

# Explore the History of Modeling

**M**ODEL MAKING is an important part of building design. Models were used in ancient times to study structures. Now they are extremely sophisticated design and presentation tools. Several types of models are created for different functions. Some are used to study and test design concepts with physical and CAD virtual models. Others can be used to market and sell a design.



## Objectives:



1. Explain the history of a model.
2. List the different types of models used in architectural design.
3. Describe the role of a model in architectural design.

## Key Terms:



concept model  
development model  
function  
large-scale model

massing model  
master builder  
model  
presentation model

small-scale model  
space planning  
study model

## Understanding the History of a Model

A **model** is a scaled representation of an object. Architectural models may include buildings and the built environment. Models have been used for hundreds of years to study construction and to design buildings. Early models were used by master builders and masons to study the building's structural properties.

### MASTER BUILDER

A **master builder** was a person who was responsible for the entire project. His or her responsibilities included the project's design, engineering, and construction. Today, the master builder's role has been divided into the areas of architecture, engineering, and construction.

## EDUCATION

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As academics developed and the study of design and engineering advanced with modern technology, models became useful in education. During the modern architecture movement at the beginning of the twentieth century, models became an important part of student work and studies. Early models were created from basic materials (e.g., wood, stone, and plaster).

## MATERIALS

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With the invention of cheaper and easier materials with which to work (e.g., foam core, cardboard, and pressed particleboard), models have become more common. As design and engineering has become more complex and advanced, model making has followed. To study more complex constructions, models have been created out of advanced materials and have been subjected to tests and studies.

## SOFTWARE

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Today, traditional materials and virtual three-dimensional (3D) models are used. Advanced computer-aided design (CAD) software allows 3D models to be subjected to virtual testing. These tests can provide significant data that improves the safety and design of buildings and other constructions.



**FIGURE 1.** For years, models have been used to study designs and spaces. This was especially true of large-scale and important buildings, such as this image of a model for Shuri Castle in Japan.

## Model Types Used in Architectural Design

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In general, the various models used in architecture can be divided into two categories based on their role or function. They are used for research and study to help develop a concept or to present a final design.

## STUDY MODELS

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A **study model** is a sample model used as a starting point for general building design ideas. Its purpose is to study the design or concept from multiple perspectives or criteria. There are several study model types.

## Concept Model

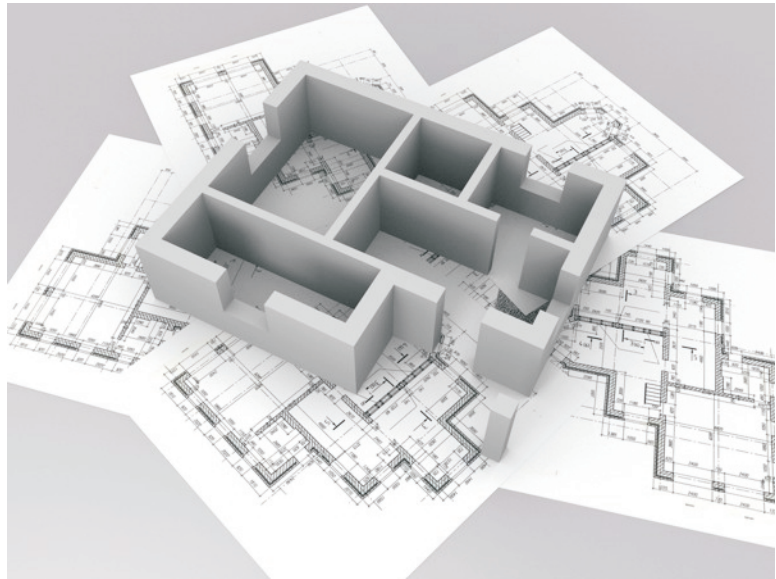
A **concept model** is a rough model used to show ideas and concepts for the building design. It may not be a scaled model because it is used to study the basic idea or basis of the building design. In many cases, these models will only include partial elements or design features, not an entire building. They may be simple, showing the overall design but just as a general or basic representation of an idea.

## Massing Model

A **massing model** is a simple scaled model used to show the general size and volume of a building. A massing model can be used to define **space planning**, which is a process used to designate an area for a specific object or task. The program's functions can be arranged and rearranged to study the space planning in a building. A space planning model can show the circulation and furniture layout for various building functions in an office or a home. On a larger scale, space planning models can be used to show building locations, green spaces, parking, and vehicular circulation.

## Development Model

A **development model** is a large-scale model used to refine massing models. This type of model focuses on a specific part of the building design. For example, in an office building, a development model may focus on the entry canopy.



