



planning
— and
designers
handbook

second edition

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P R E F A C E

This Planning and Designers Handbook was prepared primarily to assist Architecture, Engineering and Designer students to develop their skills in establishing space allocations, knowing their relationships as to functions, analyze specific needs of the client and prepare preliminary architectural design.

The criterion was presented mostly in graphic form for easy reference and use. Although the materials presented offers basic and general data for a particular planning arrangement with least dimensions as to height and distances, it does not intend to give definitive schematic or fixed formula as final solution to a particular design problem. However, the author believes that it could serve as starting point in exploring the unlimited field of analysis and study of the functional relationship of each type of design.

The materials presented in this book deals with functions rather than its form. Absolutely, no attempt was made to dictate or suggest aesthetic or definitive solution to any type of design problems because the author further believes that Architectural Planning and Design must reflect the designer's complete freedom of exercising his unlimited creative abilities.

For this edition the author wishes to express his grateful acknowledgment to those who have worked with him making possible the publication of this book.

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Planning and Designers Handbook

TABLE OF CONTENTS

CHAPTER-1 RESIDENTIAL

1-1 Planning Considerations	1
1-2 Dimensions of Human Figures	6
1-3 The Living Room	10
1-4 The Dining Room	17
1-5 Combined Dining Spaces	24
1-6 Combined Dining Kitchen Area	24
1-7 The Bedroom	27
1-8 The Kitchen	35
1-9 The Kitchen Work Center	41
1-10 Bathroom	49
1-11 Laundry Room	58
1-12 Closet	62

CHAPTER - 2 HOME FOR THE ELDERS

2-1 The Site and Neighborhood	69
2-2 Planning and Design Principles	70
2-3 Construction, Equipment and Furnishing	80

CHAPTER - 3 HOME FOR THE DISABLED

3-1 Access and Ramps	85
3-2 The Bedroom	89
3-3 The Kitchen	90
3-4 The Bedroom	94
3-5 Doors and Hardware	99
3-6 Floors	100

CHAPTER - 4 COMMERCIAL

4-1 Shopping Centers	102
4-2 Retail Shop	105
4-3 Bookshop	116
4-4 Jewelry Shop	116
4-5 Shoe Store	117
4-6 Barber Shop	119
4-7 Supermarket	119
4-8 Restaurant	121
4-9 General Offices	138
4-10 Private Offices	149

Planning and Designers Handbook

4-11 Banks	159
4-12 Hotels	164
4-13 Motels	173
4-14 Medical Offices	174
4-15 Commercial Parking Lot	180

CHAPTER - 5 SPORTS AND ENTERTAINMENT

5-1 Facilities	186
5-2 Sports Facilities	191
5-3 Bowling Lanes	241
5-4 Rifle and Pistol Range	245
5-5 Movie Theaters	251
5-6 Swimming Pool	261

CHAPTER - 6 EDUCATIONAL AND CULTURAL

6-1 Nursery School	269
6-2 Elementary and Secondary Schools	272
6-3 College and Universities	273
6-4 Community Library	289
6-5 Physical Education Locker Room	299

CHAPTER - 7 INDUSTRIAL

7-1 Industrial Building	301
7-2 Industrial Plant	310
7-3 Warehouse	315
7-4 Industrial Parks	325

CHAPTER - 8 TRANSPORTATION

8-1 Bus Terminal	327
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RESIDENTIAL

1-1 Planning Considerations

A doctor's medical prescription was usually based on the result of the examination or diagnosis of his patient. Similarly, a master plan of a house or any structure is also the designer's prescription based on the wants and need of his client.

A master plan is defined as a visual presentation of conceptual ideas supported by mathematical calculations aimed at giving convenience and comfort to the users or occupants. A good plan however, are those that are functional and economically designed adhering to the principles of "Form Follows Functions".

Sound Planning Considerations Include:

1. Distribution
2. Circulation
3. Light and ventilation
4. Sizes, areas and shape
5. Orientation
6. Zoning Laws
7. Height
8. Electrical and mechanical facilities
9. Location of doors and windows
10. Superstition

Distribution. Refers to the placement, location and arrangement of each room unit in relation with each other as to functions and coordination. One particular example is the inter-

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relation between the dining and the kitchen which primarily requires accessibility on food servicing. These area units are interrelated and should not be far from each other.

Circulation. Like roads and highways with traffic problems, traffic is also present inside the building that must be considered in planning. Circulation and movement of the occupants inside the building should not be hampered by any obstacles nor be detoured as a result of poor planning. In short, the design of the floor plan, be it residential, commercial or industrial type, must address the traffic condition inside the building without the necessity of using red and green lights signal.

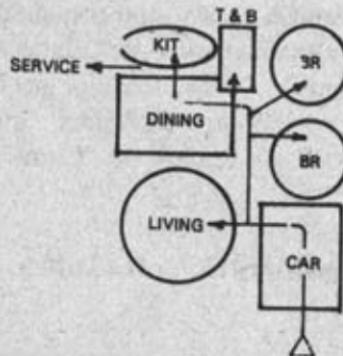


FIGURE 1-1 SCHEMATIC PLANNING DISTRIBUTION AND CIRCULATION

Light and Ventilation. There is no substitute for a good daylight and fresh natural air entering and circulating inside the building. Artificial lighting and ventilation is very costly to those who cannot afford, but others prefer it for maximum comfort regardless of costs. The design therefore, depends upon the likes and preferences of the owner.

Sec. 808 of the National Building Code on windows opening state that: "Every room intended for any use and not equipped

Residential

with artificial ventilation system, shall be provided with window or windows with a total free opening area equal to at least ten percent of the room floor area, and such window shall open directly to a court, yard, public street or alley, or open water courses”

Sizes, Areas and Shapes. All rooms are intended for human use, and therefore, should be planned according to human scale. Good design always provide ample areas to accommodate furnitures, appliances, and other related facilities, including the most critical and important lanes or pathways for routinary movements inside the house. The shape as to plan and elevations should be strictly functional, not fancy in character.

Sec. 806 of the National Building Code on Size and Dimensions of rooms provides that:

“The minimum size of rooms and their least horizontal dimensions shall be as follows:

- a. Room for human habitations shall be 6 square meters with a least dimension of 2.00 meters.
- b. Kitchen shall be 3.00 square meters with a least dimension of 1.50 meters.
- c. Bath and toilet shall be 1.20 square meters with a least dimension of 90 centimeters.

When we say least dimension, it does not mean to limit the additional length or width the owner may want.

Orientation. Refers to the position and direction of the sunrise and sunset. It also includes the prevailing wind directions in the area for the year round. A brief nap or rest at mid day or in the afternoon is normally done in the bedroom. Thus, bedroom should not be oriented facing the afternoon sun. The kitchen laundry and bathroom is better oriented west for sunlight kills many types of bacteria.

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Zoning Laws. The zoning ordinance should be consulted first before deciding on the final site of the house or building. You might be constructing your residential house on an industrial or commercial zone. Of course, the family would be very happy if their house is constructed in residential areas provided with the right facilities like; market, school and playground for school children, church, etc.

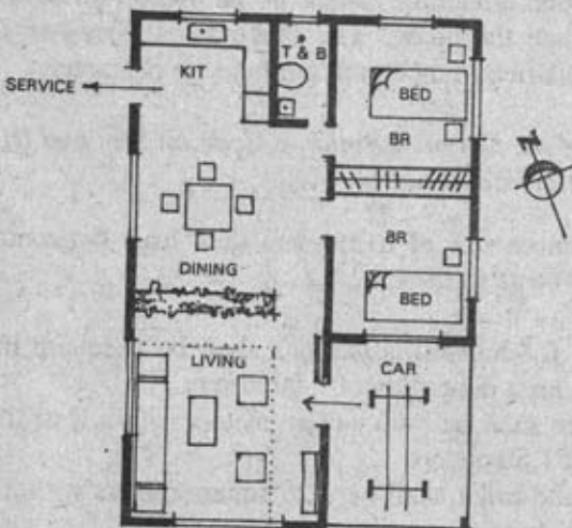


FIGURE 1-2 FINAL FLOOR PLAN

Height. A moderate high ceiling allows fresh air circulations, comfortable atmosphere, and preserved aesthetic value of the room. Room with low ceiling, has warm atmosphere that requires artificial ventilation.

Sec. 807 of the Building Code on Air Space Requirements in determining the size of the room states that:

Residential

"The minimum air space shall be provided as follows:

1. Habitable room . . . 14.00 cu. m. of air space per room.
2. School room 3.00 cu. m. with 1.00 sq. m. of floor area per person.
3. Office workshop and facilities . . . 12 cu. m. of air space per person.

Sec. 805 of the Building Code on Ceiling Heights provides that:

- a. **Habitable Rooms with Natural Ventilation** shall have a ceiling height not less than 2.70 meters.
- b. **Habitable Rooms with Artificial Ventilation** shall have ceiling heights not less than 2.40 meters measured from the floor to the ceiling. For buildings more than one story high, the minimum ceiling height of the first floor shall be 2.70 meters and 2.40 meters for the second floor. The succeeding floors shall have an unobstructed typical head room clearance of not less than 2.10 meters above the finished floor.
- c. **Mezzanine Floors** shall have a clear ceiling height not less than 1.80 meters above and below it.

Electrical Layout. Although this facility may be considered secondary aspect in planning residential house, was included because common errors were committed when the location of switches and outlets are not properly in-placed.

The location of convenience outlet should be planned simultaneously with the appliances to be placed on. The extension wire for appliances is the most unsightly obstacle in the room due to improper location of convenience outlet.

An ideal convenience outlet is installed 30 centimeters above the floor line, and not more than 1.00 meter away from the appliances to be served.

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A satisfactory electrical layout and installation, is when you avail of its services without the need of an extension cord. The location and accessibility of light switches is another thing of important consideration. It should be installed near the door of every room for convenience in switching-in and switching-off when entering and leaving the room respectively.

Location of Doors. When a door becomes an obstacle creating inconveniences to the occupant, that is the time we realized the mistake of not analyzing its proper position from the early stage of planning.

Superstition. Although superstition has no page in the book of contemporary Architecture, if your client believes and insist that his life success depends on luck brought about by his superstitious belief, then, as a planner, you have no choice but to do what your client says, if you do not want to lose your bread and butter.

1-2 Dimensions of Human Figure

The study of human figures as to physical proportion is an important aspect in planning. All structures intended for human use are planned according to human scale. Even furnitures, cabinets, cars etc. were also patterned after human dimensions.

The Study of human dimensions will be categorized into two:

1. Dimensions and clearances for children and
2. Dimensions and clearances for adults.

Dimensions and Clearances for Children

Comparatively, the physical proportions of children are different from that of the adults, especially during their early years. Children height substantially varies, but their space requirements can be approximated using Table 1-1.

Residential

For heights of children's furniture and equipment, refer to the School Section.

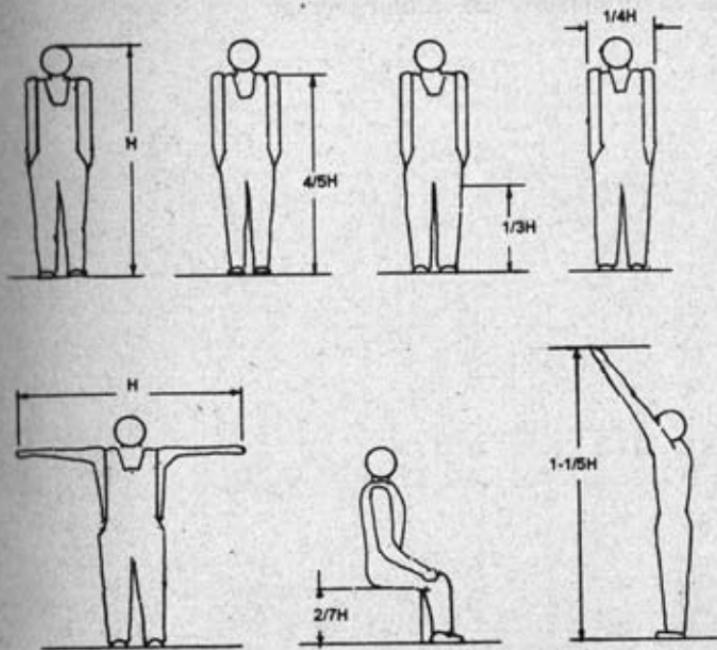


FIGURE 1-3 PHYSICAL MEASUREMENTS OF CHILDREN

TABLE 1-1 AVERAGE HEIGHT OF CHILDREN

Age	Height (cm)	Age	Height (cm)
5	110	11	140
6	115	12	145
7	120	13	150
8	125	14	155
9	130	15	160
10	135	16	165

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Dimensions and Clearances for Average Adults

Dimensions and clearances for average adults are shown to represent the minimum requirements in planning. It is suggested that clearances be increased to provide comfortable accommodation for persons larger than average.

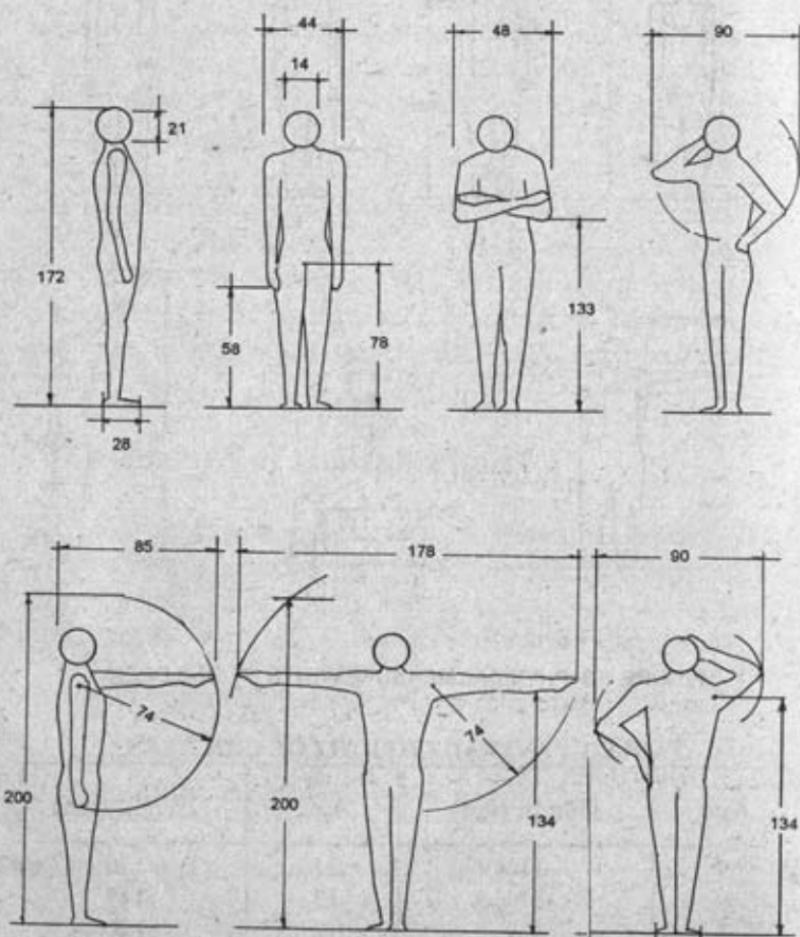


FIGURE 1-4 HUMAN DIMENSIONS

Residential

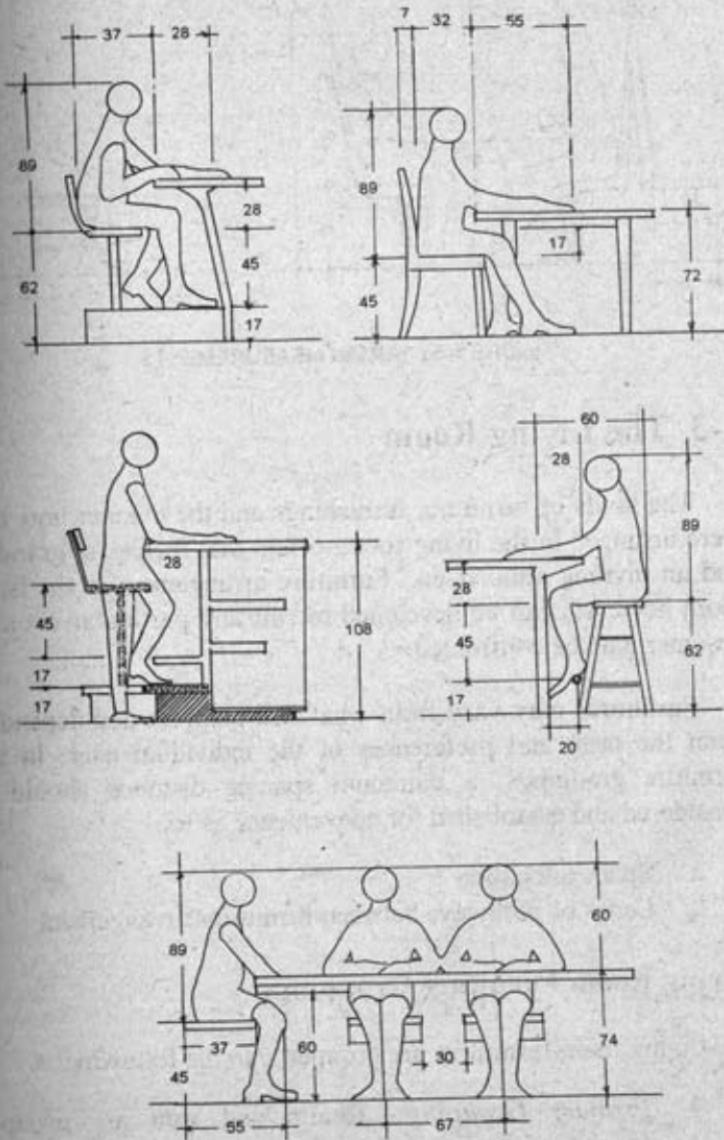


FIGURE 1-5 HUMAN MEASUREMENTS

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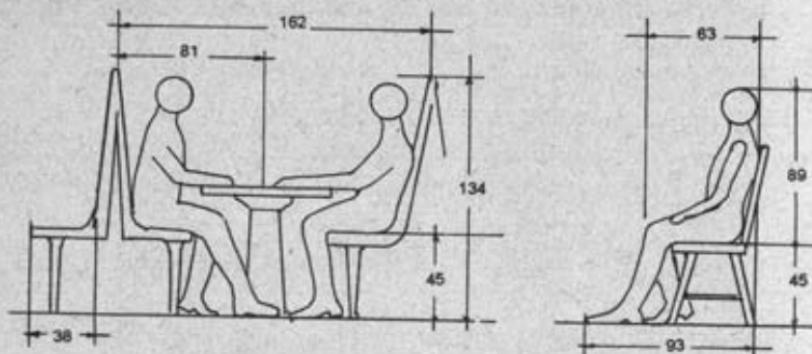


FIGURE 1-5a HUMAN MEASUREMENTS

1-3 The Living Room

The kinds of furniture, furnishings and the manner how they were arranged in the living room, offers that feeling of grandeur and an inviting atmosphere. Furniture arrangement in the living room however, can be developed to suit any particular choice a designer may be confronted.

Furnitures may vary from what will be presented depending upon the taste and preferences of the individual user. In any furniture groupings, a minimum spacing distance should be considered and established for convenience as to:

- Space allocation
- Lanes or pathways between furnitures arrangement.

Living Room Furniture Groupings

Living room furnitures are grouped into the following:

1. *Primary Grouping*.- Chairs and sofa are grouped around a fire place (if there is)
2. *Secondary Grouping*.- Chairs and love seat are grouped at end of the room or at the center.

Residential

3. *Reading Group* - Chair, Ottoman, Lamp shades, etc.
4. *Writing or Study Group* - Desk, lamp, one or two chairs, book cases.
5. *Music Group* - Piano bench, storage space
6. *Game Group* - Game tables and four chairs.

CIRCULAR PIECES



LOW COFFEE TABLE

D = 90
H = 45



ROUNDABOUT SEAT

DEPTH of SEAT = 45
DIAMETER = 120



PIECRUST

D = 90
H = 75



STAND
D = 30
H = 75



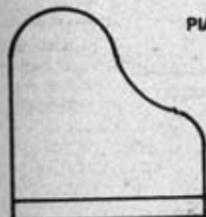
DUMBWAITER
LARGE
D = 60
H = 75



LAMP TABLE
D = 60
H = 75



DRUM TABLE
D = 90
H = 75



PIANOS

	L	D	H
CONCERT	270	150	100
MUSIC ROOM	210	150	100
PARLOR	180	150	100
BABY	165	150	100



CONSOLE

L = 150
D = 160
H = 100

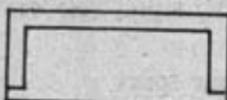
MINIATURE

L = 140
D = 50
H = 90

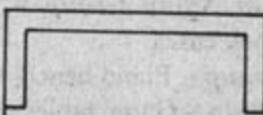
FIGURE 1-6 FURNITURE DIMENSIONS

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SOFAS

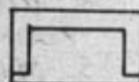


L = 180
D = 75
H = 90



L = 210
D = 90
H = 90

LOVE SEATS



SMALL
L = 100
D = 60
H = 65

LARGE
L = 135
D = 75
H = 90

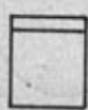
CHAIRS



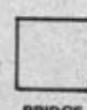
L = 75
D = 90
H = 90



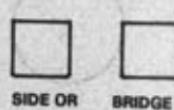
L = 65
D = 75
H = 90



L = 60
D = 75
H = 75



BRIDGE ARM
L = 60
D = 60
H = 75



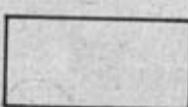
SIDE OR DESK
L = 45
D = 45
H = 75

BRIDGE ARMLESS
L = 45
D = 45
H = 75

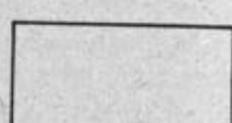
DESKS



SMALL
L = 120
D = 60
H = 75



LARGE
L = 150
D = 75
H = 75



VERY LARGE
L = 180
D = 90
H = 75

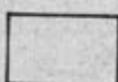
TABLES



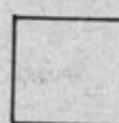
END
L = 60
D = 35
H = 60



END
L = 50
D = 50
H = 60



COFFEE
L = 90
D = 60
H = 45

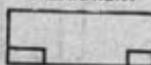


BRIDGE
L = 90
D = 90
H = 75



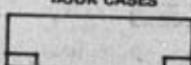
CONSOLE
L = 90
D = 45
H = 45

BREAKFRONT



L = 120
D = 45
H = 195

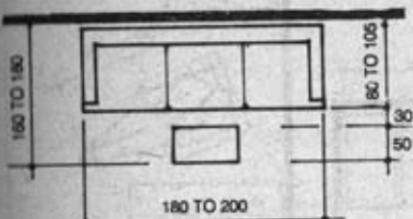
BOOK CASES



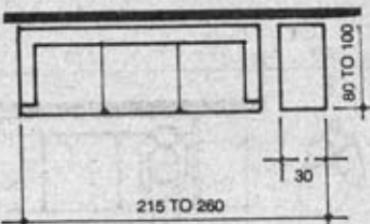
L = 150
D = 45
H = 210

FIGURE 1-7 FURNITURE DIMENSIONS

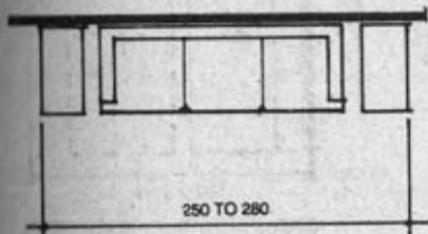
Residential



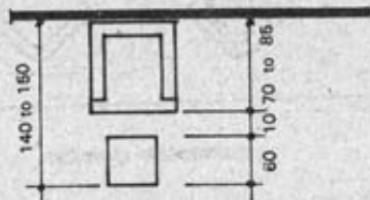
SOFA WITH COFFEE TABLE



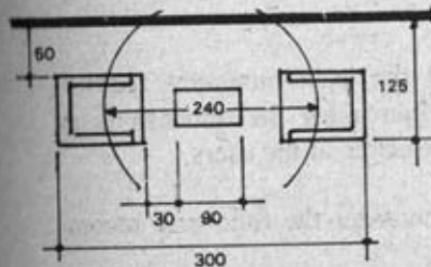
SOFA WITH ONE END TABLE



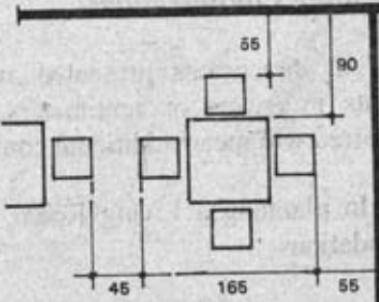
SOFA WITH TWO END TABLE



ARM CHAIR WITH OTTOMAN



TWO ARM WITH COFFEE TABLE



CARD TABLE & CHAIR

All measurements in centimeters

FIGURE 1-8 LIVING ROOM FURNITURE CLEARANCES

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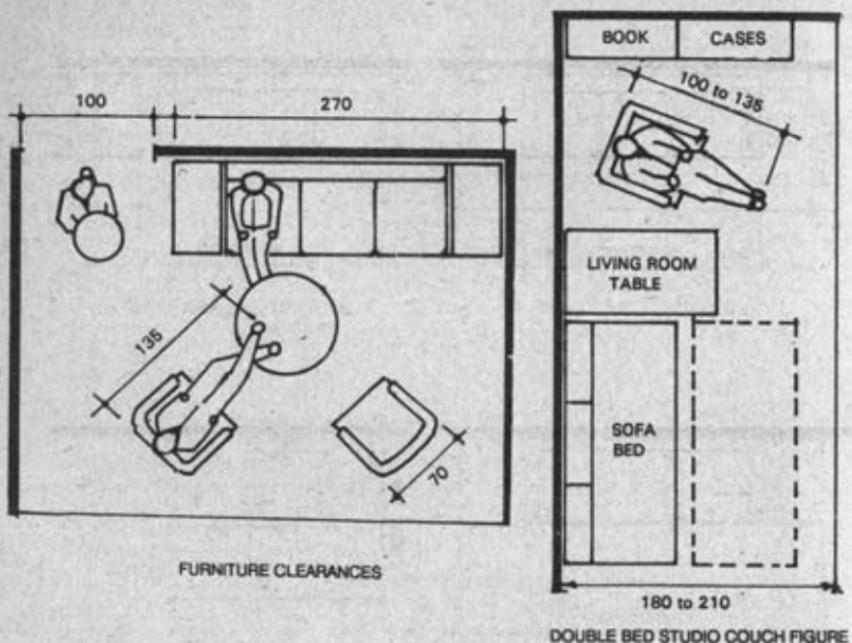


FIGURE 1-9 LIVING ROOM FURNITURE CLEARANCES

Planning Considerations:

All dimensions presented are the least minimum requirements in meters or centimeters. Increasing the dimensions as required will mean additional convenience of the users.

In planning a Living Room, consider the following recommendations:

1. Separate the through traffic from the activity center.
2. Opening should be positioned giving enough wall space for various furnitures arrangement.
3. Provide convenient access to:
 - a. Doors

Residential

- b. Windows
 - c. Electrical outlets
 - d. Thermostat
 - e. Supply grills
4. For simple passage between low objects such as sofa and coffee table, the pathway should have a minimum clearance of 40 centimeters.

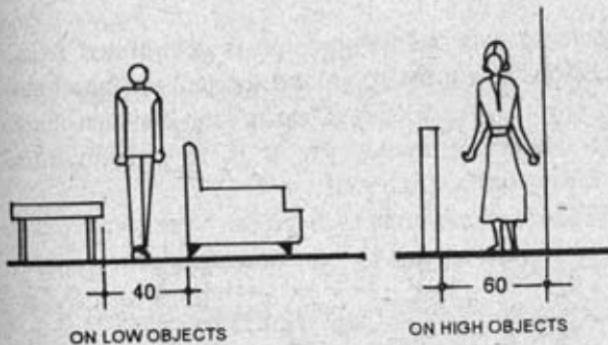


FIGURE 1-10 PASSAGE CLEARANCES

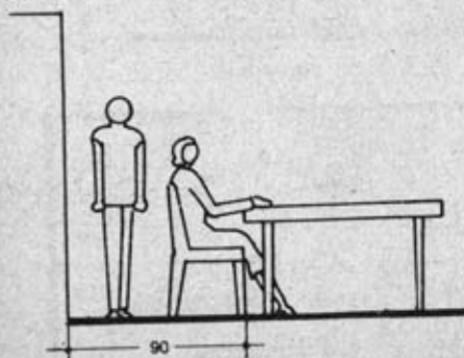


FIGURE 1-11 PASSAGE CLEARANCE AT THE BACK SEATED CHAIR

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5. For a single passage between tall objects from the hip height or over, provide minimum clearance of 60 centimeters.
6. For general traffic lane, the minimum recommended pathway clearance is 100 centimeters.
7. For seating area to permit one person to be passing at the back of an occupied chair, a minimum clearance of 90 centimeters is acceptable.

Furniture Clearances

Traffic tolerance in the living room is determined from the number of persons using the room and the narrow lane between furniture group units. An adequate traffic lane between the main entrance and the major seating group is 100 centimeters although 130 centimeters is preferred.

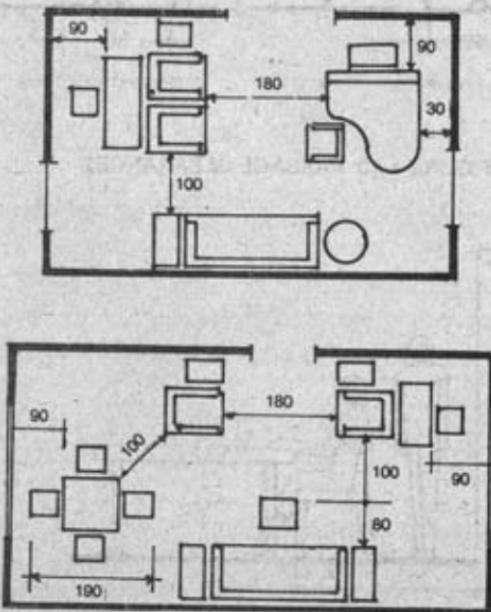


FIGURE 1-12 FURNITURE ARRANGEMENT AND CLEARANCES

Residential

To give adequate space for convenient use of furnitures in the living area, the following minimum clearances are presented.

- a. 150 cm. between facing seating
- b. 50 cm. where circulation occur between furnitures.
- c. 75 cm. for use of desk.
- d. 90 centimeters for main traffic.
- e. 150 cm. in between television set and seating.

Minimum Space Clearances

- a. 45 centimeters minimum clearances for single passage not a traffic lane between low objects such as sofa and coffee tables.
- b. 75 centimeters minimum clearances for single passage not a traffic lane between tall objects hip height or over.
- c. 100 centimeters minimum clearances for general traffic lane. As room increases in sizes, this minimum distance also increases to maintain the space scale of the room.
- d. 90 centimeters minimum tolerance for confined seating areas. For instance, between desk and a wall which permits one person to pass at the back of an occupied chair. The minimum distances constitute no major traffic lane.

I-4 The Dining Room

Dining Room is the space or room where the family seat together, pray before meals, talk about the family affairs and other matters.

Dining area should accommodate furnitures of either portable or built in for eating, sitting, serving and possible storage.

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Planning Considerations:

- a. Determine the number of persons to be seated.
- b. Compute the required space occupied by the table.
- c. Compute the space for the chairs.
- d. The space required behind the chairs.
- e. The seating arrangement.
- f. The size and type of furnitures.
- g. Space for the storage of china glassware, silverware and linen.

Recommended Space Dimensions

1. **Size of Place Setting.** For greater freedom of movement, a minimum width of 50 centimeters is acceptable, although 75 centimeters is desirable, but 60 centimeters width is adequate that could permit 45 centimeters wide chair at 15 centimeters apart.
2. **For a Place Setting.** Provide a minimum clearance of 35 centimeters, allow space for china, glassware, silver and elbow extension.

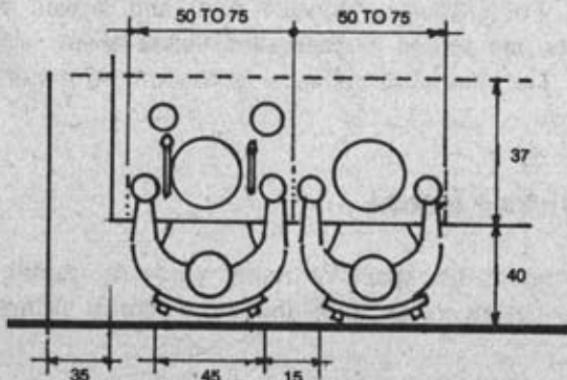


FIGURE 1-12 CLEARANCES OF PLACE SETTING

Residential

Table Requirements per Person

- a. For Crowded Seating - 50 to 55 cm. on table perimeter.
- b. For Comfort Seating - 60 cm. on the table perimeter.

Furniture Clearances

To provide ample space for convenient use of the dining area, the following minimum clearances from the edge of the dining table is recommended.

1. 80 cm.- for chair plus access thereto
2. 95 cm.- for chair plus access and passage
3. 105 cm.- for serving from behind chair
4. 120 cm.- from table to base cabinets (in dining-kitchen)

Clearances Behind Chairs

The Passage Clearance behind chairs is important for movability. The recommended minimum space is 50 centimeters but preferably 60 for convenience. If passage behind chair is not desired, a minimum of 12 to 15 cm. plus the depth of the chair is satisfactory table clearance for pushing back the chair when leaving the table.

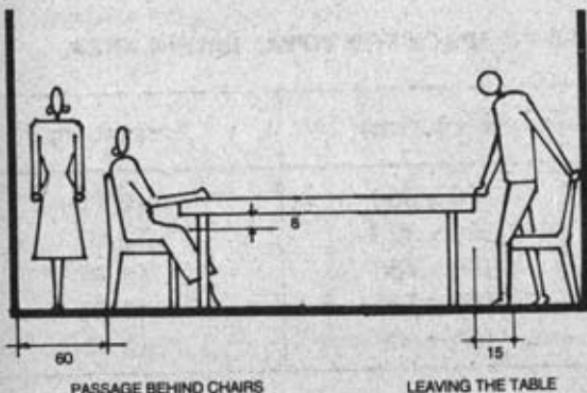


FIGURE 1-14 PASSAGE CLEARANCES

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Size of Table and Dining Area

The common width of dining table is 90 centimeters although the satisfactory width is 95 to 110 centimeters. If a 60 centimeters wide place setting table is seated at each end of the table, the minimum recommended table lengths is presented in the following table.

TABLE 1-2 RECOMMENDED DINING TABLE LENGTH

Persons	Minimum Length (cm)	Recommended Length (cm)
4	130	150
6	195	210
8	260	270
10	325	330
12	380	390

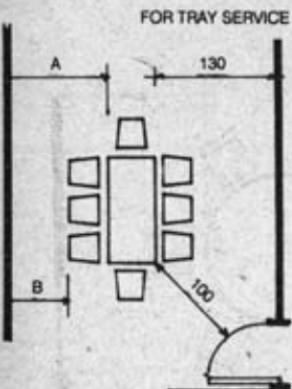
If no one is seated at either end of the table, the length could be reduced by 10 centimeters

TABLE 1-3 SPACE FOR TOTAL DINING AREA

Persons	W x L (cm)	Area (sq. m.)
4	300 x 360	10.80
6	300 x 420	12.60
8	300 x 480	14.40
10	300 x 540	16.20
12	300 x 600	18.00

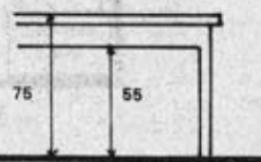
If no one is seated at either end of the table, the length may be reduced by 60 centimeters

Residential

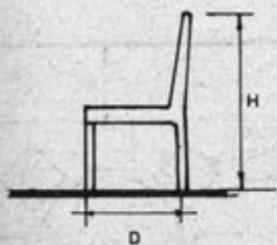


CLEARANCES FOR DINING TABLE

A	B
60	120
100	50
130	95



MINIMUM KNEE CLEARANCE



DINING ROOM CHAIRS

H = 85 TO 95

D = 45 TO 55

W = 45 TO 60

- SPACE DISTANCE**
- A - FOR TRAY SERVING 130
 - B - CHAIR PLUS ACCESS 90
 - C - PASSAGE 100

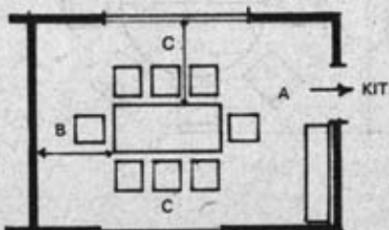


FIGURE 1-15 MINIMUM CLEARANCES AND HEIGHTS

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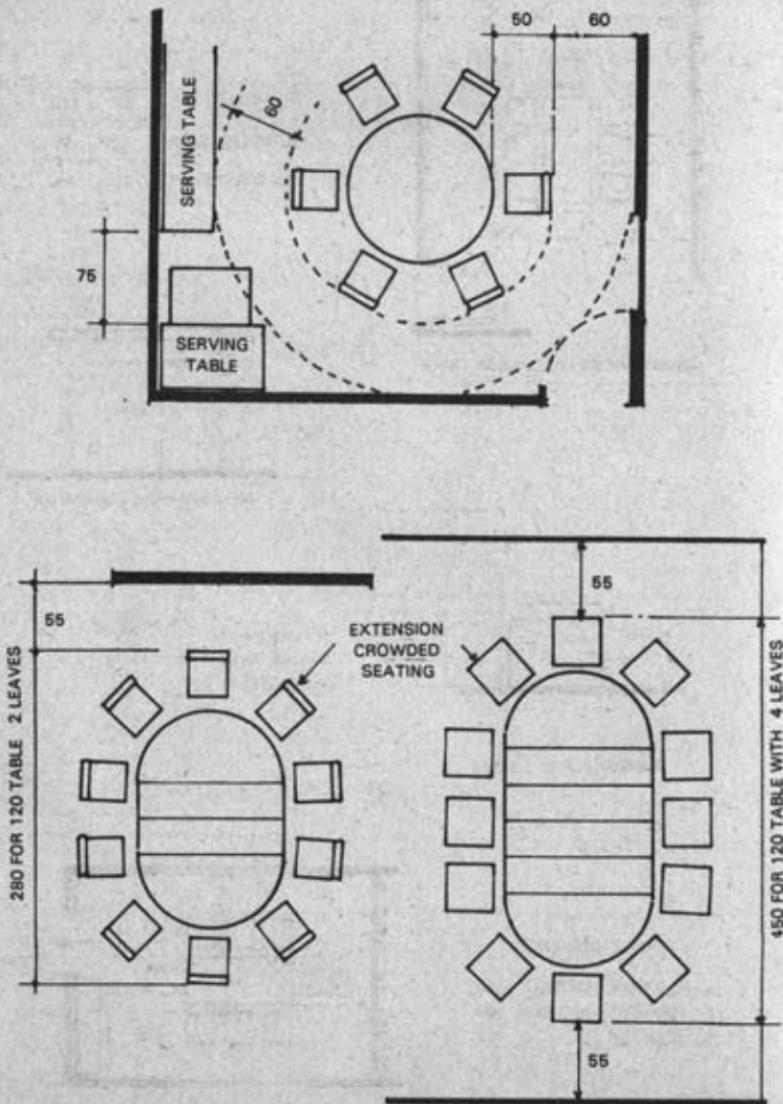


FIGURE 1-16 DINING HALL CLEARANCES

Residential

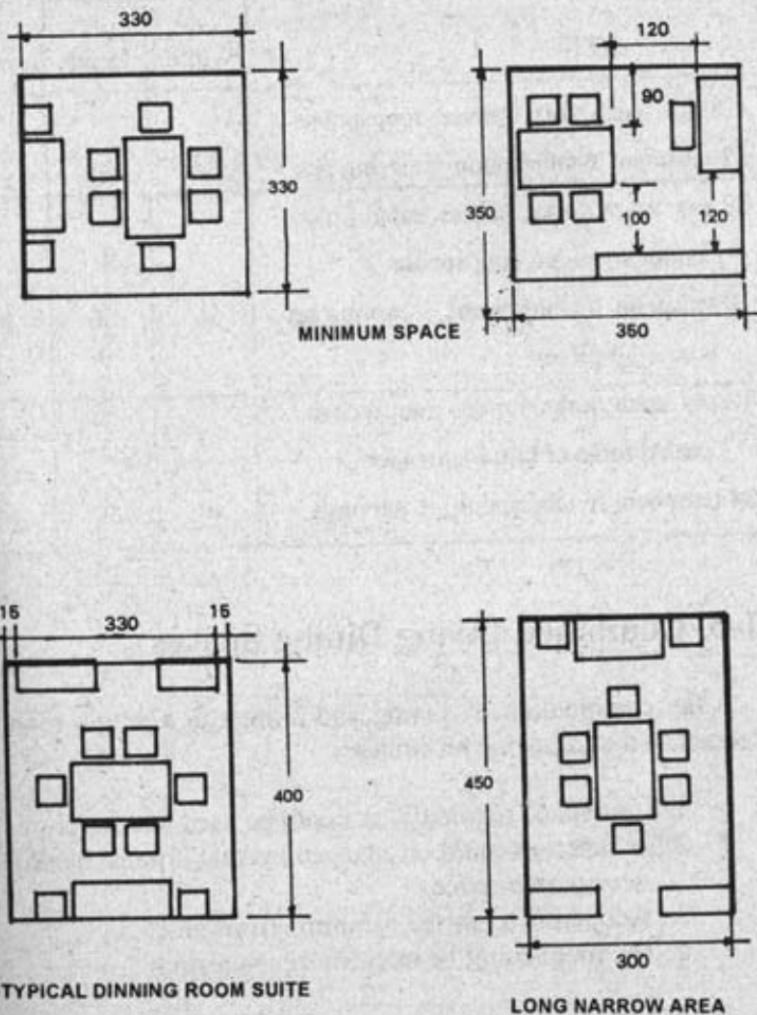


FIGURE 1-17 DINING AREA ARRANGEMENT

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TABLE 1-4 INSIDE DIMENSION OF DRAWER FOR STORAGE OF SILVERWARE IN CENTIMETERS

ITEM	Width	Depth	Height
8 pcs. each; fork, knives, soupspoons			
12 teaspoon, 6 tablespoon 4 serving pcs.	30	45	6
12 pcs. each: forks, knives, salad forks butter spreader, soupspoons			
18 teaspoon, 6 tablespoons, 3 carving set 3 serving pieces	36	50	8
12 pcs. each: forks, knives, soupspoons sealed forks or butter spreader			
24 teaspoons, 6 tablespoons, 6 servings	40	50	6

1-5 Combined Living Dining Spaces

The combination of Living and Dining in a single room or space has the following advantages:

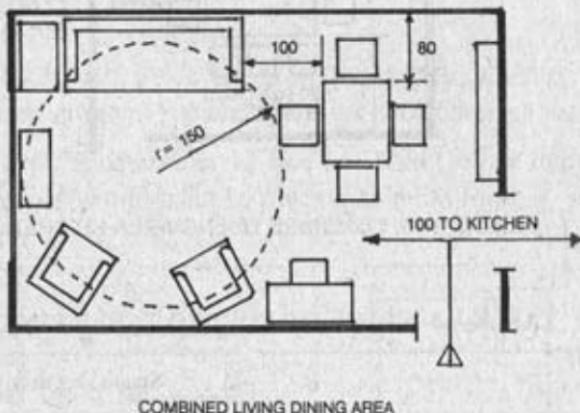
1. Less space required, but could be used intensively.
2. Its function could be changed making it more flexible serviceable space.
3. Adoptable to varied furniture arrangements.
4. The room could be made more interesting.

1-6 Combined Dining- Kitchen Area

This type of combination is most preferred by occupants more particularly small houses and apartments due to the following advantages:

Residential

1. It minimizes housekeeping chores.
2. Provides a space for the family's daily activities.
3. The kitchen provides a place for informal family breakfast, snacks or just serving tea or coffee to visitors.



COMBINED LIVING DINING AREA

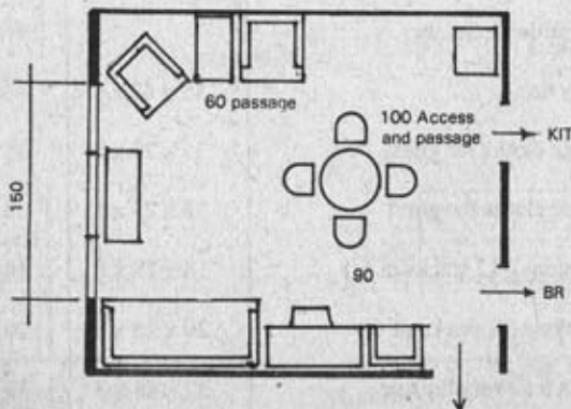


FIGURE 1-18 COMBINED LIVING- DINING SPACE

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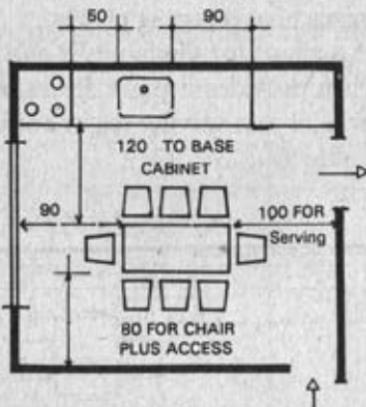


FIGURE 1-19 COMBINED DINING AREA-KITCHEN

TABLE 1-5 STACK OF FOLDED TABLE LINEN

ITEM	Space Depth in Cm.	
	Minimum	Maximum
2 Large table cloths for guest use	25 x 48 x 8	35 x 90 x 5
2 Medium table cloths for everyday use	35 x 48 x 3	33 x 70 x 3
4 Small table cloths for guest	35 x 25 x 8	35 x 70 x 3
3 Small table cloths for guest	35 x 25 x 5	35 x 70 x 3
12 Small napkins (12 stacks of 6)	18 x 25 x 8	18 x 25 x 5
12 Large napkins (2 stacks of 6)	20 x 25 x 5	20 x 25 x 5
6 Place mats for everyday use	33 x 48 x 3	33 x 48 x 3
1 Table pad	.33 x 53 x 8	33 x 53 x 8

Residential

1-7 The Bedroom

The size or area of a residential house could be visualized imaginarily by anyone based from the number of bedrooms it has, and the size of room could be determined under the following considerations:

1. The likes and preferences of the owner whether large, medium or small room with or without comfort room.
2. The type and number of bed including other items that the owner would want to place inside the room.

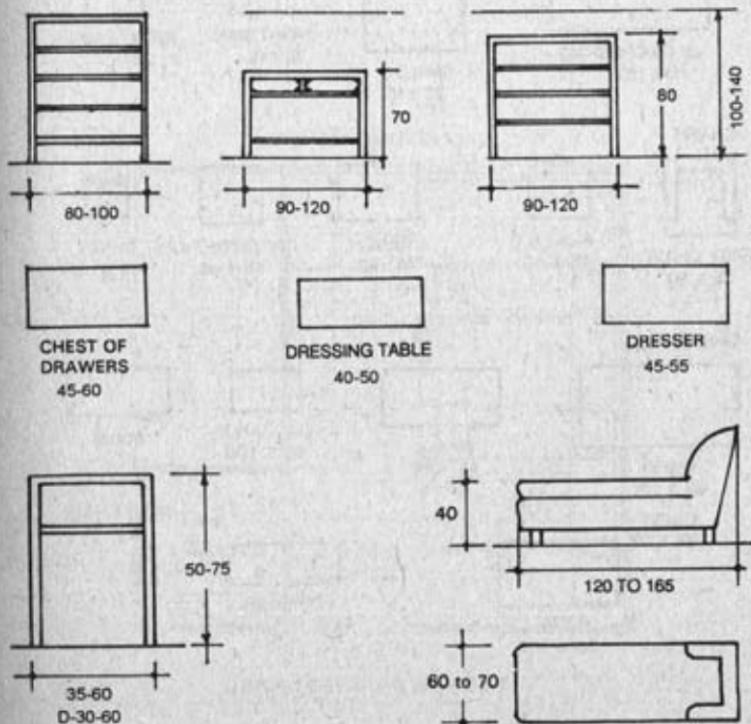


FIGURE 1-20 BEDROOM FURNITURES

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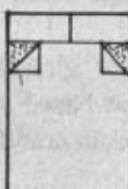
BEDS



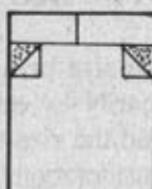
SINGLE
W-90



TWIN
W-100



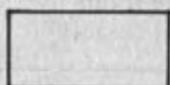
DOUBLE
W-135



MATRIMONIAL
W-180

All length from 190 to 210 cm.

TABLE



LARGE DRESSING
60 x 120



SMALL-O
75 x 75



NIGHT SMALL
35 x 45



MEDIUM NIGHT
45 x 45

CHAIRS



EASY CHAIR
75 x 90



SIDE B
45 x 45



BENCH
45 x 60

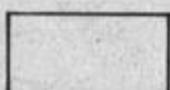


DRESSING Table
45 x 45

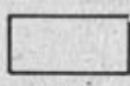


CHAIR
45 x 45

CHESTS



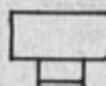
CHEST
60 x 120



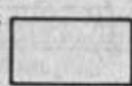
SMALL
45 x 90



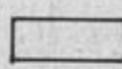
END TABLE
50 x 100



DESK
75 x 100
WITH CHAIR

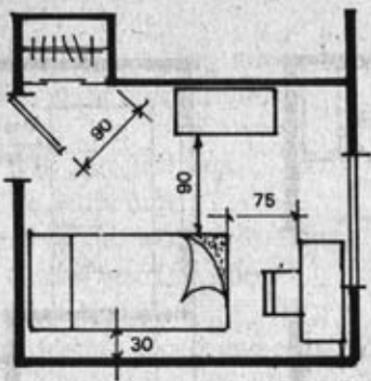


CRIB
75 x 100

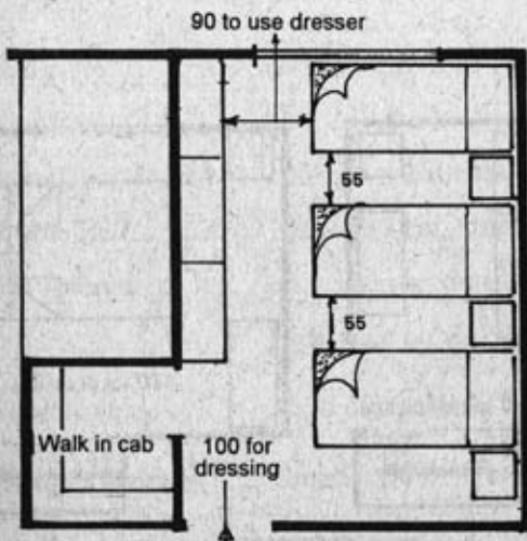


DRESSER
45 x 100 or 150

FIGURE 1-21 BEDROOM FURNITURES



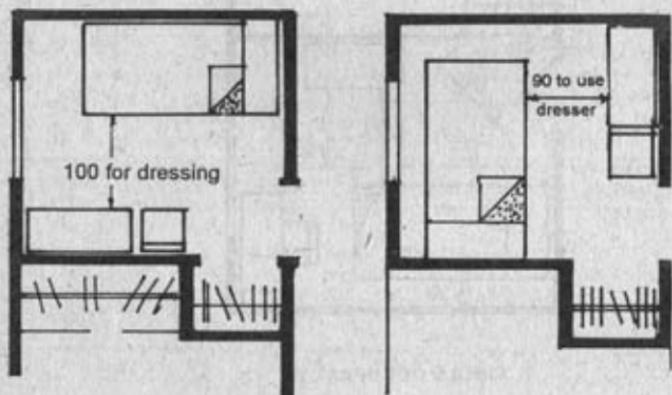
SINGLE OCCUPANCY



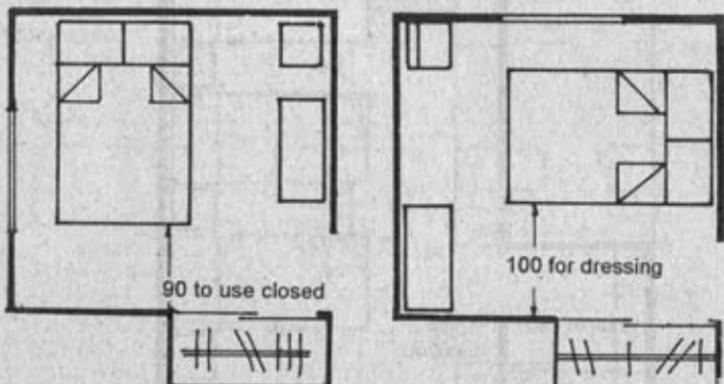
DORMITORY TYPE BEDROOM

FIGURE 1-22 TYPE OF BEDROOM OCCUPANCY

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SINGLE OCCUPANCY BEDROOM



DOUBLE OCCUPANCY

FIGURE 1-23 CLOSET AND DRESSING CLEARANCES

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Clearances Between Walls and Furnitures

A good planner has in his mind the following minimum clearances between walls and furniture.

1. Between wall and furniture 5 to 7 cm.
2. Between furniture units 5 to 10 cm.
3. One side or foot of bed for dressing 100 to 110 cm.
4. Between side of bed and side
of dresser, or chest 15 to 20 cm.
5. In front of dresser, closet and chest 90 to 100 cm.
drawer.
6. In one side of bed for circulation 55 to 60 cm.
7. For major circulation path door 60 to 70 cm.
8. On least used side of double bed 3 to 40 cm.

Side of Bed

Single	90 to 96 cm. x 230 cm. long (c)
Twin Bed	96 x 230 cm long (f)
Three Quarter Bed	125-135 x 230 cm. long (b)
Double Bed	135 x 230 cm. long
Roll Away Bed.....	60 x 150 cm. on edge, 8 cm. Clearance on wall side (a)
Bed Table (g)	35 to 60 x 30 to 60 cm.

Bedroom Chairs (h)	Small 50 x 50 cm.
	Larger 75 x 85 cm x 80 to 95 cm

Dressers (3 drawers) (d) 90 to 120 x 45 to 55 cm.

Chest of Drawers (4 drawers) (d)

80 to 100 x 45 to 55 cm.

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- Chaise Lounge** 60 to 70 x 120 to 165 cm.
Daybed 83 to 97 x 185 to 210 cm.
Dressing Table 37 to 55 x 90 to 125 cm.

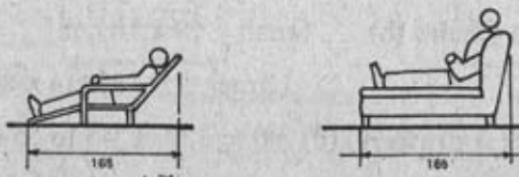
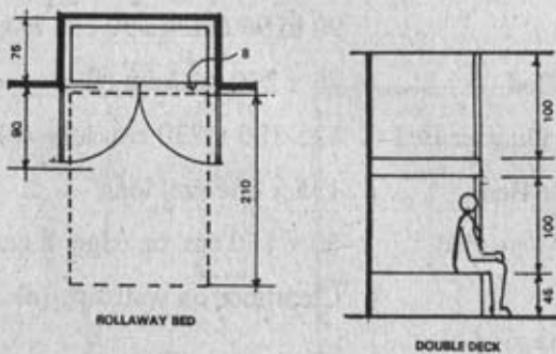
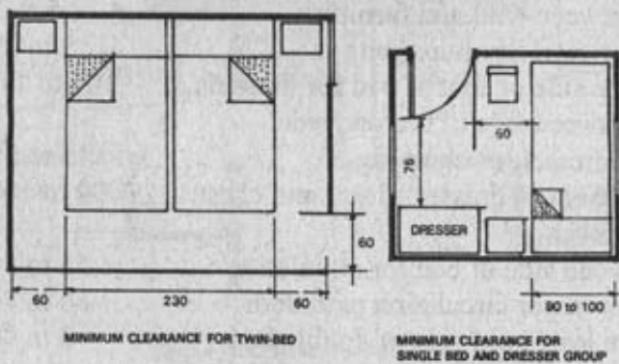
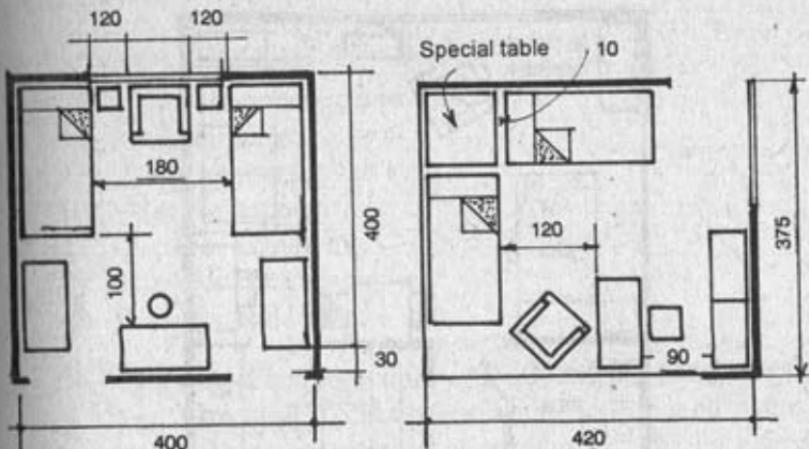
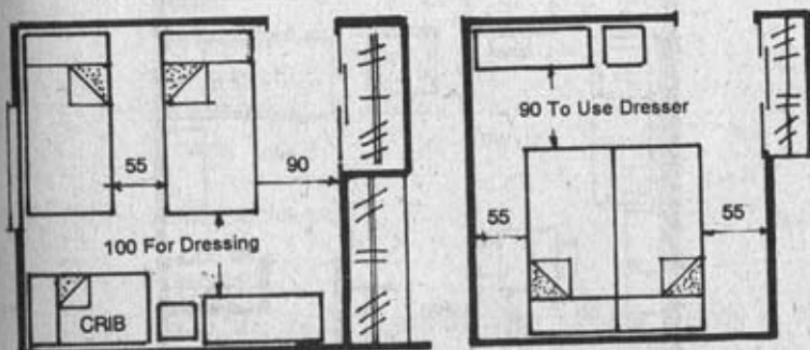


FIGURE 1-24 BEDROOM FURNITURE CLEARANCES

Residential



UNIT ARRANGEMENT AND FURNITURE CLEARANCES



CLOSET AND DRESSING CLEARANCES

FIGURE 1-25 MINIMUM CLEARANCES

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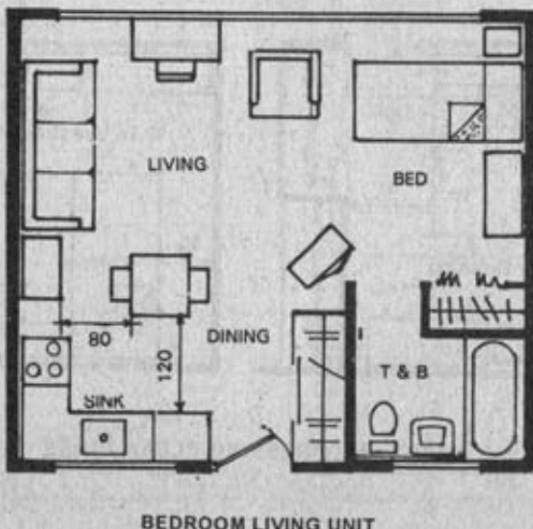
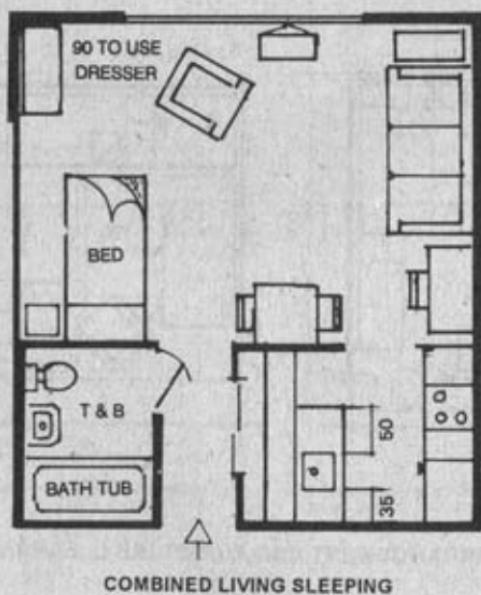


FIGURE 1-26 COMBINED LIVING SLEEPING

Residential

1-8 The Kitchen

A kitchen is the place or area where:

1. Meals are prepared and cooked.
2. Foods are preserved.
3. Food and utensils are stored.
4. Place for eating.
5. Place for laundering.
6. Place for entertaining.
7. Place for child care.

Considering that more time and efforts are being spent in the kitchen than in any other place of the house, good planning demands for the right selection of appliances, storage unit and the convenient arrangement of the area.

Comparable Amount of Trip in the Preparation of Food

1. Kitchen sink	43 to 48%
2. Range	14 to 18%
3. Mixing	12 to 13%
4. Refrigerator	7 to 8%
5. Dining room	7 to 8%
6. Dish storage	6 to 8%
7. Serving	3 to 6%

Planning Considerations:

A. Arrangement

1. To keep the basic working area compact even if the kitchen is of the large type.
2. Always consider the possibility that more than one person will be working in the kitchen.
3. The arrangement varies according to the size and shape of the space available.
4. Remember the relationship as to functions of the different unit area in the kitchen.

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B. Traffic

1. Good planning avoids traffic lane at the working areas.
2. Plan properly the service entrance to the storage so that traffic that is not essential to food preparation like servicing or storaging can by pass the area.

C. Storage

1. Kitchen storage design should be functional to minimize reaching up and stooping down. Storage facilities should be accessible to be reached out by a woman standing both feet on the floor.
2. Provide sufficient space to store items that are easily seen, reached, grasped and taken down and returned without excessive strain.
3. With proper planning, stored items should be located closer to where they are first used.
4. Storage space should be flexible to allow its adjustment to supplies, kinds of food, sizes, and utensils.
5. Shelving must be adjustable.

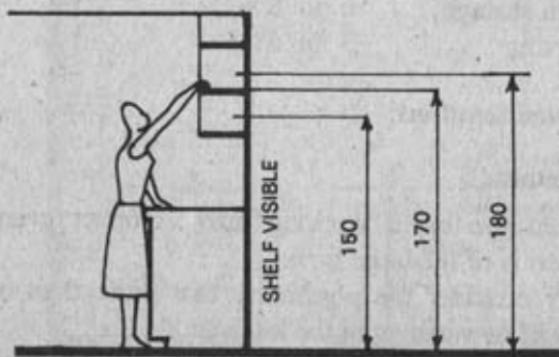


FIGURE 1-27 HIGHEST REACH FOR VERTICAL STORAGE

Residential

D. Counters and Working Surface

1. The height of counter and working surfaces should invite comfortable working posture.
2. The worker could sit if she likes to while doing certain kitchen work. For example, working at the sink.
3. Continuous line of the working surfaces provides ease of movement and cleaning of the area.

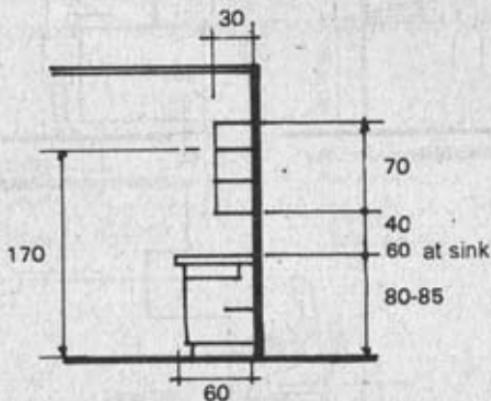


FIGURE 1-28 TYPICAL CABINET DIMENSIONS

E. Materials

The materials and finishes of a kitchen should be properly selected to minimize maintenance and cleaning. Walls and ceiling should be light in color because it creates a pleasant working atmosphere.

F. Lighting

1. Good lighting helps minimize fatigue.
2. Good lighting promotes safety and comfortable working place.
3. Lighting should be mounted at comfortable level. It should be properly positioned to minimize shade and shadows throughout the kitchen area.

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4. An adequate natural light or artificial lighting will make the room comfortable and attractive than a poorly lighted room.

