

# COUNCIL NOTES



INDOOR STORAGE

## Requirements for Good Storage Space

This publication describes storage needs *within* the house, including *minimum* dimensions for certain clothing and linen items. Also, techniques are shown for developing storage in usually ignored spaces which exist in most houses.

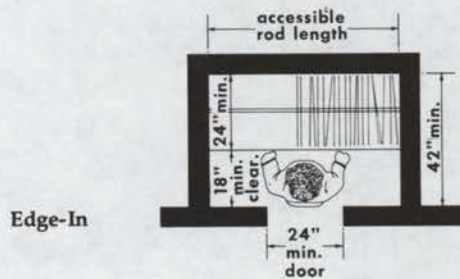
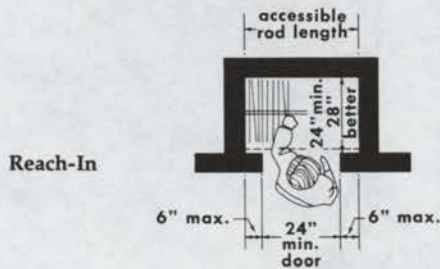
Kitchen storage is covered separately in C5.32, *Kitchen Planning Standards*. Storage arrangements for special interests, such as woodworking, sewing or hobbies are not given. Many items of furniture are well known and do not require discussion.

Good indoor storage space provides: a. orderly storage; b. visibility and easy identification of stored items; c. direct accessibility; d. economical construction; e. flexibility to meet changing needs; and f. safety from fire or injury

## CLOTHES CLOSETS

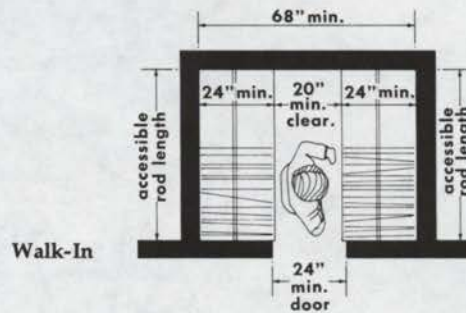
The capacity of a clothes closet depends upon the accessible length of rod. Three types of closets are common.

**Reach-In Closet.** The minimum front-to-back depth of space for hanging clothes is 24". The accessible rod length is equal to the width of the door opening plus 6" on each side.



**Edge-In Closet.** By providing an edge-in space of at least 18", the accessible rod length can be much longer than the door width. This requires less wall space than a full front opening.

**Walk-In Closet.** This type provides rods on one or both sides of an access path at least 20" wide. A wider access space within the closet may be used as a dressing area.



## Rod Lengths and Heights

The Minimum Property Standards of HUD (1973) require that each bedroom have a closet, with rod and shelf, with minimum dimensions of:

For double-occupancy bedrooms	24" by 60"
For single-occupancy bedrooms	24" by 36"
For closet at entrance to house	24" by 24"

A more desirable front-to-back depth would be 28" for bedroom closets and 30" for entrance closets to accommodate bulky outer garments.

The average rod space per garment is about 8" for women's clothing, 2 1/4" for men's clothing, and 4" for heavy coats.

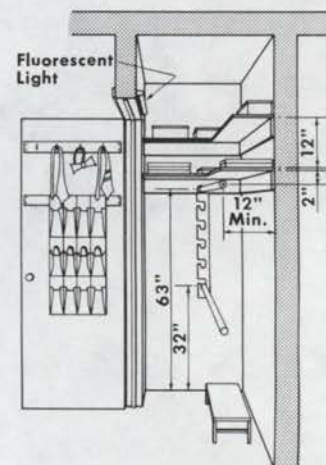
Recommended heights of rods are:

68"	for long robes
63"	for adult clothing
32"	for children's clothing

## Shelf Space and Lighting

The shelf is normally located 2" above the rod, and another shelf may be located 12" higher. Shelves higher than the rod may also be installed at the end of the closet.

