PAGES TAKEN FROM THE MITCHELL BEAZLEY ILLUSTRATED ENCYCLOPAEDIA OF WORKING IN WOOD

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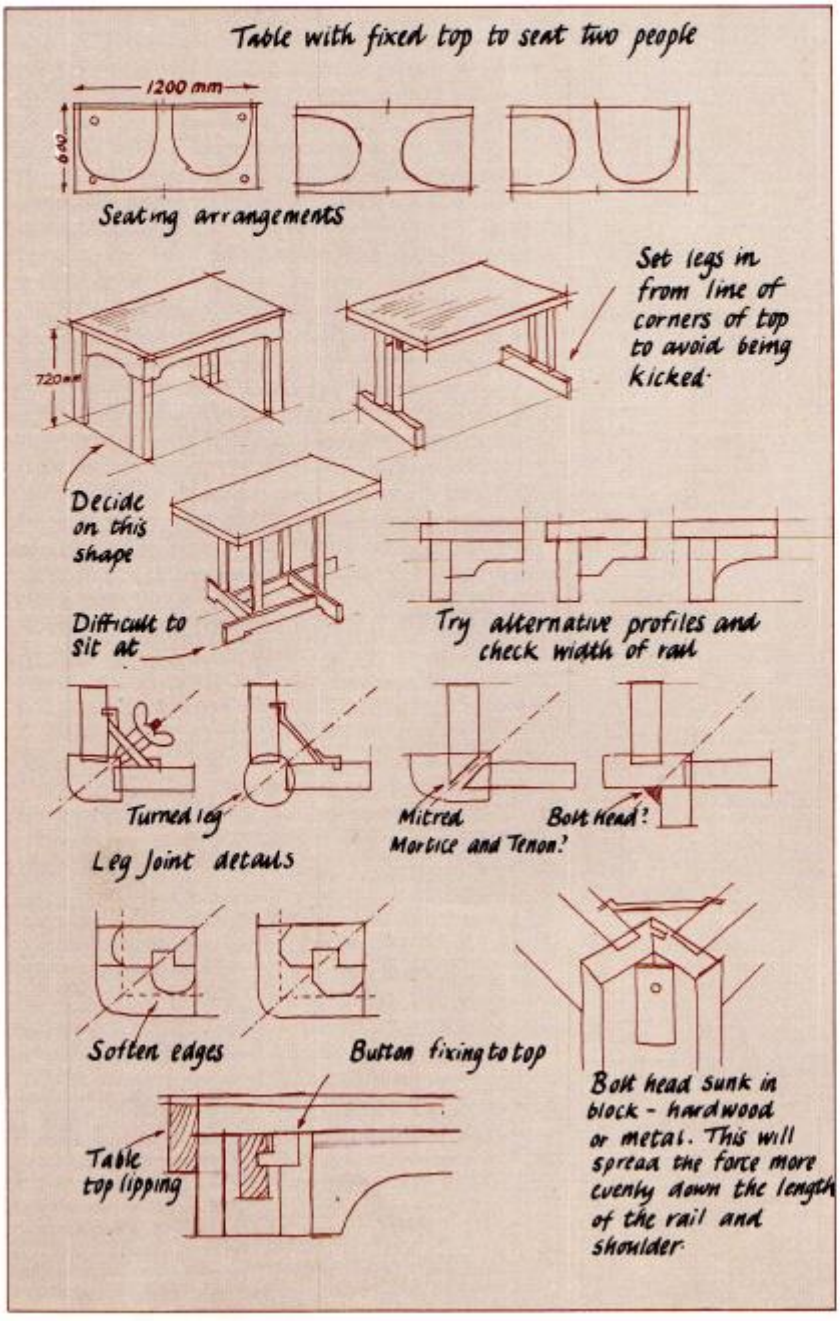
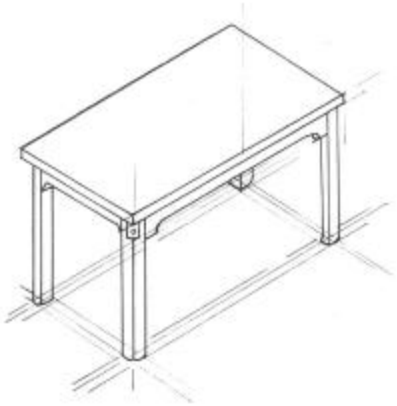
Planning a project

A methodical approach to design, following the inception of an idea, is likely to ensure the best solution to the problems of intended use and construction. This design approach can be broken down into basic stages: the brief or analysis of the idea; sketch drawings; scaled drawings; and models and rods (full-size drawings). A cutting list is then made of the required materials.