**FIGURE 2.** Massing models can be fairly basic. In many cases, they are used to show space planning and general volume, as in this image.

## PRESENTATION MODEL

A **presentation model** is a refined scale model used to present completed designs to an audience. Presentation models are created from developed plans and elevations. Depending on the size of the project, there may be several scaled models produced to show the overall concept and detailed information.

## Small-Scale Model

A **small-scale model** is a detailed scale model used to show the overall concept of a design. It may be used to show the detailed exterior of an office building.



## FURTHER EXPLORATION...

### ONLINE CONNECTION: All Types of Scaled Models

There are careers in model making and companies that produce models of all types. These professionally built models are accurate and precise. They can range in scale, materials, and subject matter from architectural buildings to engineering constructions.

To learn more about professional models, visit the following Web link:

<http://www.scalereproductions.com/>

### Large-Scale Model

A **large-scale model** is a detailed scale model used to show a specific area of a design. It may be used to show an entryway or built-in furniture. In some cases, the actual material may be used for the model.

### 3D Model

Most architectural firms today will build a 3D model on the computer using CAD. This allows the model maker to focus on certain areas and to add more detail where required. Views can be selected and printed out at different scales, depending on the amount of information required. It is becoming more common for firms to only build a small scale physical model of the overall building design and to use CAD for creating larger scale or more detailed representations.

## The Role of a Model in Architectural Design

As mentioned previously, models used in architecture can be divided into two categories based on their role or function. One is for the architect to present and describe his or her design to the owner or client. The other is to study the design and to make improvements.

### STUDY MODELS

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Study models are used for different types of studies.

### Functions

One main study is the function of the building. A **function** is the use of a space; it may be the task performed in the space or an object in a space. Different tasks or functions will have different design criteria. For example, an auditorium would be designed differently than a mechanical room. In many cases, multiple functions need to be considered within one building.



## Environment

Models are used to study how a design will perform in its environment. This may include effects from the wind or how it utilizes natural lighting. Today, this can be performed with 3D CAD models in the computer where exact results can be given. Engineers can build CAD models that test wind, seismic, and gravity loads on unique buildings. Architects also build CAD models to test minimum levels of lighting, ventilation, and design effectiveness.

## Refinement

Refining the design is a purposeful outcome of a model. It is important to study how a building will impact its surrounding area. Therefore, the model should include the creation of the building and its surrounding environment where size and other relationships can be studied.



**FIGURE 3.** Architects use physical models and CAD models for client presentations, as seen in these two examples.

## PRESENTATION MODELS

Models are commonly used to present a design to a client or an audience. They can provide additional ways to illustrate and explain a design. Models enable the client or audience to see a 3D model of the design, as it is not always easy to demonstrate an idea with 2D drawings or with words.

Marketing is an important use of a model. By showing the appearance of the final design—including its environment—businesses can create interest and awareness. The model can demonstrate how the building functions on its site and within the building structure.

Presentation models have become extremely accurate with CAD. Today, advanced and high-profile projects typically have their entire design constructed in the computer for modeling. In these cases, every aspect of the project can be rendered to show exactly how it will look, including realistic materials and lighting. In some cases, movies are created where you can see the entire project as if you were walking through it.

## Summary:

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A model is a scaled representation of an object. Architectural models may include buildings and the built environment. Early models were used by master builders and masons to study the structural properties of a building. Today, traditional materials and virtual 3D computer models are used.

A study model is a sample model used as a starting point for general building design ideas. Its purpose is to study the design or concept from multiple perspectives or criteria. Study models are used for several reasons. One main study is the function of the building.

A presentation model is a refined scale model used to present completed designs to an audience. It enables the client or audience to see a 3D view of the design. Today, advanced and high-profile projects will have their entire design constructed in the computer for modeling.

## Checking Your Knowledge:

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1. What are the responsibilities of the master builder?
2. Name three different types of study models.
3. What type of model is used to show the general size and volume of a building?
4. What are two types of presentation models?
5. What type of model is used for the testing of wind, seismic, and gravity loads?

## Expanding Your Knowledge:

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Some architects produce detailed and sophisticated models using a range of materials. They also produce extremely life-like CAD models. If you are interested in models and the various types and ways in which they are made, plan a trip to a local architect's office. Prepare a list of interests and concerns beforehand so you are able to ask intelligent questions.

## Web Links:

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### 3D Modeling and Animation

<http://www.animationarena.com/3d-modeling.html>

### Free 3D Models of Great Buildings

<http://www.greatbuildings.com/types/models/models.html>

### Different Ways to House Architectural Models

<http://www.doityourself.com/stry/different-ways-to-house-architecture-models>