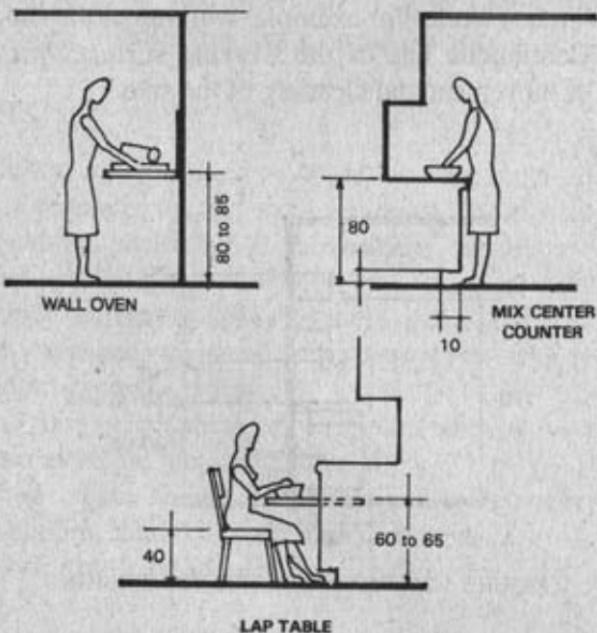


FIGURE 1-29 COMFORTABLE WORKING HEIGHTS

G. Ventilation

The kitchen should be well ventilated provided with exhaust fan to remove the objectionable kitchen odor.

H. Safety and Accessibility

1. All flammable items should be designed out of the kitchen.
2. Sharp corners, exposed handles and control knobs in the kitchen equipment should be avoided.

Residential

3. Doors and drawers should be provided with safety catches.
4. Provide accessibility to front and back door, laundry area, telephone, and bathroom.

Critical Dimensions

Working operations in an individual work center requires ample space for effective mobility. The following illustrations shows the minimum clearances required in the kitchen working area.

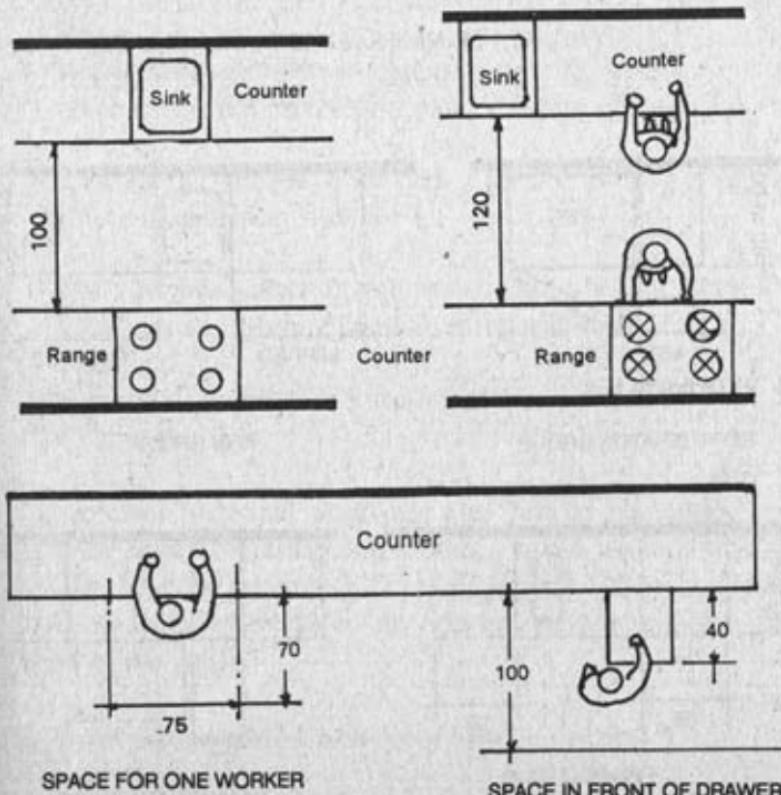


FIGURE 1-30 RECOMMENDED MINIMUM CLEARANCES IN THE KITCHEN

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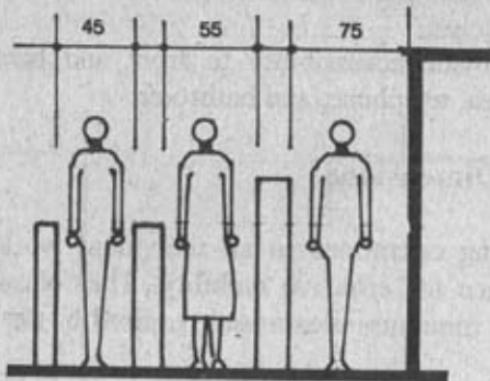


FIGURE 1-31 MINIMUM WIDTH OF PASSAGE

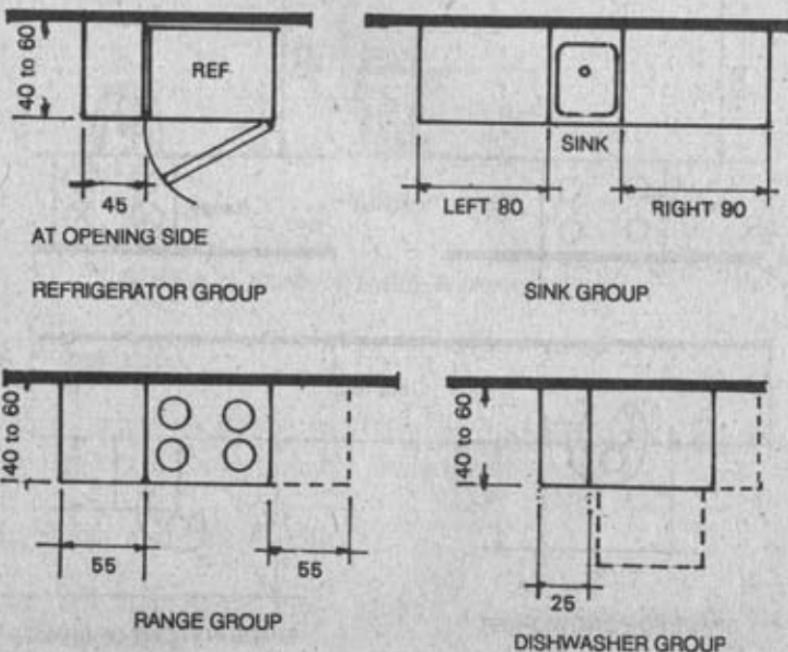


FIGURE 1-32 MINIMUM COUNTER WIDTH DIMENSIONS

Residential

1-9 The Kitchen Work Center

The kitchen work centers are planned according to:

1. Their constituent parts.
2. Their proper functions.
3. Their ideal relationship to one another.

The Six Basic Work Centers in the Kitchen are:

1. The Sink
2. The Range
3. Mix
4. Serve
5. Refrigerator (functions related to storage center)
6. Oven if it is not an integral part of the range.

Location of the kitchen work center should allow a continuity of the activities therein such as:

1. Storage. For gathering materials required of the work.
2. Cleaning and Mixing or initial preparations.
3. Cooking.
4. Serving or storing for future use.
5. Cleaning up.

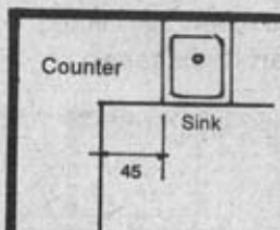
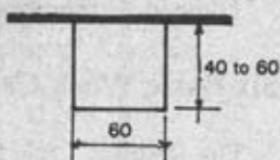
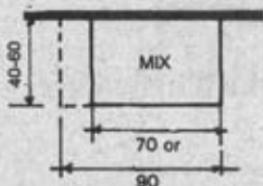
Any kitchen plan that interrupts this line of continuing activities with doors, or with non-working areas or facilities, is not considered good planning, because an extra step or movement is necessary every time the line is crossed reducing the efficiency of the work.

Three Components of Each Working Centers

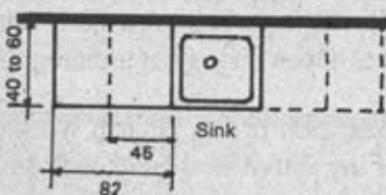
1. Adequate storage space for various items used there.
2. Ample counter space for the work to be accomplished.
3. Necessary utilities and facilities such as:

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- a. Water at the tank.
- b. Heat at the range.
- c. Outlet and space for mixer at the mix counter.
- d. Adequate lighting at each center



ADJACENT TO SINK



DISHWASHING TOP OPENING

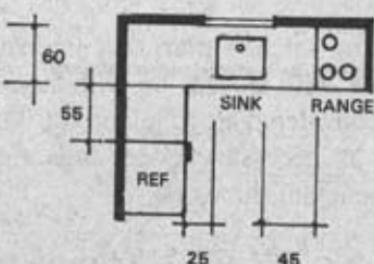
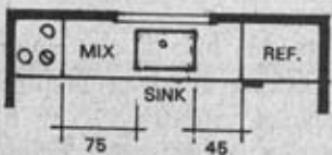


FIGURE 1-33 MINIMUM CLEARANCES AT WORK CENTER

Residential

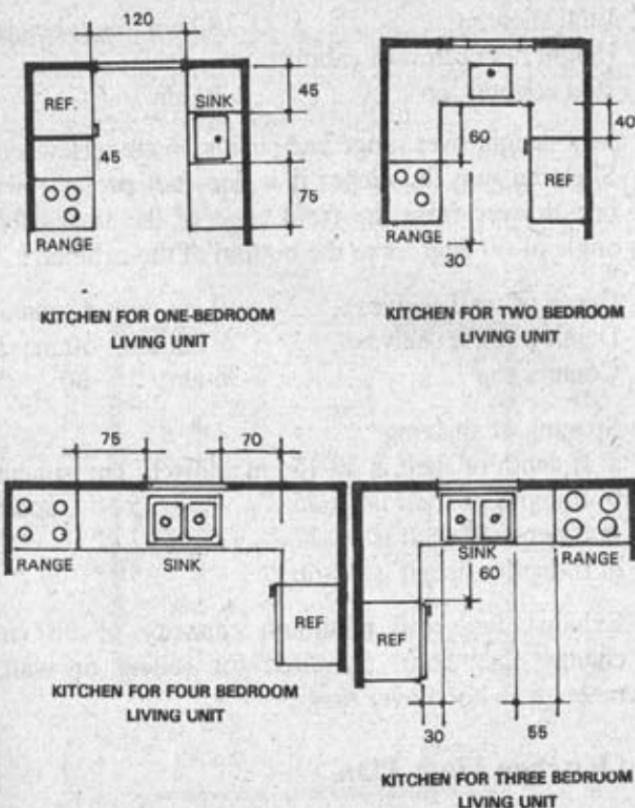


FIGURE 1-34 KITCHEN FOR A TYPE OF BEDROOM LIVING UNIT

FHA Requirements for Kitchen Storage

The critical heights and measurements in the kitchen are:

1. Total shelf area 4.6 sq. m. minimum
2. Other wall or base cabinet Not less than 2 sq. m.
3. Total counter top area 1 sq. m. minimum
4. Counter top height..... 75 cm. min. - 95 max.
5. Total drawer area 1 sq. m. min. if a 97 cm.
(39 in) range is used

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6. Wall shelving 180 cm. max. height
7. Height between wall cabinets
and counter top 60 cm.
8. Min. height over range and sink is 36 cm. elsewhere.
9. Shelving may be closer if it does not project beyond a
line drawer from the front edge of the wall cabinet at
angle of 60 degrees to the bottom of the cabinet.
10. Depth of wall shelves 10 cm min- 45 maximum
11. Depth of base shelves 30 cm.min- 60 maximum
12. Counter top 36 cm. " 60 "
13. Spacing of shelving
 - a. If depth of shelf is 10-15 cm allow 12 cm. spacing
 - b. If depth of shelf is 15-25 " " 15 " spacing
 - c. If depth of shelf is 25-37 " " 17 " "
 - d. If depth of shelf is 37-60 " " 25 " "
14. Exhaust fan with minimum capacity of 36 cm. air
changes per hour. (required for ceiling or wall near
range or in hood over range.)

Type of Kitchen Floor Plan

The common types of kitchen floor plan are:

1. U- Shaped.
2. L – Shaped.
3. Corridor Shaped.

Advantages and Disadvantages

1. The U shaped type is the most compact area but has problem of the door on one side of the three walls.
2. The L shaped type has the advantage of concentrating work area in one corner minimizing travel. The longer travel to the extremities is one disadvantage of this type.

Residential

3. The corridor type is satisfactory where the doors are located at each end of the space. The greater distance along the corridor is its disadvantage.

Each type has advantages and disadvantages. The choice however, depends upon the user's convenience and preference.

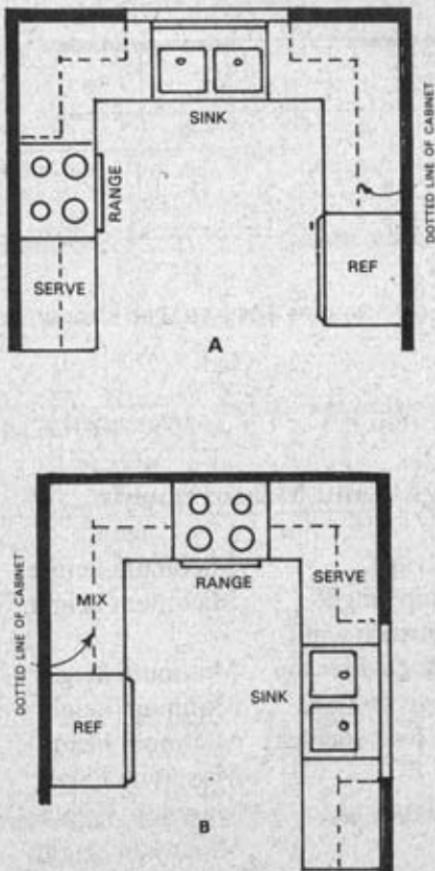


FIGURE 1-35 U-SHAPED PLAN OF KITCHEN

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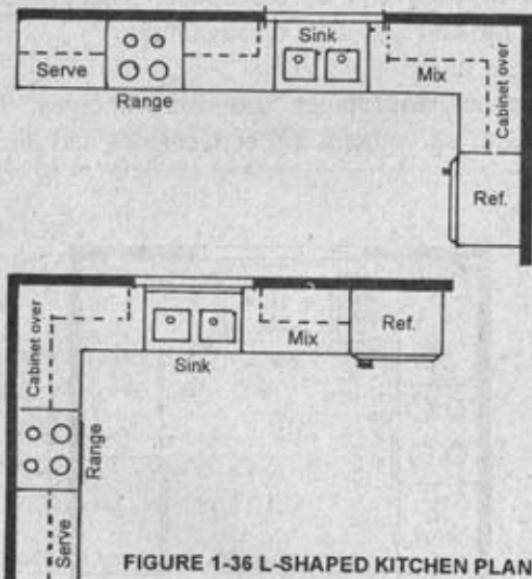


FIGURE 1-36 L-SHAPED KITCHEN PLAN

FIGURE 1-36 L-SHAPED KITCHEN PLAN

Critical Heights and Measurements

1. Wall shelving	Maximum height	180 cm.
2. Counter top height	Maximum height	90 cm.
3. Height between wall cabinet & counter top	Minimum height	60 cm.
4. Over range and sink	Minimum height	40 cm.
5. Depth of wall shelves	Minimum height	10 cm.
	Maximum height	45 cm.
6. Base shelving	Minimum height	30 cm.
	Maximum height	40 cm.
7. Counter top	Minimum height	40 cm.
	Maximum height	60 cm.
8. Exhaust fan ceiling or wall near the range..	Max capacity 15 air exchanges per hour	

Residential

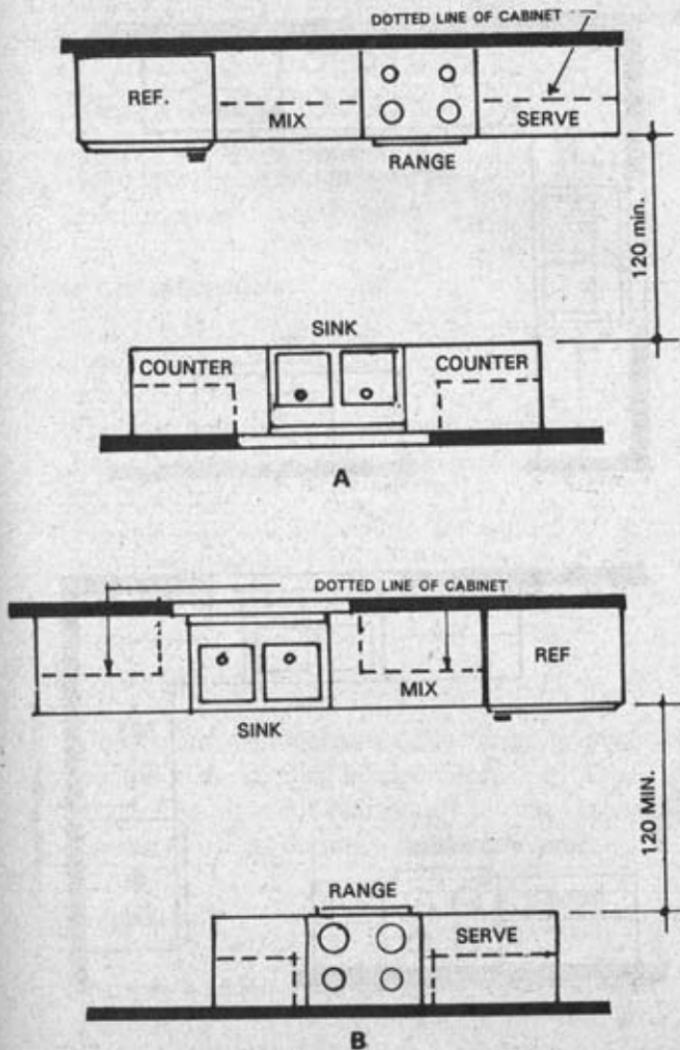


FIGURE 1-37 PLAN OF CORRIDOR TYPE KITCHEN

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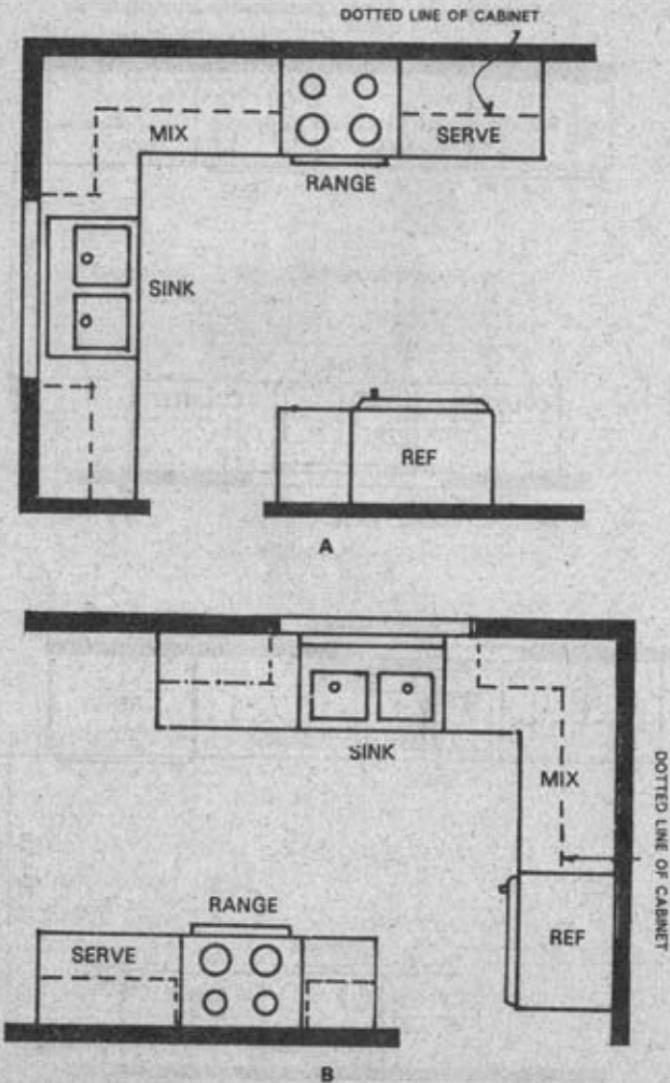


FIGURE 1-38 PLAN OF BROKEN U-SHAPED KITCHEN

Residential

1-10 Bathroom

In planning bathroom, the designer must know the various activities commonly performed in the room such as:

1. Washing of hands, face and hair.
2. Elimination and grooming.
3. Hand laundering and infant care.
4. Often used as dressing room.

Planning Considerations:

A. Convenience

1. Planning bathroom for optimum convenience.
2. For privacy of bathroom functions by all members of the household.
3. Provide adequate provisions for storage of supplies and small equipment.
4. Consider ease of cleaning.

B. Arrangement

1. Convenient arrangement of facilities giving special attention to the spacing or clearances.
2. The room should be arranged to allow more than one person to use its facilities at the same time.

C. Illumination

1. Provide an adequate lighting.
2. Provide direct light to illuminate the face from all angles for grooming.
3. High window, clerestory type window or skylight is satisfactory at daytime.
4. Luminous ceiling is effective for interior bathroom.

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D. Ventilation

1. Good ventilation reduces humidity and dispel odor.
2. Exhaust fan in the wall or ceiling is recommended to supplement natural ventilation.

E. Sound Control

1. Noise is the common problem of bathroom but could be reduced by proper placement of bathroom in relation with other rooms or areas.
2. Use closets and storage walls to serve as sound barriers between the bathroom and other spaces or,
3. Use sound proof partitions and a tightly fitted doors.
4. Acoustical treatment of the ceiling reduces sound transmission to the walls.
5. If acoustic tiles are used, it should be moisture resistant and easily cleaned.

F. Auxiliary Heat – A heat lamp provide warmth atmosphere in the bathroom.

G. Materials – All surface materials should be moisture resistant.

H. Storage

1. Provide adequate storage for the current and reserved supplies.
2. A closet opening in the bathroom and hallway is convenient for bathroom linen and cleaning supplies.
3. Medicine cabinet should be large enough to accommodate the increasing number of toiletries and medicine.
4. Hamper space is necessary for soiled linen and clothes.

I. Mirror

Mirror in the bathroom gives an atmosphere of luxury and spaciousness. Full-length mirror is desirable.

Residential

J. Drying Facilities

1. Extra racks for drying women's hose and other light laundry.
2. Racks maybe concealed in a well ventilated cabinet provided with low wattage light bulb to facilitate drying
3. Provide adequate robe hook, bag hook, toothbrush holders for convenience.

H. Accessibility

1. If possible, bathroom should be accessible to each bedroom without requiring passage through another room.
2. Bathroom is desirable near principal indoor living, work and play areas, and guest room.

Bathroom Dimension

Bathroom space requirement is not only for the use of certain fixture, but also between fixtures for cleaning purposes, and for assisting another person like small child and adults.

The basic required spacing for each fixture is sometimes overlooked. To avoid overlapping of clearances between fixtures refer to Figure 1-39.

Bathroom Categories

Bathroom arrangements are classified into 4 categories.

1. The lavatory guest bath type.
2. The larger compartmental bath.
3. The conventional three fixtures bath.
4. The utility bath.

The Lavatory or Guest Bath is a two-fixture bath for guest in varying sizes from a minimum area of about 1.3 sq. meters.

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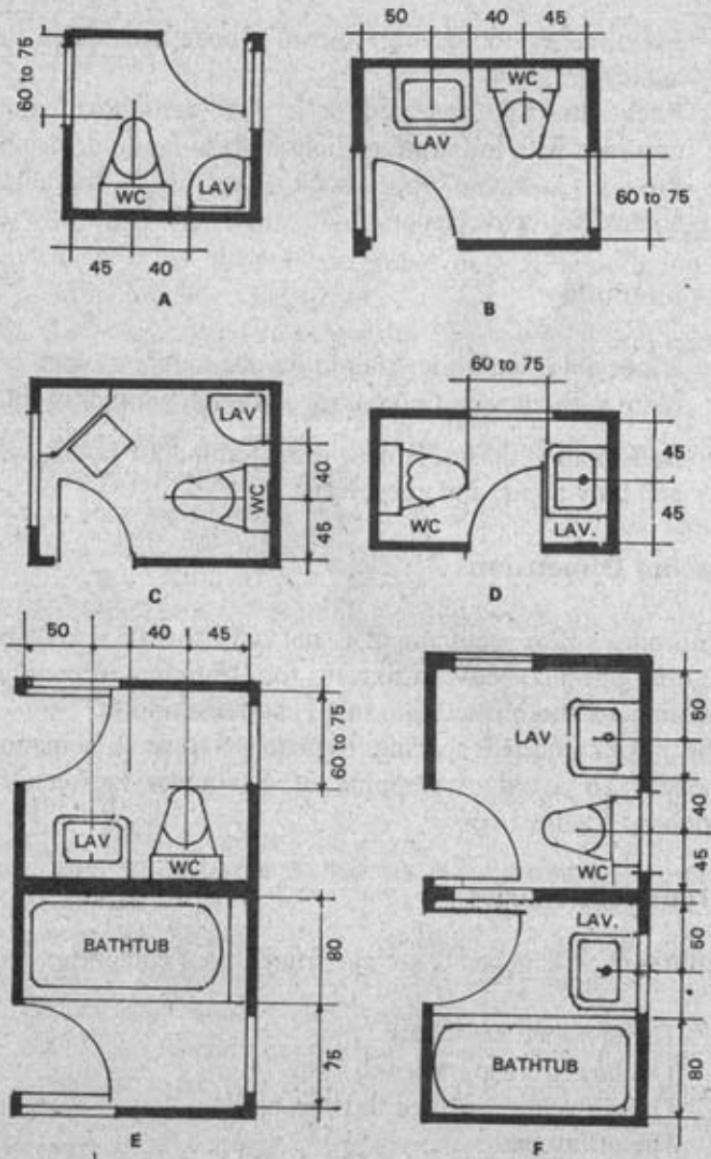


FIGURE 1-39 GUEST BATH OR TWO FIXTURE PLAN

Residential

Larger Compartment Bath. The plan separates the tub and shower from the toilet by partition with or without additional lavatory. This kind of arrangement provides greater privacy use of the toilet. Separate door with small entry is ideal.

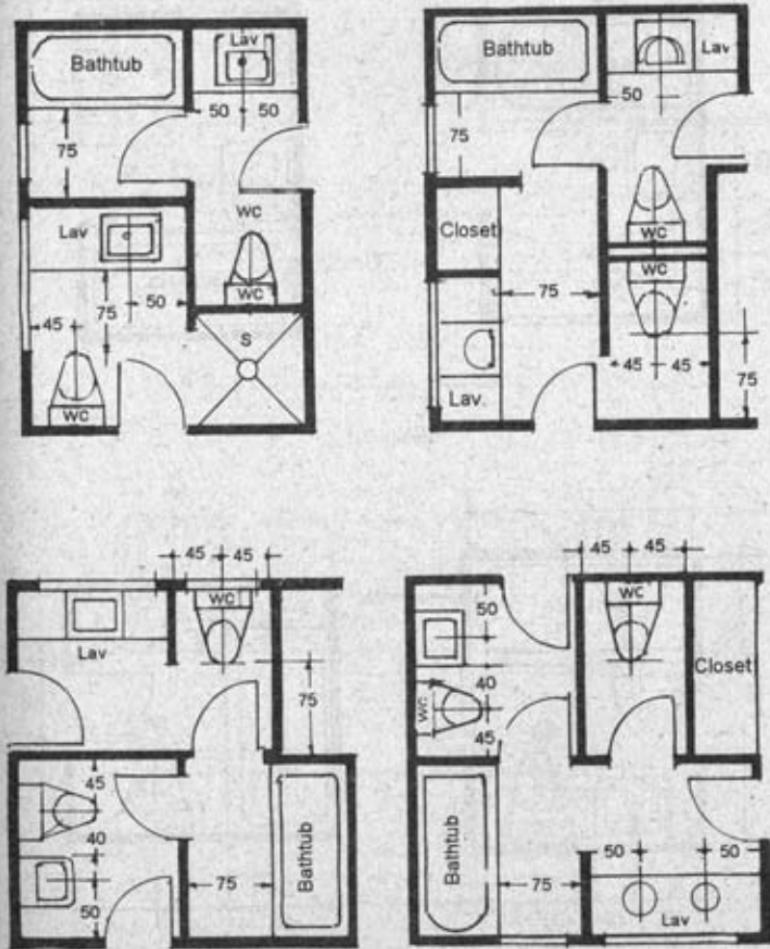


FIGURE 1-40 COMPARTMENTED TOILET PLAN

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The Conventional Three Fixture Bath has no separate compartment, designed for the use of one individual at a time. This type of bath with combination of tub shower has an average area of 3.7 square meters.

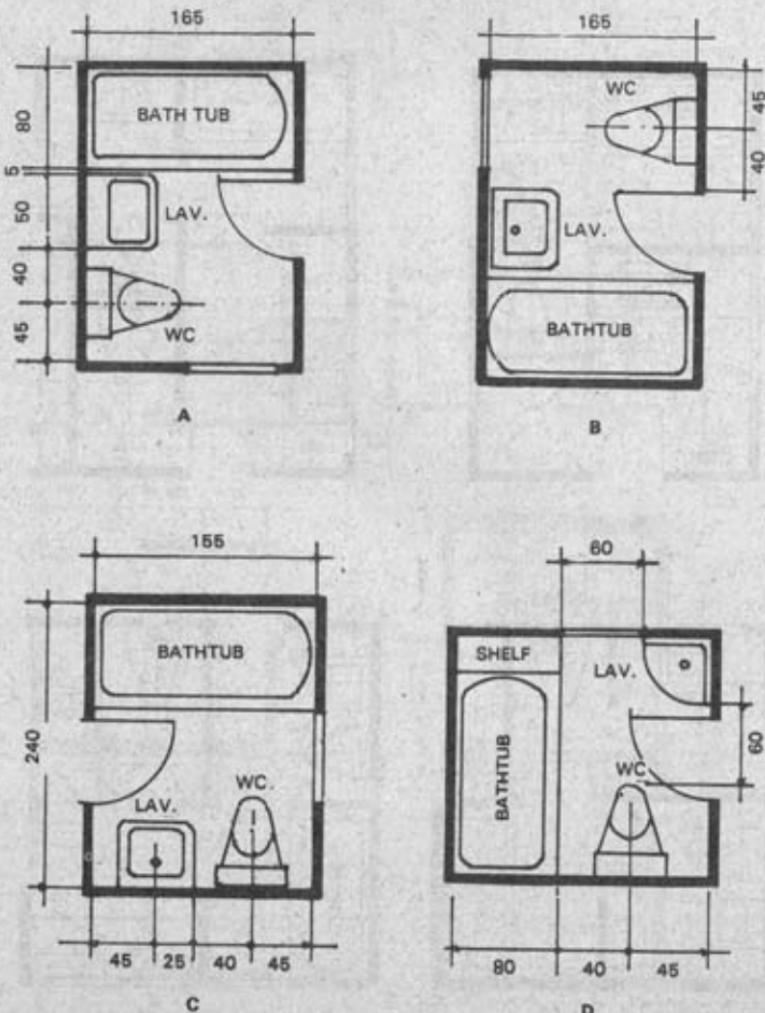
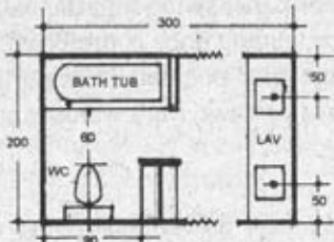
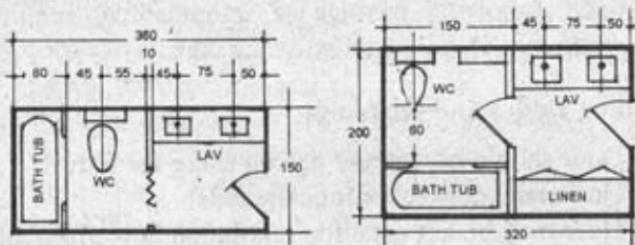


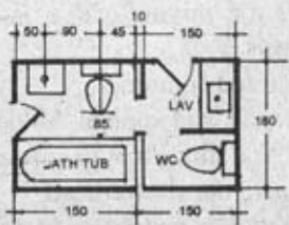
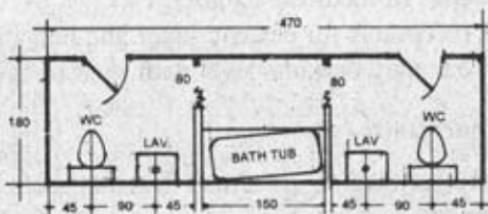
FIGURE 1- 41 THREE FIXTURE PLAN

Residential

The Utility Bath. This type provides an area much larger than the minimum size required for the three basic fixtures for laundering,



FOUR FIXTURES



FIVE FIXTURES

FIGURE 1-42 COMPARTMENTED BATHROOM

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Bathroom Doors and Windows

Bathroom door could be as small as 55 to 60 centimeters, except for utility bathroom that requires no less than 70 centimeters wide, to permit passage of equipment as required. In general, bathroom wall contain only one door.

Installing Doors and Openings

1. Door should not hit any person using the fixture.
2. Door must conceal or hide the toilet.
3. Door may be left open for ventilation in warm weather.
4. Normally, door panel swing into the bathroom.
5. To save space, sliding door is preferred.
6. Window shape and position is important for light and ventilation. For privacy, high window is recommended.

At Lavatory

1. Provide fixed mirror and cabinet above the lavatory.
2. A recessed shelf flush to the wall is preferable and maybe part of medicine cabinet.
3. Install receptacle for electric razor and hair dryer above.
4. Towel bar may be same level with shelf or lavatory top.

At Shower and Bath

1. The showerhead is governed by the users height and preference.
2. Shower valve or mixing valve installed near the entrance to shower.
3. Shower curtain rod- optional.
4. Combination soap and sponge, holder and grab bar. Use draining lip type that maybe installed at the rear or sidewall opposite the showerhead.
5. Shower ventilation is necessary to remove steam.
6. Towel bar not over the tub equipment with shower.
7. Vertical grab bar optional but recommended.
8. Install curtain rod within inside face of hub.

Residential

Other Planning Considerations:

1. Medicine cabinet should be proportional in size with the type of bathroom or toilet.
2. Every bathroom must have storage closet for cleaning utensils and supplies including reserve stocks of toilet paper, towels and sundries.
3. Provide floor space for portable accessories for occasion such as care of infants or invalids.
4. Towel bars should be sufficient in number and length to serve the needs of each occupant.
5. Provide a separate bar space for bath towel, face towel and face clothe.
6. Dressing bathroom may include completely fitted wardrobe.
7. Minimum size bathroom and toilet need adequate wall space for essential accessories.

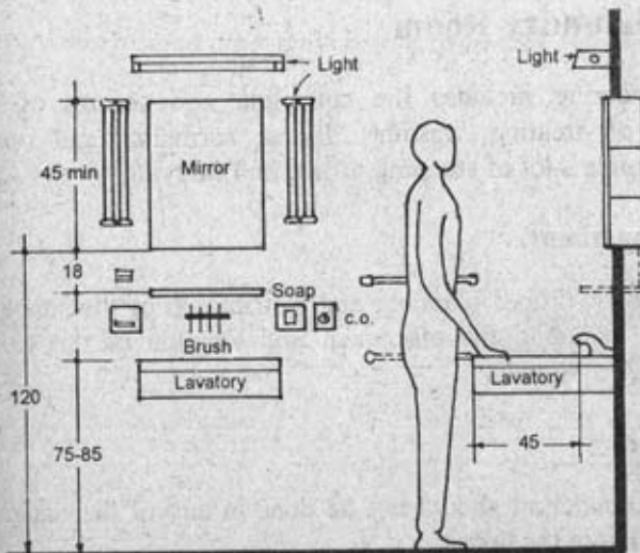


FIGURE 1-43 DIMENSIONS AT LAVATORY

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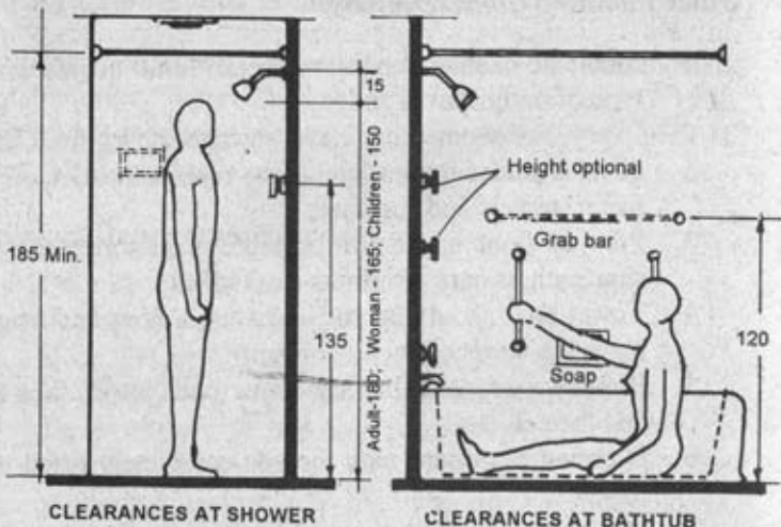


FIGURE 1-44 CLEARANCE AT SHOWER AND BATH

1-11 Laundry Room

Laundering includes the collection and sorting of dirty clothes, pre-treating, washing, drying, sprinkling and ironing. This requires a lot of stooping, lifting and carrying.

Arrangement.

Calls for proper planning and distribution of the space and facilities including the placement and location of the various laundering equipment

Traffic

1. Laundering should not be done in any of the congested area of the house.
2. Passageway should be at least 1.20 meters wide.
3. If the laundry area adjoins the kitchen, a barrier of any type such as counter between the two is necessary.

Residential

Equipment and Facilities

The laundry center must be accessible to both working area of the house and outdoor drying area provided with:

1. Sorting table.
2. Heating surface and storage facilities for soiled clothes.
3. Washing supplies and basket.
4. Washing machine and dryer.
5. Ironing board.
6. Laundry tray with 30 centimeters deep for pre-washing soaking or stretching some items.

Work Flow

1. Sorting and pre-heating table or counter.
2. Washing machine.
3. Laundry tray.
4. Dryer.
5. Ironing board adjustable height from 60 to 90 cm.
6. Standing or hanging bar.
7. Counter for ironed items.

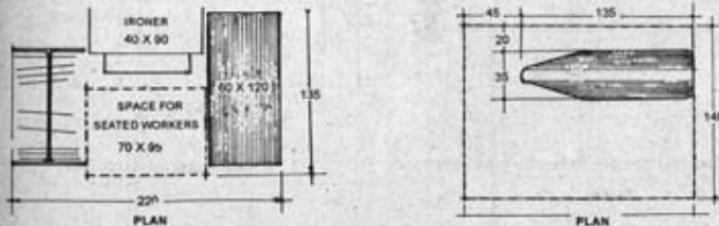


FIGURE 1-45 SPACE REQUIREMENTS FOR IRONING

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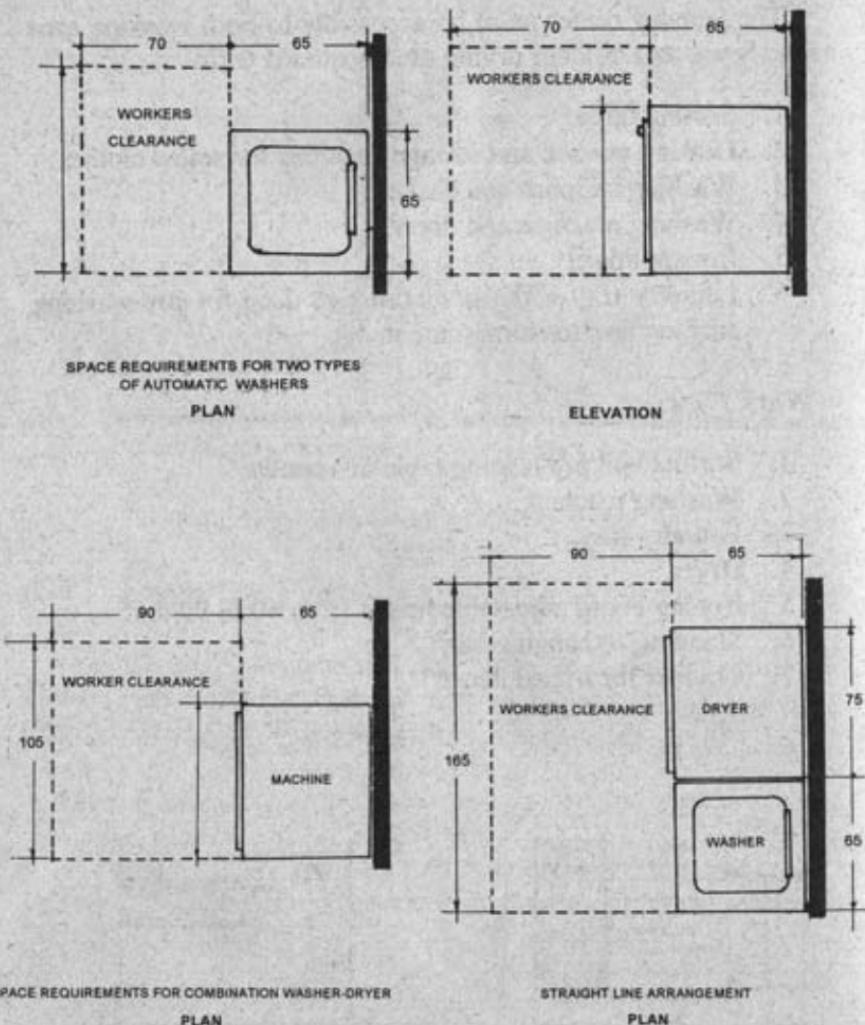
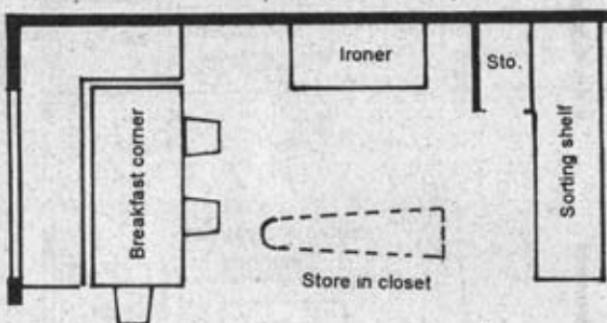
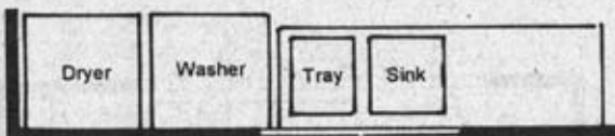


FIGURE 1-46 SPACE REQUIREMENTS FOR COMBINATION WASHER-DRYER

Residential



LAUNDRY



LAUNDRY - BREAKFAST Room

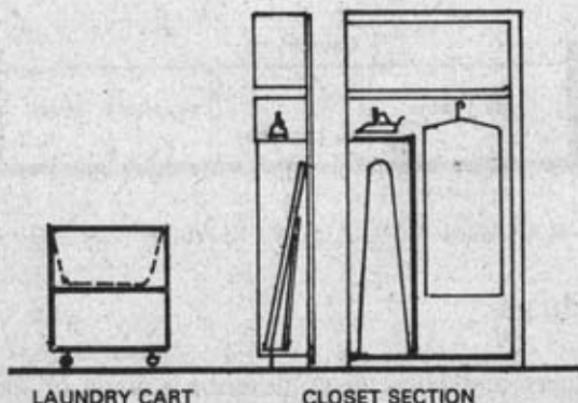


FIGURE 1-47 LAUNDRY AND ACCESSORIES

Planning and Designers Handbook

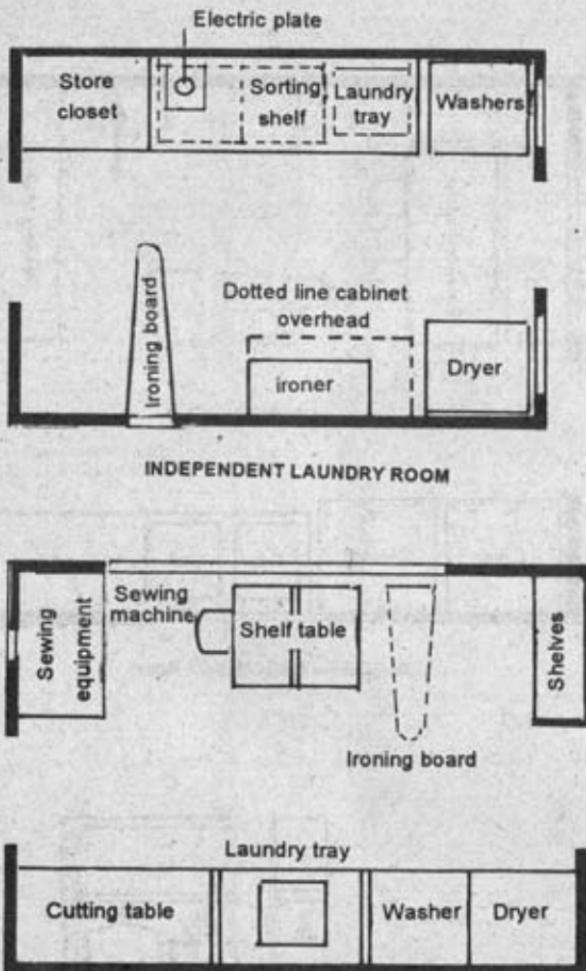


FIGURE 1-48 COMBINATION LAUNDRY SEWING ROOM WITH STORAGE

1-12 Closet

Designers and housewives describe storage or closet as a place for anything and everything in its place. A modern closet is designed for the storage of particular clothing or things of an individual or a group using the space.

Residential

Modern closets accommodate much more clothing and materials if efficiently arranged. It replaces piece of furniture providing a greater amount of free uncluttered space in the room. Much could be stored in a small space if properly planned but many closets usually have unused and unusable space due to poor planning. An allowance of about 25% capacity is incorporated for the additional belongings. The saying goes that "*It is better to have too much space than not enough*"

Design Criteria for a Good Closet

1. Convenience as to:
 - a. Accessibility
 - b. Visibility
 - c. Orderliness
 - d. Maximum use of space
2. Preservation as to:
 - a. Pressed condition
 - b. Freshness (ventilation)
 - c. Absence of Moth
 - d. Free of Dust
 - e. Against Pilfering

Clothes Closet for bedroom or dressing room has standard economical depth of 60 centimeters. If hook strip is to be used, the depth is increased by 75 centimeters.

The Basic Elements of Closet Storage are:

1. Shelves
2. Drawers
3. Poles
4. Hooks
5. Special features

Shelves. Utilized for storage of bulky shape, folded articles, books and magazines. A 25 to 30 cm. depth shelf is adequate. For linen article, 30 to 40 cm. is acceptable.

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Drawer is a popular closet for accommodating articles with minimum space but provides maximum convenience. It is dust free, neat in appearance even when carelessly used.

Poles. Hanging pole length could accommodate a hanger at 7 centimeters per men suit, and 5 centimeters per hanger of women's clothing. The height of pole above the floor average at 150 centimeters could be adjusted to individual needs. Clearance between poles and shelf above should be 7 centimeters.

Hook. A variety of size and shape is available to the users choice. Special features include shoes and bag racks.

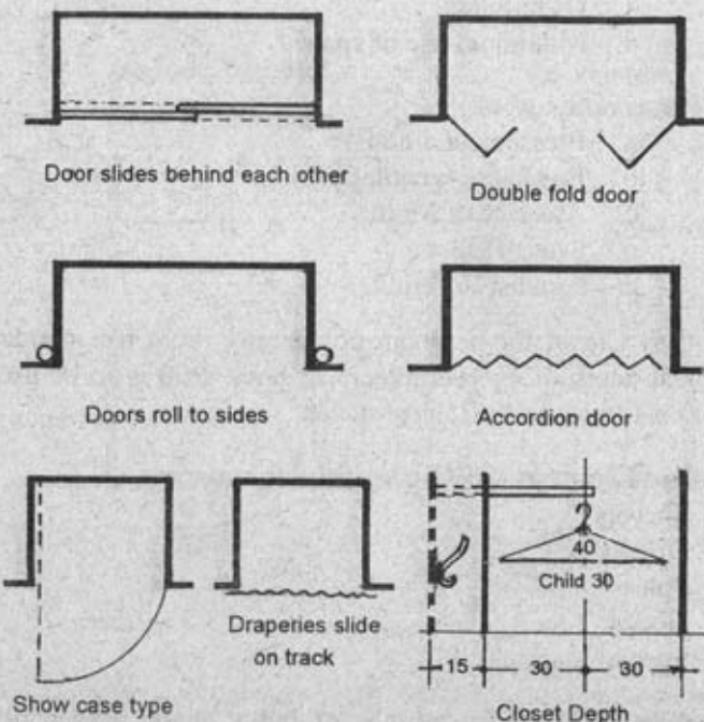


FIGURE 1-49 CLOSET CLOSING METHOD

Residential

Other Planning Considerations:

1. Whenever possible, closet doors should be opened to the full width of the closet.
2. The hinged type is the most efficient and economical.
3. Two doors for a 150 cm. closet eliminate dark, inaccessible corners which are difficult to clean.
4. Hook, racks and accessories at the back of the swinging door increases efficiency rather than occupying space in the closet.
5. Sliding door exposes the entire interior of the closet making it more accessible. Sliding door closet do not offer the use of tie racks, shoe racks, bag hangers or mirror which are handy when attached to a hinged closet doors.
6. Walk-in closet may be desirable for a maximum wall space for furniture.

Closets are Classified into Two

1. The active closet
2. The inactive closet

Different Types of Closet

1. Clothes closet
2. Coat closet
3. Cleaning equipment closet
4. Bedroom linen and bedding closet
5. Central storage
6. Miscellaneous storage
7. Outdoor storage

Clothes Closet. For bedroom and dressing room having a standard depth of 60 cm. If hook strip is included, the depth is increased to 75 centimeters.

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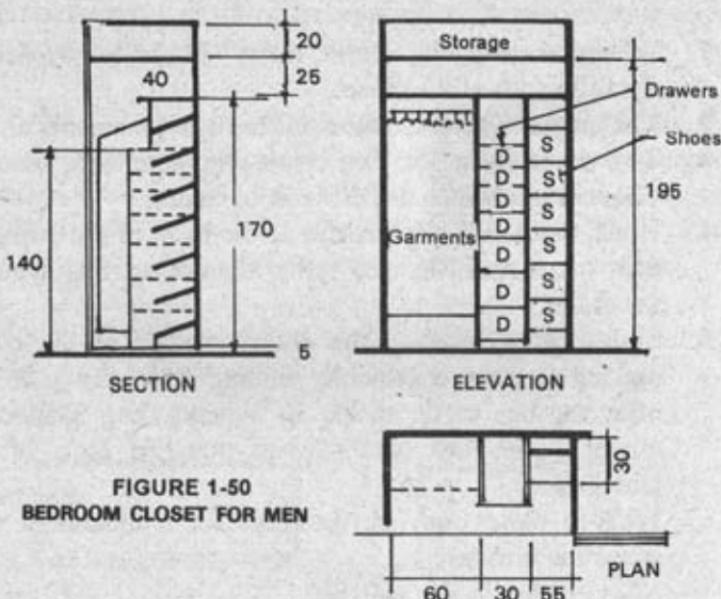


FIGURE 1-50
BEDROOM CLOSET FOR MEN

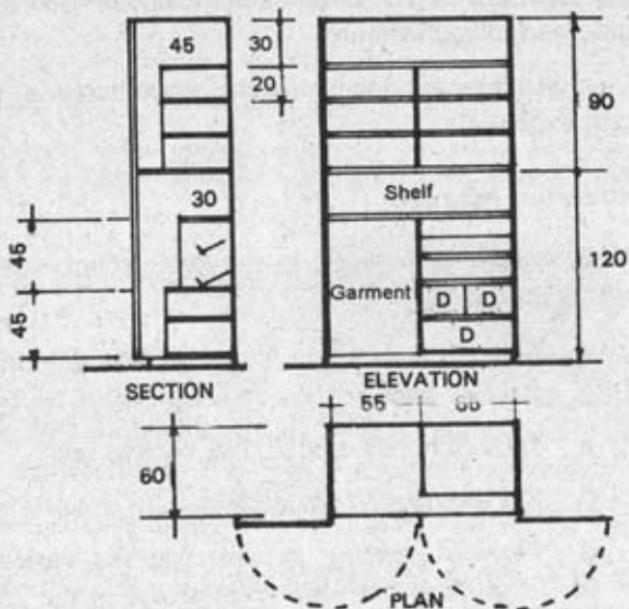
FIGURE 1-50 BEDROOM CLOSET FOR MEN

Coat Closet is usually located near the entrance door with a total depth of 80 to 85 centimeters.

Cleaning Equipment Closet is a larger type of closet to accommodate any type of cleaning equipment such as vacuum cleaner, floor polisher etc.

Bedroom Linen and Bedding Closet has a minimum interior dimension of 40 cm. wide and 35 cm. deep to a maximum of 60 centimeters. The shelves are spaced at approximately 30 cm. on center vertically. The highest shelf is 180 cm. above the floor. The minimum total shelf area for one and two bedroom house is **one square meter**. For three and four bedroom house, 1.2 sq. m. but drawers may replace one half of the shelves.

Residential



BEDROOM CLOSET FOR MEN

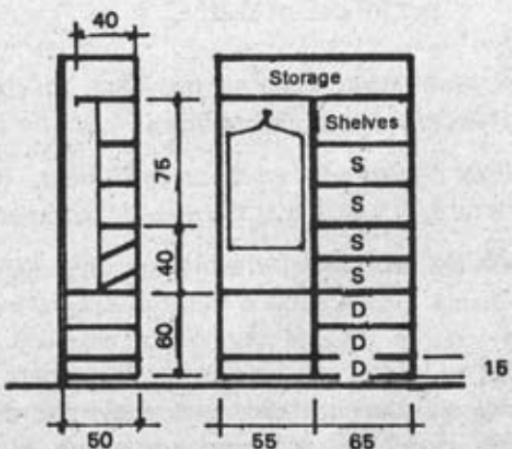


FIGURE 1-51 BEDROOM CLOSET

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Central Storage is for bulky items seldom used such as boxes, trunks and extra furniture.

Outdoor Storage for loan mowers, wheelbarrows, garden tools and equipment etc.

Miscellaneous Storage

1. *Book storage* is required in the living room, study and each bedroom.
 - a. 85% of books can fit on shelves 20 cm. deep front to back.
 - b. 10% of books need 25 cm. shelves and
 - c. 5% requires 30 cm. shelves.
 - d. *Vertical spacing* between shelves varies from 20-40 cm. with the greatest use in the 25 x 30 cm. range.
 - e. *Horizontal books* average from 7 to 8 volumes per 30 cm. of shelf.
2. *Toy and Game storage* provided on children's room and where it is regularly played.
3. *Sports Equipment* such as golf bags, basketball etc. preferably located near the outside entrance.
4. *Tools* are stored in the workshop that every house must have.

Lighting. Lighting is a necessity in modern closet. Light with diffusing reflector installed just above the door inside the front of the closet is sufficient, although automatic door switches are more convenient and preferable.

HOME FOR THE ELDERS

2-1 The Site and Neighborhood

Elderly people generally classified themselves as Senior Citizens. At their age, they do not want to break the ties with their family and neighborhood. They do not like to live in a new foreign environment. They need activities not merely hobbies, and they want to participate in the community functions.

The program and physical facilities for the housing should encourage and support the continuance of early pattern of living, daily routine, personal care habits and social contacts. One important objective is to maintain independent living under the following conditions:

1. The site and the neighborhood must be basically residential, provided with the normal range of community facilities such as:
 - a. Convenient public transportation.
 - b. Must be away from objectionable land uses.
 - c. Old established neighborhood where most of the aged are likely to live and to have their root.
2. The site is not bounded on all sides by major traffic arteries. No major street will be crossed in shopping or going to the park.
3. The site should be accessible to essential facilities like supermarket, laundries, drug stores, churches, libraries,

Planning and Designers Handbook

health center, and recreational facilities. The maximum walking radius is about 700 to 800 meters to many aged persons.

4. The site should not be adjacent to school building children's playground or active recreational areas.
5. Availability of public transportation

2-2 Planning and Design Principles

The principles in planning the home for the elders are:

1. The aged accommodations are small in size and compact for economy and convenience.
2. Should be fireproof construction for safety.
3. Minimize the problems and efforts of housekeeping and daily activities.
4. Should be pleasant, livability with spacious effect.
5. Should have a high degree of privacy.
6. Not to have an institutional look or appearance.

Leisure Areas

Planning Considerations:

1. The elderly are retired people. Thus, a comfortable and pleasant living area is very important. The approved standard size for single person occupancy is 7.5 to 8.5 square meters.
2. Privacy from the front door is necessary.
3. If dining area is included as part of the living area, it should allow location of the table by the window. A convenient outlet and or light should be readily accessible to the table

Sleeping Areas

Planning Considerations:

Home for the Elders

1. A separate bedroom is for two persons occupancy, but a combined living-sleeping arrangement is satisfactory for a single person.
2. Separate bedroom should be large enough to accommodate twin beds. It is advisable to divide the room into two with screen.
3. A combined living-sleeping arrangement is the most economical in space but having a disadvantage in lack of privacy.
4. The size of the bedroom should be about 3.00 meters wide and 3.40 meters long. This will give space for two twin beds each 1.00 meter wide with 55 cm. space between the beds.

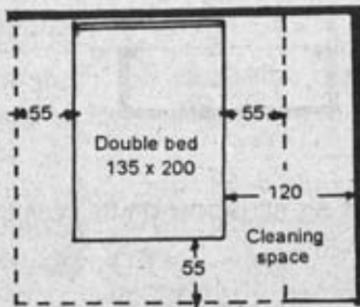


FIGURE 2-1 SLEEPING AREAS CLEARANCES

5. For two persons occupancy, if more space is available, 90 cm. is recommended as clear distance between beds although some agencies recommend an allowance of 150 cm. at one side of the bed for a wheelchair.
6. If possible, provide space for an oversize bedside table to place medicine, water, tissues and the like.
7. The bedroom plan should allow a bedridden person to see out the window from his bed.

Planning and Designers Handbook

8. Provide a bell or buzzer near the bed to be used for calling assistance.
9. Provide convenient outlet near the bed hooked up with a switch at the door or entrance to the space. Bed lamp is recommended to serve as light at night.
10. Bedroom should have direct access to bathroom.

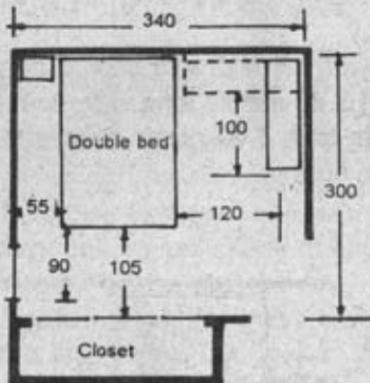


FIGURE 2-2 BEDROOM SPACE CLEARANCES

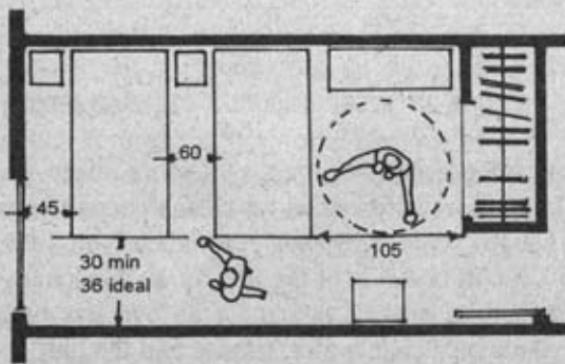


FIGURE 2-3 TYPICAL STANDARD BEDROOM WITH TWIN BED

Home for the Elders

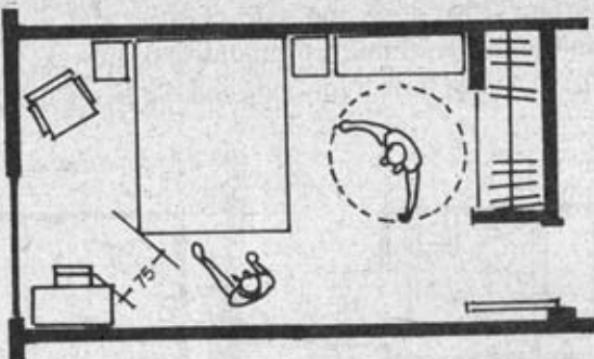


FIGURE 2-4 TYPICAL BEDROOM WITH DOUBLE BED

Bathroom for the Elders

Planning Considerations:

1. Bathroom for the elders should be planned for safety. The room must be large enough to permit one person to assist another.
2. For a person in wheelchair, the bathroom must be large enough to allow maneuver of the chair. The door must be 90 centimeters wide.
3. If possible, one should go to the bathroom without going around furniture or through other room.
4. A minimum area of 3.25 to 3.70 square meters is acceptable. If wheelchair is anticipated, the area should be 4.60 to 5.50 square meters.
5. Bathroom without window is preferred. Ventilation for the elders must be easily controlled by switch.
6. Install lavatory at 80 cm. high from the floor. It is more comfortable than the customary 75 cm. height.
7. For person in a wheelchair, the 75 cm. high lavatory is ideal.
8. Lavatory must be well supported to hold a person's weight.

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Design the shower stalls without curbs using a sliding door or other firm and safe closure, and a seat either built-in or removable for bathtub and shower.

The tub must have a low side and flat non-slip bottom.

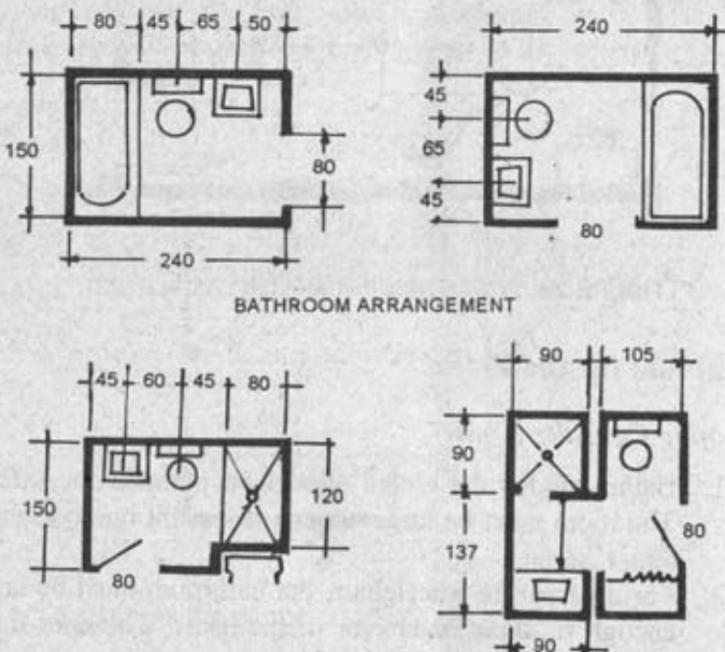


FIGURE 2-5 BATHROOM WITH SHOWER

11. The toilet should be installed next to the tub (if a tub is used) to serve as a seat when filling the tub or simply for resting.
12. Toilet and tub should be provided with grab bar. Grab bars and holds should be non-corrosive materials having a diameter of 20 to 25 mm. mounted to withstand a pull of at least 200 kilograms.
13. Towel racks and rods should be strong and securely mounted. Older people sometimes used them as grab bar to steady themselves. Glass towel rods should not be installed.

Home for the Elders

14. Medicine cabinets should be extra large, preferably recessed type. Projecting accessories must be avoided.
15. Doors could be unlocked from the outside in case of emergency.

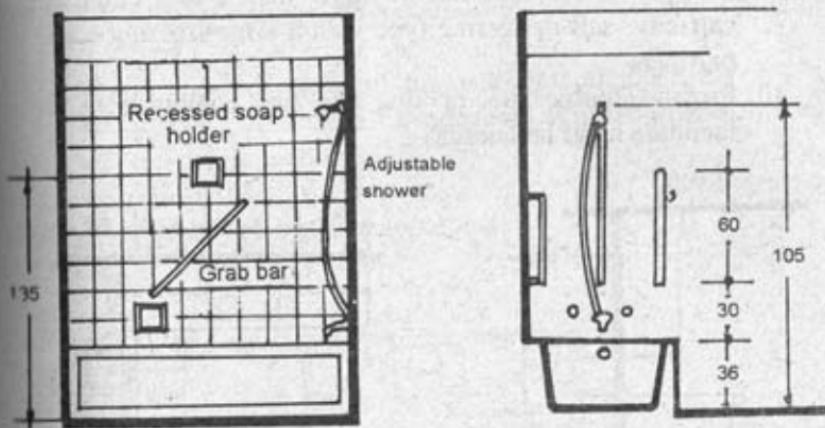


FIGURE 2-6 BATH AND SHOWER

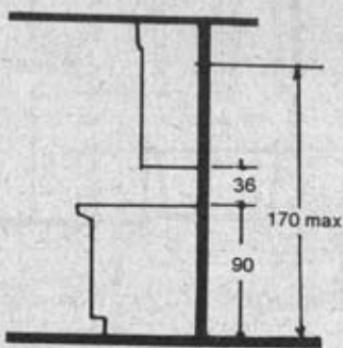
Kitchen for the Elders

Planning Considerations:

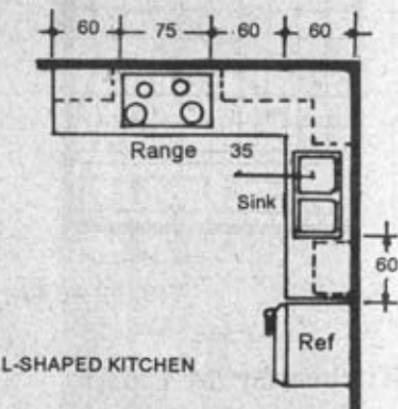
1. Provide the kitchen with easy access to the outside and a direct access to the dining - living area.
2. Do not plan an extremely compact kitchen for older people. Elders also desire an ample working space.
3. If the kitchen is too compact, storage space is limited. It is either too high or too low to be reached comfortably.
4. Shelves must not be higher than 170 cm. from the floor and not lower than 30 centimeters.
5. Too small counter top create crowded work surface and hazardous working conditions.
6. Clearance between facing equipment and counters should not be less than 90 cm. for one person.

