

10 Steps to Building Scale Models

Lesson One: Introduction

Models and young builders seem to have always been around but the way models would have been built, fifty years ago would have been very different. The model builders in the World War II era built their models out of balsa wood and tissue. A few more ambitious modellers carved their creations from solid wood using a plan as a guide and about this time, the solid plastic (known as Bakelite plastic) identification models began to appear. These models were used to help pilots recognize Allied and Axis aircraft. In Europe, the simple styrene plastic models from the FROG Company that were issued in the pre-war period began to be manufactured again and distributed worldwide. In North America, companies such as Revell, Aurora and Monogram began to make plastic model kits in the late 1940's. The model kits were, at first, very toy-like and other than the required assembly, did not resemble modern models.

Once it is constructed well and painted accurately, a model kit today is a miniature replica. The main difference between a toy and a model is the model builder who takes the time and care to build a model to look real. If you have never built a plastic model kit, what you purchase is actually a complex set of detailed parts that have been designed to fit together precisely. The manufacturer typically provides an instruction sheet (or manual in some cases), often including suggestions for ease of assembly along with color references for markings and color schemes to be used.

Selecting your first model takes into consideration a number of factors: What scale should be used? Models are miniature replica that are scaled down versions of the real thing. In aircraft modeling, you have a choice over the popular 1/72 and 1/48 scales along with larger 1/32 and even 1/24 scales.

Smaller scale aircraft in 1/144 or smaller scales are also available.

The general rule is that the larger the scale (1/32 or greater), the more detail you will have due to the model kit being much larger. What complexity do you want? Many model kits now have complete interiors and fine detailing but at a price not only in money invested in it but also in the time needed to finish a complex kit carefully. Finally, what subject do you want to model? Although we will concentrate on plastic scale aircraft models, there are many different types of aircraft models available. The choice is even greater when you realize that there are also cars, trains, figures, tanks, spaceships, buildings, animals, etc., etc. to choose from.

Model building is a skill to be learned but with help and practice, it can also be a skill that is fun to learn. The actual construction process is basically a two-stage process. The model kit is

1. Assembled by gluing parts together and then
2. Painted or finished. Having a guide in the form of a more experienced modeller may be much more useful than any of the model kit's information sheets.

The skills you learn in building your first models will result in each future model project becoming "much better" and more realistic. Having a chance to improve your models through displaying or even entering competitions hones your skills even more quickly. Above all, remember, it's the fun of modelling that really counts. Don't be overly critical of your own or others first efforts, everyone starts that way! If you do want to go on improving modelling skills, it's your decision, but it will take a little time and effort.

Lesson Two: Modeling Tools

To build plastic models, you will need to create a "tool kit" of basic tools and materials as well as more specialized tools and materials. For the most part, inexpensive tools and materials are available and you can even find household and hardware items to fill up your tool kit.

The basic tool/material list is:

- hobby knife (standard #11 pointed blade)
- sandpaper (#400 grit or finer wet or dry sandpaper)
- liquid or tube cement (white glue, "crazy" glue)
- masking tape (various sizes, frisket paper)
- modeling paints (selection of colors, flat, gloss)
- paint brushes (#00 and #1 size brushes)
- putty or filler (A+B putty, crazy glue)
- clamps or vises (number of different types)

Additional tools and materials can include files for sanding various surfaces and opening holes, pliers for cutting and holding pieces, and drills and various drill bits for making holes. A great number of homemade tools can be used including adapting common items to do another job, for example, twisting a wire coat hanger into a holder for painting models or using rubber bands as a means of holding parts together while gluing.

