

MORA SPORTS COMPLEX



GROUP D5

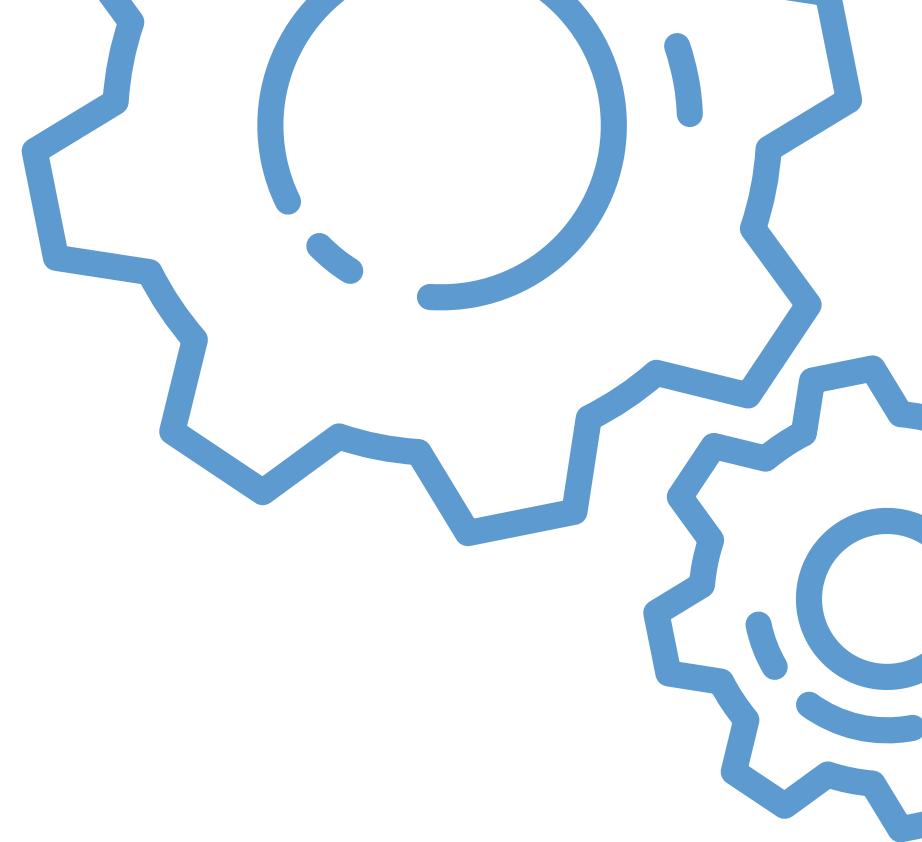
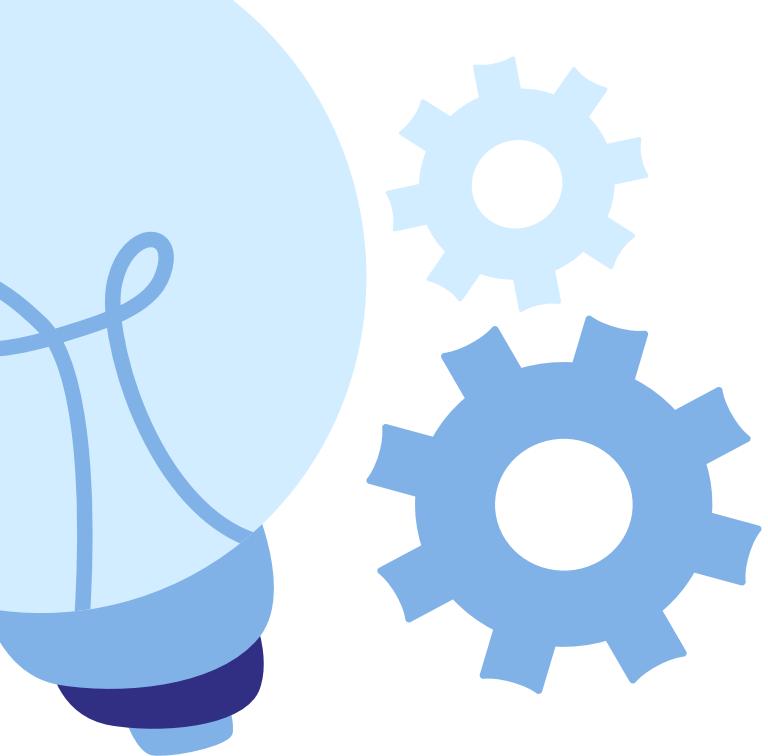


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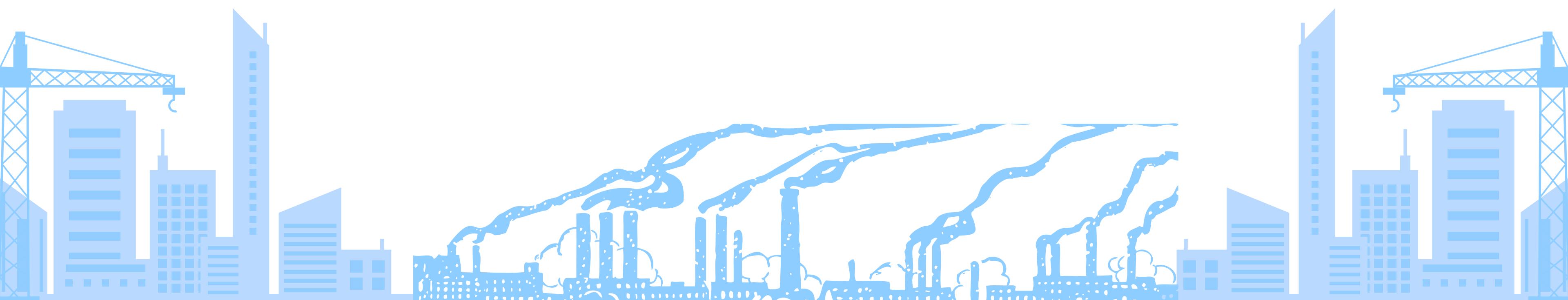
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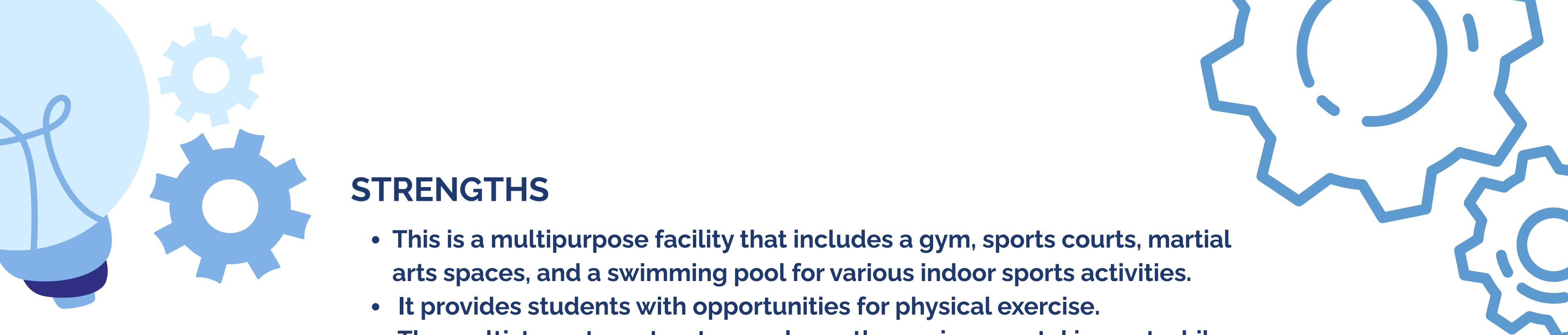
INTRODUCTION

The proposed Sports Complex at the University of Moratuwa is a modern, multi-purpose facility located between the lagoon and tennis courts. This address the main need in the University, that is a swimming pool. Covering 2,275 square meters, It includes indoor courts for basketball, volleyball, badminton and table tennis, . The complex features elevators for accessibility, a canteen, fire safety systems, and sustainable elements like natural lighting and eco-friendly materials.



SWOT ANALYSIS





STRENGTHS

- This is a multipurpose facility that includes a gym, sports courts, martial arts spaces, and a swimming pool for various indoor sports activities.
- It provides students with opportunities for physical exercise.
- The multistory story structure reduces the environmental impact while offering enough space for many sports activities.
- This replaces the new gymnasium with a modern, multi-functional facility.

WEAKNESSES



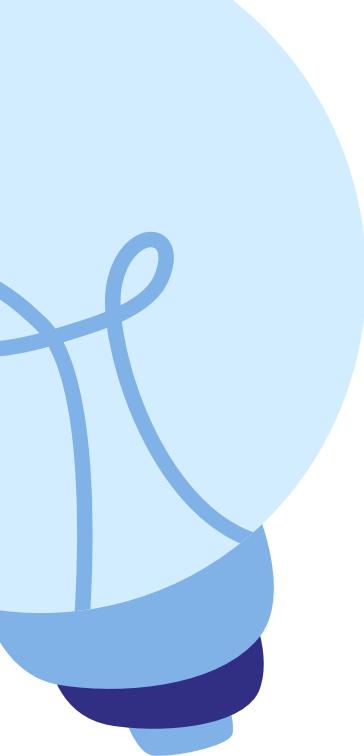
- This four-story building requires a high initial investment and includes both construction and equipment costs.
- Maintenance costs, including the upkeep of the swimming pool, gym equipment, and other sports equipment maintenance costs.
- Construction work might disturb nearby academic activities during the building process.