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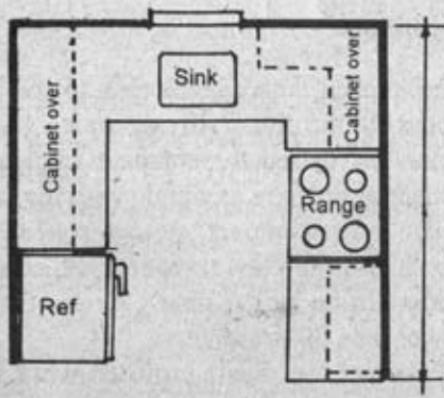
7. To allow two people to work and pass each other, the clearance between counters should be 135 centimeters.
8. Ranges should be front-controlled. Heating elements should visibly glow when hot. A wall oven should be set at waist height.
9. Refrigerators should not be larger than 6 to 7 cubic ft. capacity, self-defrosting type with a large freezing compartment.
10. Provide double sink or sink and tray combinations to facilitate hand laundering.



CABINET ELEVATION



L-SHAPED KITCHEN

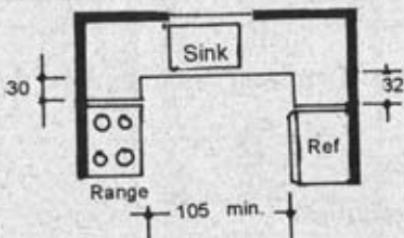


U-SHAPED KITCHEN

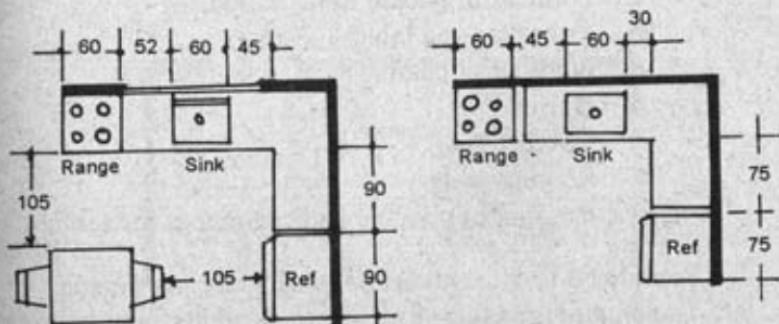
FIGURE 2-7 TYPES OF KITCHEN

Home for the Elders

11. Provide drying racks if full laundry facilities are not possible.
12. Stored items should be visible and physically accessible. Storage over the ranges and refrigerators should be avoided.
13. Sliding cabinet doors are preferred than the swinging type.
14. Provide adequate lighting over all work surfaces.
15. Install exhaust fan for adequate ventilation and to spell out cooking odors.
16. Select floor finishes or floor covering which are not slippery and grease absorbent.



MINIMUM FRONTEAGE AND EDGE DISTANCES ONE BEDROOM



MINIMUM FRONTEAGE AND EDGE DISTANCES TWO BEDROOM

FIGURE 2-8 KITCHEN CLEARANCES

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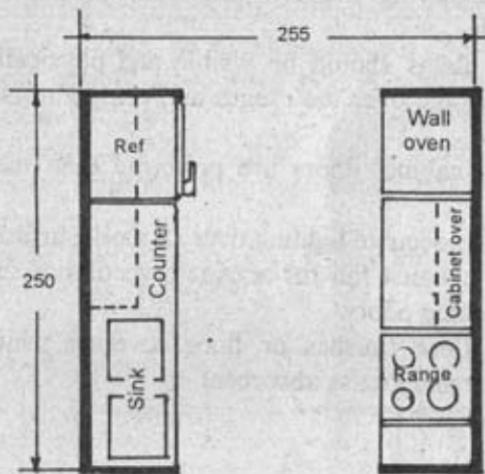


FIGURE 2-9 KITCHEN PARALLEL WITH WALL

Dining Areas

Planning Considerations:

1. The area of dining space is determined by :
 - a. Number of people to be served.
 - b. Furniture and tables
 - c. Number of chairs
 - d. Buffet
 - e. Cabinet
 - f. Serving table
 - g. Amount of passage and clearances for serving.
2. Provide 50 to 60 centimeters table space per person.
3. The minimum table size where 8 adults can sit comfortably 3 on each side and one at each end is 100 x 180 centimeters.
4. The minimum size for 6 adults with 2 persons on each side and one at each end is 90 x 150 centimeters.

Home for the Elders

5. A round table for 4 persons is 105 centimeters minimum diameter and 120 cm. for 6 persons.
6. Regardless of size and shape of dining table, the minimum clearance around it is 90 cm. between the wall or a piece of furniture and the table in order to edge past a seated person.
7. Serving requires 110 centimeters clearance from the table to the wall. 80 centimeters space is required when rising from a chair at the table.

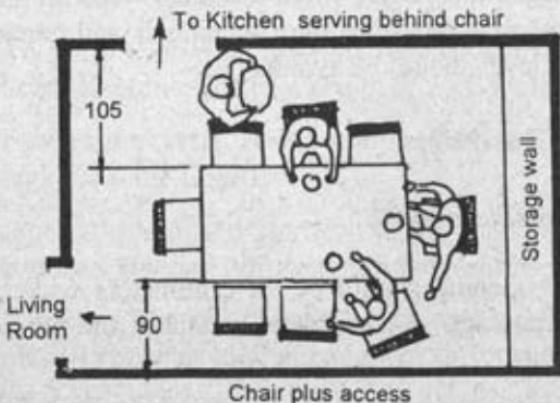
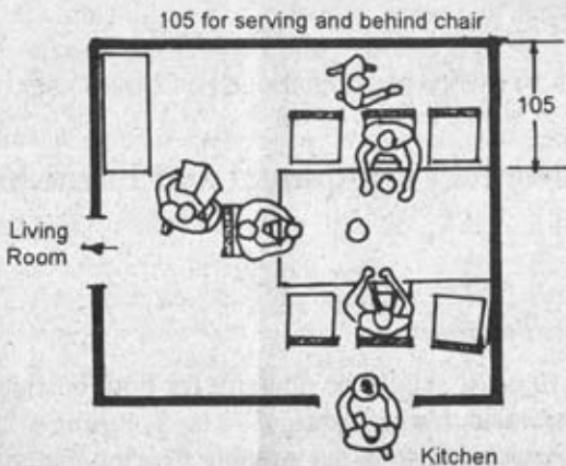


FIGURE 2-10 DINING ROOM SPACE CLEARANCES

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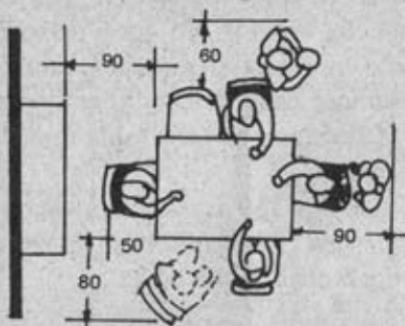


FIGURE 2-11 MINIMUM CLEARANCES FOR DINING AREA

2-3 Construction, Equipment and Furnishing

Flooring

Planning Considerations:

1. Floor finished should be non-slip for both outside or inside the basic dwelling unit.
2. For wheelchair users, the suitable flooring materials are unglazed tiles, cork, vinyl, unwaxed wood and the like.
3. As much as possible, door thresholds and minor steps in floor level should be avoided.

Doors and Hardware

Planning Considerations:

1. Door opening should be 90 centimeters wide to permit easy passage of wheelchair, stretcher and persons using crutches.
2. Door shutter should be properly installed and free from sticking, Threshold should be eliminated.

Home for the Elders

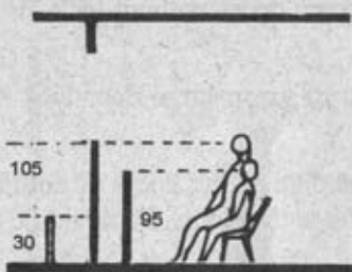
3. Install bathroom doors without lock, or use easy latches instead.
4. Use an easy to grasp large door lock or the lever type handle.
5. Revolving, double acting doors or automatic door closer are dangerous to the elders. It should be avoided.
6. Outside door should be master keyed. All devices that cannot be operated from outside should not be used.
7. Sliding door is the best, because it conserves valuable spaces. Provide peephole or vision panel.

Windows

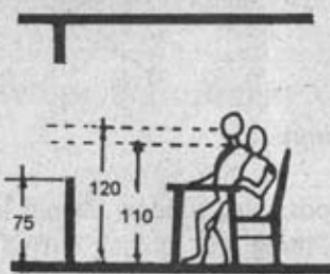
Planning Considerations:

1. As much as possible, window should look out on interesting view. Sitting and looking out of the window is a daily activity for most of the elderly.
2. The living room window should be as low as 30 centimeters, and not higher than 80 centimeters from the floor line.
3. To permit viewing from standing position, the window head should extend to a height of 2.00 meters.
4. For dining area, windowsill could be 75 centimeters high from the floor level.
5. For bathroom and kitchen, window opening should be between 100 and 200 centimeters from the floor level.
6. Bedroom window should be lower enough to permit a person in bed to look outside.
7. Choose window type and design that are easily operated and maintained.

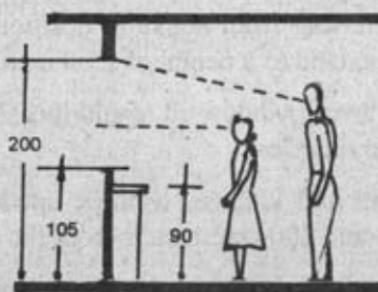
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EYE LEVEL ZONE FOR LIVING ROOM



EYE LEVEL ZONE FOR DINING ROOM



EYE LEVEL ZONE FOR KITCHEN AND BATHROOM

FIGURE 2-12 EYE LEVEL ZONE

Home for the Elders

Lighting

Planning Considerations:

1. Illumination level should be double that of the residential lighting.
2. Ceiling mounted fixture is not advisable. Cleaning of fixture and changing bulbs are dangerous to the elders.
3. Lights can always be switched on from the doorway and wall switches controls light fixtures.
4. Switch outlets are important in bedroom or sleeping alcove to avoid stumbling around in the dark when looking for the switch.
5. Convenient outlets should not be less than 40 centimeters above the floor.
6. Entrance should be well lighted so that steps can be clearly identified.

Vertical Movement

Planning Consideration:

1. As much as possible, the home for the aged should be one level floor unless otherwise provided by elevator.
2. On low buildings, the elders should not climb a stair more than one flight. Likewise, ramp should not be more than 5% slope.
3. Where stairs are to be used, the following precautions must be observed.
 - a. Step Riser should not be more than 17 centimeters high.
 - b. Fewer than two risers are not advisable.
 - c. Avoid the use of stair winders or curve.
 - d. Use non-slip nosing of contrasting colors.
 - e. Provide continuous handrails on both sides of the stairs.

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- f. Handrail cross section should be sturdy and easily grasped.
- g. Stairs should not be less than 100 centimeters width.
- h. Doors should not open directly on the stairs.
- i. Traffic should not cross the top or bottom of the stairs.
- j. Stairs should be well lighted with shielded sources.

**In the presence of elevator, the following precautions
must be observed**

- 1. Self-operated elevator should be equipped with automatic doors.
- 2. Provide signaling devices for call of assistance.
- 3. Provide a continuous handrail for large elevator and a small bench.

HOME FOR THE DISABLED

3-1 Access and Ramps

Planning Considerations:

1. Building entrance should be approached by paved walks non-skid surface, sloped for drainage not to exceed 5%. Steps for disabled should be avoided.
2. Landing platform in building entrance door should be flat with mild slope for drainage requirements.
3. Platform minimum width should not be less than 30 centimeters beyond the door jamb.
4. The platform minimum depth should be 90 centimeters, if the door swing-in, and 150 cm. if door swings out, but should not be less than 90 cm. beyond the edge of the fully open door.
5. Ramp slope should not exceed 5% fire proof, and non-slip.
6. If two ramps are required, it should not exceed 6 meters long, separated by a level platform not less than 165 centimeters long to provide rest space.
7. The recommended width for one-way ramp is 90 cm. between handrails, and 180 cm. for two-way circulations.
8. Handrails and anchor should be capable of supporting 110 kilograms for 5 minutes, and extended at least 30 to 60 cm. beyond the beginning and end of the ramp to assist person with poor vision, and should be returned to a wall or an upright post for safety.
9. Handrail for children should not be less than 60 centimeters high.

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10. The minimum width of a parking bay is 330 centimeters although 360 centimeters is ideal.
11. A pipe rail between the sidewalk and parked cars should be installed for protection from people with poor sight.
12. Provide 90 centimeters clear minimum passage width for multi-family dwellings. For individual dwellings, provide 85 centimeters minimum width.
13. Revolving doors must be avoided. Hinged door to dwellings are the safest and economical.

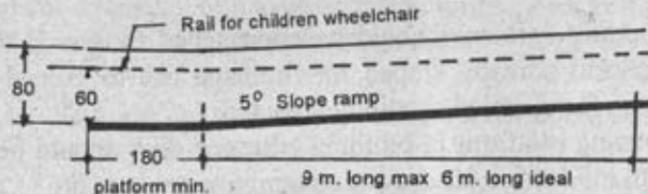


FIGURE 3-1 MINIMUM RAMP DISTANCE AND SLOPE

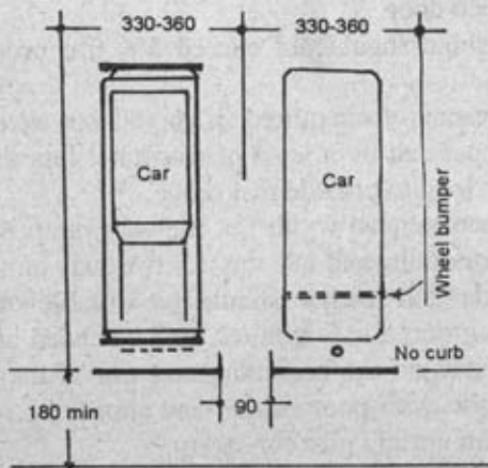


FIGURE 3-2 PARKING AREA

Home for the Disabled

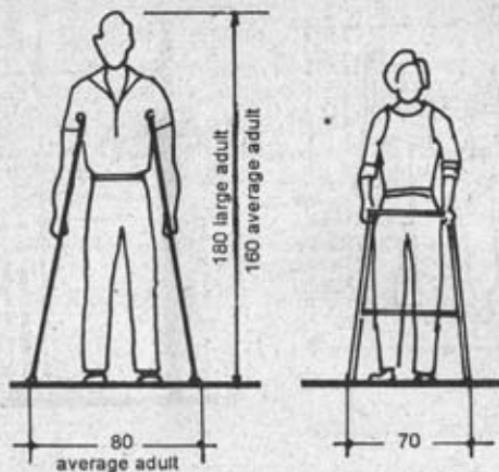


FIGURE 3-3 AVERAGE CLEARANCES

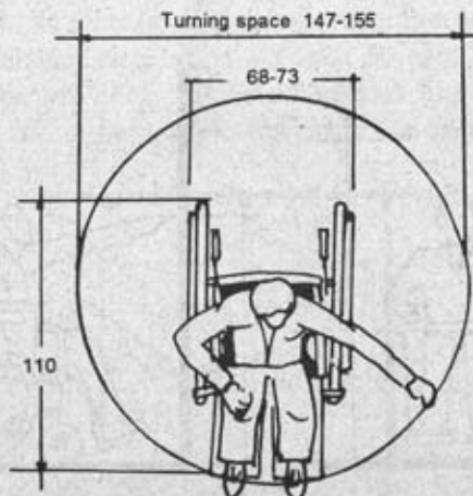


FIGURE 3-4 WHEELCHAIR DIMENSION

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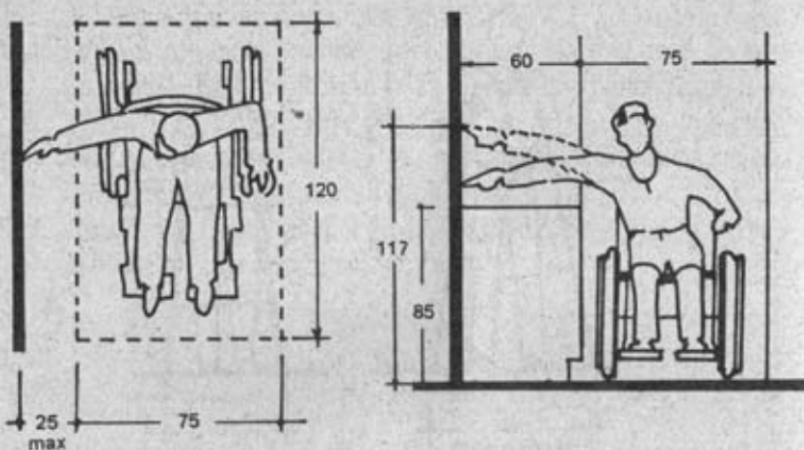


FIGURE 3-5 HORIZONTAL REACH

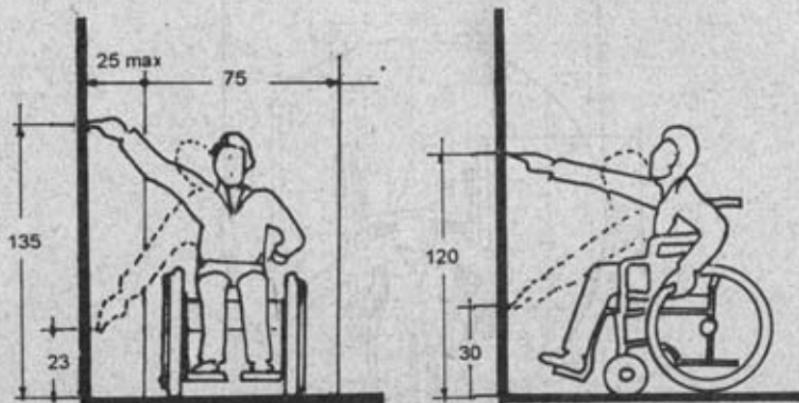


FIGURE 3-6 VERTICAL REACH

Home for the Disabled

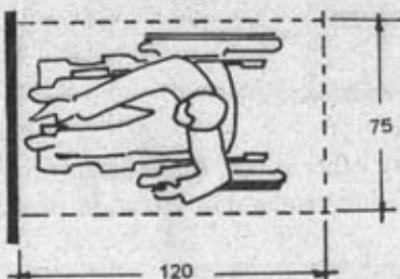


FIGURE 3-7 SPACE CLEARANCE

3-2 The Bedroom

Planning Considerations:

1. Sleeping-living room combination is not recommended.
2. Room layout suggests the bed placed in a corner, or the side of bed against the wall.
3. At least one bedroom is planned for twin beds to accommodate two or more persons.
4. Bedroom for impaired person requires more floor area for the wheelchair circulation. At least 90 or 100 centimeters should be provided for the wheelchair along one side of one bed and in front of clothes closet and furniture.

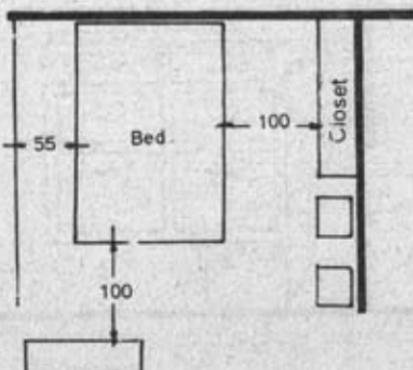


FIGURE 3-8 BEDROOM CLEARANCES

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3-3 The Kitchen

Planning Considerations:

More than any other room, the kitchen for the disabled persons, requires more considerable attention in planning, enumerated as follows:

1. Provide a minimum width of 150 centimeters for the wheelchair turns between counters on opposite walls, or between counter and opposite wall.
2. Counter top working height should be 85 centimeters above the floor.
3. Provide 15 centimeters deep recessed space for toe, by 22 centimeters high to allow wheelchair user get closer to the counter allowing maneuverability.

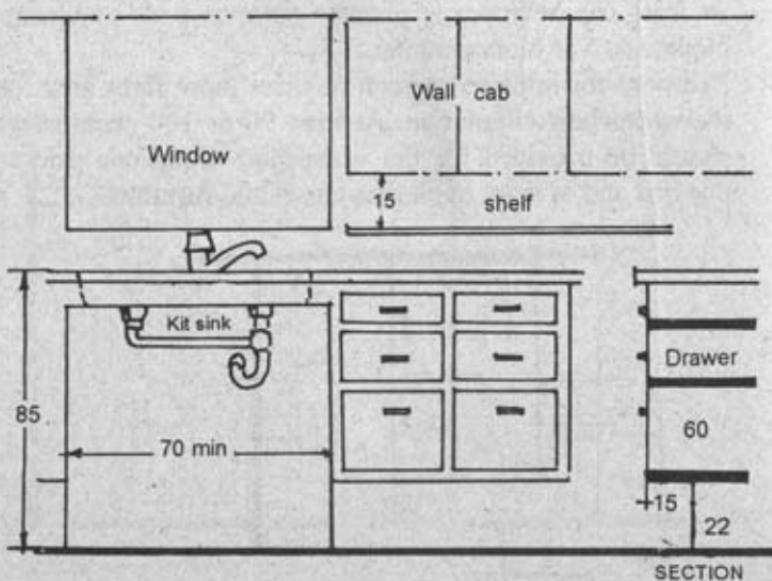
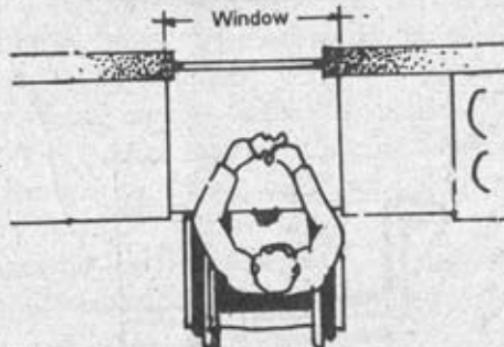


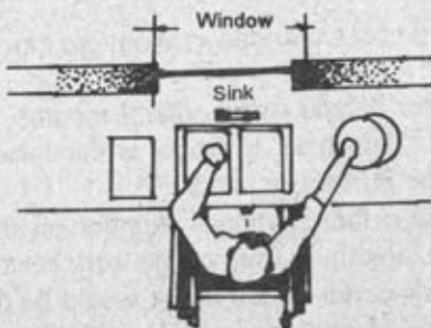
FIGURE 3-9 KITCHEN SINK AND BASE CABINET

Home for the Disabled

4. Provide open space under the sink with minimum width of 70 centimeters.
5. Avoid the use of hinged doors, fixed or adjustable shelves on base cabinet storage.
6. For one or two persons dwellings, provide 10 centimeters deep kitchen sink single compartment, and a double compartment sink for larger dwellings.
7. Drain should be at the rear of the sink, to provide clearance for the knees, and clearance under the sink, for standard wheelchair arms 74 centimeters above the floor.



KNEE RECESS WORK AREA



DISPOSAL SINK

FIGURE 3-10 CLEARANCES AT THE WORK AREA

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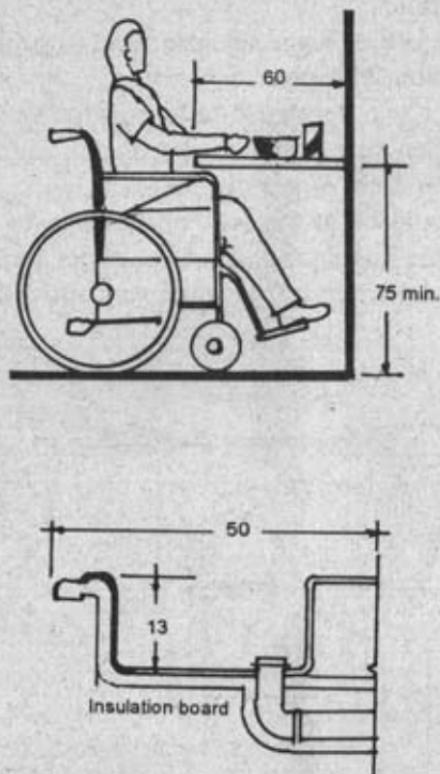


FIGURE 3-11 CLEARANCES AT WORKING CENTER

8. A single lever handle water control mixing-faucet should be installed. This type of faucet is the easiest to operate for those with infirmities hand.
9. Locate storage for additional supplies on the counter or wall cabinet directly in front of the work center.
10. Another work center arrangement would be the right hand pedestal 40 to 45 centimeters wide with drawers.
11. Provide lapboard pullout shelf beneath the counter at the work center to provide working surface for mixing and cutting operations.

Home for the Disabled

12. A wall storage cabinet mounted 30 centimeters above the counter is convenient and accessible from a sitting position.
13. Take note of the following average female reach.
 - a. From floor to wrist is 153 cm.
 - b. When standing 175 cm.
 - c. Height when sitting on wheelchair ... 140 cm.
 - d. Sidewise reach sitting on wheelchair. 132 cm.
14. The standard wall cabinet is 30 cm. deep and 75 to 85 cm. high with 3 adjustable shelves.
15. Install 8 cm. adjustable shelves at the work counter inside the cabinet doors. This will serve as convenient storage for numerous small items.
16. Never install cabinet above the counter top burners or oven. This is fire hazard to person reaching stored articles. Burners should not be placed below or near the window or door.
17. Refrigerator should not be placed adjacent to heat producing equipment such as oven, top burner or water heater.

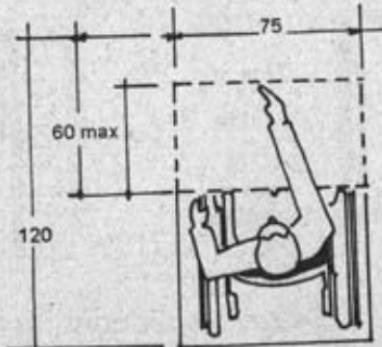


FIGURE 3-12 WORKING COUNTER CLEARANCES

3-4 The Bathroom

Planning Considerations:

The bathroom is more hazardous than any other room in the house hence, planning for safety is of utmost importance.

1. The minimum floor area of a carefully planned bathroom is 3.7 to 4.2 square meters.

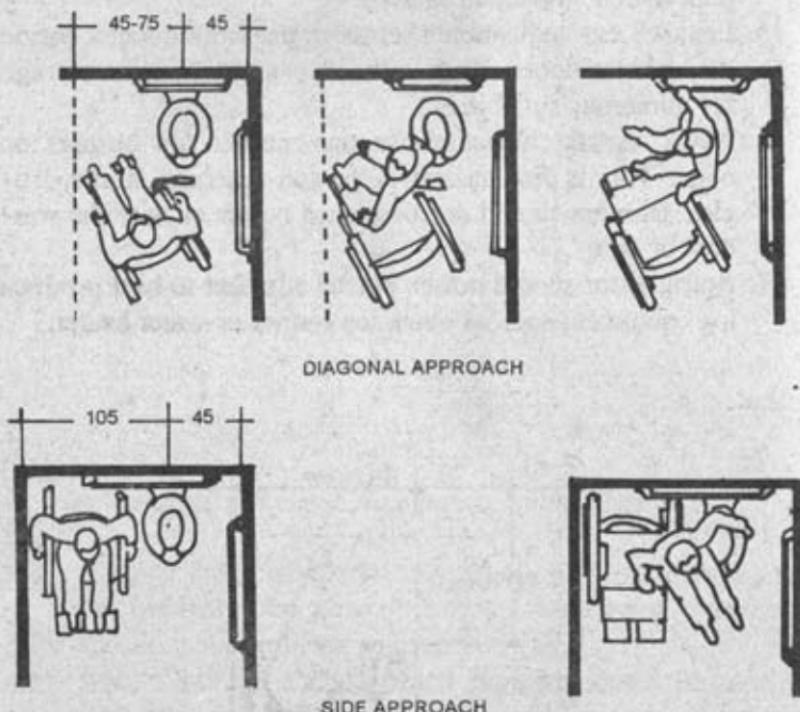


FIGURE 3-13 ENTERING THE COMFORT ROOM

2. Bathroom for disabled persons should be larger than the standard size to permit use of wheelchair. An area of 4.2 to 5.0 square meters is recommended.

Home for the Disabled

3. Install unglazed floor tiles drain into the shower without curb or step.
4. Install single lever mixing handle set at 100 centimeters above the floor located at shower compartment reachable from outside the shower.
5. Provide a recessed soap dish, convenient when sitting or standing position.
6. Install grab bar that is capable of supporting 110 kilograms weight, devoid of sharp corners their ends returning to the wall.
7. Set the lavatory at 80 to 85 centimeters above the floor with 10 centimeters maximum depth with drain opening at the rear of the bowl.
8. Closet for standing position is fixed at 190 centimeters. For wheelchair position, 130 to 135 centimeters high is the most convenient.

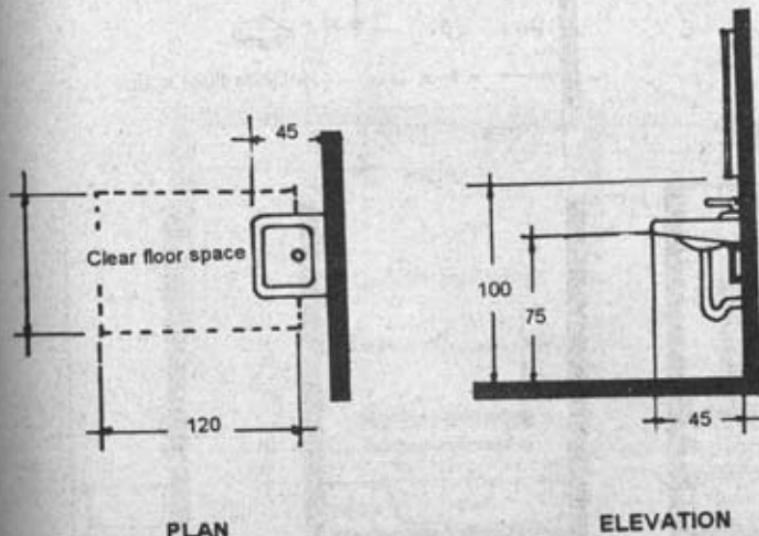


FIGURE 3-14 CLEAR FLOOR SPACE AND HEIGHTS

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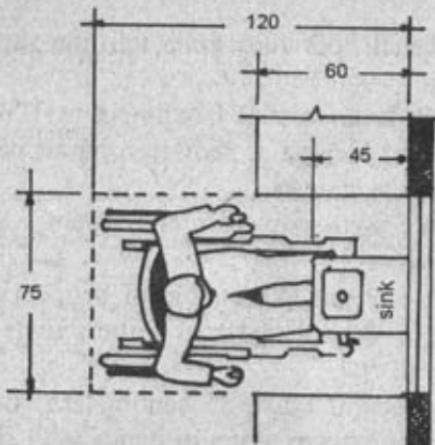


FIGURE 3-15 SPACE CLEARANCES

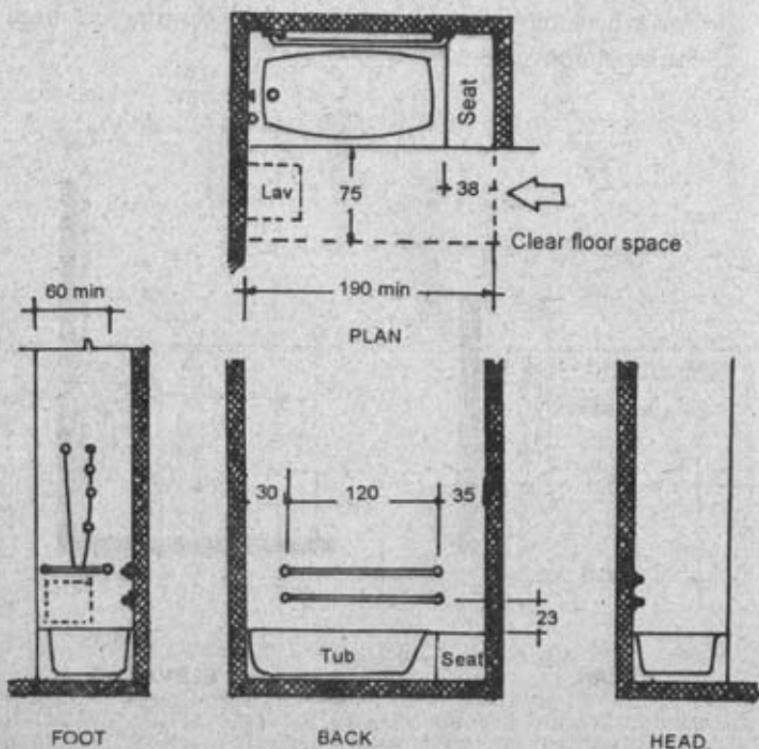


FIGURE 3-16 CLEARANCE AND GRAB BAR FOR BATHTUB

Home for the Disabled

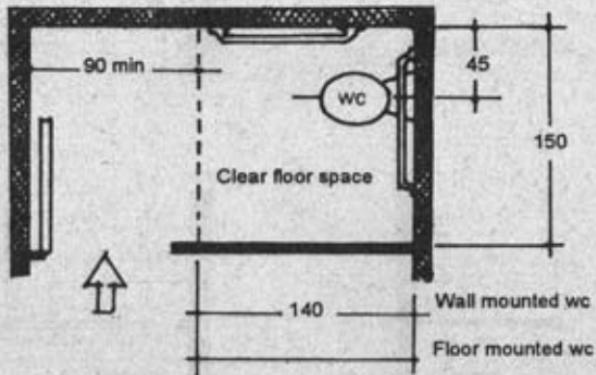
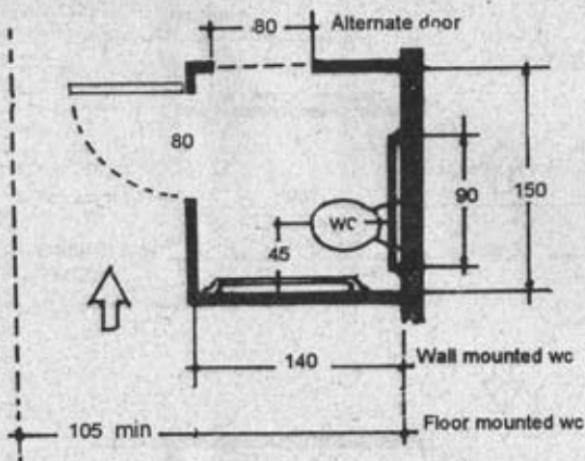


FIGURE 3-17 STANDARD STALLS

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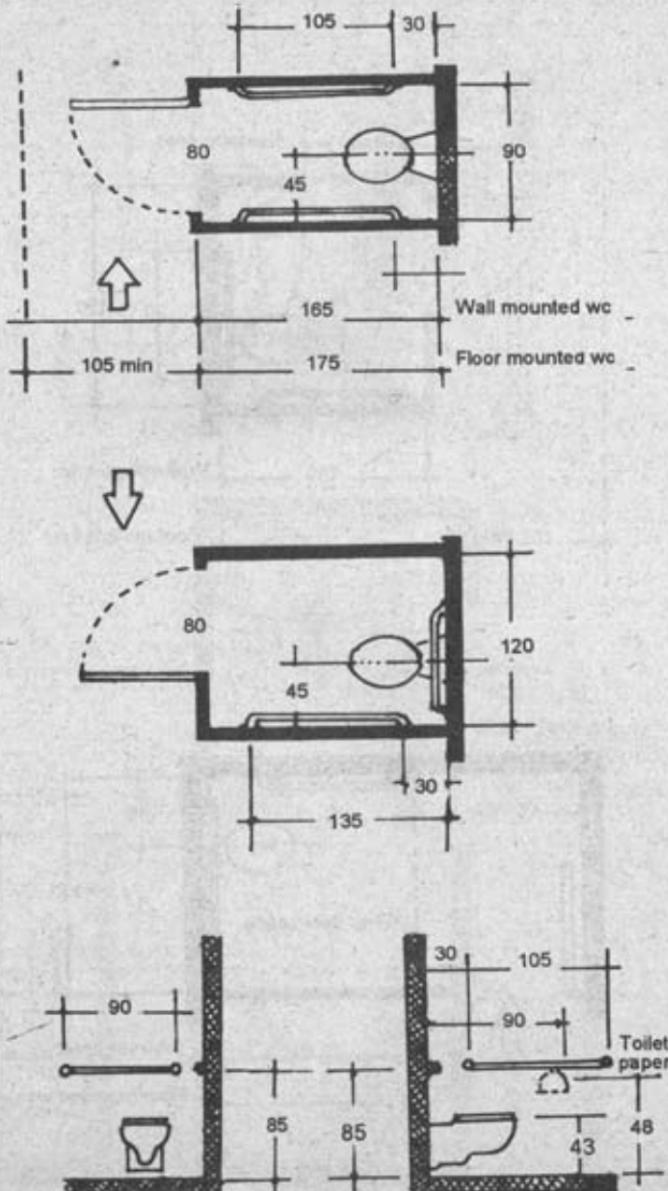


FIGURE 3-18 ALTERNATE STALLS

Home for the Elders

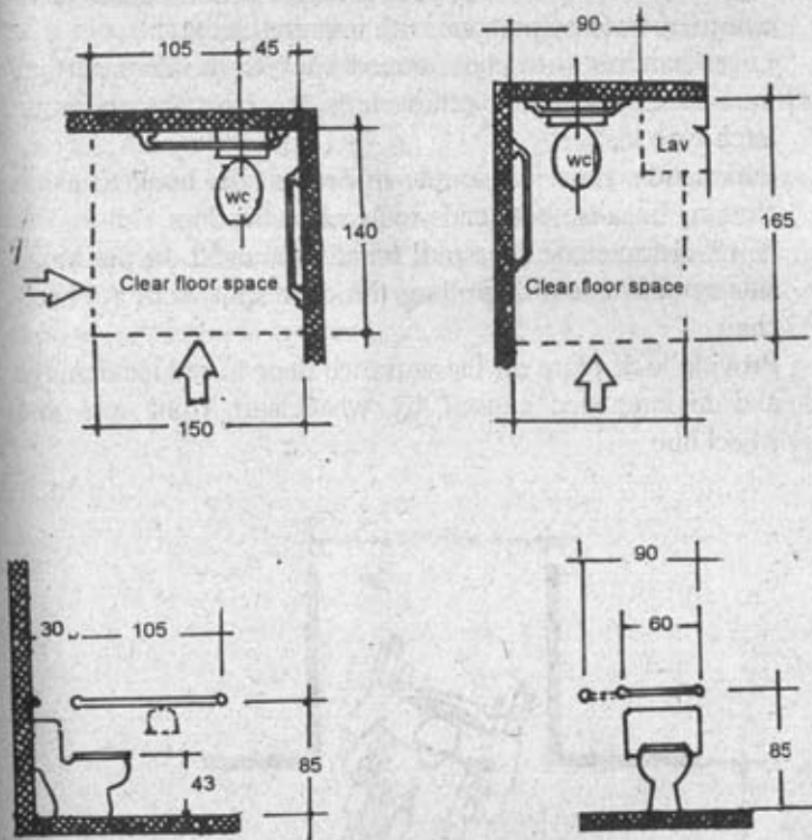


FIGURE 3-19 CLEAR FLOOR SPACE AT WATER CLOSET

3-5 Doors and Hardware

Planning Considerations:

1. Hinges for bathroom doors must swing outward to remove collapsed person. Two-way swinging door is hazardous and should not be used.
2. Operating hardware on doors should be 90 centimeters above floor including entrance door.

Planning and Designers Handbook

3. Avoid the round or oval doorknob for it is the most difficult to operate by persons with impaired hands.
4. Lever handles with ends looped back to the door surface prevent catching of clothes. It is the best for operating latch type lockset.
5. Pull handle must be simple in design. No hook to catch clothing because both ends returned to the door.
6. A 12 centimeters door pull handle mounted on the hinge side is convenient in pulling the door shut from a wheelchair.
7. Provide kick plate on the entrance door to reduce damage and maintenance caused by wheelchair front rest and wheel hub.

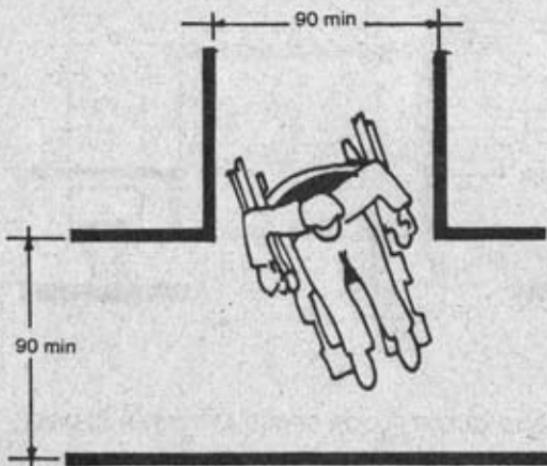


FIGURE 3-20 PASSAGE WAY CLEARANCE

3-6 Floors

Planning Considerations:

1. Floor should be non-slip properties. Slippery floor surface is dangerous to users of canes or crutches when the rubber ferrules becomes wet.

Home for the Elders

2. Bare concrete floor is not advisable.
3. Flooring that requires special maintenance equipment or treatment should not be installed inside the dwellings.
4. Floor materials of intermediate colors with pattern surface are recommended.
5. Unglazed ceramic tiles with smaller sizes of 5 centimeters or less, provides reasonable friction at the joints.
6. Kitchen floor should be grease resistant. Materials that can be kept clean with warm water and detergent like vinyl asbestos is recommended.

COMMERCIAL ESTABLISHMENT

4-1 Shopping Center

Shopping center is a complex of retail stores designed as a unified group to give the customers an exposure of the merchandise for shopping convenience.

The concept of shopping center is not new. It was started as early as 110 A.D. during the ancient civilization of Greece when emperor Trojan ordered his slave Apollodorus a well known Architect to design and built the famous Agora building adjacent to the Roman Forum.

Agora building was a two-story commercial center in the heart of business district, enclosed and ventilated mall, lined with open fronted shops similar to the recent most updated shopping centers. Likewise, the typical Arabian Souk as market of the middle ages, was designed with weather protection malls covering a series of open fronted shops similar to what are being constructed today.

The Fast Growth of Shopping Centers was Influence by:

1. The fast growth of population that led to the expansion of towns and cities, has invited the attention of real estate broker to develop idle land, converting them into residential subdivisions.
2. The urban congestions and traffic problems due to the old narrow streets and inadequate parking space, weakened the business activities prompting businessmen to set up branches in suburban periphery.

Commercial Establishment

3. The improved wide and high-speed circumferential roads attracted shopping centers competition in the different urban district.
4. The decline of retail business and the deterioration of old buildings in the central business districts, have dramatically forced the transfer of business to the new developed urban areas.

Because of these declining factors, shopping center industries, changed strategies by converting suburban centers to mega department stores, offering complete display of shopping needs in one roof including offices, hotels, amusement theaters, and attractive wide parking facilities.

Site Selection

Criteria:

1. The site available must be located within the trade area.
2. Location must be accessible to at least one existing major highway, but preferably, on two or more highways.
3. Consider land cost in relation with the total capital investments and obtainable rentals.
4. Adequate size and suitable shape, to allow proper planning of merchandising and parking areas.
5. Existing zoning laws suitable for the purpose.
6. Ground conditions that can be overcome at acceptable costs.
7. Availability of prime utilities at reasonable cost such as; electric power, water, telephone etc.
8. Free easement or other legal restrictions that will interfere with proper planning.
9. Topographical condition that will not incur excessive grading or drainage costs.
10. Provisions for expansions.
11. Proximity to public transportations.

Planning and Designers Handbook

Schematic Planning

Schematic planning is focus on:

1. Building size and arrangement.
2. Gross area for lease.
3. Malls and public space.
4. Parking layout.
5. Access roads.
6. Methods of serving.

The Primary Principles of Schematic Planning are:

1. Convenience and Comfort for the Customers and;
2. Maximum merchandising potential for the tenant stores.

Customers Demand for Convenience

1. Ease of vehicular access to and from the site.
2. Ease and adequate parking areas.
3. Reasonable walking distance.
4. Simple direct pedestrian shopping routes with minimum obstructions and inconveniences.

Attraction

The primary consideration in planning shopping center is *Attraction*. Customers are attracted when offered the following facilities and conveniences.

1. The vehicular access to and from the shopping center.
2. Provisions for an adequate parking space.
3. Reasonable walking distance.
4. Simple direct pedestrian routes with minimum obstruction because shoppers rarely go to where there are inconveniences.

Commercial Establishment

With respect to the tenant store in the shopping center, the planner has to consider the following:

1. A good plan avoids any dead-end route or out of the way location of stores.
2. There should be equal opportunity for the tenant stores to capture a portion of the customers.

Equal Opportunities - Means that a merchandising unit who has good appeals and promotions to the public has the chance of capturing the customers.

4-2 The Retail Shop

A successful retail shop or store is one primarily designed to merchandise, in addition to its nice looking appearance and attractiveness. People by nature, love to look, window shop, then buy. Therefore, design of storefront or facade must be attractive and beautiful to catch the shopper's attention and invite customers from the street or from the shopping centers. Merchandising psychology starts from arousing interest then satisfy it.

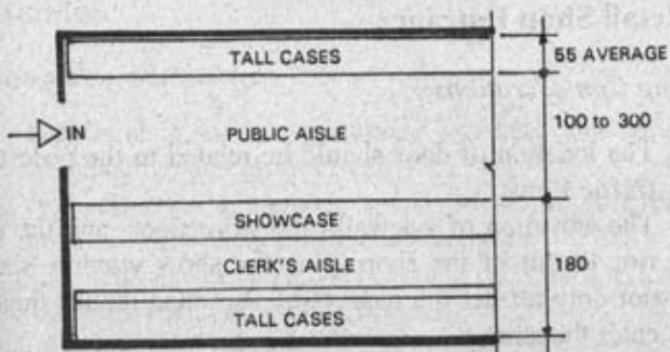


FIGURE 4-1 SINGLE AISLE STORE

Planning and Designers Handbook

The store maybe divided into two principal functions:

1. The exterior comprising the storefront, the show window and the displays that gives identification.
2. The interior where the promise of the storefront displayed - delivers.

In short, *the front attract the sale, the interior consummate it.*

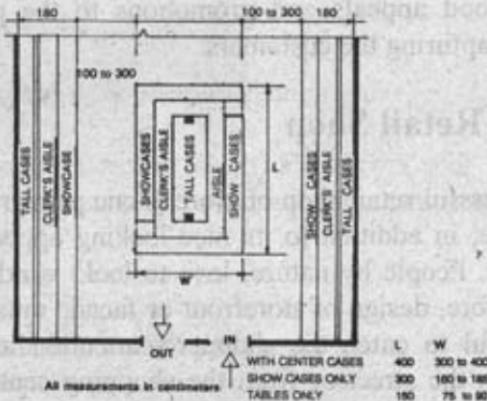


FIGURE 4-2 SINGLE AISLE STORE

The Retail Shop Entrance

Planning Considerations:

1. The location of door should be related to the pedestrian traffic flow.
2. The elevation of sidewalk, the store floor, and the interior layout of the shop, plus the show window should not only attract the passers-by, but also induce them to enter the store.
3. Customers who are on window shopping only, may be tempted and forced to buy once attracted by any of the merchandise on display.

Commercial Establishment

4. Attracting customers could be accomplished by means of advertising, show window display, introducing new style, and much more, when the price is right.

Store Space

Planning Considerations:

1. A well-organized store space and its merchandise for sale, help the customers find the object easily. On the other hand, it is also easy for the storekeeper to check the items and determines the profit or loss.
2. Merchandise and space should be well arranged, providing easy circulation and exposure of the merchandise.
3. Monotony in circulation and display of merchandise should be avoided
4. Location of fitting room should be conveniently near the items being sold.
5. Location of storage room should not permit the sales person to leave the counter too long a time.
6. Fixture design should not let the sales person reach an item in the shelf too high or stoop too low, except in enclosed storage room where stool or ladder can be used.

Self Service

Planning Considerations:

1. The trend is for the customers to select and handle the merchandise that attract them.
2. The self-service method, speed up selling because, the stock is easily accessible to the shoppers.
3. The self-service method however, is not applicable to valuable small items like jewelries.

Retail Shop

Retail shop size has no specific standard measurements.

Planning and Designers Handbook

Whatever convenient to both store operators and customers are considered approved and adopted.

Planning Considerations:

1. In large cities, the size of a shop with one customer aisle, usually provides 3.60 to 4.50 meters wide by 20 to 30 meters long.
2. The height from floor to ceiling is normally about 3.60 meters without mezzanine.
3. If mezzanine is desired, the height should not be less than 2.20 meters above the ground floor level.
4. A mezzanine floor for ceiling may be as low as 1.95 m. if used for service space only, but for public occupancy or use, the height should not be less than 2.10 meters.
5. If there is a basement floor, the height should be from 2.40 to 2.70 meters clear distance from floor to ceiling.

Show Window

Planning Considerations:

1. Show windows must be accessible with ease in placing and changing the display items. Likewise, display item could be dressed and cleaned as quickly as possible.
2. Back window may be opened or closed depending upon the type of the shop. Storage space is necessary for the keeping of accessories such as foams, blocks, panel, background etc.
3. For easy window cleaning, provide an access panel with sufficient width to permit entry of tools and equipment.
4. Dummy window is sometimes used on rolling platform.
5. Distorted glass and mirror should not be installed.
6. Show window lighting reflections should be controlled, although lighting intensity could be increased above ordinary for good vision and competition

Commercial Establishment

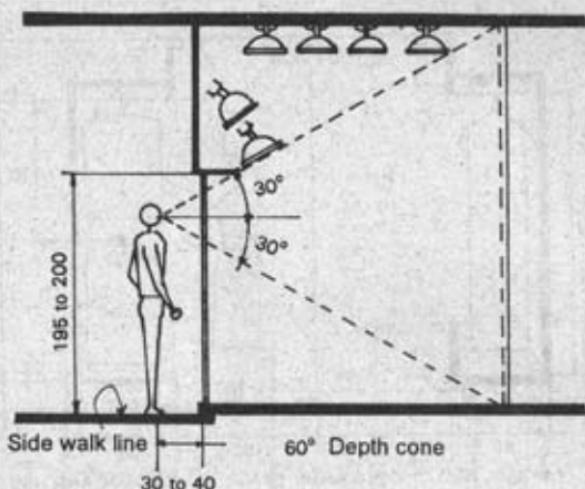


FIGURE 4-3 OPTIMUM SHOW WINDOW

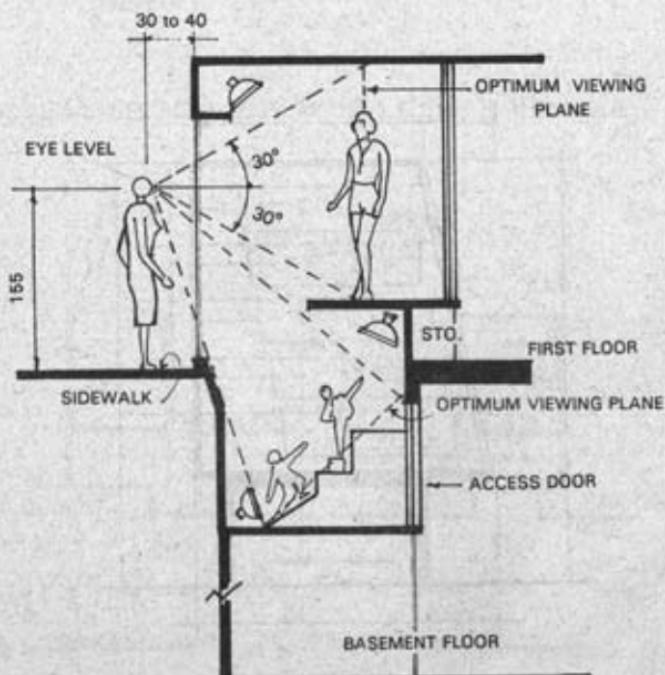


FIGURE 4-4 SHOW WINDOW FOR FIRST AND SECOND FLOOR

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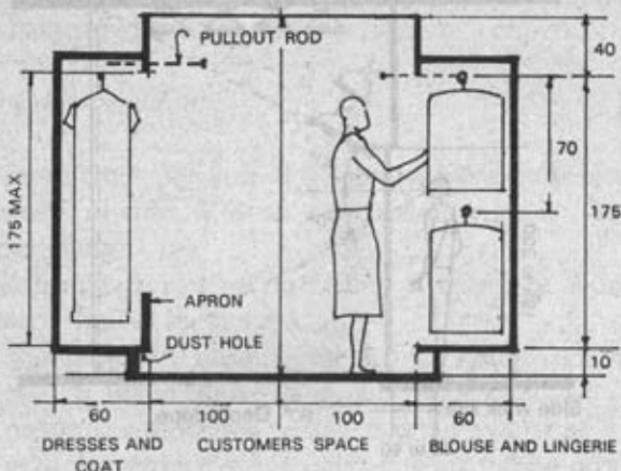


FIGURE 4-5 HANGING CASES

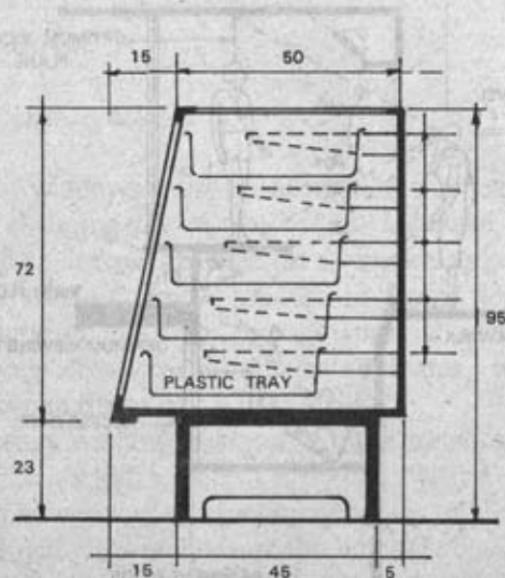


FIGURE 4-6 NECKWARE AND PANTIES CASES

Commercial Establishment

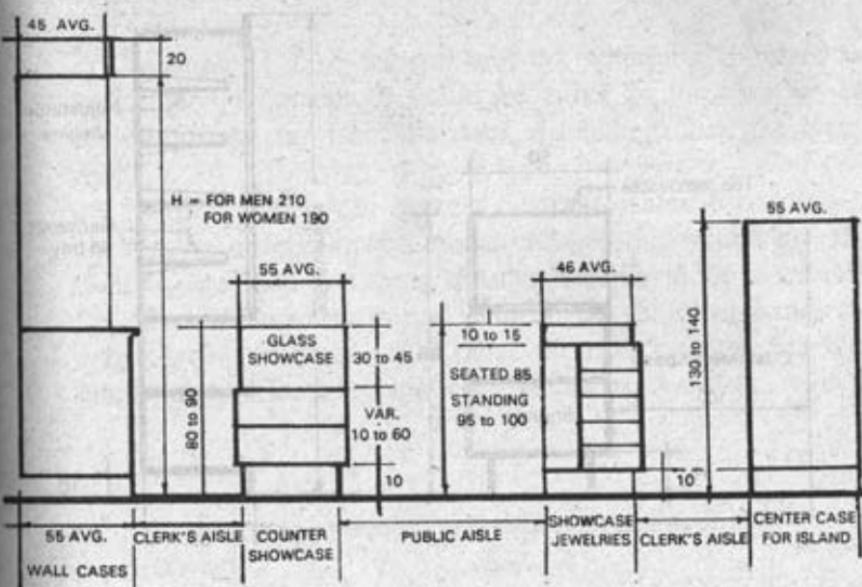


FIGURE 4-8 SECTIONS FOR TYPICAL FIXTURE AND AISLE

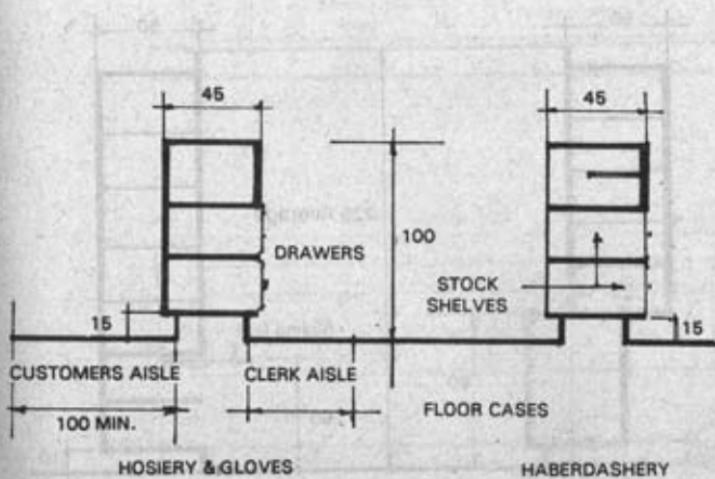


FIGURE 4-9 MENS WEAR CASES

Planning and Designers Handbook

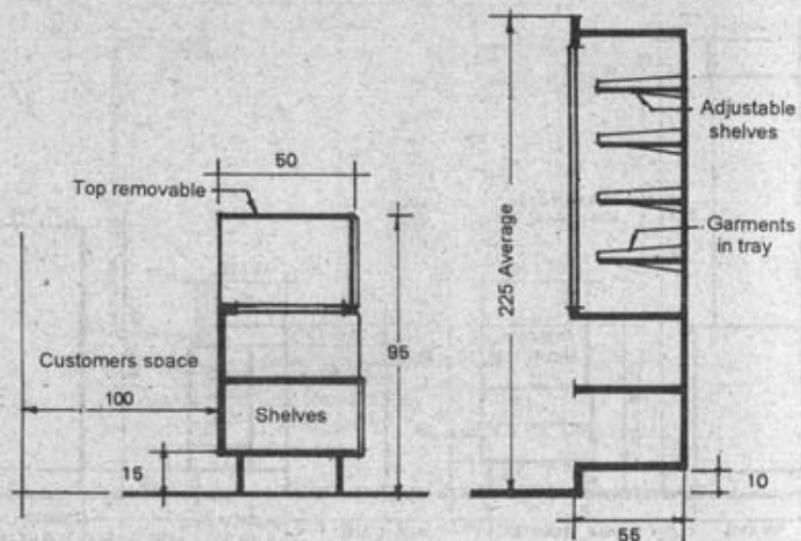


FIGURE 4-10 UNDERWEAR AND KNIT GOODS CASES

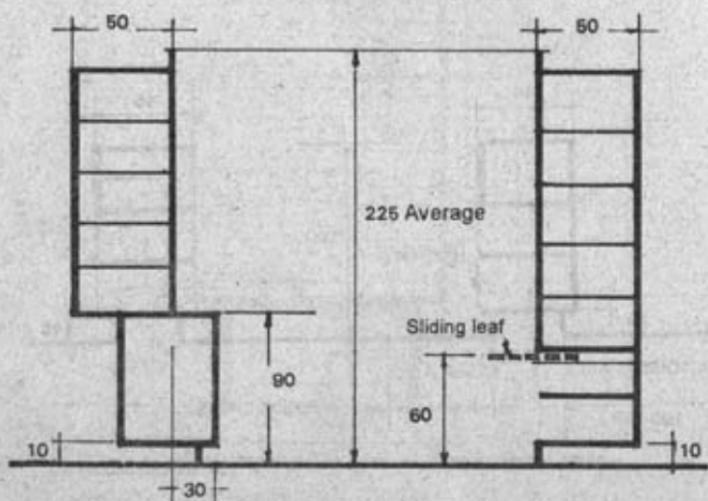


FIGURE 4-11 MENS WEAR CASES

Commercial Establishment

Working Areas

Location of cash register and the wrapping counters falls under good judgment. It could be either in the open or concealed near or far from the door, depending upon the type of shops.

In small shop with hurried business where for a time the clerk sells, orders, wraps, make changes and watch the shop, cash register and wrapping counter near the door is advisable for effective supervision and control. On the other hand, store with narrow entrance could place the cash register and wrapping counter remote to avoid crowding at the doorway.

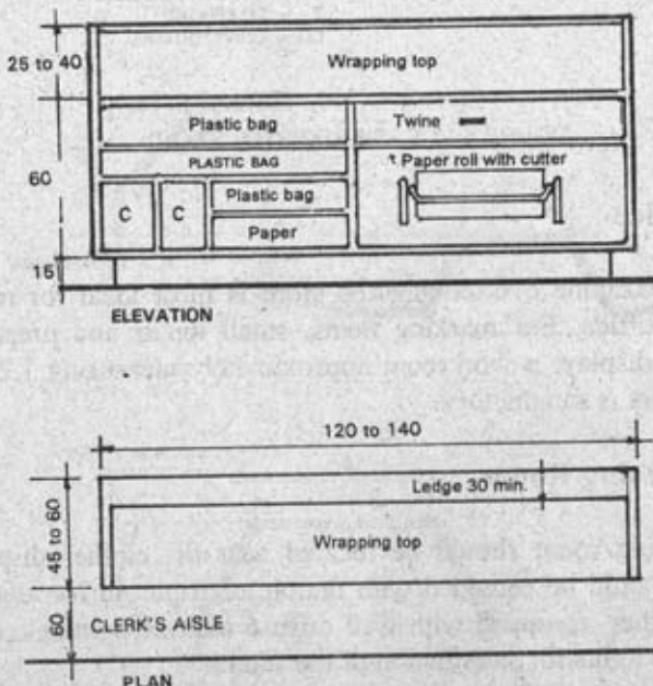


FIGURE 4-12 WRAPPING COUNTER

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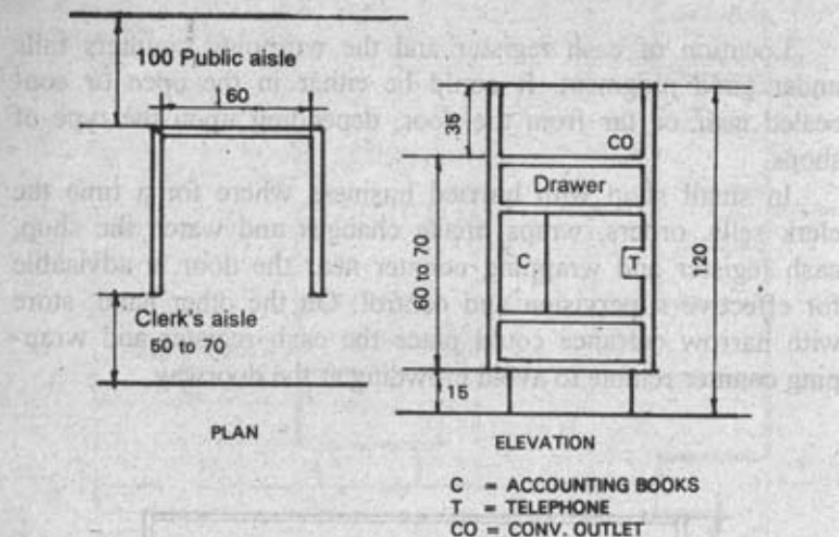


FIGURE 4-13 CASH REGISTER STAND

The Office

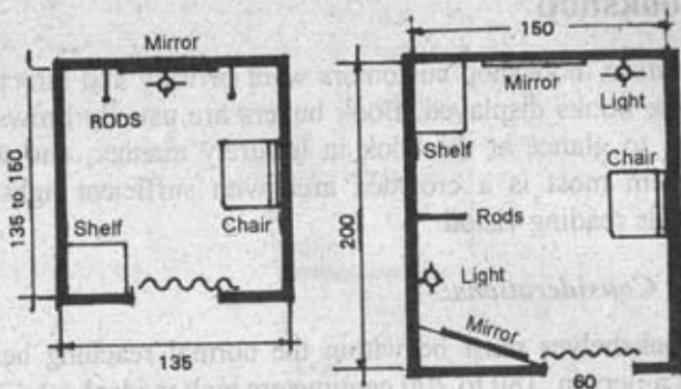
A mezzanine overlooking the store is most ideal for management office. For marking items, small repair and preparations for display, a workroom approximately measuring 1.20 x 1.80 meters is satisfactory.