Here is a list of all the kind of easily obtainable tools and a suggested use in modelling:

- Scissors (cutting decal sheets),
- Nail clippers (separating parts on the sprue),
- Toothpicks (to replace small plastic parts, to hold parts like wheels for painting or for stirring paint),
- Swizzle sticks (for paint stirring and mixing),
- Dental picks (just ask your dentist for old picks which are great for cleaning up filler and carving plastic),
- Kitchen cleansers (for washing plastic parts),
- Small plastic or glass tubs or containers (to hold parts, for decal solutions and paint mixing),
- Transparent plastic tapes (for masking or for holding parts),
- Plasticine or clay (for holding parts and weight distribution),
- Black ink (for detailing parts such as panel lines), and
- Tweezers (great for holding parts and positioning them).

There are many other items that you may find and adapt to modelling. Just add them to this list. The big challenge is to learn to use each of the tools and make the most of them. Remember the old adage "A good workman (or craftsperson) never blames his tools".

Lesson Three: Research and Planning

- To create a miniature replica, the model builder has to take the time and care to build a model to look real. The first step in building a model is to plan out the project; the kit manufacturer typically provides an instruction sheet (or guide), often including suggestions for ease of assembly along with color references for markings and color schemes. Understanding this guide will help in planning out the final model as well as determining the stages of assembly, painting and detailing.
- Finding more information is required to build a precise replica. The kit instruction sheet/guide may be only one place to go for information. If you need model building information, you may find that a general source such as a book or magazine may help. If you require exact details about your modeling project, then specialized research may be necessary. The best source of information is a first-hand collection of data such as seeing the original item in person to take notes, drawings or photographs. The next best sources are specialized research materials such as manuals, photographs, interviews and other second-hand sources. After these sources are reference sources such as books, magazines or other materials that cover the subject in a more general manner.
- Model building can be a set of skills to be learned but with help and practice, it can also be fun to learn. If you find that you also can benefit from a group of friends getting together to talk and learn about modelling, consider a model club. Having a model club may be much more useful than any model kit's information guide. You can share experiences, swap stories as well as parts and tools and find that you will gain much more from modelling!

Some Suggestions for Research Sources

General Sources:

Hints and Tips for Plastic Modeling by Angle, Burt, ed., IPMS USA, Kalmbach Publishing, 1980.

Best of the Basics from Fine Scale Modeller Magazine The, Wakeusha, WI, Kalmbach Publishing, 1992.

Scale Modeling Tips and Techniques by Hembree, Mark, ed., Wakeusha, WI, Kalmbach Publishing, 1992.

The Modelmaker's Handbook Jackson, Albert & Day, David, New York, Knopf, 1982.

Building Plastic Models Schleicher, Robert., ed., Wakeusha, WI, Kalmbach Publishing, 1976.

Specialized Sources:

Fine Scale Modeller Wakeusha, WI, Kalmbach Publishing.

RT, IPMS Canada PO Box 626, Stn. B, Ottawa, Ontario, Canada K1P 5P7

Squadron/Signal Publications 1115 Crowley Dr., Carrollton, Texas, 75006

Model Organizations/Clubs:

IPMS CANADA c/o P.O. Box 626, Station B, Ottawa, Ontario, Canada K1P 5P7

(There are also IPMS organizations worldwide, check with a local hobby shop for an address in your country.)

These parent organizations can put you in touch with local IPMS chapters which are the most common model clubs. The following, for example is the model club to which I belong:

IPMS Winnipeg c/o Bill Zuk <wzuk11@gmail.com>

Lesson Four: Construction of a Model

Work Space

You will need a room with a flat working space- the larger the better. Avoid bedrooms if you can, as they are too dusty for painting. Most often a garage, basement room or recreation room will be the work space but a custom-designed room will be the best! You will also need lots of light, preferably from windows or from a high-intensity light. Try to find an area where you can work for several hours without being bothered as you may have to leave glued or painted parts in place overnight without moving them.

Assembly

Protect your working area by spreading a newspaper or drop cloth under the model. This will protect the table surface from spilled glue or paint. Read the kit manufacturer's instructions carefully before starting and familiarize yourself with the way the kit will be assembled.