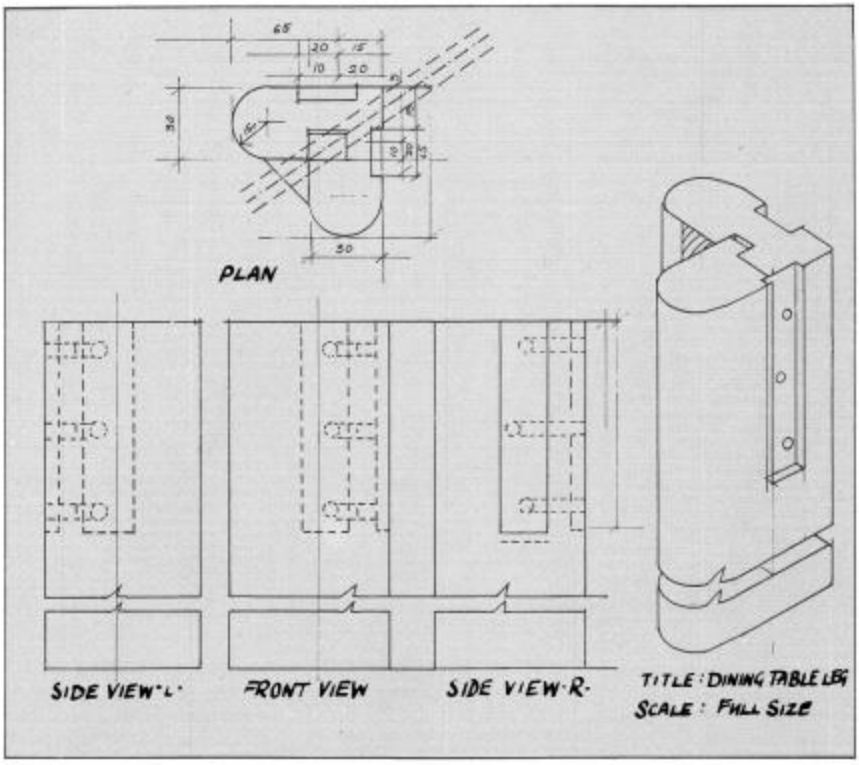
The brief identifies the intended use and function of the object within its proposed context. It can set limits on the materials and finishes and how they are to be used. It can set visual guidelines; thus, for compatibility with existing furniture or room setting, the intended proportions, positioning and colour can be compared. The brief need only be a short statement clarifying the needs for the object. Even where ideas may seem very clear and the furniture simple, a brief is always useful as a written record, providing a check on progress throughout the project. In the example illustrated the brief would describe the following requirements: a table with fixed top to seat two people; to be used mainly with one side against a wall with seating positions either at the ends or on one side; stable hardwood supporting the structure; veneered top with a durable finish harmonizing with the chairs.



Sketch drawings
The designer's sketchbook translates the written brief into a series of visual solutions. Among the general considerations incorporated will be the material sizes and thicknesses, with appropriate allowance made for joints. It can also include a more precise breakdown of materials required, such as any fixtures to be used and any special tools that may be required. From the various sketches and ideas, one will be selected and developed. Check that the sketch chosen conforms in all aspects with the outline on the original brief. In the example illustrated the following are a few of the considerations that have been made: the size of the top; its height and rail width to give sufficient knee clearance; the leg structure and the method of connecting the rails with joints, knock-down fittings or dowels; the lower shape of the rail; and, finally, how to fix the top.