The Dressing Room

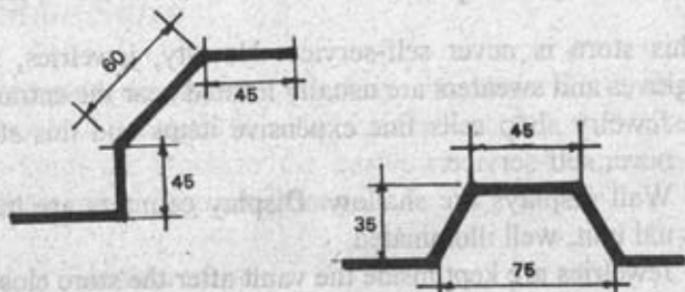
Dressing room should be located near the clothes display area. It should be provided with double or triple mirror angled to each other, equipped with well diffuse indirect lightings, and direct side lights for satisfaction of the fitters.

Strong direct overhead lights should be avoided because it cast unflattering shadows.

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DRESSING ROOM PLAN 90 X 120 MIN. SIZE



TRIPLE MIRROR

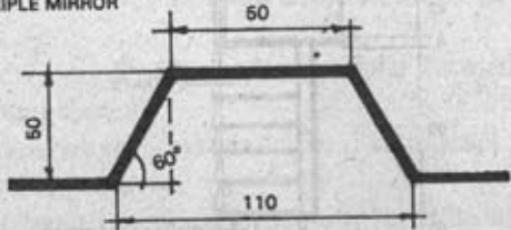


FIGURE 4-14 FITTING ROOM

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4-3 Bookshop

By nature, bookshop customers want privacy and direct access to the books displayed. Book buyers are usually browsers. They like to glance at the book in leisurely manner, and what attract them most is a crowded area with sufficient light for comfortable reading vision.

Planning Considerations:

1. Bookshelves must be within the normal reaching height of a person. 180 to 200 centimeters high is ideal.
2. Aisle clearance should not be less than 90 cm. wide.
3. Main circulation aisles should not be greater than 2.00 meters. For detail of bookshelves, refer to school library.

4-4 Jewelry Shop

This store is never self-service. Novelty, jewelries, stockings, gloves and sweaters are usually located near the entrance.

1. Jewelry shop sells fine expensive items and this store is never self-service.
2. Wall displays are shallow. Display counters are individual unit, well illuminated.
3. Jewelries are kept inside the vault after the store closed.

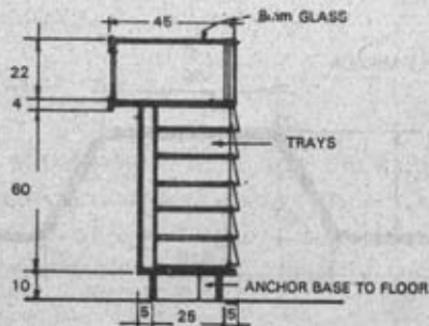


FIGURE 4-15 CUSTUME JEWELRY CASES

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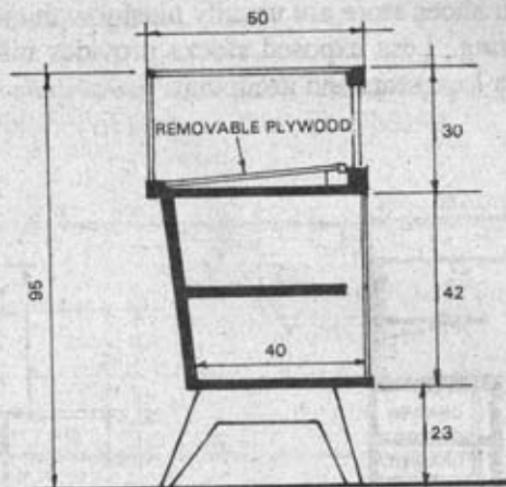


FIGURE 4-16 JEWELRY AND LINGERIE DISPLAY COUNTER

4-5 Shoe Store

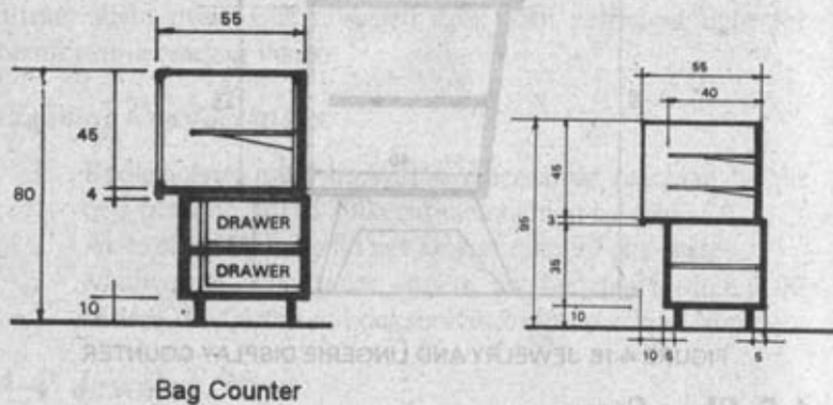
Shoe store is highly competitive business. Thus, the store must be well designed to allow ample circulation for the sales person from the stock to the customers, by not crowding the front chair of the fitting customers.

Planning Considerations:

1. Open shelves in the sales area must be within the reach of the salesperson without the necessity of using stool.
2. Concealed stock room shelving should be as high as 3.00 meters.
3. Cashiers counter should be carefully located for accessibility and control.
4. Provide enough portable or fixed shoe level fitting mirror and full size mirror.
5. Chairs must be comfortable with separation arm between customers.
6. As much as possible, floor in the selling area must be carpeted.

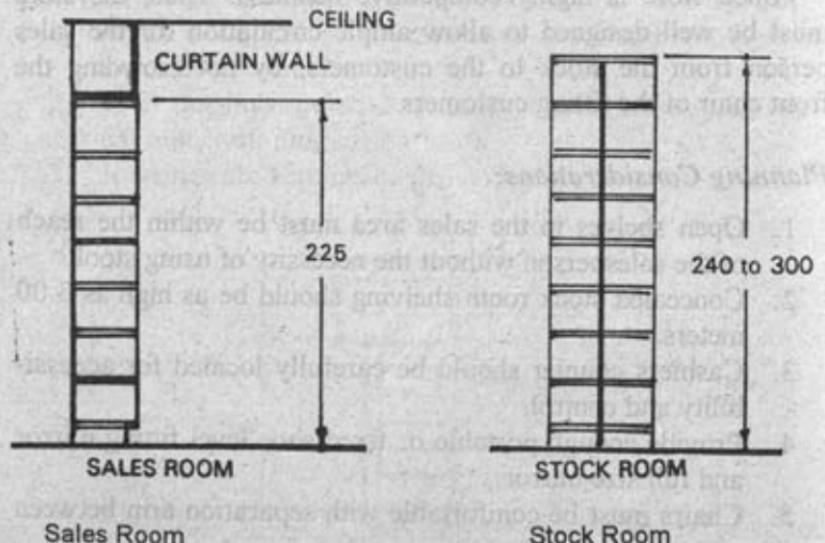
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7. Woman shoes store are usually plushy with motif of a salon setting. Less exposed stocks provides informal seating with love seats and groupings.



Bag Counter

Shoe Counter



Sales Room

Stock Room

FIGURE 4-18 FLOOR SHOW CASES

4-6 Barber Shop

Barber shop areas and space clearances are governed by the sizes and number of seats as illustrated below.

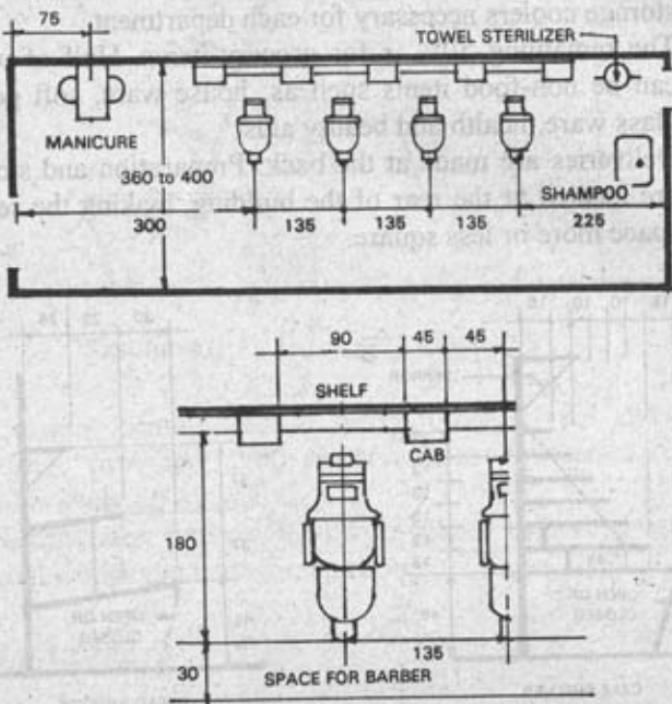


FIGURE 4-19 BARBER SHOP DIMENSIONS AND CLEARANCES

4-7 Supermarket

Supermarket is a big scale emporium of merchandised which does not require shouting and advertisement in order to be noticed.

Normally, supermarket has an average area of about 2,000 to 3,000 square meters. Of this area, 75% to 80% is reserved for stores and the remaining 20-25% was allotted to services area such as storage, coolers, repacking area, grocery storage and others.

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Planning Considerations:

1. About 50% of the supermarket total equipment and fixtures investment are refrigeration equipment intended for meat, dairy produce, frozen food, delicatessen and the storage coolers necessary for each department.
2. The remaining 50% is for grocery items. Half of which can be non-food items such as; house ware, soft goods, glass ware, health and beauty aids.
3. Deliveries are made at the back. Preparation and storage are located at the rear of the building, making the selling space more or less square.

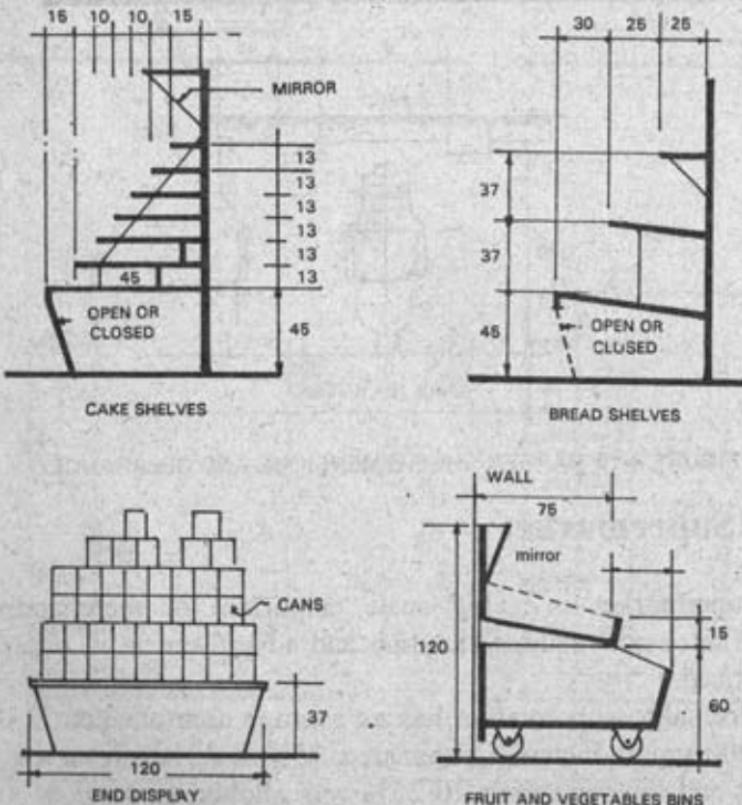


FIGURE 4-20 DISPLAY SHELVES

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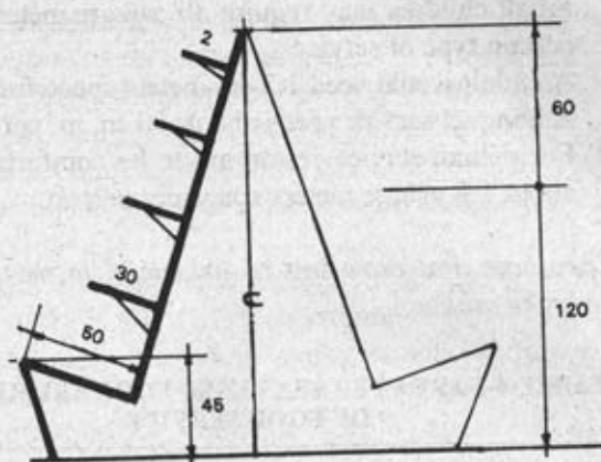


FIGURE 4-21 ISLAND DISPLAY SHELVES

4. Column location should be kept out of the shopping aisles, providing 2.00 meters aisles between 1.20 m. wide shelving islands.
5. Refrigerated fixtures should be placed near their associated workroom and storage cooler.

4-8 Restaurant

The space for dining area is calculated by the area in square meter per person seated, multiplied by the total number of persons seated at one time. Space requirement for a well-planned restaurant is determine from the result of the following information.

Planning Considerations:

1. What volume and type of services to be offered.
2. The number and sizes of the equipment to be used.
3. The volume of needed supplies.
4. The number of workers or employees required.
5. Suitable traffic area.

Planning and Designers Handbook

6. Small children may require .08 square meters space for a certain type of service.
7. An adult would need 1.2 sq. meters space for comfort.
8. A banquet service needs about .90 sq. m. per seat.
9. For deluxe service restaurant to be comfortable, requires about 1.8 square meters space per person.

Take note that crowding is distasteful to most diners particularly the adults

TABLE 4-1 AREA PER SEAT USED FOR VARIOUS TYPES OF FOOD SERVICE

Type of Service	Area per Seat in sq. m.
Cafeteria Commercial	1.50 to 1.70
Cafeteria College and Industrial	1.10 to 1.40
Cafeteria School Lunchroom	0.84 to 1.20
Counter Service	1.70 to 1.80
Table Service, Hotel, Club Restaurant	1.40 to 1.70
Banquet minimum	0.93 to 1.00

Space requirement influences the building design and operating costs. For instance:

1. When the space is too small, the labor, time and efforts are likely to increase, but the volume and quality of output decreases.
2. When the space is too large, building and maintenance costs become excessive.

Space Requirements for Dining Area

Planning Considerations:

1. Place setting for small children requires .08 sq. meters

Commercial Establishment

for certain types of service compared to adults that need 1.2 square meters for comfort.

2. A banquet seating allowance can be small as 0.92 sq. m. per seat, and 1.8 sq. m. for deluxe restaurant.
3. Diner's comfort should be given allowance. Remember that crowding is distasteful to many people especially the adults.
4. Although crowding is acceptable to low cost quick service units, it is not to those offering leisurely dining.
5. Both young and adults enjoy having sufficient elbow-room and enough space for their food and beverages.
6. Place setting for adults provide 60 cm. and 45 to 50 centimeters for children.
7. Service entrance maybe estimated in the proportion of:
 - a. One small entrance for every 20 seats and
 - b. A large central door for every 50 to 60 seats.
8. The central servicing station is determined by the distance between the dining area and the service area. Small substation for silver dishes, napery beverages, ice, butter, and condiments could be 2.0 to 2.5 square meters by 90 to 100 centimeters high.

Table Size and Heights

1. Table size gives the patron feeling of comfort and efficient utilization of the space. Four trays 35 x 40 cm. fit better on a 120 centimeters square table than on 90 cm. or 106 centimeters square table.
2. Small tables measuring 60 or 90 centimeters square are economical for seating, but not comfortable for large people. They are only suitable in crowded areas for fast turn over and light meals.
3. Tables with common height and width, offers flexibility

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in seating arrangement. They are good for banquets or cocktails type bench seating along the wall.

4. Table for booths longer than 120 centimeters is difficult for the waitresses to serve.
5. The width of booth and seats including tables are usually 165 centimeters.

Lunch Counter and Aisles

1. Lunch counter minimum width is 40 centimeters
Maximum width with seat is 60 to 75 cm.
2. The maximum area best served by one waitress is 4.80 meters counter. This will allow 8 to 10 seats.
3. The U shaped counter maximizes the use of space and reduces travel.
4. Space with 2.60 to 3.30 meters depth will be required for every linear foot of counter. This will provide 90 to 120 centimeters public aisles. Where employees must pass a width of 135 centimeters is ideal.
5. A minimum passage area is 40 centimeters between chairs excluding chair area.
6. Table should be spaced at 120 to 150 centimeters apart.
7. The best utilization of space can be determined through the use of templates or scaled model.
8. Diagonal arrangement of square table utilizes space better than the square arrangement.
9. Lanes that passes between back of chairs are usually blocked when someone arises or seated.
10. Height of dining tables in school eatery should be adjusted to the comfort of school children. 60 centimeters is provided for children and 75 centimeters for adults.

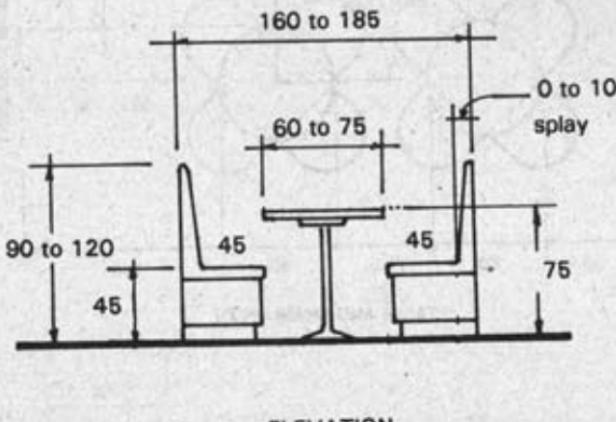
Calculating the Size of Dining Room

The number of people to be seated at one time is the information needed to calculate the size of a dining room.

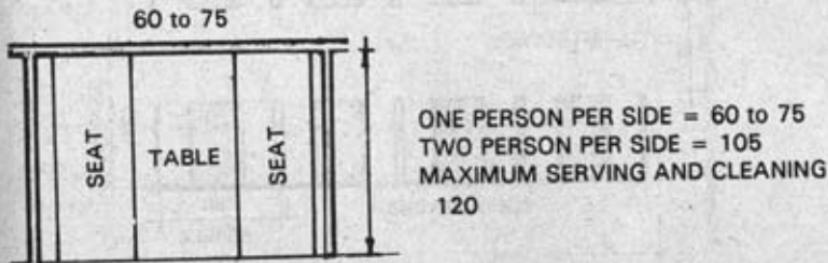
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The total number of seats required at one time, multiplied by the space required for each seat, will give the desired area of dining room.

The number of times a seat is occupied during a given period is referred to as turn over. The turn over per hour times the number of seats available, gives the total number of customers that can be served in an hour.



ELEVATION



PLAN

FIGURE 4-22 RESTAURANT BOOTH SEATING

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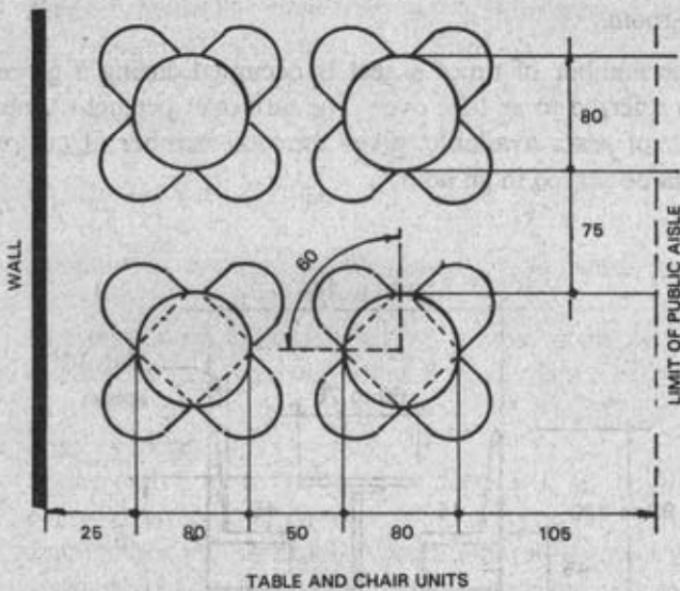


TABLE AND CHAIR UNITS

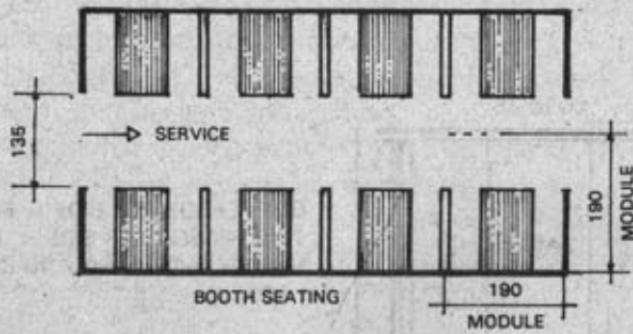


FIGURE 4-23 SEATING CLEARANCES

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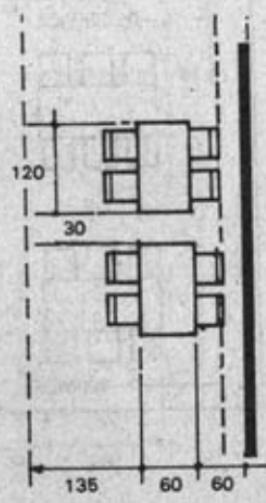
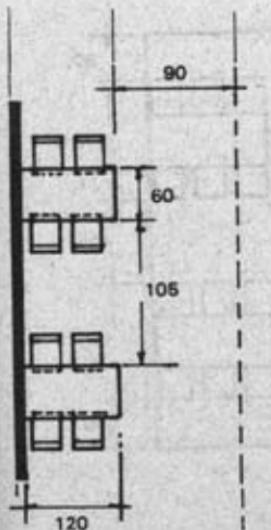
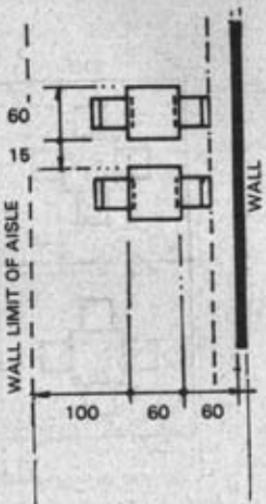
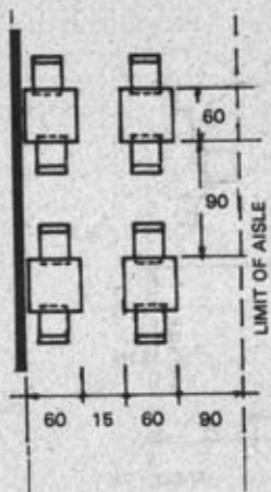


FIGURE 4-24 TABLE AND CHAIR UNIT CLEARANCES

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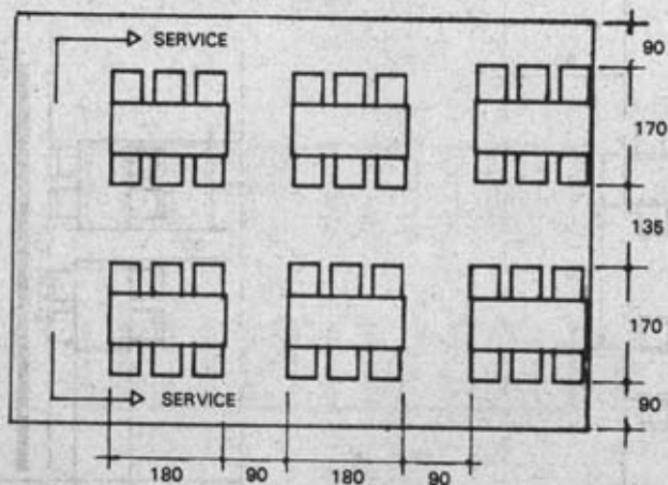
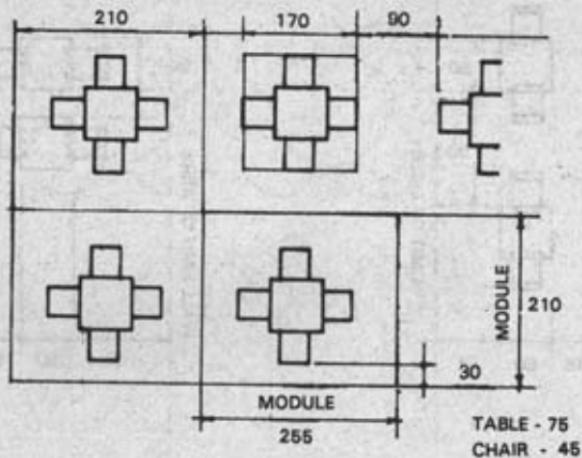


FIGURE 4-25 SEAT GROUPING

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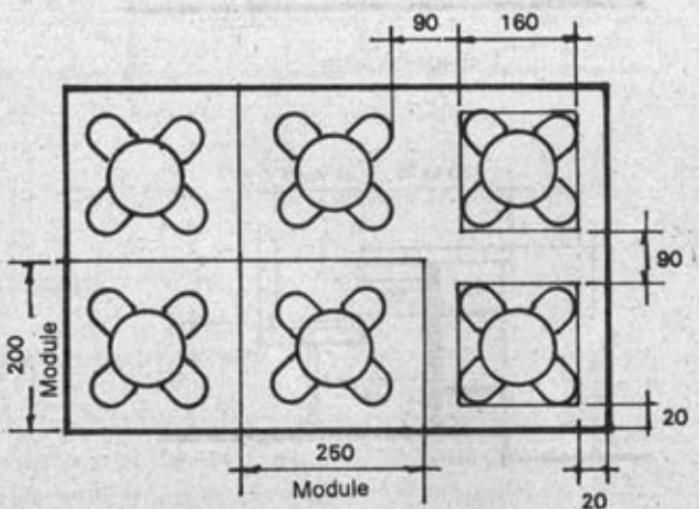
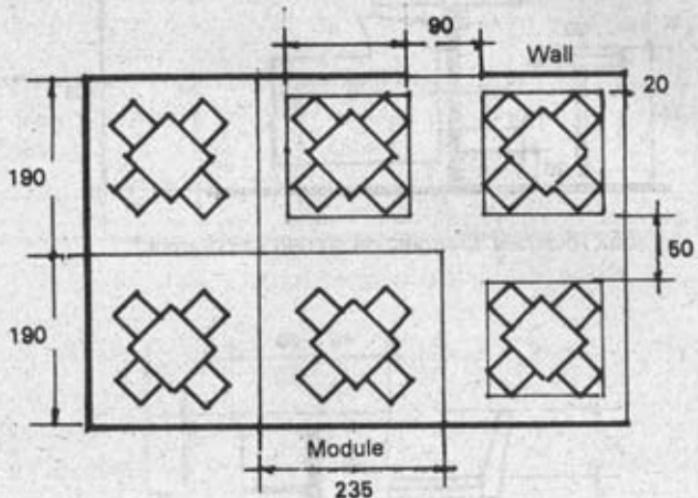
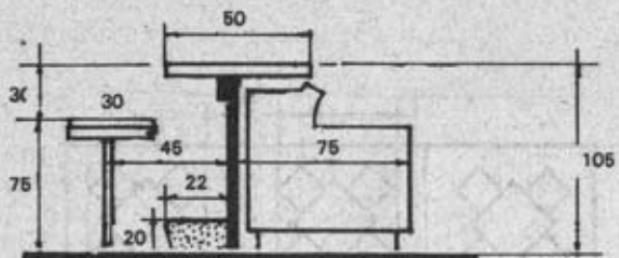
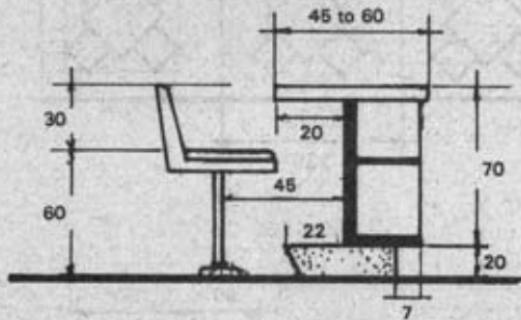


FIGURE 4-26 SEAT GROUPING

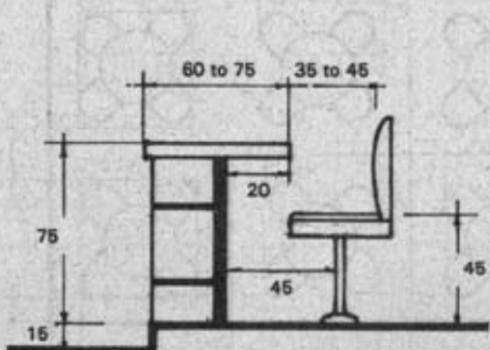
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SODA FOUNTAIN STANDING OR SITTING AT COUNTER



LUNCH COUNTER



DINING COUNTER

FIGURE 4-27 COUNTER SEAT CLEARANCES

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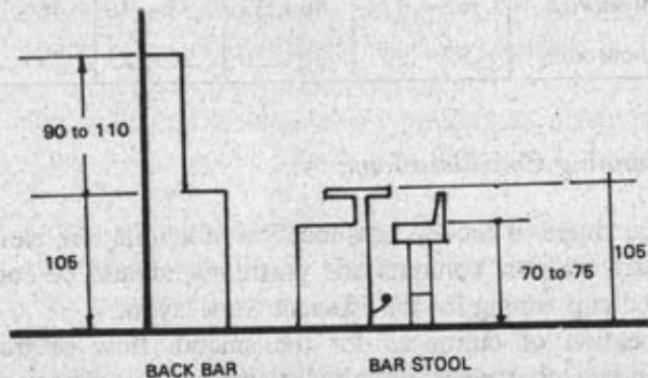
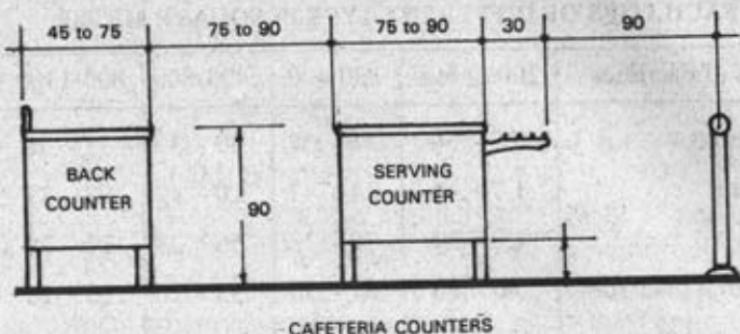


FIGURE 4-28 COUNTER AND LIQUOR BAR

The Kitchen

Planning Considerations:

1. Type of preparation and services required.
2. Amount of the total production made per unit.
3. The volume or number of meals served.
4. Variety of food listed in the menu.
5. Elaborateness of preparation and serving
6. Quantity of individual service as in hospital tray.
7. Seating and service on several floors.

Planning and Designers Handbook

TABLE 4-2 AREA OF KITCHEN SPACE PER MEAL FOR FOOD FACILITIES OF DIFFERENT TYPE IN SQUARE METER

Types of Facilities	200 or less	200-400	400-800	800-1300
Cafeterias	.07 - .50	.46 - .37	.37 - .33	.33 - .28
Hospital	1.7 - .42	1.1 - .42	1.0 - .42	.93 - .37
Hotel	1.7 - .37	.70 - .28	.56 - .28	.37 - .28
Industrial lunchroom	.70 - .50	.37 - .30	.33 - .20	.28 - .20
Lunch counters	.70 - .20	.20 - .14		
Restaurant service	.65 - .37	.46 - .33	.33 - .46	.46 - .28
School lunchroom	.37 - .30	.30 - .20	.20 - .23	.23 - .15

Other Planning Considerations:

1. The shape of the kitchen, location of ventilation, elevator shaft, support columns and partitions, should be considered in planning for the efficient work layout.
2. Location of entrances for the smooth flow of traffic, window placement, suitable spaces and coordination of different sections requires careful planning.
3. If possible, eliminate partition that reduces space. This will allow easier supervision of the production areas.
4. Kitchen serving small number of people requires larger area footage per meal than those serving bigger number.

Production Areas

Planning Considerations:

1. A 60 to 75 centimeters table width is ideal if no dishes or food containers rest at the back of the table.
2. A 90 cm. square table is preferred when the back of the area is used for storage.

Commercial Establishment

3. Where two workers are working opposite each other, A 110 cm. wide table is recommended.
4. A 120 to 180 cm. work area is within the convenient reach of average person.
5. A 240 to 300 cm. long table is used for two persons working side by side.
6. Working table height is normally from 80 to 85 cm.
7. Aisles space should allow free easy movement of essential traffic. The minimum width of a lane between equipment where one person is working alone is 90 cm.
8. Where more than one is working, and another worker passes each other in the progress of the work, 105 cm. space is required. Where mobile equipment is used, 120 to 135 centimeters aisle is sufficient.
9. For main traffic lane where workers regularly pass each other with mobile equipment, provide 180 centimeters passageway.
10. Door opening must accommodate large piece of equipment like roasting pans, baking sheets and stockpots.
11. The main passageway should not pass through work centers.
12. Compactness is essential in step savings. The work center should be in close proximity to the main traffic lanes for accessibility.
13. Avoid disturbance from outsider passing through the work centers.
14. Efficient work centers are those at right angles with the traffic lanes.
15. A good plan allocate less than 30% of total space for equipment and 70% for work areas, traffic lanes, and space around equipment for easy operation and cleaning.
16. For hospital production and service areas, provide 2.5 sq. m. per bed for 50-bed hospital, and 1.8 sq. m. per bed for 200-bed hospital. These areas exclude major storage room, dining room, employee's facilities or floor serving pantries.

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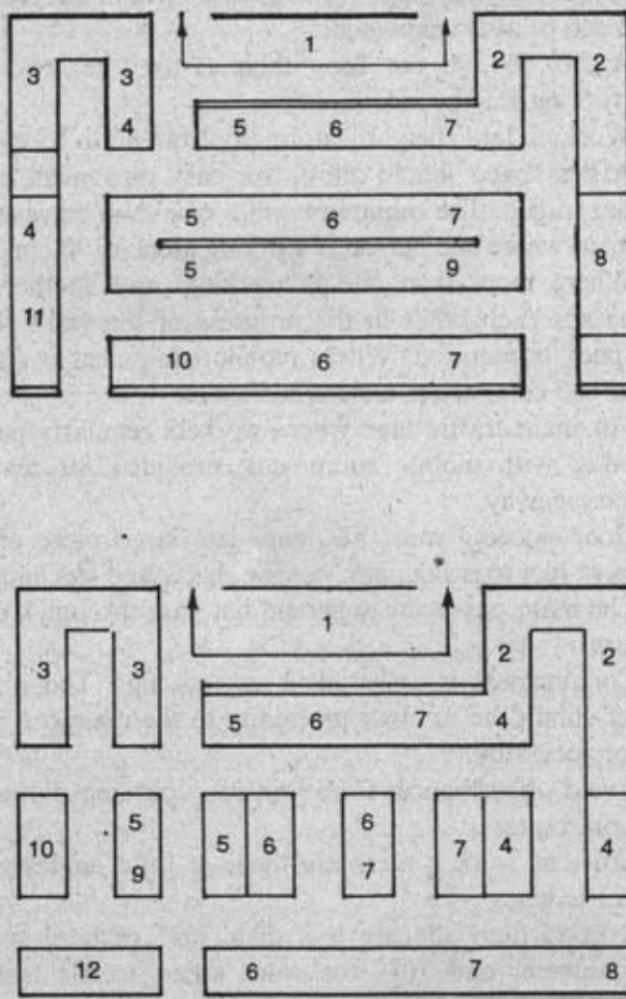


FIGURE 4-29 HOTEL OR RESTAURANT KITCHEN LINEAR ARRANGEMENT TO ACCOMMODATE 100 TO 200 PERSONS

Commercial Establishment

Legend

1. Waiters passageway, meal and beverage counter-dish return
2. Dish washing area (dishes, glasses, silver)
3. Beverages preparation and serving
4. Pastry (cookies, cakes, ice cream, desserts) prepare and serve
5. Cold kitchen (cold appetizers, salad, fish)
6. Warm kitchen (sauces, roasts, grill, fish) prepare and serve
7. Warm kitchen (soaps, vegetables, entrees) prepare & serve
8. Pot and Pan washing – casseroles area.
9. Vegetable preparation
10. Vegetable cold storage
11. Meat and storage

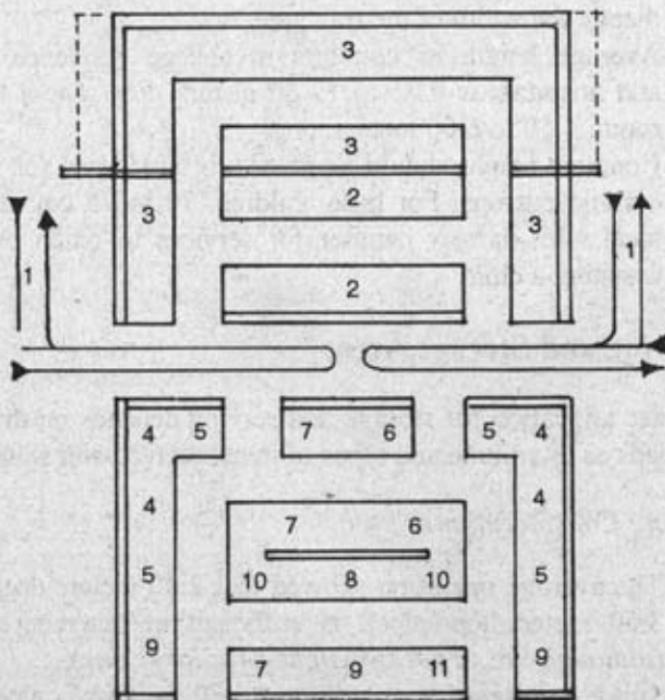


FIGURE 4-30 LARGE RESTAURANT KITCHEN WITH MANY AUXILIARY ROOMS, BOWLING ALLEYS, GARDEN SNAK BAR AND CONFERENCE ROOM ETC. 1000 TO 1200 CAPACITY

Planning and Designers Handbook

Serving Areas

Planning Considerations:

The space allowance for serving areas should be in accordance with the specific type of facility. The type of service is also a factor in allocating space.

1. The length of cafeteria counter depends on the variety and volume demands. Filled space is unattractive, while crowding is undesirable.
2. A 4.50 meters wide floor space will permit 120 cm. patrons lane, 30 cm. tray side, 60 cm. counter width, 135 cm for workers and 75 cm. for back bar. The sizes of tray dictate the width of the tray side.
3. Average length of counters in college residence, halls and hospitals is 9.75 to 12.60 meters. For school lunchroom, 4.50 to 6.00 meters long.
4. Counters height should be at comfortable level for workers and patrons. For little children, 70 to 75 cm. high is ideal with narrow counter for services to reach over in assisting a child.

Receiving and Storage Areas

Space allocation for storage and serving depends on the specific needs as to volume and types of item received and stored.

Planning Considerations:

1. The average operation showed that 2.40 meters deep and 3.60 meters long dock is sufficient in receiving items (*although this is not sufficient for a large one*)
2. Space requirements of storage for 30 days was calculated approximately one half the total served. If 1,000 are served, 50 sq. meters maybe used as tentative for food storage needs.

Commercial Establishment

Refrigerated and Low Temperature Storage

Planning Considerations:

1. Know the quantity to be stored at one time.
2. Allocate 20-30% for meat.
3. 30-35% for fruits and vegetables.
4. 20-25% for dairy products.
5. 10-25% for frozen foods.
6. 5-10% for carry over foods, salads, sandwiches, materials and bakery products.
7. Walk in storage is more feasible for operations serving 300-400 meals per day. A 110 centimeters aisle is recommended.
8. The minimum dimension of a walk in storage is 3.00 x 3.00 meters. This will permit two storage areas at 75 cm. wide with 90 to 120 centimeters aisle.
9. Door has a minimum width of 105 centimeters to admit large crates container.
10. About 20 kilograms frozen food can be stored in a cubic foot if stacked in cases and 15 to 30 kilograms for refrigerated food per cubic foot.

Employees Facilities

Planning Considerations:

1. Provide lockers and lounge area, toilets and showers, time recording equipment, and hand basin near the working area.
2. Provide one washbowl for every 10 or less workers.
3. Provide one toilet stool for every 12- 15 women.
4. Provide one urinal and toilet stool for every 15 men.
5. Toilet compartment should be 90 x 130 cm. clear inside dimensions.
6. Space for clock recorder is 40 x 33 x 40 cm. high.

Planning and Designers Handbook

The Cashier

The most ideal location of cashier's desk or counter is the right side of the door when leaving the store. This will avoid cross traffic with the incoming customers.

4-9 General Offices

Office operations like machine needs to have all parts synchronized moving smoothly. The main office function is information. The purpose of having an effective office layout design is to have this information flowing smoothly avoiding unnecessary turns and traps.

Absolutely, there is no office that will fit all company's functions more than an all purpose machine, although there are some good principles of layout by functions that could be adapted to any office situation.

General Principles in Planning General Offices

Work Flow

The most important phase in space planning is the development of the layout that conforms to and compliments with the predominant workflow requirements.

The planner must know the operations, processes and procedures involved in a particular office in order to assist the management by providing workstation patterns that will insure smooth flow of work.

Space planning should not conflict nor overlap with the field of methods and systems analysis. Planner must know the functions as developed and translate into the best space layout within the limitations imposed by building characteristics, fiscal allotment etc.

The Straight Line Principles

1. In a well planned office, papers move from one desk to

Commercial Establishment

another with the least amount of carrying, traveling and delay.

2. Work must go in series of straight line with general forward movement, avoiding cross-cross motion and backward flow.
3. Under the straight line principles, the flow pattern can be traced from desk to desk.
4. Straight line pattern however, cannot be adopted to all activities like departmental offices whose staff functions are different from the assembly line processing type.

The Executive Core Concept

Executive core concept is placing all or most of the offices in the core area, providing spaces along the building for others.

The Work Station

Planning Considerations:

1. Desks should be facing in one direction. This type of arrangement provides straight line work flow pattern, fast communication, neat and attractive in appearance.
2. In an open office space area, placing desk in rows of two allows bank type partitions as dividers for work that requires visual privacy.
3. Desk should be spaced at 1.80 meters from the front of a desk to the desk behind it. This distance should be increased to 2.10 meters when desk are in rows of two.
4. In an open office space work area, supervisor should be located adjacent to the receptionist or secretary.
5. In private offices, desk is positioned where the occupant could see the door.
6. Access to the supervisory workstation should not be through the work area.
7. Desk of employees having more visitors contact, should be placed near the office entrance.

Planning and Designers Handbook

8. Desk of employees doing classified work should be far from the entrance.

Other Planning Considerations:

1. Employees working in closed working area should be in a well-lighted condition. Glaring surfaces that affects vision should be corrected.
2. Heavy office equipment should be placed against walls or columns to avoid floor overloading.
3. Observe safety. Comply with the safety rules. Do not obstruct exits, corridors or stairways.
4. Aisles leading to main exits from areas with substantial traffic should be 180 centimeters wide.

The General Office Space

General office space refers to an open area occupied by number of employees, supervisors, furnishings, equipments and circulation areas. General large office space area, offers the following advantages.

1. Offer flexibility and effective utilization.
2. Aid office communications.
3. Provide better lighting and ventilation.
4. Reduce space requirements.
5. Offer a better flow of work.
6. Simplify supervision.
7. Eliminate partition costs.

A wide open office space with more than 50 persons working, should be sub-divided by either: cabinets, shelving, railings or law bank type partitions.

The Conference Room

The size of conference room is based on demand from past

Commercial Establishment

records and experiences, rather, than on anticipated needs.

1. Private office needs not be provided with conference space.
2. For large offices, conference room should be adjoining the office of top officials that held large number of conferences.
3. Conference room should be centrally located to the users.
4. Interior space that is not so desirable for office purposes is suited for conference use.
5. Access to conference room should be through corridors or reception area.

Size of Conference Room

Conference room is designed to accommodate average number of people only, not maximum attendance. Extra chairs can be used for additional seating.

The Reception Area

The impression of visitors lies on the layout, and decoration of the reception area. Therefore, reception area must be:

1. Attractive.
2. Neat.
3. Business-like.
4. Adequate to accommodate normal visitors traffic.

One square meter allowance for each visitor to be served may be used for space allocations. For instance, in planning space required for 5 visitors at any given time, requires 5 square meters space area. The receptionist should be positioned to command clear view of those entering and, be readily accessible to visitors.

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Typical Space Allotment based on their use by 15 people

1. Reception room 35 sq. m.
2. Waiting or interviewing room... 18 sq. m.
3. Conference room..... 45 sq. m.

Add approximately 1 square meter for each additional person to be served.

Basic Office Functions

To enumerate the basic typical office functions will need several long list that no one might be interested to read. However, all office functions can be capsulated into six groups:

- | | |
|-------------------|-----------------------|
| 1. The management | 4. General services |
| 2. Finance | 5. Technical services |
| 3. Sales | 6. Production |

The Management Group

1. Have the largest and best selected space.
2. Arranged together in a sort of chain command.
3. Reasonably isolated from the general office traffic and casual interruptions.
4. Mostly around the edge of the office but may also be in the center.
5. Top executives need bigger space not only for prestige but accommodate more visitors and meetings.
6. The new office trend for top management measures 3.60 by 4.50 meters.

The Finance Group

1. Place accounting functions near where it gets the order.
2. The accounting functions normally line up according to the system procedures going on straight line activities.

Commercial Establishment

3. The purchasing department has more contact to vendors or suppliers. Thus, it should be located near the entrance or reception room to avoid heavy traffic.
4. Purchasing is tied up with the accounting functions and therefore, must be accessible with each other.
5. The personnel must be closed to the reception to interview applicants and other callers.
6. The data processing activity comes at the end of the line. It should be out of traffic swirl, to be located in a place where noise can be confined.

The Sales Group

1. Sales group frequently has lot of visitors. It requires ample space for catalogue and specification files. Pricing, estimating, and correspondence are big functions in the sales group.
2. Sales group need conference room or all-purpose room for training, meetings, demonstrations and conferences with engineering and product development.

The General Services Group

1. Provides general services for all other functions like central file, stenographic services, library, mail handling duplicating and general communications.
2. It might be at the center by itself convenient to the other office activities.

The Technical Services

Technical services group includes the engineering, drafting and designing people. When they deal with production and systems work, they are out of the plant.

The Production Group

1. Usually in a sub office set up out in the production plant.

Planning and Designers Handbook

2. The shipping and receiving department should not be on top floor although their space requirements could be placed on the top floor.

Space Allowances

Good space utilization does not mean allocating the least possible working space per person. On the contrary, too little working space may reduce the worker's efficiency and waste many times the savings on any reduction in square meter rental costs. Good space utilization means allocating more space to those positions whose activities requires it, and reduces the space where there is an access.

Definitely, there is no accurate measurement of space that will make planning layout automatic. However, experienced planners recommend the following space requirements.

1. Top executive	40 – 50 sq. m.
2. Junior executive	10 – 20 sq. m.
3. Supervisors	8 – 10 sq. m.
4. Operator at 1.50 m desk	5 sq. m.
5. Operator at 1.40 m. desk	4.5 sq. m.
6. Operator at 1.20 m. desk	4.0 sq. m.
7. Operator to be at desk side by side ...	2 in a row

Categories of Space Required in a Typical Offices

1. Office space
2. File space
3. Special equipment space
4. Storage space
5. Special room

Office Layout

Planning Considerations:

1. Office layout is based on modules derived from standard furniture and equipment, and other space clearances.

Commercial Establishment

2. For large general offices, the module is based on the desk and chair that are about 150 x 180 centimeters.
3. Since the 150 x 180 cm. dimension is also satisfactory aisle between rows of desks, the module can be used to form rectangular grid in planning large office areas.

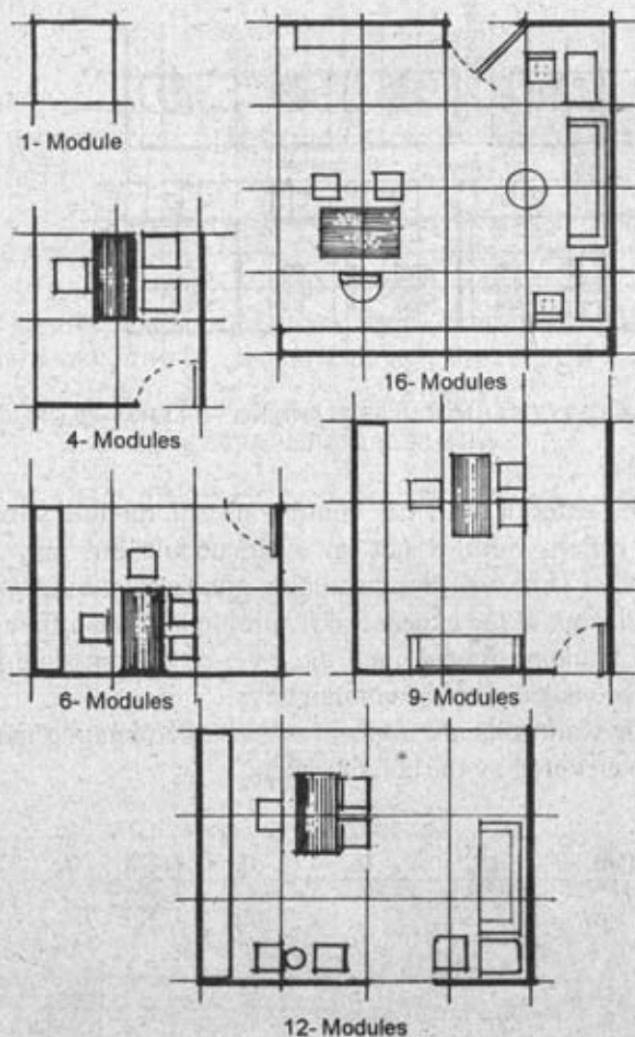


FIGURE 4-31 TYPICAL OFFICE MODULAR PLANNING

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- For private offices, the controlling factor is the minimum practical office layout with wall and window designs. A planning module of 120 to 150 cm. is ideal.
- With this module, the smallest office with 2 modules would be 2.40 - 3.00 meters wide.

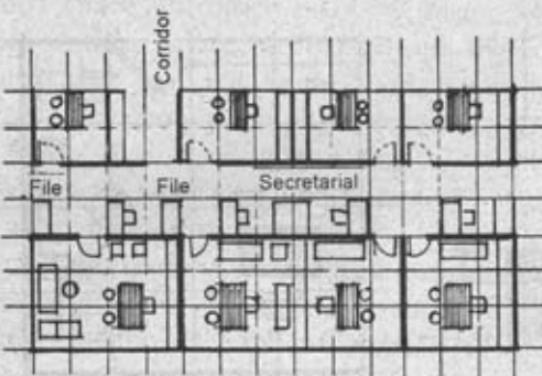


FIGURE 4-32 TYPICAL MODULAR PLANNING FOR PRIVATE OFFICE WITH SECRETARIAL AREA

- If the exterior wall has continuous one module window, the office width is not an even module but may vary widely. This wall design allows greater flexibility in office layout at the expense of natural light in the office.
- The planning module and the exterior wall module must be reconciled with the column bays.
- If the wall units are uniform in size, the planning module is interrupted by the column width.

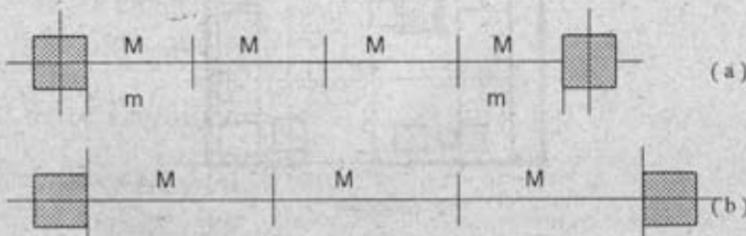


FIGURE 4-33 PLANNING MODULE WITH WALL AND COLUMN

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9. If columns are set inside the walls, planning modules will be affected, unlike when it is set outside the walls.

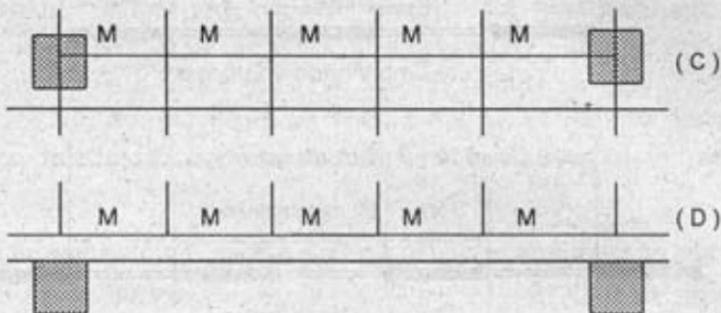


FIGURE 4-34 PLANNING MODULE WITH WALL AND COLUMN SPACING

10. Column spacing commonly used on multi story buildings is about 9 to 10 meters, although the trend is to provide wider span from 18 to 21 meters spacing.

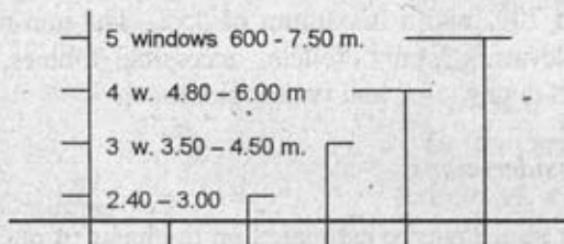


FIGURE 4-35 PRIVATE OFFICE USING MODULE OF 120 TO 150 WITH CONTINUOUS WINDOW

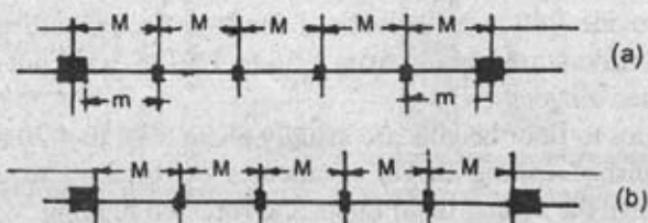


FIGURE 4-36 PLANNING MODULE FOR LAYOUT OF GENERAL OFFICE

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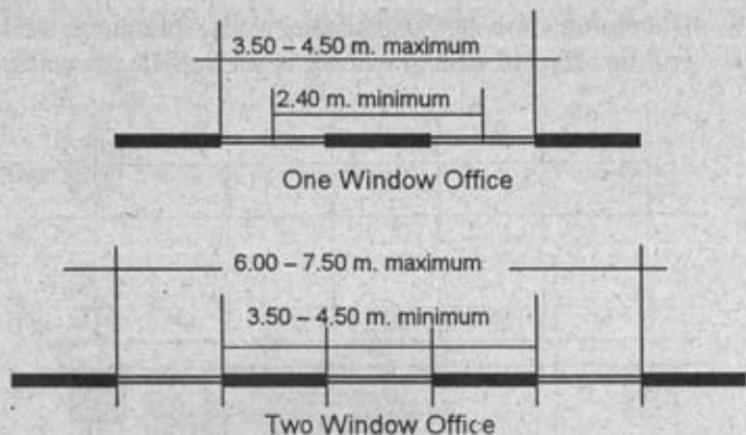


FIGURE 4-37 PRIVATE OFFICE WIDTH USING 120 TO 150 MODULE

Efficiency of an Office Building Design

The efficiency of an office building design is measured on the ratio of rented space to the total area. The average rented space is about 70% and a maximum of 85%. The non-rentable spaces are: elevators, stairs, toilets, accessible lobbies, corridors, pipes and duct shafts, and janitor closets.

Planning Considerations:

1. Elevator space maybe estimated on the basis of one elevator per 2,300 square meters of rented area.
2. Elevator lobby should be 1.80 to 2.70 m. wide if elevator is on one side only.
3. Provide 3.60 m. wide lobby if elevators are on both sides.
4. Corridors are usually from 1.50 to 1.80 m. wide but wider when longer.
5. Floor to floor heights are usually about 3.60 to 4.20 m.
6. Finished ceiling height is about 2.40 to 2.60 m. space above the ceiling is for ducts and recessed lighting.
7. Provide opening on the web of girder design to allow passages of ducts to avoid excessive depth of utility spaces.

Commercial Establishment

4-10 Private Offices

Private offices are viewed primarily for functional reasons such as the nature of the work, visitors, traffic, and for security reasons. Private office must be ample enough for occupants to exercise his normal business with a degree of dignity. Dignity means prestige to impress visiting representatives of industries and the general public.

The minimum size of a private office is about 10 sq. meters and a maximum of 30 sq. m. each depending upon the preference of the occupants.

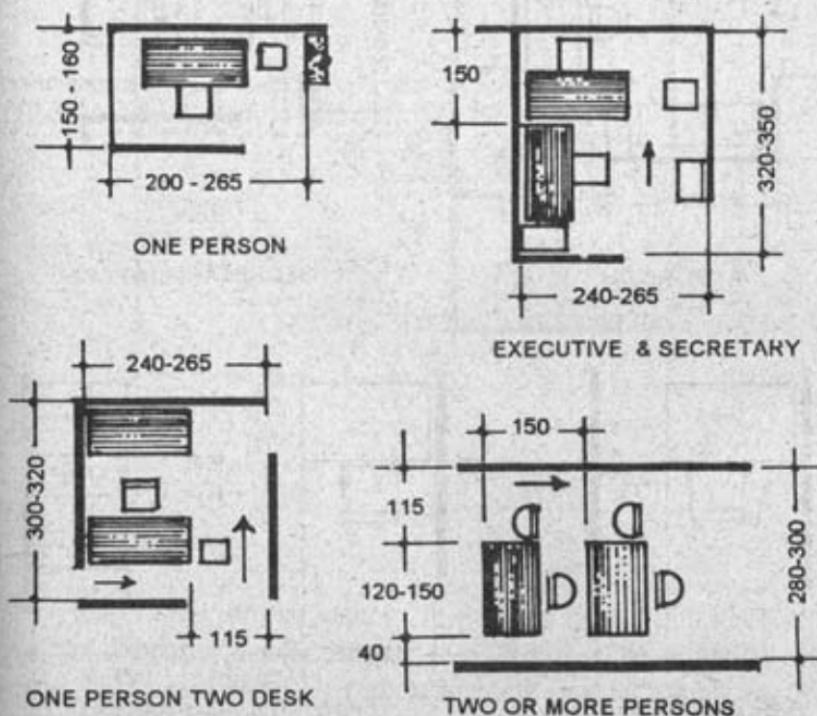
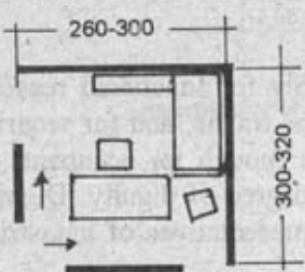
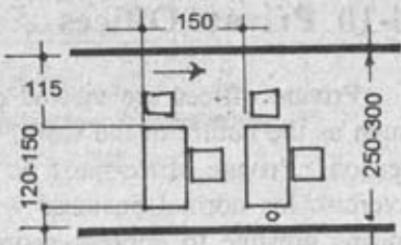


FIGURE 4-38 PRIVATE OFFICE DIMENSIONS AND CLEARANCES

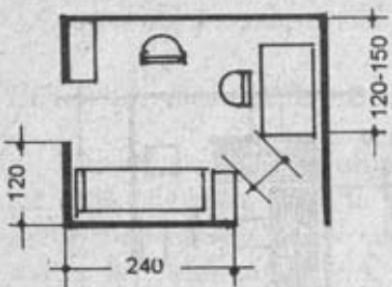
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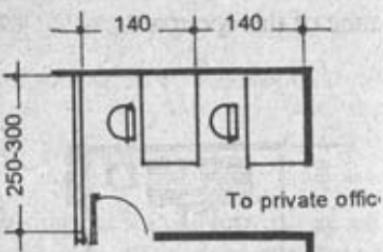
DESK AND WORKTABLE



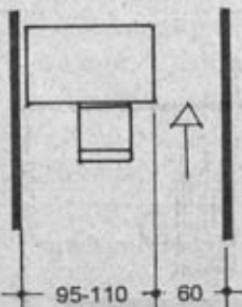
TWO OR MORE MERSONS



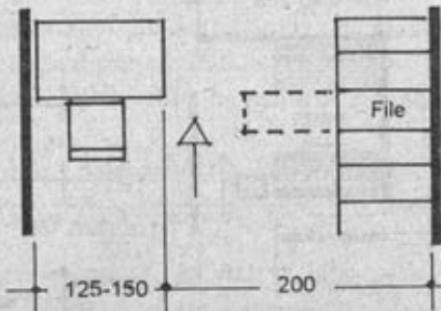
ANTE ROOM



SECRETARIAL SPACE



TYPEST PLUS PASSAGE



DESK FILES PLUS PASSAGE

FIGURE 4-39 FLOOR PLAN OF PRIVATE OFFICES

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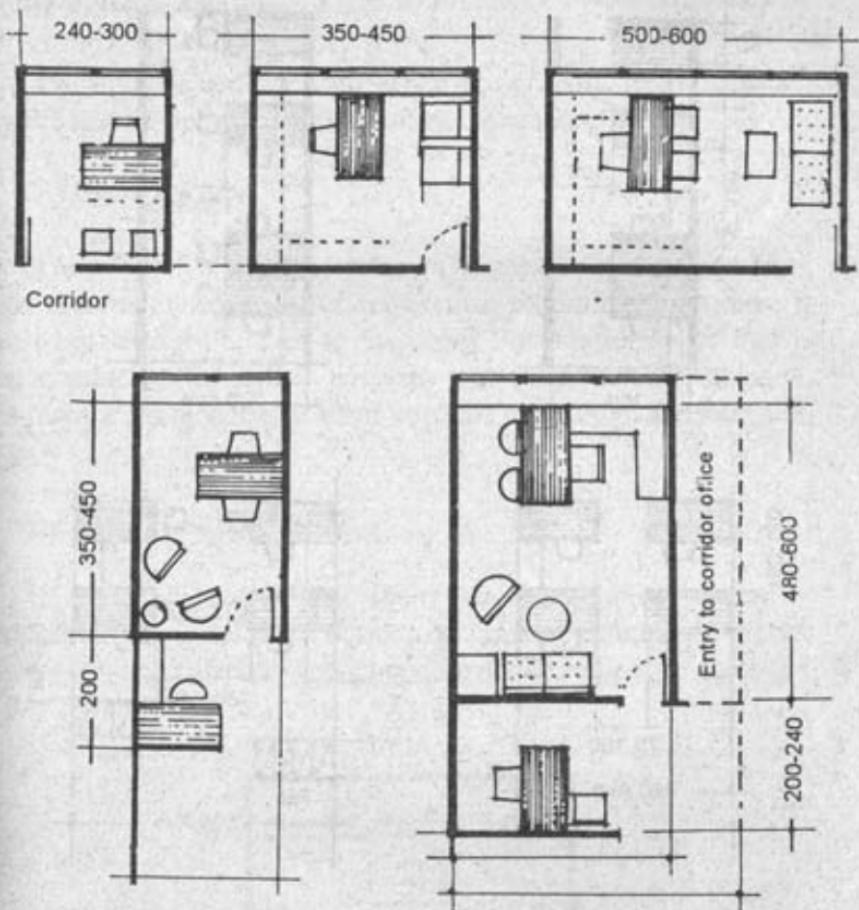


FIGURE 4-40 LAYOUT OF PRIVATE OFFICES

Reception Area

The impression of visitors lies on the layout and decoration of the reception areas. Hence, it must be attractive, neat, business like and adequate to accommodate normal visitors traffic. An allocation of one square meter for each visitor is satisfactory. If 10 visitors will be attended at any given time, 10 square meters area will be satisfactory.

