DREAMERS

Design REsearch, implementation And Monitoring of Emerging technologies for a new generation of Resilient Steel buildings

As-built BIM model of the building

Deliverable D5.1

WP 5 - Task 5.1: Construction, testing and structural health monitoring of the demonstration building

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1. Introduction

The digital transformation of the construction sector is a key enabler for improving efficiency, traceability, and sustainability throughout the entire life cycle of buildings. In this framework, Building Information Modeling (BIM) plays a strategic role not only during design and construction phases but also in the long-term management, monitoring, and maintenance of built assets.

This deliverable documents the digital building information model of the demonstration building as actually constructed, in full compliance with the design specifications developed in WP1–WP3. The as-built model was developed by UNISA, lead partner for this deliverable, based on on-site supervision and in collaboration with the consortium partners.

In addition to accurately reflecting the geometric and constructional features of the building, the as-built BIM model provides the foundational digital environment for integrating structural health monitoring (SHM) data and managing future maintenance interventions. Specifically, it offers an interoperable and up-to-date platform to support advanced SHM strategies, enabling real-time performance assessment, risk-informed decision-making, and predictive maintenance planning.

The availability of a BIM model consistent with the actual built structure is a major asset for the DREAMERS project, promoting the development of scalable and transferable methodologies for the construction of resilient, intelligent, and sustainable steel buildings.

In the following, several screenshots from the BIM .ifc file are provided, highlighting the presence of structural elements, finishes, and service installations. The .ifc model has been opened using a third-party BIM viewer to demonstrate the interoperability of the file, independently from the native authoring software.

2. Description of the BIM file

The as-built BIM model has been developed using a BIM software and is provided in the interoperable open formats (.ifc) to ensure accessibility and future integration with other platforms. The model includes a detailed three-dimensional representation of all structural and non-structural components, consistent with the final construction stage. The modeling process was based on technical documentation provided by the general contractor and updates from specialized units during the construction phase and site ispections.

All primary structural elements (columns, beams, slabs, bracings) have been modeled with exact geometry and positioning, based on the approved construction drawings and verified measurements. Non-structural components supplied by KNAUF, including partition walls, claddings, and false ceilings, are also represented, with attention to their physical and functional integration within the building envelope. Moreover, also the implants and all the finishings are implemented.

The BIM file is structured according to industry standards and includes metadata for each element (materials, dimensions, codes), enabling its use for asset management, facility maintenance, and structural monitoring. The model achieves a Level of Development (LOD) 350, with accurately modelled structural components (e.g., steel columns and beams, composite slabs, bracings) and non-structural components (partition walls, internal linings, false ceilings). Element geometry, location, and orientation are faithfully represented according to as-built surveys and technical documentation.