The following are the general assembly steps to model kit construction:

1. Examine the parts of the kit while they are attached to the parts tree. Keep in mind that parts can be painted while still attached. Review the "finishing" section of your kit before painting.
2. Remove flash or extra bits of plastic from the parts with your hobby knife or sandpaper. Small rough spots should be scraped off with the edge of the blade end and smoothed over with sanding. Do your trimming on a piece of flat scrap wood or glass and never hold plastic pieces against your hand when cutting. Cut the parts off carefully with a saw, pinchers or sharp blade.
3. Try fitting pieces together without gluing first, in case adjustments must be made. Painted parts must be thoroughly dry before gluing. Do not get paint on surfaces to be glued.
4. Usually assemble parts in the order shown in your instructions, but sometimes to paint certain sections, you may wish to work on them first, for example, interior areas should be assembled and painted before final assembly.
5. Both tube type and liquid type cement for plastic models are available. Tube cement can make a strong joint but should be used carefully. The critical thing is to use only enough cement to do the job as cements for plastic models contain a "welding" agent which actually fuses the plastic together so only a small amount is needed. Remember to scrape away paint or chrome plating from surfaces to be joined. Liquid cement is used differently - hold the parts to be joined together then dip a brush in cement and touch the joint, the glue will flow along the opening to fuse the parts together. Some modellers prefer liquid cement for some applications because it may produce a cleaner bond. "Crazy glue" or cyanoacrylate glues are another alternative for strong, long-lasting bonds. For clear parts, you can use white glue which is easier to work with and dries clear. However, it does not actually glue the parts together and cannot be used on parts that need strength. Try to get the glue to work the first time.
6. Use tape, clamps or rubber bands to hold parts together while the glue is drying. Glued sections which support a lot of weight must usually dry overnight before stress is placed on them. Use tweezers to hold and move small parts and a toothpick to transfer glue.
7. Fill cracks between sections with plastic putty. Remember that it shrinks when drying, so build up a little ridge along fill lines so that it can be sanded flush with the surface later. To smooth putty when it is wet, use your finger dipped in rubbing alcohol. When thoroughly dry, sand carefully with fine sandpaper until flush, then smooth it with wet and dry paper. Allow 24 hours for drying. When the putty has set, file down the excess with sandpaper using wet or dry for the final smoothing. If any gaps or uneven spaces remain, fill them again and allow another 24 hours for drying. Then paint over the puttied area with flat gray before applying final colors.
8. Avoid getting cement on clear plastic pieces but sometimes scratched or clouded areas can be removed by polishing them carefully with toothpaste, fine grit sandpaper or even car wax. Attach clear pieces with white glue which although not as strong as plastic cement will hold the parts in place and dries transparently.

Lesson Five: Painting a Model

Brushes and Paint

Be sure your brushes are soft, clean, and flexible, and keep them that way by cleaning with brush cleaner or mineral spirits. Bottle paints should be stirred completely with a stick handle or toothpick, spray paints must be shaken thoroughly- you can hear the agitator ball in the can. Two types of paint are usually used- oil-based enamels which spread thinly and spray very well and water-based acrylic which are easy to clean up and cover very well. Paint thinners that are matched to each of these types of paints will also have to be used. Follow these steps in painting:

1. Wash all plastic parts in warm, soapy water especially any flexible polystyrene parts, such as some HO scale figures before painting. Dry parts and if they are stored for a while, they should be brushed clean of dust with a tack rag available at automotive supply stores.
2. For best results, paint plastic surfaces with a neutral or gray primer before final color application. This is most important if you are painting light colors over dark plastic. Coat metals with primer before painting. Some miniature metal figures come already primed. Check their instructions. Small parts can often be painted directly on the plastic tree or sprue before being cut off. Touch up the parts after detaching them.
3. You may want to pencil in shapes of such things as camouflage or separate colors before painting.
4. Brush paint in one direction; if your paint is the right consistency, the brush strokes will disappear as it dries. If not, thin it with mineral spirits or paint thinner. Use a variety of different sizes of brushes for large areas to small details. For special treatments, you can even create a brush shape by cutting the bristles to a point or other shape. For stippling paint, a square-tipped brush or even a sponge can be used.
5. Paint light colors first and work towards the darkest colors, leaving enough time for the paint to dry or cure- usually 24 hours for most enamels and at least a few hours for acrylic.
6. Mask with tape or frisket. Using "magic" type tape that is low tack (or stickiness) or specially made masking film called frisket is best. Paint away from the tape rather than into it.
7. Spray paints in a suitable location. If you use spray paints, use them outdoors on a windless day they can spread a film of paint over your room before any change is noticeable. For best results, avoid spraying when both excessive heat and humidity are present. Also, it is important to spray light coats, holding the can at a distance of approximately two feet. Let dry two to three minutes and spray another light coat. To clear valve after using, invert can and spray several seconds. If nozzle clogs, clean with thinner.

Lesson Six: Finishing Techniques for a Model

Decals

Decals will usually come with model kits but you can purchase additional decals to make your model more realistic. Some decals are stick-on but most of them are water-slide decals which have to be attached with the following method:

1. To apply a decal, the surface must have a smooth, glossy finished or painted surface. Spray or paint a gloss finish (a fast and easy method is to use acrylic floor wax) over the entire model to avoid uneven patches when a final gloss or flat finish is added later. Allow paint to dry thoroughly.
 2. For best results, decals should be applied so that they can dry horizontally; using a jig will allow the model to lie on its side.
 3. Cut each decal from the sheet as needed. Cut clear film away from design. Decals should be trimmed out as close to the printed area as possible or a section of clear border will be visible around the edge. (Some modellers using modern setting solutions, prefer to leave a margin around the decal area in order for the edge of the decal to blend cleanly.) Use decal setting agent which allows the decal to flow evenly over the model's surface to insure good results. Using tweezers, dip decal completely into water for about 10 seconds then remove and allow the decal adhesive to soften. About one minute should be sufficient.
 4. While adhesive is softening, use a soft, medium size brush, and wet the area where the decal is to be applied with a few drops of setting agent which helps eliminate tiny air bubbles.
 5. Holding the decal paper with tweezers, use the brush to slide the loosened decal onto the model.
 6. A decal setting solution can be applied to the decal and set the model aside for drying. After the decals have dried for several hours, carefully wipe the residue decal adhesive from the entire model using a damp, soft cloth.
 7. After the decals have dried for at least 24 hours, complete the model by spraying with either a flat or gloss paint depending upon the sheen of the finished project.
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Lesson Seven: Detailing a Model

Stretched Sprue

("sprue" (aka parts tree) = the tubular plastic branch that your parts came attached to.)

There are many materials and pre-molded parts available for adding your own small details to models, but one of the most basic is the left-over plastic in your kit. The sprue or parts tree is the tubular plastic branch that your parts came attached to. If held over a candle until it is soft, it can be stretched to make threads of different thicknesses. These are useful for making aerials, flying wires, spark plug cables, etc. Take both ends of the plastic in either hand or place it about one inch above a candle flame but not close enough to catch fire. Be careful. When the plastic has started to distort, it can be pulled apart with an even motion. Hold apart until the plastic cools. With practice you will get the thickness and length desired.

Detailing

Generally it is the small details that add the most realism to models. Some standard examples:

1. Some models look more realistic when they show signs of wear and constant maintenance. Edges should be nicked with silver spots where the paint has been knocked off. Worn areas should also be indicated around access panels. Engine and exhaust stains can be simulated by applying a mixture of flat black and mineral spirits or paint thinner. Oil stains can be made in the same way but remember that oil stains should be swept across the model horizontally, as it is much lighter and moved by the slipstream. Mud stains are made by mixing brown and flat black perhaps with bit of talcum powder mixed in. Paint some panels in a lighter shade to bring out details. Rust can be simulated with a red and black, or brown mixture. For vehicles in heavy use, and abuse, parts can be bent or banged. Cut off or file down sections of the model (thin the parts by grinding or filing the part down first from behind before altering the part).
 2. To show panel and part lines a thin line of paint or ink can be applied using a brush or "rapido-graph" type pen. (Black may be too stark - a little grey or brown can be mixed into it for a more realistic look.)
 3. Many parts that are not in scale can be replaced by more authentic looking pieces. A thin plastic sheet or wire part usually looks much more realistic than the kit part it replaces.
 4. Figures have improved greatly in past years with faces in particular being highly detailed. By painting a flat color that is mixed with tan or brown, a realistic look can be achieved.
 5. Transparent plastic parts can be easily modified. Windows and openings can be sawed (not cut) in two; a hobby or razor saw is good for this. Put masking tape over the rest of the piece while working to prevent damage. If your original clear piece needs replacement, you can mold another with a vacuum forming machine, using clear plastic sheets. If you don't have access to one, the following procedure can be tried: coat the outside surface of the old piece with a very thin layer of Vaseline. Next, apply a coat of clear fingernail polish and allow it to dry. Over a period of a few days, add more and more layers of polish until you have built up a thickness of 1/32" or more. When the final coat is dry, separate the old piece from the film of nail polish. Trim as needed and glue the molded polish part to the model with white glue.
 6. Parts that are difficult to paint can be masked with adhesive tape cut into thin strips with a hobby knife and applied carefully to the surface. Thin strips of colored tape can also be used for areas.
 7. Painting has to be realistic and a thin, slightly "whitened" color that is sprayed provides the best appearance for a scale model. A blending in of colors or a subtle shading can be achieved by using artist's pastels. Grind up pastels to make a dust then apply with a soft brush.
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Lesson Eight: Presentation and Display of your Model

Display Base

Constant handling is a problem for a model that is not protected in some way. Little details such as aircraft landing gear, AFV machine guns, and ship masts will soon snap off if people pick up the models. Mounting your model on some type of base so the base, rather than the model itself, can be handled and moved about is a solution. Hardware, craft and hobby shops sell wooden plaques with fancy beveled edges that come suitable sizes for most models. Plaques can be finished with a simple paint job or with the same kind of sanding and varnishing you'd give a piece of furniture. A thick piece of clear plastic also can serve as a base if the edges are beveled and sanded to give it a finished look. Larger models can be mounted on plywood or plastic bases cut to fit a model's dimensions.

An inexpensive picture frame with the glass taken out can also serve as a nice display base. The model can sit on its own weight or be held in place with pins or fine wires. Placing a group of models or figures onto a base that has texture can also create a diorama setting. Whatever base you choose, it will enhance the appearance of your model and enable you to handle the model without touching any of its delicate details.

Display Case

Once you have finished your model, how is it going to be displayed? If you have seen models in a museum, they would probably be in a glass case. You could buy a glass case, or a cabinet or bookshelf with a glass front, but it is not necessary. A box can serve as a display case if you have at least one side as a see-through panel- use a picture frame and glass for a quick display case. A clear plastic box can also serve as a good place to store models but these kind of cases tend to obscure details. Once you have decided how you will display your models, you will need to decide where you wish to display them. A few models could even sit outside a case on a windowsill or mantelpiece, as long as the models will not be in the sun or on a heated surface as heat will warp plastic and sunlight will cause paint to fade. Ideally, models should be displayed where the most people will see and appreciate them, however, due to the possibility of accidental damage, it may be wise to keep your models in a room or workshop when they are not being viewed by visitors.

