RHIKE PARK TBILISI MUSIC THEATRE EXHIBITION HALL

BUILDING DISMANTLING WORKS

TECHNICAL METHOD STATEMENT AND OPERATIONAL PROCEDURE

Istanbul, 22 December 2025
T25109 – Method Of Statement

The dismantling and stacking of the facade and roof glazing/panels, glass and panel connection profiles, load-bearing steel structures such as columns and beams, and all steel components constituting the shell of the 'RHIKE PARK TBILISI MUSIC THEATRE EXHIBITION HALL' buildings, to be deconstructed in Tbilisi, Georgia, shall be carried out according to the following method.

Cem AKTURK

SAYTEKNO – Steel & Freeform Fabrication & Installation Technology Group

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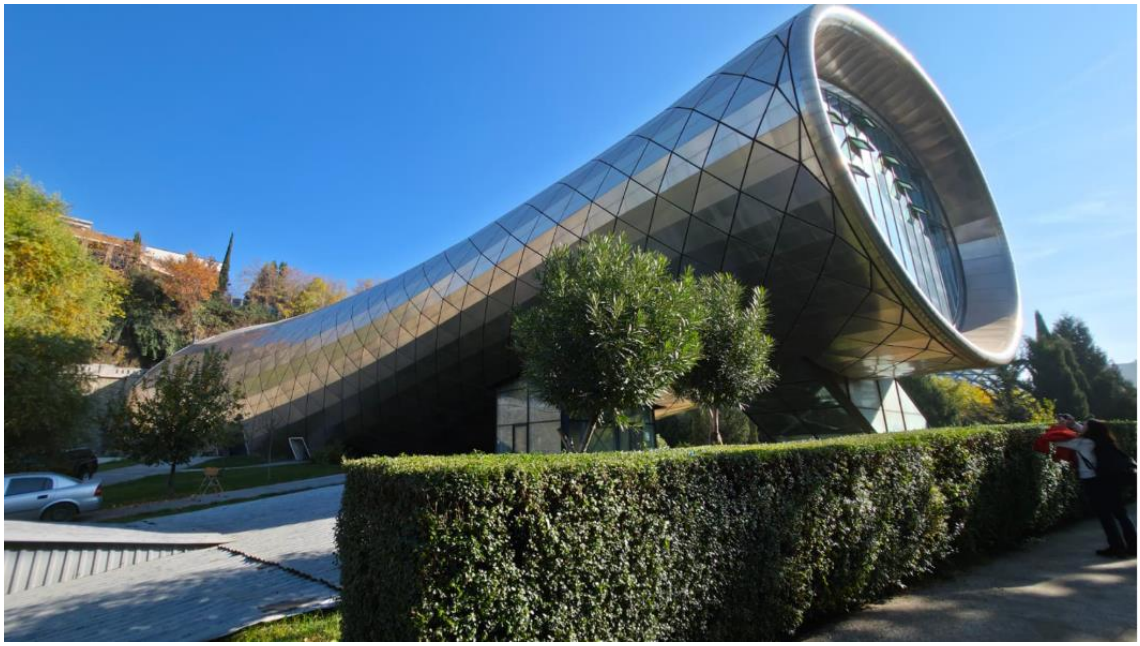
METHOD STATEMENT OVERVIEW

This project involves the dismantling of two iconic structures with complex cylindrical geometries for which no current as-built projects exist, while maintaining their static integrity and preserving material quality.

The dismantling method is based on the principle of creating a **Digital Twin** of the existing structures using **Reverse Engineering** focused and scientifically grounded methodologies. The structures will first be constructed in a digital environment, dismantling scenarios will be simulated on this model, and subsequently, operational applications will be executed on-site.



1. PROJECT DESCRIPTION AND SCOPE

The scope of the project includes the engineering (design), dismantling, coding of components, and stacking in a manner suitable for re-installation of two steel structures located in Tbilisi, which feature a horizontal cylindrical form and are clad with glass and stainless steel facades.

