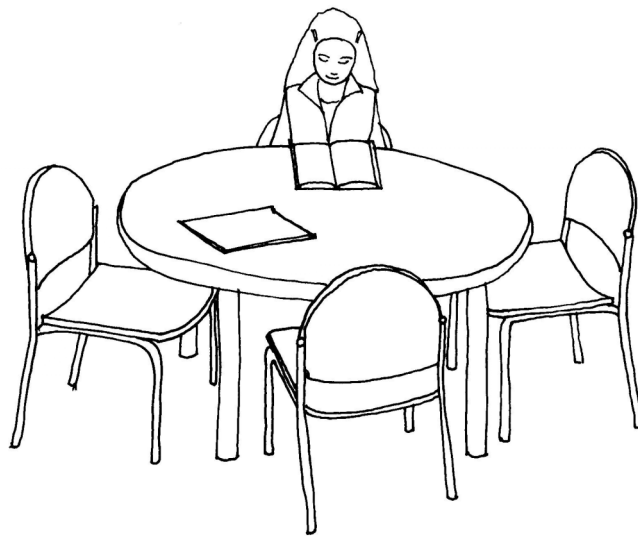


Furniture for Libraries



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1. THE FURNITURE PROGRAM

Planning for furniture cannot occur too early in a project. The amount of furniture and equipment required to support a library's program will drive the amount of space and funding required to complete the project. Many planners begin to identify furniture and equipment needs during the programming phase. Planning for the furniture for a library project requires careful scheduling and budgeting and the assistance of a design professional with experience in the selection, evaluation, and procurement of specific items. When furniture is an afterthought it is frequently unavailable, mismatched to the architecture, or ill-suited for the intended location or purpose.

1.1 What is a furniture program?

Furniture is an essential element that makes a space functional. Without it, people cannot work, customers cannot be served, and the equipment and tools of the business cannot be housed. It typically supports all of the functions and services that must occur on a daily basis. Often, however, little attention is paid to it until just before it is needed. When it is addressed early, an adequate budget and production and delivery schedule can be built into the project. Additionally, with pre-planning coordination issues, such as architectural design and electrical and data placement, can be discussed and resolved.

A furniture program provides a formal method for establishing the standards and requirements for all furniture, equipment, and sometimes millwork for the library project. It should list all of the furniture items to be placed in each area of the library, along with preferred dimensions, quantity, equipment to be housed, and any electrical and data requirements. It should also incorporate any staff workstation standards that are to be used. The program may be adjusted as the furniture plan and building design develops, since it provides the basis for the final furniture list and specification. Existing furniture to be reused should also be noted indicating any refurbishment specific items might require.

Item #	Item Name	#	Location	Ex./New	Description	Finish	Note
T4	Reader Table for 4	12	Ref. Room	New	36" x 72"	Wood Laminate	
T4A	Reader Table for 4	12	Ref. Room	Ex.	54" Round	Wood	Refinish
C1	Reader Chair	48	Ref. Room	New	Armless	Wood	(Match existing)
C2	Reader Chair	48	Ref. Room	New	With Arms	Wood	
C3	Task Chairs	6	Ref. Room	New			OPAC
A1	Atlas Stand	1	Ref. Room	Ex.		Wood	Refinish

Figure 1: Sample Spreadsheet format for Preliminary Furniture Program

A simple furniture program can be prepared using a spreadsheet, which can be sorted by any number of fields; e.g., Location, Item Name, Finish, or Note. Each unique furniture item can be given an alphanumeric code (example: T4 for a table for four) or a sequential numbering system can be used (example: A1 for Accessory 1). The spreadsheet can contain an unlimited number of fields, but would most likely include some of those suggested above as

well as a notation regarding power or data requirements, specific equipment dimensional requirements, and an estimated cost.

1.2 When is it needed?

The furniture program should be developed in the programming phase of a project. The building program often contains the essential elements of a furniture program. This early input assists the space planner in providing adequate square footage to accommodate the required furniture. It also assures that realistic budget figures can be developed. More detailed building programs will include all of the information about furniture, including dimensions, materials, and cost.

1.3 Who prepares it?

The library director and/or the library consultant will initiate the furniture program, listing quantities, dimensions and location by individual item. Other elements, such as design, finish materials, and electrical and data requirements, can be included or developed with the interior designer in the design development phase of the project, when architectural and millwork design are being formalized.

2. THE PROFESSIONALS

The Interior Designer can be employed directly by the Client (Owner) or by the Architect as a member of the design team. The primary benefit to employing the Interior Designer directly is having an independent and objective advocate whose only focus is the function and aesthetics of the interior space. The main benefit to having the Interior Designer under contract to the Architect is enhanced communication and closer project coordination. In either case the Interior Designer's activities will be closely coordinated with both parties.

The Interior Designer's scope of services may include space-planning, development of the furniture program and budget, design of custom millwork and furniture, selection of interior finish materials and design motif, interior signage design and specification, specification of furniture and shelving, coordination with other design consultants, and installation observation. At the minimum the scope should include several meetings to discuss the function of the interior spaces and the furniture requirements and several meetings to present layout, selection of specific items, and presentation boards of proposed colors and finish materials.

The Interior Designer's fee can be a flat fee for a specific scope of work, an hourly rate for consultation services, a percentage of the furniture and equipment to be purchased, or a dollar per square foot cost of the total construction project, although the latter is not common. Qualified designers belong to professional interior design associations, such as ASID or IIDA, are certified in the State of California by CCIDC, and will have references for previous work available. Interior designers who specialize in libraries and public facilities will have a better understanding of the requirements of a public library.

3. PROCUREMENT METHODS

There are a variety of methods available to procure furniture. These include competitive bidding, sole source, proprietary specifications, government contracts, or a combination of the above. Each of these is covered in great detail in “Specification and Bidding of Furniture and Shelving” which is available on the Libris DESIGN (www.librisdesign.org) website.

Frequently the governing agency will determine which method is required, and frequently this is determined by the dollar value of the purchases. The procurement method can also be determined by the owner’s expertise, available assistance, or the time available to order and receive the furniture. All options should be explored to assure the best pricing and highest quality of service. The interior designer and the purchasing agent, if there is one, can pool their knowledge to produce the best buying situation for the client.

4. FURNITURE SELECTION

4.1 Evaluating Existing Furniture

The reuse or refurbishment of existing furniture is sometimes desirable, particularly when furniture is high quality and relatively new. Evaluating the furniture requires an assessment of its condition, quality, age and projected life span. The cost of refurbishment is also a consideration. An inventory of the items should be compiled, as well as a cost evaluation comparing the use of the existing furniture versus the cost of buying new. The interior designer or furniture dealer, who has expertise in this area, should provide the evaluation.

Some items are easily refurbished, while others require labor-intensive attention that may make this process almost as expensive as new. Typically, wood case goods and metal items must be taken off-site to be stripped and refinished or electrostatically painted. Minor touch up may be done on site. Seating is typically not worth refurbishing, as the cost of pick-up, refinishing, reupholstery, and delivery may total more than the cost of a new chair. An exception would be if the chair were of very high quality or a recent purchase.

Another element to be considered is whether the design of the existing furniture will fit into the new or remodelled library, particularly in the public areas. Ideally, the furniture will enhance the architectural design. New furniture can be selected or designed so that this goal is achieved, while existing furniture may not contribute to the desired effect.

A final critical factor to consider relates to quantity and availability. Is there a sufficient number of the existing item available for reuse to fit the new plan? If not, is the item still on the market and easily obtained? If not, what is available on the market that will match the existing item in the new library?

4.2 Timeline

The selection and budgeting of furniture is typically done during the design development phase of a project, while the specifications and any required drawings are produced during the construction documents phase. Because of the electrical and data coordination required, this must occur early in the project. The actual bidding should conclude approximately eight

months before the product is needed. This allows an appropriate amount of time for each of the phases to take place.