OPPORTUNITIES

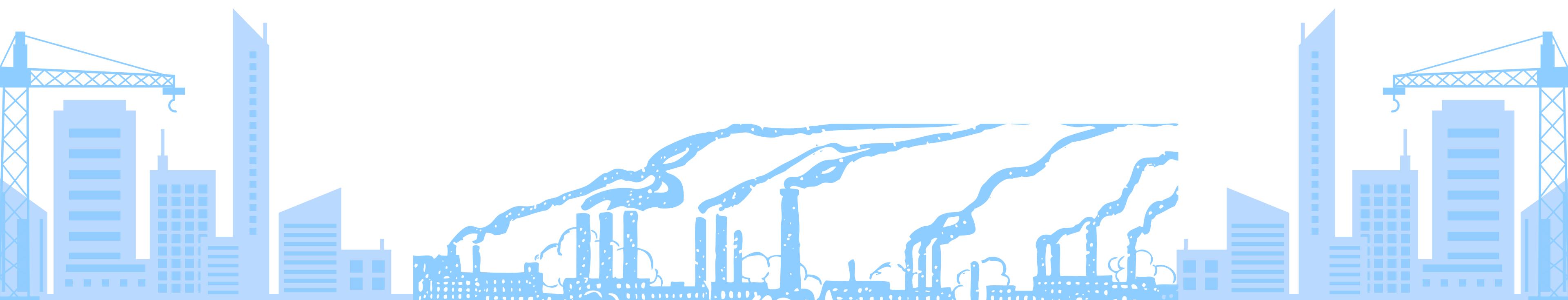
- Hosting tournaments and events for both inter-university and intra-university activities.
- Partnerships with sports brands and health organizations.
- The facility can be integrated with academic programs for elective modules related to physical education.

THREATS

- University budget limitations and delays in funding.
- Proper management and ensuring safety standards for all activities.
- Without proper maintenance, the swimming pool and gym facilities may deteriorate quickly and become unsafe for use.

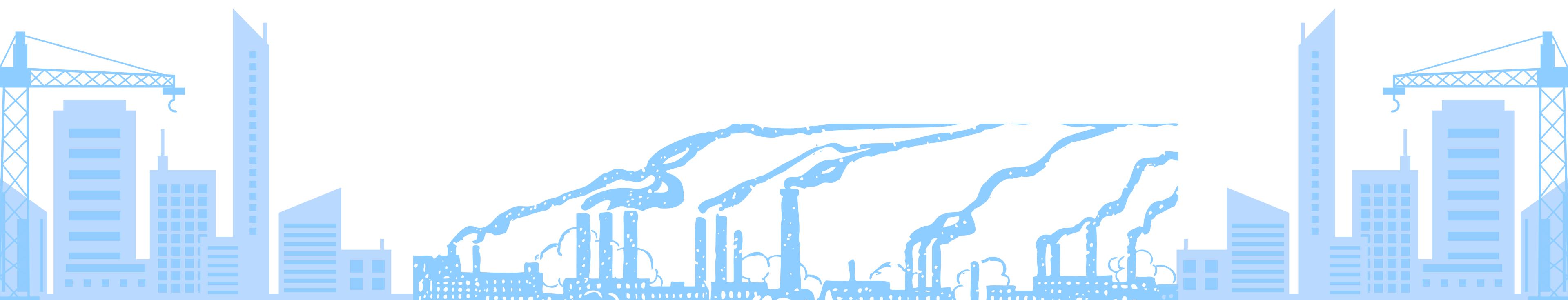


CIVIL ENGINEERING PRINCIPALS





STRUCTURAL FACTORS

- Reinforced concrete (RCC) frame structure designed to resist gravity and lateral loads effectively.
 - Pre-tensioned beams are introduced to span large areas such as courts and the swimming pool roof, minimizing deflection and material usage.
 - Structural design ensures high durability, strength, and serviceability under varying load conditions.
- 



MATERIAL SELECTION

- Concrete blocks are used for the walls.
- Zinc-aluminum roofing sheets for the roof which is lightweight, corrosion-resistant, and economical.
- Non-slip ceramic tiles on pool decks and wet areas for safety and easy maintenance.





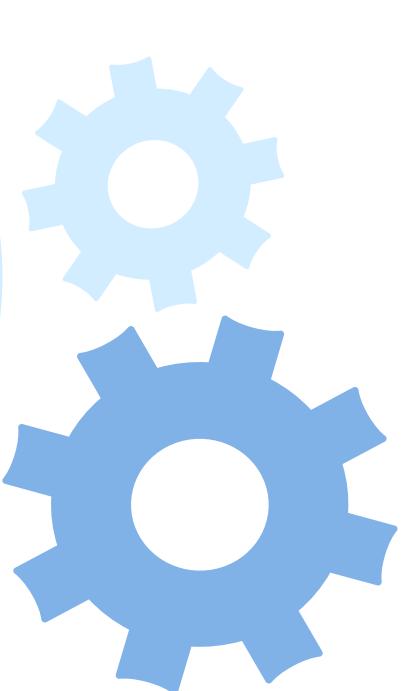
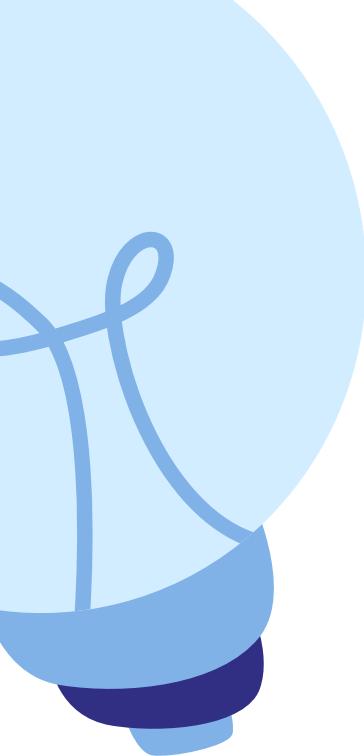
REGULATORY AND DESIGN COMPLIANCE

- elevator access and accessible washrooms on all levels.
- Structural and material design aligns with Sri Lankan building codes and international sports facility standards.
- Integration of energy-efficient lighting and ventilation systems across all floors.
- Using solar panels to generate electricity to the national grid and reducing electricity expenses



FACILITIES AND CAPACITY

- Total Height: 38 m
- Floors: Ground + 3 + Roof
- Structure: Reinforced Concrete Frame with Pretention beams
- Roof: Zinc–Aluminum sheets on steel trusses
- Energy: Solar panels used to power elevators
- Vertical Transport: 4 Elevators + 2 Emergency Staircases
- Supporting Facilities: 12 Toilets, 2 Changing Rooms per floor

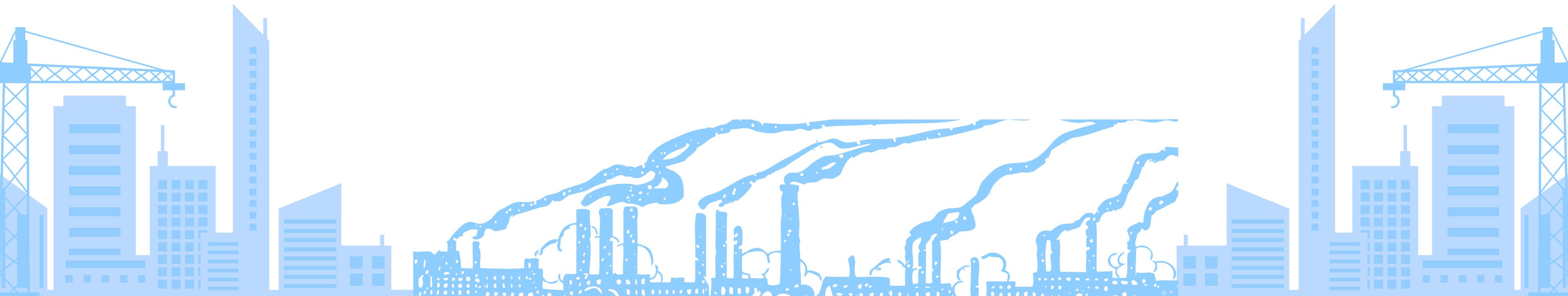


GROUND FLOOR

- Ground Floor (8 m)

Facilities:

- Semi-Olympic Swimming Pool (25 m × 25 m)
- Changing Rooms
- Canteens, Lobby, Offices, Stadium
- Spectator Capacity: 290



FIRST FLOOR

- First Floor (12 m)

Facilities:

- 3 Badminton Courts (8 m × 18 m each)
- Taekwondo Court, Weightlifting Gym
- First Aid Room, Stadium
- Spectator Capacity: 400

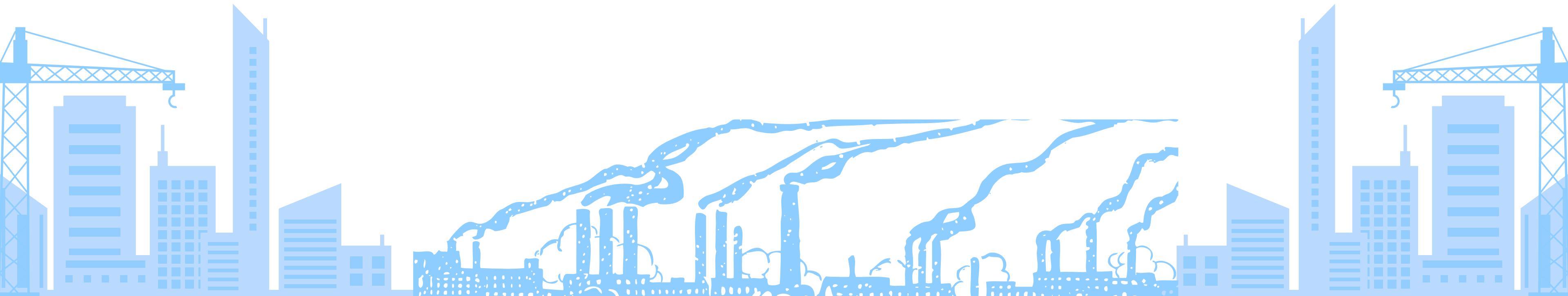


SECOND FLOOR

- Second Floor (12 m)

Facilities:

- Basketball Court & Large Stadium
- Maintenance Rooms
- Spectator Capacity: 1,080