A fluorescent fixture over the door is recommended for lighting a closet. Deluxe cool white tubes match daylight for selecting clothes.



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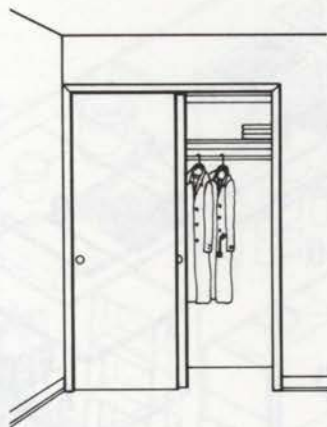
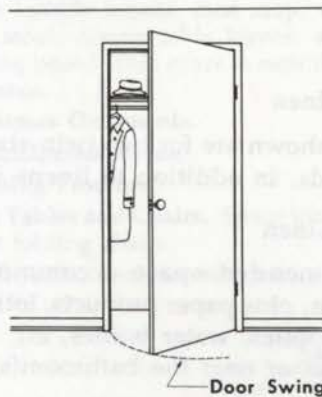
## Closet Doors

Four types of doors are commonly used for closets. The factors which influence the choice of doors include cost, appearance, ease of operation, ventilation, wall space required, door projection or swing (both inside and outside the door), and net opening size. Closet doors are usually 6'-8" high, but some are 8'-0".

Air leakage around doors may help reduce mildew formation in the closet in humid conditions. Louvered doors are recommended for closets on outside walls, where moisture condensation is more likely to be a problem.

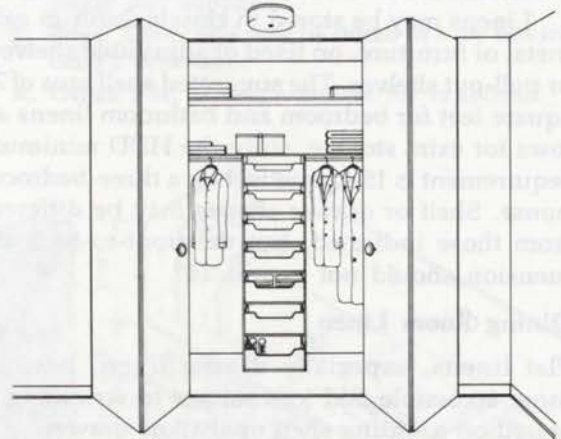
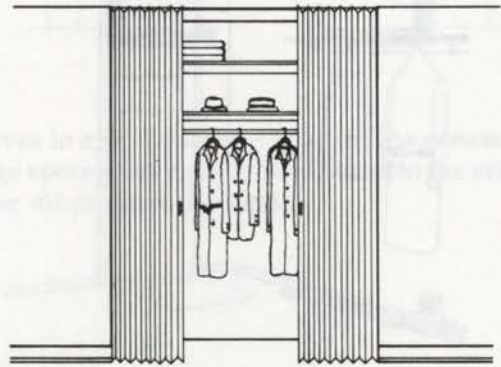
**Hinged Door.** There must be adequate space in front of the door to allow it to swing. The doors are available in stock widths varying from 24" to 36" wide, and may be used singly or in pairs.

This is the only type of door which can accommodate closet accessories on the inside face. Most flush doors have a hollow core; therefore, closet hardware can be fastened only to the side or top rails or to a wood strip at least 1/2" thick glued across the door face.



**By-Pass Sliding Doors.** These doors do not interfere with access space or traffic in front of the closet. However, part of the opening is always blocked by a door. Such doors are available in widths of 18" to 36", and can be used in multiples for large openings.

**Multi-Fold Doors (accordion type).** With this type, the entire width of the closet opening, except for the space occupied by the folded doors, is accessible. The doors are made of narrow sections of wood or fabric-covered metal frames. Multi-fold doors are available in widths of 25" and up.