At least two to three weeks should be allowed for the evaluation of the bids and any samples. Two to three weeks will be required for the issuance of the purchase order(s) or contracts to the successful furniture vendor(s). Shop drawings and finish material submittals and approvals will require an additional three to four weeks. Typical production time for standard library furniture is sixteen weeks; custom would probably take longer. An additional two weeks for shipping is needed, particularly if the manufacturer is on the East Coast. The final installation can take anywhere from one week for a very small library to up to four weeks for a large one. In total, the amount of time required after the receipt of bids is twenty-six to thirty-two weeks.

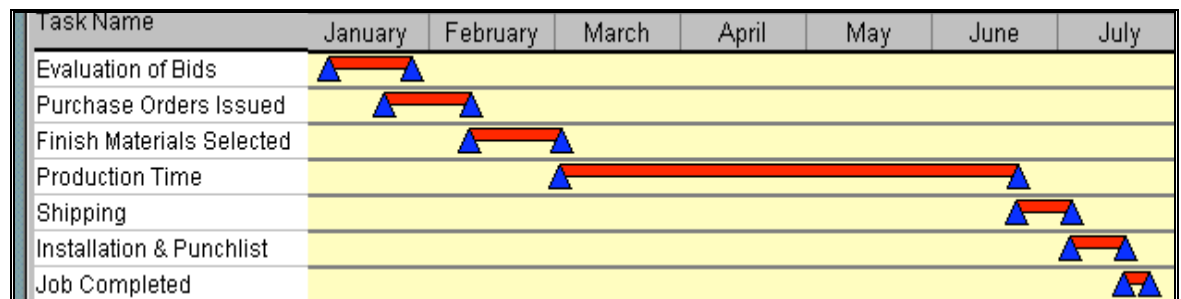


Figure II: Timeline from Evaluation of Bids to Punch list

Counting forwards from furniture programming, design review, and the lengthy decision-making process that needs to occur before the specifications are written and the bids issued, one can assume that the entire process requires approximately 14 to 16 months and should begin before the groundbreaking. During the six to eight month period prior to the issuance of bids, the owner and the Interior Designer will review furniture layout and specific furniture items, “test drive” certain pieces of furniture, and make final decisions on the style and motif for the project. Many libraries have underestimated the length of time it takes from the issuance of bids until the new furniture is in place, particularly the subtle difference between the date the manufacture of the furniture is completed and the actual date the furniture arrives on site.

4.3 Coordination with Millwork

In a well-designed project, the public area millwork and furniture are an extension of the architecture and complement the over-all theme of the library. The ultimate coordination is achieved with custom furniture, which can be designed to replicate millwork details and finishes providing a totally cohesive design throughout the facility. If this is not an option, standard (catalog) library furniture can be selected with careful attention to shapes, details and finish materials that are compatible with the millwork.

4.4 Custom versus Catalog

The architect and interior designer often prefer custom designed furniture. It brings a unique look to the project that complements the architectural statement and avoids the standard,

cookie-cutter approach of manufactured library furniture that is so prevalent. It also permits custom sized pieces that are designed to fit unusual spaces and the equipment that is housed in them.

The quality of custom furniture can be much higher than that of catalog furniture. Local craftsmen, employing time-honored techniques for building furniture by hand, may be available to produce custom furniture. Joinery and other detailing will be superior. There is no limit to the types and combinations of materials that can be used, unlike catalog furniture, which usually permits only a few wood species, standard laminates, and a small range of colors for metal trim. Custom furniture can often be a good value, with pricing that may be competitive with higher end catalog furniture, depending upon the complexity of the design and the materials used. In addition, if it is locally made, there are no freight charges from the East or Midwest, where most library furniture is manufactured.

Depending upon the manufacturer's workload, production time may be shorter, and if it is local, the two weeks of delivery time are shortened substantially. Standard library furniture manufacturers have fixed production schedules and are rarely open to negotiation unless the project is large.

The challenges with custom furniture occur when replacements or additional pieces are required. New items that are not identical to the original furniture will require professional design drawings. The cost of producing a few custom pieces may be more than when they were part of a large order. Typically custom manufacturers are small firms, and may be less stable than the larger vendors. It may be necessary to find another manufacturer if the original one is no longer in business.

Catalog furniture, on the other hand, is generally available for as long as the manufacturer is in business, so it is easy for library staff to simply order another piece that will match, even when many years have passed. There is a consistent level of quality of construction and finishing with a given manufacturer, and typically, product samples can be reviewed before ordering, either via individual samples or visiting a similar installation. Project references should also be furnished to verify comfort and durability. Because the furniture is mass-produced, engineered and manufactured, the pricing at the low to mid range of product is typically lower than that of custom furniture. There is also a fairly broad range of product styles to fit most budgets, ranging from low to very high end. Many library furniture manufacturers will customize their standard product by changing dimensions, wood species, finish color, minor design details, or create a new piece to match standard product. Warranties are easily obtained from standard furniture manufacturers, and they usually have the history and stability to make them meaningful.

4.5 Alternative Furniture

Office furniture can be used in place of standard library or custom furniture, particularly when budget is of primary concern. Although office furniture is not constructed for the heavy usage and frequent abuse that library furniture experiences, ergonomic task chairs and modular systems furniture can have a place in the library. The latter is most often used for staff workstations but may substitute for the traditional wood carrel or study station. The acoustic properties make it especially suitable for that usage.

Manufacturers who supply chairs for restaurants are also a viable source for study chairs, as long as the construction is extremely durable and incorporates the use of stretchers with wood chairs. They offer a much wider variety of styles and materials than the library

furniture manufacturers. Steel framed chairs made by office furniture manufacturers may also make durable reader chairs.

4.6 Performance Standards

There are many points to consider when selecting library furniture, with functionality and durability being primary. Whenever possible, performance standards should be reviewed prior to making a decision. Although there is no universal, comprehensive set of furniture standards, there are some standards available for individual items.

The Business and Institutional Furniture Manufacturer's Association (BIFMA) provides a listing of available standards which can be downloaded, and a sample order form on its website (www.bifma.org/standards). It currently lists the American National Standard for Office Furnishings (ANSI) standards for the following products: General Purpose Office Chairs, Lateral Files, Vertical Files, Lounge Seating, Desk Products, Panel Systems, and the BIFMA Ergonomics Guideline for VDT (Visual Display Terminal) Furniture.

Static electricity generation standards are available for floor covering products, but not for furniture, even though it may be a contributing factor. Because static electricity is typically the result of the contact of two dissimilar materials, one being clothing or shoe soles, it is difficult to predict when it will occur. When computer use dictates minimal static electricity, metal and vinyl should be avoided. See 5.2 below for additional information. Some library and office furniture manufacturers have conducted their own product performance testing and can supply those results upon request.

4.7 Technology Integration

The importance of integrating technology requirements into the furniture at an early stage cannot be stressed strongly enough. Technology Infrastructure For Libraries which is available on the www.librisdesign.org website covers this in greater detail.

4.8 Budgeting

Early and accurate budgeting of the furniture will aid in achieving a successful project and prevent unpleasant surprises later. Once the furniture program and an initial furniture plan have been prepared, a preliminary budget can be estimated. It is important to use realistic itemized costs at this point rather than general cost per square foot figures typically used by cost estimators and others who have no expertise in furniture selection and specification.

Allowances should be included for freight, delivery, installation, relocation and sales tax. A contingency amount should be included for unforeseen items and unanticipated price increases, particularly if the project timeline is a long one. The budget should be updated as the furniture plan is revised and more decisions are made about furniture style and materials.

Life Cycle Costing is sometimes a factor in budgeting and specifying furniture. This method includes elements other than the acquisition cost to determine the actual cost over time. Initial costs may include discounts, shipping, delivery, handling, assembly, storage, installation, personnel training, etc. Other elements to be considered include service life of the product, recurring operational costs such as electrical power required, recurring

maintenance costs, etc. A lengthy checklist is prepared and thoroughly evaluated by the design professional in this approach.