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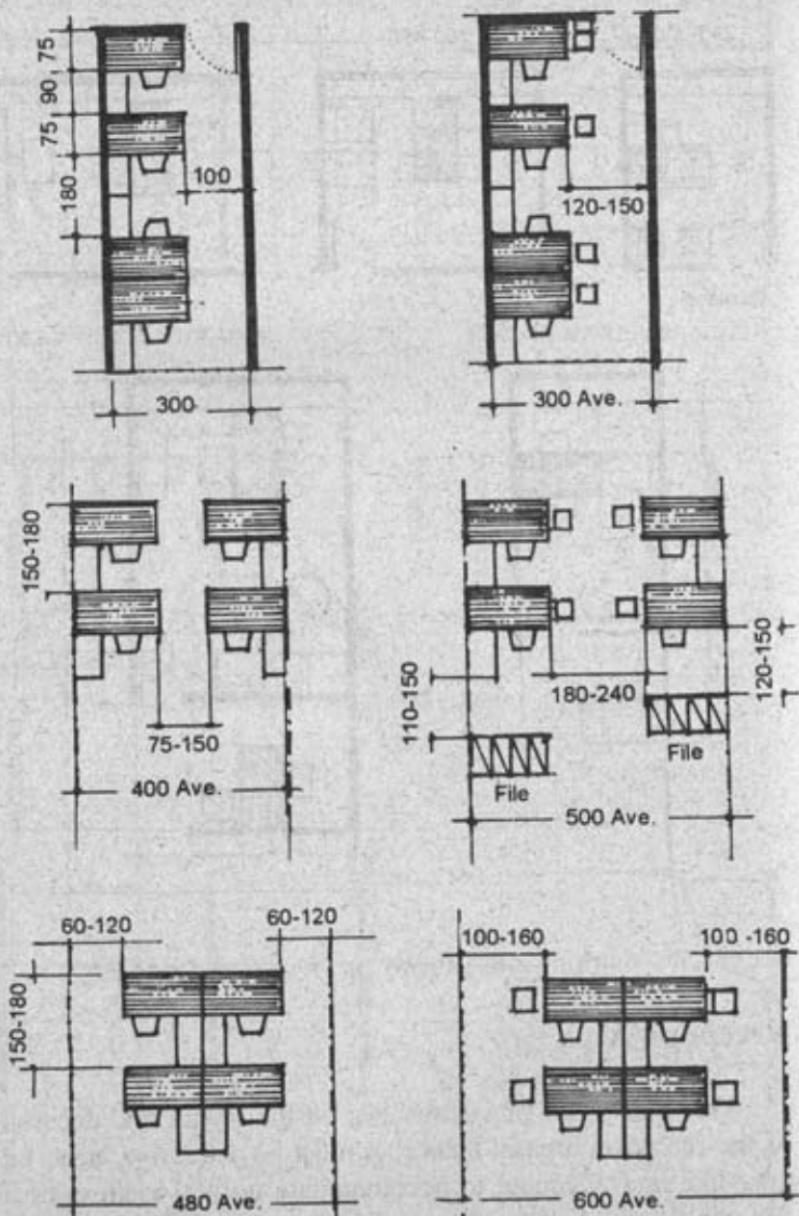


FIGURE 4-41 CLEARANCES FOR CLERICAL AREAS.

Commercial Establishment

Semi Private Office

The area of semi private office is normally from 15 to 40 square meters occupied by two or more persons.

Conference Room

The size of a conference room is based on demands from past records and experience rather than on anticipated needs. It must be centrally located to the users. An interior space that is not conducive for office purpose is recommended. Access to conference room must be from corridor or through the reception area.

Size of Conference Room

The size of a conference room should be enough to accommodate average number but not maximum attendance. Extra chairs can be utilized to accommodate additional participants.

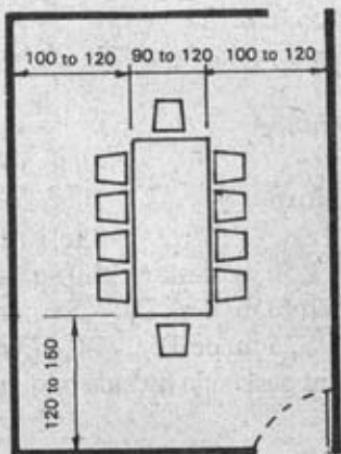


FIGURE 4-42 PLAN OF A PRIVATE OFFICE CONFERENCE ROOM

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Basic Office Functions

To enumerate all the typical office functions will require a very long list that one may no longer interested to read. Office functions can be capsulated into the following:

1. Management
2. Finance
3. Production
4. Sales and collections
5. General services
6. Technical services

Space Allowance

Good space utilization is to give more space to those positions whose activities requires it and reduces the space of those who doesn't need it.

Types of Spaces Required

1. Office space
2. File space
3. Special equipment
4. Storage space
5. Special room

Office Space Allowances

1. Top executive	40 to 50 sq. m.
2. Junior executive	10 to 20 sq. m.
3. Supervisors	8 to 10 sq. m.
4. Operator at 1.50 m. desk	5.0 sq. m.
5. Operator at 1.40 m. desk	4.5 sq. m.
6. Operator at 1.25 m. desk	4.0 sq. m.
Operator to be at desk side by side two in a row	

File Space Allowance

File cabinet is actually measured and knowing the quantity

Commercial Establishment

required would be easy to determine the space requirement. For open file cabinet with no working area in front of the open drawer we have:

- | | |
|----------------------------|------------|
| 1. Standard letter file | 0.6 sq. m. |
| 2. Standard legal file | 0.7 sq. m. |
| 3. Side opening file | 0.6 sq. m. |
| 4. Side opening legal file | 0.7 sq. m. |

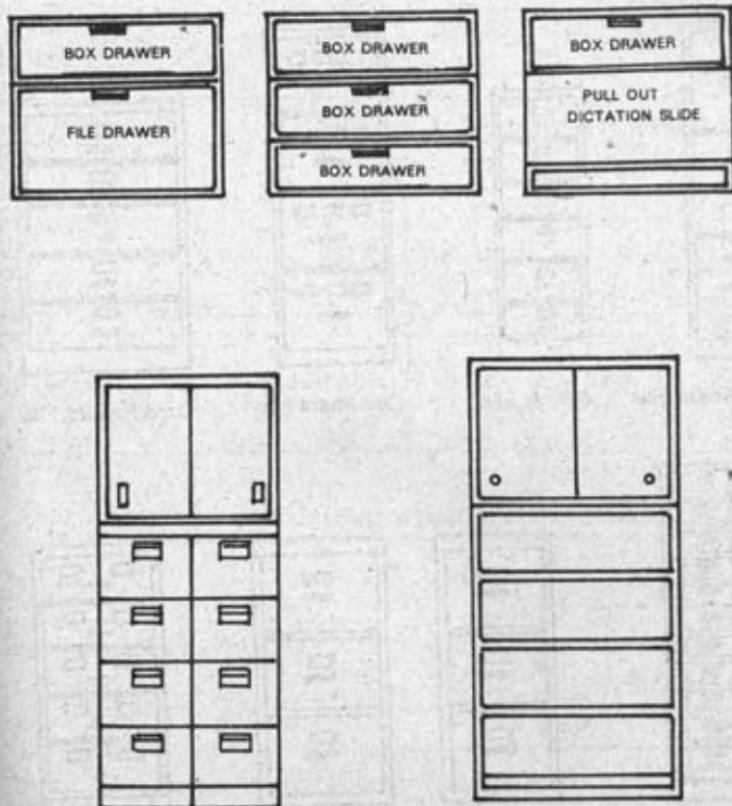


FIGURE 4-43 TYPICAL CREDENZA COMPONENTS AND VERTICAL FILES

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TABLE 4-3 TYPICAL CREDENZA DIMENSIONS

Type	Width cm	Depth cm	Height cm.
One Component	70-75	45-52	63-75
Two Components	93-100	45-52	63-75
Three Compartments	110-150	45-52	63-75
Four Components	155-200	45-52	63-75
Five Components	240-245	45-52	63-75



Ledger Sheet File



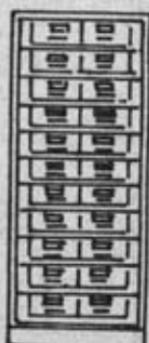
Check File



Document File



Card Record File



Tabulating Card File



Fire Insulating File



Card File

FIGURE 4-44 FILING CASES

Commercial Establishment

TABLE 4-4 TYPICAL OVERFILE STORAGE

Type	Width cm.	Depth cm.	Height cm.
Over two letters	75	70	65
Over two legal	90	70	65
Over three letters	110	70	92
Over three legal	135	70	92

TABLE 4-5 VERTICAL FILES

Type	Width cm.	Height cm.	Depth cm.
5-door letter	37	150	70
legal	45	150	70
4-door letter	37	126	70
legal	45		
3-door letter	37	103	70
legal	45	103	70
2-door letter	37	75	70
legal	45	75	70

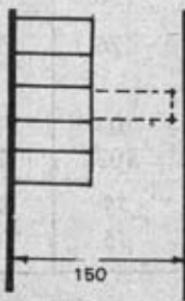
TABLE 4-6 TYPICAL OVERFILE STORAGE

Type	Width cm.	Height cm.	Depth cm.
Letter size	90	65	38
Legal size	90	65	45
Inside Drawer Dimension			
Letter	31	26	67
Legal	38	26	67

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TABLE 4-7 LATERAL TIES (in CM.)

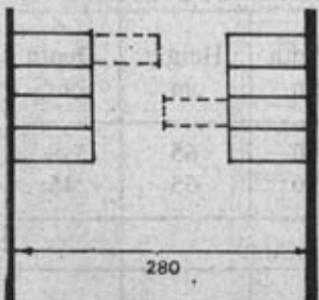
Type	Width	Height	Depth
2-door letter	90	75	38
legal	90	75	45
3-door letter	90	102	38
legal	90	102	45
4-door letter	90	130	38
legal	90	130	45
5-door letter	90	160	38
legal	90	160	45
6-door letter	90	190	38
legal	90	190	45
7-door letter	90	220	
legal	90	220	



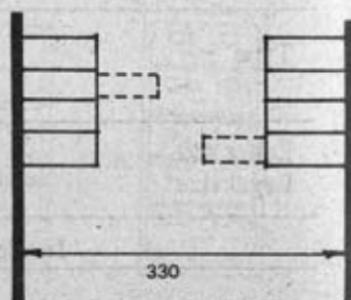
PASSAGE ON DRAWERS CLOSED



PASSAGE DRAWERS OPEN



FACE TO FACE PASSAGE
DRAWERS CLOSED



FACE TO FACE PASSAGE
DRAWERS OPEN

FIGURE 4-45 STANDARD CLEARANCES FOR LETTER AND LEGAL FILES

Commercial Establishment

TABLE 4-8. SPECIAL FILES (in CM.)

TYPE	Width	Height	Depth
1. Ledger sheet files	37	131	70
2. Check files	32	103	70
3. Document files	45	131	70
4. Card record files			
6-Drawers 3" x 5" and 4" x 6" cards	63	103	70
5-Drawers 3" x 5", 4" x 6" and 5" x 8" cards	63	103	70
5. Tabulating card file 5" x 8" card	48	103	

TABLE 4-9 FIRE INSULATING FILES (in CM.)

TYPE	Width	Height	Depth
Two door	letter	38	70
	legal	50	70
Three door	letter	43	102
	legal	50	102
Four door	letter	43	130
	legal	50	130

4-11 Banks

Bankers have indicated that banks of the next decade will blend excitement and attraction with dignity and modern feeling of solidity. Banks design will be more inviting through the further use of glass, colors, and art in addition to their offering of more convenient services through direct access to the street and through drive-in facilities.

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Planning Considerations

A. Public Spaces

1. *The Lobby*. This must be accessible to the public. It contains reception/information, loan officers, tellers and check writing desks.
2. *The Tellers* should be accessible and the space surrounding allows easy circulation of the public. This is located at one side of the bank to permit future expansion.
3. *Loan Officer* should be readily accessible to the public.
4. *Check Writing Desk* is positioned not to block circulation especially of the line-up space in front of the teller.
5. *Officers Platform* provides open space for contract officers, cubicles for collection officers, installment loan and commercial loan offices.
6. Provide access to the safety deposit vault for customers and to the money vault for tellers.

B. Operations

Operations is the department that supervises and control all clerical works that runs the bank and keep the records in order.

1. Bookkeeper Department
2. Proof Department is not accessible to the public, but can be separated from other areas but fairly closer to the Data Processing area.
3. Data Processing Area is where computers are installed
4. Clerical, mail and other minor services. Mailroom should be in close proximity to the proof department.
5. Fireproof Records Vault to service proof, trust and bookkeeping department.
6. Safety Deposit Vault provides boxes for the storage and safekeeping of customer's valuables.
7. General Services includes employees lounge, snack bar, comfort rooms, mechanical equipment and maintenance.

Commercial Establishment

8. Drive-in and Walk-up Tellers. Teller windows should be considered with regards to flow of traffic and security.
 9. Trust Department. The major services to the public where trusts, probates, and accounts are carried out.
- C. Executive Suite is the office for senior vice president, board members and president including their personnel. A conference room and board meeting room is also required.
- D. Legal Department attending bank's legal business.
- E. Data Processing Department processes bank payrolls, operations and other procedures.
- F. Mail Room contains addressograph, microfilm equipment, duplicating machines and other equipment. It should be located near the service yard or elevator in close coordination with the printing/purchasing department.

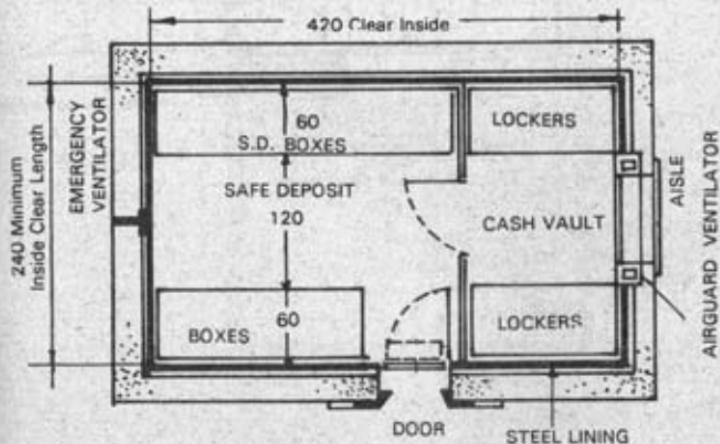


FIGURE 4-46 PLAN OF A SINGLE AISLE VAULT

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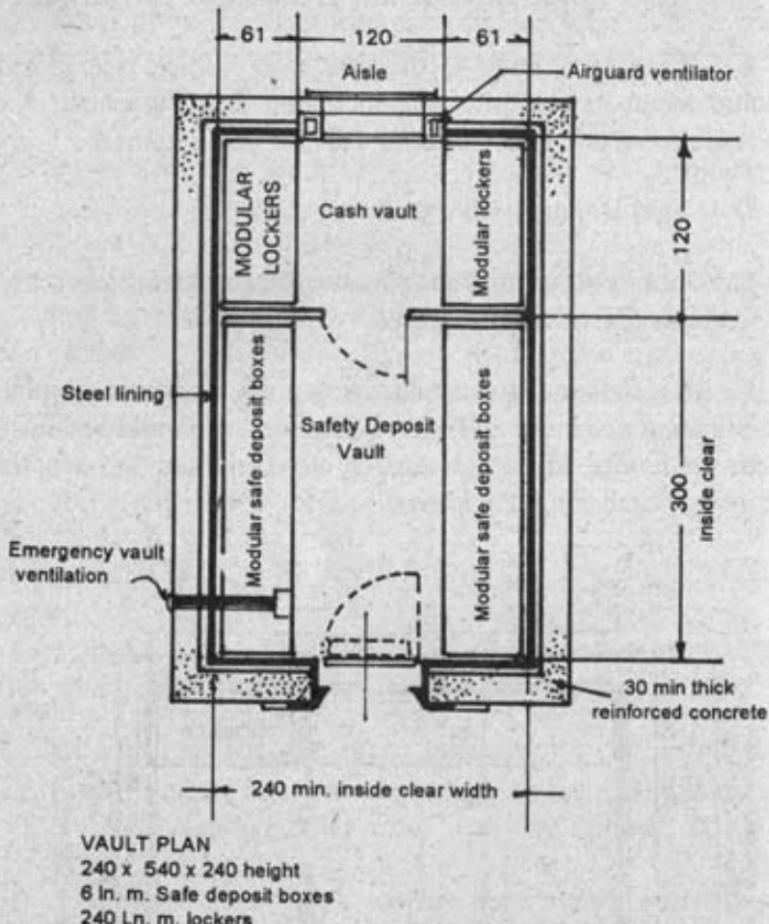


FIGURE 4-47 PLAN OF A SINGLE AISLE VAULT

Commercial Establishment

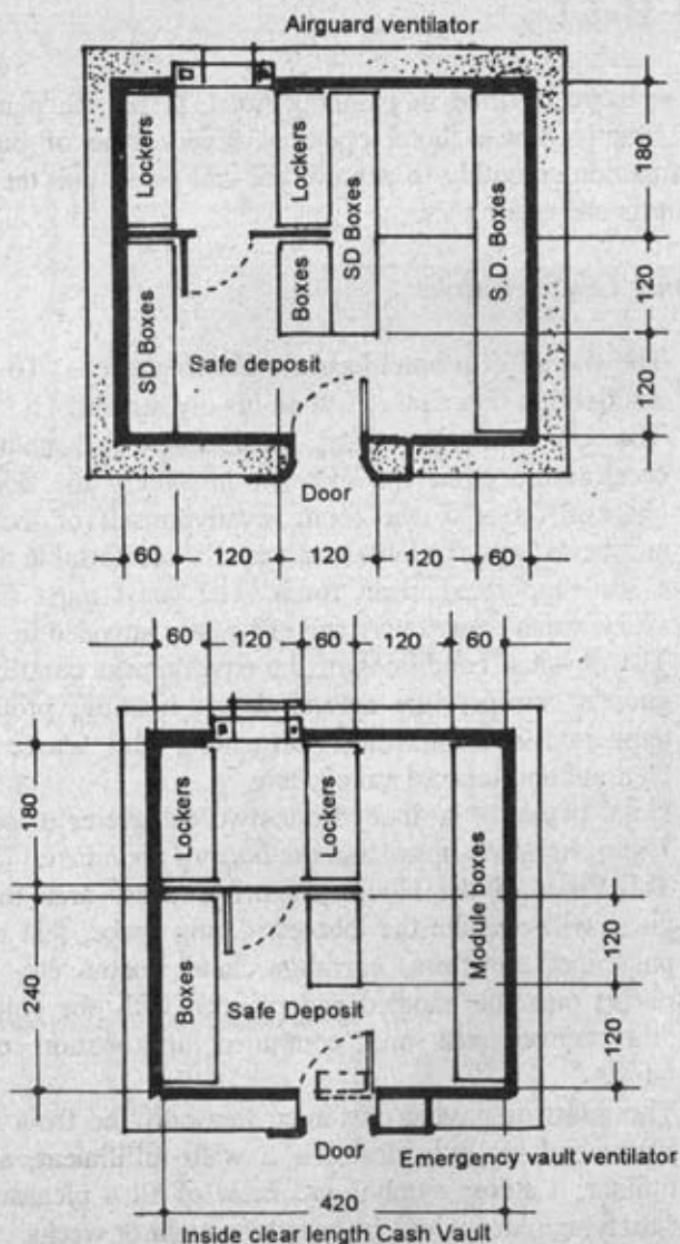


FIGURE 4-48 PLAN OF DOUBLE AISLE VAULT

4-12 Hotel

The basic theories in planning hotel, is for the planner to know exactly how a hotel operates. Every type of buildings must function smoothly to achieve the end result that the owner and guests are seeking for.

Planning Considerations:

1. The Owner of a hotel has but one objective – “To realize a satisfying financial return on his investment”
2. The Guest on the other hand, must feel completely comfortable from the moment he enters the doorway, check-in, goes to the room, avail himself of the foods and beverages available and spend a comfortable night in a well appointed clean room. The guest must find his every wants courteously and efficiently attended to.
3. The physical conditions of the environment contribute to guest's comfort like colors, decor, lighting, proper air temperature, comfortable furnishing and above all a pleasant and relaxed atmosphere.
4. Hotel planning is divided into two categories of service. *The front of the house and the back of the house.*
5. The Front of the House comprises every area that the guest will see like the lobbies, dining space, rest rooms, passenger elevators, corridors, hotel rooms etc. These places must be handled and planned with one objective: “the convenience and continued approbation of the guests.”
6. The guest or paying customer sees only the front of the house and his only desire is a wish fulfillment, an ego builder, a status symbol and most of all a pleasant and satisfying place where he spend the night or weeks.
7. The Back of the House or general services is the most critical part of the plan. This is the area that absorbs all orders and demands making everything possible.

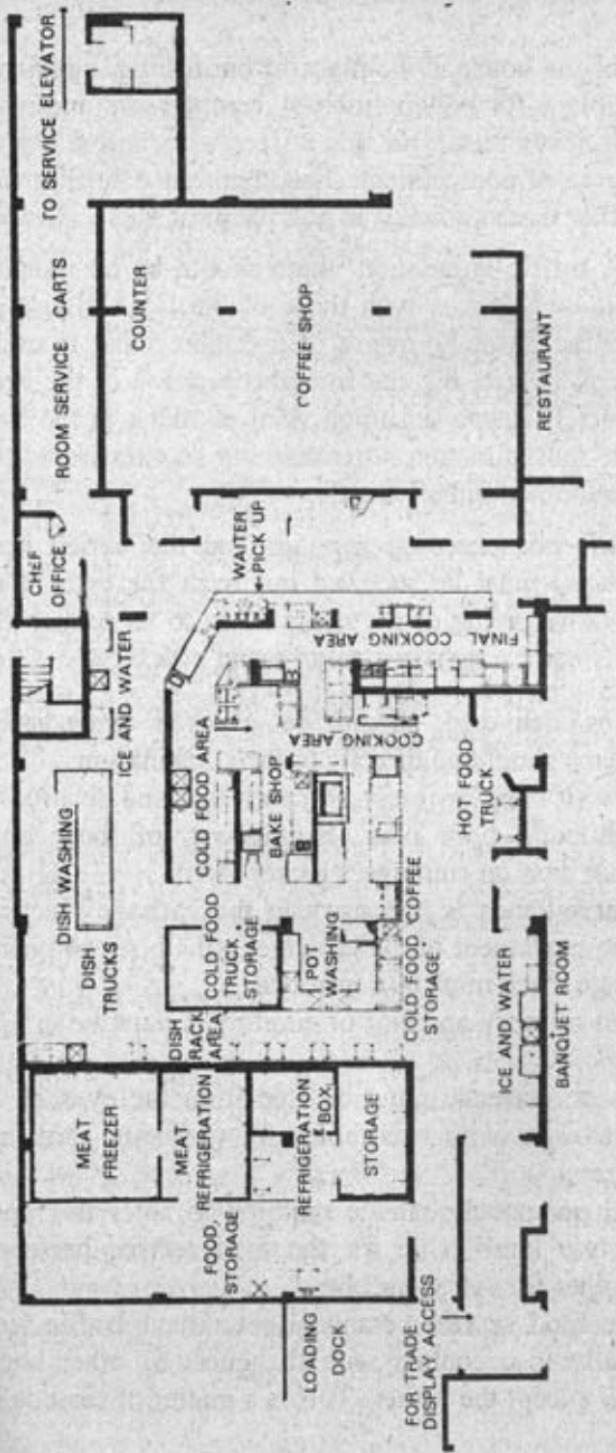


FIGURE 4-49 DOUBLE AISLE VAULT PLAN MAIN KITCHEN, PARADISE ISLAND, NASSAU BWI

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The back of the house is the place of burnishing, butchering and baking. A place for boilers, motors, compressors and ovens that guests has never seen. But this unseen area will determine the guest's degree of contentment. The area that will ultimately determine whether the hotel will run at a profit or loss.

In planning traffic circulation, there should be no mingling of the Front House services with those of the Back House. At no time should the guest be aware of everything that is taking place at the Back House, but the smooth operation of the Front House is completely dependent upon what is taking at the Back House. The two must function separately but so interrelated that each function smoothly and efficiently.

All foodstuff housekeeping supplies and the varied items required in a hotel must be received out from the eyes of the hotel guests. The receiving of the items down to its proper destination must be under a tight control to avoid pilferages:

1. All items delivered should be checked immediately. These items should go directly to their destination.
2. The flow of supplies must be controlled and secured by the Architect's floor plan. Passageway of these items should not pass an employees locker room.
3. Tight surveillance is necessary in the garbage receiving area. The movement of the garbage to the point of pickup by garbage truck must be controlled.
4. The point of entry and exit of employees must be in tight control.
5. The service entrance must be free from the eyes of the guest, provided with two tables for receiving clerk and timekeeper.
6. All hotel personnel shall be required to enter this point passing two lanes. One for the food service personnel and the other for every one else.
7. Once the food service personnel enter their traffic lane, they totally lose contact with the guest or other house personnel except the waiter. This is a matter of secrecy.

Commercial Establishment

Housekeeping

The usual number of rooms a maid could make up a daily tour is 12 to 15 rooms. This include the removal of bedspread, straightening of the room, supply of soap, toilet paper etc.



FIRURE 4-50 HOTEL GUEST REGISTRATION

Hotel Guest Registration

Hotel guest registration should be located visibly from the hotel lobby. The size of the desk is determined by the hotel size. There is no definite rule as to how many registration clerk required, but experienced proved that 1,000 room hotel has three registration clerks, while the 100 to 200 rooms has one or at most two registration clerks.

Big hotels provide a more sophisticated computer to indicate the arrival and departure of guests, the reservations, information as to whether the room has been vacated and ready to receive new guest etc.

Planning and Designers Handbook

Hotel industry primarily depends on reservation. Thus, location of the reservations office should be closer to the front desk for easy response to any questions that may arise.

The Administrative Area

Administrative area must be accessible to the public. The administrative area deals with guests seeking arrangement for luncheons, banquets and conventions.

The Lobby

Every hotel must have a lobby. There is no definite rule to follow as to the size of the lobby for a certain type of hotel. It goes without saying that; "the bigger the hotel the bigger the lobby is."

A hotel lobby establishes the mood for the hotel. This particular space creates the first and the most lasting impression. The furnishings, size, decorations, color, finishing and lighting must create the proper ambience regardless of the hotel size.

The Elevator

Planning Considerations:

1. The location of elevator must be visible immediately from the entrance or from the registration area.
2. The elevator must be located in a shortest walking distance of the guests.
3. As to the number, size and speed of the elevator, consult the manufacturing company.
4. Guest elevator should not be used for service, and service elevator should be separate and apart from the guest elevator.

Commercial Establishment

The Guest Floor Corridor

Planning Considerations:

1. Passenger's elevator is usually noisy. No guest room should be placed opposite the elevator.
2. As much as possible, corridors length should not be more than 50 meters long.
3. Normally, a 180 to 2.00 meters width corridor is adequate.
4. Setback doors by 30 to 60 centimeters apparently, give the corridor an additional width and at the same time give each room-entrance, a feeling of privacy and individuality.
5. Lighting the corridor alcove creates a pleasant feeling and at the same time lighting the number of the rooms.
6. Provide big ashtray for cigarettes near the elevator.

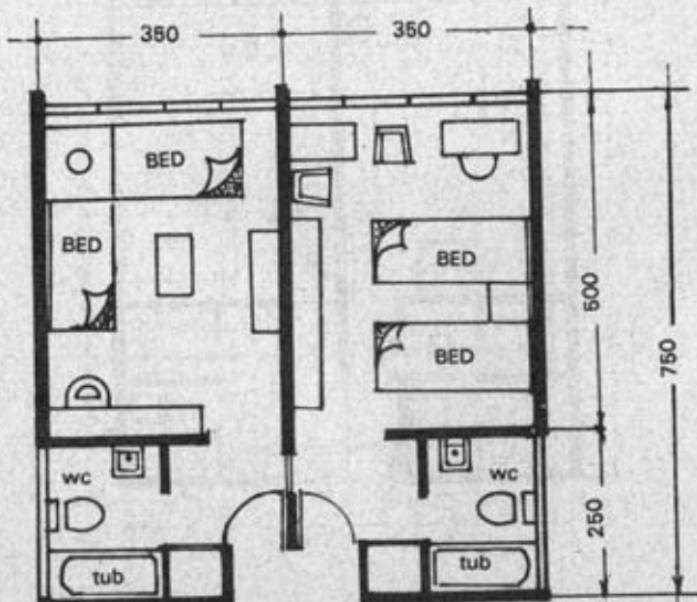
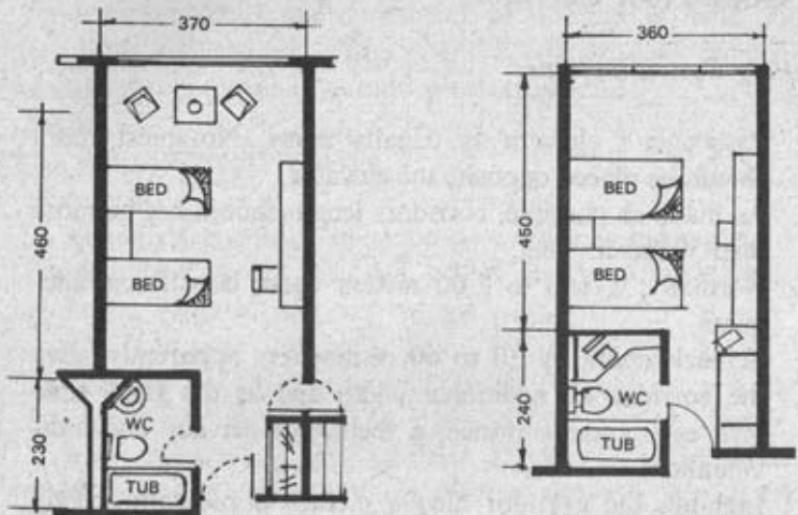


FIGURE 4-51 PLAN OF A HOTEL TWIN BEDROOM

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TWIN BEDDED GUEST ROOM

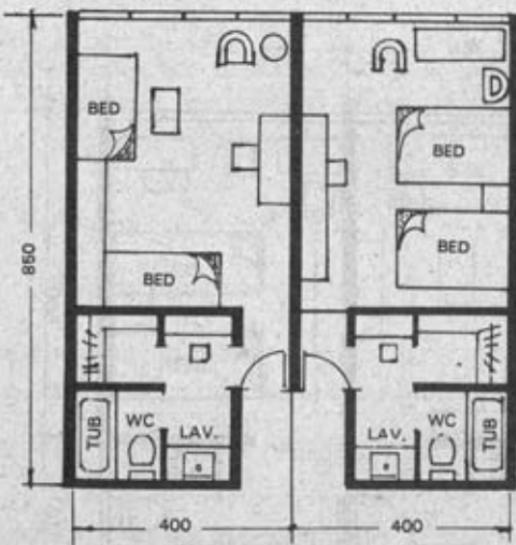
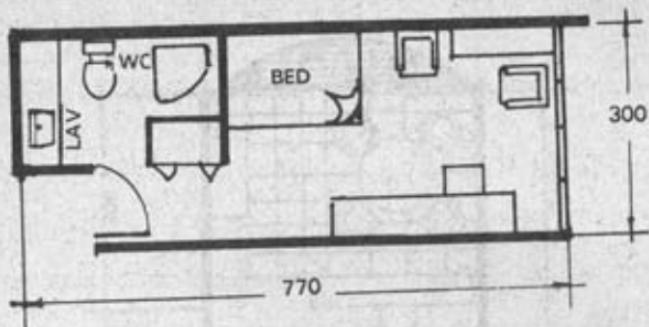


FIGURE 4-52 PLAN OF DOUBLE BEDDED GUEST ROOM

Commercial Establishment



SINGLE BED GUEST ROOM

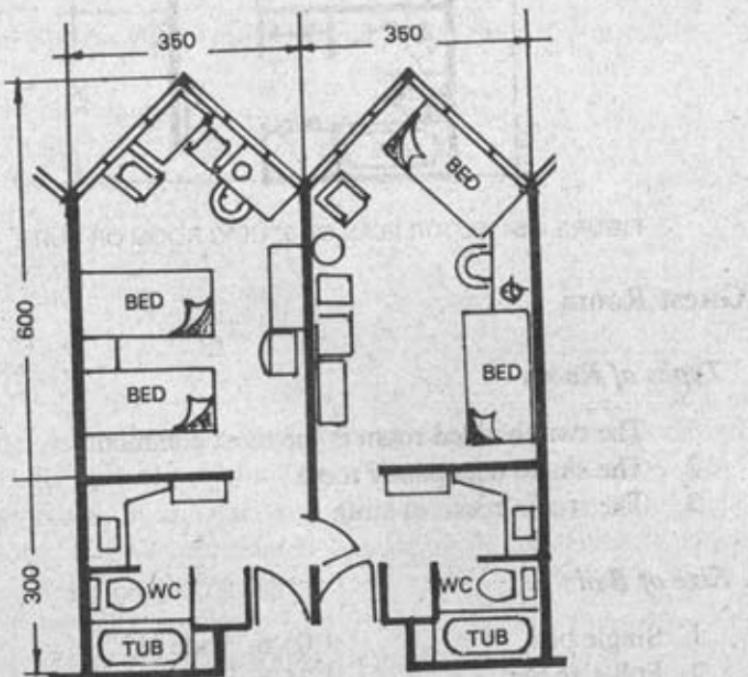


FIGURE 4-53 PLAN OF STUDIO ROOM OR SUITE

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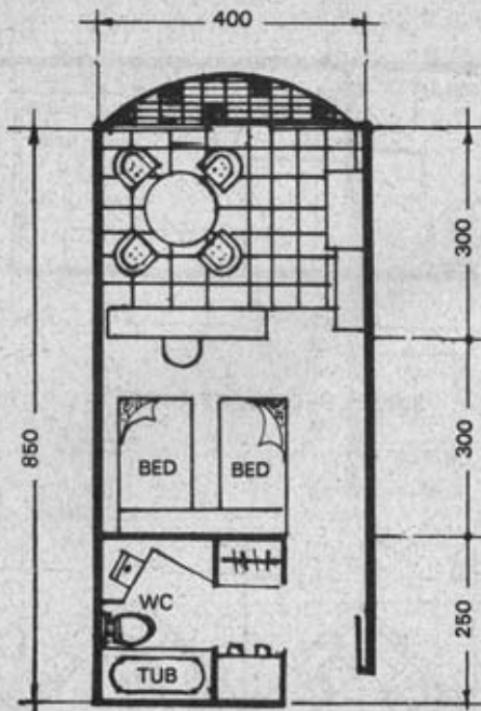


FIGURE 4-54 FLOOR PLAN OF STUDIO ROOM OR SUITE

Guest Room

Types of Room

1. The twin bedded room is the most common.
2. The single occupancy room
3. The studio room or suite

Size of Bed

1. Single bed	1.05 m. wide (42")
2. Full size bed	1.35 m. wide (54")
3. Queen size bed	1.50 m. wide (60")
4. King size bed	1.80 m. wide (72")
5. Presently bed length	1.95 m. long (78")

Commercial Establishment

Considering the average height of the new generation is becoming taller, the 210 cm. or 84" long bed is recommended.

Estimating an Area for Meeting or Banqueting Space

Standing person will require	46 sq. m. per person
Person seated at a table	1.0 - 1.4 sq. m. per person
Person seated for a seminar	0.83 sq. ml. per person
Foyer or pre-banquet space is 25% of the actual dining area.	

From the above data, the planner can make a rough estimate of the dining or meeting area.

Six Main Spaces of a Typical Hotel According to Functions

1. Public space
2. Concession space
3. Sub rental space
4. Food and beverage service area
5. Guest room space
6. General service space

4-13 Motel

Motel is defined as any type of sleeping accommodation designed for travelers using car. The word motel came from Motorist Hotel. It is otherwise called Cabin, Court, Lodge or Inn. Motel is now considered a part of hotel business since many big motels are offering the same services as hotels.

The Success of Motel Business Depends on:

1. Good location
2. Attractive appearance
3. Economical but quick good service

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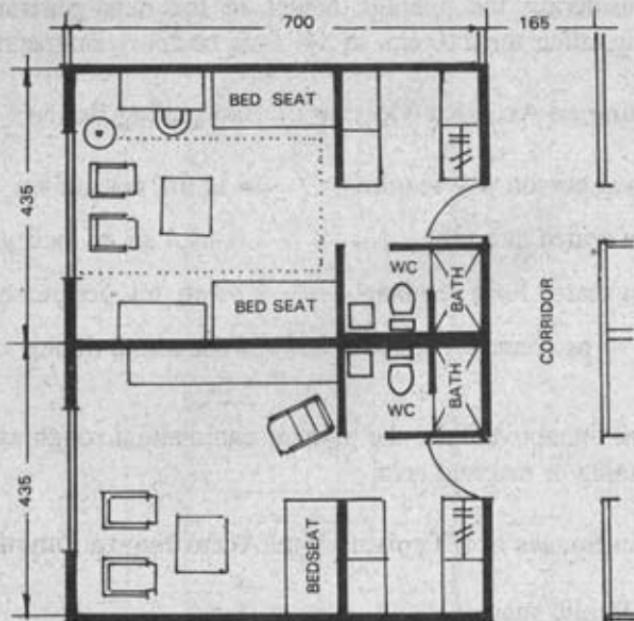


FIGURE 4-55 PLAN OF A MOTEL ROOM

Types of Motel

1. The City Motel – Built in town or on edge of town intended for business traders with transaction in downtown area.
2. Motor Annex – Adjoins an existing hotel in the city.
3. Highway Motor Motel – Provides room-side parking for travelers.
4. Resort Motel – Intended for guest already at their destination that requires ample recreational facilities.
5. The Airport Inn – Built at a major international airport offering a large and high-class operation.

4-14 Medical Offices

A medical offices has the following elements: .

Commercial Establishment

1. Reception control station, business and the office.
2. Waiting room
3. Consultation room
4. Examination room
5. Treatment room
6. Laboratory
7. X-Ray room
8. Utility and service area
9. Toilet

Definitely there is no fixed plan for medical practice facilities because of:

1. No person or group of persons think and work alike.
2. The geographical and physical condition that characterized medical facilities. Each facility is custom made depending upon the working habits of those who use it.

The Receptionist

The receptionist is usually the doctor's assistant, book-keeper and collector. She keeps an eye to all works in the office, see and acknowledge the arrival of the patient, follow the progress of the doctor for a proper flow and direction of the patient. For larger office, the above functions are divided to the receptionist and nurse.

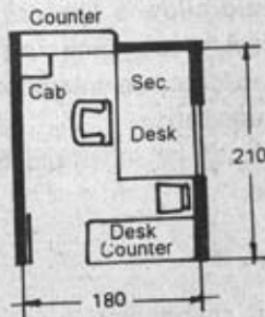


FIGURE 4-55 PLAN OF THE RECEPTIONIST

Planning and Designers Handbook

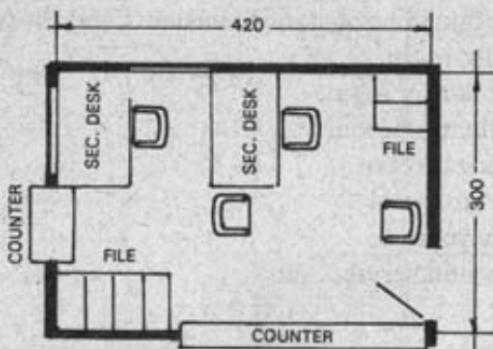


FIGURE 4-56 PLAN OF RECEPTION OFFICE

Waiting Room

The waiting room is the space that gives first impression to the patient. The room physical appearance support the type of care a client can expect to receive. A crowded outmoded room depresses and disgruntled even the best and regular patient.

Qualities of a Good Waiting Room

1. Provided with adequate table and chairs properly spaced to make reading possible giving the patient a feeling of freedom.
2. The room should be properly decorated to have an overall homely and restful effect.
3. The room should allow a view of the outside. The view refers to a pleasing one, such as flowers, threes and distance. In it's absence, an interesting view of people and activity is the alternative.
4. Waiting room must be separated from the office activity or a traffic aisle.

Consultation Room

Consultation room should not be necessarily spacious but properly furnished with tasteful furniture, decor and colors.

Commercial Establishment

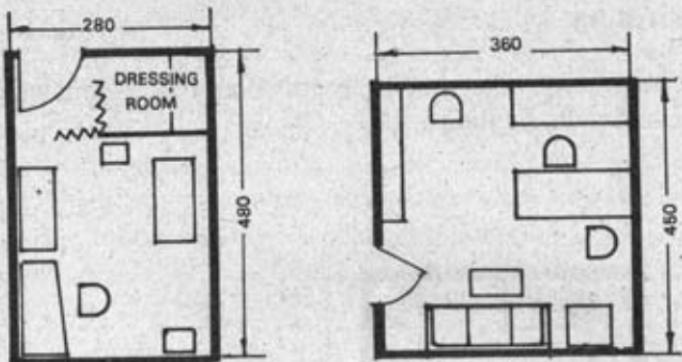


FIGURE 4-57 CONSULTATION ROOM

Examination Room

Examination room should be properly lighted designed in accordance with the doctor's habit and preference. A patient could be prepared ahead by the doctor's assistant if two or more examination rooms are available.

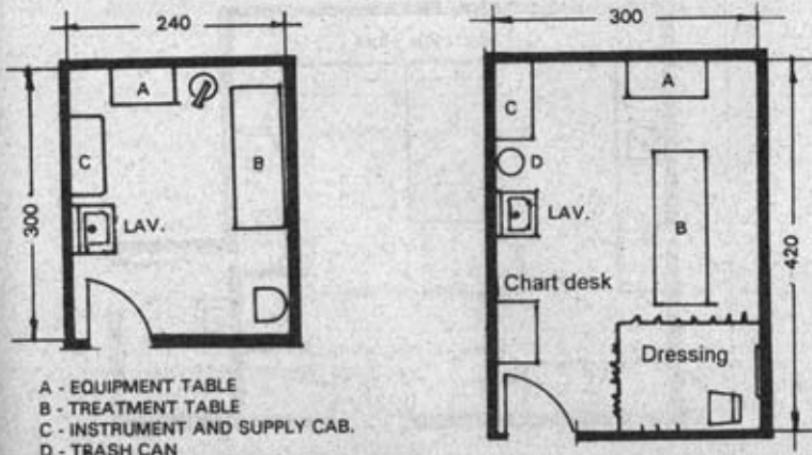


FIGURE 4-58 PLAN OF EXAMINING AND TREATMENT ROOM

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Laboratory

Laboratory room should be provided with an ample counter space and toilet facilities.

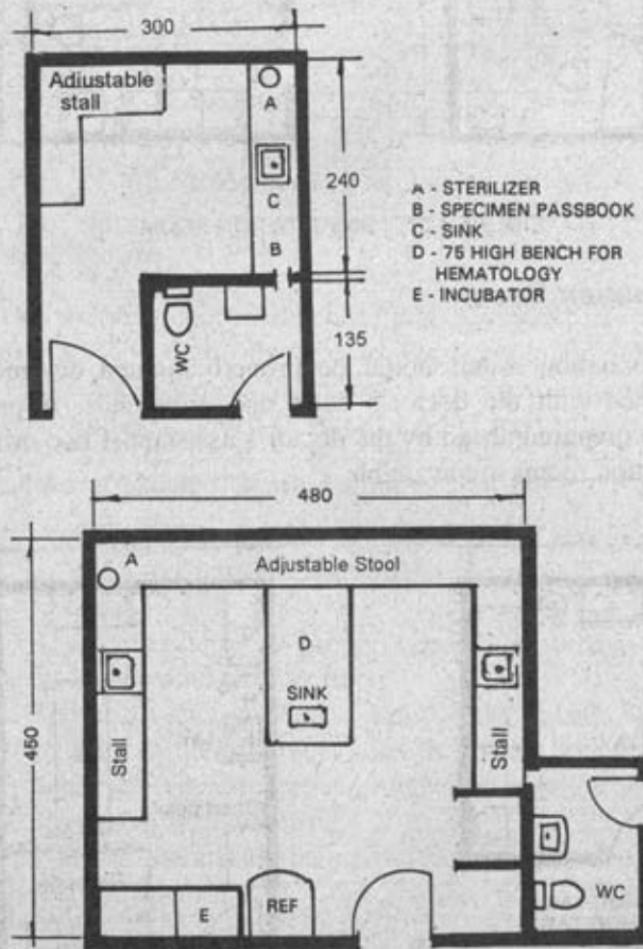
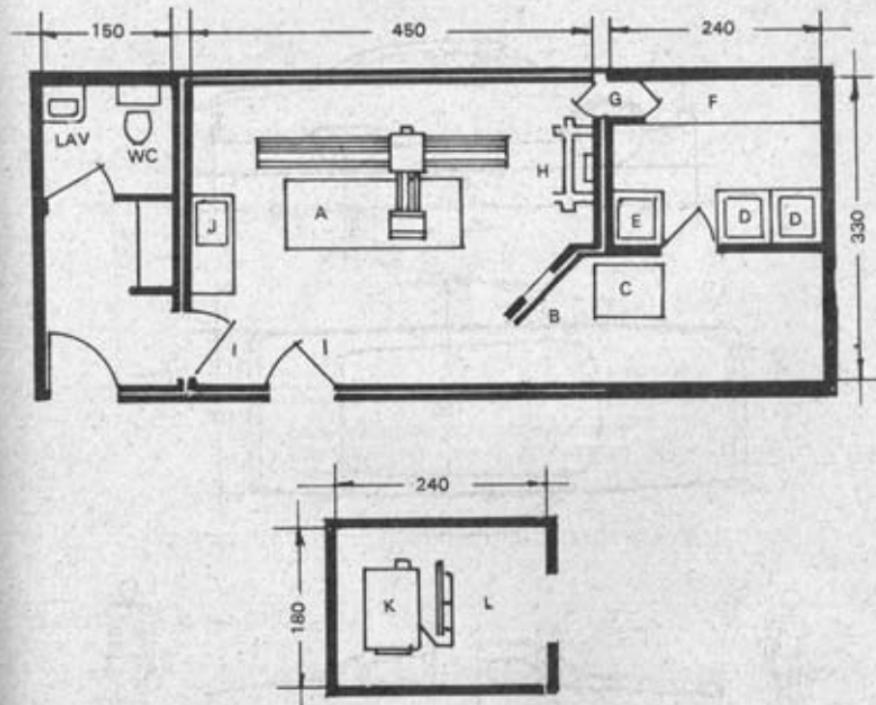


FIGURE 4-59 PLAN OF LABORATORY ROOM

Commercial Establishment

X-Ray Room

The doctor should decide earlier before acquiring what kind of X-Ray, dark room, and developing equipment he will buy. Planning of the structure will be adjusted to the above data and information. All interior walls, ceiling and doors of the X-Ray room should be protected by lead or concrete as required by the building Code.



- A - RADIOGRAPHIC AND FLUOROSCOPIC COMBINATION UNIT
B - LEADED GLASS VIEW WINDOW
C - CURRENT CONTROL UNIT
D - DEVELOPING TANK
E - FILM WASHING TANK
F - LOADING COUNTER WITH FILM STORAGE BIN
G - CASSETTE PASS BOX
H - CASSETTE CHANGER
I - LEAD LINED DOOR TIGHT PROOF
J - BARIUM SINK IN COUNTER
K - FLOUROSCOPE
L - ADJUSTABLE STOOL

FIGURE 4-60 PLAN OF X-RAY ROOM

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The area of this room depends upon the size of the equipment to be installed. The measurement of this room usually does not exceed 4.00 x 6.00 meters. It contains heating and air conditioning equipment, janitor sink and space for supplies.

4-15 Commercial Parking Lot

Commercial parking lot design is to accommodate the larger cars ordinarily used.

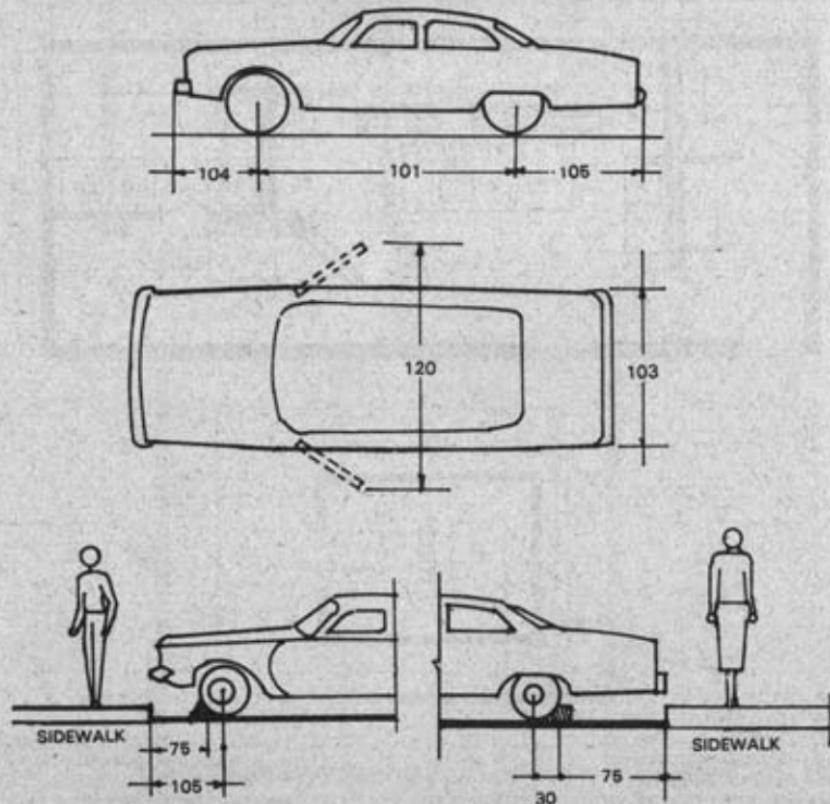


FIGURE 4-61 CAR DIMENSIONS AND OVERHANG

Commercial Establishment

To design parking lot for small and medium cars will only invite difficulties and inconveniences. A larger car has overall length of 5.70 meters with an overall width of 2.00 meters door open wide projecting 1.00 meter beyond the overall width.

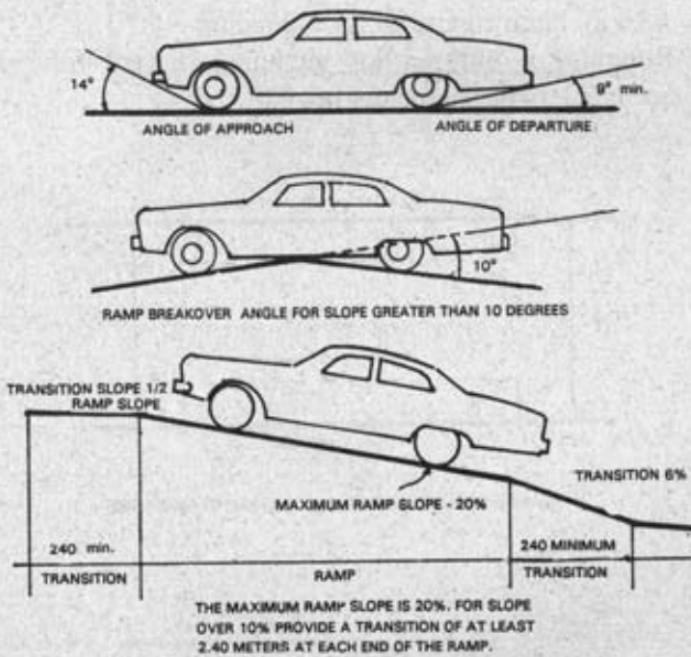


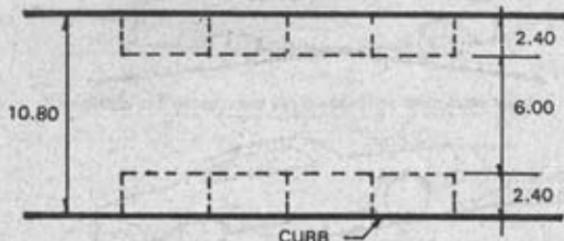
FIGURE 4-62 ALLOWABLE SLOPE OF RAMP

Planning Considerations

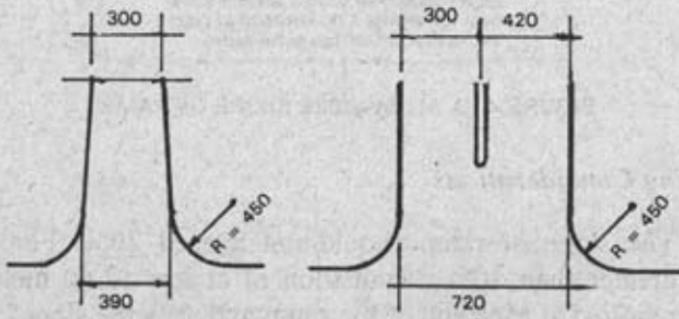
1. The slope of ramp should not exceed 20%. For slope greater than 10% a transition of at least 2.40 meters is required at each end of the ramp and at $\frac{1}{2}$ the slope.
2. The limit of the front approach angle is 14° while the corresponding angle at the rear is limited to 9 degrees.
3. When parked at right angle to the curb, the front overhang seldom exceed 75 cm. and the rear overhang seldom exceeds 1.05 meters

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4. For central driveway parking at 90° on both sides, the clearance required is 18.60 meters and the space between buffers should be 17.70 m. due to overhang.
5. Parking stalls should be from 2.70 to 3.00 meters wide.
6. Motel parking lots planned for maximum convenience measures 3.30 meters wide and 6.90 m. long allowing 1.20 m. back clearance for unloading.
7. Roughly, a parking lot including drivers for entering needs 32.5 square meters per car.



TWO LANE DRIVE-PARALLEL PARKING EACH SIDE

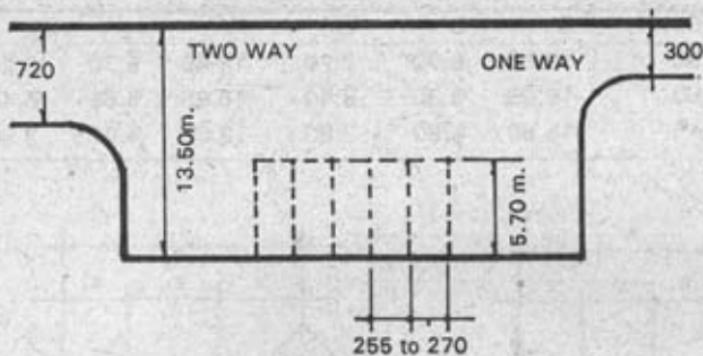


ONE WAY SINGLE ENTRANCE

TWO WAY ENTRANCE-EXIT

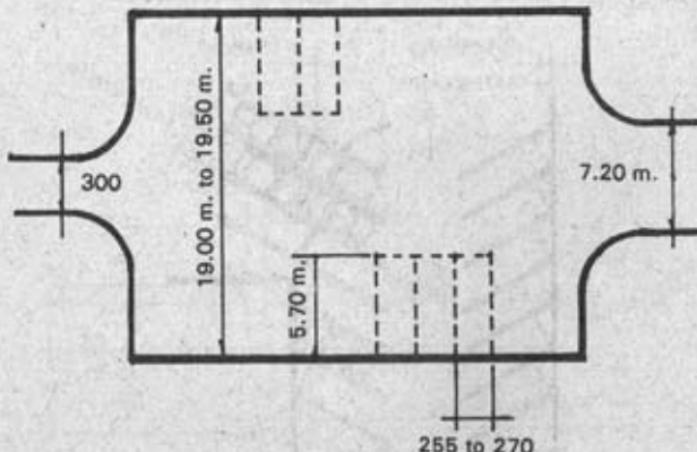
FIGURE 4-63 ENTRANCE PARKING AND EXIT

Commercial Establishment



90° DEGREES PARKING BAY ONE SIDE

FIGURE 4-64 PARKING AREA



90° PARKING BAY TWO SIDES

FIGURE 4-65 PARKING AREA

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TABLE 4-10 PARKING LAYOUT DIMENSIONS IN METERS

D	A	B	C	X	Y	Z
90	18.60	5.70	7.20	18.60	5.70	7.20
60	18.00	6.30	5.40	16.65	5.65	5.40
45	15.80	5.80	3.90	13.85	4.97	3.90

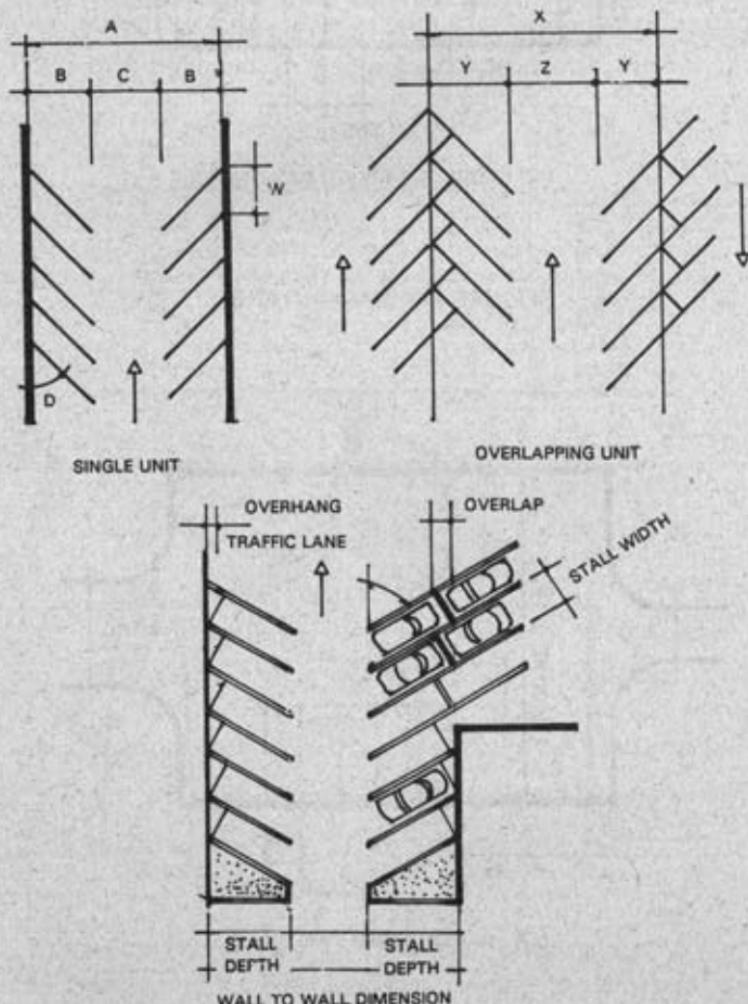
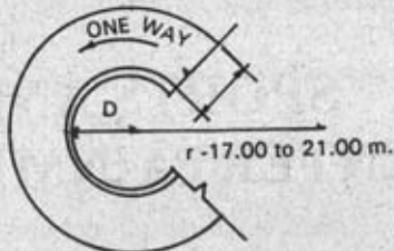
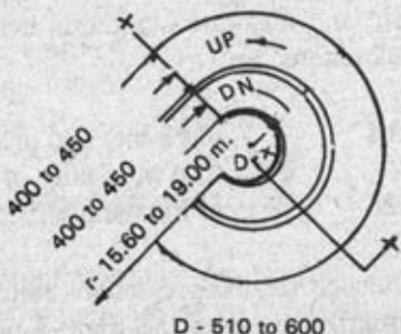


FIGURE 4-66 PLAN OF PARKING AREA

Commercial Establishment



D - 510 to 600 MAX GRADE - 12%



D - 510 to 600

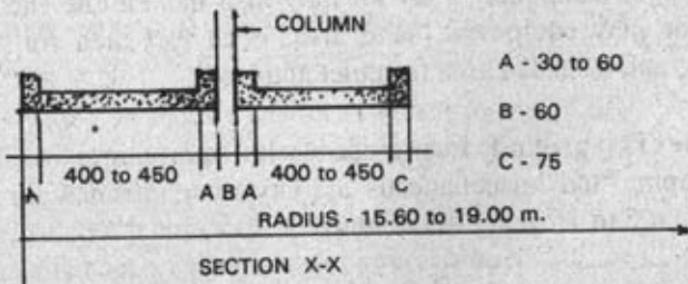


FIGURE 4-67 CIRCULAR RAMP FOR CARS

SPORTS AND ENTERTAINMENT

5-1 Facilities

The National Recreational Association has tried to set up desirable standard for recreational facilities but could not imposed on what specific and absolute standards because of the variable difficulties encountered on:

- | | |
|------------------------|-----------------------------|
| 1. Climate conditions | 4. Habits and preferences |
| 2. Population | 5. Availability of the site |
| 3. Institutional needs | 6. Financial difficulties |

The Play Lot is intended for the pre-school children up to 6 years old. This is primarily to serve the multi-family in town house apartment neighborhood considerably away from elementary school compound. Play lot may also include the enclosure area for play equipment, sand area, open turf-area for active playing and a shaded area for quiet activities.

The Playground is provided with sports area facilities, landscaping and miscellaneous activity area intended for children from 6 to 16 years old or above.

The Play Equipment to be installed in the play lot or playground must be designed to promote recreational enjoyment, healthy growth of children, and giving them the opportunity to learn the art of competition, cooperation, courage and the acquisition of self confidence.

Sports and Entertainment

The Play Equipment Must Also

1. Develop the physical strength, alertness and balancing capability of a child.
2. Develop the knowledge of sharing, giving and to compete under the spirit of fair play.
3. Develop the creativeness of a child and to acquire play experience that are valuable to him.
4. Give a child the complete fun and enjoyment.
5. Play equipment must be constructed based on human scale in proportion with the height, and the emotional capability of the children in different level.
6. Allow the children to use the equipment by themselves without the assistance of adults.
7. Give the children free inspirations and wide variety of play opportunities.
8. To acquire variety of interest, abilities and aptitude.

Safety of the Play Equipment

All play equipment must be designed and fabricated strictly observing the maximum safety of the users. Thus, it must be:

1. Free from any sharp or protruding surfaces.
2. Strong enough to carry the expected weight or load.
3. Designed to discourage improper use such as:
 - a. Slide that requires children to sit down.
 - b. Ladder that discourages more than one player at a time, etc.
4. Provide with hands or safety rails.
5. Installed according to manufacturer's specifications.
6. Installed on surface minimizing danger of injuries or abrasions in the event of child's fall.
7. Play equipment should be functionally designed to possess visual appeal to stimulate the child's imaginations.
8. Select equipment that requires less maintenance.

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9. Equipment parts that are subject to wear and tear, should be a replaceable type.
10. Specify equipment that requires minimum of direct attention and supervision.

TABLE 5-1 PLAYLOT EQUIPMENT FOR PRESCHOOL CHILDREN

EQUIPMENT	Number of Pieces	Play space requirements in meters
Climber	1	3.00 x 7.00
Junior Swing (4 swing)	1	5.00 x 9.00
Play Sculpture	1	3.00 x 3.00
Play wall or Playhouse	1	4.50 x 4.50
Land area	1	4.50 x 4.50
Slide	1	3.00 x 7.50
Spray pool including deck	1	11.00 x 11.00

Surfacing of the Playground

Surfacing of the playground must be selected from suitable materials for each type of play area under the following conditions:

1. **Functions.** The surface of the ground must be suitable for the purpose and functions of the area, whether it is single or multi purpose area, seasonal, or yearly round use.
2. **Economy.** Consider the replacement and maintenance cost. Normally, a bigger initial cost, demand lesser replacement and maintenance costs.
3. **Durability.** Durability of the ground surface depends on its resistance to the general wear caused by the participants, sunlight, rain shower and dust.
4. **Cleanliness.** The clean playground surface should attract participant players, not insects or rodents.
5. **Safety.** Safety of the ground surface should not be compromised for the sake of economy.