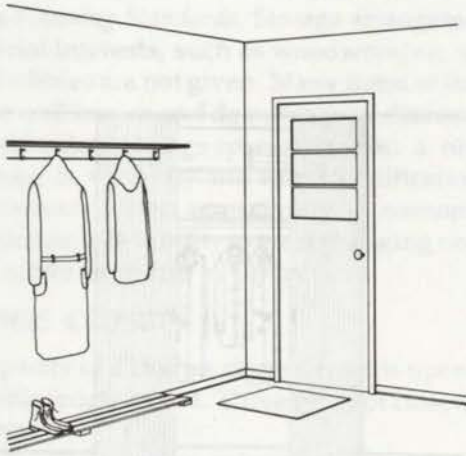
**Bi-Fold Doors.** Two panels, 12" to 18" wide, comprise a bi-fold door. One or two such bi-fold doors can close openings from 24" to 72" wide. Clearance in front of the closet must be provided for the projection of the panels into the room.

## Drawers in Closets

A stack of drawers, pull-out trays, or shelves can be placed at the end of or between hanger rods.

## Work and Play Clothes

This storage should be near the service entrance and have a washable floor surface. Work and play clothes can be stored on hooks. A low slatted shelf provides ventilation for damp boots and shoes.



## LINEN STORAGE

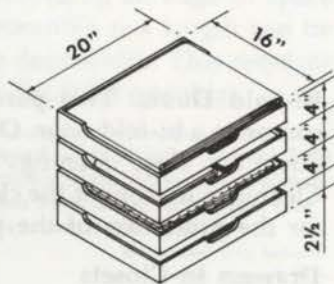
Suggested space requirements are shown for bedroom, bathroom, and dining linens. The amounts shown are based on the needs of a family of four.

Linens may be stored in closets, built-in cabinets, or furniture, on fixed or adjustable shelves, or pull-out shelves. The suggested shelf area of 29 square feet for bedroom and bathroom linens allows for extra storage, since the HUD minimum requirement is 15 square feet for a three-bedroom house. Shelf or drawer shapes may be different from those indicated, but the front-to-back dimension should not exceed 24".

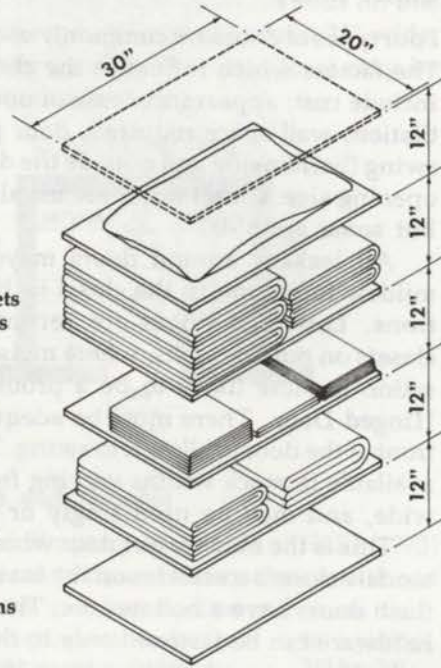
### Dining Room Linen

Flat linens, especially dining linen, become more accessible and less subject to wrinkling if stored on a sliding shelf or shallow drawer.

- 3-dining table cloths
- 20-napkins
- 2-small table cloths
- 8-place mats
- paper cups, plates, napkins, etc.



Alternate: 16" wide x 20" deep



1-pillow

3-heavy blankets  
2-light blankets

6-full sheets  
2-twin sheets  
8-pillow slips

2-bed spreads  
1-mattress pad

extra linen items

Alternate: 36" wide x 16" deep

### Bedroom Linen

The linens shown are for two twin-size and two full-size beds, in addition to linens in use.