- **Job Description:** Dismantling and Digital Archiving of Iconic Amorphous Steel Structures.
- **Location:** Tbilisi, Georgia.
- **Contractor:** SAYTEKNO – Onesteel Yapı Teknolojileri Ltd. Şti.
- **Total Surface Area:** Approx. 5,000 m².
- **Total Steel Weight:** Approx. 3,500 Tons.
- **Building 1:** Features bolted connection details.
- **Building 2:** Features on-site welded and partially bolted connection details.
- **Current Status:** No as-built projects are available.

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1.1. Scope of Work

- 3D Laser Scanning, Revit, and Tekla modeling engineering services.
- Preparation of dismantling detail projects and determination of part codes in a digital environment.
- Static analysis required for dismantling.
- Physical marking of all parts and creation of reference lines.
- Dismantling of roof and facade cladding panels (glass/stainless steel).
- Dismantling of the steel load-bearing system.
- Damage-free stacking of materials and preparation for transport.
- Creation of stacking maps.
- Preparation of detailed re-installation projects.
- Dismantling of Electrical and Mechanical (E&M) installations (must be completed prior to structural dismantling).
- Demolition and excavation of reinforced concrete sections (stairs, floors, elevator shafts, foundations, etc.).

2. ORGANIZATION AND RESOURCES

2.1. Human Resources

- **White Collar (2-3 Persons):** Project Manager (Operations and Client Relations), Site/HSE Manager (Dismantling supervision and Safety).
- **Blue Collar (20-24 Persons):** Cutting Operators (Oxygen/Argon), Glass/Panel/Steel Assembly and Dismantling Specialists (Riggers & Slingers), Assistants.

2.2. Equipment and Machinery

- Mobile Cranes: Tonnage to be determined based on part weights derived from the model.
- Platforms: Articulated Manlifts and Spider Platforms (for interior access).
- Laser Scanner: Leica/Trimble or equivalent.
- Cutting Tools: Oxygen/Acetylene or manual plasma cutting sets.
- General: Hand tools, marking pens, torque wrenches, horizontal transport vehicles.

The following equipment is planned to be used for the execution of the work. The final equipment list will be finalized upon the completion of the structural modeling of the buildings.

- 2 units of 40-50 ton capacity cranes (for Glass and Panel dismantling)
- 2 units of 80-100 ton capacity cranes (for Steel dismantling)
- 4 units of manlifts (42-meter articulated manlifts)
- 1 unit of transport vehicle (for on-site transfer)
- Stacking and storage materials (Glass/panel racks, wooden wedges/dunnage, lashing and protection materials)

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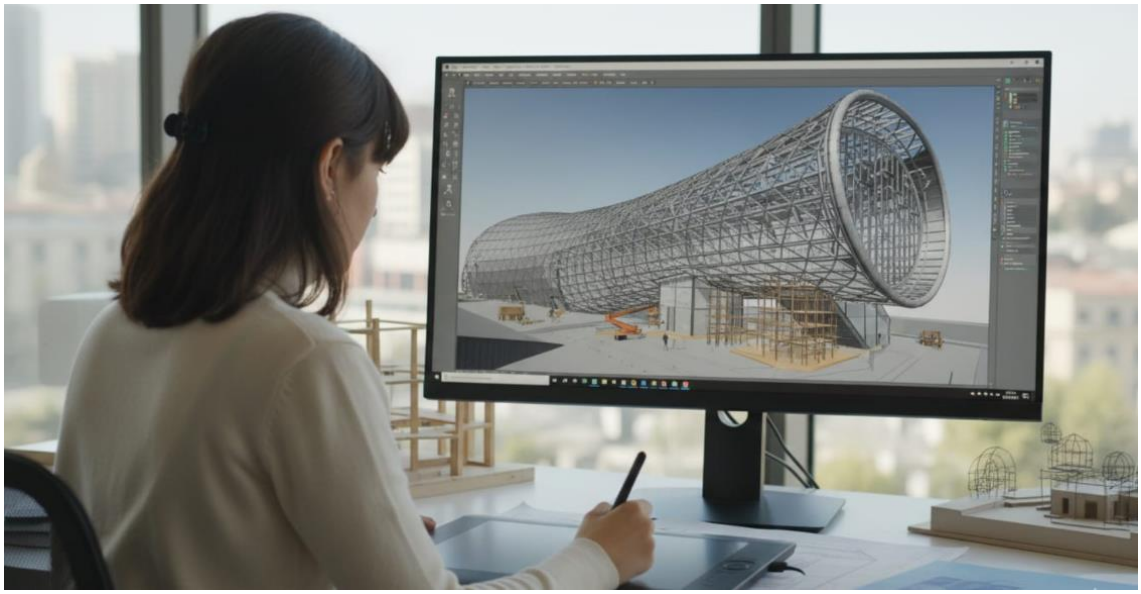
3. PREPARATION AND ENGINEERING PROCESS