Sports and Entertainment

TABLE 5-2 PLAYGROUND EQUIPMENT FOR ELEMENTARY SCHOOL CHILDREN

EQUIPMENT	Number pieces	Play space dimensions
Balance beam	1	4.50 x 9.00
Climbers	3	6.50 x 15.00
Climbing pools	3	3.00 x 6.00
Horizontal bars	3	4.50 x 9.00
Horizontal ladder	1	4.50 x 9.00
Merry go round	1	12.00 x 12.00
Parallel bars	1	4.50 x 9.00
Senior swing set (6 swings)	1	9.00 x 13.00
Slide	1	3.50 x 10.50

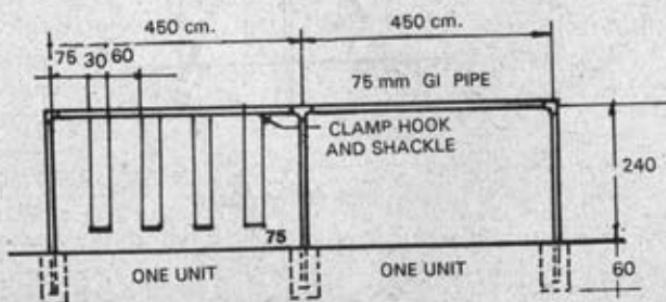
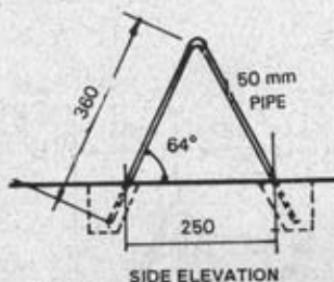
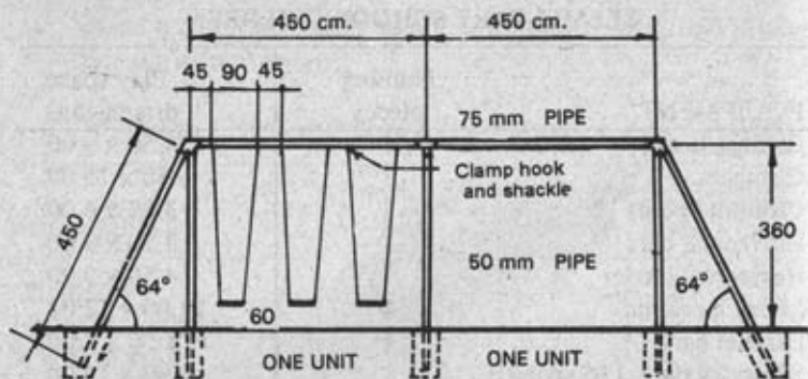
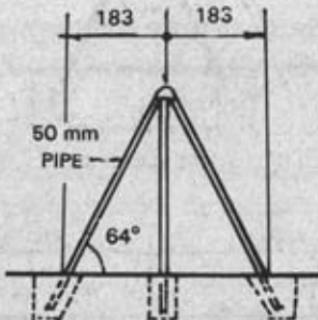


FIGURE 5-1 SWING SET

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FRONT ELEVATION



SIDE ELEVATION

FIGURE 5-2

Sports and Entertainment

5-2 Sports Facilities

Basketball AAU	192
Basketball NCAA	193
Official Basketball	194
Babe Ruth Baseball (13-15 yrs. and 16-18 yrs. old)	
Senior League Baseball (13-15 yrs. old)	
Official Baseball	195
Baseball Bronco League 9-12 yrs. old	196
Baseball Pony League 13-14 yrs. old	197
Baseball Colt League 15-16 yrs. old	198
Baseball Little League 9-12 yrs. old	199
Badminton	200
Softball 40 cm (16 inches) Slow Pitch	201
Softball 30 cm (12 inches) Fast and Slow Pitch	202
Croquet	203
Discuss Throw	204
Football NCAA	205
Six Man Football	206
Touch and Flag Football	207
Field Hockey	208
Flicker Ball	209
Golf Driving Range	210
Handball one wall	211
Handball three wall	212
Handball four wall	213
Handball Team	214
Hopscotch	215
Hammer Throw	216
Hammer Throw Cage Detail	217
High Jump	219
Ice Jockey	220
Javelin Throw	221
Lacrosse for Men	222
Lacrosse for Women	223
Long Jump	224
Pole Vault	225
Roque	226
Running Truck	227
Rubby	228
Shuffleboard	228
Soccer for Men and Boys	229
Soccer for Women and Girls	230
Speedball	231

Planning and Designers Handbook

Shot-put	232
Tennis	233
Tennis Paddle	234
Tennis Deck	235
Tennis Table	236
Archery Target Range	237
Valley Ball	238
Billiard and Pocket Billiards	239
Wrestling NCAA	240

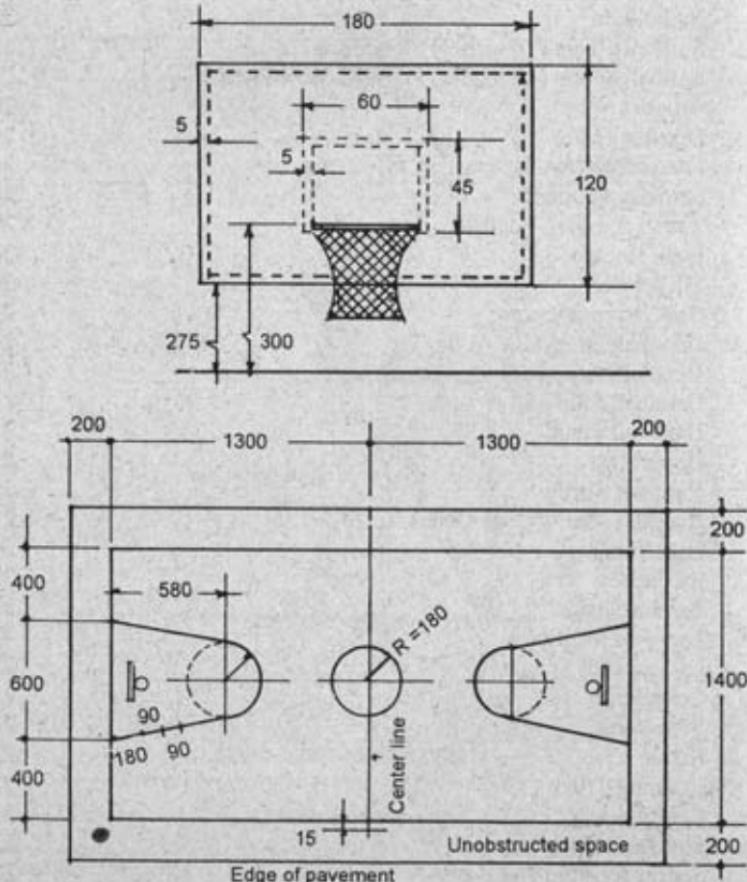


FIGURE 5-3 BASKETBALL (AAU)

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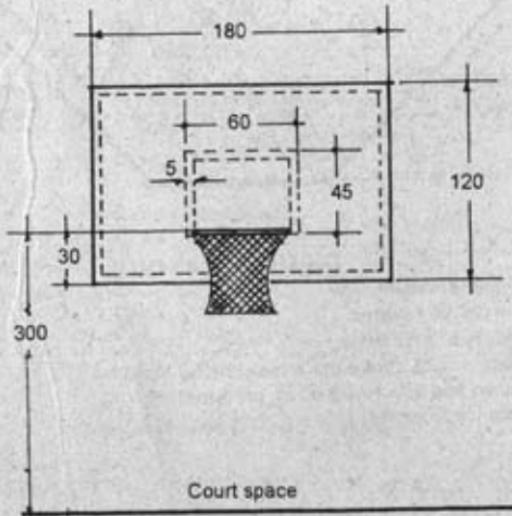
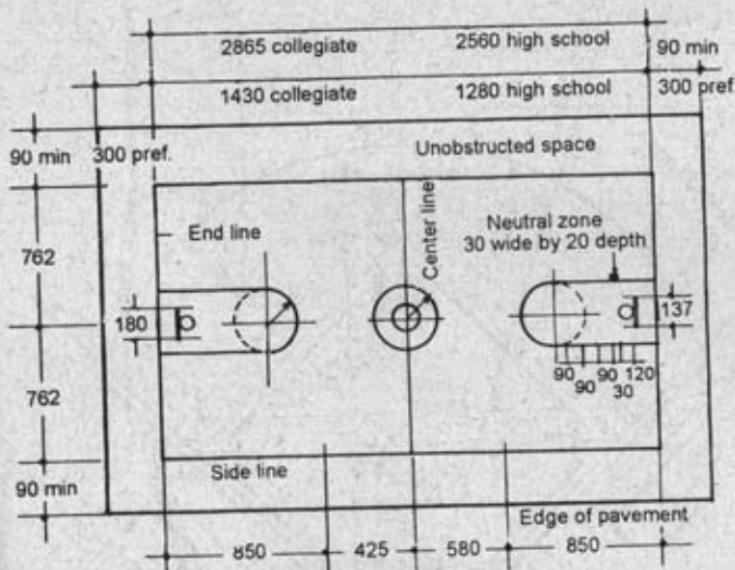
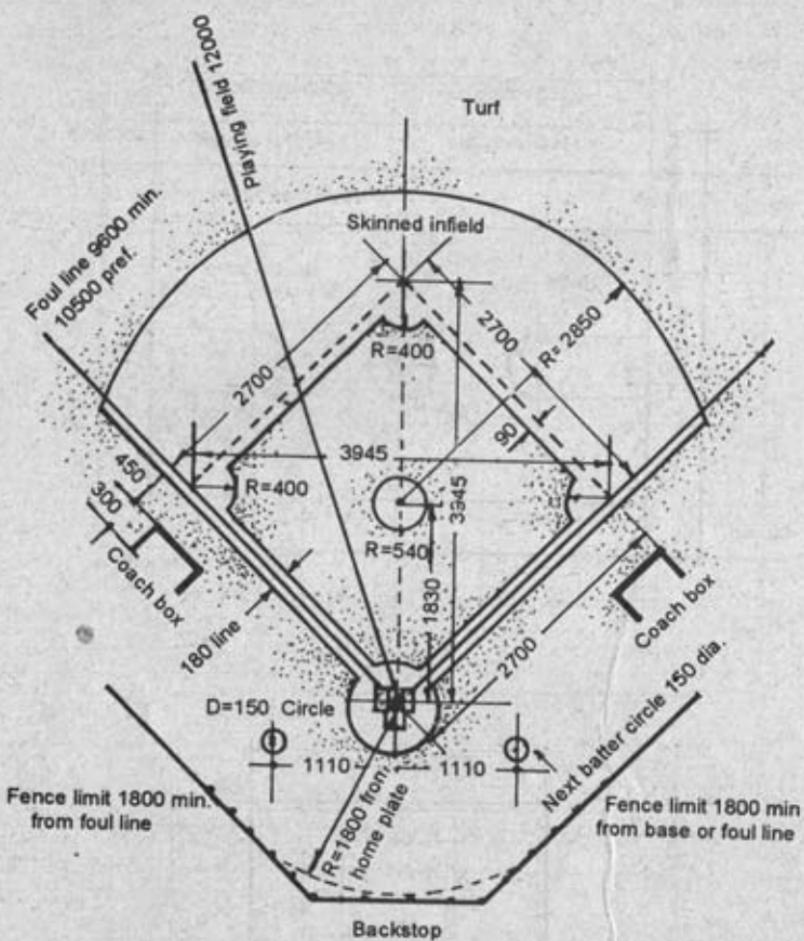


FIGURE 5-4 BASKETBALL (NCAA)

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DIAMOND LAYOUT

SIZE AND DIMENSION

Base line = 27.00 meters

Pitching distance = 18.30 m.

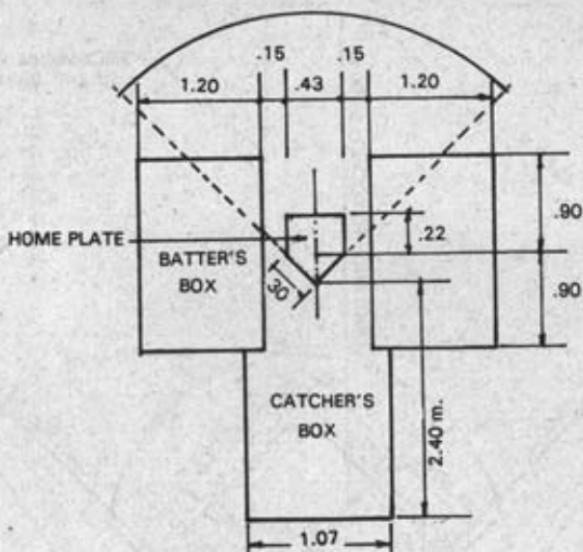
Pitcher's plate = .25 above the level of home plate

Distance down foul line = 105.00 m. preferred

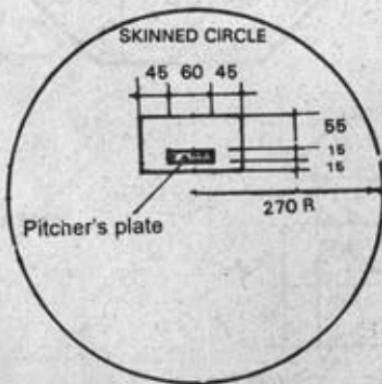
Outfield distance to center field = 120.00 m

FIGURE 5-5 OFFICIAL BASEBALL

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LAYOUT OF HOME PLATE



LAYOUT OF PITCHER'S PLATE

FIGURE 5-6 OFFICIAL BASEBALL

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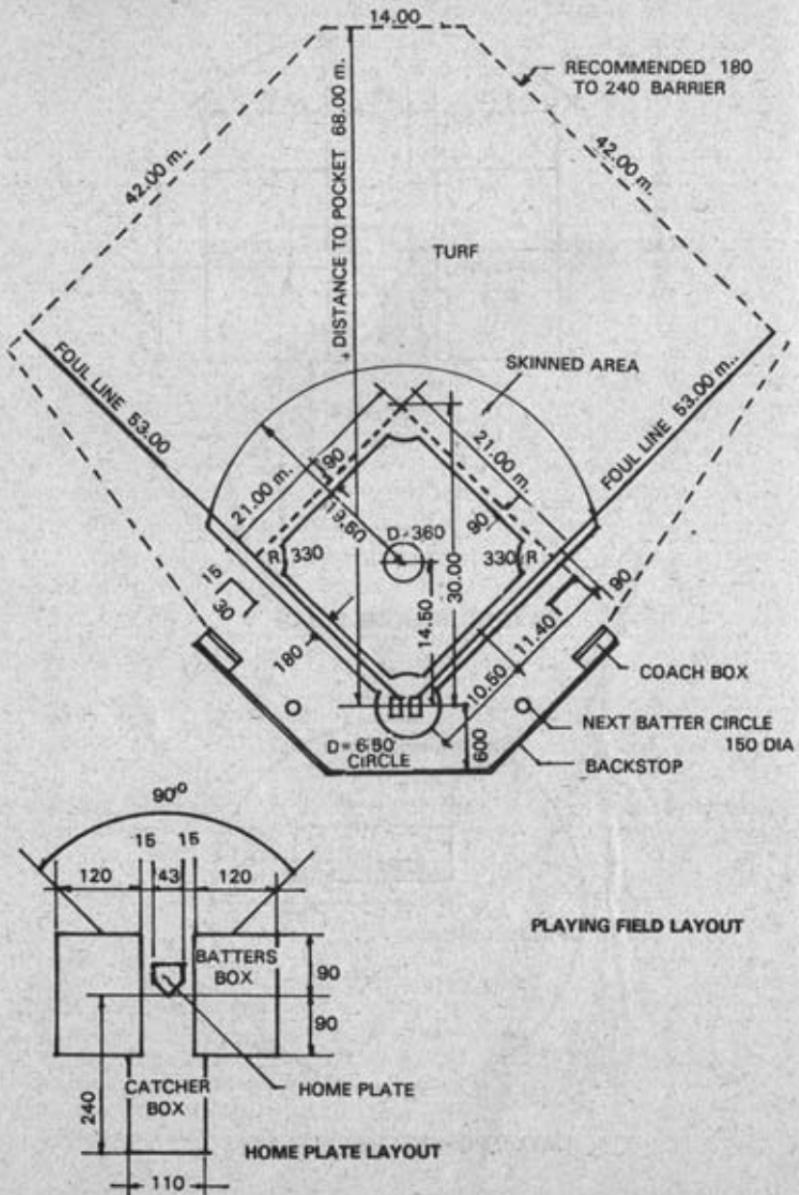


FIGURE 5-7 BASEBALL
BRONCO LEAGUE 9-12 YEARS OLD

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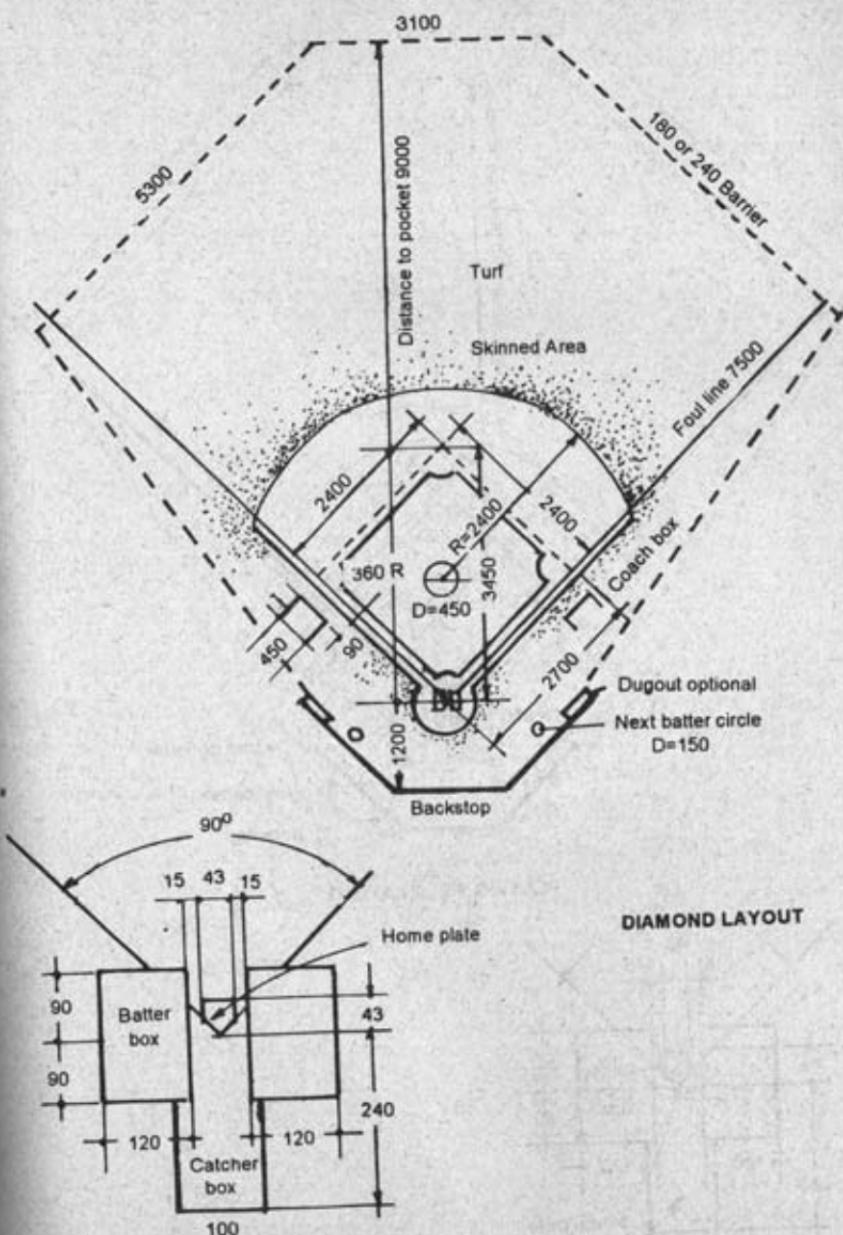


FIGURE 5-8 BASEBALL
PONY LEAGUE 13-14 YEARS OLD

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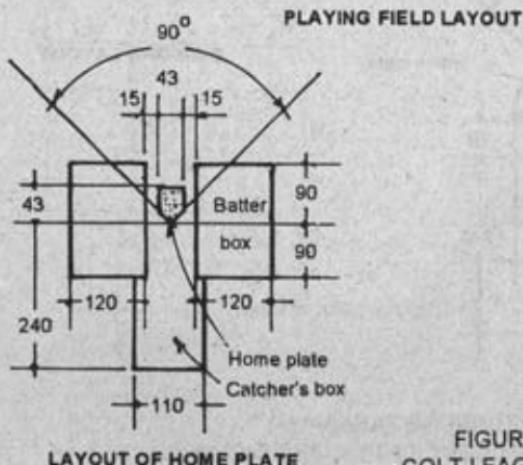
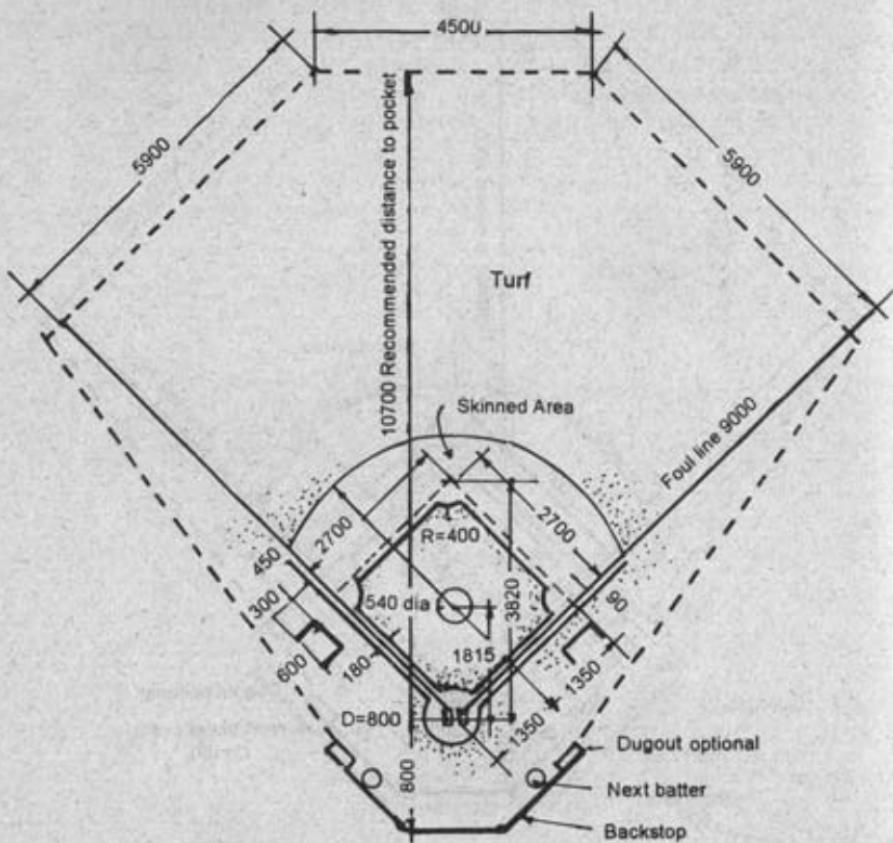
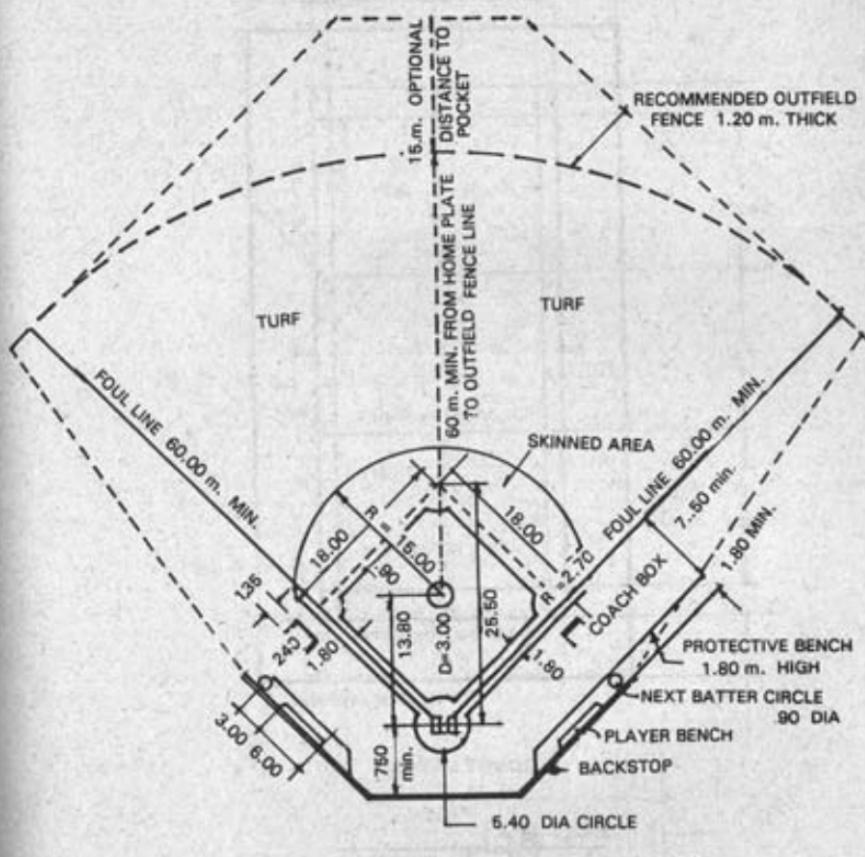
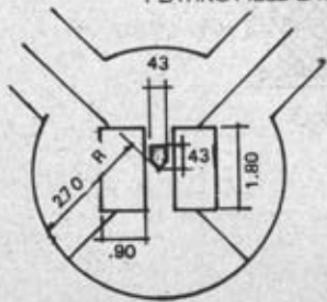


FIGURE 5-9 BASEBALL
COLT LEAGUE 15-16 YEARS OLD

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PLAYING FIELD LAYOUT PLAYING FIELD LAYOUT

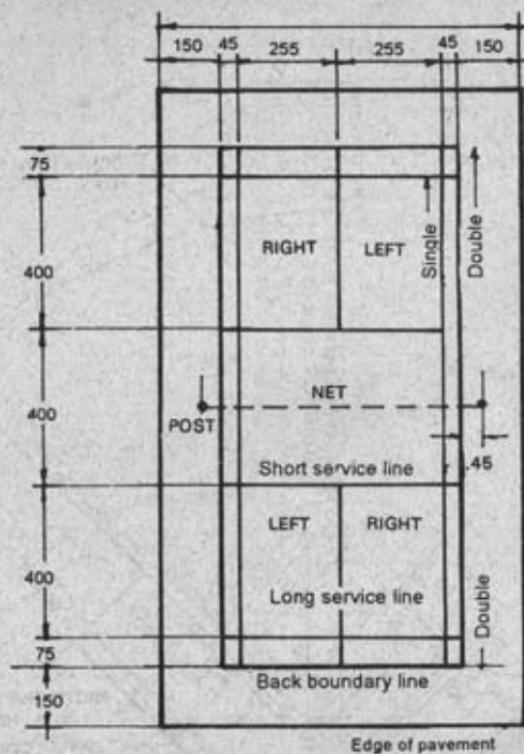


LAYOUT OF HOME PLATE

FIGURE 5-10 BASEBALL
LITTLE LEAGUE 9-12 YEARS OLD

FIGURE 5-10 BASEBALL
LITTLE LEAGUE 9-12 YEARS OLD

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COURT LAYOUT

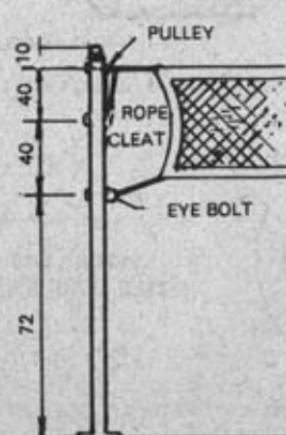


FIGURE 5-11 BADMINTON

Sports and Entertainment

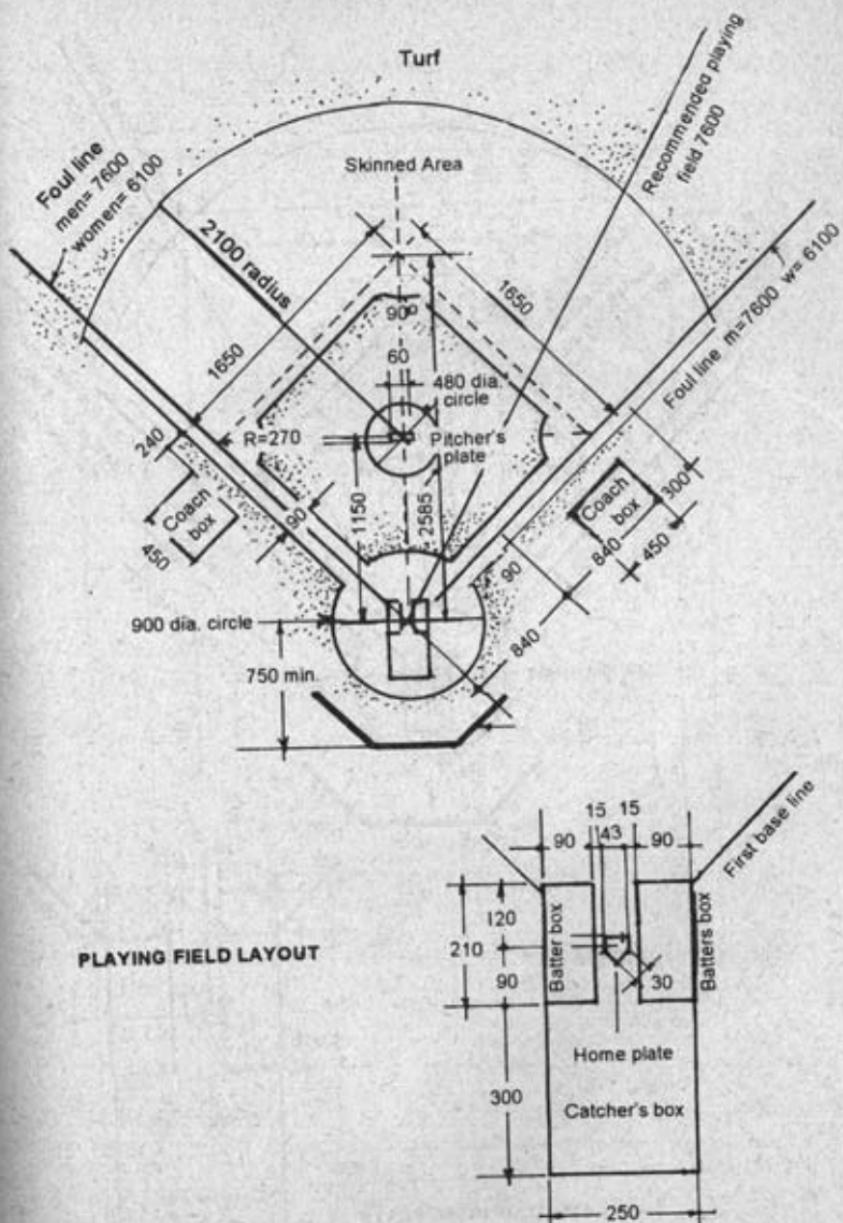


FIGURE 5-12 SOFTBALL
40 CM (16 INCH) SLOW PITCH

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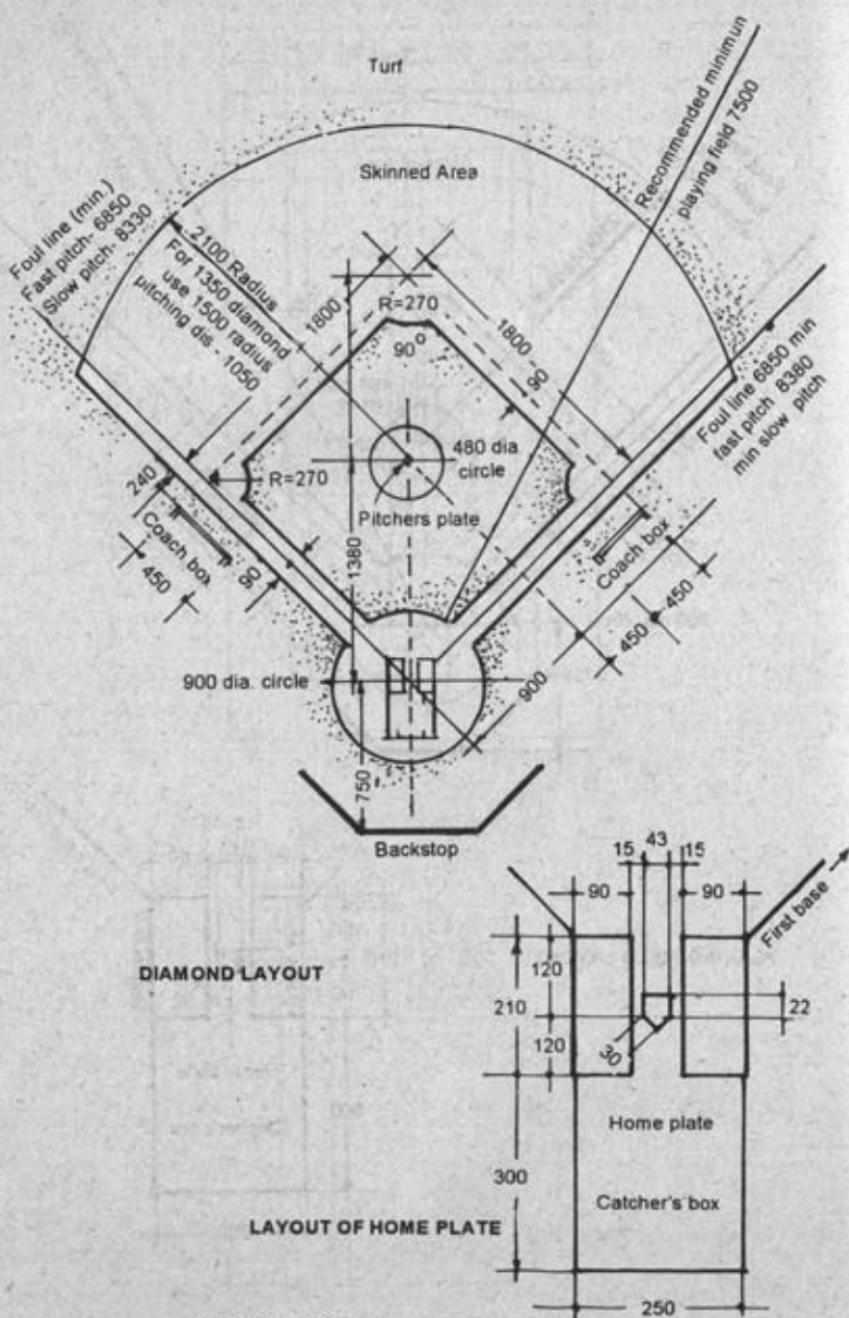


FIGURE 5-13
30 CM (12 IN.) FAST AND SLOW PITCH

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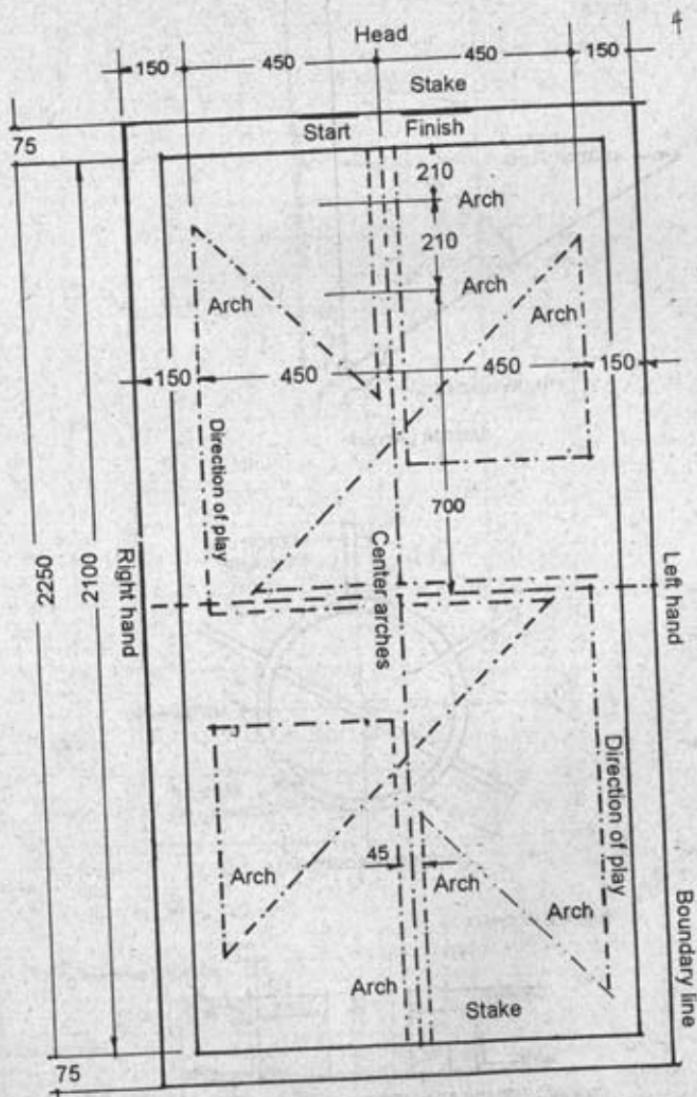


FIGURE 5-14 CROQUET

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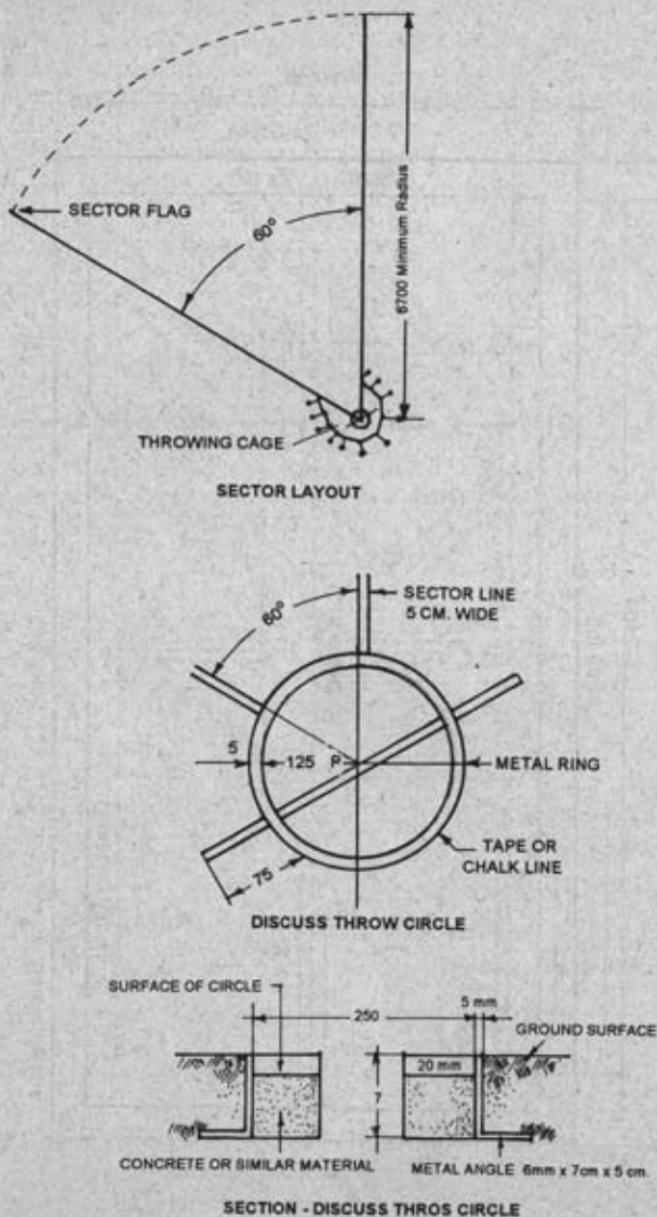
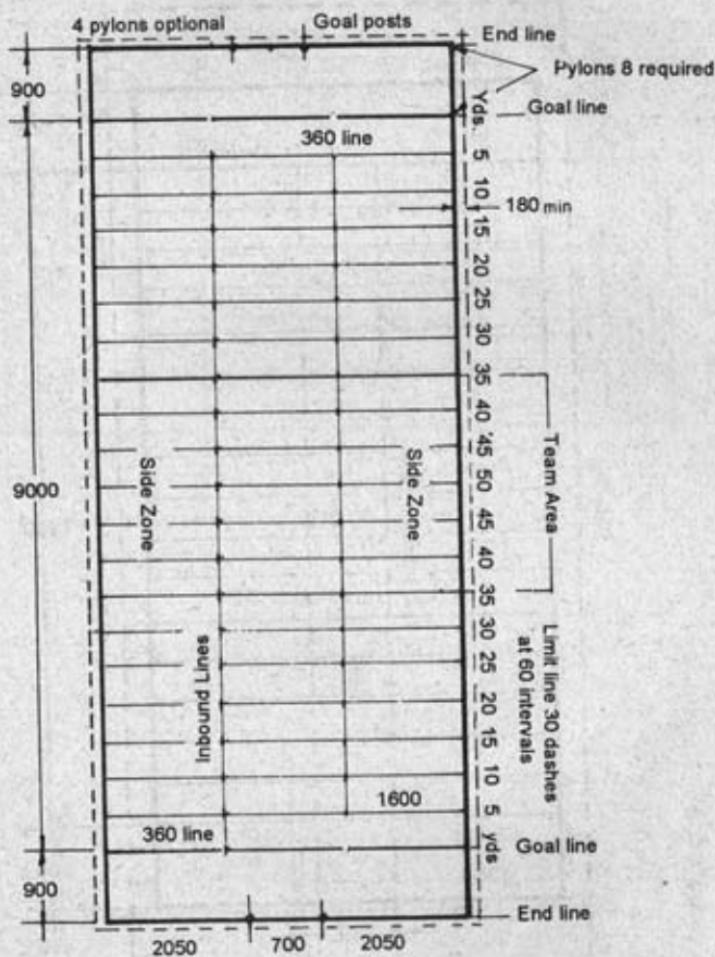


FIGURE 5-16 DISCUSS THROW

Sports and Entertainment

PLAYING FIELD LAYOUT



PYLON DETAIL

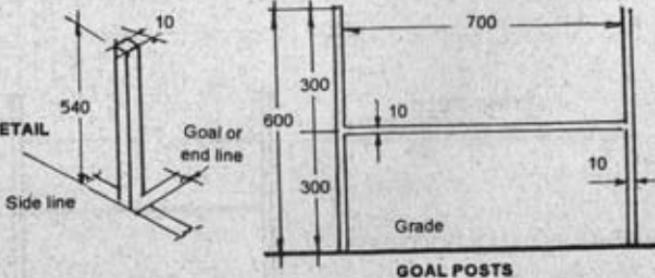
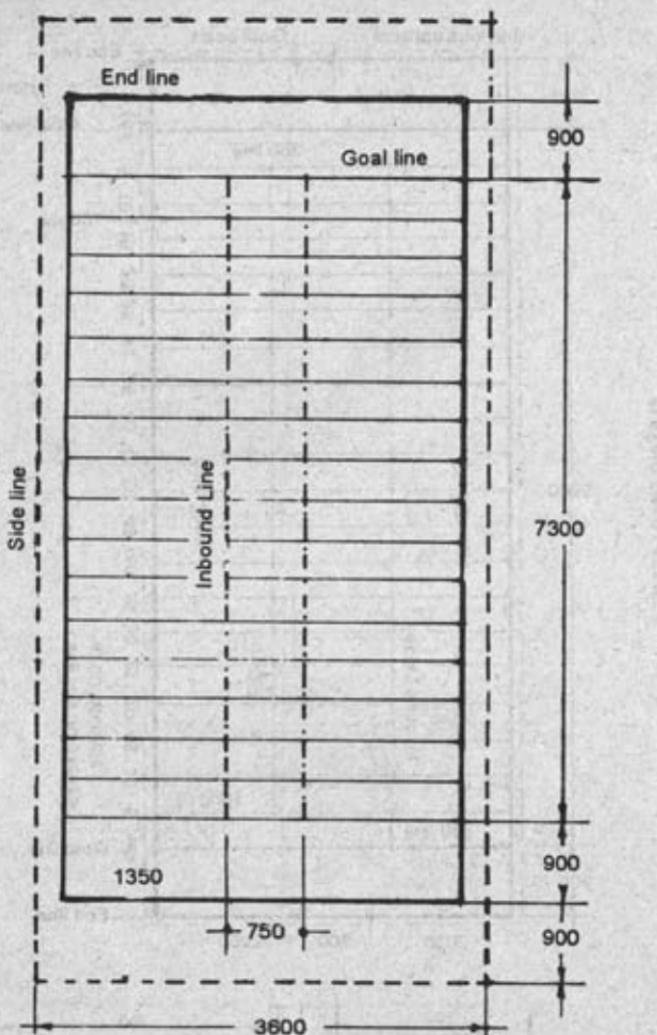


FIGURE 5-16 FOOTBALL (NCAA)

Planning and Designers Handbook



PLAYING FIELD

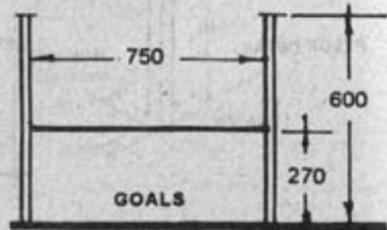
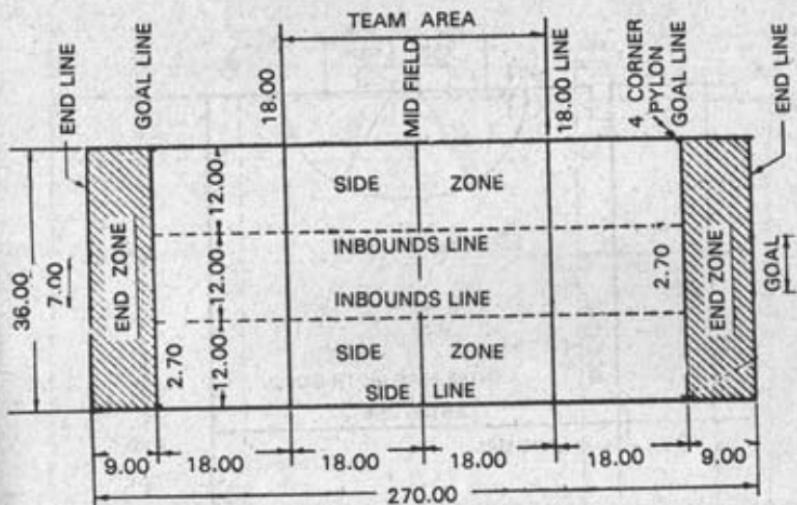
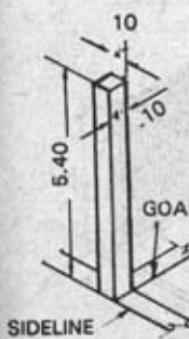


FIGURE 5-17. SIX MAN FOOTBALL

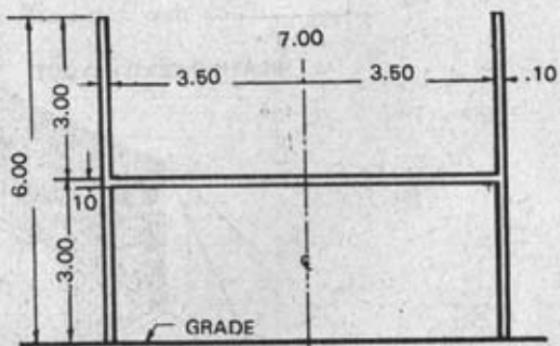
Sports and Entertainment



PLAYING FIELD LAYOUT



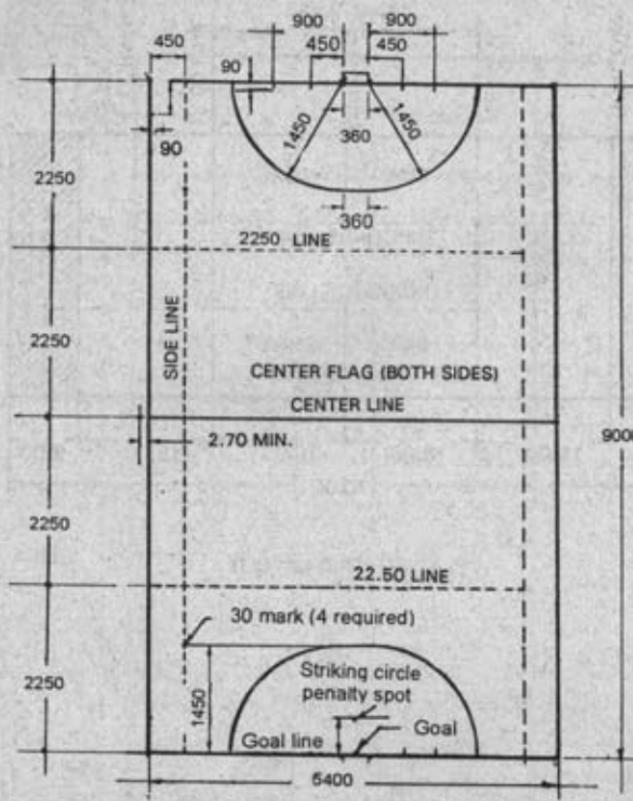
PYLON DETAIL



GOAL POSTS

FIGURE 5-18 TOUCH AND FLAG FOOTBALL

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PLAYING FIELD LAYOUT

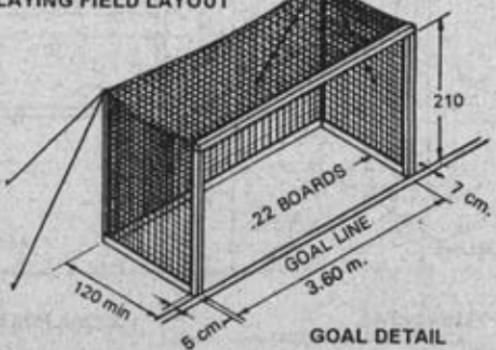


FIGURE 5-19 FIELD JOCKEY

Sports and Entertainment

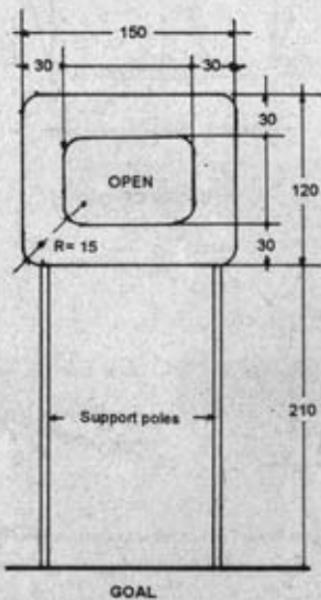
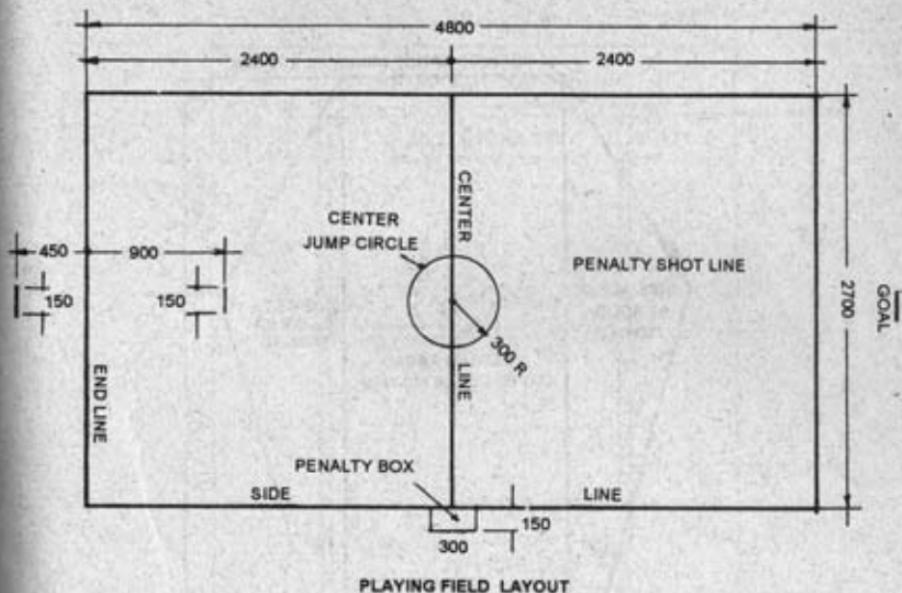


FIGURE 5-20 FLICKERBALL

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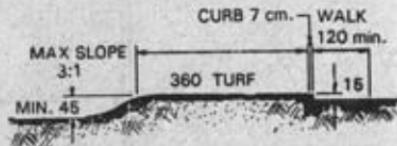
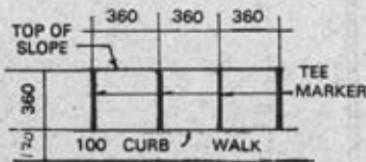
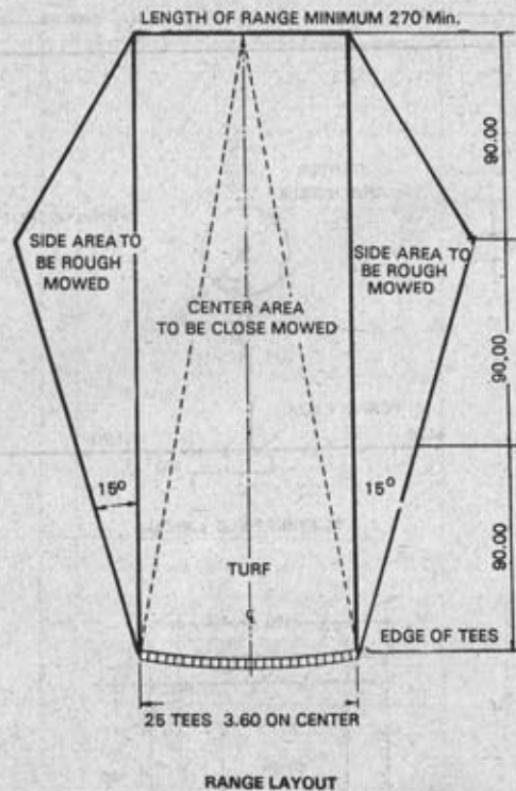
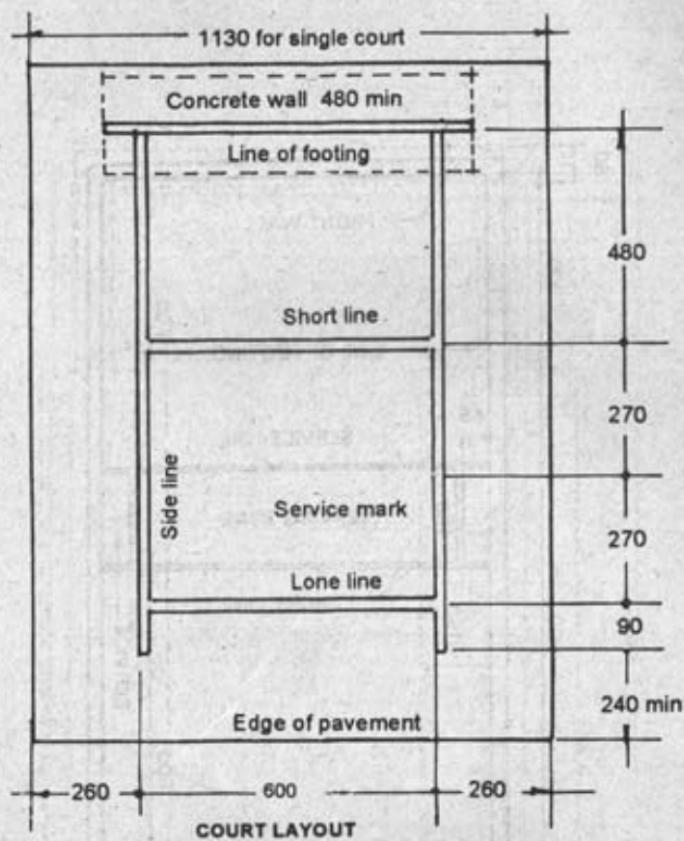


FIGURE 5-21 GOLF DRIVING RANGE

Sports and Entertainment



38 mm mesh gauge 11 chain fence

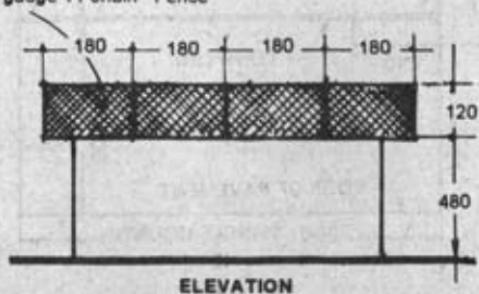


FIGURE 5-22 ONE WALL HANDBAALL

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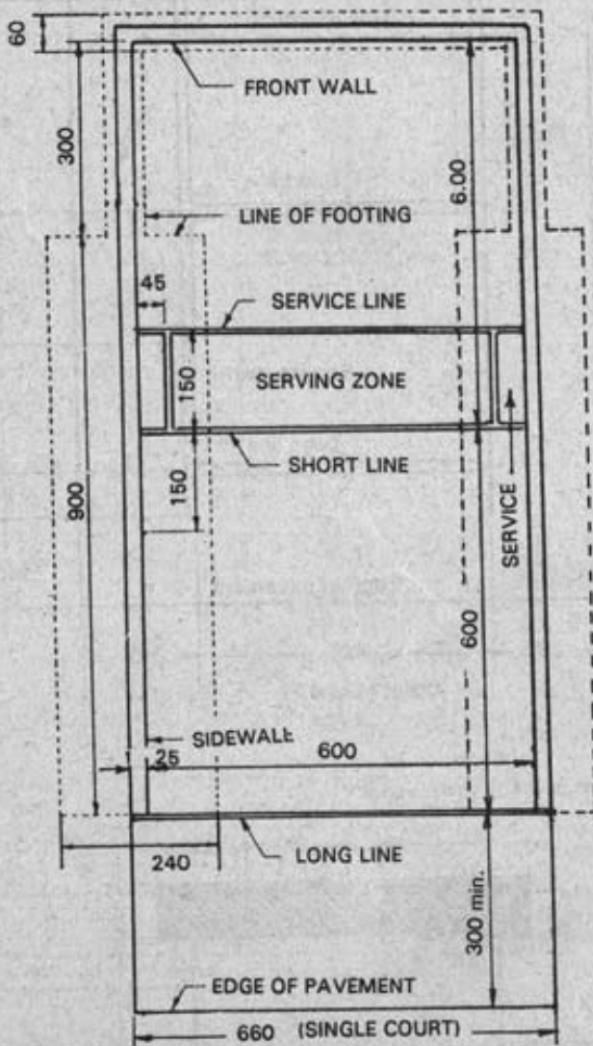


FIGURE 5-23 THREE WALL HANDBALL

Sports and Entertainment

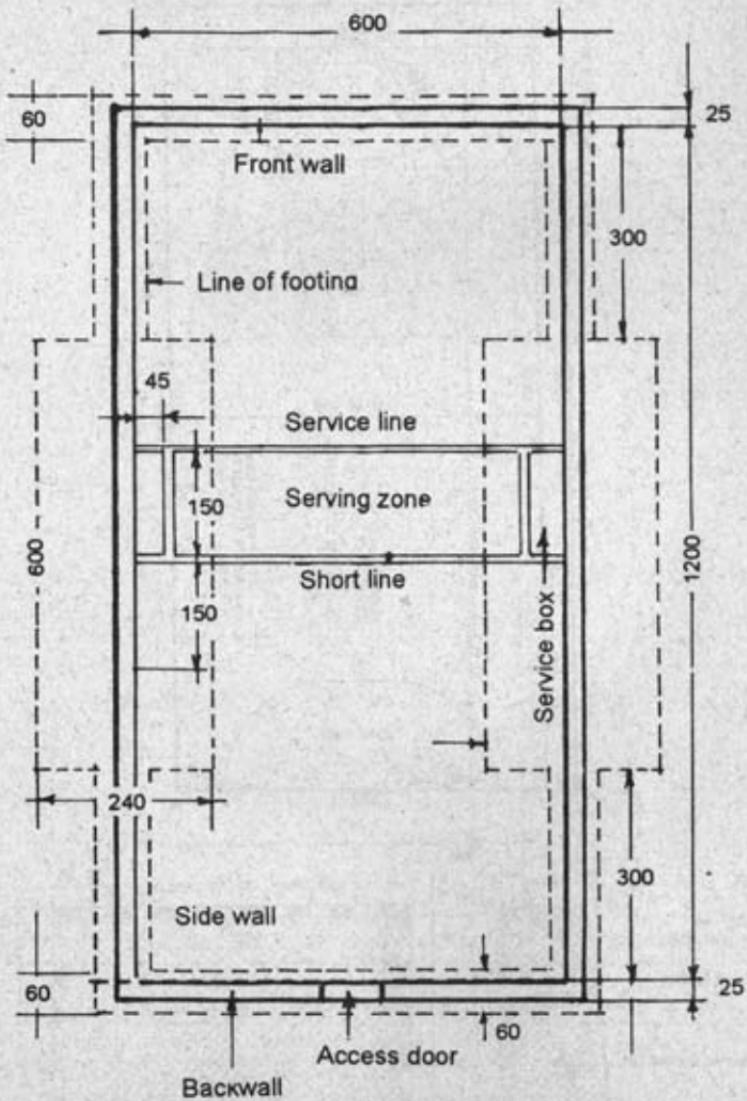


FIGURE 5-24 FOUR WALL HANDBALL

Planning and Designers Handbook

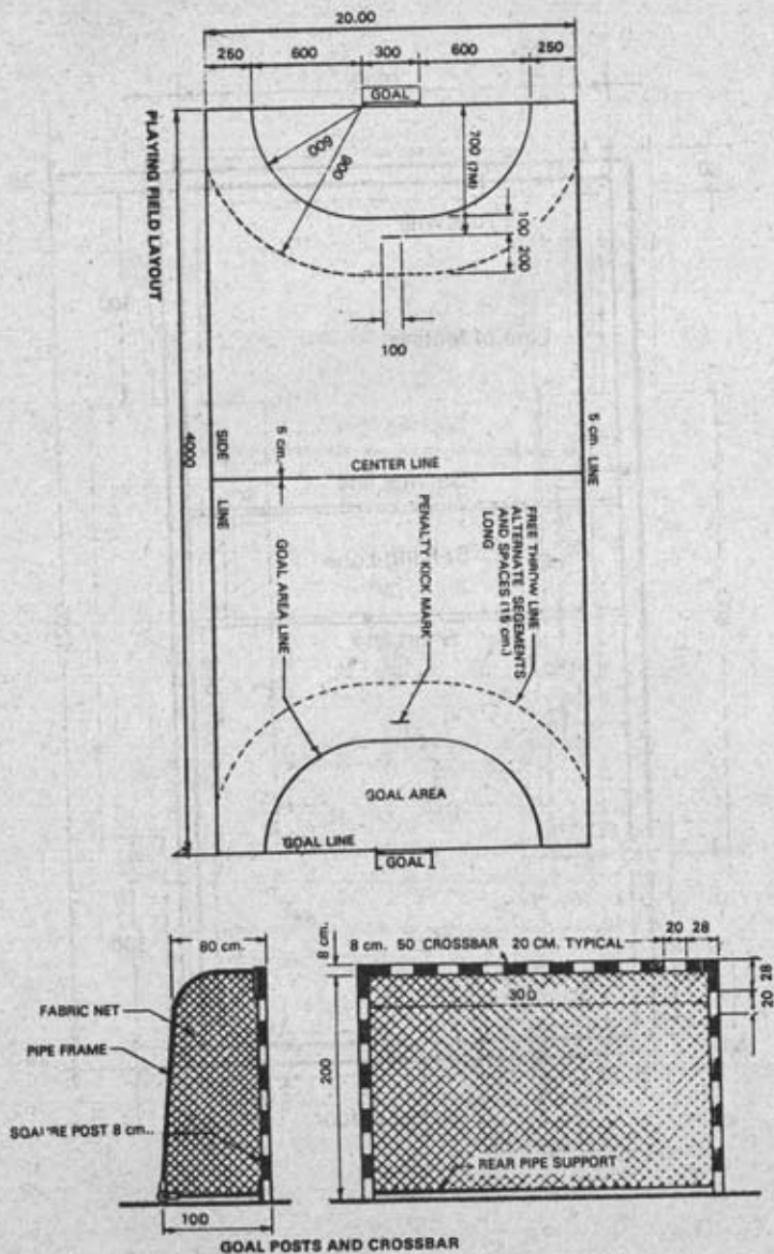


FIGURE 5-25 TEAM HANDBALL

Sports and Entertainment

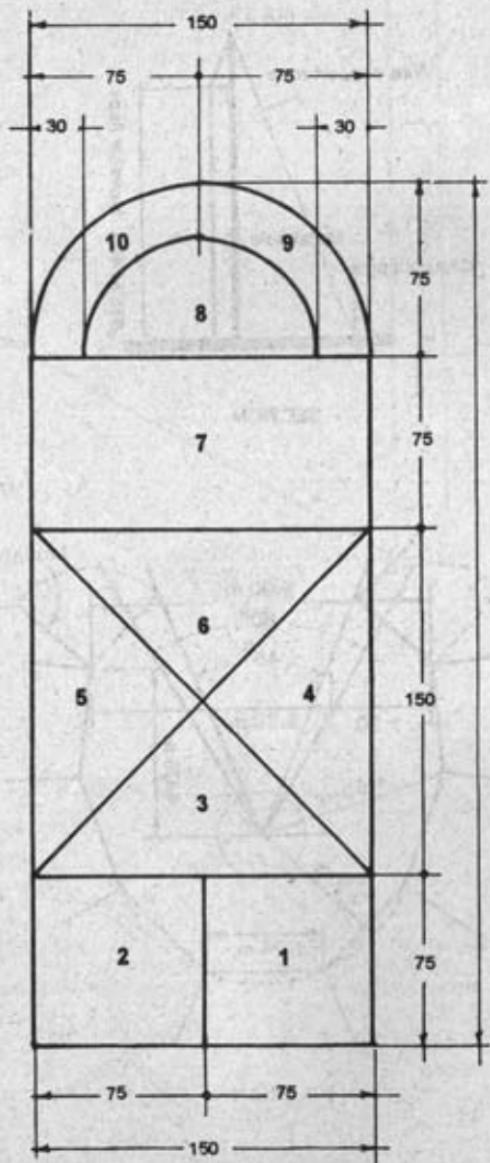
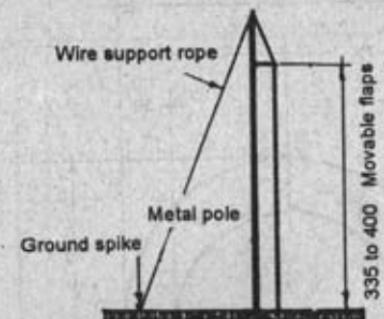
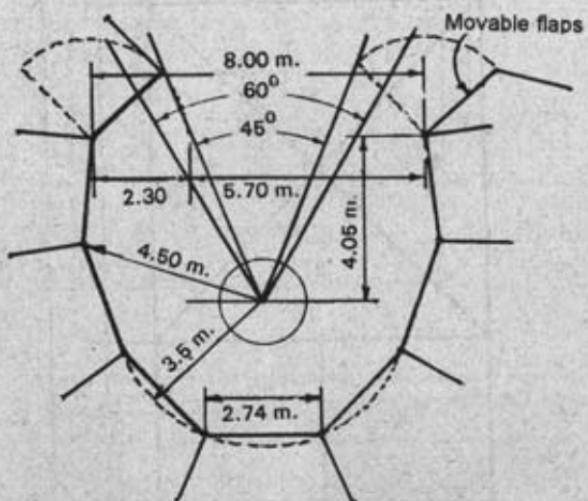


