

BASICS

# MODEL BUILDING

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MENTALS OF PRESENTATION  
STRUCTION  
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## EQUIPMENT, TOOLS AND TECHNIQUES

When building small spatial objects, many students will feel the same passion that drew them to architecture as a profession in the first place. Others will prefer pencils and drawings to the tools of the modelers' trade. Whatever their preference, all architectural students will be confronted with the demands of modelmaking in their very first semester. What is the simplest way to build a model?

### CUTTING

The simplest method is to work with a utility knife and a piece of paperboard or cardboard. The utility knife is an essential modelmaking tool since it can be used to cut a variety of materials in their original form. It is simple and inexpensive, and many different versions are available for different cutting tasks. We recommend purchasing a high-quality knife instead of the simple carpet knives found in many home improvement stores. The blade must be firmly attached and must not move during cutting. Ideally, the knife will fit comfortably in the hand so that it can be held and guided effectively. The selection of a knife is just as important as the choice of a good pencil.

In addition to the universally deployable utility knife, a variety of other cutting tools are available at speciality shops. The scalpel, the well-known surgical instrument, can be used to make fine cuts in materials or cut out very small windows from cardboard.



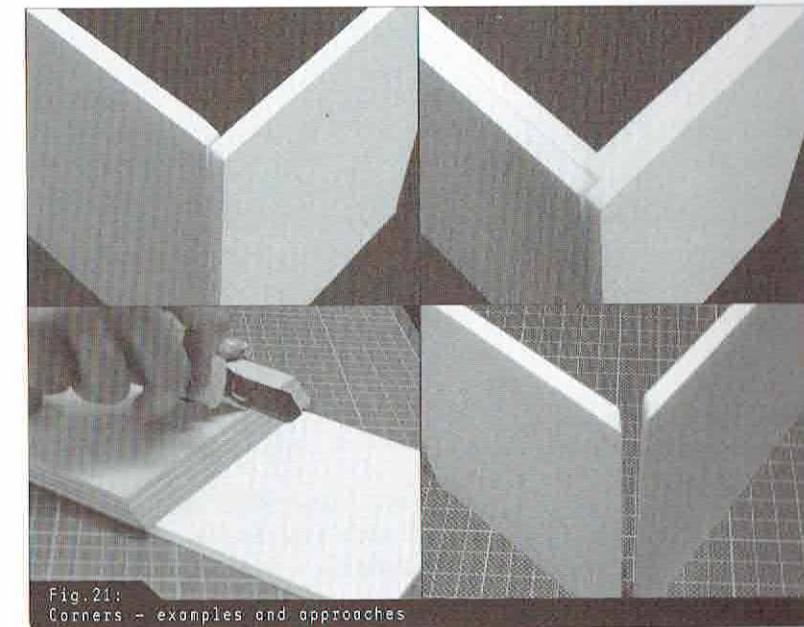
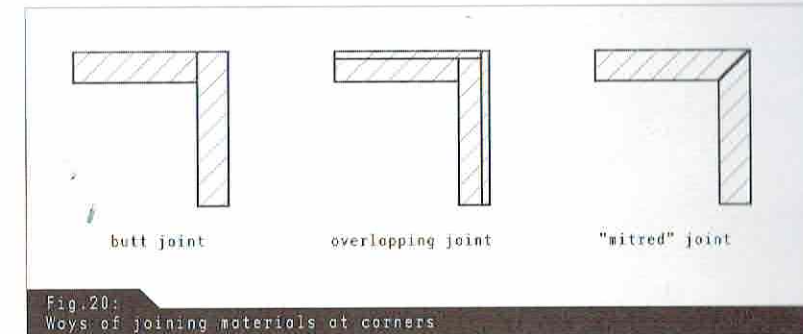
#### Hint:

Many modellers have had painful experiences with the utility knife, especially when working under time pressure. To minimize the risk of injury, you should always handle tools with the utmost care and only use them for the work for which they are intended. For instance, you should not try to cut a hard piece of wood with a utility knife due to the danger of slipping.



