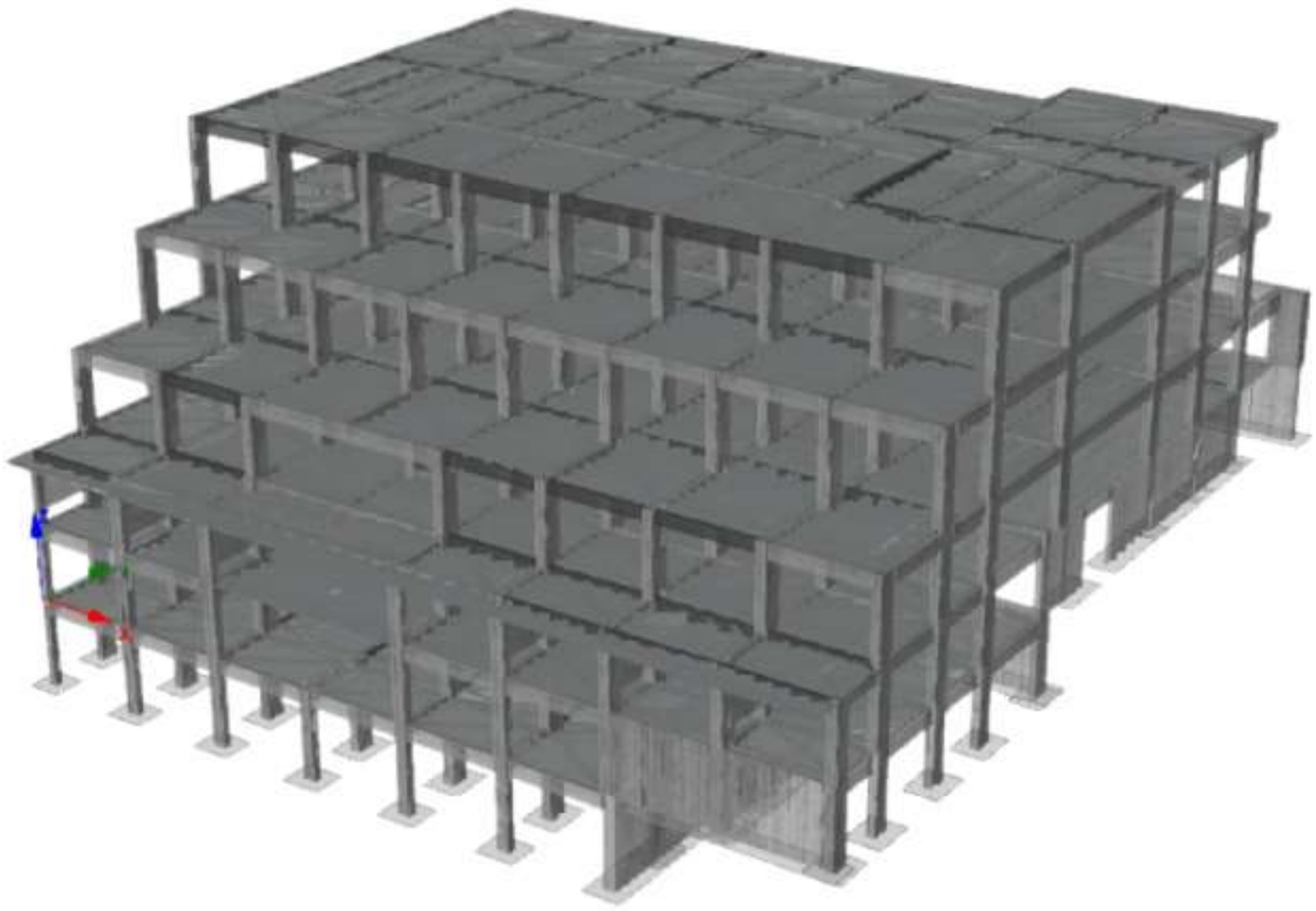