The absence of as-built projects for the buildings will be compensated for through the utilization of modern measurement technologies. Prior to the dismantling process, a **"Reverse Engineering"** approach will be implemented to design and project the buildings within a digital environment.



3.1. 3D Laser Scanning (LIDAR)

The internal and external geometry of the structure will be scanned using LIDAR scanners with millimetric precision to create a "Point Cloud" consisting of billions of points.

3.2. Revit Modeling

The Point Cloud obtained via laser scanning will be processed in the Revit environment to precisely recreate the architectural and structural geometry of the building. By determining the types of all structural elements within the Revit model, data will be generated for the Tekla Model. Existing joints and connection details of the parts will be shown in the Revit model.

3.3. Tekla Xsteel Structural Modeling

The obtained data will be transferred to the Tekla Structures (Xsteel) environment, where each individual facade and roof panel (glass, stainless steel) and all steel elements (columns, beams, purlins, braces) will be modeled one by one. A unique identification number (ID) will be assigned to each part. Final quantities (bill of materials) will be obtained upon the completion of the Tekla model.

3.4. Dismantling Detail Projects and Dismantling Scenario

For Welded Joints: Cutting points and all associated reference lines will be determined based on static evaluation results and transport limits (truck length/width), preferring points where the moment is near zero, and these will be integrated into the model.

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For Bolted Joints: Bolted connection details will be processed into the Tekla model in line with the data received from the Revit model, and these points will be taken into account in the dismantling scenario.

A unique ID will be assigned to each part (e.g., B1-AKS3-K01). These projects will be provided to the dismantling teams in the form of drawing sheets (shop drawings).

3.5. Dismantling Scenario Static Evaluation

Load transfers that will occur during the dismantling of the steel carcass will be analyzed on the model. "Temporary Propping/Bracing" points will be identified for critical stages where the structure cannot support itself. Temporary supports will be placed at these points, or the suspension method using auxiliary mobile cranes will be utilized to ensure the safe dismantling of the structure.

4. MARKING AND REFERENCE SYSTEM

To achieve 100% precision during re-assembly, the following specific procedures will be applied:

4.1. ID Marking

Every glass unit, stainless panel, and steel part shall be coded via indelible markers or cold marking as designated in the Tekla model and dismantling drawings. All coding must be executed meticulously by qualified personnel according to the project requirements.

4.2. Match-Marking (Reference Lines)

The reference line application will be implemented exclusively at welded connection zones and for components that require cutting during dismantling. Prior to cutting, a linear reference line—precisely **200mm** in length—will be drawn on the component using a specialized indelible marker. These lines will be drawn on at least two different axes and positioned perpendicular to the intended cut line.

The cutting process will be executed exactly through the center of these reference lines. The cut locations, and consequently all reference lines, will be determined based on static evaluation results, with a preference for points where the **bending moment is near zero**.