#### Tip:

When using a utility knife to cut cardboard, you should hold the knife as close to the surface as possible in order to make precise, clean cuts. If this is not done correctly, the material may tear and increase the risk of injury since the sharp blade is more likely to slip.



How should cuts be made? First, the required edge should be marked with a thin pencil; after cutting, this thin mark will no longer be visible. The edge should then be cut at a 90° angle to the surface so that the individual parts can be butt-jointed or glued together.

At corners the edges of the material can also be cut at a 45° angle to form mitred joints. Special utility knives with slanted blades are available to make such cuts. Another method is to make a wooden board with a 45°

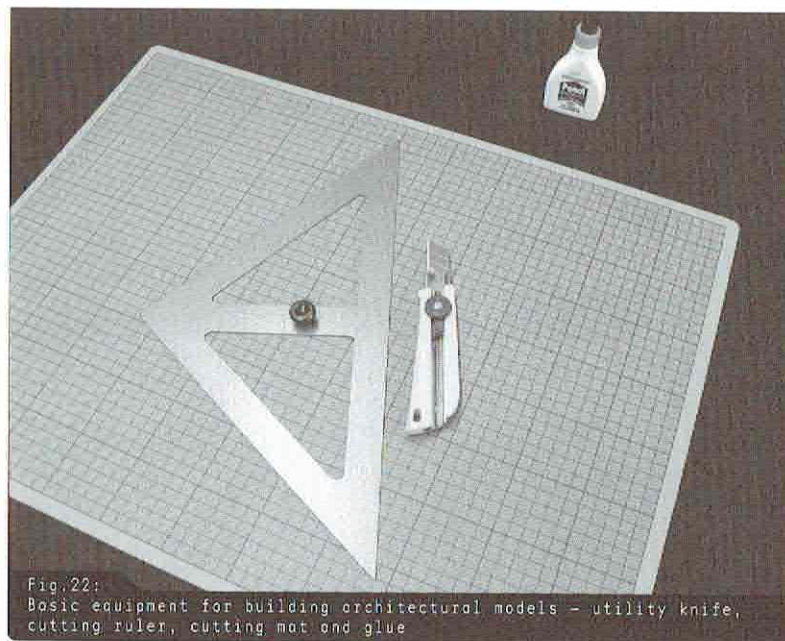


Fig.22:  
Basic equipment for building architectural models – utility knife,  
cutting ruler, cutting mat and glue

edge and use it as a kind of a template for guiding the blade of a standard utility knife.

In other cases, a metal-edged ruler can be used to guide the knife and ensure a straight cut. Another important tool is a hard cutting mat, which not only protects the tabletop but also makes for a better quality cut than a soft base. We recommend plastic cutting mats.

These are the only tools a modeller needs to build simple, practical working models out of cardboard and pasteboard. But other tools are necessary to intensively work the material, including:

- Sandpaper: required to smooth surfaces, finish cut edges and remove sharp pieces from cut-out holes. If sandpaper is wrapped around a firm, stable base such as a sanding block, it is easier to move back and forth over the part that needs sanding.
- File: excellently suited for finishing the corners and edges of a variety of materials. Files are available for both wood and metal. It is