Scaled drawings
The scaled drawing is the basis for confirming the decisions taken at the sketch stage and for establishing accurate dimensions and proportions. The most straightforward drawing uses third-angle projection to show, respectively, the front, side and top views. A scale of 1:5 (metric) or 1:4 (Imperial) will usually result in an overall drawing of manageable size. An isometric drawing, showing the three views combined, is a useful aid to a fuller appreciation of the design. When designing furniture to fit a particular room, it may also prove helpful to apply the same principles of scaled drawing to the room itself. Cardboard cut-outs of each item of furniture can be moved around a scaled plan of the room to establish the position and suitability of the new piece. The example illustrates an isometric projection.



Models and rods
Full-size drawings against which the work can be laid for checking are known as rods. The drawing is usually a cross-section, either vertical or horizontal, to show the joints more clearly; it can be laid out on lining paper or a sheet of three-ply or thin board. It is especially useful when defining a particularly intricate part of the design, such as the position of the pivot on a folding chair, and for checking the work at progressive stages. For a more complete evaluation of the overall appearance of the object a scaled model, made from stiff card or balsa wood, is helpful. Balsa-model details can be taken direct from the scaled drawings; when using stiff card, take the dimensions from the scaled drawings and redraw the object, making as many surfaces as possible continuous with their adjacent sides for cutting and folding into a three-dimensional form. The example illustrates a rod for the joint in the table leg, drawn using third-angle projection and also as an isometric drawing.

Cutting List — All finished sizes · Units in m.m.

ITEM	N° OFF	MATERIAL	LENGTH	WIDTH	THICKNESS
Leg Members	4	Pine	735	70	30
Leg Members	4	Pine	735	50	30
Rails	2	Pine	1,052	100	20
Rails	2	Pine	440	100	20
Top	1	Pine	1,212	606	23
Buttons for top	14	Pine	45	35	20
Leg inserts	4	Mahogany	102	20	20
Pellets to cover bolt heads	4	Mahogany	150	20	20
Dowels	24	Beech	40	11 (dia)	
Corner leg braces	4	Large complete with 6 mm/¼" mushroom-headed bolts, washers and wing nuts.			

The cutting list
Using the scaled drawings or rods, the cutting list can be prepared for ordering the wood — either in nominal or finished sizes. Nominal is the size that the boards are cut on the bandsaw or a circular saw. When planed the board's thickness is reduced by at least 3 mm/⅛ in. Prepared wood is indicated on the cutting list either as finished sizes or PAR (planed all round). List the names of the parts, the number of pieces of the same size; then, in order, the length, width and thickness, allowing 13 mm/½ in of waste in length and 6 mm/¼ in in width. Specify the wood required and re-check the total number of parts. The example illustrates the cutting list for the table.