Life Cycle Costing adds another dimension to the budgeting process and provides additional quality control by analyzing the cost of the product over its lifespan, with the added potential for operational and maintenance cost savings that may be realized by the library. Since the labor cost of these items over a period of time is often more than the initial product cost, the savings can be substantial and more than make up the difference between a low and high bid. Because this is a complicated procedure requiring a great deal of information and analysis, it may not always be warranted. However, including the option for using Life Cycle Costing in the furniture specification puts the bidders on notice that the bid evaluation may include much more than initial cost and leaves the door open for its use if desired.

5. MATERIALS SELECTION

5.1 Options and Comparisons

The variety of materials that can be used in furniture, particularly custom furniture, is practically limitless. It includes all types of metal, wire mesh, vinyl, glass, stone, fabric, lightweight concrete, Plexiglas®, plastic laminates, molded plastic, solid surface materials, tile, Formica®, linoleum and, solid wood or wood veneer. Standard furniture typically limits itself to a few of these materials with less variety of color and finish.

5.2 Selection Criteria

In addition to functionality and cost, appropriateness to the over-all design concept is one of the first criterion used in selecting furniture finish materials. If the furniture is custom, then some of the materials used in the millwork and architectural backgrounds should be used in the furniture. Careful attention should be paid to matching materials and stain colors and sample submittals for all products should be scrutinized and compared. Standard (catalog) library furniture can often be customized through the use of special stains, wood species, or paint colors sometimes at an increased cost. In this case, extra care is needed to provide samples to the manufacturer for matching and to check submittals for accuracy. Some manufacturers have a difficult time achieving satisfactory results, and others will not attempt custom work.

Durability is an important criterion in selecting materials. If a material won't stand up to heavy use and wear or can't be easily repaired, then it probably shouldn't be used. Often, longevity depends upon the choices made within a material category. For example, some woods are harder than others, natural, matte finishes show fewer scratches, some paint methods are superior to others, some laminates have special coatings or embedded metal particles to increase their lifespan, etc.

<u>Wood Species</u>	<u>Pressure to mar</u>	<u>Wood Species</u>	<u>Pressure to mar</u>
Hickory	1820	Walnut	1010
Maple	1450	Maple	950
White Oak	1360	Cherry	950
Beech	1300	Gum	850
Red Oak	1290	Elm	830
Yellow Birch	1260	Sycamore	770
Green Ash	1200	Alder	590

Figure III: Hard wood species and pressure required to mar (in pounds)

Source: Wood Handbook: Wood as an Engineering Material, USDA, Washington, D.C.

To minimize static electricity generation in sensitive computer areas, wood or other non-conductive materials should be used rather than plastic coated or metal furniture. Vinyl upholstery can also contribute to the problem. Wool or wool nylon blends would be a better choice.

Color and texture are other aspects of material finish selection that impacts the appearance and durability of the product. Very light or very dark solid colors, particularly with no pattern, can be poor choices, regardless of the material, as they provide little or no soil or abuse hiding properties. Very heavy textures can be problematic, as they tend to attract dirt and bacteria. A design professional can find the perfect material to fit the aesthetic as well as the durability criteria.

Upholstery fabric requires another level of knowledge in order to select the best product. Different yarns and constructions react in a variety of ways to the heavy wear experienced in a library. In addition, they have varying flame resistance. The Association for Contract Textiles (ACT) has established minimum standards and test results for fabrics. Most commercially used textile samples have a card attached bearing the ACT symbols indicating compliance with these minimum standards. The tests and standards cover such things as abrasion resistance (how many “rubs” the product can sustain before it begins to wear), flame resistance, colorfastness (how many hours of sunlight a product can endure before it begins to fade), breaking strength, pill resistance, seam slippage, and mildew resistance. The American Society for Testing and Materials (ASTM), a non-government group, develops fire safety codes and standards and is involved in developing testing procedures.

The greatest variety of upholstery fabrics is now made of nylon or nylon blends, and they are at the top of the durability ratings. Wool has long been a top quality upholstery fabric, known for its durability and higher price. Polyolefin fabric has also become more popular due to its ability to be cleaned. When comparing the ACT or ASTM ratings, however, nylon fabrics will typically have outstanding results. Where a fabric is located in the facility with regard to exposure to sunlight is a factor which should be considered particularly in regard to fading.

State fire safety rules also apply to upholstery fabrics. The minimum California standard for this product is TB 117. It is mandatory that all seating products comply with this technical bulletin. Another, more stringent State bulletin is TB 133, which applies to upholstered seating in public assembly areas without sprinklers. It is important to scrutinize all of the test results for proposed fabrics and assess the usage conditions before making a selection.

5.3 Maintenance Issues

Even the most carefully selected and highest quality furniture materials must be maintained. However, these are usually the items most often overlooked or carelessly cleaned by the custodial staff. Maintenance instructions should be requested from each manufacturer and kept together in a file for reference. Often the life of a material is determined by the care it receives. Wood, for example, can retain its appearance indefinitely if the finish is renewed periodically. Many materials, particularly laminates and vinyl molding or finishes attached with a specific gluing compound, are actually harmed by improper cleaning compounds or excessive pressure. Correct cleaning procedures will help preserve the value of this significant investment.

5.4 Coordination

In addition to the focused attention on individual furniture pieces, the over-all theme of the project must be kept in mind. All of the disparate materials should produce a harmonious, cohesive entirety. Having a myriad of resources from which to choose, and being able to visualize the end result are attributes, which the professional can bring to the project.

6. FURNITURE TYPES

6.1 Chairs

Several different types of chairs are found in the library, among them the lounge chair, reader chair, and task or ergonomic chair, which is on casters, adjustable, and scientifically designed to support the body. Stools, benches, rocking chairs, and sofas are used as well.

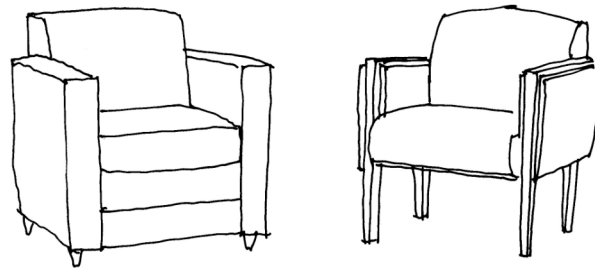
Chairs in the public area can be upholstered, solid wood, metal frame with molded plastic shell or upholstery, or a variety of other combinations of materials. Upholstered chairs are usually more comfortable, give a more residential, home like feeling to the space, and provide the opportunity for color and pattern accents. Non-upholstered chairs may be easier to maintain and more durable, although plastic and wood show scratches and handprints. One of the more important factors in considering a chair is its scale in relationship to the intended user, the architecture and surrounding furniture.

6.1.1 Lounge Chairs

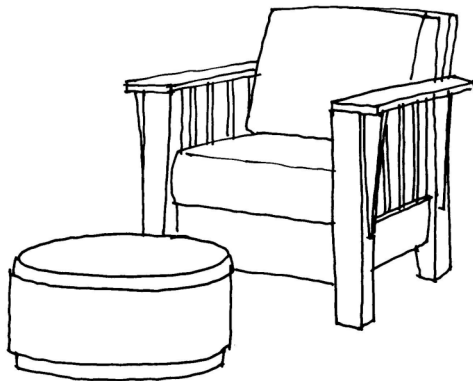
Lounge chairs are larger, upholstered chairs designed for casual reading or relaxing. Some manufacturers will produce children's size lounge chairs also. The dimensions of the chair are an important consideration so that the chair itself is not too large to move, the pitch of the back is comfortable, and the seat is not so deep as to make it difficult to stand up or prevent the occupant's feet from touching the floor. The height of the back and the arms also impact

the chair's comfort. There is no substitute for sitting in a chair to determine its suitability; catalog photographs cannot tell the story.

Lounge chair with upholstered side and arms (left), and with wood cap on chair's arms (right)



The chair's construction is also important, particularly the structural materials used, type of upholstery filling and fabric covering. Ease of recovering and cleaning should also be factors. Because of their scale, large patterned fabrics are often used to make these chairs focal points. In this case, a COM (Customer's Own Material) may be specified providing a wider range of fabrics over and above the manufacturers' own sometimes limited offerings. For durability, consider elimination of piping on upholstery seams, using tight or fixed seat and back cushions, and selecting a wood cap on the chair's arms where the wear is likely to be the heaviest.