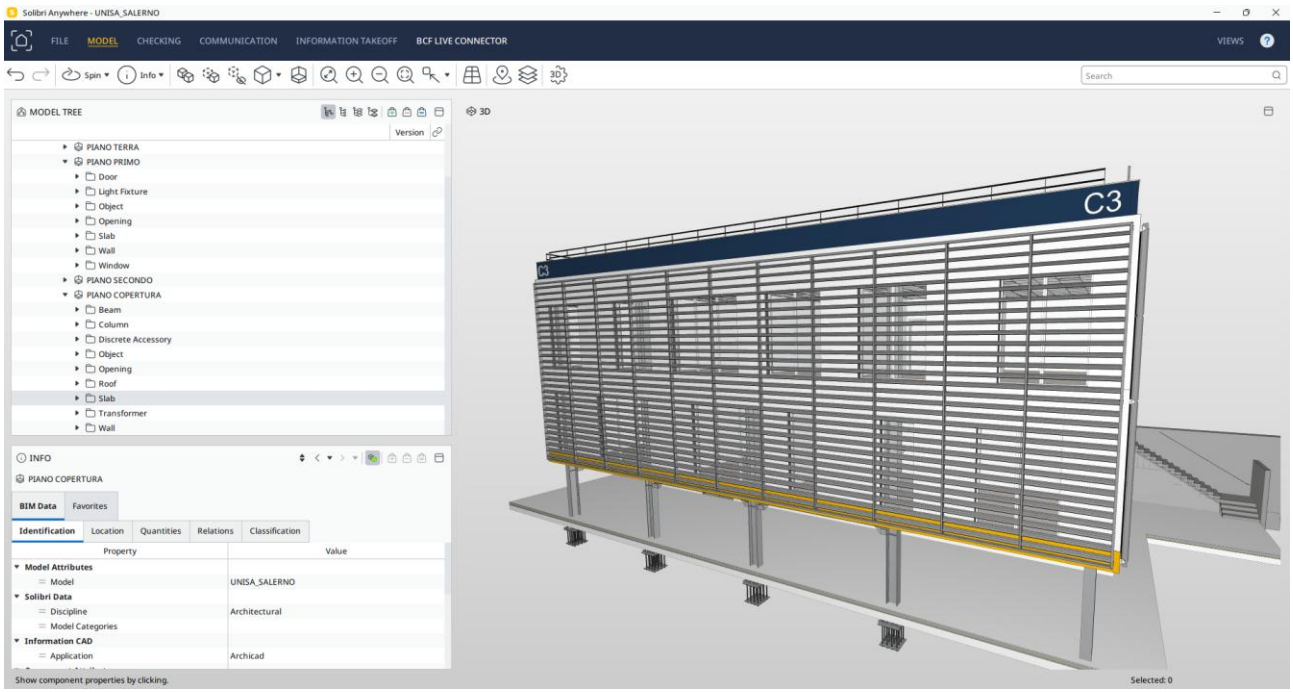

Figure 1. Main façade view

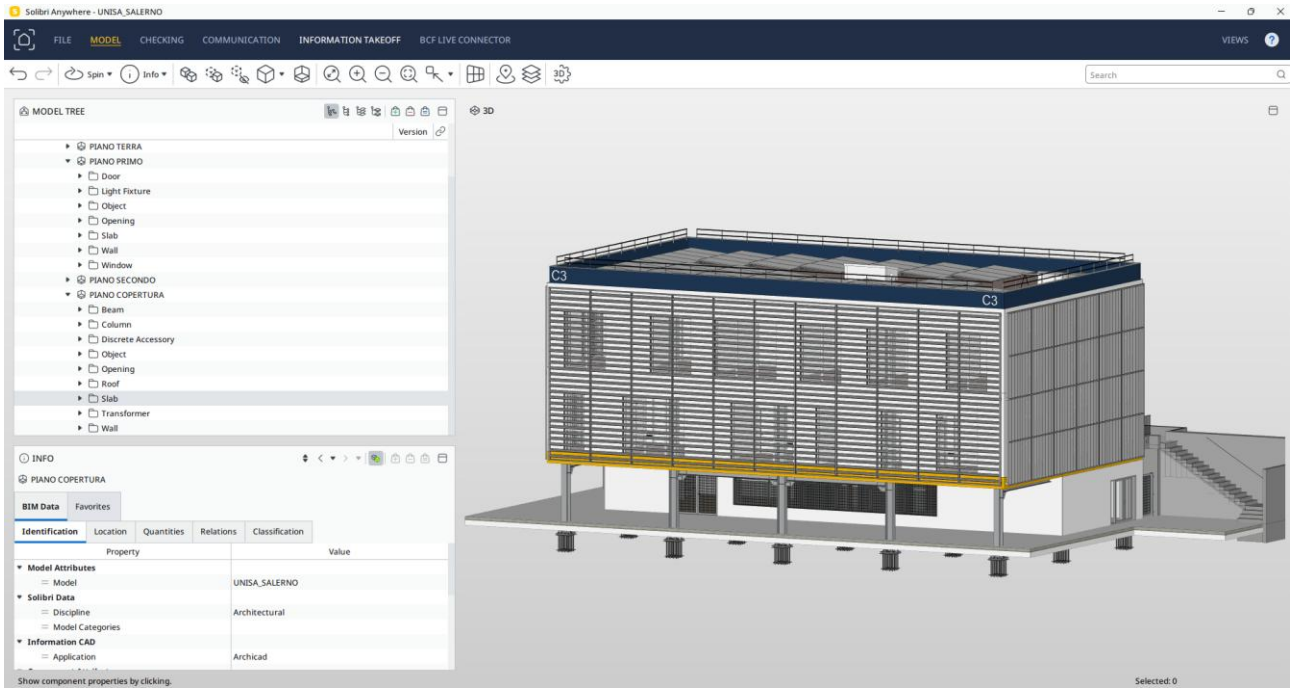

Figure 2. A larger view of the main façade

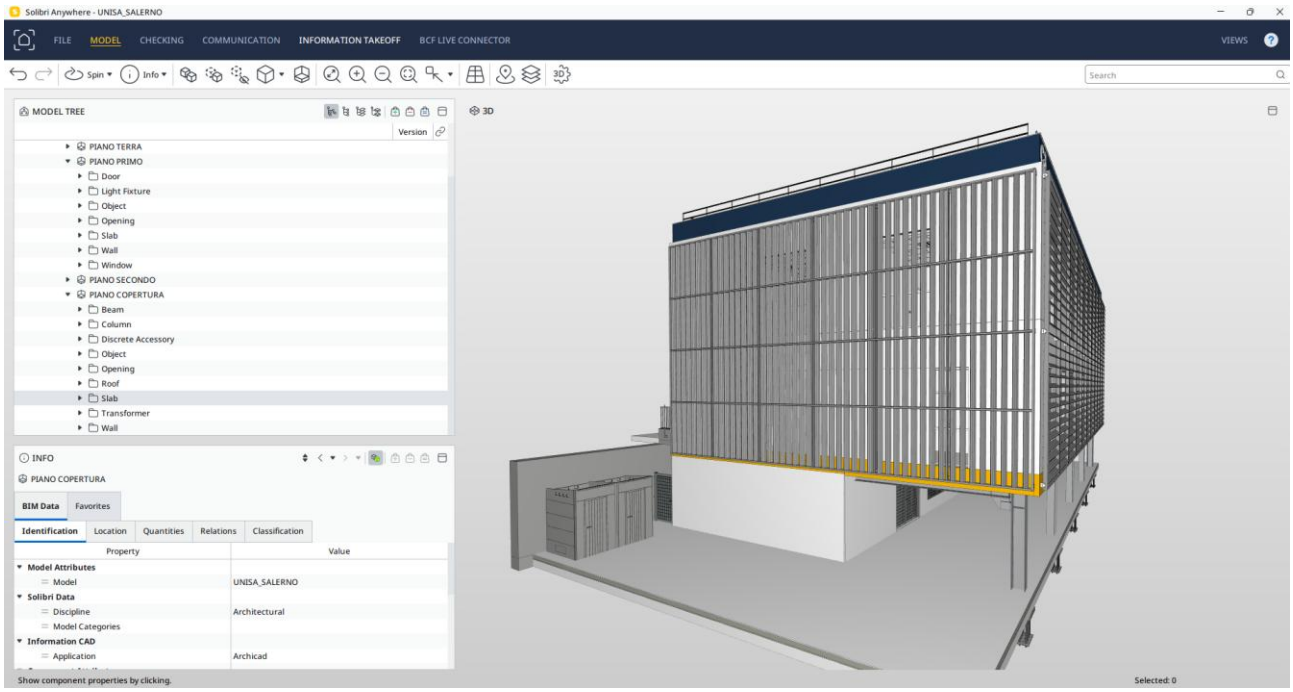

