

**BIM MODELING OF INTERIOR OBJECTS IN REVIT SOFTWARE***Student: Azimova S.A.**Scientific Advisor: dots. Ikramov Sh.R.**Tashkent University of Architecture and Civil Engineering*

**Abstract.** The development of BIM (Building Information Modeling) technologies is transforming approaches to architectural environment design. Today, attention is given not only to modeling structural elements but also to interior objects. Autodesk Revit makes it possible to create digital models, enabling realistic spatial design. This article is devoted to relevant practices in modeling with Revit software, analyzing modern requirements for object parameterization and categorization, and also draws attention to the opinions of leading architects on the role of small forms in digital architecture.

**Keywords:** BIM technologies, Revit, furniture, interior, parameterization, categorization, information models, families, 3D model, visualization.

**Introduction.** Before the advent of BIM technologies, modeling interior furniture relied mainly on drawings, hand-drawn sketches, and visual mockups. Throughout the 20th century, architects and designers developed furniture manually using paper, tracing paper, ink, and pencils. Furniture layout plans, elevations, axonometric views, and sections were drawn in 2D graphics, which required precision, a careful approach, and accurate proportional calculations. Often, to better understand the shape, size, and layout, physical models were created using paper, cardboard, wood, or plastic.

Over time, the approach to interior design became deeper and more systematic. It was no longer enough to simply place furniture on a drawing — designers began looking for tools that account for the interaction of objects with space, engineering systems, and user needs. The emergence of a new generation of software solutions met exactly these needs. The field gradually shifted from two-dimensional drawings to a unified system that integrates graphics and data. Furniture ceased to be just a decorative element and became a project component defined by parameters, functionality, and usability. Along with the advancement of BIM technologies came the need to model interior elements as accurately and completely as building structures. Revit made it possible not only to create furniture models in 3D, but also to turn them into digital objects containing information about materials, properties, and usage. This enabled integration with engineering sections of the project, calculation of material volumes, and data extraction from the model. [1]

Traditionally, BIM was focused primarily on structural elements — walls, columns, partitions, and floors. However, already by the 2020s, architects and design teams recognized that without fully digitalizing architectural environment elements, buildings could not be effectively utilized.

As noted at the “BIM World Paris 2024” conference, over 45% of operational errors in buildings are linked to insufficient modeling of interior and urban infrastructure objects at the design stage. Therefore, the creation of digital furniture models is becoming a full-fledged part of the architectural process — influencing spatial ergonomics, aesthetics, and functionality.

One of the main directions in modeling interior objects using BIM is parametric modeling of families. In the traditional approach, any element change — for example, table dimensions or bench upholstery — required creating a new object. In parametric models, this is no longer necessary: one object can adapt to various versions simply by changing its properties. [2]

Parameterization provides the following benefits to designers:

- Time saving in model development and editing;
- Ability to adapt elements to client requirements and architectural concepts;
- Reduction of “heavy” elements in the project;
- Efficient management of changes at all project stages.

Additionally, parametric families are organized using internal components and formulas, which allows geometry to automatically adjust based on changes to user-defined parameters. [2]

For example, a lighting fixture model can include parameters such as height, type, and base material — making it adaptable to different rooms without the need to create new versions. In this way, active use of parametric tools increases the productivity of designers and architects, while the building itself becomes a “live” and flexible system. This is especially important in today’s rapidly changing urban environment.

In Revit, correct categorization of families plays a crucial role when modeling interior objects. A category defines how an object appears in drawings and schedules, and how it behaves throughout the entire lifecycle within a project. Some common model categories in Revit include:

- Furniture — interior elements like sofas, armchairs, tables, shelves;
- Site Components — urban infrastructure elements like benches, trash bins, lights, playgrounds, and pavilions;
- Planting — trees, shrubs, and landscaping elements.

Incorrect categorization can lead to the following issues: confusion in drawings and plans, incorrect data in specifications (e.g., furniture appearing under engineering equipment), disruption of templates, visibility filters, and malfunctioning of annotation styles. [3]

Every element in a BIM model must be “intelligent” and interrelated. Correct categorization ensures that a 3D model is not only visually correct but also functions as an integral part of the project system. This greatly facilitates the work of architects, engineers, builders, and maintenance personnel.

Modern design conditions require specialists to develop new competencies in BIM workflows. Knowing traditional modeling tools is no longer enough — the ability to create intelligent families for furniture has become a key skill for architects and designers. It is essential to evolve educational programs in this direction: this reduces the gap between design and



construction, helps create more accurate and realistic models, and supports standardization of design processes within companies.

Within educational development, special attention should be paid to practical training in Revit: creating parametric families, setting up categories, working with materials, and optimizing models for teamwork. Intensive courses, in-house training sessions, and the integration of BIM programs into architectural universities — all of these are critical in forming a new generation of professionals capable of shaping the future digital environment.

In conclusion, modeling interior and urban environment objects using BIM is a new philosophy of design, where every detail matters and becomes part of a larger architectural narrative. Today, Revit opens up the possibility for architects and designers to visualize the city and building down to the smallest detail. And it is precisely the quality of these details that determines how comfortable, livable, and human the world we create will be.

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