Scientific Basis: Micro-expansions that may occur after heat treatment (cutting) or angular deviations during re-assembly will be eliminated thanks to the 200mm fixed reference lines. When these two lines are aligned and the distance is verified as 200mm during re-installation, the structure is restored to its original 3D coordinates.

5. DISMANTLING PROCEDURE

Dismantling works will commence following the procurement of the necessary demolition permits and work authorizations from local authorities. The dismantling process will proceed from top to bottom, based on the **"Top-Down" (Reverse Construction)** principle. The outer shell will be dismantled first. Steel construction and concrete dismantling works will be carried

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out sequentially and simultaneously. During the dismantling process, a **5% wastage rate** for glass, stainless steel panels, and structural steel will be considered "standard/allowable."

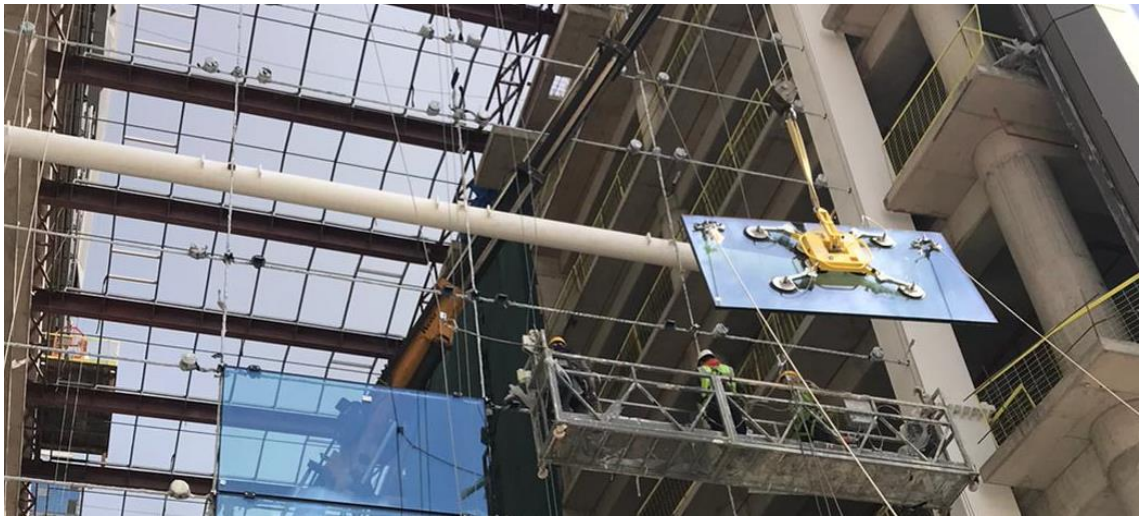
5.1. Site Safety and Access

- The working area will be surrounded by a security perimeter/tape and will be closed to pedestrian and vehicular traffic.
- All kinds of portable obstacles such as trees, small-scale structures, etc., that may hinder the dismantling works, will be removed and relocated without compromising their integrity or quality.
- Access roads for the movement of cranes and manlifts will be established, and the working areas will be improved/rehabilitated.
- Ground information (bearing capacity) for the crane installation areas will be requested from the relevant institutions and organizations.
- After the engineering and design phase is completed, crane placements will be indicated on the site plan (layout), taking load lifting charts/diagrams into account.

5.2. Outer Shell (Glass and Stainless Steel Panel) Dismantling

- Panel dismantling will commence from the highest point, taking wind loads into account.
- If silicone is present in the joints between glass and stainless steel panels, it will be cut to provide access to the connection screws.
- After being marked in accordance with the project drawings, glass and stainless steel panels will be dismantled by unscrewing the connection fasteners without damaging the panels.
- To prevent scratching of the glass and stainless steel panels, "non-marking" vacuum suction cups and polymer-based protectors will be utilized.
- The secondary sub-frames (carcasses) of the panels will be dismantled and stacked after being marked.

Attention: Wind speed will be monitored continuously during the dismantling of the glass.