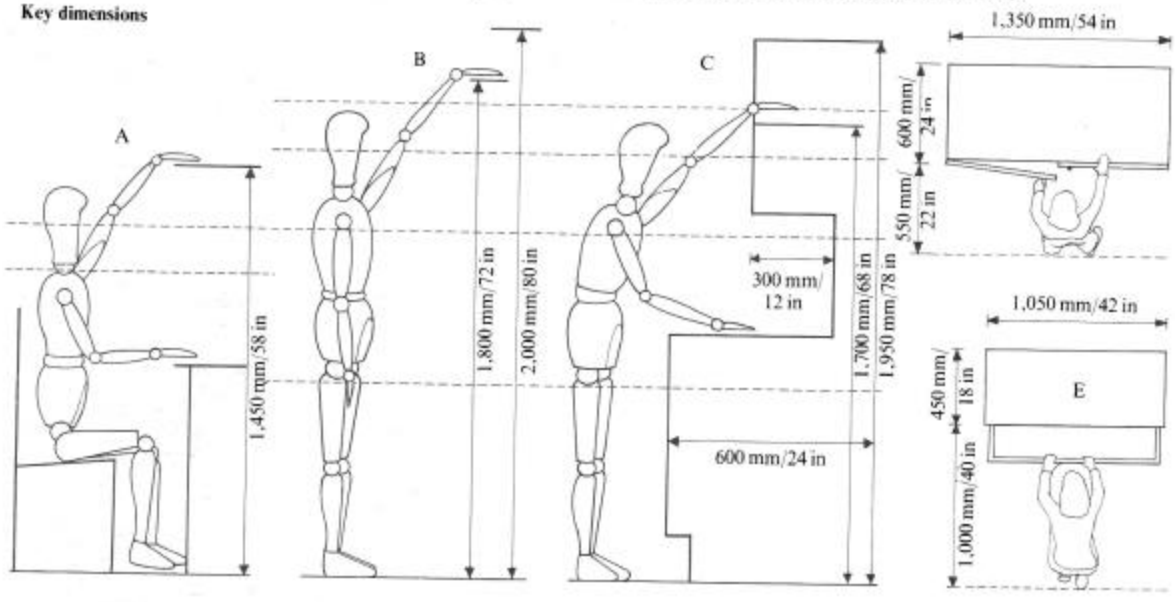
Storage

Ideally, well-designed storage should be capable of coping with the changing demands of an individual or a family, it should be easily accessible, make economic use of space and protect the items against dust, mildew and extremes of temperature. The main restraints on any design are the size of the items to be stored, the available space for storage, the height to which the items can be lifted and the distance that can be reached to retrieve them. These ideal requirements and restraints should also be considered in the context of the area needed for circulation around other objects or work surfaces and the daily routines in each room.

Storage items can be categorized into those used most frequently, such as food, shirts and toys, and those used only occasionally or seasonally, such as lawn-mowers, winter overcoats and suitcases. Those items used frequently should be easily accessible and those used infrequently should be well protected.

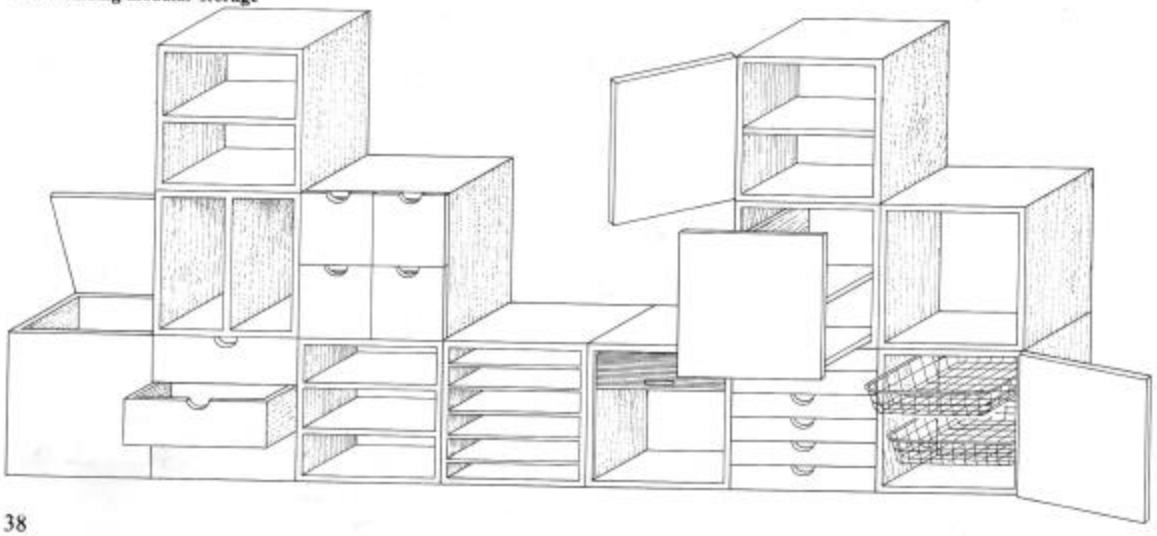
Storage units can be categorized into those that are free-standing and those that are fixed. Apart from individual pieces, free-standing storage can be considered in modular form; unit-size carcasses can be fitted out individually to suit particular requirements and be arranged, rearranged and added to at will. The modular system can also be applied to fixed storage. Manufactured boards fixed from the floor to the ceiling can be used to take adjustable shelves and units. Fixed storage can be built-in or be attached to a wall. Whatever the type of storage, fixtures and fittings can influence the design (*see* pages 256–65).