Lounge chair with wood arms and sides and footstool

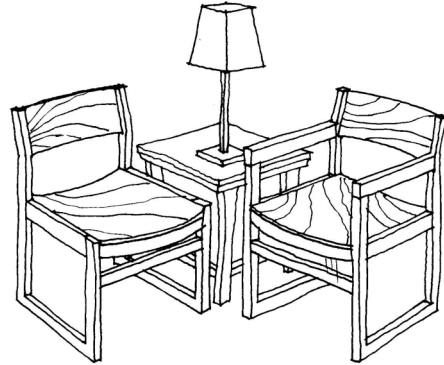
6.1.2 Reader Chairs

Reader chairs receive more use and abuse than any other piece of furniture in the library. They seem to present a challenge to patrons who have discovered many creative ways to occupy them. Since these chairs must be comfortable and durable, much care should be given to their selection. Different sizes should be used for young children, juveniles and adults.

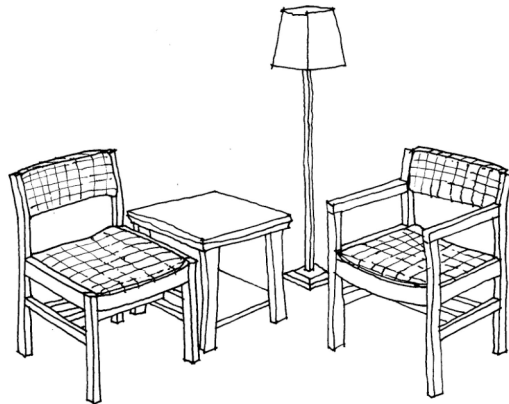
Standard wood reader chairs are seen in many libraries, some with a few new design elements to update them. The seats and backs may be upholstered or non-upholstered. In addition, there is a wide range of other wood chairs, metal-framed chairs and thermoplastic molded chairs manufactured by contract furniture companies that may be appropriate. Many of these have been manufacturer-tested for performance, and the results should be reviewed before a decision is made. Samples should also be requested for evaluation, which should

include investigation of the type of joinery used for the various parts, the size and placement of the rails and stretchers, the size of structural members and whether they are continuous, type of fastening hardware used, the diameter of metal frame tubing and other details.

All wood sled (or sleigh base) reader chairs, armless (left) and with arms (right), with side table and table lamp



Styles may vary from four-legged, sled based, steel framed, and with or without arms. When arms are selected for reader chairs, it is critical that the arms fit under the tabletop or carrel work surface. This should be tested on the specific table or carrels intended for use since the addition of a skirt or panel to a table can lower the under-table clearance. The chair's weight is also a factor in the ease with which it can slide in and out under the table. Sled based chairs can be quite heavy and difficult to move, but with glides attached, they can extend the life of a carpet in a way that chair legs being pulled in and out over the finished carpet can not. Many libraries prefer heavier chairs, which are less likely to migrate around the building.



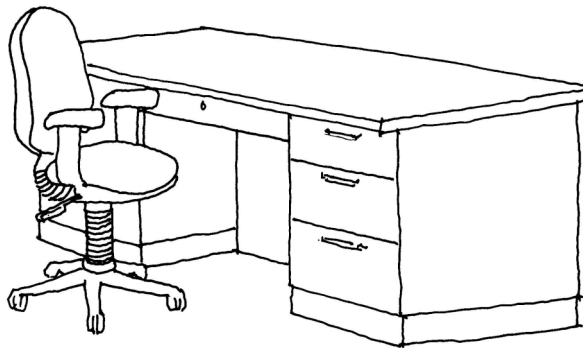
Reader seats, with legs, with upholstered seat and back, armless (left) and with arms (right), floor lamp, and side table

If upholstered, fire and life safety code requirements apply to the fabric and filling used. It is always a good idea to ask the manufacturer if the chair is appropriate for this type of heavy use facility, or if it has been used in other libraries. Checking actual references is time well spent.

6.1.3 Task Chairs

Task chairs are often found in both public and staff areas of the library. These chairs are ergonomically designed to adjust to the user's body via mechanisms ranging from simple seat height to a multitude of sophisticated adjustments. The back and seat may tilt or be fixed, back tension may be increased or decreased, the back and arms may lower or rise, etc. Casters are attached to the base, which facilitate easy movement. A particular style of chair may come in a variety of overall widths, depths and heights, with or without arms, so that the right size can be tailored to the appropriate use. Armless chairs are often used when the space is confined or when the occupant is in and out of the chair frequently.

People who spend significant time in the chair working at a computer or completing other seated tasks often prefer chairs with arms. When specified for staff areas, samples should be requested for trial. The ease of adjustment is especially important so that the user doesn't need to vacate the chair in order to adjust it. The pneumatic lift mechanism is favored for that reason. Since these chairs receive heavy usage, strong warranties are advisable.



Ergonomic task chair
at standard double
pedestal desk

Criteria for evaluating an ergonomic chair include:

- Arm rests which adjust independently and are short enough so the occupant can get close to the work surface or which fit under the work surface
- Lower back support
- Stain and fire resistant or open mesh upholstery
- Seat and backs units, which can be field replaced
- Seat and back units which move independently; adjustable back rest height
- Adjustable tilt tension
- Pneumatic seat lift for adjustable seat height
- Stable base with five star pedestal support preferred
- Heavy duty casters, hooded if available
- Minimum five to ten year product warranty
- Electrostatic discharge rating

6.1.4 Other Reader Seats

Other seating options include sofas, rocking chairs, benches, upholstered cushions, and stools. Sofas or loveseats are sometimes used in the preschool area so that a parent and child can read together. They are rarely used in the other public seating areas since people tend to want their own space and dislike sitting close to strangers. Benches are frequently used in waiting areas, such as the lobby to provide a brief respite. They also may appear in children's areas where picture book tables with sloped tops are used. Stools also can provide short-term seating in children's areas or at catalog computer stations. (See 7.1) Upholstered floor cushions provide impromptu seating in the children's reading or story time areas and can be creative, whimsical elements when special shapes such as animals or bright colors are used.

6.2 Tables and Carrels

6.2.1 Tables

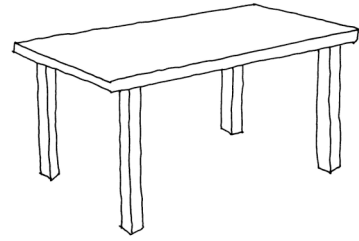
Tables are an important component of the library furniture plan. The elements of a table must produce a balanced construction that will be strong and stable. Tables that are not designed to carry the load required of heavy usage will wobble, sag or tip under certain conditions. Review of performance tests and actual use experience is valuable. The strength of a table depends upon its structural support (legs or base), the stability of its top and supporting rails and keels, and the quality of its joints and attachment hardware. Tables may be constructed of all wood, wood and laminate, wood and metal, metal and laminate and other materials. The style may feature four wood legs with a variety of rail and stretcher placements, panel ends, metal legs, metal or wood columns and may have a rectangular, round, square or other geometric shape top.



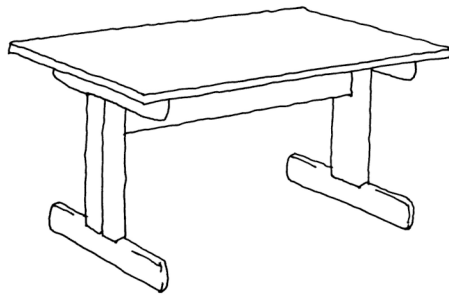
Single station panel end reader table

The panel end design presents an opportunity for added stability, additional design details and provides the maximum cable-hiding abilities. The panels, however, can become an attractive target for kicking and foot propping by the occupants. They also create a heavier appearance than the four-legged table.