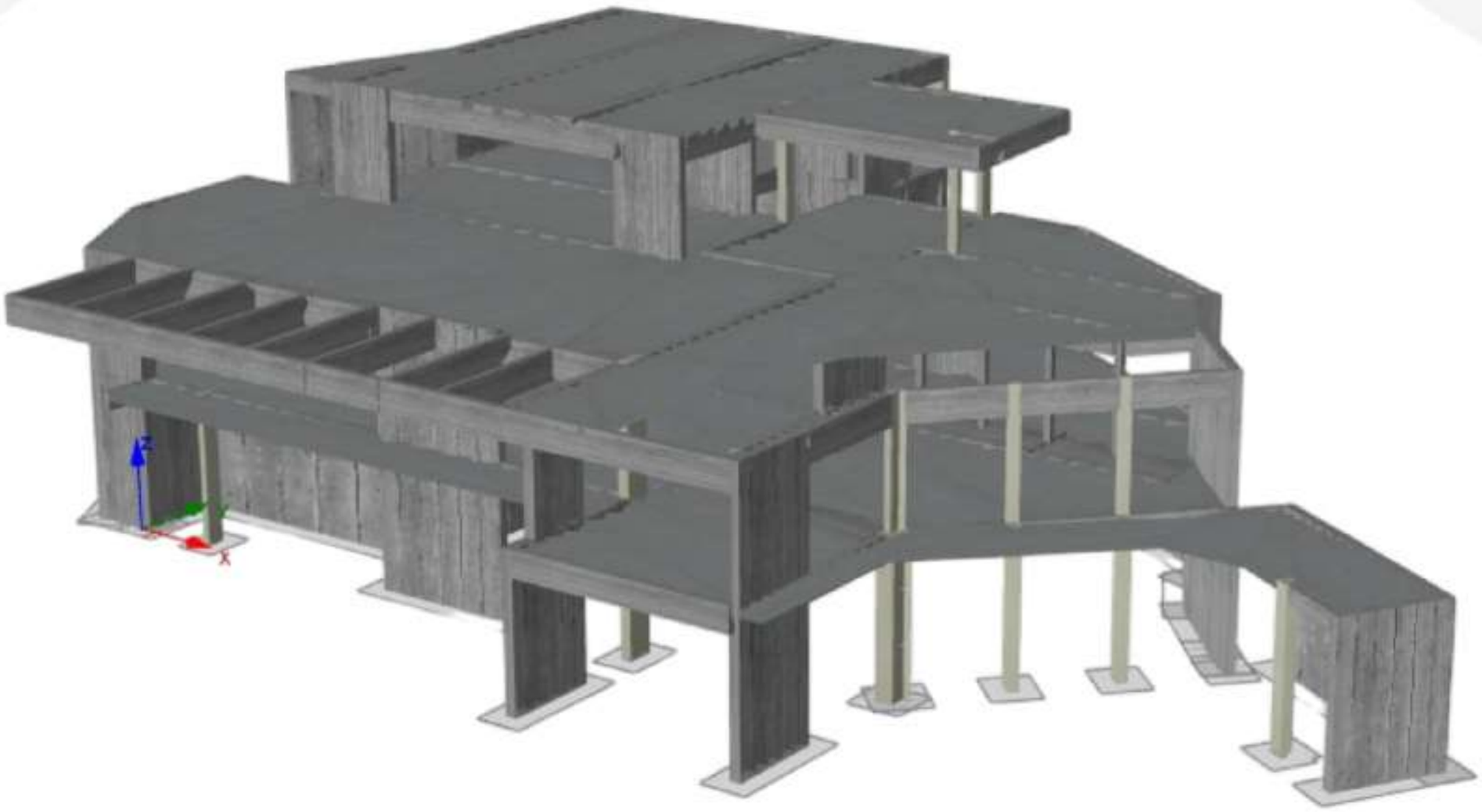