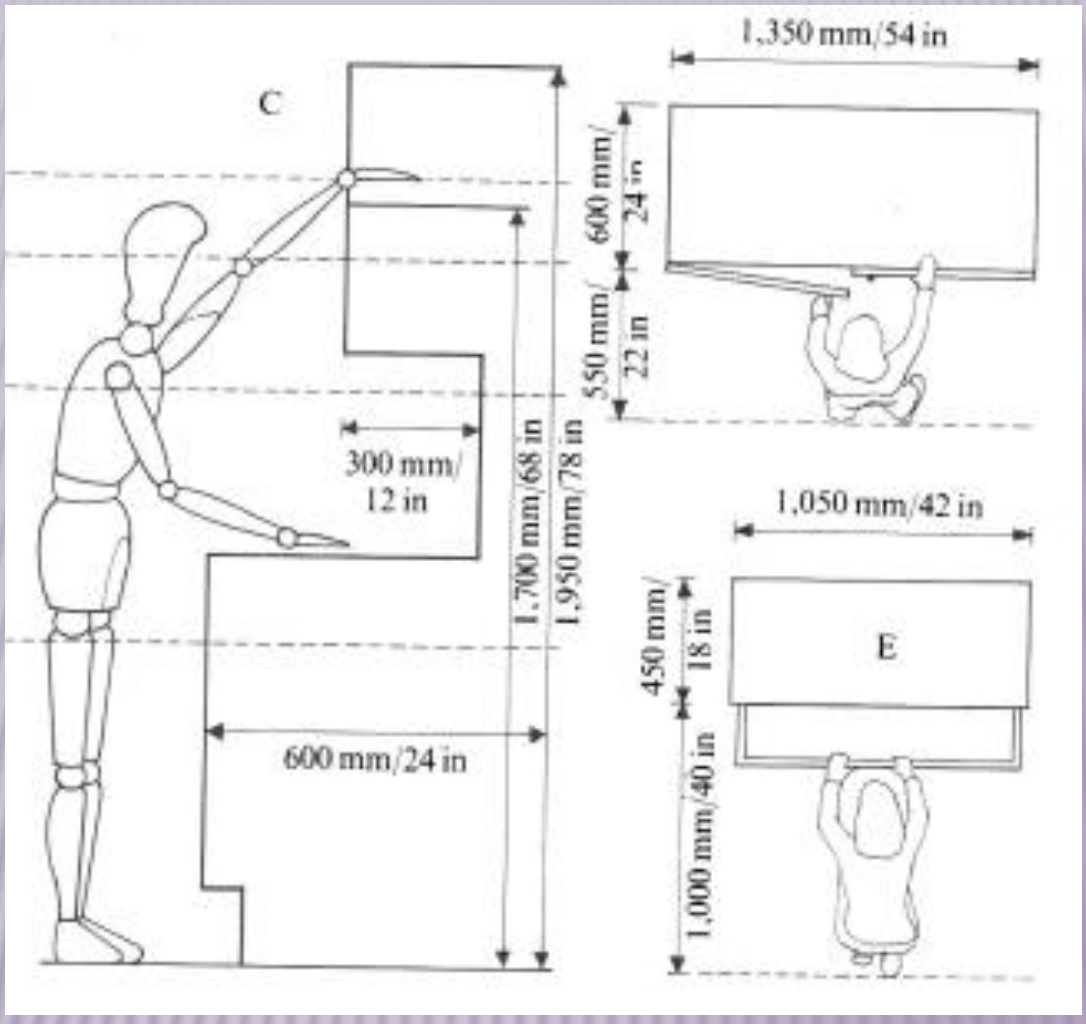
Key dimensions

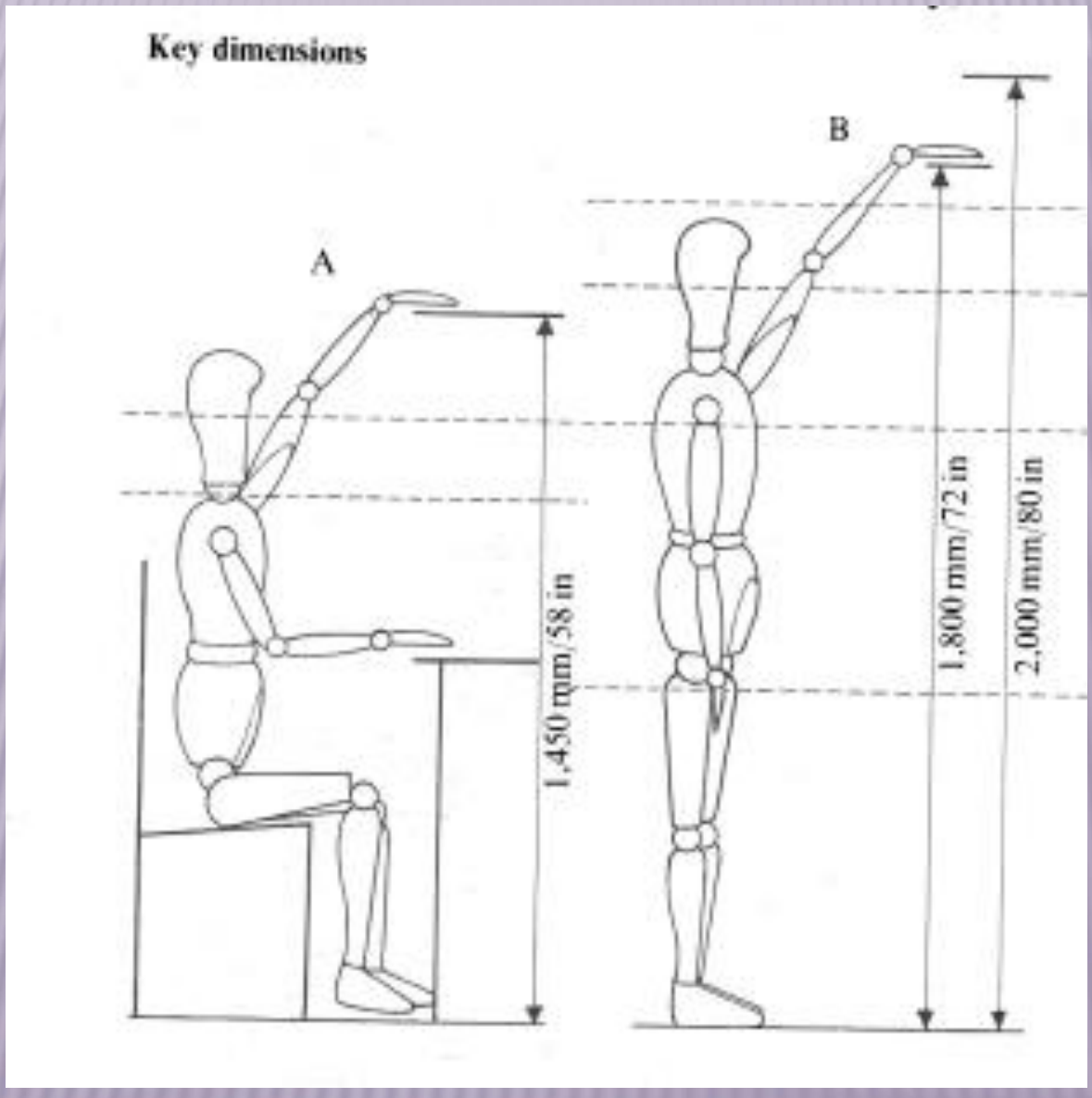


The central zone for storing items most frequently used or heavier items requiring two hands to lift with minimal effort is between 700 mm/28 in and 1,300 mm/52 in. Longer term or lighter weight storage not requiring direct visual access should be stored above or below this zone. The average eye level for an adult when standing is from 1,550 mm/62 in to 1,750 mm/70 in, and when sitting is from 1,100 mm/44 in to 1,250 mm/50 in. Comfortable vertical reach when sitting should be considered **(A)**, as should both comfortable reach and full stretch when standing **(B)** and when leaning over a work top **(C)**. Allow sufficient area when using a wardrobe **(D)** and a chest of drawers **(E)**.