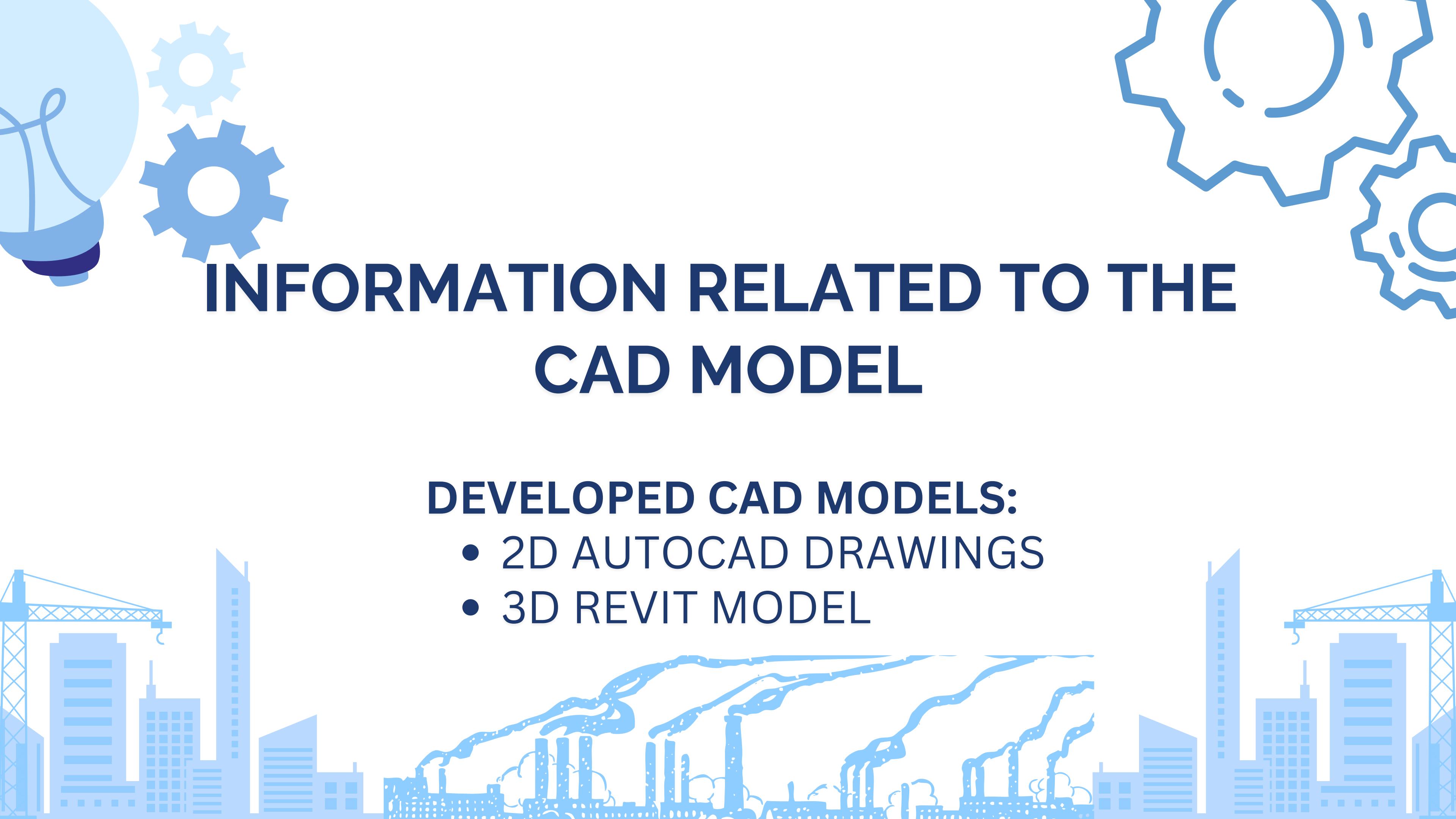
THIRD FLOOR

- Third Floor (6 m)

Facilities:

- 2 Volleyball Courts
- Boxing Room
- Indoor Sports Room (8 Table Tennis, 4 Pool, 4 Carrom Tables)
- Café
- Spectator Capacity: 400