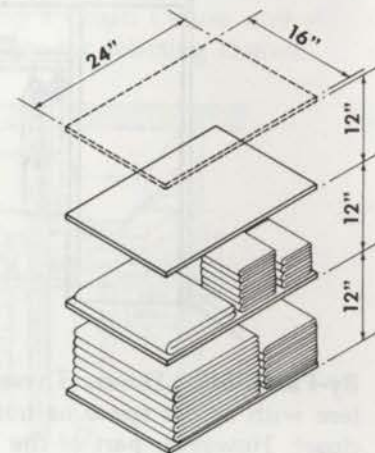
### Bathroom Linen

The recommended space accommodates the items shown, plus paper products, lotions, soap, cleaning supplies, water bottles, etc. The space should be in or near the bathroom(s).

extra shelf for  
other linen

1-bath mat  
6-wash cloths  
4-guest towels

6-bath towels  
6-face towels

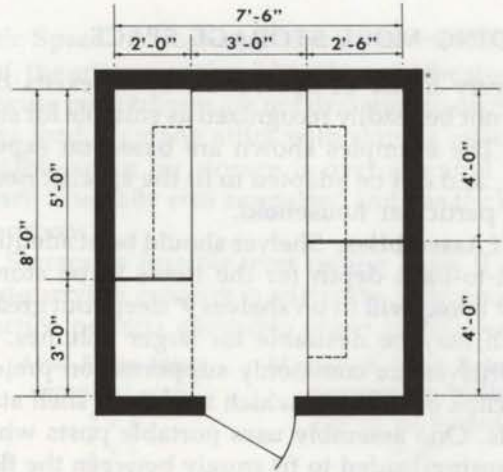


Alternate: 30" wide x 12" deep

## GENERAL STORAGE ROOM

Household storage space is always needed for common items. A general storage room can provide this space, with the items visible and accessible. For better accessibility, the front-to-back dimension of the shelves should be less than the vertical spacing. Shelves more than 72" above the floor can be reached from a step stool.

The space shown is 7'-6" by 8'-0", with a ceiling height of 8'-0". This 480 cubic feet of general indoor storage exceeds the HUD minimum standards of 425 cubic feet (including both indoor and outdoor storage) for a three-bedroom house. Such a storage room with only one door will be less expensive than a series of cabinets or small closets of equal capacity. If space is not available for a general storage room, these items may be stored on shelves in closets, wall cabinets, or suitable



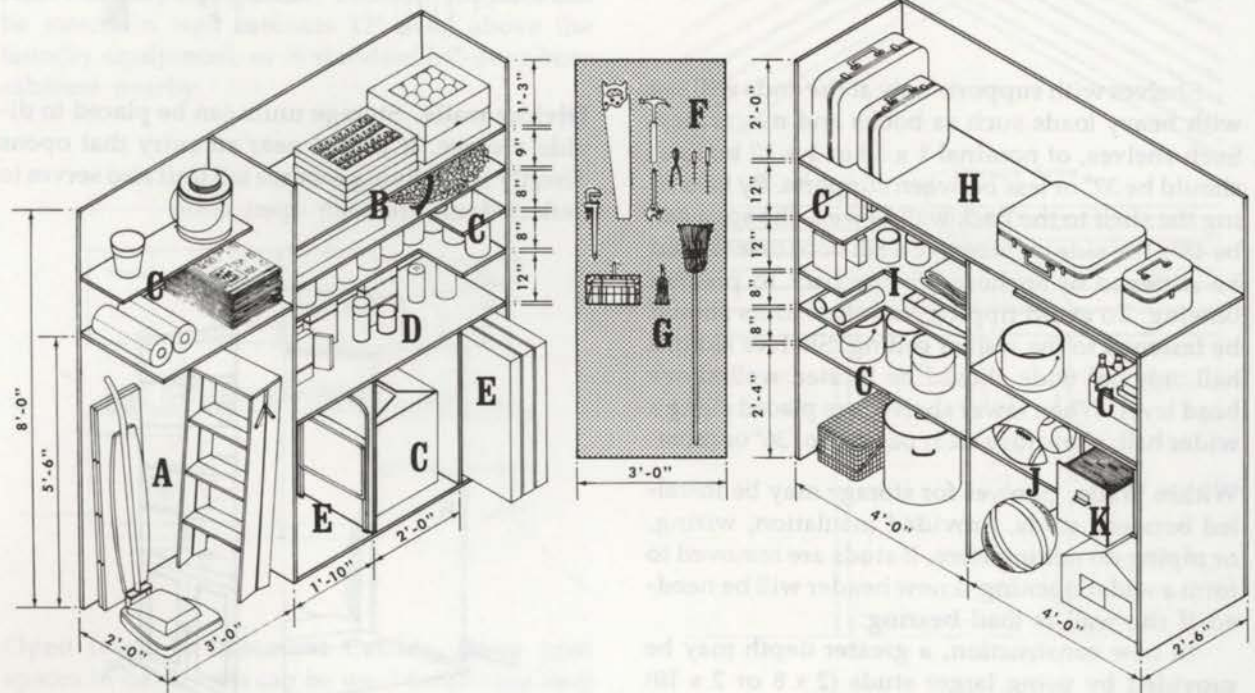
areas in a dry basement or attic. The general storage space shown could be reduced to the extent of the other space available.