Figure 3. Side view

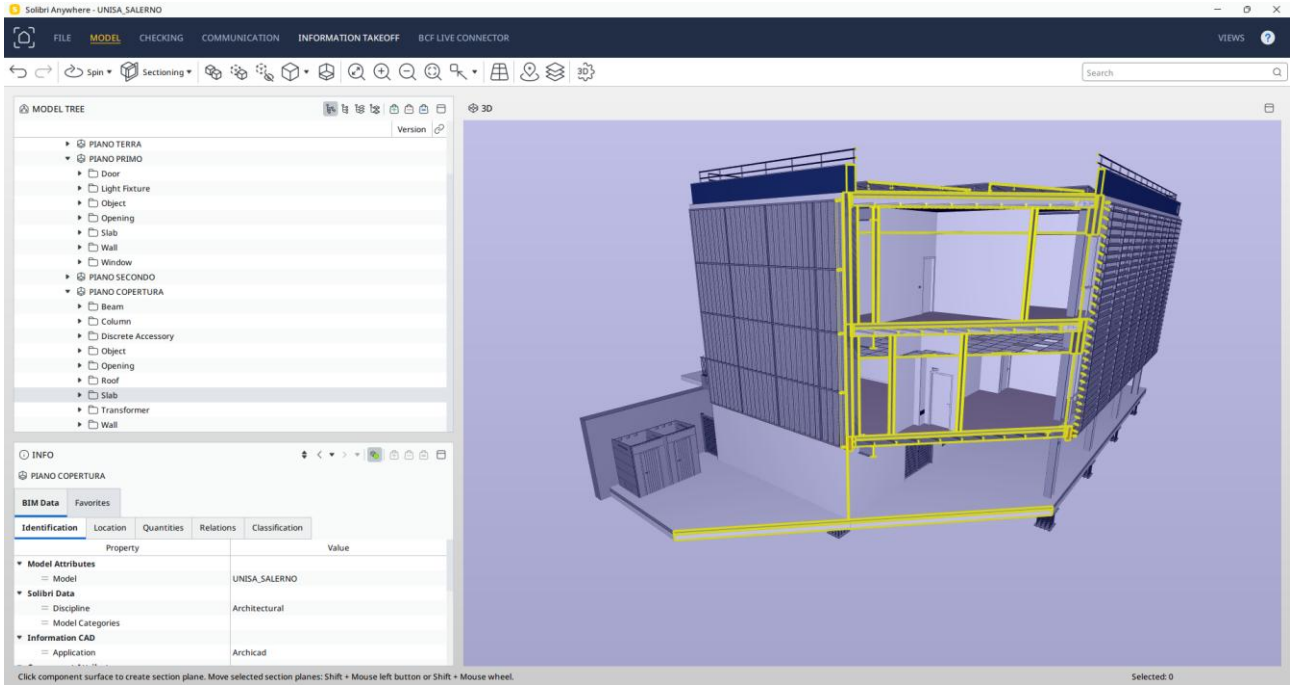

Figure 4. Partition section of the building

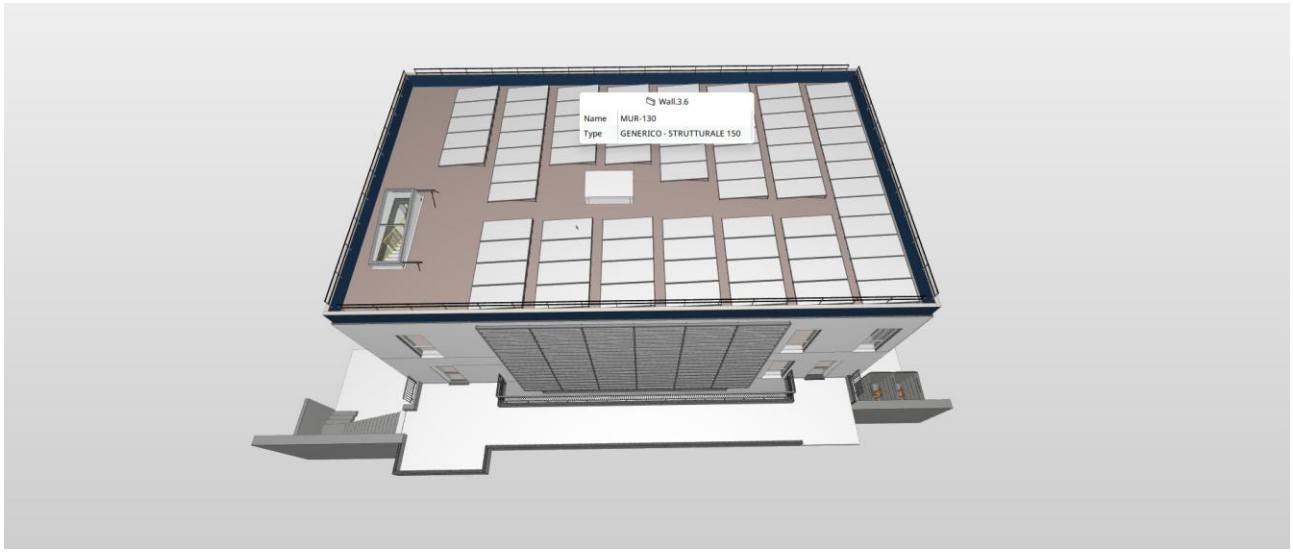

Figure 5. Solar panels on the roof

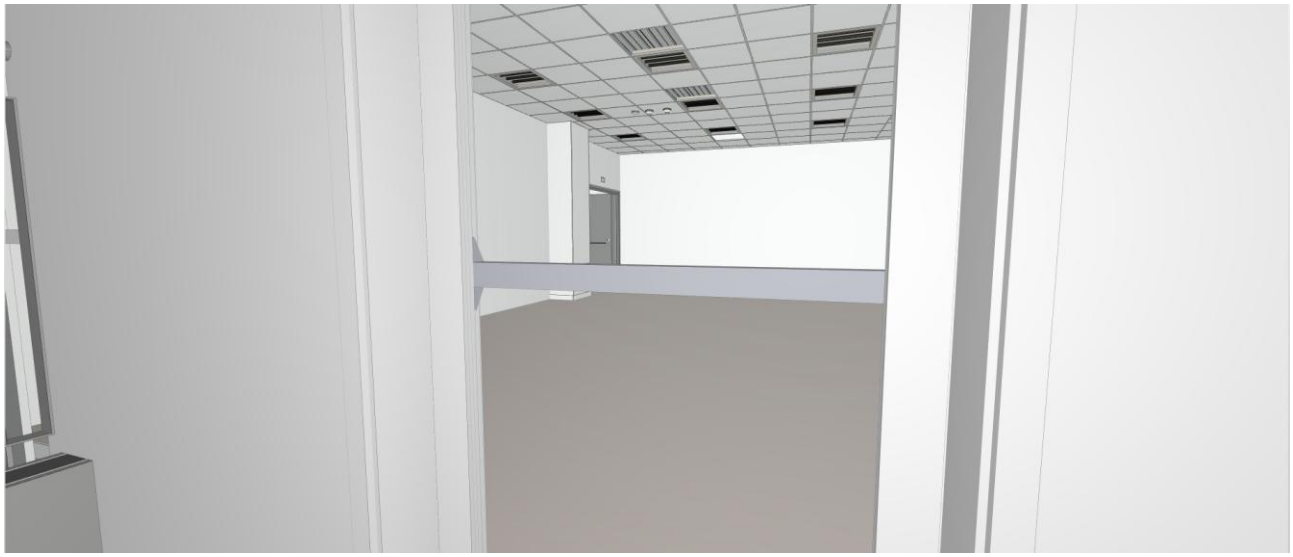