Total Spectator Capacity≈ 2,170 People

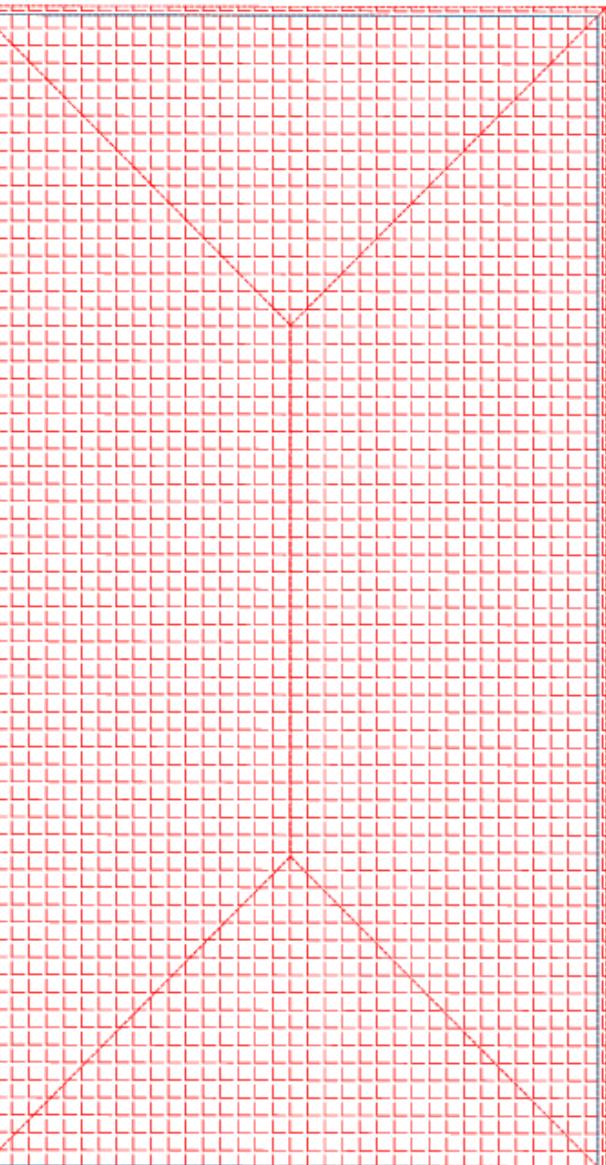
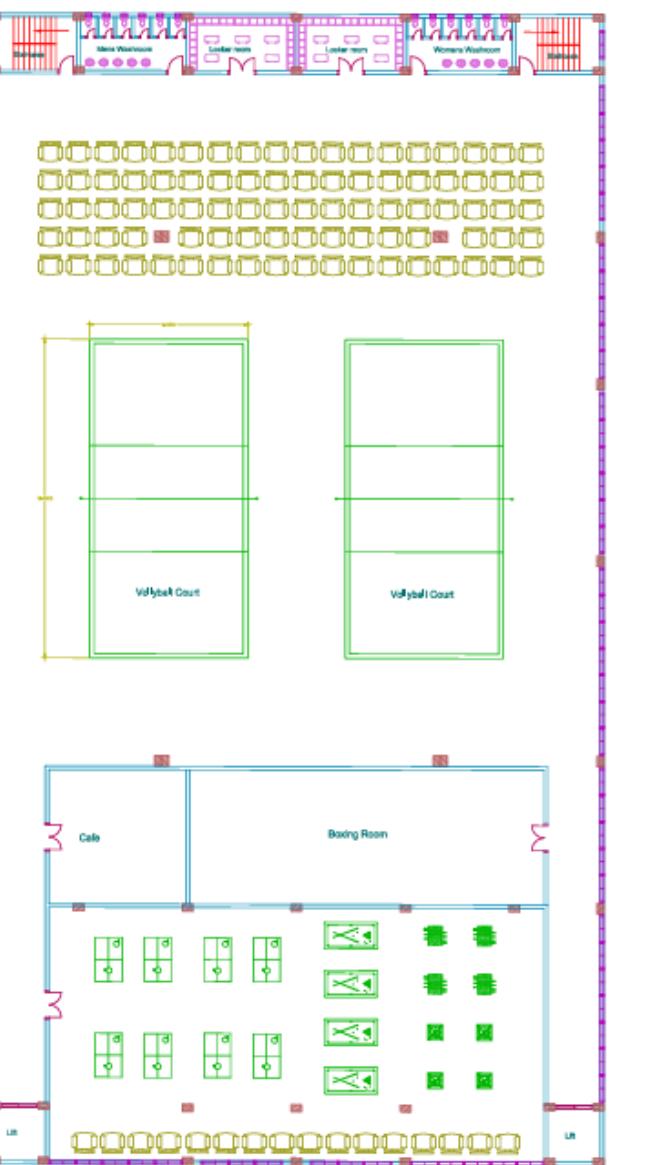
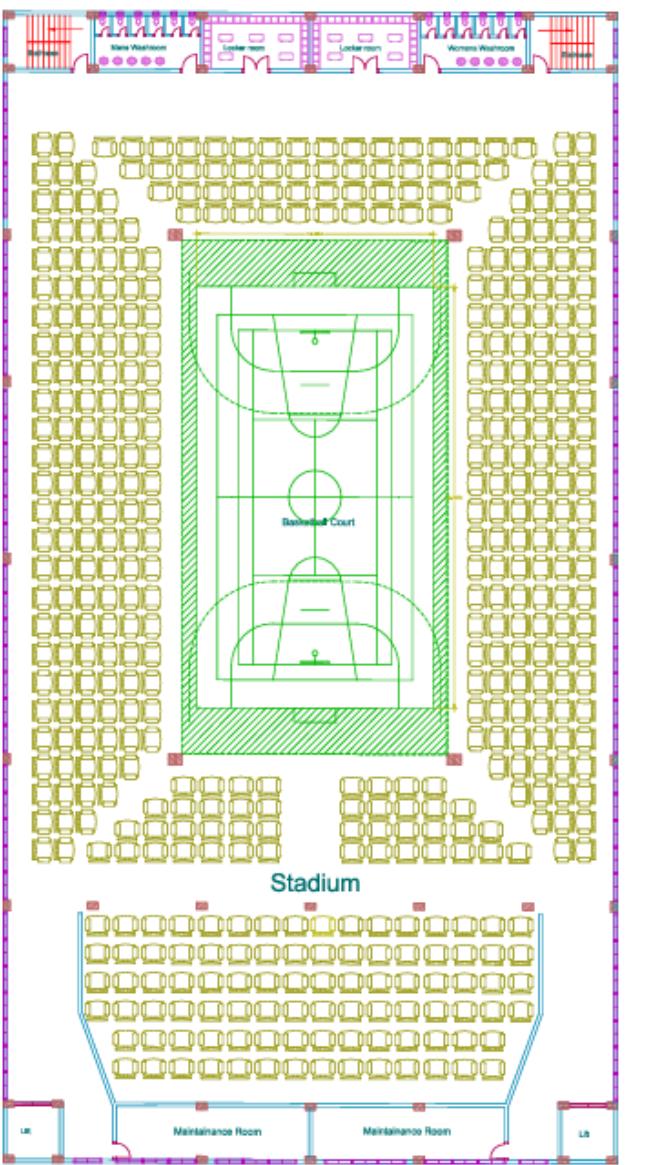
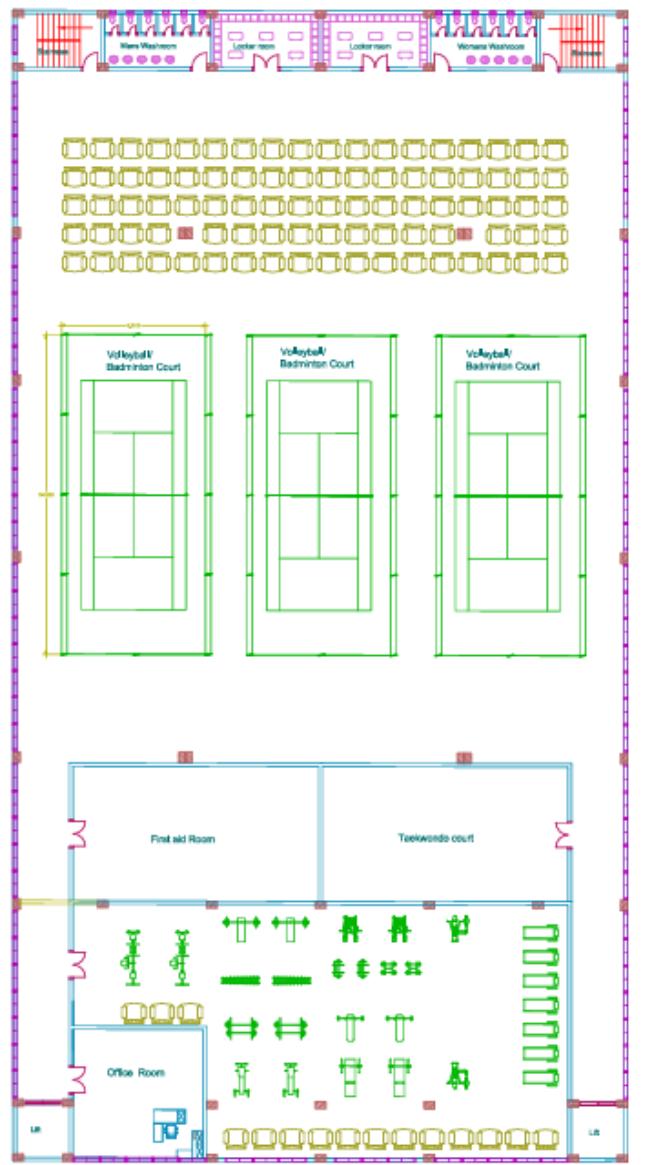
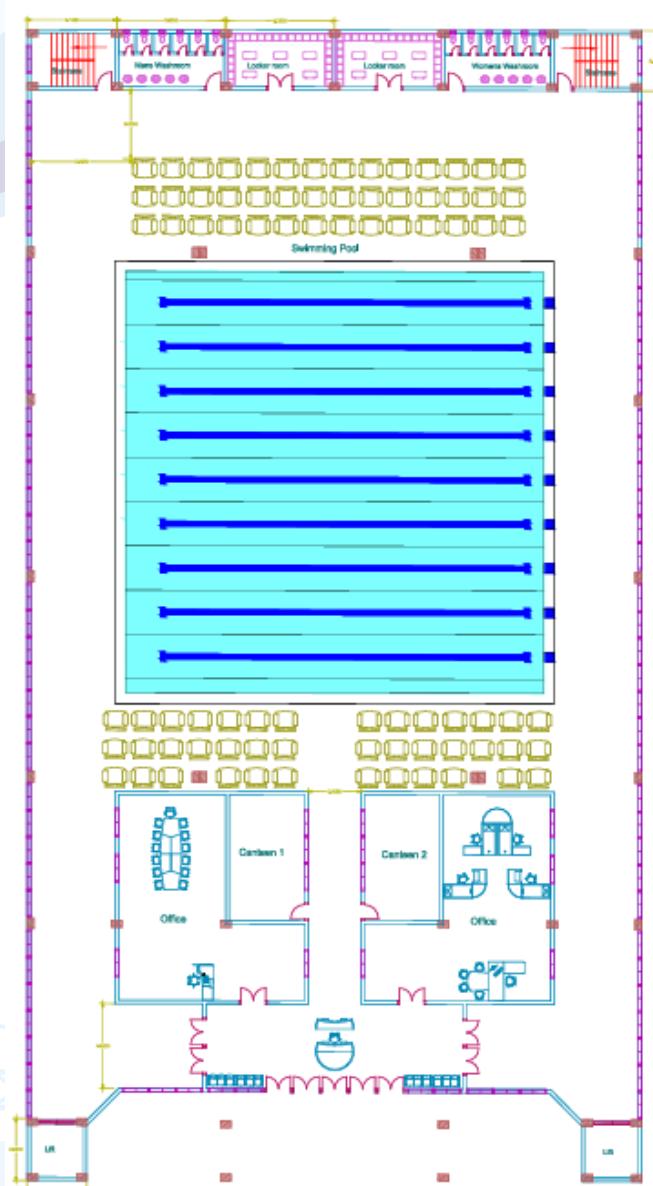