FIGURE 5-26 HOPSCOTCH

Planning and Designers Handbook



SECTION



PLAN

FIGURE 5-27 HAMMER THROW

Sports and Entertainment

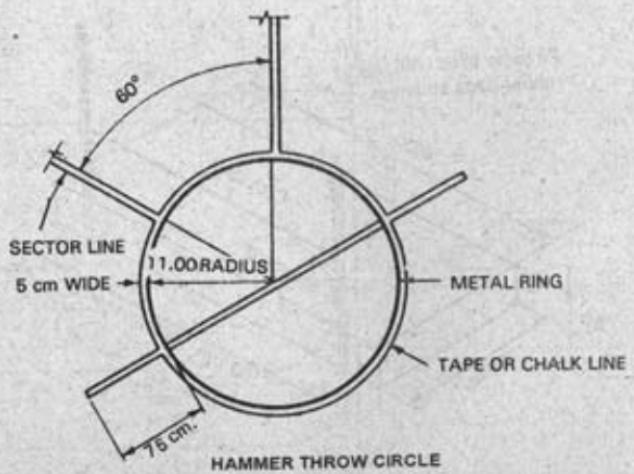
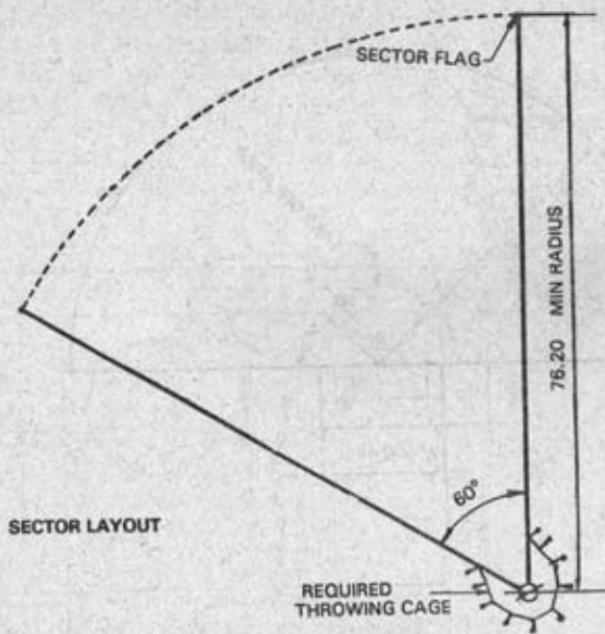


FIGURE 5-27 HAMMER THROW

Planning and Designers Handbook

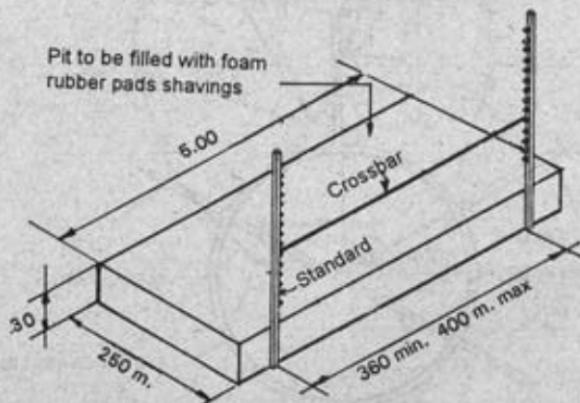
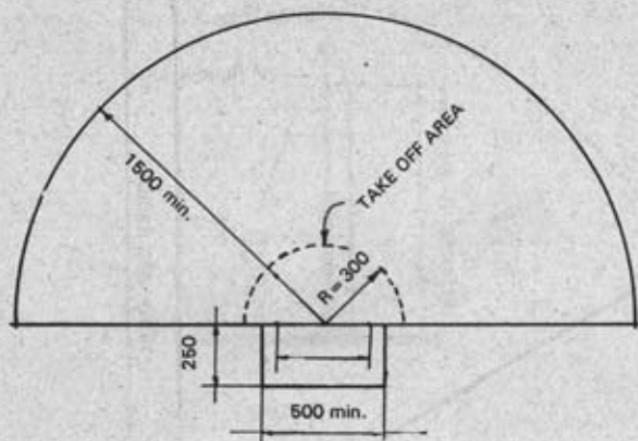


FIGURE 5-28 HIGH JUMP LAYOUT

Sports and Entertainment

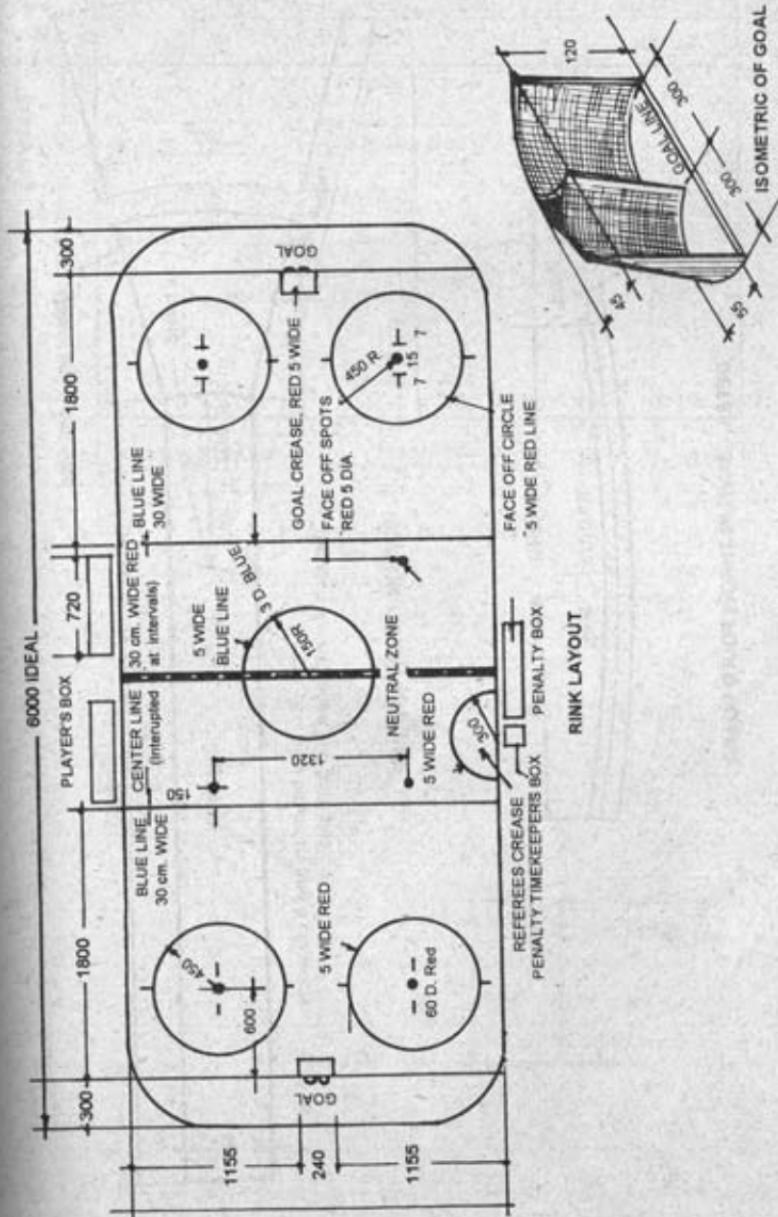
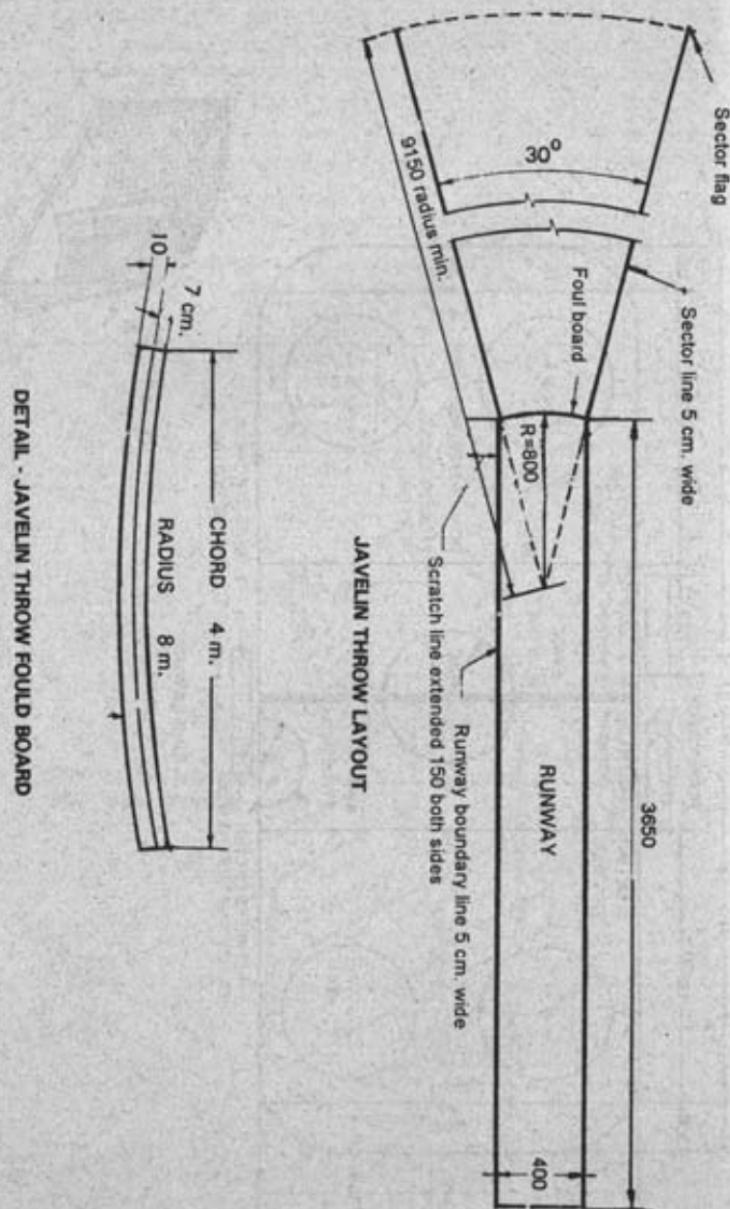


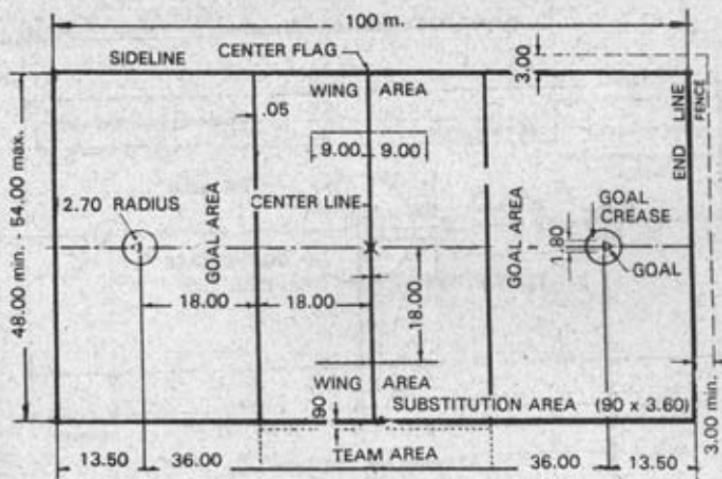
FIGURE 5-29 ICE HOCKEY

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DETAIL - JAVELIN THROW FOUL BOARD

Sports and Entertainment



PLAYING FIELD LAYOUT

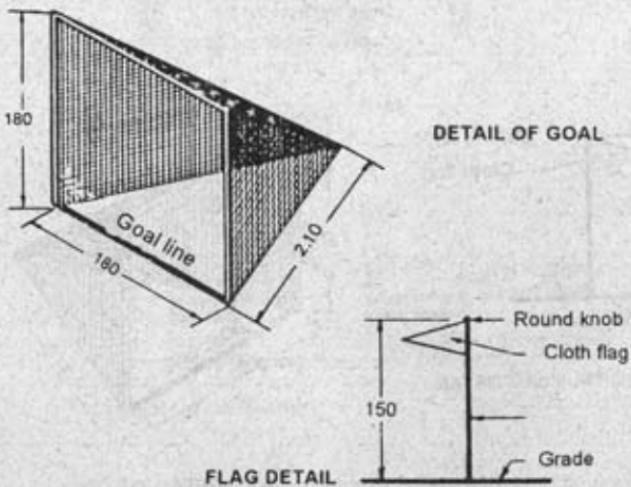
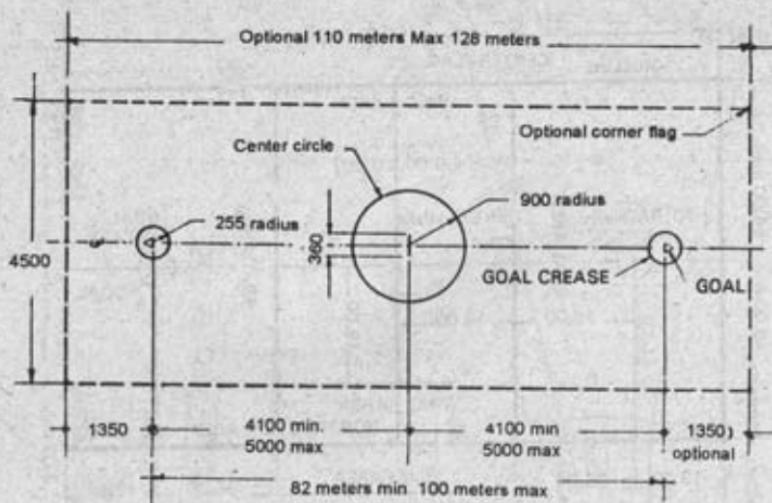
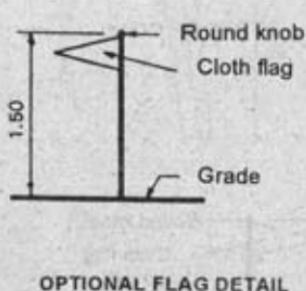


FIGURE 5-32 LACROSSE FOR WOMEN

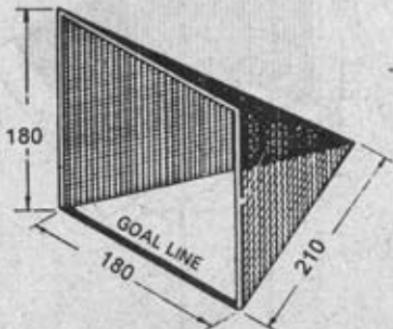
Planning and Designers Handbook



PLAYING FIELD LAYOUT (SHAPE VARIES)



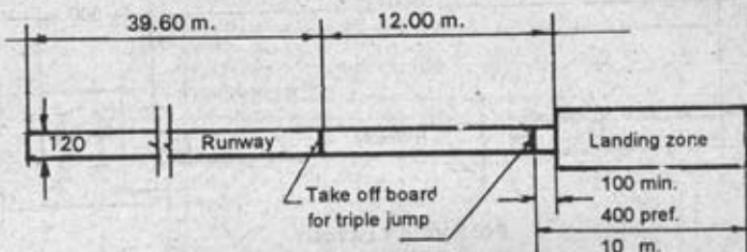
OPTIONAL FLAG DETAIL



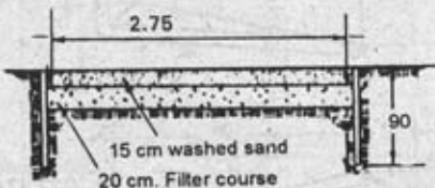
DETAIL OF GOAL

FIGURE 5-32 LACROSSE FOR WOMEN

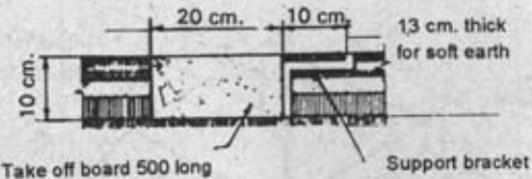
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LONG JUMP AND TRIPLE JUMP LAYOUT



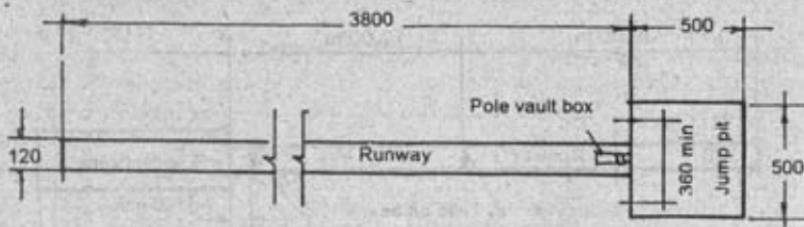
SECTION - LANDING ZONE



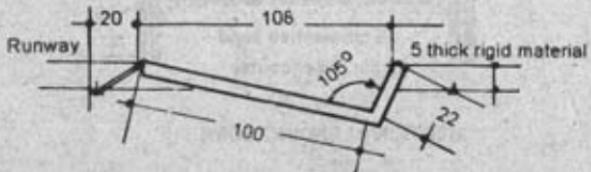
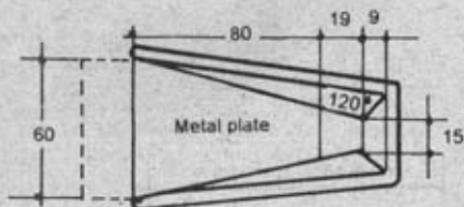
SECTION - TAKEOFF BOARD FOR LONG JUMP AND TRIPLE JUMP

FIGURE 5-33 LONG JUMP AND TRIPLE JUMP

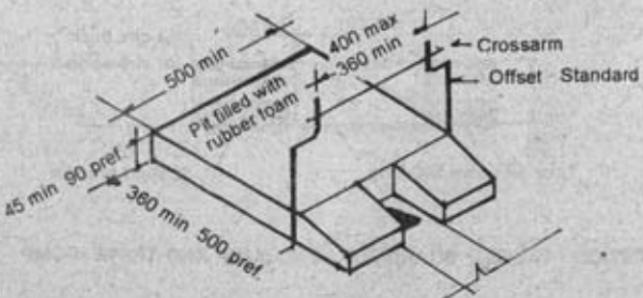
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POLE VAULT LAYOUT



POLE VAULT BOX



ISOMETRIC OF JUMPING PIT AND CROSSBAR

FIGURE 5-34 POLE VAULT

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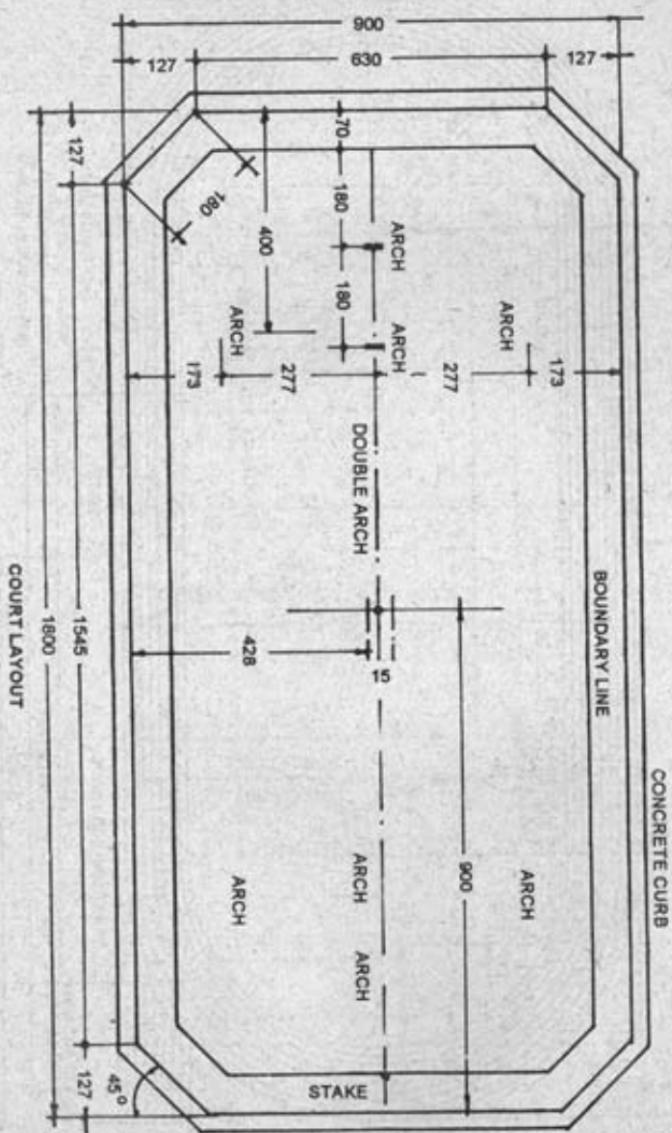


FIGURE 5-35 ROQUE

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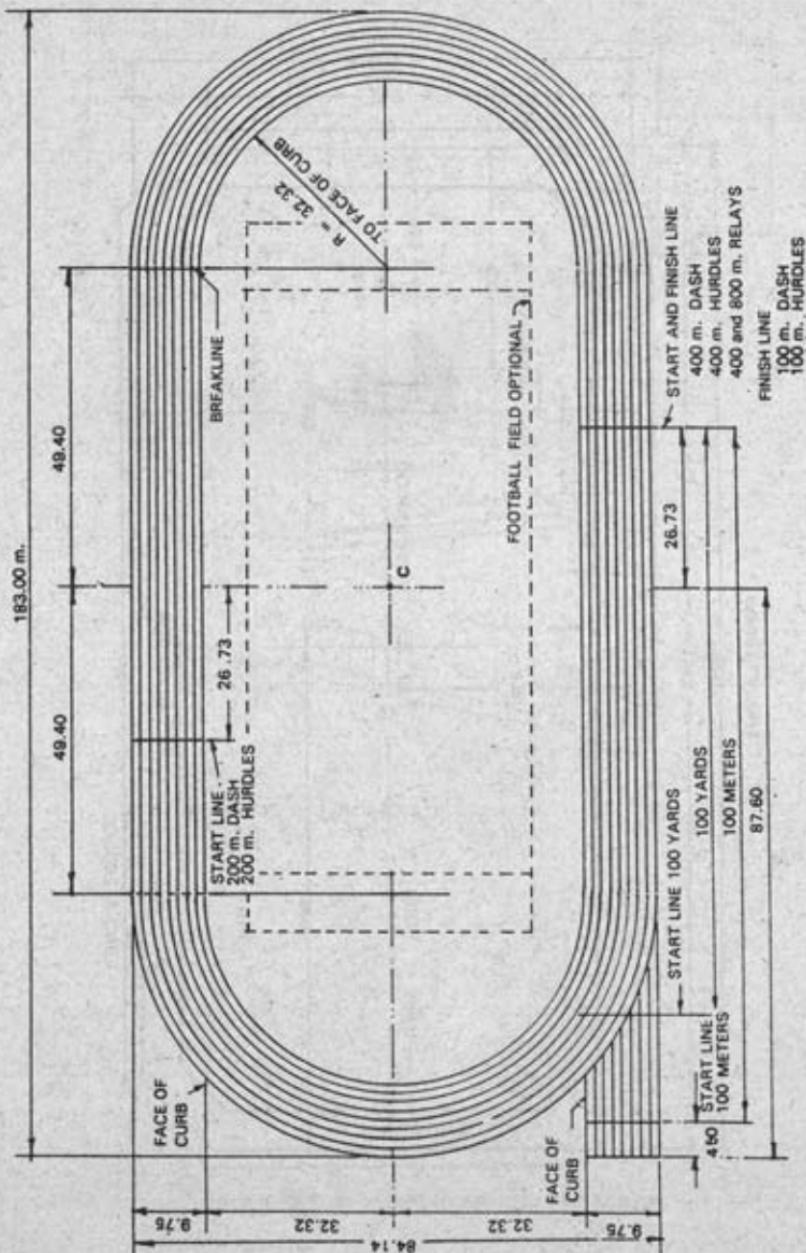
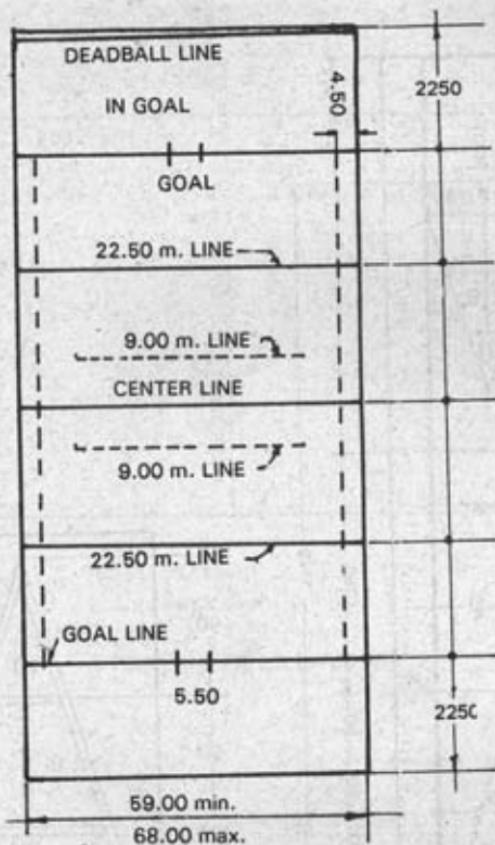
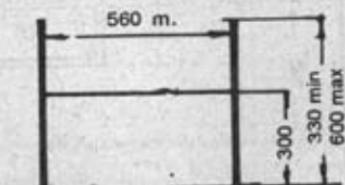


FIGURE 5-36 RUNNING TRACK

Sports and Entertainment



PLAYING FIELD LAYOUT



GOAL POST

FIGURE 5-37 RUGBY

Planning and Designers Handbook

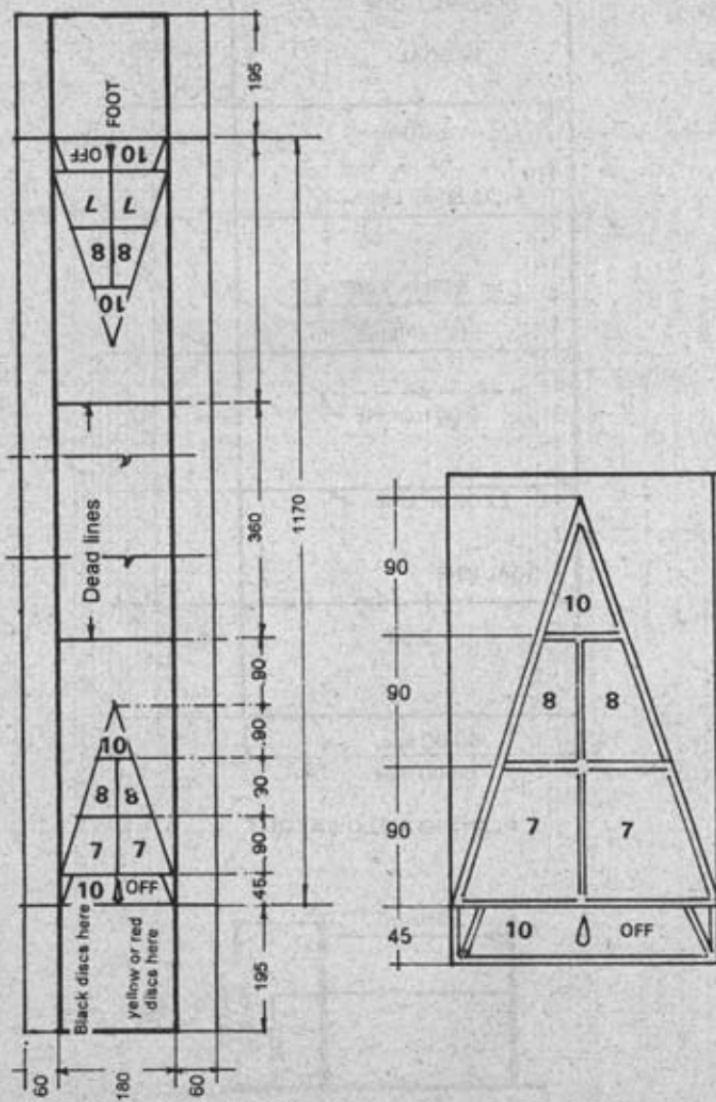
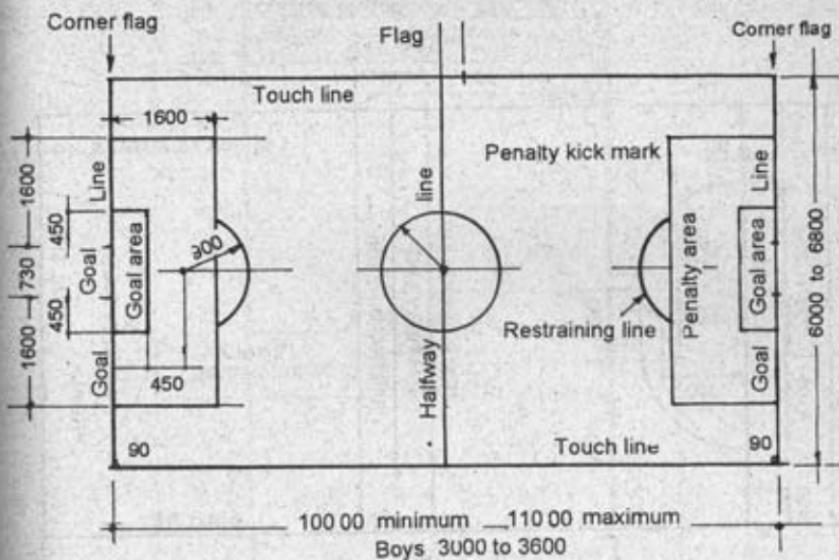


FIGURE 5-38 SHUFFLEBOARD

Sports and Entertainment



PLAYING FIELD LAYOUT

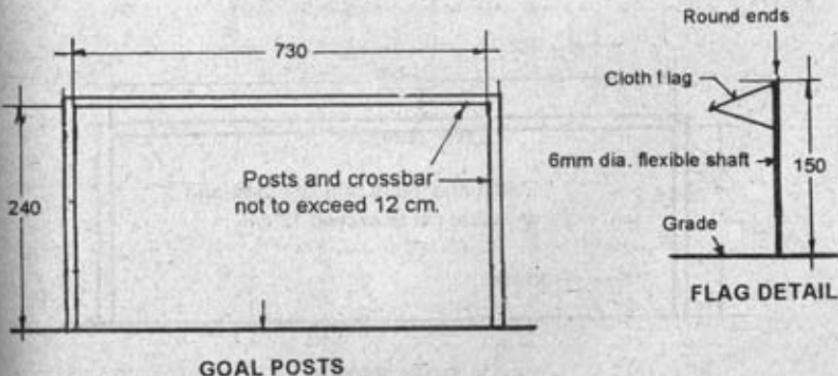


FIGURE 5-39 SOCCER FOR MEN AND BOYS

Planning and Designers Handbook

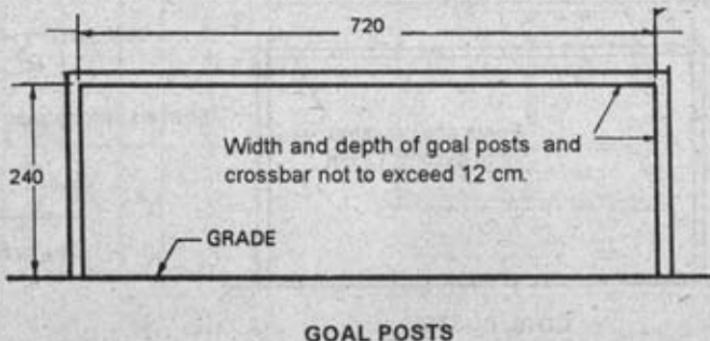
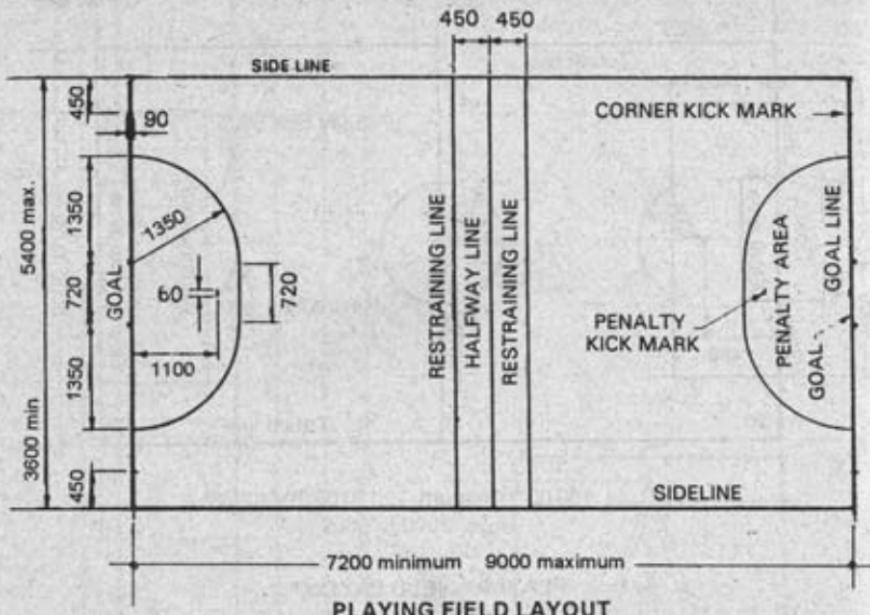


FIGURE 5-40 SOCCER FOR WOMEN AND GIRLS

Sports and Entertainment

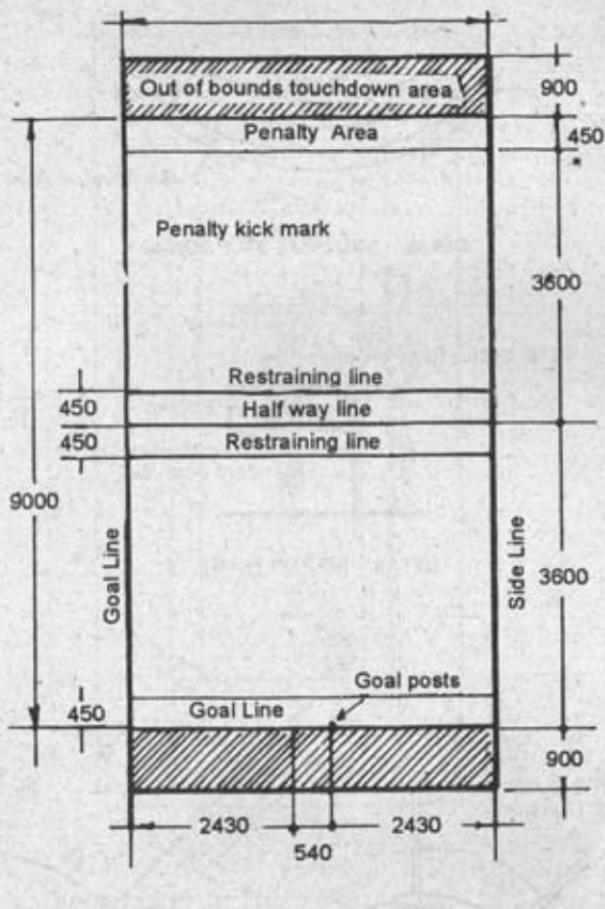
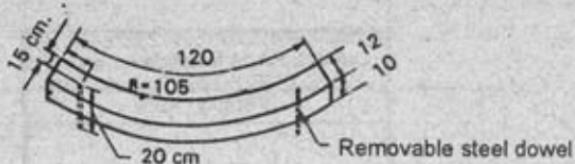
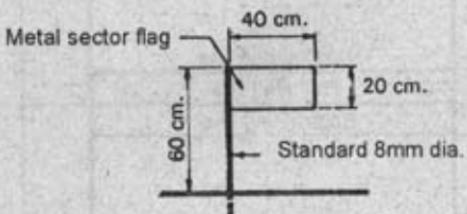


FIGURE 5-41 SPEEDBALL

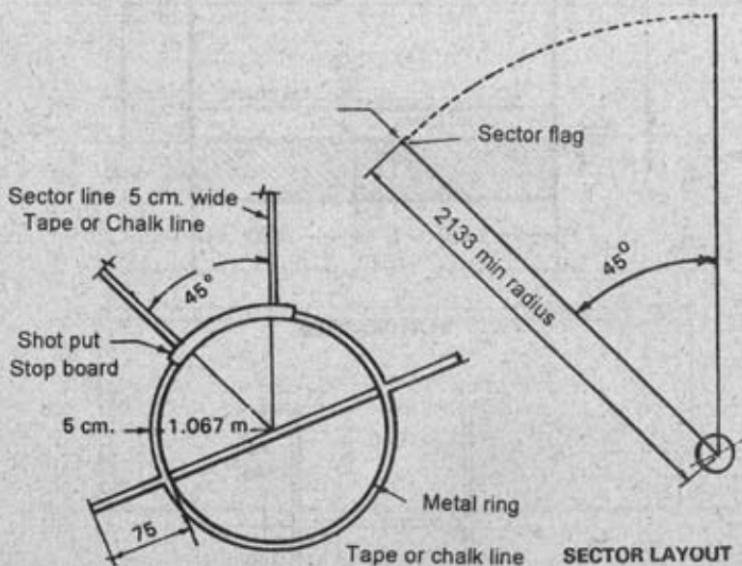
Planning and Designers Handbook



DETAIL - SHOT PUT STOP BOARD



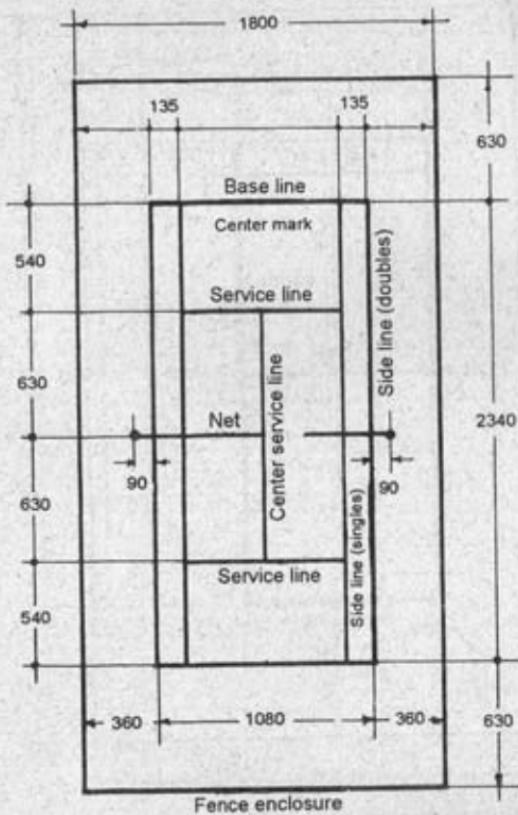
DETAIL - SECTOR FLAG



SHOT PUT THROW CIRCLE

FIGURE 5-42 SHOTPUT

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COURT LAYOUT

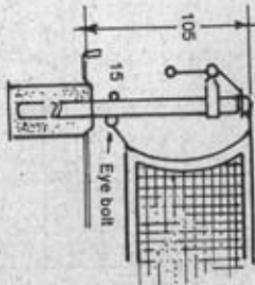
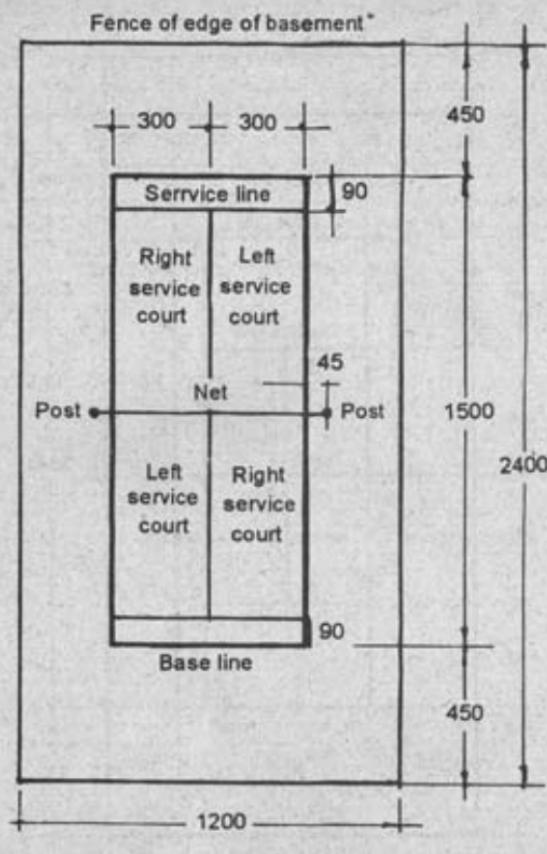
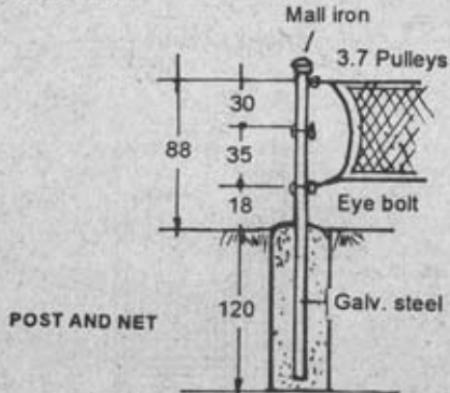


FIGURE 5-43 TENNIS

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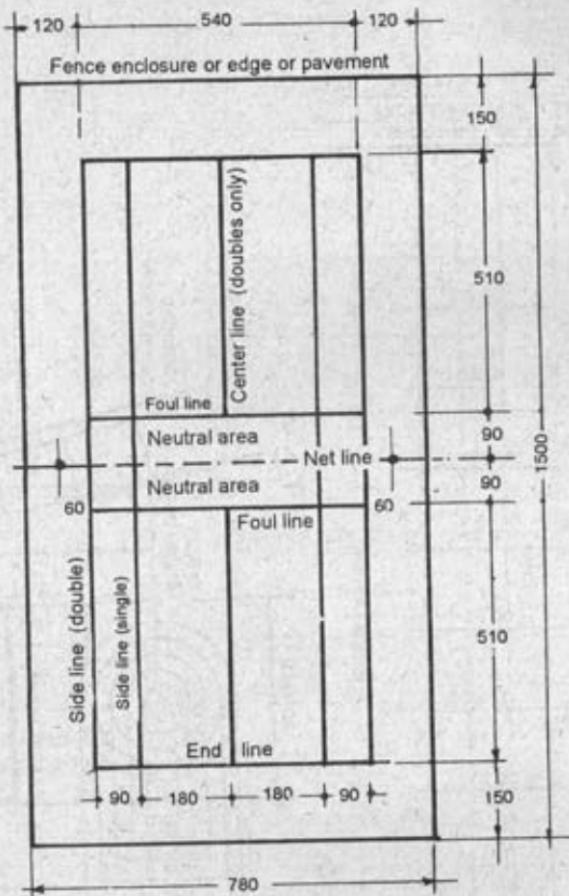
COURT LAYOUT



POST AND NET

FIGURE 5-44 PADDLE TENNIS

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COURT LAYOUT

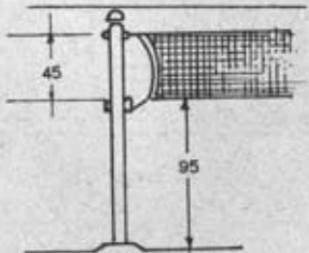


FIGURE 5-45 DECK TENNIS

Planning and Designers Handbook

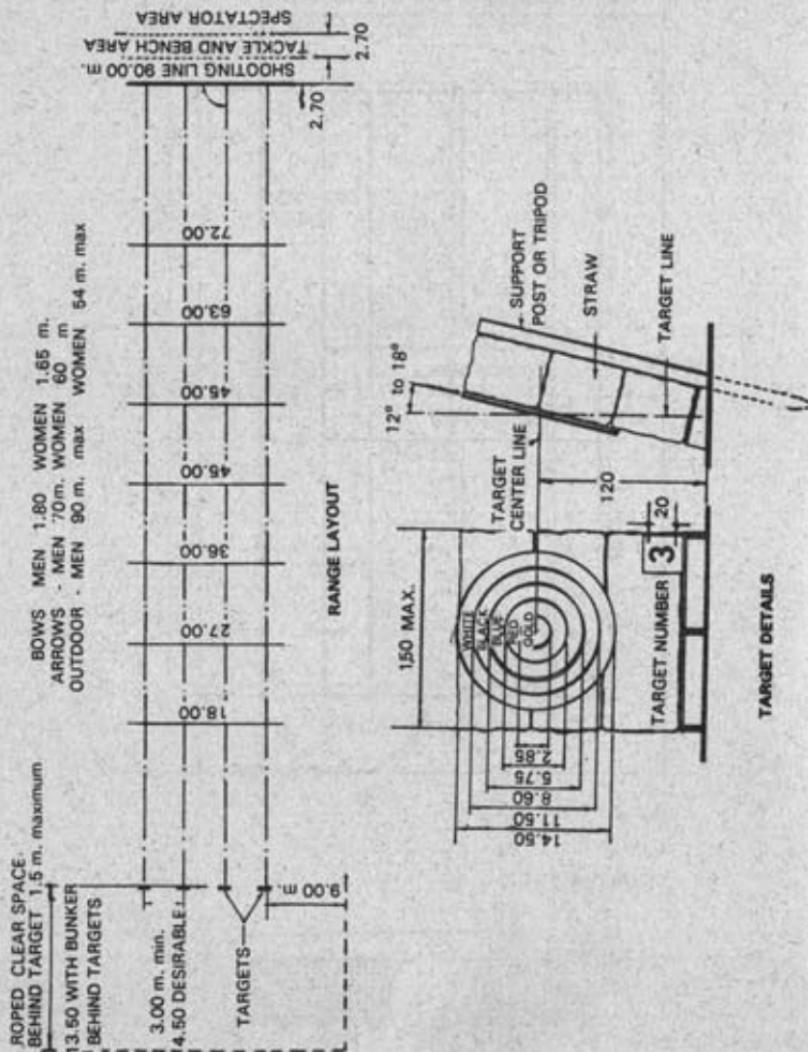
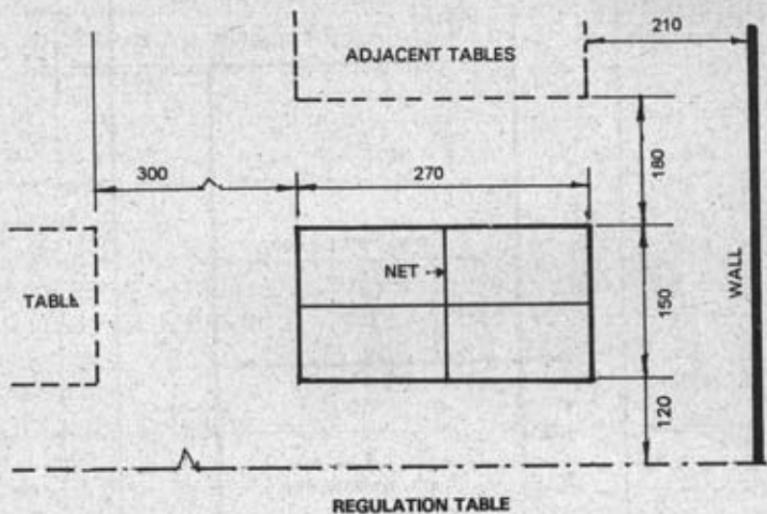


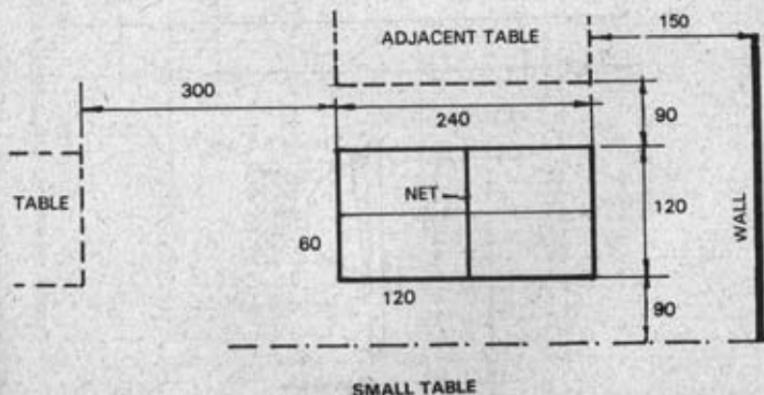
FIGURE 5-46 ARCHERY

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REGULATION TABLE

TABLE HEIGHT 75 cm.
NET HEIGHT 15 cm.
HEADROOM 2.10 m. min.



SMALL TABLE

FIGURE 5-47 TABLE TENNIS

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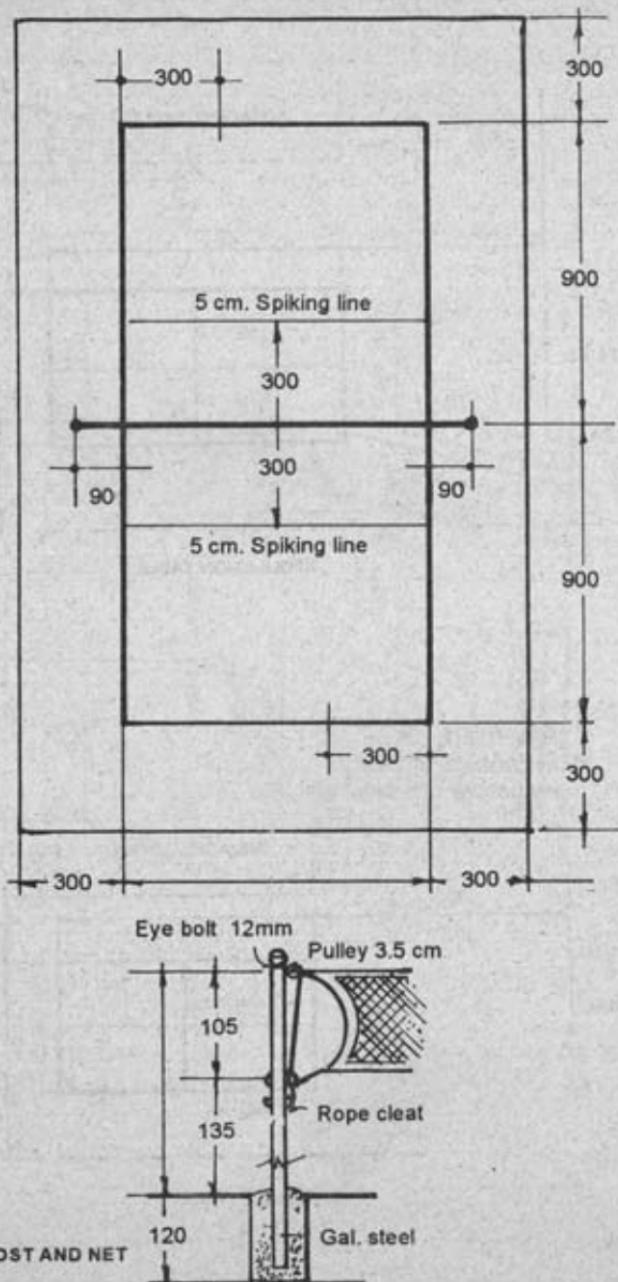


FIGURE 5-48 VOLLEYBALL

Sports and Entertainment

TABLE 5-3 BILLIARD AND POCKET BILLIARDS

TYPE OF TABLE	PLAYING TOP		TABLE SIZE	
	W cm.	L cm.	W cm.	L cm.
English Snooker	180	360	200	380
Standard Pool or Billiard	150	300	175	300
Standard Pool or Billiard	135	270	160	290
Standard Pool or Billiard	120	240	140	260
Junior Pool	105	210	130	235
Junior Pool	90	180	110	200

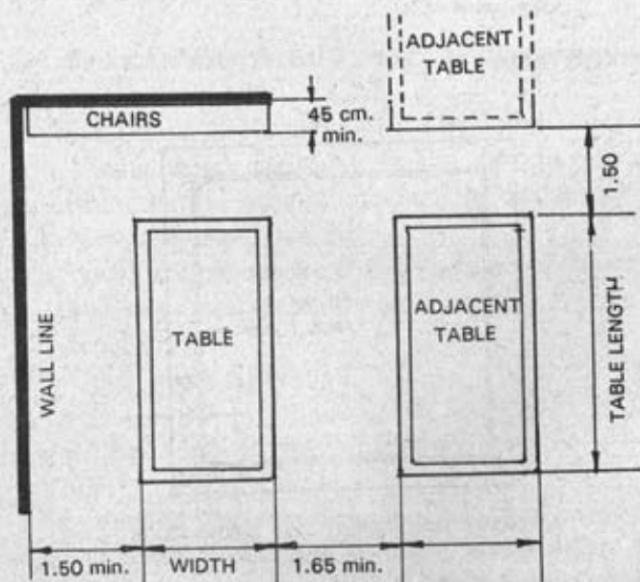
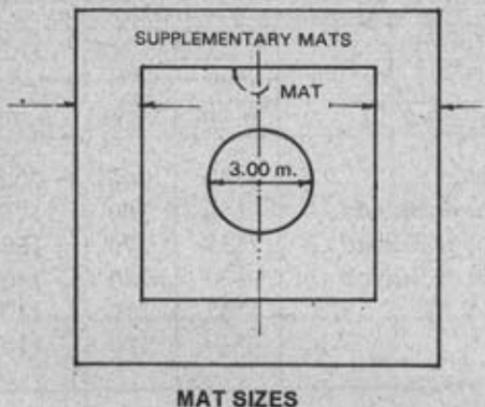


FIGURE 5-49 BILLIARD AND POCKET BILLIARDS

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WRESTLING (NCAA)

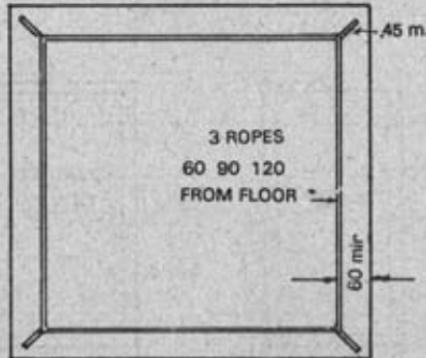


MAT SIZES

Intercollegiate Competition....730 x 730 cm.
International Competition..... 600 x 600 cm.
Olympic Competition 800 x 800 cm.

Data source NCAA

BOXING (AAU)



PLATFORM MAX HEIGHT 120 ABOVE FLOOR
RING SIZES 4.85 x 4.85 min. 7.30 x 7.30 max

Data Source AAU

FIGURE 5-50 WRESTLING (NCAA) AND BOXING (AAU)

5-3 Bowling Lanes

Bowling center is classified as one of the most expensive permanent structure that requires future general long planning consideration of the site.

1. Consult the Zoning Code and Local Ordinance that regulates the land use.
2. Consider the adjacent structures like churches, schools, hospitals and the like that might restrict bars, liquors, beverages and traffic flows to enter and exit the property.
3. Parking area provisions for future expansion and existing drainage system.
4. Visibility of the building from the street.

Planning Considerations

1. The feasibility that the people in the locality will patronize the business.
2. Is it public or privately owned business.
3. The immediate capital needed to start the business.
4. Property area, location, and zoning ordinances.
5. New or existing building.
6. Local ordinances governing the sale of liquor, snack bar and restaurant, billiard room, meeting room and banquet facilities.
7. Other sports facilities.

Column Spacing of the Building

As much as possible, designers would always want to have a total clear span of columns on bowling alleys. However, if such desires would not warrant and a column is inevitable structure, it should be properly located not to hamper the position of the bowling lanes. Under such conditions, adopt minimum lateral spacing of 6.87 meters between columns which is suitable

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for four lane-bay plus 3 centimeters allowance on each side of the column along the lane for acoustic finishes.

Longitudinally, the lesser the column, the better the design is, but the approach area that measures about 5.00 meters, plus the 60 centimeters space beyond the foul line must be totally free of column.

TABLE 5-4 WIDTH OF BOWLING LANE
(Excluding column, walls and passage between lanes)

Number of Uninterrupted Lanes	Minimum Depth in Meter
2	3.45
4	6.84
6	10.22
8	13.61
10	19.99
12	20.38
14	23.76
16	27.15
18	30.53
20	33.92

For each additional lane, add 338 centimeters

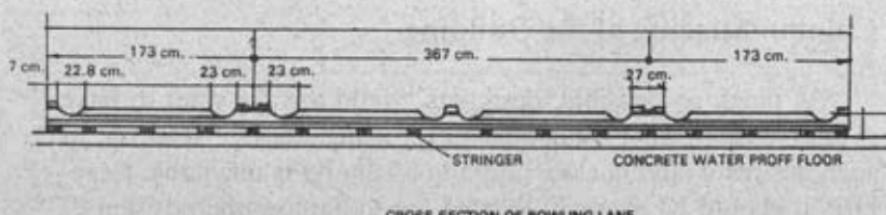
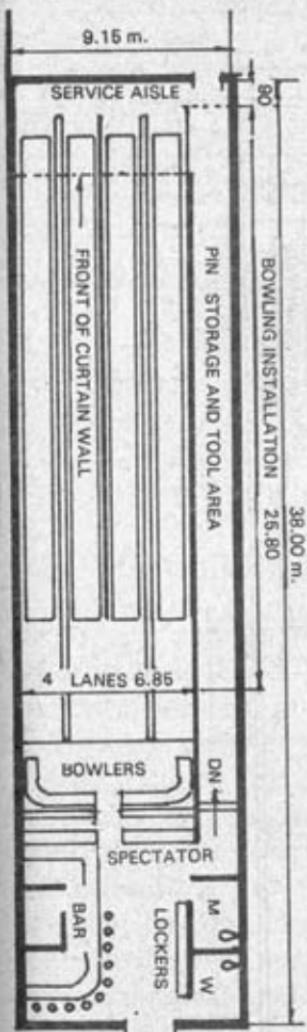
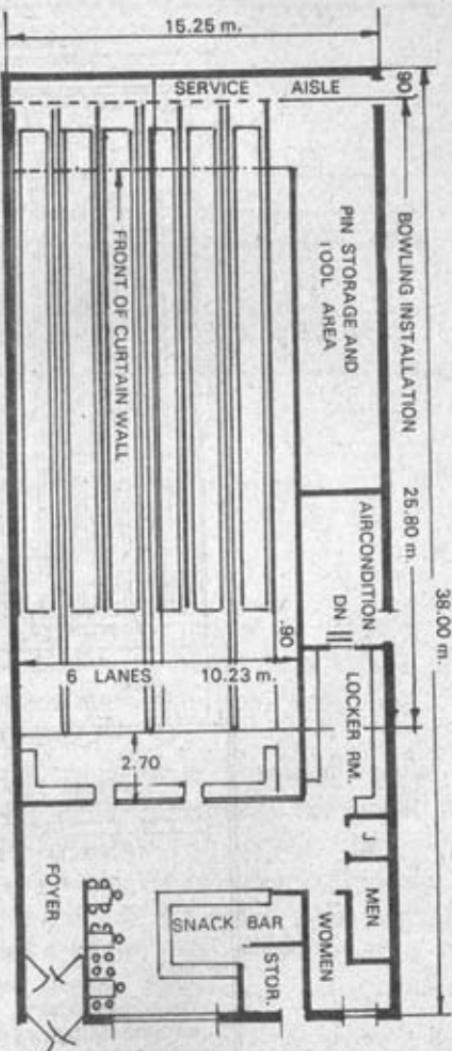


FIGURE 5-51 CROSS SECTION OF BOWLING LANE

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4 - LANES BOWLING LANE



6 - LANES BOWLING LANE

FIGURE 5-52 FOUR AND SIX BOWLING LANES

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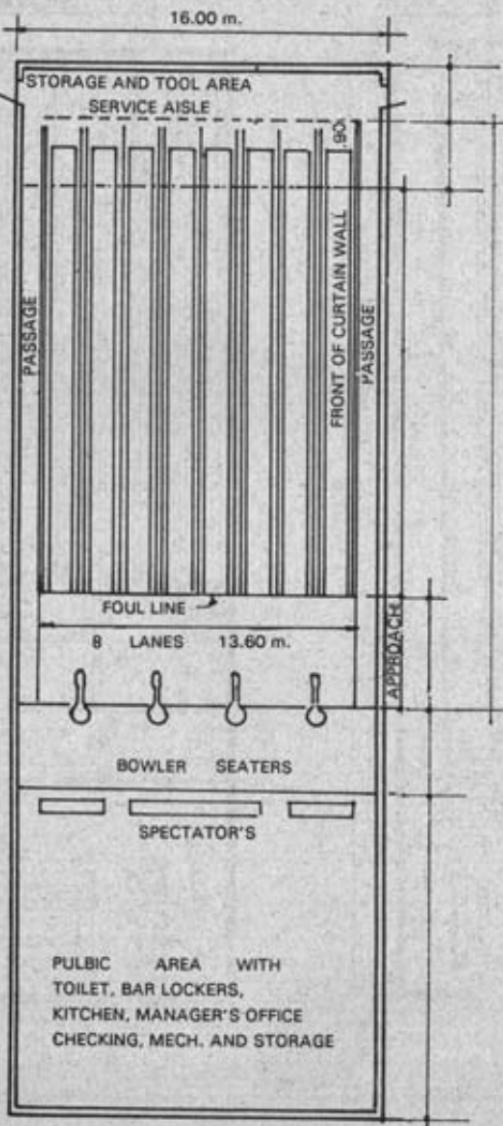


FIGURE 5-53 LANES BOWLING PLAN

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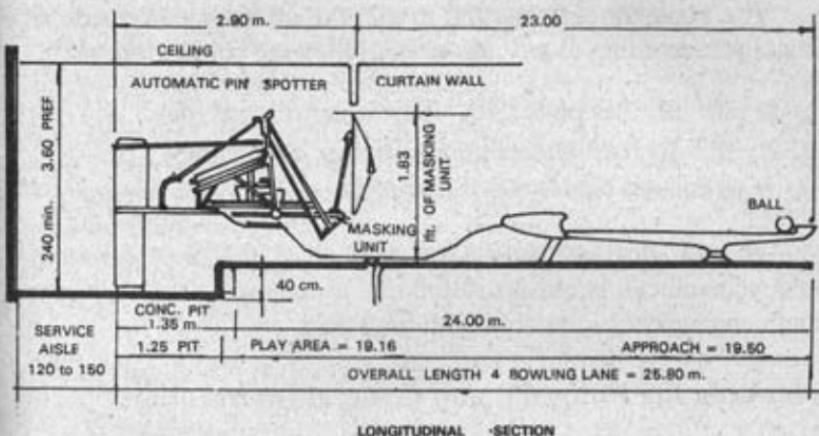


FIGURE 5-54 SECTION OF AUTOMATIC PIN SPOTTER

5-4 Rifle and Pistol Range

The rifle and pistol range, can either be indoor, or outdoor. Indoor building should be at least 23 meters long for a 15 meters range, allowing provisions for the bullet stop, firing line, the assembly, and the spectator's area.

The width of rifle and pistol range varies depending upon the number of firing points desired. If the space is somewhat limited, 1.20 meters wide range for a pistol is considered normal. Likewise, a 1.80 meters wide range for rifle points is ideal but could be reduced to 1.50 meters if the space is limited. However, if indoor range is used for both pistol and rifle, 1.80 meters is the ideal width.