Standard reader table for four with legs

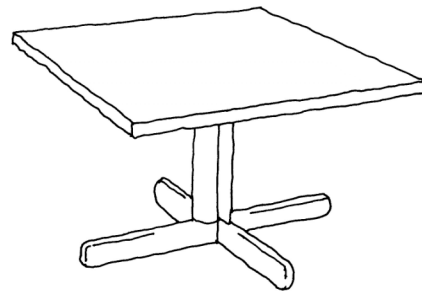


The latter are lighter in scale, easier to move, and provide the most flexible seating. If current or future use dictates any electrical or data connections, the legs must be designed to house cabling, or a centrally located vertical chase can perform that function. The typical adult reading or reference table is a 36" x 72", or 48" x 72", rectangle that can seat four people, two per side. This provides suitable space for books, and writing materials.



Trestle style reader table for four

Small, square tables are sometimes used in informal reading areas, and round tables are frequently preferred in cafes, lounges, browsing areas, and juvenile and children's areas because of their body-friendly curves and egalitarian seating arrangement.



Single pedestal square table for four

The material selected for the tabletop determines how well it maintains its appearance as it ages. Wood provides a classic, rich look and can be refinished, but it presents an almost irresistible temptation for carving and scratching. High-pressure laminate plastics are extremely durable and come in a wide variety of patterns, textures and colors. Some manufacturers produce laminates with metal or other particles on the surface to provide greater protection and longer wear. Small patterns or textures will hide abuse better than solid colors, particularly dark ones. High gloss laminates, which can create glare, should never be used in horizontal applications. Solid surfacing materials, such as Corian®, may

also be appropriate for tabletops, although they would be much more expensive, and are usually offered for custom furniture only.

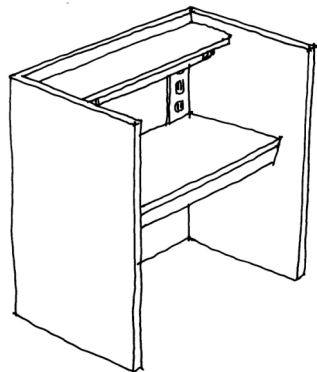
Appropriate sizes should be selected for young children and older juveniles, (See 7.1) as well as adults. The table design often will include task lighting and electrical and data components all of which should be integrated into the table and should provide wire management as well. This is covered in great detail in Technology Infrastructure For Libraries, which is available on the website, www.librisdesign.org.

Criteria for evaluating a table include the following:

- Appropriate size for function
- Scale for location
- Stability and weight
- Durability and mar resistance
- Finish
- Reflectivity of work surface
- Ease of maintenance of item and surrounding area
- Availability of accessible pieces (or compatible units)
- Ability to provide power and data at the work surface if required
-

6.2.2 Carrels

Originally designed for quiet study, carrels are now used to house a variety of electronic equipment from computers and printers to television monitors, other video equipment, and audio listening devices. The style and materials selected should complement that of the other library furniture, particularly the tables. Smaller sizes and lower work surfaces should be specified for children. As with tables, the durability of carrels depends upon their structure. They may have legs of wood or metal or panel ends, or may be part of a larger structure that forms a hexagon or other geometric shape. The typical rectangular shape may be single faced for one user, or double faced, where two carrels share a central panel in a face-to-face configuration. They may also be ganged or joined together using one dividing panel to form longer runs of single-faced or double-faced carrels. These are typically known as “starter” and “adder” units.



Standard single station study carrel (starter unit) with overhead shelf, task light, and power and data strip

Carrels joined together may share electrical and data cabling and connection up to a maximum determined by the equipment load. The manufacturer should install UL Rated electrical components within the carrel. Reader carrels can contain a shelf above the work surface for books and a fluorescent light under the shelf. If large equipment is to be housed, the upper shelf and light are removed to provide clearance.

Custom carrels may be designed with storage units and shelves for the various equipment and media. Because the vertical panels of the carrel define the dimensions of the work surface, it is important that sizes and placement of the equipment have been taken into account. Computer use may dictate a lower work surface or an adjustable one, or a keyboard tray. However, accessibility standards must be considered here as well. At least five percent, or not less than one, of each seating element in a library must comply with accessibility guidelines. Custom carrels can also be included in the general construction contract and be designed as built-in casework utilizing the perimeter walls as the back or side of the carrel. This can reduce costs, but will also reduce flexibility, and may provide issues with replacement of work surfaces should carrels become damaged. If carrels are designed utilizing a perimeter wall, the walls will quickly become marred and damaged by feet. Application of a protective material, such as perforated metal, can protect the surface of the wall.

6.2.3 Technology Stations



Custom six-station technology pod at University of Southern California's Leavey Library

Photo courtesy of the Synsor Corporation.

Technology tables, carrels, and counters to house electronic workstations in either the public or staff work areas, are available from systems furniture manufacturers, office furniture vendors, and library furniture vendors. They are available in as many shapes and varieties as other public and staff furniture, including single surface workstations, counters, side-by-side, or back-to-back, or in circular or hexagonal "pods" accommodating four, five, six, or more stations. Multi-station configurations, which are heavier and occupy a large footprint, should not be used if flexibility is a concern. They are difficult to relocate and are frequently hardwired to a power source provided through a floor box. They are available as sit down

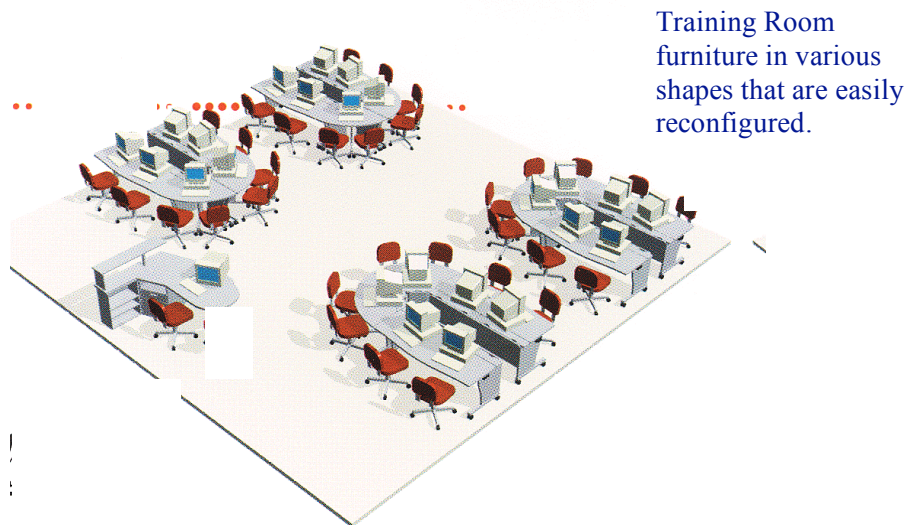
stations, or stand up since many libraries allocate a percentage of the technology stations to be stand up stations in the public area to discourage long term use.

Of the many optional features available in a technology station, the most frequently included are a “sling” or lockable CPU cabinet, a built-in mouse pad, an articulated keyboard carrier that can slide under the work surface, and audio jacks or electrical outlets on the work surface. Of primary concern in selecting a technology carrel is the depth required to house the hardware and the width to accommodate both the hardware and paper materials if this is desired. Of further consideration is whether or not a printer or scanner is required adjacent to the computer workstation, and the dimensions of this printer or scanner, and any other peripheral equipment that will be housed on the work surface. The required electrical and data components should be an integral part of the carrel.

Recommendations for the minimum dimensions for a technology carrel are a depth of no less than 30” with 24” acceptable for a “dumb” terminal and a width of no less than 36” for a library catalog only station, with all others at 42”, 48” or 60” wide.

6.2.4 Training Room Furniture

Training Room furniture shares many of the same characteristics as noted above and can be purchased from office furniture dealers or educational and institutional furniture dealers. Because different instructors frequently reconfigure training rooms, the tables should be light enough to be moved around and reconfigured frequently. Many vendors offer training tables on casters with locking brakes. Units are available in various shapes including semi-rounds, and curved trapezoidal pieces in order to configure the room in horseshoes, or concentric horseshoes. Smaller units, less than 24” wide, are available that can be interlocked between tables and can be used to house CPUs or printers. Tables that gang or attach together and that house all of the required electrical and data outlets are typically preferred. Close coordination with building outlet placement is essential.