INFORMATION RELATED TO THE CAD MODEL

DEVELOPED CAD MODELS:

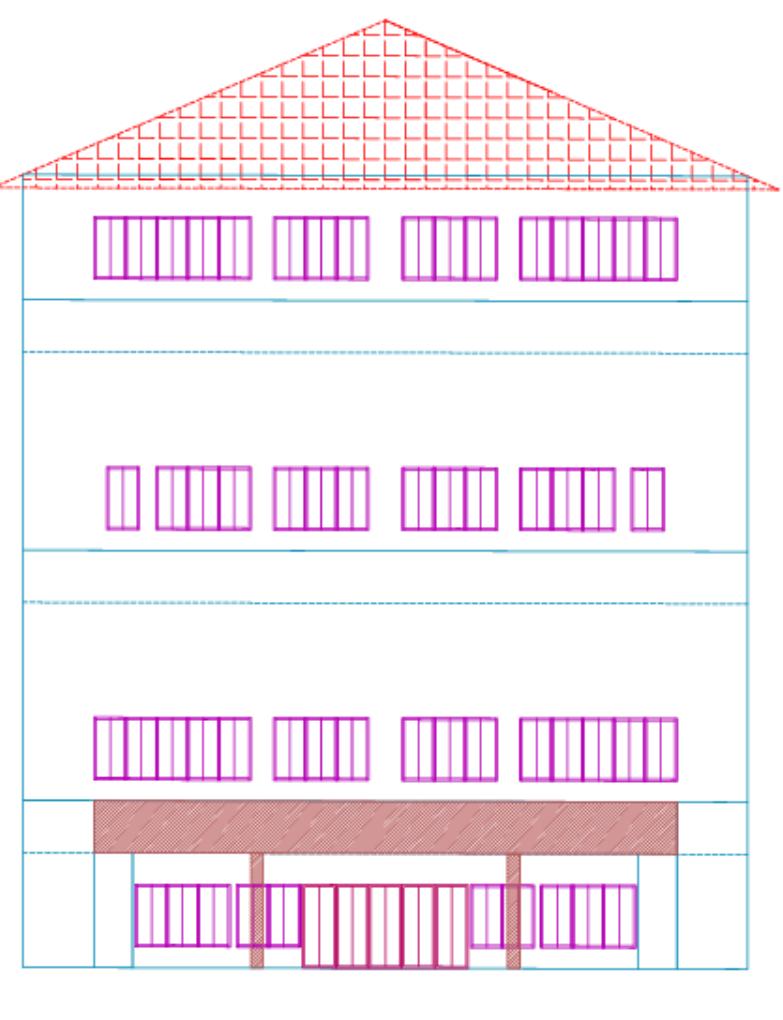
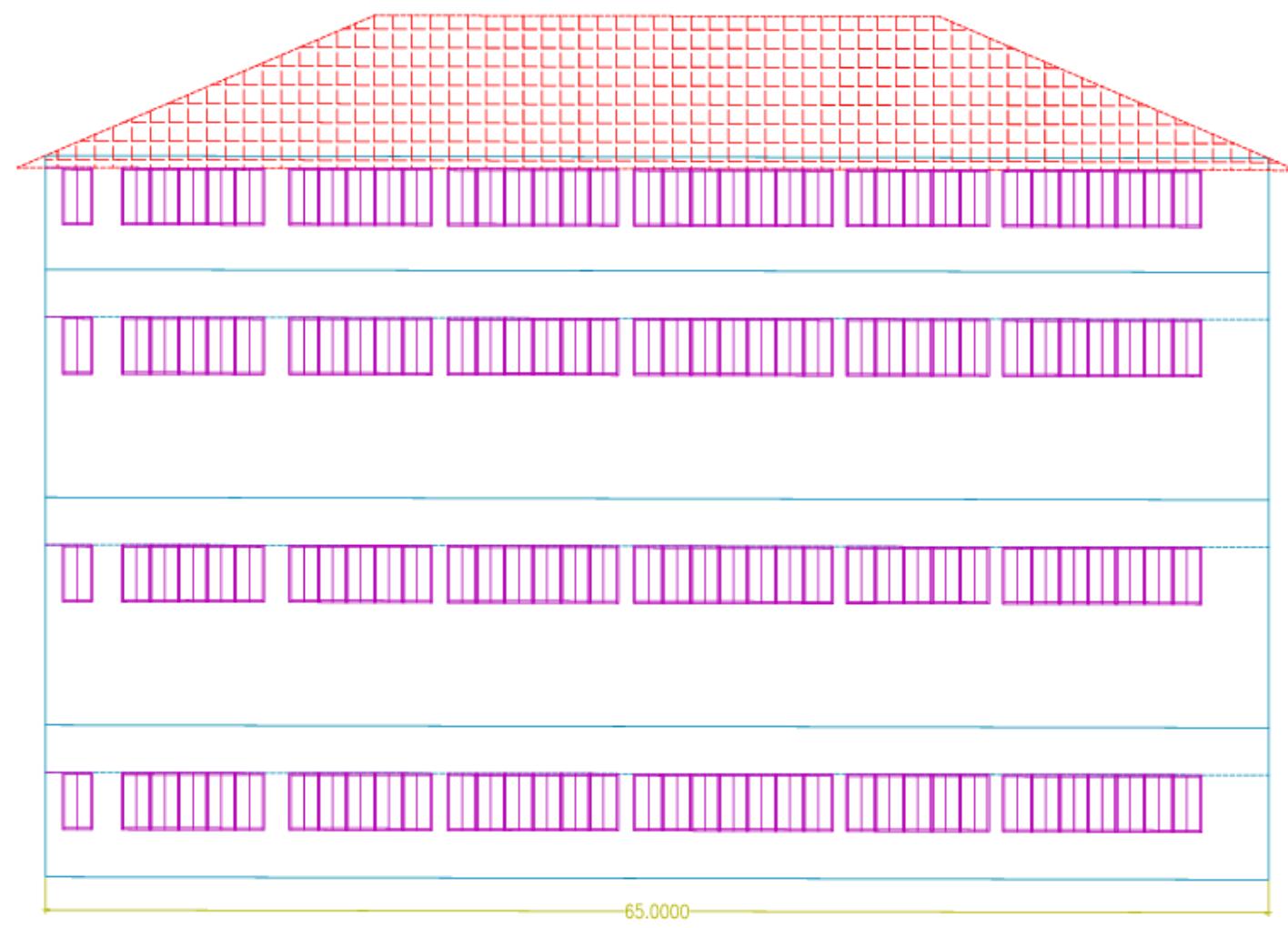
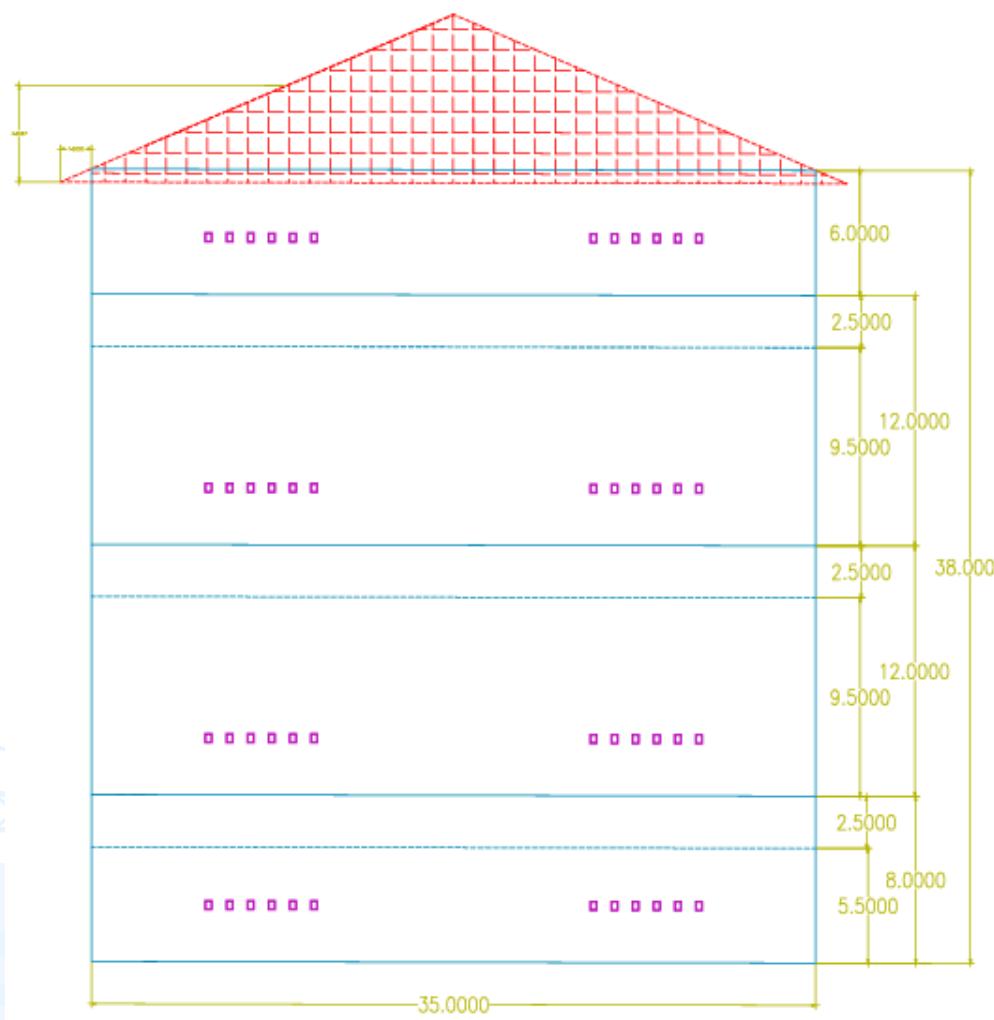
- 2D AUTOCAD DRAWINGS
- 3D REVIT MODEL