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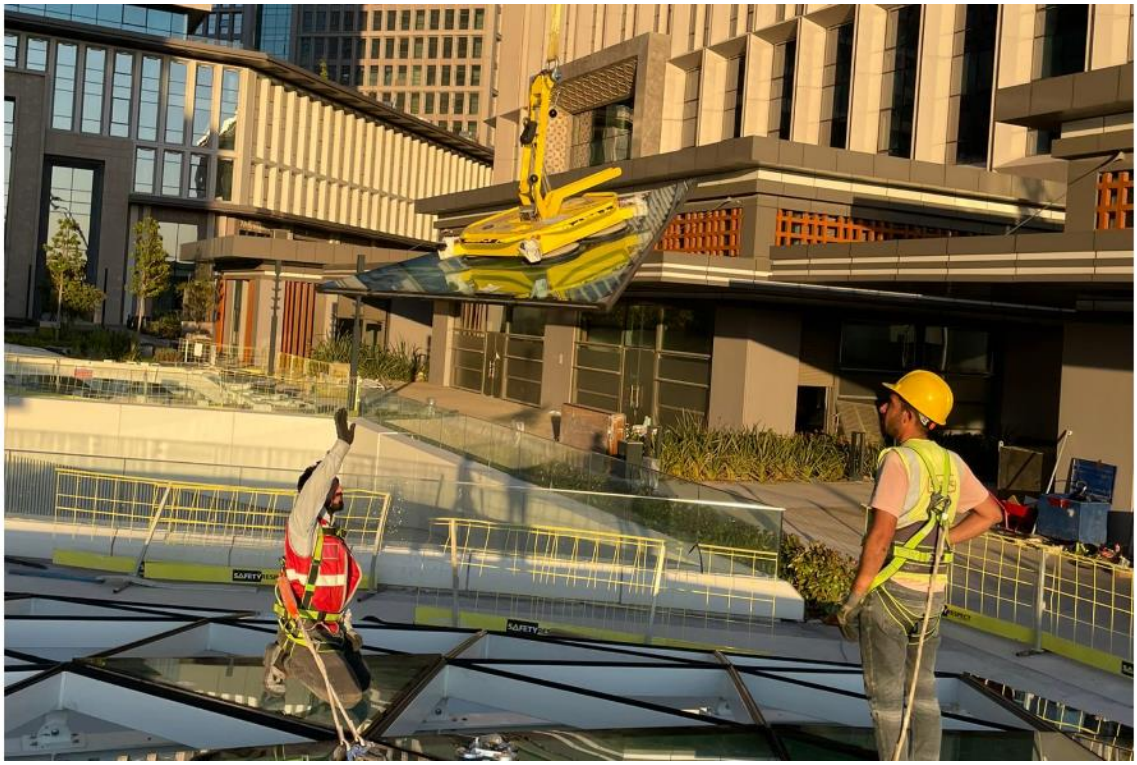

5.3. Steel Construction Dismantling

5.3.1. Dismantling of Bolted Connections:

- The component is suspended by a crane using appropriate connections (to ensure no load is applied to the joints).
- Based on the stability analysis performed on the model, methods such as temporary steel tensioners, shoring towers, or suspension with auxiliary cranes are used to prevent **buckling** during dismantling.
- All necessary safety measures are taken to prevent the component from swinging freely during the dismantling process.
- Bolts are loosened using nut runners/impact wrenches; in cases where these are insufficient, electric or hydraulic torque wrenches are utilized.
- Corroded bolts are cut under controlled conditions.
- Bolts are removed.
- Removed bolts are placed in bags labeled with the part code (e.g., M35*50).
- Once the dismantling process is complete, the parts are lowered to the ground and stacked after taking necessary site safety precautions.

5.3.2. Dismantling of Welded Connections:

- The markings (ID) and reference lines, determined by the engineering office and applied by the expert team, are verified.
- The cutting line is marked to run through the center of the reference lines and perpendicular to them.