## GENERAL STORAGE ITEMS

- A. **Cleaning Equipment and Table Leaves.** The main items include broom, dust mop, vacuum cleaner, step stool, dining table leaves, and possibly an ironing board. This space is near the door for convenience.
- B. **Christmas Ornaments.**
- C. **Miscellaneous Items.**
- D. **Cleaning Products.**
- E. **Card Tables and Chairs.** Space for three tables and eight folding chairs.
- F. **Small Tools.** Tools for minor household repairs —

workshop or hobby shop requires separate space.

- G. **Cleaning Items.** Small cleaning tools can also be hung on the wall panel hangers.
- H. **Hand Luggage.**
- I. **Paints and Supplies.** Only water-base paints and supplies are shown. A metal cabinet in basement or garage is recommended for storing flammable paints and supplies.
- J. **Toys.** Other toys may be stored in a toy box in the child's bedroom.
- K. **Office File.** A single-drawer file is shown.

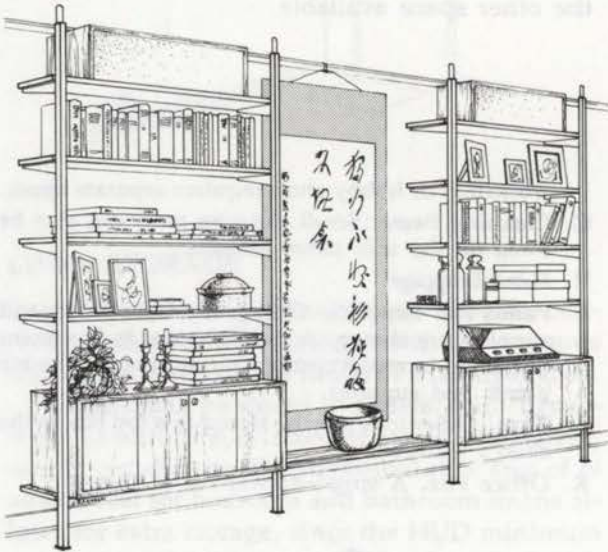


## FINDING MORE STORAGE SPACE

In every house or apartment, space exists that may not be readily recognized as suitable for storage. The examples shown are based on experience, and can be adapted to fit the specific needs of a particular household.

**Shelf Assemblies.** Shelves should be of adequate front-to-back depth for the items to be stored. Most books will fit on shelves 9" deep, but greater depth may be desirable for larger volumes.

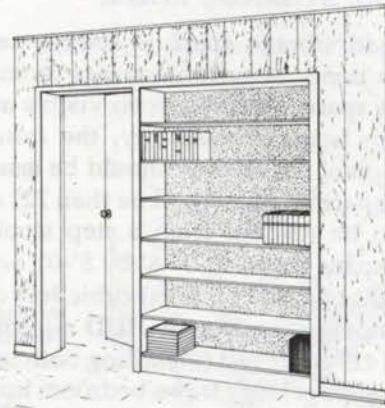
Shelves are commonly supported on projecting clips or brackets which hook into shelf standards. One assembly uses portable posts which are spring-loaded to fit snugly between the floor and ceiling.