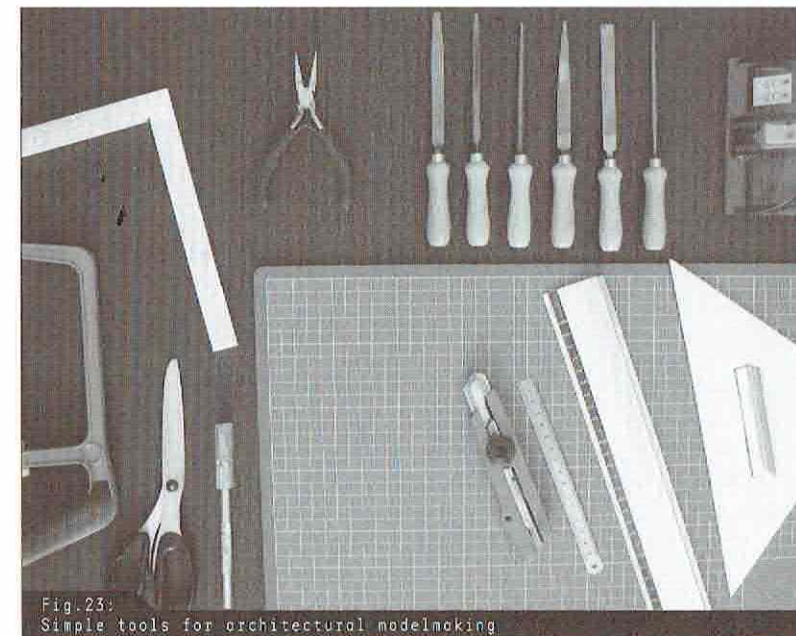


Fig.23:  
Simple tools for architectural modelmaking

generally possible to use the same tools when working on plastics or metals – for instance, a fine iron saw lends itself well to cutting plastic.

- Tweezers: increase the precision of the human hand and allow modellers to work on even the smallest parts. Small-scale models may contain parts that are only a few millimetres in size and nearly impossible to grasp with the fingers.
- Measuring instruments ("sliding calipers"): are used to measure diameters and cross sections accurately. Since the trained eye can detect even the tiniest size differences on a small-scale model, precise measurements are an important aspect of modelmaking. Precision extends to one tenth of one millimetre, a unit that cannot be measured with normal rulers.
- Measuring tools (ruler and measuring stick): for the precise measurement of lengths and dimensions.



#### Tip:

Before gluing the model together, you should first find out about the most suitable glue. Most glues are sold in containers and do not include a tool for applying the glue properly. As a result, you may apply too much glue and leave unsightly stains.

One way to remedy this situation is to buy a standard syringe with a wide conula from a pharmacy and fill it with the selected glue. This method can be very useful when gluing transparent plastic films since stains on these materials are eye-catching and bothersome.

An even simpler method is to apply daubs of glue using a toothbrush or a thin wooden stick.

## GLUING

Depending on the materials to be glued, modellers have a wide range of products at their disposal. Whereas all-purpose glues can be used universally for many different materials, white glue is the perfect choice for all types of wood, wood-based materials and cardboard.

Table 1:  
Overview of glues

| Glue             | Properties                                                                                                                                                                                                                                                 | Application                                                                                                                                                                                                                                                                      |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All-purpose glue | Generally a solvent-based artificial resin adhesive that is transparent, viscous and may become stringy when applied. Reacts with some plastics (e.g. Styrofoam), melting their surfaces. Usually dries in just a few minutes. A light irritant; non-aging | Can be used for various materials (e.g. cardboard, wood, plastics, metals, glass, fabric etc.). Parts can be glued to the same or different materials. The glue does not cause cardboard to buckle and is often all that is needed in modelmaking thanks to its great diversity. |

|                        |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| White glue (wood glue) | Has a white, viscous consistency and dries by absorbing the moisture in the bonded material. Transparent and slow drying, meaning the glued surfaces can be moved for a while after application. Fast-drying "express glue" dries in 3-5 minutes. | Ideal for woods, wood-based materials, cardboard and paperboard. The parts must be pressed together for an effective bond. The glue's high moisture content may change the shape of the material and cause cardboard to buckle. Not suitable for plastics, metals or materials that cannot absorb moisture. |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|              |                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                               |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact glue | Used to bond large surfaces. The glue is applied to both parts and bonds with itself. After application, the parts must dry for a few minutes before they are bonded together, and it is important to apply firm pressure. Contact glue should only be used in well-ventilated rooms. | Ideal for gluing large surfaces (e.g. cardboard) in raised-relief models. Since the glue is applied to both parts and the room must be ventilated, this is a time-consuming method, but it has the advantage of not buckling the materials. Can be used for wood, cardboard, a large number of plastics, metals and ceramics. |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                           |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plastic-bonding adhesives | A fluid, usually clear glue containing solvent. Specially designed for plastics and the single-sided application of glue. The parts must be joined quickly while the glue is still wet, and the surfaces must be free of dust and grease. | Can be used for many thermoplastics, including polystyrene, PVC and perspex, but not suitable for polyethylene or polypropylene. Can also be used to bond wood or cardboard (see all-purpose glue), and are more effective than all-purpose glue for plastics. |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|            |                                                               |                                                                                      |
|------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Super glue | Transparent, very fast-drying glue; viscous and non-dripping. | Ideal for connections that cannot be held together and that require an instant bond. |
|------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------|