2D AutoCAD Model

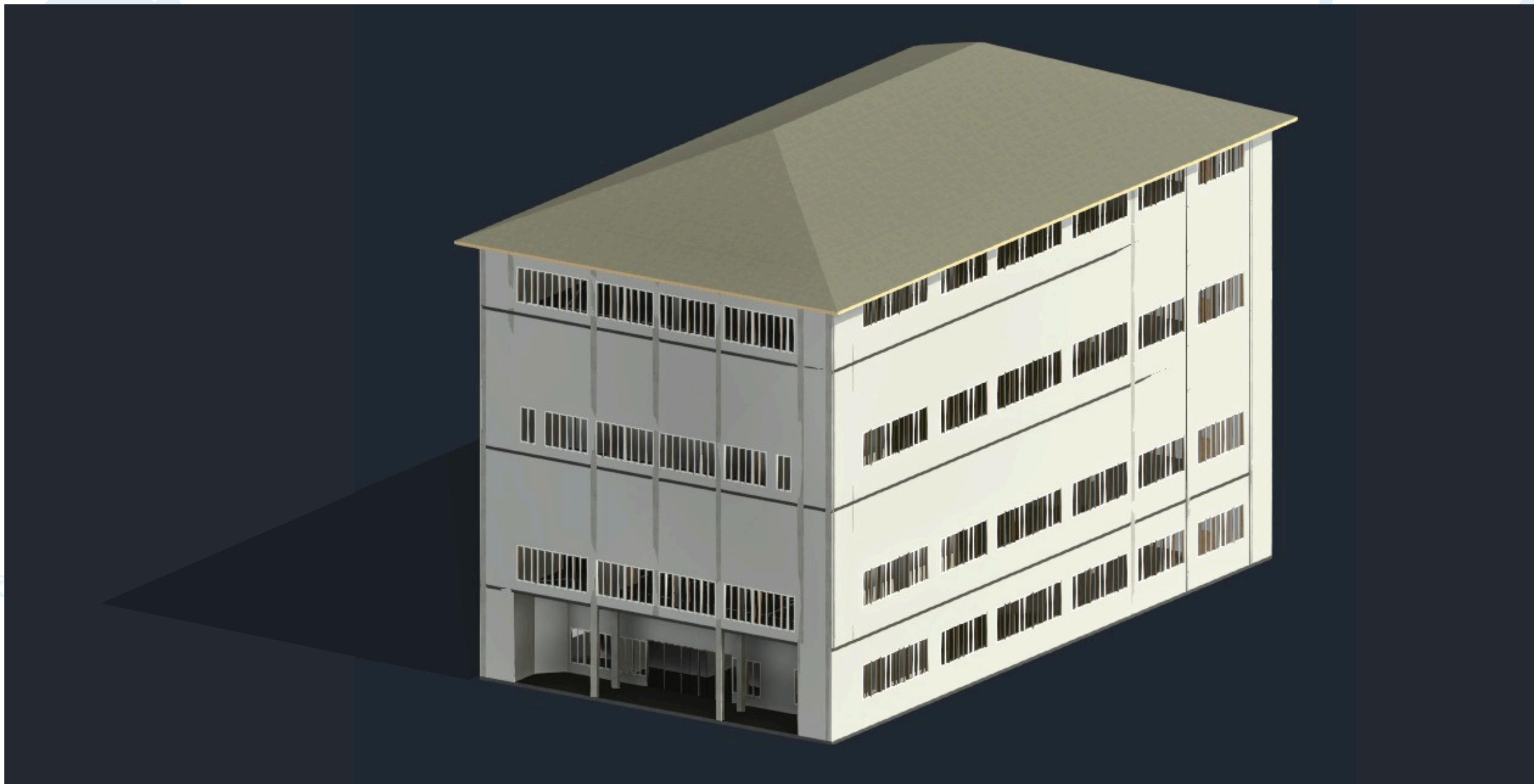


Scale of AutoCAD file Drawing 1:1

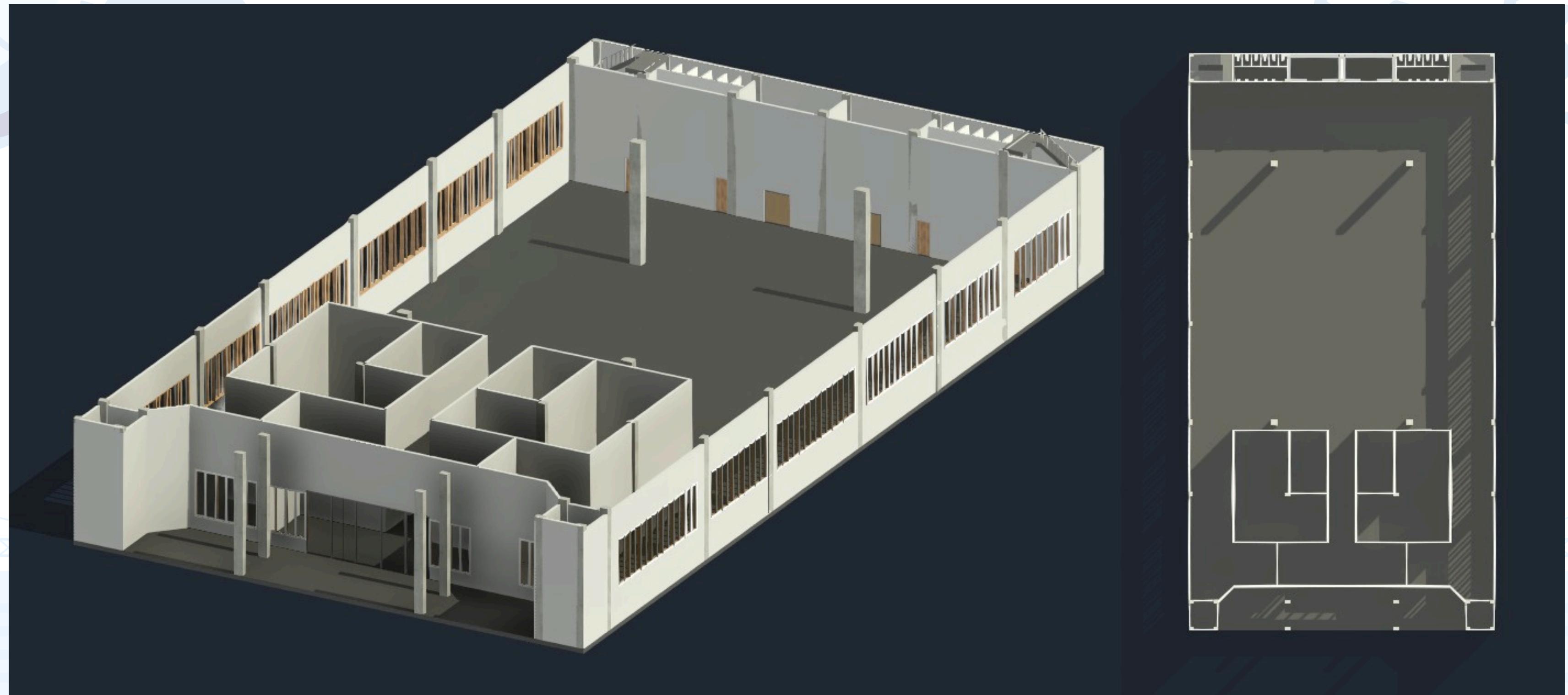
2D AutoCAD Model



3D Revit Model



3D Revit Model



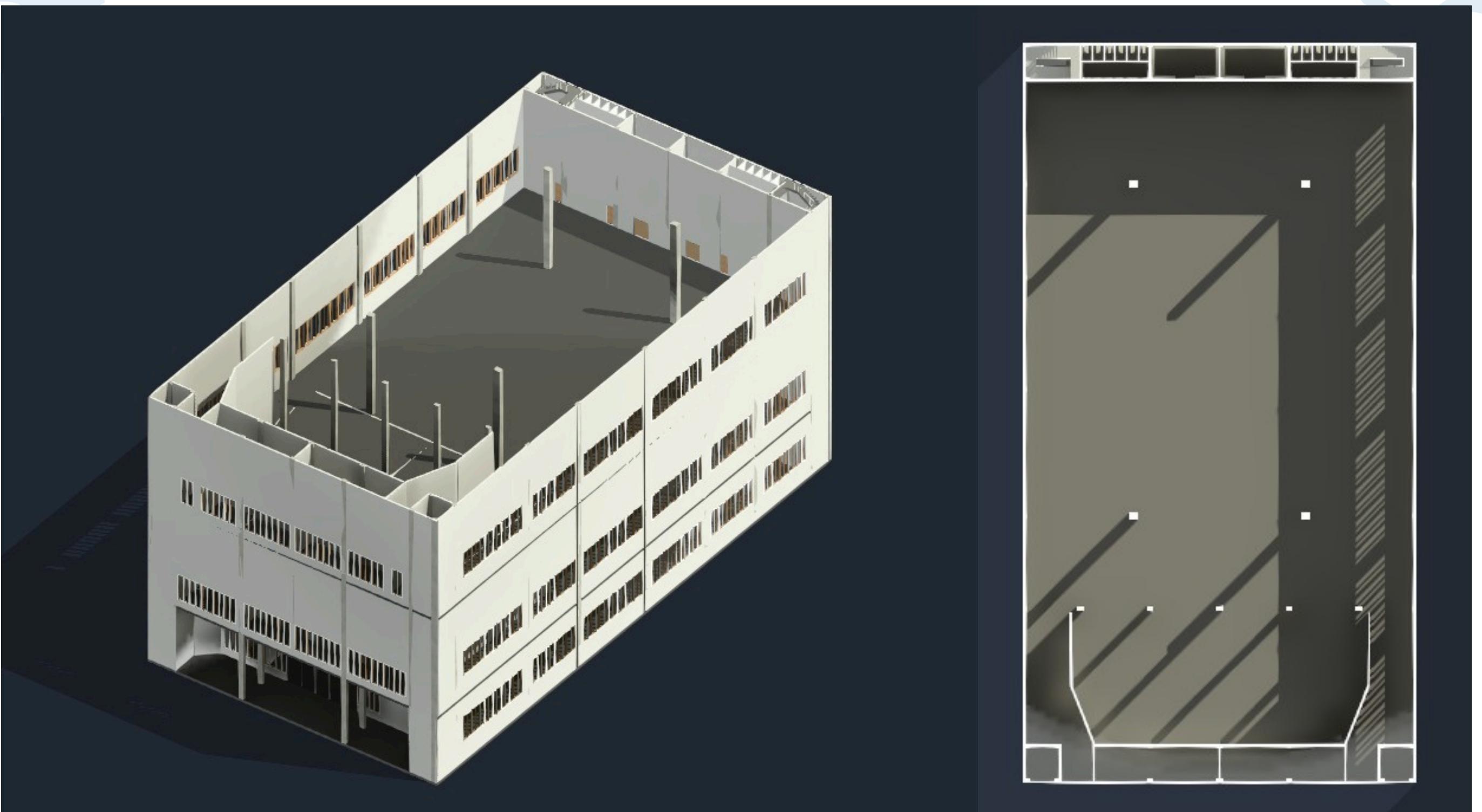
Ground Floor

3D Revit Model



1st Floor