Cleaning

Cleaning a model is important as dust is a perpetual problem. A dusting and, later, a thorough cleanup may be needed. A large soft brush or a photographer's puff brush available at photo supply stores make good tools for large areas. Use a small, fine-pointed damp paintbrush to work around the tight and delicate areas that you can't reach with the puff brush. Vacuum clean around, but never directly on the model while you are blowing the dust away so that it doesn't settle back down. If the model has collected sticky dust, you may be able to remove the dust with a cotton swab sprayed with household Endust or Windex on a cotton swab to scrub away the sticky residue that can accumulate on a model, particularly one in a home heated by a forced-air gas-fueled furnace.

Monthly dusting should keep your model clean enough to last for years. Residue that has set over a period of time may have to be scrubbed away with a brush or cotton swab dipped in lighter fluid which is a solvent for nearly every type of paint, however, so you will have to be careful to dissolve only dust and not paint. A bath in a saucer of detergent will be enough to wash away most residue and dust. All of your models need such a cleaning periodically.

Don't forget to wash the detergent off or it will dry to a tacky, dust-catching finish. Repair any broken parts using quick-setting cyanoacrylates to reattach any parts which may have broken off the model, A coat of paste wax will help to protect the finish on car models or you can add a protective coat of flat clear spray to your military models.

Lesson Nine: Advanced Model Building Techniques

Airbrushing

The airbrush can be described as a "mechanical paintbrush". By placing paint in an attachment to the airbrush and then applying some kind of air pressure, the modeller can achieve anything from pencil-thin lines of color, to uniform coverage of broad areas. Subtle tonal gradations are easy to achieve, and the modeller or artist can mix their own particular paint shade to produce any colour scheme.

The most basic type of airbrush is an external mix spray gun. These are usually siphon fed with air blown through the brush and over the paint outside of the brush. The spray is less fine than most airbrushes. Internal atomization type of airbrushes (where paint and air are mixed inside the airbrush) are more common. In a simple single-action airbrush, the trigger can be pressed for air and the amount of paint (i.e. width of spray) must be preset by adjusting a knob on the end of the airbrush body. In the more complex double- action type, both air and paint flow through the airbrush. The trigger can be pushed down for air and pulled back for paint, controlling the ratio of paint to air and allowing the artist to control the width of the spray while painting.

The air pressure can be supplied through a variety of means. Cans of compressed air are silent, easily portable, simple to use, inexpensive for occasional use but for regular use are expensive, and the air pressure goes down as the can gets empty or cold. Compressors are more commonly used and can include the following types:

1. Diaphragm compressor which uses a diaphragm to pump the air into the compressor and out the airbrush and is the least expensive type of the compressors but the diaphragm produces a pulsing of airflow that can sometimes be seen in the artwork.
2. Piston compressor uses a piston to compress the air. It does not have the pulsating quality that the diaphragm type has but the oil that is used to lubricate the pistons can get into the airbrush occasionally and it can overheat if used for a long period of time.
3. Storage compressor contains a reservoir tank for the compressed air, so that pulsing does not occur through the airbrush but the simple types run continuously and can overheat.
4. Automatic compressor types use a reservoir. When the reservoir is filled to a certain preset pressure, it shuts itself off automatically. When pressure drops below the preset level during use, resumes filling the reservoir. The pluses include silent operation, even pressure and that the motor does not run constantly so reduces chance of overheating but the machine tends to be very expensive.

Other air sources include CO2 tanks (with pressure regulator) which are silent, refills are inexpensive and can go for quite some time before needing refill but you need to buy a pressure regulator to use with tank since pressure straight from the tank is too high for an airbrush and the tank is heavy- definitely not portable. Car tires are cheap, you can pick up a used one just about anywhere. They can be refilled and reused often and are silent but pressure to airbrush will drop as tire deflates and constant refilling is needed; the tires are often dirty and hard to clean.

After selecting an airbrush and source of air pressure, the first thing for a beginner to do is to practice mixing a diluted paint/thinner mixture that will flow evenly from the airbrush. Generally, a thinner mixture is needed compared to that of brush painting. The combination of thinned paint, air pressure and nozzle setting of the airbrush has to be determined for each application. As more skills are learned, the modeller will be able to use the airbrush to create very accurate looking paint finishes on any type of model.