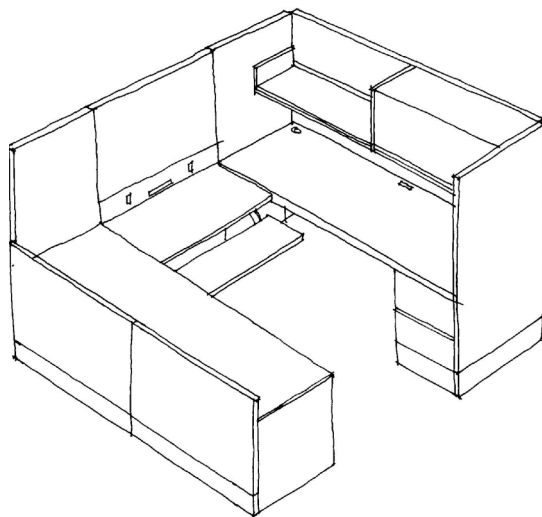


Courtesy of the Synsor Corporation

6.3 Systems Furniture

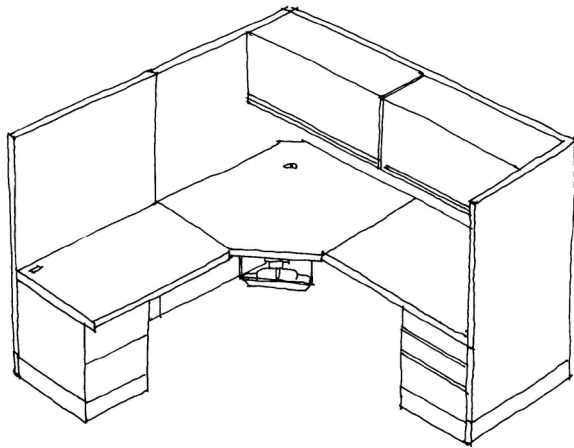
Other types of furniture are often used in the public areas of the library as well as in the staff areas. As discussed previously, modular office systems may be used for carrels or public staff desks. These systems consist of vertical panels of varying heights (30", 42", 60", 72", 84") and sizes containing vertical slotted strips from which such components as work surfaces, shelves, and storage cabinets and files are hung (cantilevered or mounted similar to a bookstack construction.) The panels can connect together to form L or U shapes. If electrical, telephone and data jacks are provided in accessible horizontal channels at the base or work surface height of the panel, they are known as "powered" panels. Other panels which provide simple slots or grommets for cord pass through are less expensive and more easily installed. The panel surface may be fabric, laminate or wood; the components are usually plastic laminate. Fabric panels provide acoustical value that hard surfaces lack. A number of tests have been performed on panel systems relating to flammability, acoustic properties, stability and durability.

Systems produced by different manufacturers are not interchangeable, so a detailed evaluation of products is important before locking into a long-term commitment. In some systems, additional space is required for the connecting posts, which may add up to a substantial increase if many workstations are joined together.



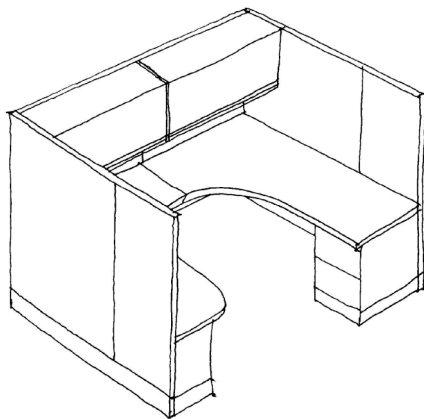
U-Shaped Systems Furniture Workstation with 60" high panels and 42" high panels, keyboard carrier, overhead shelf, overhead storage, and under counter pedestal unit

A variety of storage modules are available with systems furniture, including pedestals that fit under the work surface and cabinets and shelves that hang above it. Pedestal units typically house files and may contain a combination of file and box drawers. Some are completely mobile on casters, while others may be hung from the work surface or sit on the floor and support it. The upper cabinet units typically have flipper doors that open up and slide over or into the cabinet. Open cabinets and shelf type units may also hang off the upper panels.



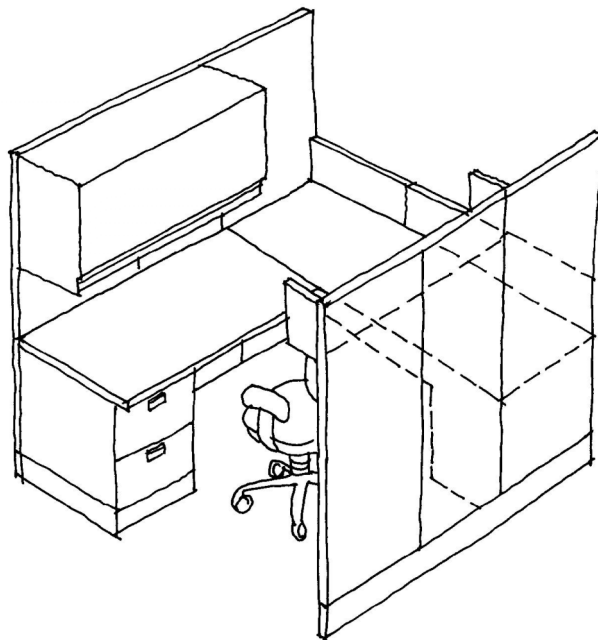
L-Shaped systems furniture workstation with 60" high panels, 45° corner unit, keyboard carrier, overhead storage units, and two under counter pedestal units

When systems furniture is used in large open areas, the freestanding panels form the workstations, and all components hang off vertical strips on each end of the panel. When it is used in small areas or offices, panels may not be needed, and the components can be attached to wall-mounted strips. Additional legs or panel ends for work surfaces may be required. Using the wall strips saves a great deal of money over the use of panels. However, since the panels contain the cabling raceways, all equipment would now connect directly to the building power rather than the panel. The challenge of hanging cords and cables will need to be addressed. While panel based workstations can be easily moved, wall-hung units are less flexible and require patching and painting when wall strips are relocated. In addition, walls must be clear of windows, switches, fire extinguisher cabinets, chair rails, thermostats, and exit signs.



U-Shaped workstations with 60" high fabric-covered panels, under counter pedestal unit, and overhead storage cabinets

Many grades of fabric are available for the panels, with the resultant price increase as the patterns become more sophisticated. Basic simple weaves in solid or heathered colors begin at grade 1, with several higher levels after that. In a large project with many panels, the choice of fabric can have a significant impact on the overall cost. If the system furniture manufacturer's fabric choices are not desirable, COM or Customer's Own Material may be specified. However, only vertical panel fabric (100% polyester) may be used, and the furniture manufacturer must approve the fabric in advance. Specifying COM may increase delivery time as the fabric must be ordered separately and received by the furniture manufacturer before panel production can start.



L-shaped systems furniture workstation with panel mounted work surface, wall mounted work surface, freestanding panel, under counter pedestal units, and overhead storage cabinets

6.4 File Cabinets

File cabinets are frequently located in both public and staff areas. Available floor space often determines whether vertical or lateral files are used, although the latter are now the most common and consume less space since they are typically 18” deep. Another consideration if the files form a walkway is whether adequate exiting space exists when the drawers are open. The 30” deep vertical files often cannot fulfil this requirement. Files can be configured in many ways and for different media, and should have been tested for stability and strength. They are available in all steel, steel frames with laminate or wood cladding, all laminate or all wood. The use of a steel frame enhances the strength of the cabinet. Only quality file cabinets that are stable, weighted and balanced, and will not tip over when drawers are opened should be used in library applications. Many products that are available for the home office are inappropriate for library applications.