Figure 6. Details of the ceilings

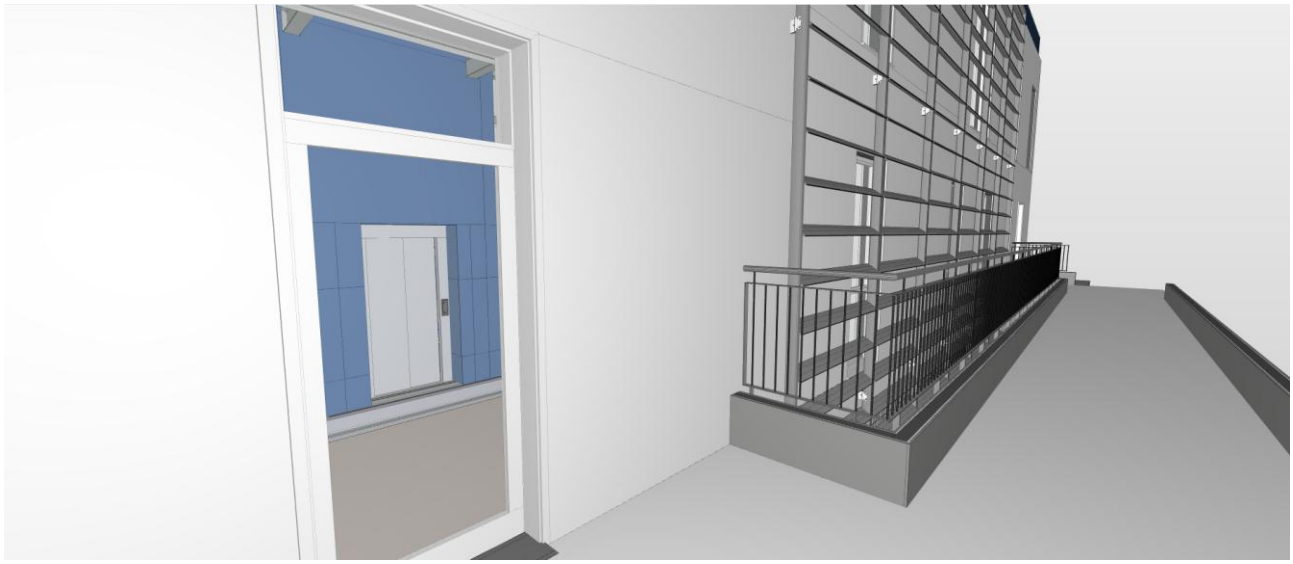

Figure 7. Details of the solar shadings and the elevator door

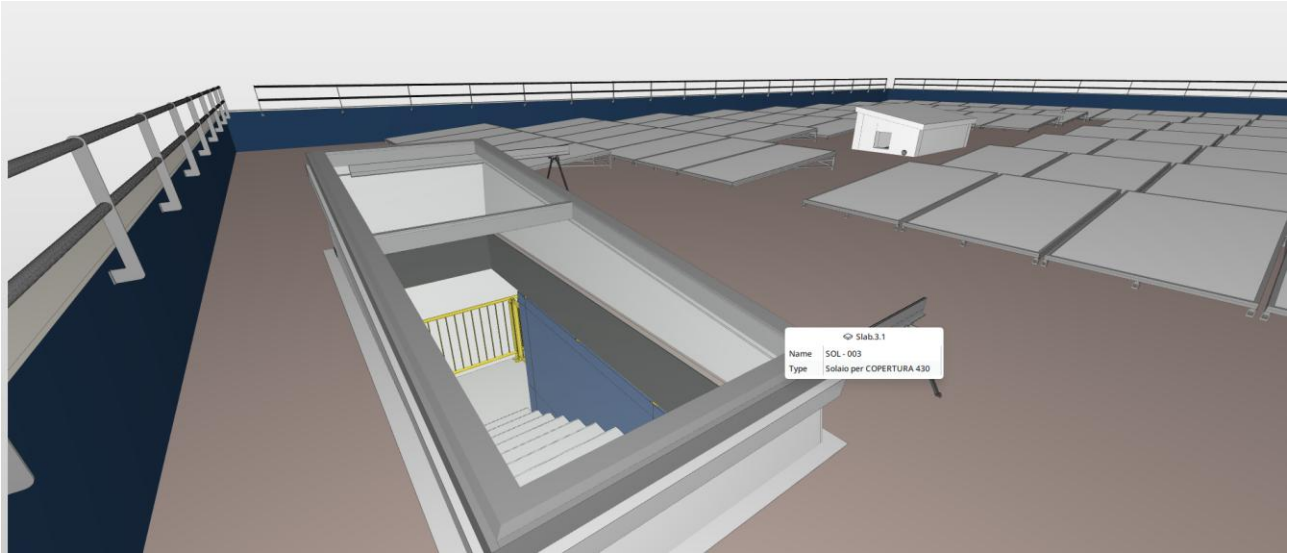

Figure 8. Details of the solar panels on the roof

Figure 9. Details of the solar shadings

Figure 10. An inner view of the building

3. Conclusions

The as-built BIM model represents a reliable and interoperable digital replica of the demonstration building. It will serve as a reference for future monitoring activities, maintenance planning, and data-driven management throughout the building's lifecycle.