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- The component to be cut is fully suspended by the crane, and the load is transferred to the crane (wire rope tension is strictly controlled).
- Based on the stability analysis performed on the model, methods such as temporary steel tensioners, shoring towers, or suspension with auxiliary cranes are utilized to prevent **buckling** during dismantling.
- All necessary safety measures are taken to ensure the component does not swing freely during the cutting process.
- Cutting is performed using the designated method (oxygen or argon) in a manner that does not disturb the static equilibrium.
- Once cut, the component is lowered to the ground and temporarily stacked following the implementation of site safety measures.
- Fire blankets, fire extinguishers, and fire watchers will be present and ready during all cutting operations.

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5.3.3. Reinforced Concrete Dismantling

Concrete dismantling works will be performed in coordination with the dismantling of the steel load-bearing system. Considering that conventional demolition methods may cause resonance and permanent deformation in amorphous steel structures, the adoption of the **"Vibration-Free Cutting and Breaking"** method is recommended.

- Slabs are marked in blocks (e.g., 2m x 2m) suitable for the crane capacity.
- To prevent collapse during concrete cutting and to stop the free fall of cut sections, floors and beams that are entirely reinforced concrete and hinder the steel dismantling will be supported from below with temporary scaffolding/shoring. Temporary supports will not be required for steel composite decks.
- Reinforced concrete slabs are cut into blocks from the marked points using methods such as **Diamond Wire Sawing, Hydraulic Concrete Cutting, Circular Sawing, Pneumatic or Electric Breakers, and Core Drilling.**
- Vertical reinforced concrete systems such as **Elevator Shafts, Gallery Voids, Stairwells, Shear Walls, and Concrete Columns** are demolished using the **"Top-Down"** method with hydraulic concrete crushers, pneumatic or hydraulic breakers.
- The cut concrete blocks are evacuated from the structure using cranes or horizontal transport equipment (pallet jacks, forklifts, etc.).
- Dismantling of the foundations will commence after the main anchorage points of the steel structure have been removed.
- All necessary precautions will be taken on-site during foundation breaking to ensure that surrounding buildings and roads are not affected.
- Foundation breaking is carried out using **20-30 ton excavators** equipped with high-impact hydraulic breakers.
- During excavation carried out simultaneously with foundation dismantling, an analysis of the Georgian soil structure will be performed (considering Tbilisi's generally clayey and rocky soil composition).

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- To protect neighboring plots, temporary **"Shotcrete"** or **"Shoring/Retaining"** systems will be applied if necessary.
- **High-pressure water pulverization systems (dust cannons)** will be utilized throughout the breaking and excavation phases to suppress dust.
- Before commencing foundation breaking, all existing non-displaced **electrical, water, and gas utility lines** will be identified and mapped.

6. SAFETY MEASURES AND RISK MANAGEMENT (HSE PLAN)

This project is classified as **"High-Risk Work."** Full compliance with Georgian national standards and international **(OSHA)** standards will be ensured.

6.1. Working at Height:

- All personnel will have completed **"Working at Height Training."**
- The use of a **full-body harness (parachute type)** with a **double-leg lanyard** is mandatory.
- Personnel must strictly be tied off/anchored to the **manlift basket** at all times.

6.2. Lifting Operations:

- All slings, shackles, and cranes must be certified.
- Standing or passing under a suspended load is strictly prohibited.
- Radio communication will be maintained between the Rigger/Slinger and the Crane Operator.
- For each component; the crane load chart, sling angle, and wind speed limits will be pre-determined and planned.

6.3. Hot Work:

- No flammable materials shall be kept beneath the areas where welding or cutting is performed.
- A fire extinguisher and a "Fire Watcher" must be present at every cutting point.