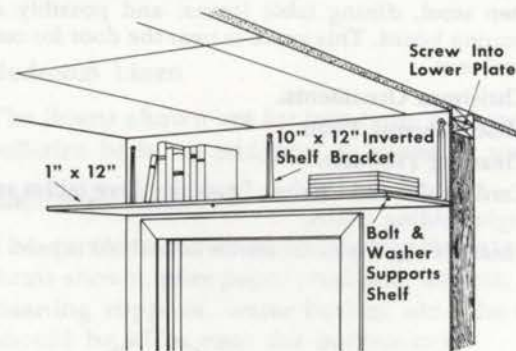
Shelves with supports only at the ends will sag with heavy loads such as books and magazines. Such shelves, of nominal 1 x 10 or 1 x 12 boards, should be 32" or less between supports. By fastening the shelf to the back wall as well, the span can be 48". The side members of a tall bookcase should be stiffened or anchored to the back to prevent bowing. To avoid tipping, tall shelf units should be fastened to the wall or ceiling. Shelves along a hall only 36" wide should be located well above head level. When lower shelves are placed along a wider hall, allow for a clear passage of 36" or more.

**Within Walls.** Shelves for storage may be installed between studs, provided insulation, wiring, or piping do not interfere. If studs are removed to form a wider opening, a new header will be needed if the wall is load-bearing.

In new construction, a greater depth may be provided by using larger studs (2 x 8 or 2 x 10) with shelves of matching depth.



**High on the Wall.** In frame construction, shelf brackets must ordinarily be fastened to the studs. However, shelving can be installed near the ceiling of any room by fastening inverted shelf brackets to one of the 2 x 4 wood plates at the top of the stud wall. If only one plate exists, the attachment screw must be angled upward into the plate. The shelf is then bolted to the bottom of the bracket.



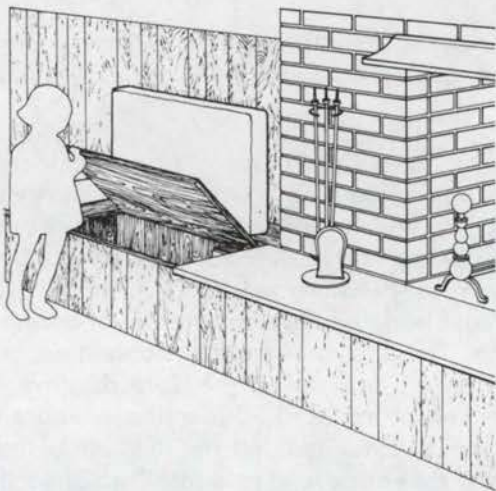
**Divider walls.** Storage units can be placed to divide a space. If placed near an entry that opens directly into a living room, a tall unit also serves to deflect drafts from an open door.



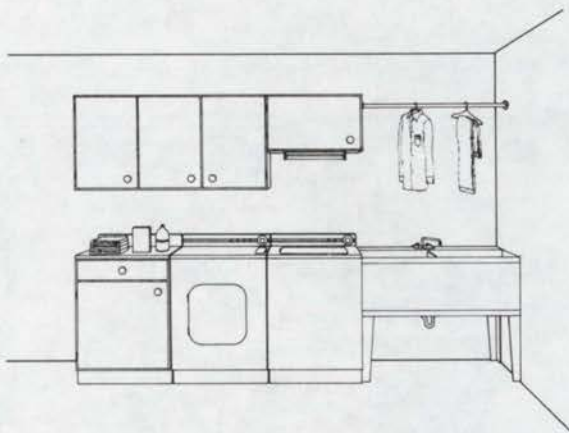
**Bathroom Cabinets.** The spaces below the lavatory and above the toilet tank may be used for storage. Allow access space above the water closet for maintenance. Medicines and some hazardous items, such as cleaning compounds, should be located in cabinets that can be locked for the protection of small children.