3D Revit Model

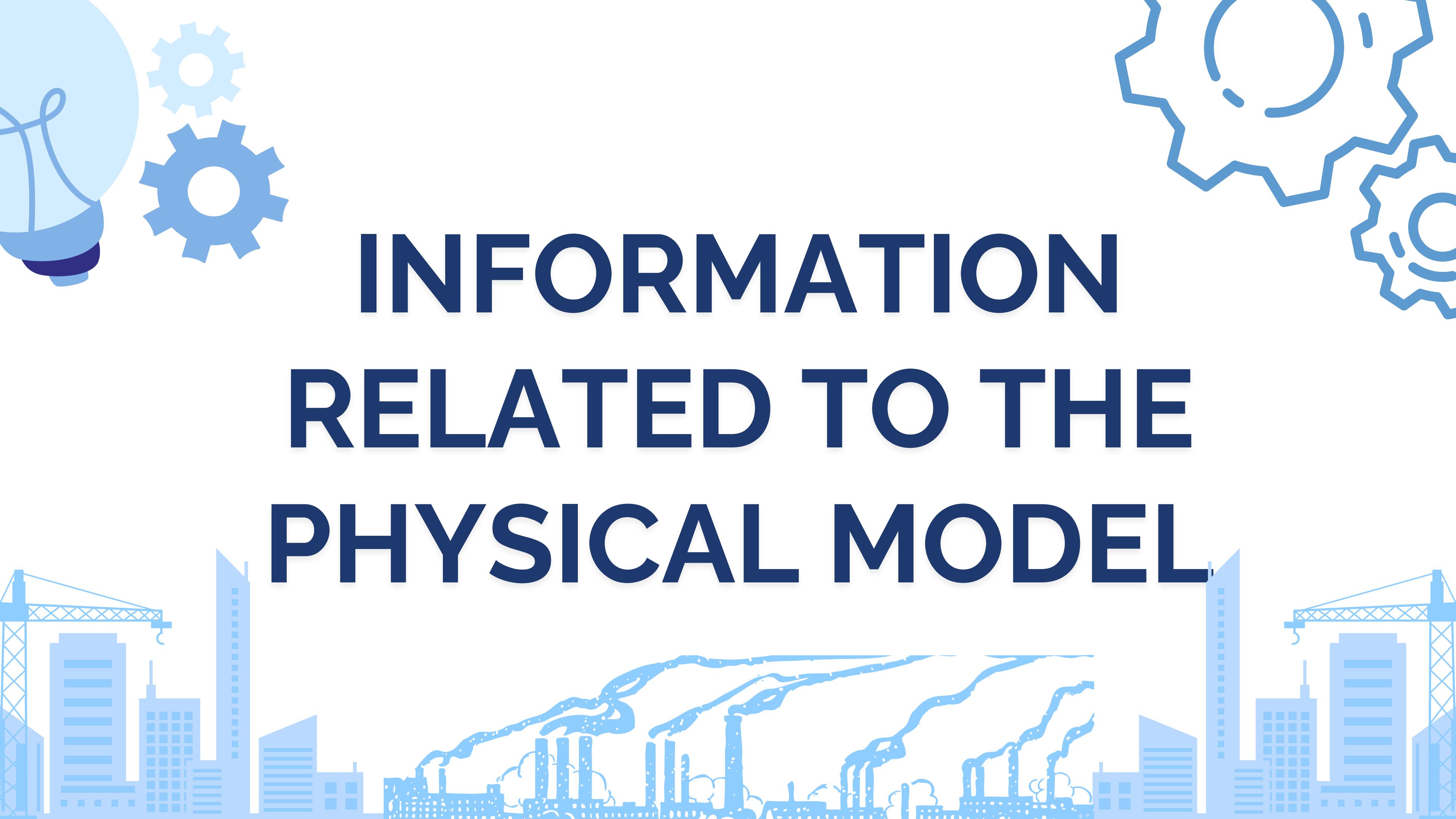


2nd Floor

3D Revit Model



3rd Floor



INFORMATION RELATED TO THE PHYSICAL MODEL

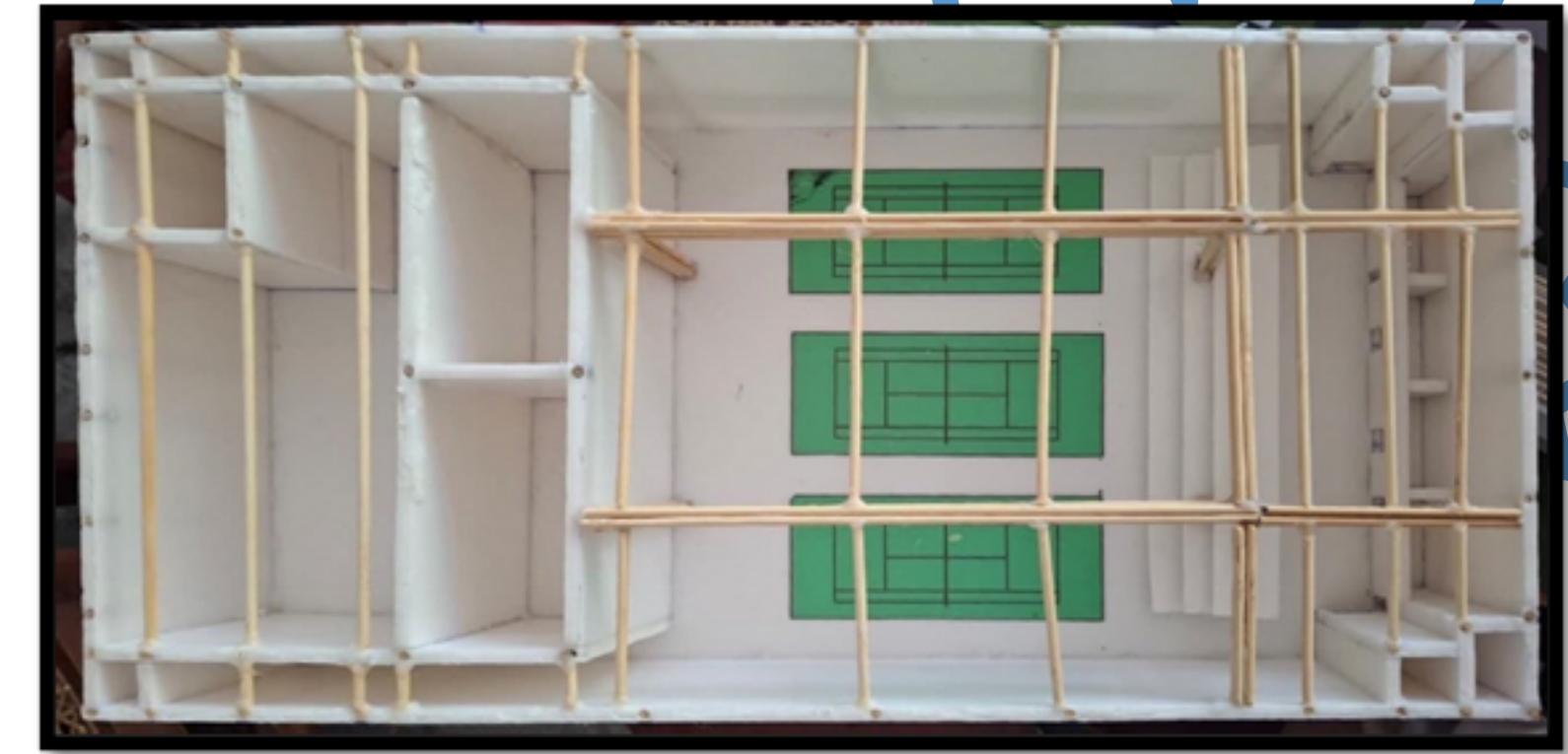


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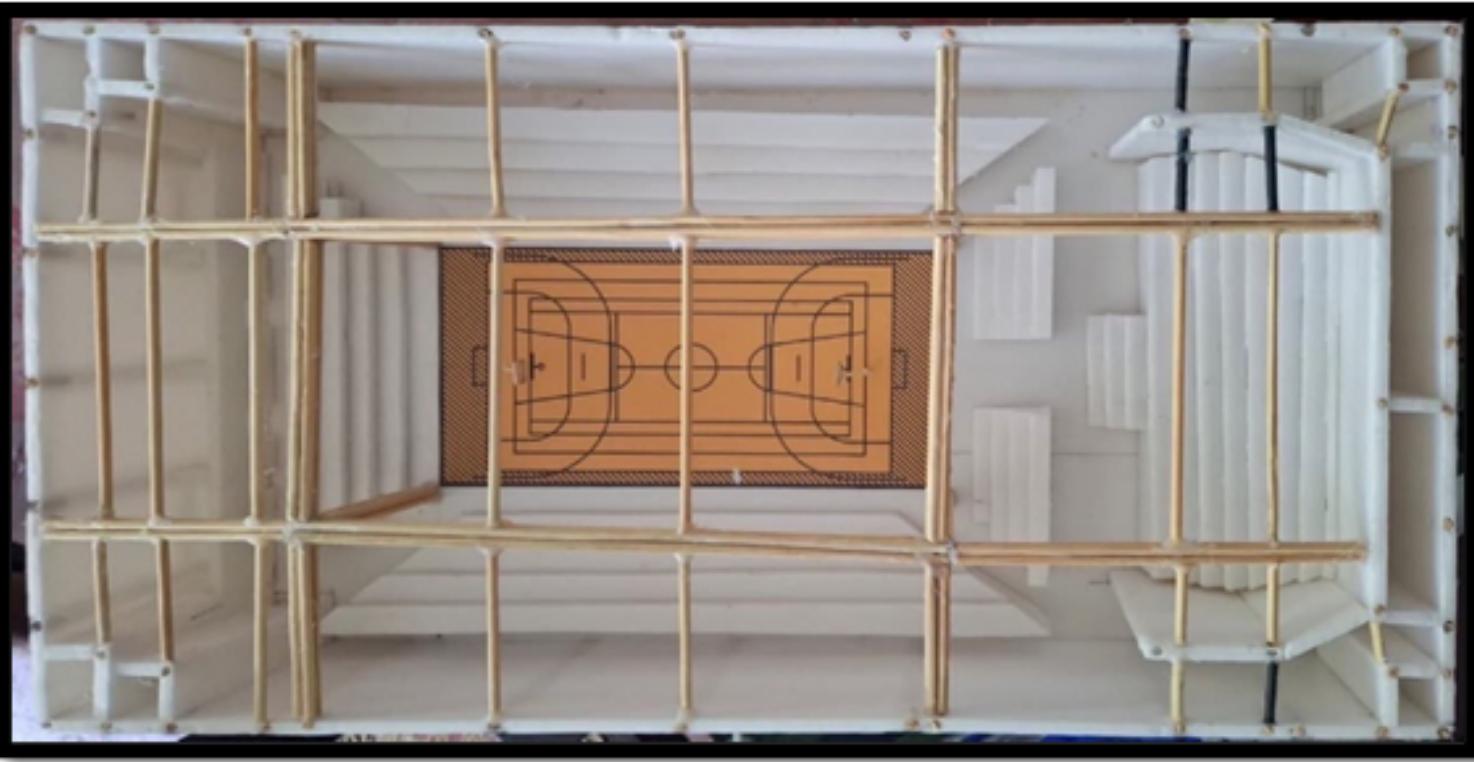