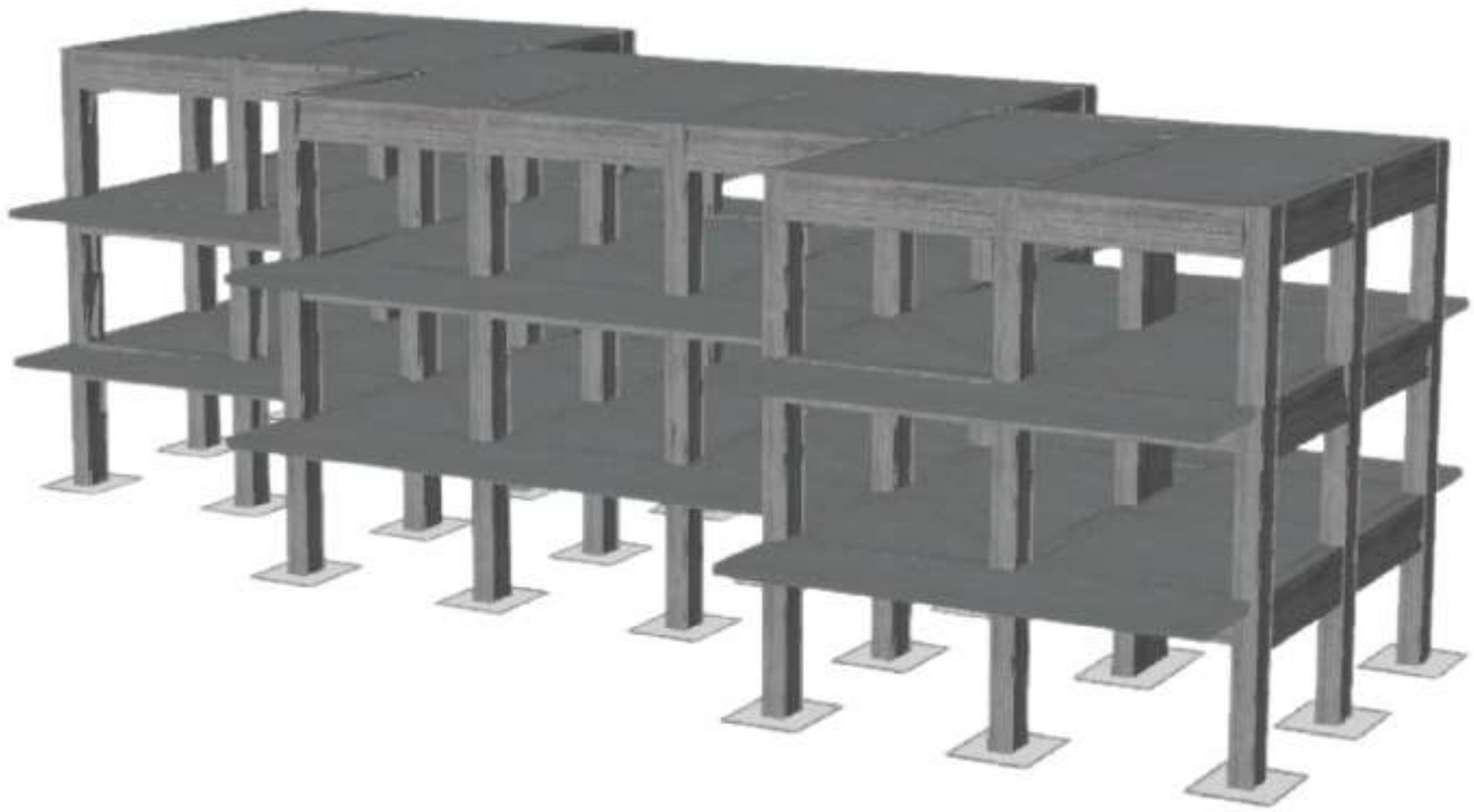
Structural model of a retrofitted multi-storey building with basement levels



Structural model of a retrofitted multi-storey building with basement levels



Structural model of a retrofitted structure



Structural model of a retrofitted three-storey bungalow building

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Engineering Complex
Infrastructure with Precision