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6.4. Personal Protective Equipment (PPE):

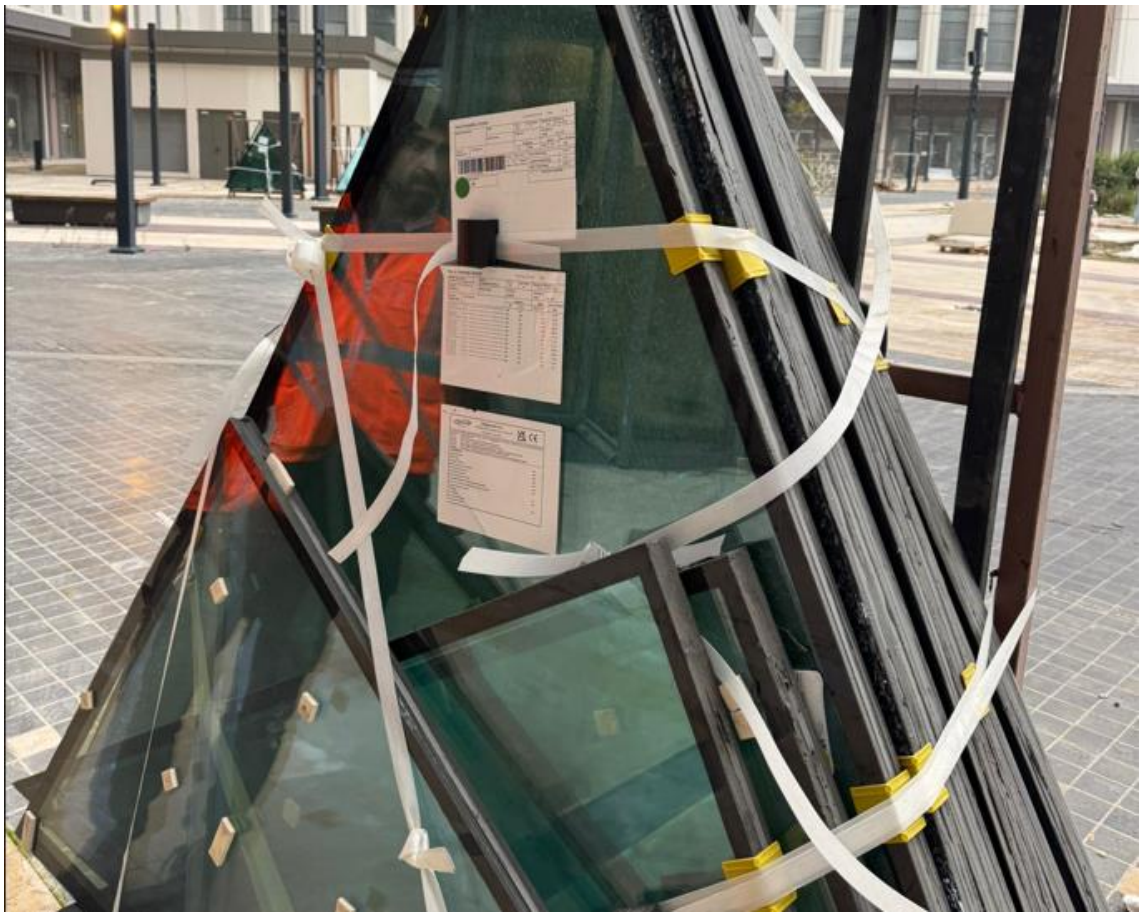
- Hard hat (helmet), reflective vest, and steel-toed safety shoes are standard.
- For personnel performing cutting: Leather apron, dust mask, and a face shield with appropriate filters.

6.5. Waste Management:

- All resulting consumables and waste materials will be categorized and directed to licensed disposal facilities.

7. STACKING AND DELIVERY

- Dismantled components will be grouped according to the installation sequence in the Tekla model or based on transportation priority.
- Wooden spacers (timber dunnage) will be placed between steel elements to prevent them from touching each other and scratching the paint during transport.
- Components will be arranged on wooden pallets or timber blocks to ensure there is no direct contact with the ground.
- Glass and sensitive panels will be transported on specialized **A-Frame racks** or in custom wooden crates.