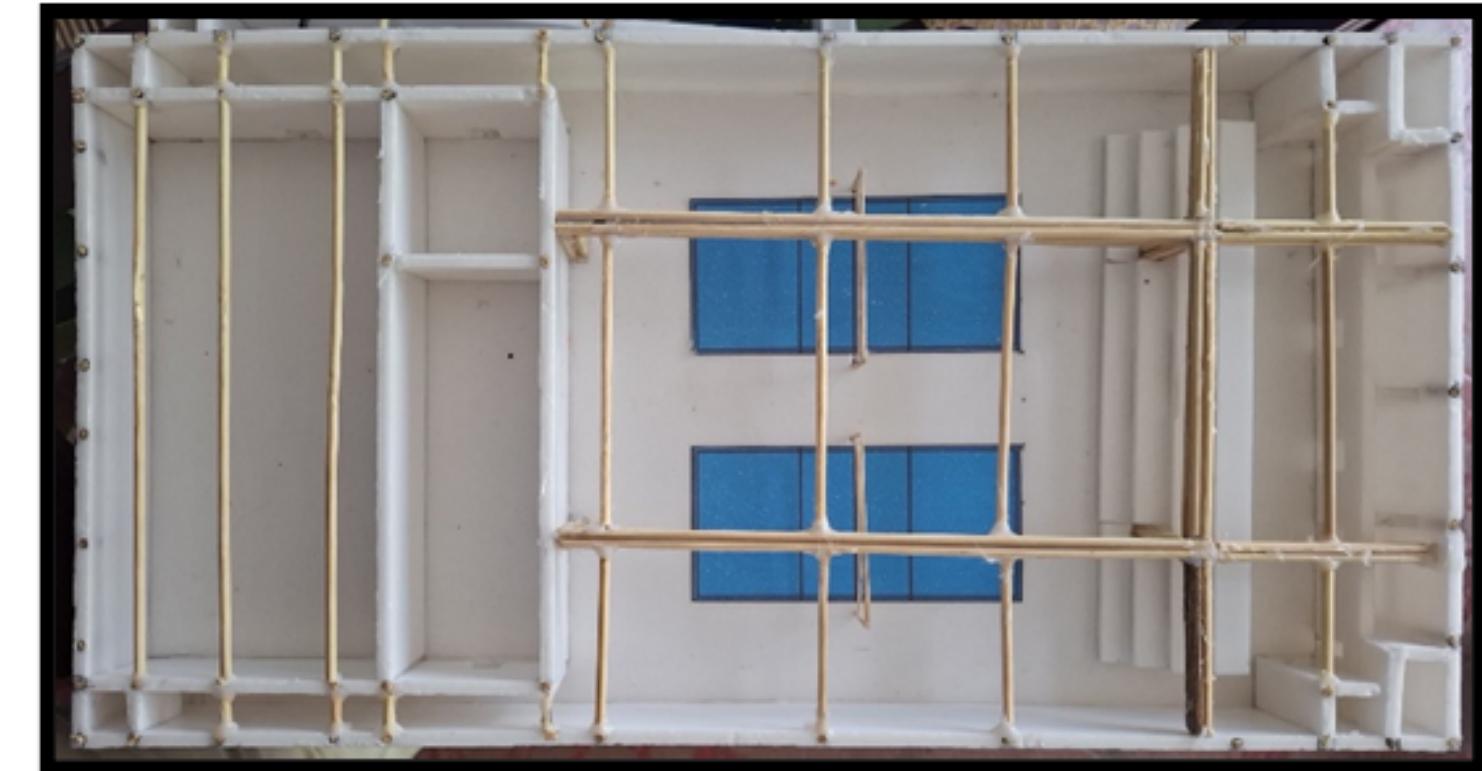
Ground Floor



1st Floor



2nd Floor



3rd Floor

Choice of Materials

Component
Walls

Roof

Roof structure

Beams & Columns

Windows

Staircase

Stadium seating

Prototype Material

Concrete blocks

Zinc-aluminum sheets

Steel truss

RCC

Tempered glass + Aluminum frames

RCC + Steel handrail

Steel + Plastic chairs

Model Material

Foam boards

Paper sheets

Wooden sticks

Wooden sticks

Paper

Hardboard + Paper

Foam board

Structural Connections

Connection	Prototype	Model Representation
Column-Beam	Reinforced concrete joints	Wooden sticks glued at intersections
Beam-Beam	RCC intersections	Wooden sticks glued together
Truss Connections	Bolted steel	Overlapping wooden sticks glued
Staircase	RCC slab + steel handrail	Hardboard slab (landings) glued to paper stairs
Roof to Columns	Steel trusses	Wooden sticks pinned to top column positions



Load Paths

3rd Floor

Roof sheets → Roof trusses → Columns → Foundation

2nd Floor

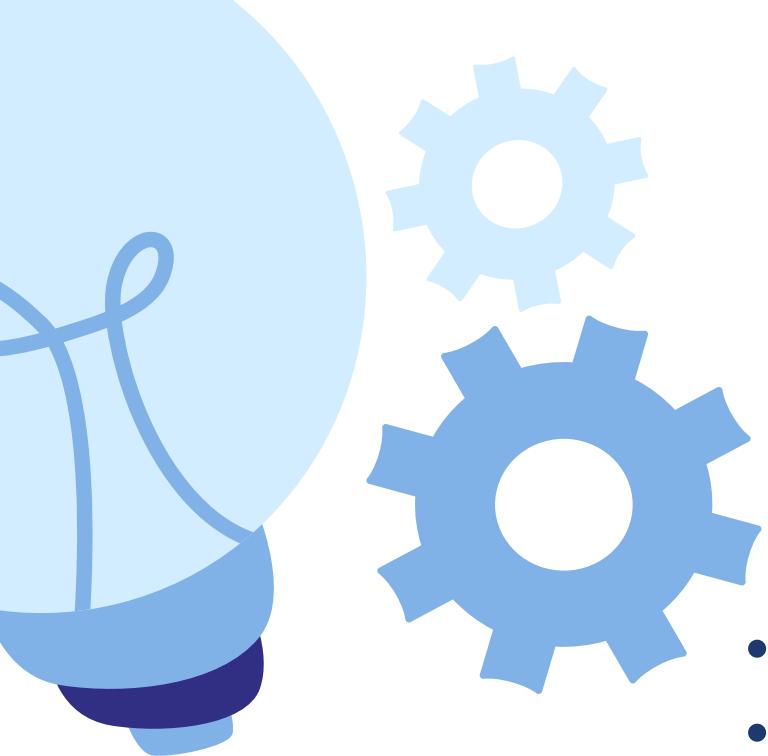
2nd floor slab → Beams → Columns → Foundation

1st Floor

1st floor slab → Beams → Columns → Foundation

Ground Floor

Ground floor slab → Beams → Columns → Foundation

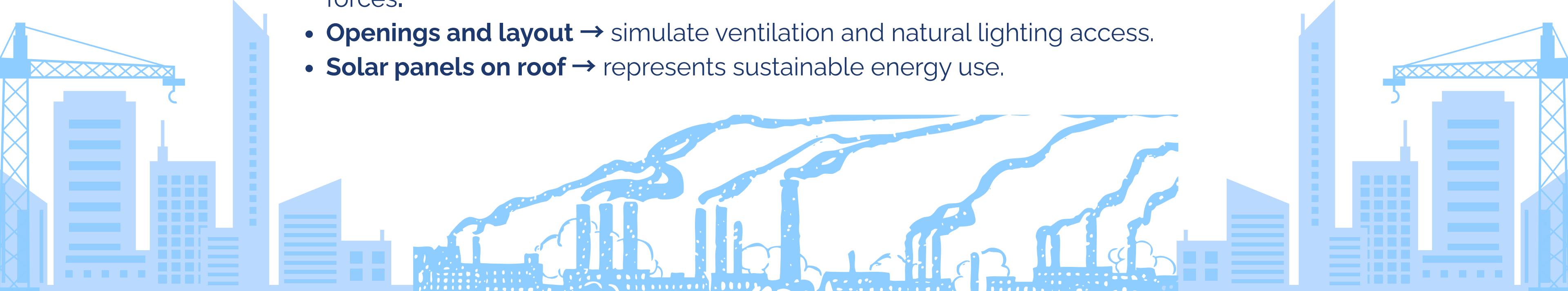


Stability Considerations of Physical Model

- **Foundation:** Regiform on wooden base provides stability and prevents tipping.
- **Roof trusses:** Diagonal sticks simulate tension/compression for rigidity.
- **Walls:** Foam boards glued together and to floor plates for lateral stability.
- **Columns:** Wooden sticks inside walls provide vertical support.
- **Beams:** Multiple sticks glued together carry scaled floor and roof loads.

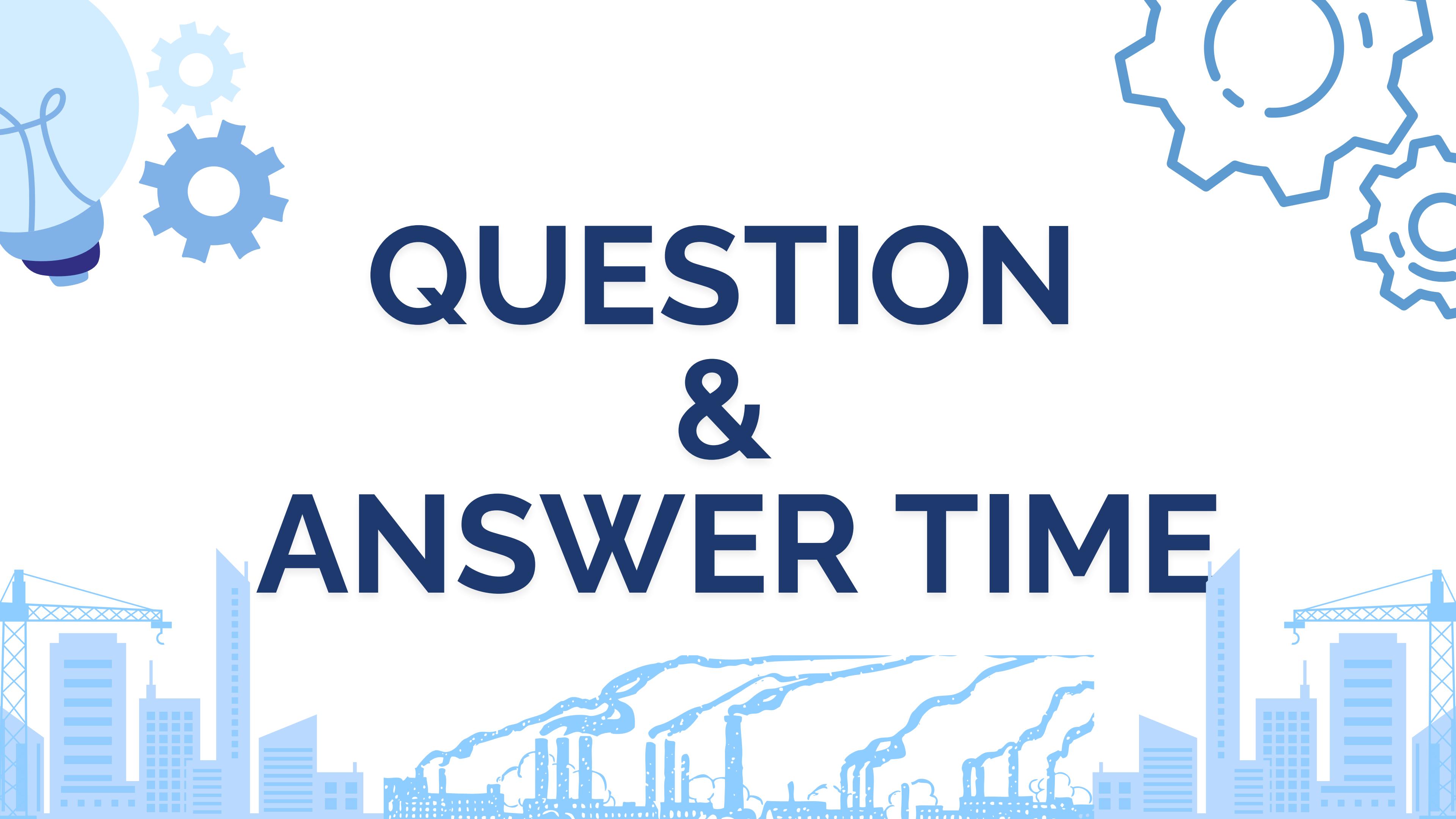


Environmental Factors

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- **Roof slope and coverage** → simulates rainwater drainage and sun protection.
 - **Wall and roof connections (Truss diagonals)** → show resistance to wind/lateral forces.
 - **Openings and layout** → simulate ventilation and natural lighting access.
 - **Solar panels on roof** → represents sustainable energy use.



**THANK
YOU**



QUESTION & ANSWER TIME