A periodic airbrush cleaning is necessary (some modellers prefer to clean after each use). Often spraying a solvent through the airbrush is all that is needed but a breakdown of the airbrush can help eliminate problems of paint buildup. Useful solvents to clean an airbrush (after taking it apart) are methyl hydrate (commonly used solvent) or lacquer thinner (great for stubborn cases but be careful as some airbrushes have internal seals that would be affected).

Lesson Ten: More Advanced Model Building Techniques

Scratch building

Basically, even though plastic kits are available for most modeller's interests, there are still examples of subjects that are not offered by manufacturers. A need to improve upon current models and the chance to create special bases for a completed model leads to scratch building.

The simplest scratch building involves "kit-bashing" or the mix of parts from various kits to create a new version of the original kit. Some plastic kits offer the modeller a choice of versions with "3-in-one" or other types of kits. Optional parts allow you to change the basic model. Keep all the extra parts even as they can be the start of a parts box.

Accessory parts are also sold by many manufacturers, most of them small, independent or "cottage" / "garage" companies. These accessory kits are often matched to a particular model kit already in production and can include additional detail parts, decals or a combination of these items.

Entire kits are also sold as either vacu formed plastic or resin that are often low production runs and can require an experienced or advanced modeller. In making a unique model or wishing to convert an existing model using available materials, scratch building techniques are then employed.

Materials Plastruct structural shapes include tubes, angles, I-beams, stairs and even figures to allow you to build unique models. Styrene plastic sold in sheets in both translucent and clear by plastic suppliers and can also be found in many hobby shops. Thin, clear sheets can also be used in vacu forming new parts for replacing kit windows or canopies.

Resin is now the choice of most cottage manufacturers when they turn out accessory parts or models. Casting a master part in materials such as latex or RTV (room temperature curing vulcanizing) products is also possible for an individual modeller to create a new part or duplicate an existing part.

Resin or even metal can be used as material for the cast. The cost and time involved in the procedure makes this method more suited for the experienced or advanced modeller. Wood and paper are also extremely useful materials in scratch building. Balsa wood is a soft and easily shaped wood used in flying models. Sealing the balsa wood before painting is important. Harder woods are also useful as they have a finer grain and are easier to paint.

Paper can be easily shaped and in thicker sheets can also be useful as a structural material. Whole models made out of paper can be very effective in making a miniature, especially buildings. Other materials include inexpensive foam board, Plaster of Paris or papier mache. Metal sheets or tubes are also another good source of material for modelling projects.

Techniques The first step in scratch building is in designating which parts can be built with sheet, rod or other available parts. Then drawing out plans of the parts to be made or modified helps to make a list of small projects.

Using ingenuity, the scratch builder can proceed but as indicated, this is an area of modelling that requires some experience and patience, as it is a life-time learning process! ... ***And don't forget, have fun!***

A Model Course Survey

Directions: Complete the following questions in the spaces provided: The information is requested in order to determine the type of modelling course you will require.

1. Indicate your name (in full- first and last name):
2. Provide your current vocation;
3. List your age (as of your most recent birthdate):
4. Have you built models before?
5. If you answered yes in question 4, from the list provided, indicate the type or types of modeling you have done:
 - a. plastic scale models
 - b. remote control (RC) models
 - c. flying models
 - d. railway models
6. If you answered yes in question 4, from the list provided, indicate what kind of models do you like to build?
 - a. cars
 - b. planes
 - c. military subjects
 - d. space
 - e. others
7. If you answered yes in question 4, from the list provided, indicate areas of skills or techniques you have been able to apply successfully:
 - a. assembly and construction
 - b. painting
 - c. finishing (decals, other finishes)
8. What kind of models do you presently own? (or wish to own)? Give names or types where applicable.
9. What would you like to learn especially in a modelling course?
10. What would you like to do in modelling after the course is finished?