**Below the Bed.** Most beds have a space below the bed frame that can accommodate a storage box. This can be as simple as a cardboard box with a cover, or a wooden platform mounted on casters.

**Seating Storage.** Built-in seating below a window, along a wall, or alongside a raised hearth can be used as storage bins. Fireplace wood should be stored outside to avoid insect infestation.



**Near Laundry Equipment.** Laundry supplies can be stored in wall cabinets 12" deep above the laundry equipment, or in standard 24"-deep base cabinets nearby.



**Open Joists in Basement Ceiling.** Some joist spaces in basements can be used for storing long objects. Avoid spaces containing electrical wiring.

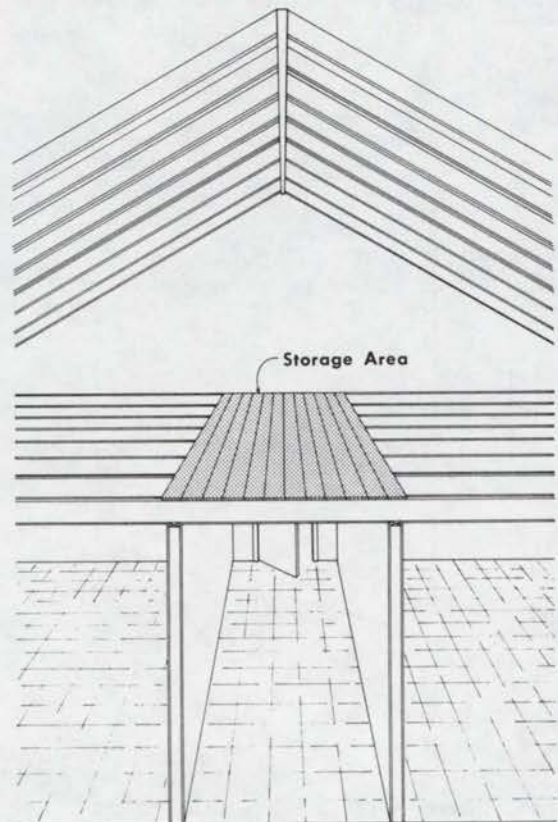
**Attic Space.** If truss construction is used for the roof, the attic space should not be used for storage, because most trusses are not designed to carry the extra load. In many attics with sloping rafters, a suitable space for storage is over a central hall, which is usually well supported and has the most headroom.

Storage is feasible over ceiling joists if their load-carrying capacity is adequate. Conservative practice permits allowable spans as follows:

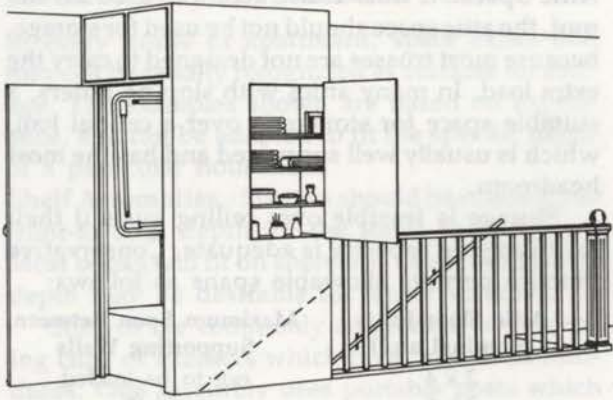
Attic Floor Joists (nominal size)	Maximum Span Between Supporting Walls
2 x 4	not to be loaded
2 x 6	6'-0"
2 x 8	8'-0"
2 x 10	11'-0"

**Note:** These sizes and spans are based on an attic load of 30 pounds per square foot, which corresponds to stacks of books or magazines 12" high. It is also based on a joist spacing of 16". For longer spans or wider joist spacings, the loading should be reduced to avoid cracking the plaster on the ceiling below.