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8. STRATEGIC RISK ANALYSIS AND CONTROL MATRIX

This matrix focuses on the top 5 most critical operational phases of the project.

8.1. Structural Stability and Risk of Unexpected Collapse

- **Risk:** Loss of lateral stability of the steel load-bearing system due to the absence of original as-built projects and the pre-demolition of reinforced concrete elements (stairs, slabs).
- **Scientific Control:** Through **Dynamic Stability Analysis**, the center of gravity and the overturning moment of the remaining structure will be recalculated after the removal of each individual component.
- **Mitigation Measure:** Temporary **Shoring** systems will be installed on the exterior of the structure where necessary. Furthermore, temporary **X-bracing** (cross-bracing) will be applied or components will be suspended using auxiliary cranes before critical node points are dismantled.

8.2. Working at Height and Falling Objects

- **Risk:** Objects falling from "negative angle" zones that are inaccessible to personnel using standard platforms due to the amorphous geometry of the structure.
- **Engineering Control:** Implementation of **"Fall Arrest Systems"** and temporary lifelines anchored to the primary spine of the building.
- **Mitigation Measure:** The ground projection area directly beneath the dismantling zone will be designated as a **"Red Zone"** and closed to all entry. For small items (bolts, hand tools), tool lanyards/tethers attached to wrists will be utilized.

8.3. Uncontrolled Load Swing (Lifting Operations)

- **Risk:** Sudden load transfer to the crane at the moment a welded joint is cut or bolts are removed, creating a pendulum effect (**Swinging**).
- **Technical Control: "Pre-tensioning."** Before cutting or dismantling begins, the crane will suspend the load with a tension of at least **60%** of the component's calculated weight.
- **Mitigation Measure: "Tag lines"** (guide ropes) will be attached to both ends of the component to allow ground personnel to control any oscillation. A dedicated radio frequency will be established for communication between the crane operator and the rigger.

8.4. Metallurgical Degradation and Fire (Hot Work)

- **Risk:** Excessive heat generated during oxy-fuel cutting causing deformation or corrosion in the primary load-bearing elements intended for reuse.
- **Scientific Control:** Management of the **Heat Affected Zone (HAZ)**.
- **Mitigation Measure:** Cutting points will be determined by leaving a sufficient allowance for future weld beveling/preparation during re-installation. In sensitive areas, argon-shielded cutting or cooling-assisted techniques will be employed. All flammable materials will be completely removed from the area prior to cutting.

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8.5. Data Loss and Geometric Deviation

- **Risk:** Re-installation becoming impossible due to the erasure of on-site markings and reference lines (e.g., the 200mm line) or the incorrect stacking of components.
- **System Control: "Digital Data Backup."**
- **Mitigation Measure:** The marking and ID code on each component will be integrated into the digital model (**BIM - Building Information Modeling**). Every part in the stacking area will be verified, and a comprehensive **stacking map** will be created.

9. RISK SUMMARY TABLE

Operation	Potential Risk	Risk Rating	Mitigation Measure
Digital Twin (Design & Engineering)	Data Gaps / Deviations	High	Point Cloud, Revit Model, Tekla Model, and Cross-Checking/Clash Detection of Existing Hard Copy Projects.
Marking	Misalignment / Incorrect Positioning	High	Marking and Reference Line Procedure and Cross-Checks
Dismantling of the Outer Shell	Fracture / Deformation	Medium	Use of Suction Lifters and Appropriate Slings
Structural Steel Deconstruction	Structural Collapse and Fire	High	Dynamic Stability Analysis and Fire Safety Protocols
Stacking	Deformation and Loss of Marking	Low	Wood Dunnage and Proper Stacking. Marking Control and Stacking Map

Important Note: This “Technical Method Statement and Operational Procedure” has been prepared under conditions of limited information, based on general engineering principles and operational expertise. It may require revisions based on the detailed engineering and necessary structural analyses of the facility, the requirements of official institutions and authorities, and specific site or safety conditions.

Prepared by: Cem Akturk

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