|                   |                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spray glue        | Colourless, UV-resistant, CFC-free glue that comes in a spray bottle and does not change colour when applied. Due to its low moisture content, it does not permeate the material. Spray glue should only be used out of doors or in well-ventilated rooms. | Ideal for application to large surfaces, such as in cardboard raised-relief models. The materials may buckle or warp slightly, but do not usually wrinkle. Can also be used to glue paper or cardboard to different backgrounds, especially when large surfaces must be glued. |
| Solvent           | Used to bond plastics. The solvent melts the surface of the material, and pressure is applied to "weld" the two parts together. Example: dichloromethane (methylene dichloride), which like all organic solvents is extremely harmful to human health.     | For gluing polystyrene, perspex or polycarbonates; bonds both parts without residue by dissolving the thermoplastic resin. Use only in very well-ventilated rooms.                                                                                                             |
| Rubber cement     | An elastic adhesive that is easy to remove, normally without any residue. If applied to both parts, it creates a permanent bond.                                                                                                                           | Can be used for various materials including paper, cardboard and plastics. Ideal for use in working models or montages                                                                                                                                                         |
| Double-sided tape | A basic alternative to fluid bonding agents, useful because of its instant bond. The properties of the bonded materials are not adversely affected by moisture.                                                                                            | Can be used for bonding large surfaces, and ideal for all types of materials, including PE and PP, which cannot be joined with other adhesives. The materials do not buckle, warp or wrinkle. Not suitable for joining small points.                                           |

Working with  
modelling clay

## MODELLING, SHAPING AND CASTING

An alternative method for building working models is to use plasticine or another modelling clay.

Plasticine is usually sold as a greyish-green modelling material whose plasticity varies with temperature. It is hard to knead plasticine at room temperature, but it becomes softer and easier to work once it is slightly warmed up (e.g. on a warm radiator). Plasticine can also be heated in a pot, and in fluid form, it can be applied to a surface with a putty knife or brush.

Modelling clay lends itself well to experimental work with a model. It is excellently suited to studies of urban space and enables modellers quickly to build many different versions of the same object. Small structures can be quickly and easily cut off with a knife.

By working the clay with their hands or tools, modellers can gain a feel for the manual work and its results. The finished object may not be a very precise model, but the modelled form can be a very expressive way of representing space.

Plaster and  
pouring  
compounds

Plaster (gypsum) is an inexpensive material that is very easy to work with. Even so, making a plaster model is a time-consuming process because it requires two steps:

- First, an exact negative mould is made of the subsequent three-dimensional object and liquid gypsum is poured into it. The precision of the mould determines the quality of the final result.
- After the plaster dries, the cast object is removed from the mould.

Plaster models are often used in architectural competitions, particularly for urban design models, since here the same site model must be

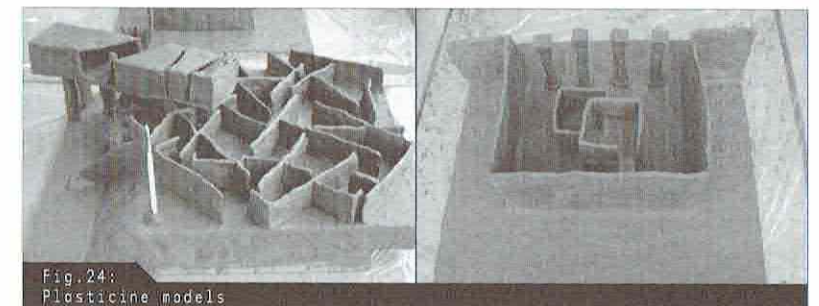


Fig. 24:  
Plasticine models