The attic space should be protected against the entry of pests, leaves, and rain or snow. Items stored in the attic may be subject to a large variation in temperature, from well below freezing in winter to as hot as 140°F in summer. Humidity can also vary widely.

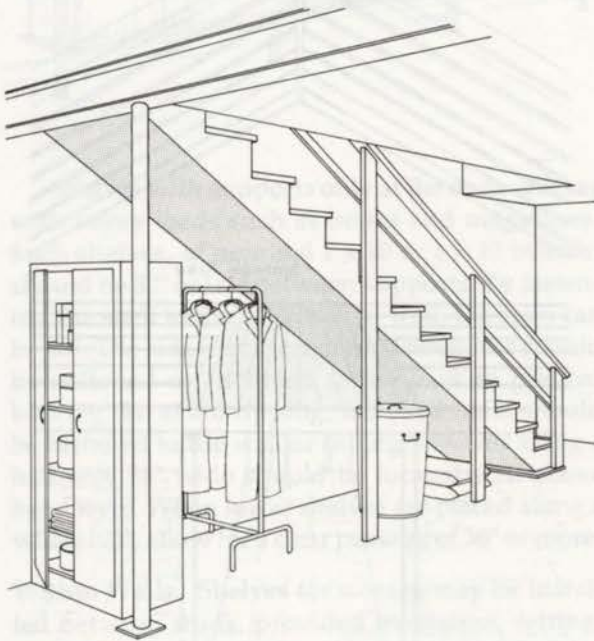


Storage over a central hall with stair access to attic

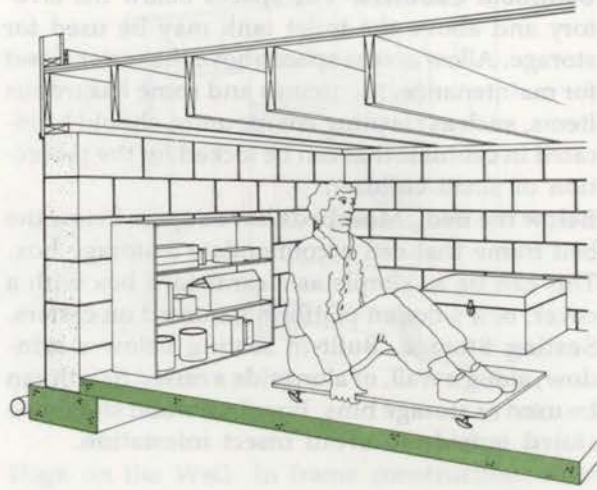


**Above Upper Stair.** Space above a stairway may accommodate storage with shelves that are accessible from the floor above, or even from the stairs. The required clearance above a stair is 6'-8".

**Below the Stairs.** The space below some stairs can be used for storage. To protect against dirt, the stairs should have risers and be covered on the underside. (If installing risers, note that the tread should extend at least 1" beyond the face of the riser for safety.) This may be a good area for out-of-season clothes, especially heavy garments, which can be placed in garment bags and hung from steel pipe storage racks.



**Crawl Space.** Only a fully-enclosed crawl space that is free from moisture can be considered for storage. A portion of the space that is most accessible can be paved if desired. A dehumidifier may



be necessary to limit humidity. For proper crawl-space construction, see F4.4, *Crawl-Space Houses*.

**Converting a Crawl Space to a Basement.** A crawl space that is adjacent to a partial basement can be expanded for easy access to storage by digging out the center. A ledge must be retained to support the original foundation. It should extend one foot horizontally for each foot of excavation depth. The soil must be firm; obtain an expert opinion on soil stability before digging. The ledge can be surfaced with concrete, and a new wall can be extended up from the new basement floor. It may be necessary to install an under-floor drain.

If the floor joists are supported by a pier, they should be temporarily supported while the pier is removed and replaced with a full-height steel column.