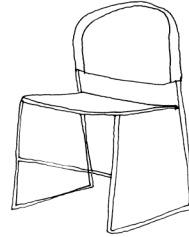
6.5 Office Furniture

Freestanding office desks, credenzas, bookcases and workstations are also part of the furniture program. These may be made of wood, laminate or steel and are available in a wide variety of qualities and price ranges. To ensure longevity and serviceability, the highest quality furniture that is affordable should be selected. Items to be considered include the quality of construction details and how well the pieces fit together, an absence of any rough or sharp surfaces, the quality of the wood finish, operation of drawers, adjustability of glides on the legs or panel ends, etc. Grommets should be provided where needed for cord drops, and locks specified where required. Frequently accessories such as keyboard trays and task lights are incorporated into this category of furniture for additional cost. They can add greatly to productivity, however, particularly if the user spends a substantial amount of time at the computer. Standard desks are too high for ergonomic keyboard use.

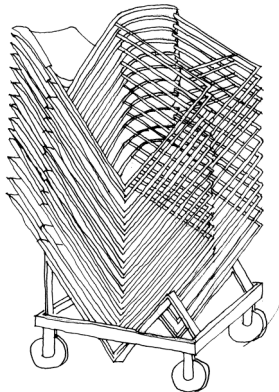
6.6 Meeting Room Furniture

Meeting rooms, community rooms, and conference rooms of the library may require conference tables and chairs, lecterns, media carts, folding tables and stacking chairs and other multi-purpose furniture items. While there can be unlimited options in metal finish, wood, laminate, molded plastic, and fabric for these items, the style, finish and color of all furniture items should be coordinated with the architecture of the building. Strength and stability are another important criteria for evaluation.

Sled based stackable meeting room chair with molded plastic seat and back



In any location where chairs with arms are used with tables, clearance for the arms must be provided. Stacking chairs require the appropriate dolly to facilitate their easy removal to storage areas. Meeting room chairs come in many different styles, upholstered or non-upholstered, with or without fasteners to gang them together in rows. Tablet arms can provide a writing surface, and under seat wire baskets can hold books or packages. Because people often sit for extended periods of time in stacking chairs, comfort is a prime focus. Some models feature a back that flexes as the occupant changes position, which can greatly enhance comfort. Chairs must be also be tested for pitch and depth of seat.



Stackable meeting room chairs on a dolly (20 to 30 chairs per dolly)

Folding tables have dollies to facilitate their movement as well. These should be included in the furniture and equipment budget. Large tables are often too heavy and difficult for staff to handle. Thought should be given to the use of lighter weight but durable tables with a honeycomb top construction. They look like the heavier tables but are easier to fold and store. These tables also may have clamps for ganging them together in rows, and some models provide electrical and data capacity as an option. Folding tables should be coordinated with the overall design of the building, or be relatively neutral, since they are likely to be used on a temporary basis in almost any location in the building.

Electrical and data outlets should be incorporated into any furniture piece that may potentially house equipment or need that flexibility. Meeting room tables that will be required to serve as training room furniture should be a minimum of 30” deep with a width allowance of no less than 36” per person. Shallower tables, 24” deep or less, often referred to as “ribbon tables,” will accommodate the use of a laptop computer with the same width per person.

Occasionally the requirement for fixed, auditorium style seating may arise in a large meeting room that is heavily used by the public. This is a specialty type of seating that is manufactured by only a small number of vendors. The seats and backs are usually upholstered, and the outer back shell is often wood or laminate for durability. Wood or high-density plastic arms are an added comfort feature.

Because it is attached to the concrete floor, it is usually provided and installed by the general contractor. The floor is generally sloped, raked, or tiered to provide good sightlines, and the seat widths vary in order to conform to the width of the rows provided. After a preliminary plan is produced by the design professional, the vendor will develop an exact seating plan showing the various seat widths, and aisles. Many code issues come into play regarding aisle widths and exiting.

In addition to furniture, meeting rooms will frequently require whiteboards, blackboards, projection screens, and presentation centers which combine these. The furniture and equipment budget should also include an allowance for blackout shades if there are windows, audiovisual carts, multimedia presentation equipment, media cabinets, and lockable storage for the equipment and the folding tables and chairs.

6.7 Miscellaneous Furniture

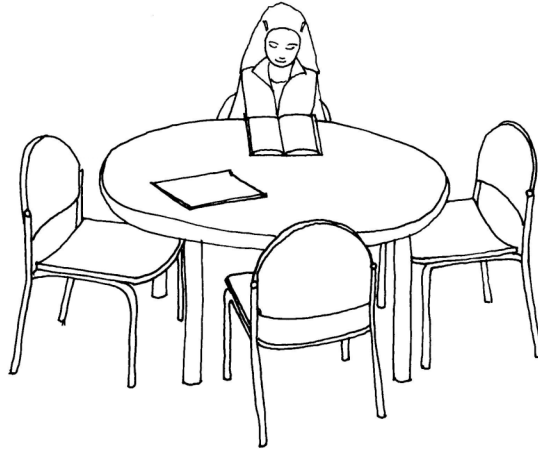
The furniture program for a library will typically include a variety of miscellaneous furniture and accessory items including footstools, coffee tables, end tables, literature racks, clocks, lamps, desk accessories, coat racks, dictionary stands, atlas cases, map cases, display cases and cabinets, book troughs for display, and information kiosks. These should be selected to coordinate and enhance the other furnishings in the project and specified at the same time.

Among these items, lamps are likely to be the most problematic in this type of facility. They must be UL listed, and should have a compact fluorescent lamp rather than incandescent. Table lamps should be bolted to the table surface so that they are not easily moved and the cord can be concealed. The shades for table lamps must be of a durable and relatively mar resistant material, frequently metal or glass are preferred over cloth, which can have a short life in a public building. Individual light switches may be provided, or the lamps may be controlled by main lighting switches. Floor lamps must be stable and preferably bolted to the floor to prevent tipping over, which makes their location less flexible. Cords should be secured, shortened if necessary, and concealed. Careful thought must be given before using floor lamps in public libraries, and even then, they should be used only in adult areas where there is less likelihood of damage.

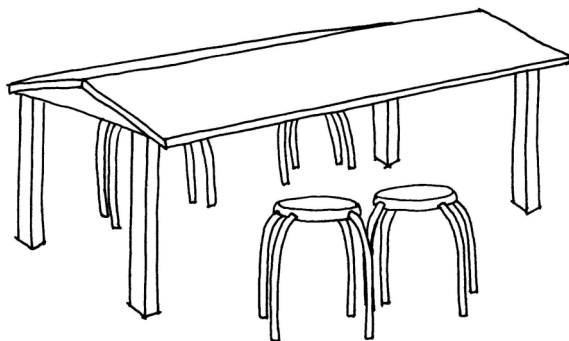
7. SPECIAL FURNITURE

7.1 Children's Furniture

Children's juvenile reader table for four with 27" high table top and 16" high reader seat



Scale is a primary factor in selecting children's furniture. Very few manufacturers make children's furniture, and of those who do, typically two sizes of children's tables and chairs are available unless the product is custom designed. Juvenile tables are typically 27" high and pre-school tables are typically 21-24" high. A few manufacturers have more options, with heights of 16", 18", 20" or 25". The corresponding seat heights on chairs are typically 16" high for juveniles and 13-14" high for children. Whichever is selected, the table and the chair must be in the same scale and most critically allow a dimension of 9-10" between seat height and table height. If a chair designed for an adult is to be scaled down for children and juveniles, it is not enough to merely lower the seat. The seat saddle should also be scaled down, as should the back height to provide comfortable seating for smaller bodies. This is also true of stools used as seating. Frequently children's chairs are available without a back, a feature that makes the chair more stable and less prone to tip over. Children's chairs should be designed not to rock or tip over.



Children's slant top picture book table with stools

Several types of child-size lounge seating are available from library furniture and commercial seating manufacturers. Here, too, the overall size of the piece must be scaled down from adult versions in order to be appropriate for children.

A great deal of the typical children's furniture seen in catalogs is poorly designed and badly made, so it is worth the effort to seek out those few manufacturers who regularly build well designed furniture for children. Children's furniture with sharp or squared edges should be avoided, as they are potential sources of injury.