Free-standing modular storage




C
1,350 mm/54 in
600 mm/
24 in
550 mm/
22 in
300 mm/
12 in
1,700 mm/68 in
1,950 mm/78 in
600 mm/24 in
1,050 mm/42 in
450 mm/
18 in
E
1,000 mm/40 in


Key dimensions
A
B
1,450 mm/58 in
1,800 mm/72 in
2,000 mm/80 in

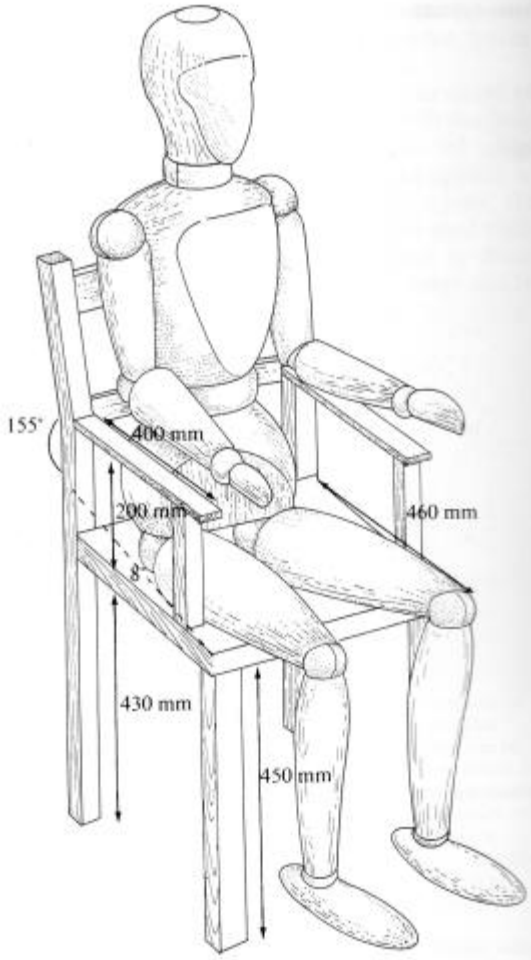
Chairs

Traditional chair design and construction demand a high degree of specialist skill, the main problem being that one component rarely meets at a right angle to the next. Modern designs, however, employ straight-sectioned timber, where possible, and timber that has been bent by steaming or laminating for curved work.

Before starting a design there are three key points to consider — stability, durability and comfort. Will the chair fall over when a sitter starts rocking it? Will it stand many years of use and misuse? Are chair arms necessary? Will the type of upholstery be suited to the chair's use? Finally, the visual appearance has to be considered. Will the chair suit the room setting?

Of all these considerations comfort is the one on which chairs are primarily judged. However, comfort is not measured or guaranteed by the amount of soft upholstery. The essentials to comfort are the angles and positions of the individual components and the support given by the completed frame. If they are correct the body muscles should not have to work significantly to maintain a comfortable posture.

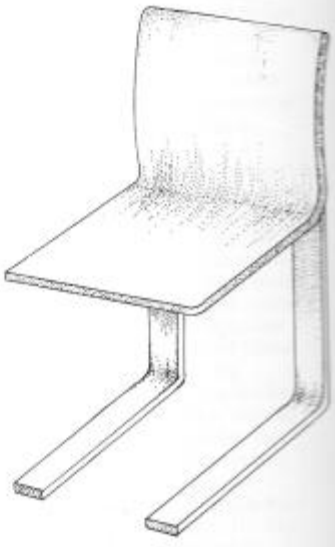
A front seat height of 400 mm/16 in to 450 mm/18 in is suggested so the sitter's feet may rest on the floor, with a seat depth not exceeding 460 mm/18½ in if the back is straight across its width, or 420 mm/16¾ in if the back is curved. This will ensure that the front edge of the seat does not exert pressure at the back of the knees, resulting in blood starvation in the legs. The seat should slope back slightly, between 5° and 8° from the horizontal or by about 20 mm/¾ in in height between the front and back legs. This slope will help to hold the natural tilt of the pelvis and lumbar curve of the spine. About 200 mm/8 in above the seat the chair back should be shaped to follow the lumbar curve and then be extended, for a high back, at a 20° to 25° angle to the vertical to support the shoulders. The front edge of the arm rests should be about 200 mm/8 in above the seat and set back by a minimum of 60 mm/2½ in to ensure that the knuckles are not crushed when the chair is pulled up to the table's edge. The amount of upholstery should be kept to a minimum.



The chair dimensions illustrated are the maximum suitable for the "average-sized" person; they should therefore be considered carefully in relation to the worker's specific needs. In particular when designing dining chairs ensure that they relate to the height and structure of the table.

Rigid frame

Top-stacking frame



Side-stacking frame