7.2 Furniture for Seniors

At the other end of the spectrum is the senior patron, who may also have specific furniture needs to consider. Lounge seating should be firm and not too low (18 to 18 1/2" seat height) so that it is easy to stand up. The seat depth should not be so great that feet can't touch the floor. Typically 30 to 32" seat depth is advisable for medium sized people. Arms must provide a firm base for steadying the body as the patron attempts to stand. The chair should not have casters or be so light as to easily move out from under the patron when they stand up. Reader chairs should provide firm support. Arms are particularly helpful when attempting to sit down or stand up. The chair should be light enough to move easily back from the table but stable enough to be leaned upon.

7.3 Furniture for Young Adults

Young Adults appreciate furniture that is fun and casual in style and facilitates their more informal style of interacting. They frequently do not use chairs in the intended manner, so they must be extremely durable and easily maintained. Modular armless lounge furniture may be appropriate in casual reading areas, particularly if it can be recovered on site when necessary. Reader chairs should be very sturdy; the two-position chairs, which rock back slightly, are popular with this group, which often balances chairs on two legs.

Stand-up workstations and stools may be good choices for these active patrons, as well as furniture that facilitate interaction. Comfortable and roomy chairs and tables are needed for study and research activities, while carrels are often preferred for individual study.

7.4 Accessible Furniture

A very important part of the library planning process is providing access to the disabled person, and making all areas of the library available and welcoming. The Americans with Disabilities Act (ADA) sets forth the requirements for reading and study areas, checkout areas, displays and stack aisles. At least 5%, but not less than 1 of each element of fixed seating; tables or study carrels must comply. This means that tables, carrels, or other work surfaces must provide the 30" wide by 19" deep by 27" high clear knee space, and the tabletop must be from 28" to 34" maximum above the floor. At least one lane or portion of the checkout desk must provide a counter at least 36" long with a maximum height of 36". Display furniture must provide reach height between the 18" minimum and 48" maximum for forward approach, or 54" maximum for side approach. (See [Universal Access for Libraries](http://www.librisdesign.org) available on at www.librisdesign.org for further information.)

There are several ways to achieve the optimum height for tables, carrels, and counters. One is to specify a design that does not incorporate an apron or other obstruction where the patrons will sit. Another is to select furniture that features an adjustable height mechanism to raise or lower the table as needed. Some manufacturers make tables and carrels that use hand cranks or electric motors to accomplish the adjustment. The hand crank is a much less expensive option than the electric motor, but may be more difficult to operate, particularly by someone with arthritis or impaired motor skills. Since only 5% of the furniture must comply, the additional cost of the electric motor would not greatly increase the over-all budget and would allow greater flexibility in height adjustment than the typical 29" high carrel work surface affords, particularly in the children's area, where tables and carrels are usually lower than the ADA standards.

8. FURNITURE INSTALLATION

8.1 Coordination

Coordination of all of the elements impacting the furniture must occur during the construction stage, particularly that of the placement of the electrical and data outlets. Verification of their proper location by the architect or designer should occur before the final slab pour so that any necessary adjustments can be easily made. Any dimensions critical to the placement of furniture are also taken at this time by the appropriate vendor and required modifications discussed with the designer and client.

Many components from different vendors will be installed towards the end of the project, so it is critical that all of them be coordinated and scheduled so that they do not interfere with each other. The process must start before orders are placed, as once they are in production, shipping dates cannot be changed. This often poses a challenge in new construction or extensive renovation, as the general contractor must commit to his completion date as a starting point to scheduling furniture. Ideally, all construction will be complete and the construction punch list corrections finished before any furniture is moved on site. Millwork and steel shelving should be in place before furniture installation commences, as these are large items that can easily damage furniture.

8.2 Delivery and Installation

The furniture may be delivered directly to the site when it is ready to receive it, thus circumventing storage charges and double handling. The furniture dealer's installation crew must be on site and ready to receive the furniture when the truck(s) arrives. This is sometimes difficult to achieve. The alternative is to have the furniture shipped to the dealer's warehouse, where it can be inspected and scheduled for later installation. This allows more control over the date of installation but does incur storage fees. If more than one furniture dealer is involved in the project, as is often the case, they are scheduled so that one follows the other in a logical fashion, depending upon what areas should be completed first. Delivery of large amounts of furniture can create confusion, even when the installers have a furniture plan to refer to. It is essential to have the interior designer and a designated library staff member present during the installation(s) for guidance and to answer questions.

8.3 Punch List

After all of the furniture is set in place and wiped down by the installers, the interior designer and a staff member should inspect each item and note any incorrect product or finish, any damage, or defects, and any missing items. This punch list will be prepared by the designer and provided to the client and appropriate vendors. Vendors must address all items on the punch list to the client's satisfaction before their contracts are concluded.

Vendors should also provide the client with maintenance and operating information and warranties on the product and arrange for a demonstration to staff of appropriate items, such as task chairs. Written information should be kept together so that it is available in the future. Any subsequent problems with the furniture should be addressed directly to the furniture dealer so that prompt action can be taken and replacements provided, if appropriate.

8.4 Equipment Installation

Even the most perfectly planned project can be compromised when the equipment vendors perform their installation improperly, particularly when they do so without using the wire and cable management devices provided within the furniture. The result is unsightly cords draped over furniture, spilling onto the floor and creating obstacles in areas designed for feet and knees. Aside from the aesthetic considerations, this lack of attention can create an uncomfortable and hazardous situation for patrons and staff. Since these are usually the last vendors to perform their work, the library staff should make sure that the furniture and equipment installation is done correctly and that all of the cabling is properly stowed out of view. This extra attention will produce a project that is well planned and executed down to the last detail with nothing to mar the over-all result.

9. GLOSSARY OF FURNITURE TERMINOLOGY

Case goods	Also known as casework. Counters or cabinets of custom design and construction, which are usually fixed to the structure and are included in the general construction contract.
COM	Customer's Own Material
Construction documents phase	Project phase, which entails the preparation of the final architectural, and engineering building plan documents (working drawings) that will be used for bidding and constructing the facility.
Contract Furniture	See Systems Furniture
Design development phase	Project phase, which consists of extensive detailing of the schematic documents including location of power and data, finish materials, fenestration, doors, windows, access and egress, security, and mechanical and structural systems.
Finish	A broad term describing the specific material treatment for a furniture item or a facility interior includes work surfaces, walls, floors, ceiling, glazing, etc.

Floor plan	Drawings that include furniture and equipment, square footage for each space, and placement of walls, doors, and windows.
Furniture plan	A floor plan of the building containing two-dimensional diagrams of the proposed furniture in its planned location. This plan should be created during the schematic design phase, revised throughout the project, and coordinated with the lighting, power, telecommunications, and interior elevation plans.
Furniture program	An itemized list of the furniture required for a project including quantity and location, as well as other specific details about the furniture or equipment item.
Landscape Furniture	See Systems Furniture
Millwork	See case goods.
Programming phase	Beginning phase of a building project which involves providing a description of the physical requirements for a facility including functional statements, space names, locations, adjacencies, rough square footage allocations, and other functional requirements that will be used by the design professionals.
Punch List	An inspection of furniture items and installation before final payment is released.
Schematic Design	Early project phase when building spaces are sized, adjacencies determined, and floor levels and circulation are organized into a building footprint.
Systems furniture	Furniture, workstations, or work areas which are created using horizontal work surfaces and storage units which are mounted to vertical panels of varying height or metal support posts attached to a perimeter wall.
Task Chair	An ergonomic clerical chair, with or without arms, that adjusts to the user's body via mechanisms ranging from simple seat height to a multitude of other adjustments. Casters are attached to the base, which facilitate easy movement.
Veneer	A thin application wood affixed to a board made of chip core or particleboard used to produce the appearance of solid wood for a reduced cost.

10. FURTHER SOURCES OF INFORMATION

Societies, Organizations, and Agencies

ACT	Association for Contract Textiles	www.contract-textiles.com
ANSI	American National Standards Institute	www.ansi.org

ASTM	American Society for Testing and Materials	www.astm.org
ATMI	American Textile Manufacturers Institute	www.atmi.org
BIFMA	Business and Institutional Furniture Manufacturer's Association	www.bifma.org/standards

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