Planning the Shooting Area

The most important thing that planner should consider first in designing a shooting area, is the construction of the backstop. The backstop requires the biggest appropriation of the project where the costs of this structure might be equal or even bigger than the building itself.

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The backstop of shooting range will be considered safe, if installed according to any one of the following configurations:

1. 45° degrees plate with either water or sand pit.
2. 45° degrees reverse plate with dry lead catcher.
3. Venetian blind type of backstop.

The 45° degrees plate with sand pit is the most common, and economical backstop, although it requires slightly higher maintenance cost compared with the others.

Planning the Bullet Pit and General Information

1. The bullet pit shall cover the entire area of the backstop
2. The depth of the pit should not be less than 10 centimeters.
3. The sand pit is dug-up yearly to remove the lead deposits or earlier cleaning schedule depending upon the volume of the participants.
4. The inconvenience of cleaning and changing the sand inside the pit prompted the use of water pit for ease in cleaning. The use of water pit avoids dust and minimize health hazard.

Backstop Steel Recommended Specifications

1. *Type of Steel* - Heat-Treated that requires low hydrogen welding to avoid distortion of the material in the heated affected area.
2. *Minimum Thickness* of the 45° backstop steel for:
 - a) 6.4 mm thickness for standard velocity of 22 calibers firing only.
 - b) 9.6 mm. thickness for .38 caliber woodcutter.
 - c) 12.7 mm. thickness for .45 caliber pistol including hardball.
3. *Minimum yield strength* of 100,000 psi
4. *Minimum tensile strength* of 115,000 to 135,000 psi.

Sports and Entertainment

5. *Minimum elongation* of 50 mm 16 to 18%
6. *Minimum reduction area* of 35 to 40%
7. *Brinnell hardness* of 321

High powered guns are not recommended for firing on conventional 45° steel backstop for fear of deflection rather than penetration.

Shooting Booth

Shooting booth is not recommended due to:

1. A portion of the range is hidden or concealed from the range officer.
2. There is no visual contact with each other.
3. The range officer lost control of the shooter that occasionally results to accident.
4. The booth magnifies the noise level to individual shooter

Reduction of Noise

Prolonged exposure to discharge of any firearm creates a muzzle blast that could affect the hearing that may result to total hearing damage.

Firearm that fires more than 342 meters per second generates a sonic boom that is more damaging to hearing because of frequency. Hearing damage could be resulted even from a .22 rim fire cartridge.

The noise could be reduced by acoustical treatment of the wall area next to the firing line and the ceiling 1.00 meter directly in front of the firing line.

Range Equipment

1. Gun racks placed on a conventional location booth at the rear of the firing line and the assembly.
2. Hand gun benches on firing line for pistol range

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3. Trash receptacle.
4. Coat rack
5. Storage cabinets
6. Bulletin board
7. Shooting mats
8. Seats in the assembly area

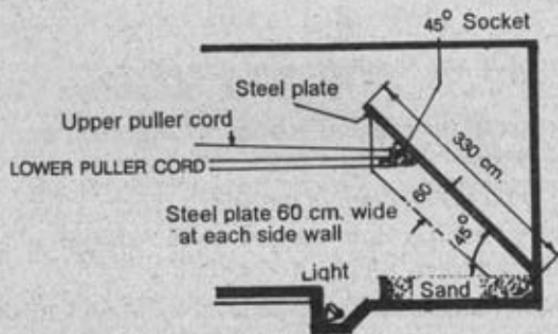


FIGURE 5-55 SECTION THROUGH BULLET STOP

TABLE 5-4 COEFFICIENT OF ABSORPTION

Materials	125 Hz.	500 Hz.	2,000 Hz	4000Hz
Concrete blocks, unpainted	0.36	0.30	0.39	0.25
Brick wall painted	0.01	0.02	0.02	0.03
Brick wall not painted	0.03	0.03	0.05	0.07
Carpet with 40 oz. felt underlay	0.08	0.57	0.71	0.73
Heavy fabric 18 oz./sq.m. drape	0.14	0.55	0.70	0.65
Fiber glass 5 cm. thick	0.39	0.94	0.85	0.84
Plywood panel 12.5 mm thick	0.28	0.17	0.10	0.11
Mineral fiber tiles 16 mm	0.52	0.62	0.78	0.55

Hz = Frequency of the sound wave in cycle per second. Coefficient of absorption percentage of sound absorbed by the specific materials.

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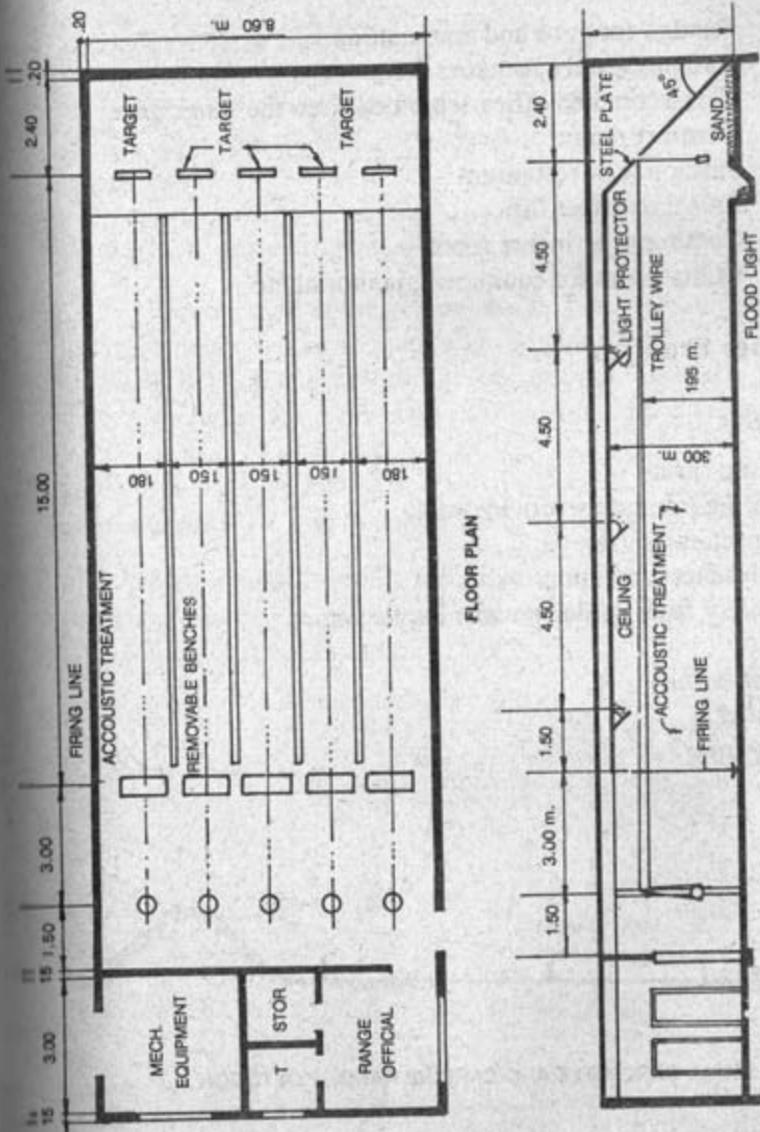


FIGURE 5-54 INDOOR RIFLE AND PISTOL RANGES

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Space Requirements

1. Storage for guns and ammunition.
2. Assembly and spectators area.
3. Classroom and office separated from the range area.
4. Comfort rooms.
5. Snack bar or restaurant.
6. Range manager office.
7. Coat room or locker room.
8. Utility room for equipment, janitorial etc.

Designer Problem

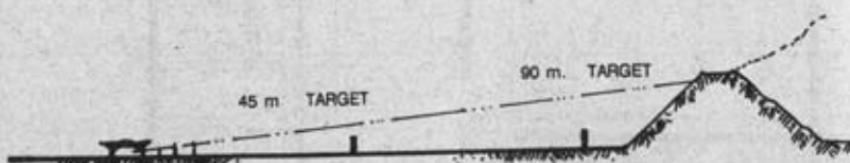
A. Safety

1. Trap safety.
2. Firing line safety provide stalls.
3. Spectator safety.
4. Ricochet protection.
5. Safety from spilled powder explosion.

B. Ventilation

C. Noise

D. Lighting



SMALL BORE RIFLE AND CARBINE RANGES OUTDOOR

FIGURE 5-55 RIFLE AND CARBINE RANGE

5-5 Movie Theaters

Designing a cinema includes audio-visual combined with showmanship and economical cost of the structure. The success of commercial cinema depends on its ability to present good films, maximum admission, and price that would realize adequate profit.

Movie patrons on the other hand, expect the following:

1. Good vision of the screen image.
2. Undistorted reproduction of the sound effects.
3. Discernible detail of the objects and comfort. Comfort includes the manner of seating and the vision angle of screen.

Determining the maximum distance from the screen

The maximum viewing distance should not exceed twice the width of the widest picture to be projected = $2W$. The width of the seating pattern should be $1.3 W$.

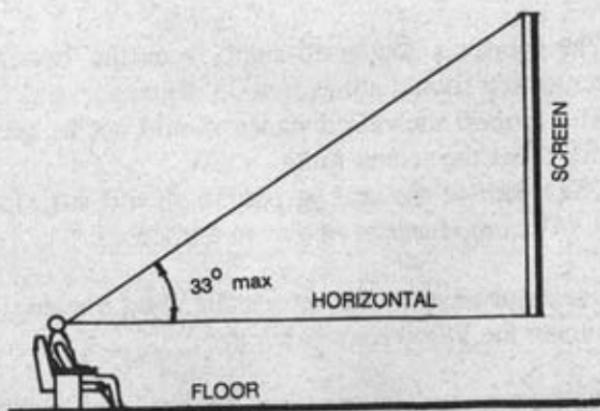


FIGURE 5-56 MINIMUM DISTANCE FROM SCREEN
TO FIRST ROW OF SEAT

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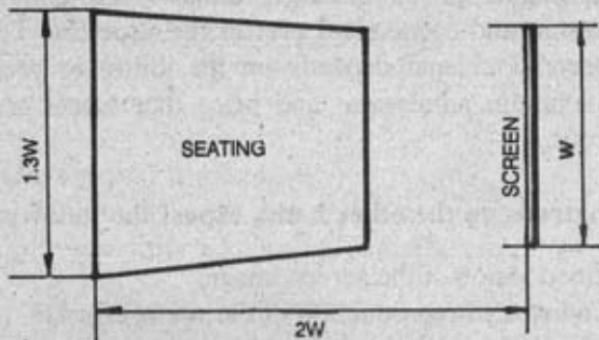


FIGURE 5-57 MAXIMUM VIEWING DISTANCE

A good motion picture theater is designed for only one type of projection system and the width of film to be shown. However, since the width of film being produced varies from 35 mm and 70 mm, movie theater must be suitable for both system if designed under the following conditions:

1. The viewer's angle of sight from the bottom of the screen top should not exceed 33 degrees.
2. The farthest viewing distance should not be greater than two times the screen width = $2W$.
3. The width of the seating pattern should vary from W to $1.3 W$ at the farthest row from the screen.

The seats nearest to the screen for good viewing could be attained under the following conditions:

1. For the standard 35 mm films, the projected picture width should not exceed 11.00 meters.
2. For cinemascope 35 mm films picture width = 14 meters
3. For 70 mm film = 20.00 meters.

Sports and Entertainment

Balcony

Balcony is the alternative if larger seating is desired in order to avoid excessive viewing.

Floor Slope and Seats

Planning Considerations

1. Avoid objectionable screen obstruction caused by persons seated in front.
2. Floor slope should provide standard vision of the screen image.
3. Slope of the main floor should be increased for one row vision.
4. Two rows vision is not ideal but acceptable if seats are staggered to allow viewing between heads.
5. Two rows vision provide wider chair for wider space between heads.

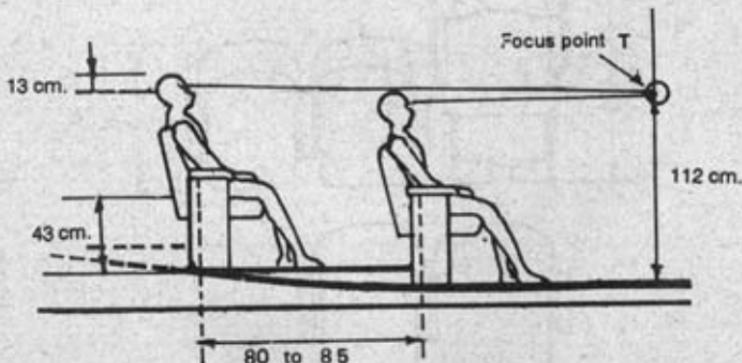


FIGURE 5-58 SIGHT CLEARANCES

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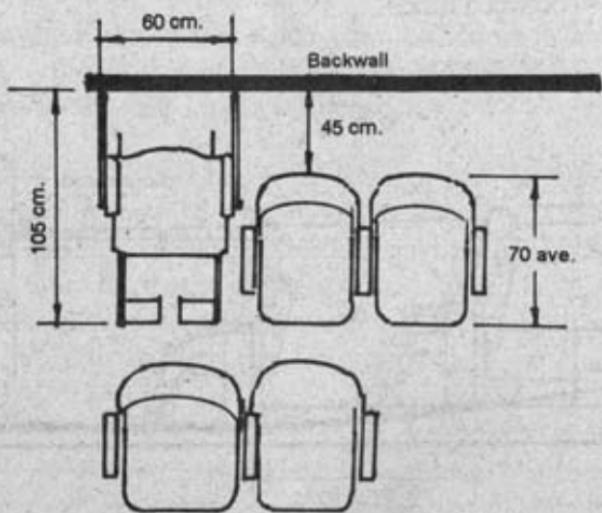
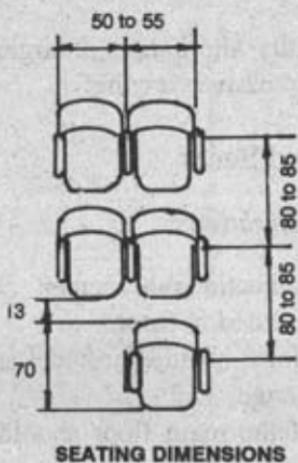
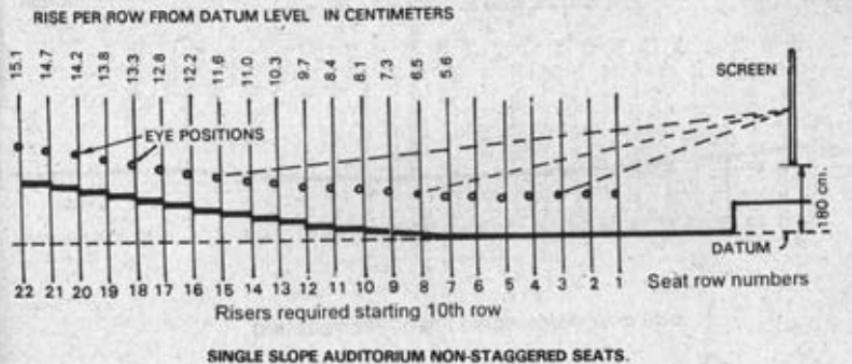
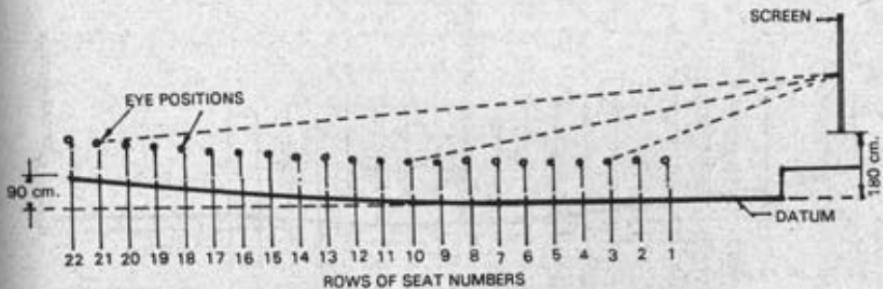


FIGURE 5-59 SEATING FOR DISABLED PERSON

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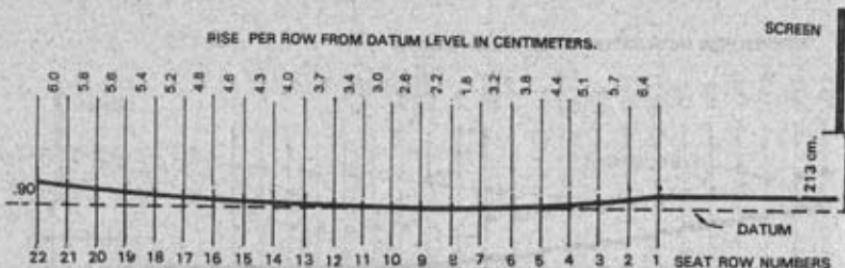
SINGLE SLOPE AUDITORIUM NON-STAGGERED SEATS.



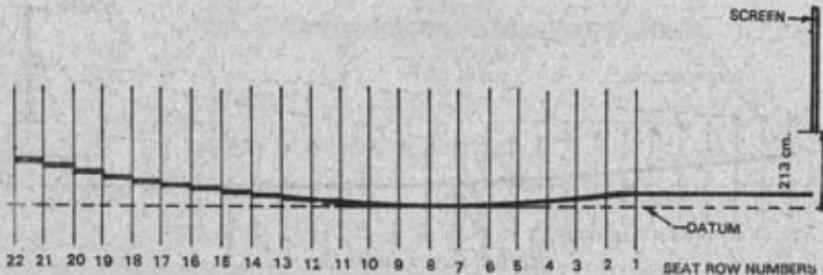
SINGLE SLOPE AUDITORIUM USING STAGGERED SEATS. GROUND SLOPE 90 CM. OR MORE DOWNWARD THE SCREEN. RISE OF SLOPE STARTS FROM THE TENTH ROW.

FIGURE 5-60 LONGITUDINAL SECTION OF A CINEMA

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ONE ROW VISION USING STAGGERED SEATING



ONE ROW VISION NON-STAGGERED SEATS

FIGURE 5-61 LONGITUDINAL SECTION OF A CINEMA

Sports and Entertainment

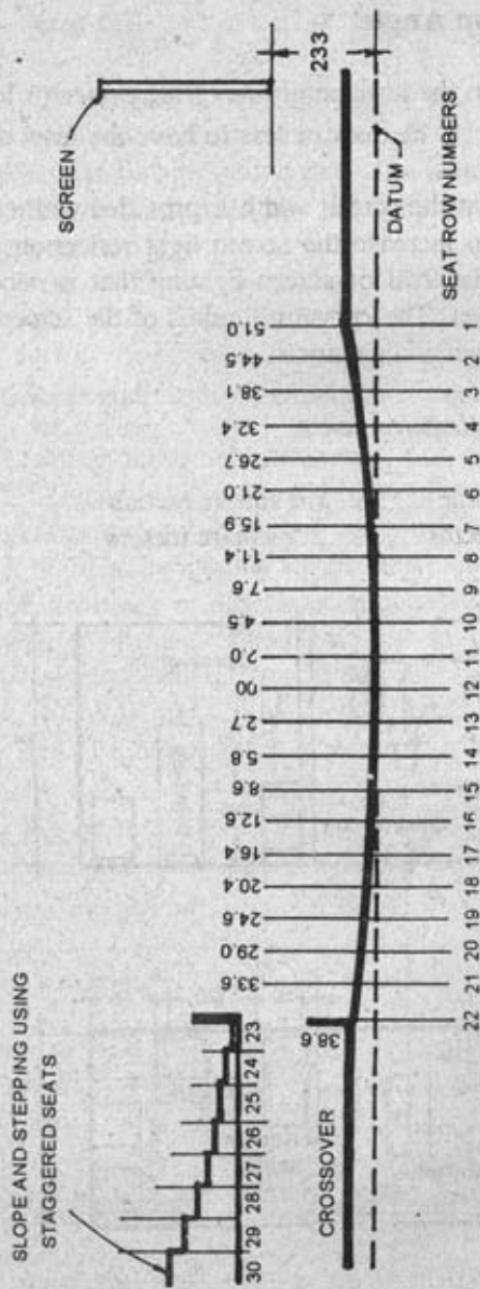


FIGURE 5-62
DOUBLE SLOPE AUDITORIUM WITH BALCONY,
FIRST SIX ROWS ALIGNED SEATING AND THE REST STAGGERED

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Screen and Projection Angle

Projected angle from the horizontal line of the projector lens to the screen should be 10° degrees or less to have the least distortion of the picture details.

It will be noticed that the screen width is provided with curvature. The reason is to increase the screen light reflections in order to attain better dispersal of screen lighting that is necessary for larger size screen. The curvature radius of the screen is about 1.25 times the projection distance.

Projection Room Area Requirements

First projection machine 5.0 square meters
Each additional projector 2.5 square meters

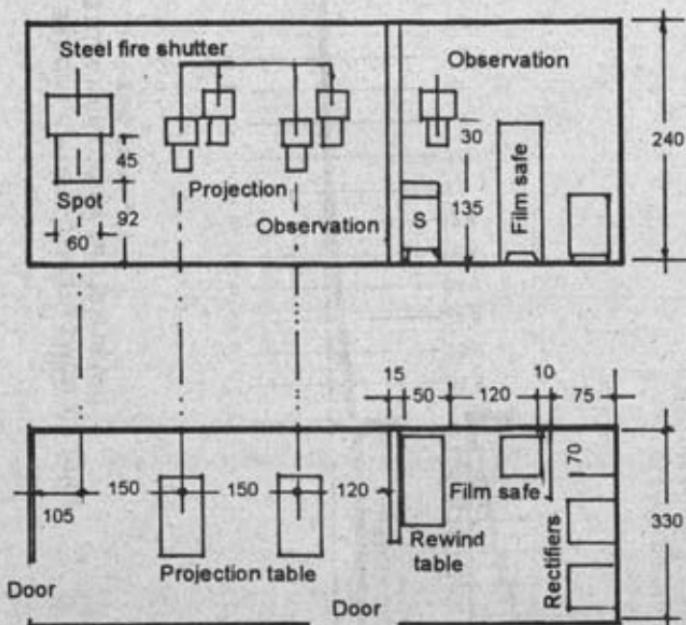


FIGURE 5-63 PLAN OF THE PROJECTION ROOM

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Picture Making

In order to absorb the fuzzy edges of the projected picture on the screen, the designer used a dull black surrounding or a curtain that can be adjusted to mask the various picture widths.

Another method is to use designed walls and ceiling that meet the picture edges.

Lighting

The cinema auditorium lighting has three functions:

1. Lighting during intermission.
2. Emergency exit and mood lighting used during screen presentations.
3. Full intensity lighting for making announcement clearing of the house or other special occasions.
4. Source of these lights from:
 - a) Reflection from the screen.
 - b) Wall and ceiling surface lighting.
 - c) Light projected on walls or concealed pictures.

Toilet Facilities

Theater Capacity	Men	Women
400 or less seats	1 - Basin 1 - Toilet 1 - Urinal	1 - Basin 2 - Toilet
400 - 600 seats	2 - Basins 2 - Toilets 2 - Urinals	2 - Basins 3 - Toilets
600 - 1000 seats	2 - Basins 2 - Toilets 3 - Urinals	2 - Basins 4 - Toilets

5-6 Swimming Pool

Definition of Terms

Swimming Pool. Any constructed pool with water depth over 60 centimeters intended for bathing or swimming or with surface area of more than 23 square meters.

Main Outlet. Water outlet at the deepest portion of the pool.

Main Suction. The pipe connecting the main outlet to the pump suction.

Vacuum Fitting. The pipe outlet of fitting in the wall used for suction cleaning.

Vacuum Piping. The hose that connect the vacuum pump cleaner and the vacuum fitting.

Return Piping. The piping return for filtered water from the filter to the pool.

Inlet. The fitting where water enters the pool.

Face Piping. The entire piping, valves and fittings that connects the filter system as a unit.

Public Swimming Pool. All artificially constructed pools other than a residential pool are called public swimming pool.

Re-circulating Piping. The piping from the pool to the filter and back to the pool.

Backwashing Piping. The piping that extends from the backward outlet of the filter to its end at the point of disposal.

Filter. Any material or apparatus that clarify water.

Filter Element. Filter device which return the filter media.

Re-circulating Skimmer. A device connected with a pump suction used to skim the pool over a self adjusting weir and return the water to the pool through the filter.

Overflow Gutter. A straight canal by the wall of the pool used for overflow and to skim the pool surface.

Filter Media. A fine material that entraps the suspended particles of water.

Pool Depth. Distance between the floor and the highest level of water.

Sports and Entertainment

Pool Deck. The panel area around the pool.

Width and Length. Actual water dimensions.

Lifeline Anchor. Ring in the wall of pool as transition point between shallow and deep area.

Planning Considerations:

1. The pool structure should be strong enough to withstand the expected load and forces.
2. The wall slope to a depth of 1.50 meters from the top shall not be more than 30 centimeters horizontally.
3. The floor slope at the shallow end of the pool shall not be more than 30 centimeters vertical to 2.00 meters horizontal. The transition line between the shallow and deep water should not be less than 1.35 meters or more than 1.50 meters deep.

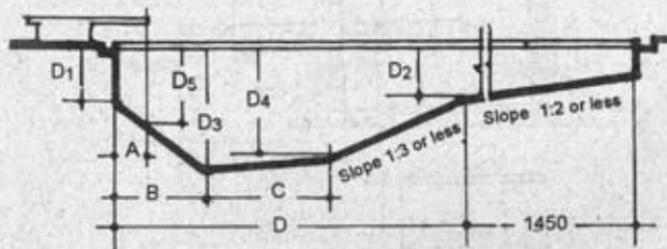
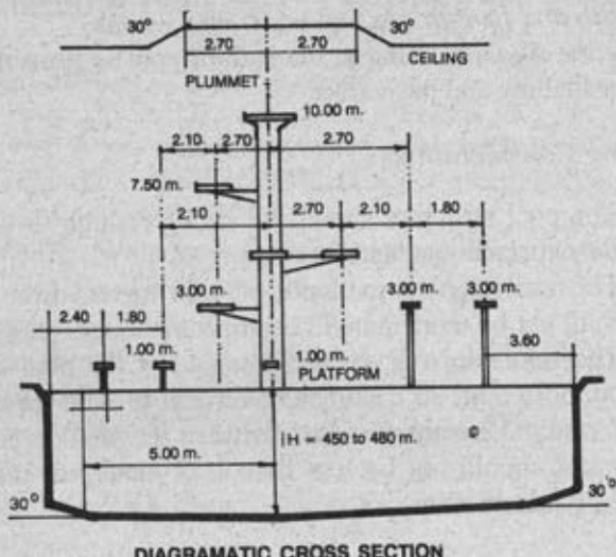


FIGURE 5-64 SWIMMING POOL MINIMUM DIMENSIONS

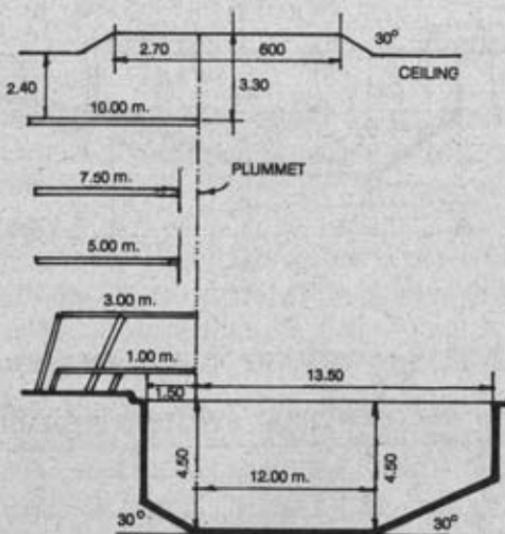
TABLE 5-5 RECOMMENDED SWIMMING POOL DIMENSIONS

Board Height Above water	D ₁	D ₂	D ₃	D ₄	D ₅	A	B	C	D
60 cm.	150	135	240	240		75	180	180	720
100 cm.	150	135	255	240	225	150	180	270	900
300 cm.	150	135	360	350	255	150	180	270	1050

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DIAGRAMMATIC CROSS SECTION



DIAGRAMMATIC LONGITUDINAL SECTION

FIGURE 5-65 CROSS SECTION OF SWIMMING POOL

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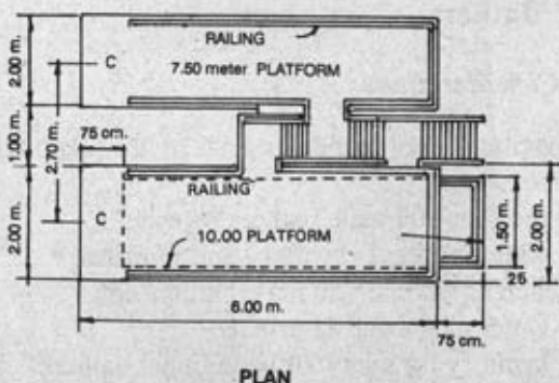
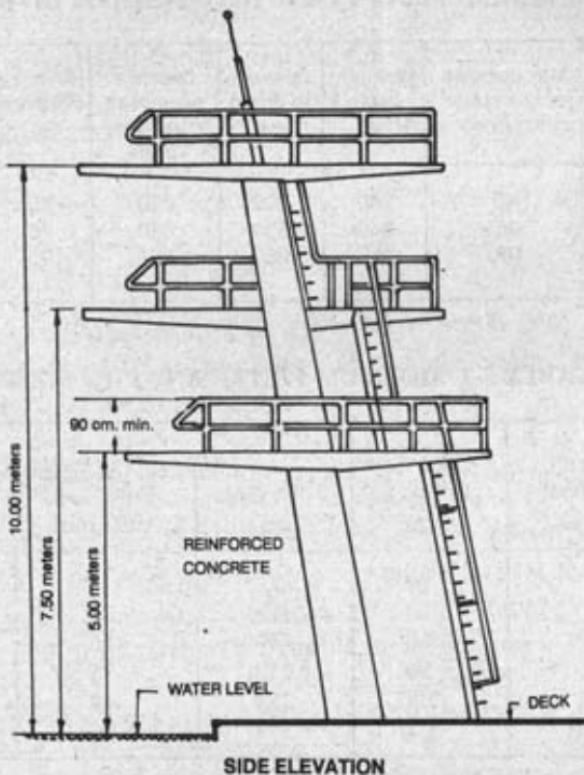


FIGURE 5-66 CONCRETE DIVING TOWER 150-300 CM. PLATFORM

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TABLE 5-6 MINIMUM DEPTS AND DISTANCES OF DIVING AREA

Diving Boards	Max distance above water cm.	Minimum depth cm.	Distance to diving wall	Distance deep point to transition point	Minimum overhang	Minimum width to board
Deck level	40	240	300	300	75	210
Residential	30	240	330	330	75	225
1- Meter	100	255	360	360	90	240

TABLE 5-7 MINIMUM FILTER AND PIPE SIZES

Pool Capacity Maximum Pool Capacity (gal.)	Filter Size Filter Dia. cm.	Filter and Backwash Rates		
		Filter Area cm.	Filter Rate Gal./min.	Backwash Gal./min
9,500	40	53	9	18
11,750	50	65	11	22
26,400	60	94	16	32
38,200	90	212	35	71
51,900	106	289	48	96
67,800	120	377	63	126

For Male Bathers

Planning Considerations:

1. Capacity of pool bathers is 1.86 sq. m. (maximum) per person.
2. For the first 100 male bathers provide:
1- water closet; 1- lavatory and 1- urinal
3. For each additional 150 male bathers add:
1- water closet and 1- urinal;
1- lavatory for every 200 additional bathers.
4. For the first 150 male bathers, add three showerheads. Likewise, one showerhead should be provided for each additional 50 bathers.

Sports and Entertainment

Female Bathers Planning Considerations

1. For the first 100 female bathers, provide minimum two water closets - lavatory combination.
2. For each additional 75 female bathers, add one water closet and lavatory combination.
3. For the first 100 female bathers, provide two showerheads minimum. For every 50 additional female bathers, add one showerhead outlet.

Statistical report showed that the ratio of male and female bathers are 60% to 40% respectively. This could be the basis of computing the anticipated bathers.

Quality of Water

Swimming pool water must have minimum free available chlorine residual not less than 0.25 ppm but not more than 1.0 ppm at any time. The measure of hydrogen-ion content pH shall not be below 7.0 or more than 8.0 on the hydrogen-ion scale.

TABLE 5-8 PIPE VELOCITY IN FEET PER SECOND

FLOW RATE Gal/min.	PIPE SIZE		FLOW RATE 32 mm	PIPE SIZE (mm)		
	20 mm	25 mm		38 mm	50 mm	62 mm
9	5.4		32	6.6		
10	6.0		35	7.5		
11	6.6					
16	9.6		48	10.2	7.6	
18	10.8	6.7	50		7.9	
22		8.2	63		9.9	
25		9.3	71		11.1*	6.9
32		11.9*	96			9.2
			126			12.1*

*Do not select suction or backwash line sizes where velocity exceed 10 ft. per second

The pool should be provided with circulating system capable of filtering the whole water contents in 18 hours, where flow is computed at the maximum of five gallons per minute per square foot of filter area.

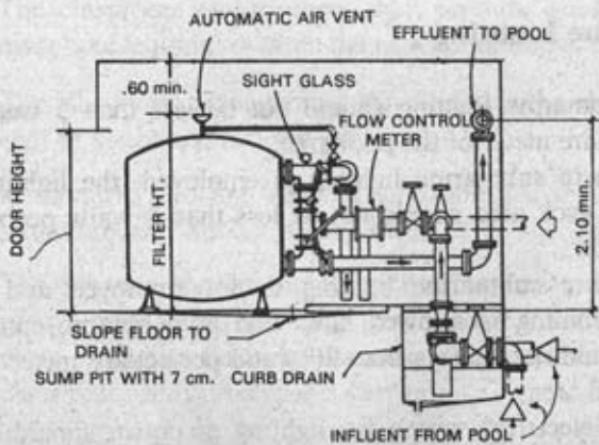
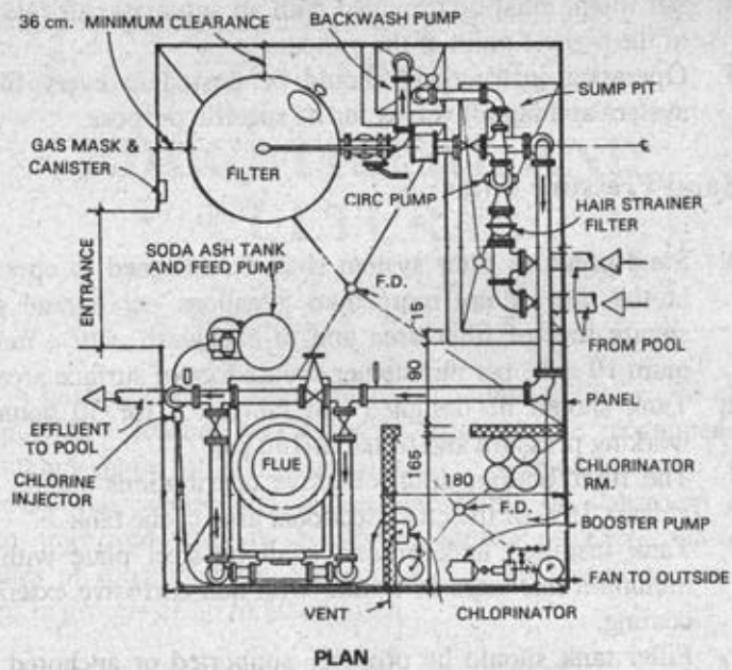
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1. Filtered water shall be clear and ready to identify 5 centimeters diameter disk through 2.40 meters depth water.
2. Filter capacity should require only once in every four days cleaning for normal operation.
3. Filter should be equipped with influent and affluent pressure gauges to determine the frequency of cleaning.

TABLE 5-9 MINIMUM SIZE OF PIPE

Diameter of filter m.	Max length suction line m	Main suction line mm	Vacuum line mm	Filter return line mm	Backwash line mm	Approx total backwash head mm.
.40	6.00	25	25	18	25	9.60
	9.00	25	25	18	25	10.50
	12.00	32	32	18	32	6.60
	15.00	32	32	18	32	7.20
.50	6.00	25	25	18	32	8.70
	9.00	32	32	18	32	6.60
	12.00	32	32	18	32	7.50
	15.00	32	32	18	32	7.80
.60	6.00	32	32	25	32	8.40
	9.00	32	32	25	32	9.30
	12.00	32	32	25	32	10.20
	15.00	38	32	25	32	8.70
.75	6.00	38	38	32	38	8.70
	9.00	38	38	32	38	9.60
	12.00	38	38	32	38	10.50
	15.00	50	38	32	38	8.40
.90	6.00	50	38	38	50	7.60
	9.00	50	38	38	50	8.10
	12.00	50	38	38	50	8.70
	15.00	50	38	38	50	9.30
1.05	6.00	50	38	38	50	9.30
	9.00	62	38	38	62	6.30
	12.00	62	38	38	62	6.60
	15.00	62	38	38	62	7.80
1.20	6.00	62	38	38	62	7.50
	9.00	62	*50	38	62	8.10
	12.00	62	*50	38	62	8.40
	15.00	62	*50	38	62	9.90

Sports and Entertainment



CROSS SECTION

FIGURE 5-67 SWIMMING POOL PUMP AND FILTER

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4. All filters must be provided with an automatic air release at the highest point of the system.
5. Operating instructions should be posted in every filter system and tag all valves for its specific purpose.

Sand Pressure Filter

1. Sand pressure filter system shall be designed to operate at the rate of not more than 5 gallons per minute per square foot of filter area and to backwash with a minimum 10 gals. per minute per square foot of surface area.
2. Tank should be designed and fabricated for 50 pounds working pressure and tested at 150 psi.
3. The filter bottom drain effective distributions should be at least 25% of the cross sectional area of the tank.
4. Tank installed underground shall be steel plate with a minimum thickness of 5 mm. with non-corrosive exterior coating.
5. Filter tank should be properly supported or anchored to avoid tipping or settling.

Submarine Lighting

1. Submarine lighting should not be less than 5 watts per square meter of the pool area.
2. Where submarine lighting is employed, the lighting for the deck area should not be less than 6 watts per square meter.
3. Where submarine lighting is not employed and night swimming is allowed, area and pool lighting combined should not be less than 20 watts per square meter of the total area.
4. No electrical wiring for lighting or power should be allowed to pass overhead within 6.00 meters of the pool perimeter.

EDUCATIONAL AND CULTURAL

6-1 Nursery School

A nursery classroom normally accommodates 15 to 23 children with a teacher and assistant teacher. The recommended minimum space for instructional area is 48 square meters. The conventional square and rectangular forms of classroom had been improved through creative planning of unconventional shapes of room that could accommodate two or three nursery class in groups of 30 to 60 children.

Planning Considerations:

1. The classroom environment shall promote conducive atmosphere leading towards the educational objectives.
2. The classroom arrangement should foster the child's concept of space and orderliness.
3. A separate tutoring booth is advisable for individual instructions and teacher's interaction.
4. The planner should include acoustical treatment of the room, considering the high pitch voice of school children. Activities held simultaneously cause disturbance on class that needs a complete silence.
5. The school children's height must be considered in planning any display area because an object displayed higher than 1.30 meters is beyond the child's normal range of awareness. The ideal recommended height is 1.00 meter.

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6. Window height should be lower enough for the children to look freely out of the window.

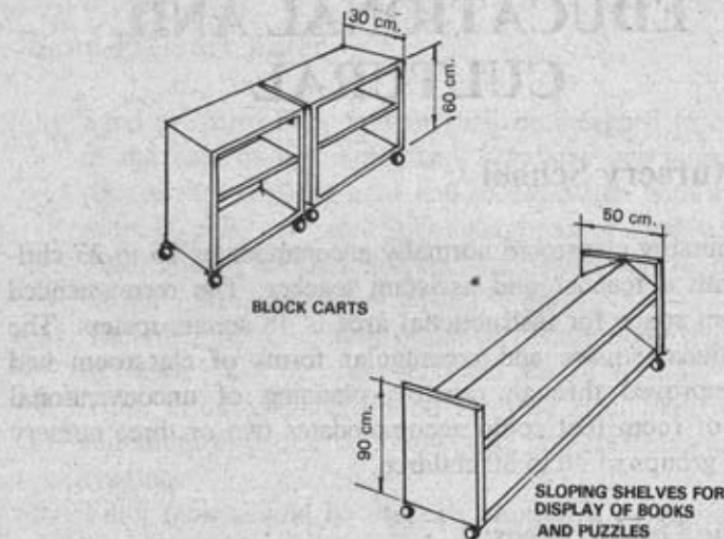


FIGURE 6-1

Nursery School Requirements

1. *General Area* is a place for group activities like programs, singing, dancing etc.
2. *The Block Area* where children play with unpainted blocks that are uniform in height but varying length or a group of blocks with different geometrical shapes.
3. *Manipulative Toy Area* is where the children go and play after exploiting the block area.
4. *Reading and Listening Area* is the library room where children read with the assistance of a teacher.
5. *Doll and Housekeeping Area* is considered the most attractive area for the school girls.

Educational and Cultural

6. *Art Area* is where the children draw, paint, play with clay modeling gum paste etc.
7. *Tutoring booth* for teaching a child one at a time.
8. *Toilet and storage*
9. *Observation space*

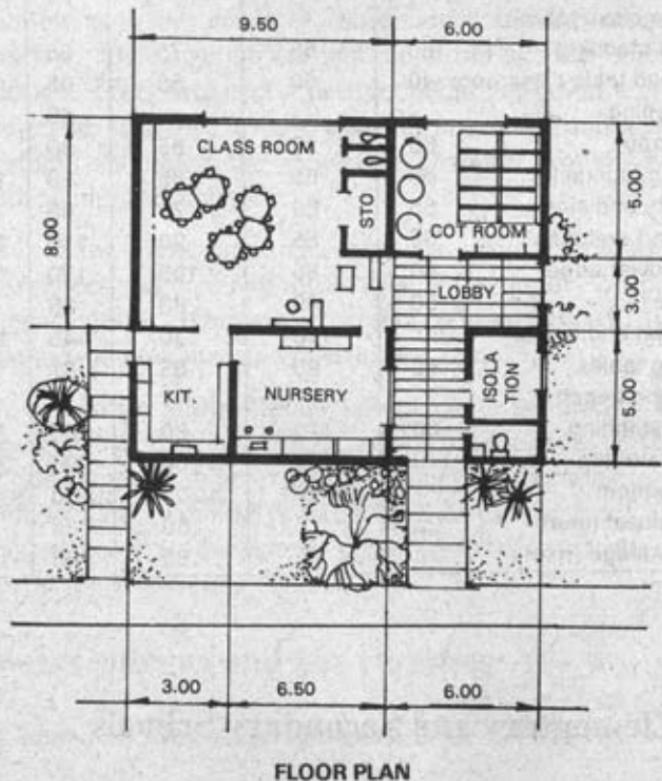


FIGURE 6-2 CARE CENTER FOR 25 CHILDREN

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**TABLE 6-1 WORKING HEIGHT FOR ELEMENTARY AND
SECONDARY SCHOOL CHILDREN IN CENTIMETERS**

FACILITIES	KINDER-GARTEN	ELEMENTARY		HIGH SCHOOL	
		Grade 1-111	Grade 1V-VI	Junior	Senior
Cabinet display top	120	130	250	175	185
Cabinet display bottom	60	65	75	85	90
Cabinet top(Pupil max.)	120	135	150	180	200
Chairs and bench	25	27	30	85	38
Chalk board bottom	50	60	70	80	85
Counter cafeteria	60	70	80	90	100
Counter class room work standing	60	65	75	85	90
Desk and table classroom	40	50	55	65	70
Desk typing	-	-	-	65	65
Door knob	60	80	85	90	95
Drinking fountain	60	65	85	90	100
Lavatory and sink	55	60	70	85	88
Light and switches	65	85	90	110	120
Mirror lower edge	80	85	100	120	130
Hand rail	50	60	80	85	87
Shelf, hat and books	100	110	130	145	150
Drawing tables	60	80	85	87	90
Table and bench work standing	60	70	80	85	90
Tack board top	170	200	200	200	200
Urinal bottom	-	10-20	10-20	10-50	10-50
Water closet (seat)	25	27	30	35	35
Window ledge (max)	70	75	80	85	100

6-2 Elementary and Secondary Schools

Education is life and people think of it as an everlasting non-transferable asset. The school is both a kind of shelter and a stage. It attracts attention and becomes the focus of interest bringing the children and adults together on their daily business of sharing, working hard, having fun and growing up.

Educational and Cultural

The Architect or planner must exert efforts to create schools that will attract and suit the functions of education it serves not only to accommodate, but also contribute to a special environment of learning. An environment of learning that actively stimulates the development of human being socially, intellectually, physically and emotionally. The Planner should create an environment not just a space. It should not be a reward, but rather, a minimum requirement.

The design must be quality structure, changeable and compatible with the needs of the children and the community that uses it. "Buildings do not just die of old age but obsolescence in design." The Architect's design should not be only practical and efficient response to the present programs and teachings but rather, anticipate the inevitable changes brought by the ever advancing technologies.

In the event that space and cost are rigid requirements, the Architect's choice and alternative is the quality of materials and constructions, otherwise, the school authority will be burdened on the maintenance and operational costs.

A cheap and adequate school facilities initially save a little cost, but in the long run, is indeed a poor investment that could permanently handicap the teaching and learning process. The school is a planning process, and an envelope for change. The objective is to develop a school that will provide an environment for growth and change.

6-3 Colleges and Universities

Classroom Planning Considerations:

1. The seating and writing purposes.
2. Space and furniture for lecture.
3. Wall space including blackboard, location of windows, screen, etc.
4. Facilities for visual aid.

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5. Acoustics and lighting.
6. Air conditioning.
7. Aesthetic consideration.

Dormitory Room Planning Considerations:

1. Dormitory room dimensions must accommodate furniture sizes, either wall mounted or free standing design.
2. Furniture must have usable space and accommodate furniture combinations.
3. Single Room approximate area shall be:

a) Minimum suggested area	8 sq. m.
b) Average suggested area	10 sq. m.
c) Ample size	11 sq. m.
4. Double Room with bunked beds

a) Minimum recommended area	13 sq. m.
b) Average recommended area	14 sq. m.
c) Ample recommended area	16.5 sq. m.

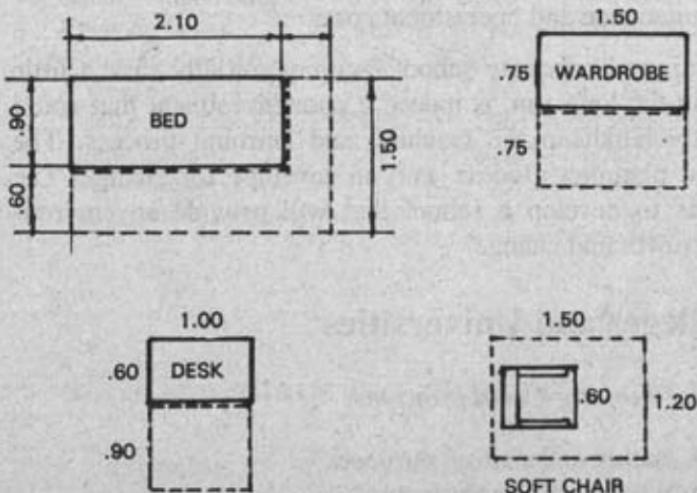
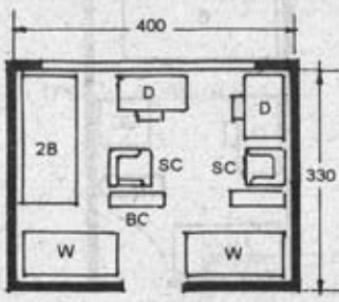
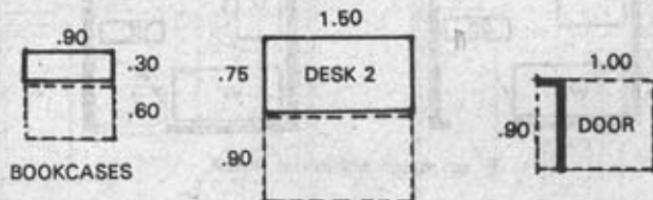


FIGURE 6-3 SIZES OF FURNITURE AND USABLE SPACE

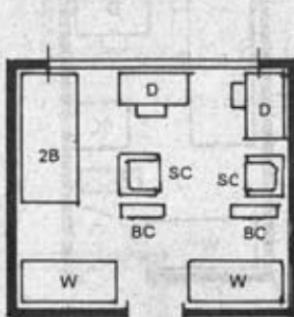
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5. Double room without bunk bed:

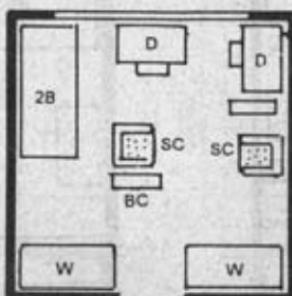
a) Minimum recommended area	16.5 sq. m.
b) Average recommended area	20 sq. m.
c) Ample recommended area	22 sq. m.



13.2 SQ. M. MINIMUM AREA



15 SQ. M. AVERAGE AREA



17 SQ. M. AMPLE AREA

FIGURE 6-4 DOUBLE ROOM WITH DOUBLE DECK BED

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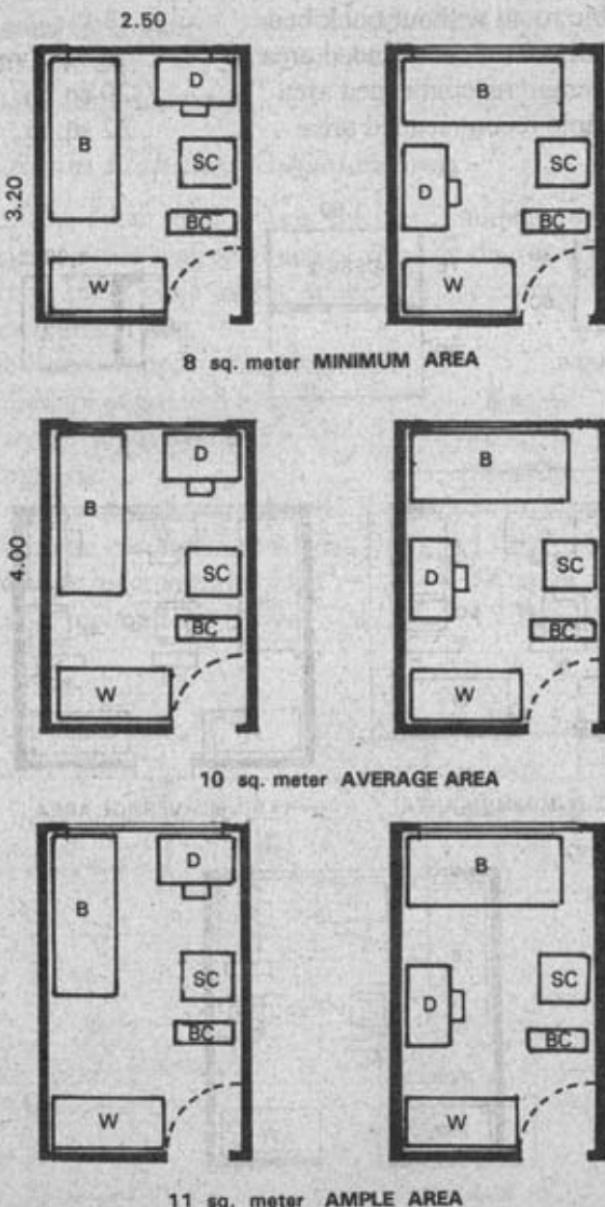
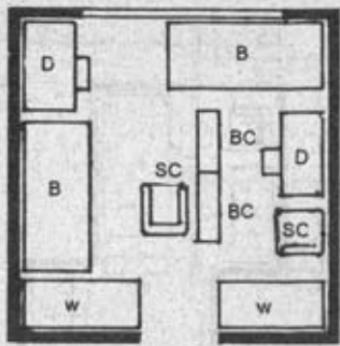
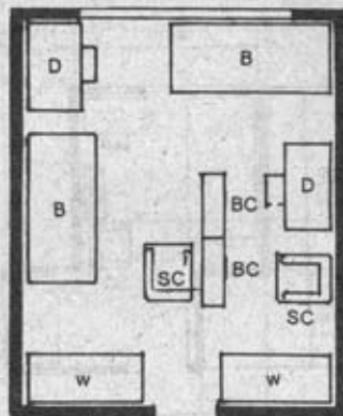


FIGURE 6-5 TYPES OF ARRANGEMENT FOR SINGLE RECTANGULAR ROOM

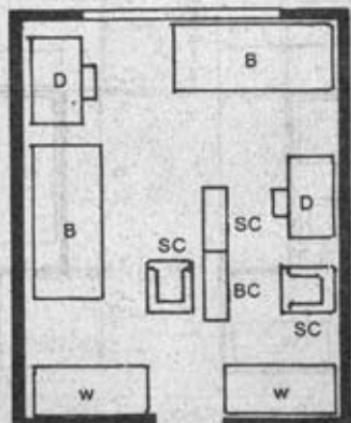
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17 SQ. M. MINIMUM AREA



20 SQ. M. AVERAGE AREA



22 SQ. M. AMPLE AREA

FIGURE 6-6 TYPES OF ARRANGEMENT FOR DOUBLE ROOMS

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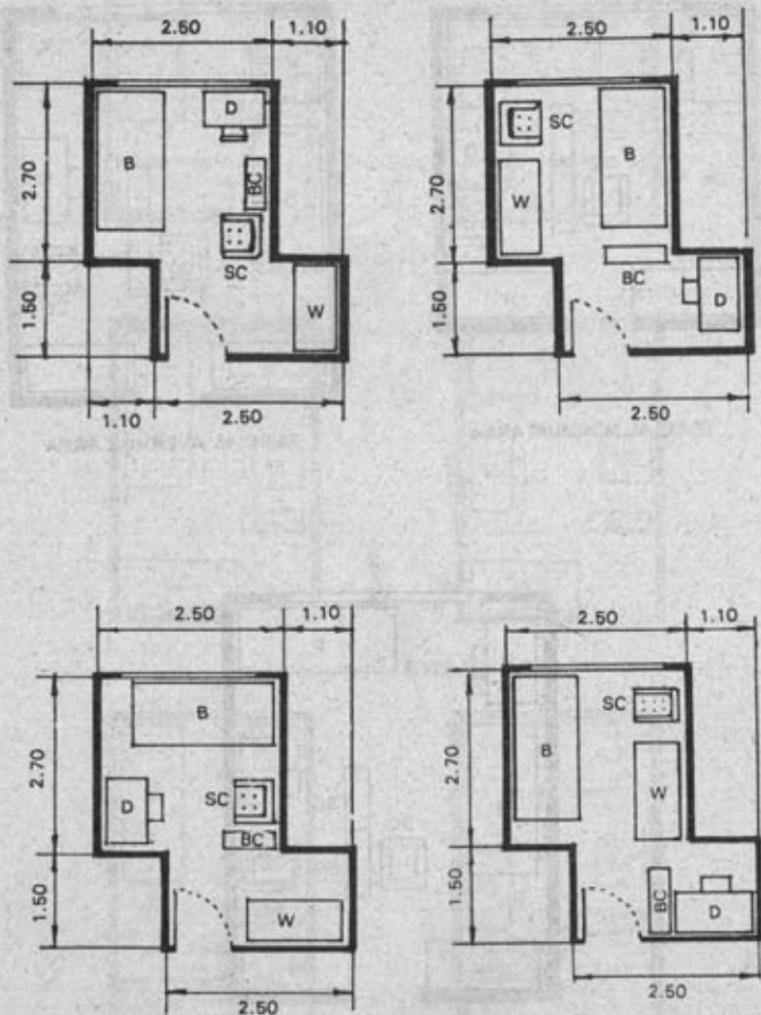


FIGURE 6-7 UNCONVENTIONAL ROOM

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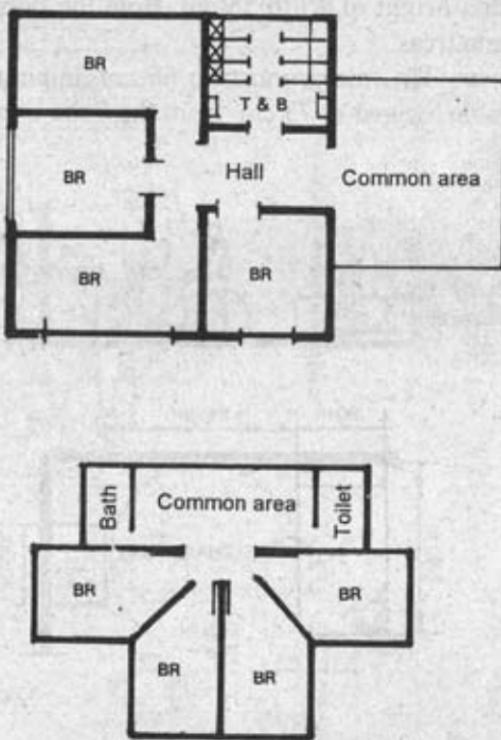


FIGURE 6-8 SUITE ORGANIZATION

Dormitory for Handicapped Students

Planning Considerations:

1. *Sleeping and Study Room* must have a minimum clear floor space of 1.80×1.80 meters to allow a 360° turn of the wheelchair.
2. *Working area*. The wheelchair requires a space clearance under the counter table and the desktop. The minimum space clearance is 70 cm. high and 80 centimeters wide.

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3. *Beds.* The minimum dimensions of bed is 90 x 180 cm. With a height of 45 to 55 cm. from the floor to the top of the mattress.
4. *Mirror.* The mirror must be 60 cm. minimum height adjustable hanged at 75 cm. from the floor level.

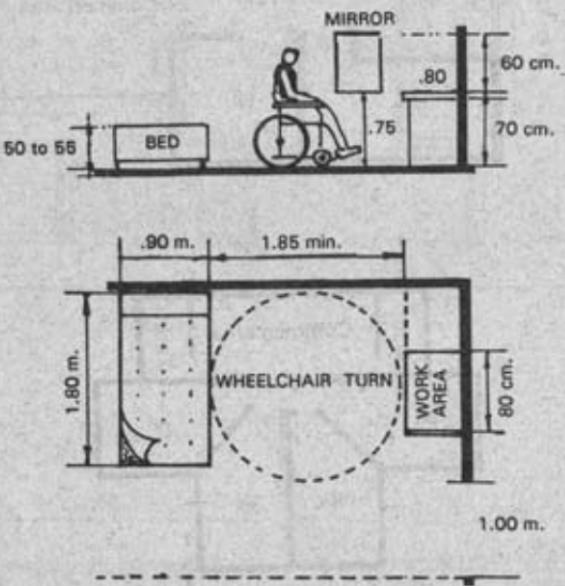


FIGURE 6-9 BED AND WORKING AREA SPACE CLEARANCES

5. *Electrical outlets* should be mounted not lower than 50 centimeters above the floor line.
6. *Switches* should be push button type.
7. *Handles.* Install protruding handles for protruding desk, dresser and drawers.
8. *Ramps.* The ramp width should not be less than 120 cm. and the inclined length should not exceed 9.00 meters.
9. *Turning point of the wheelchair* should not be less than 180 x 180 cm. on level floor. Any vertical drop greater than 1.5 centimeters shall be ramped using a gradient not greater than 8% but preferably 6%.

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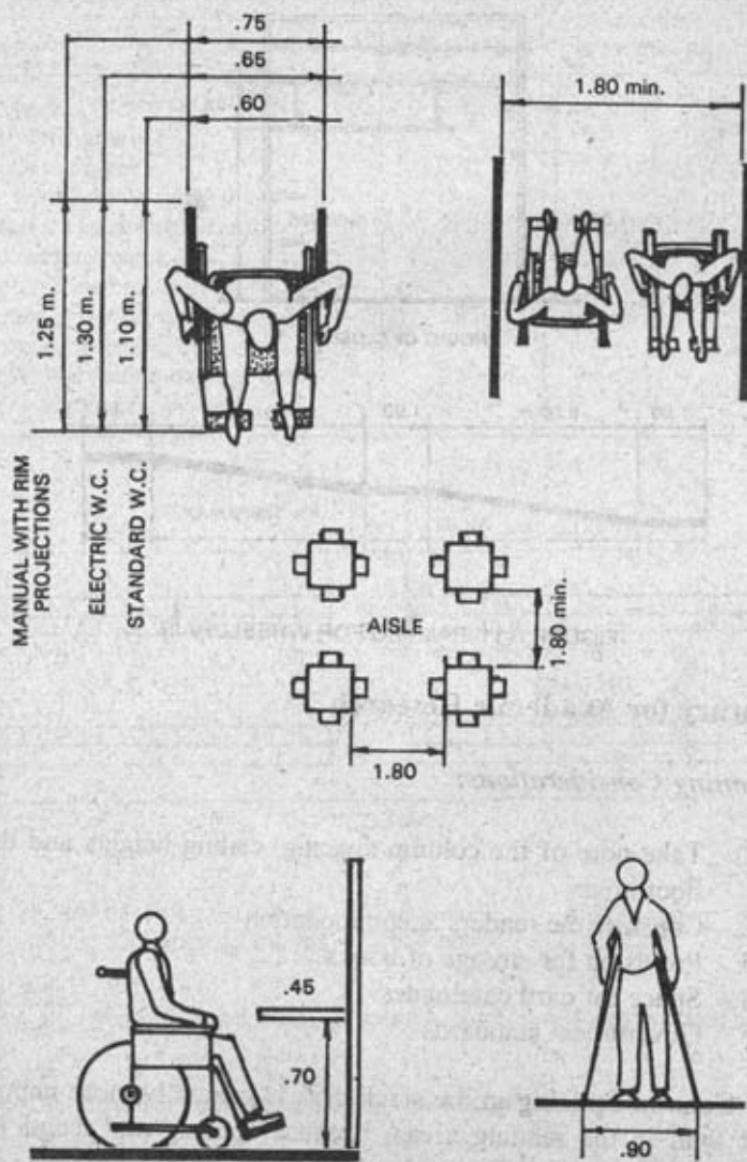


FIGURE 6-10 MINIMUM CLEARANCES FOR HANDICAPPED STUDENT

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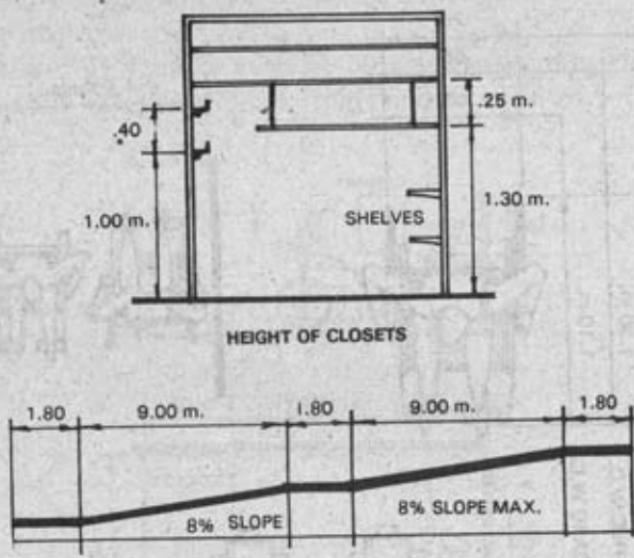


FIGURE 6-11 RAMPED FOR WHEELCHAIR

Library for Academic Research

Planning Considerations:

1. Take note of the column spacing, ceiling heights and the floor areas.
2. Consider the readers accommodation.
3. Provision for storage of books.
4. Space for card catalogues.
5. Government standards.

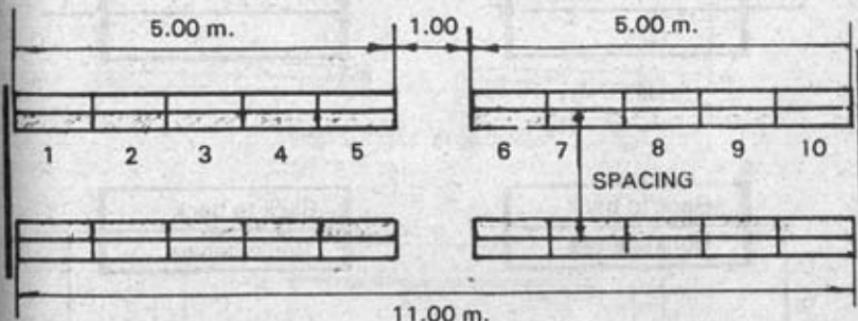
Column Spacing in the stack area is generally more important than in the reading areas, because spacing and length of columns has greater effect on book storage capacity.

In a column range, the most preferred distance is a multiple of 1.00 meter plus additional 10 centimeters allowance for irregularities in the column sizes for vertical position of the stack.

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TABLE 6-2 CLEAR CEILING HEIGHTS

Area	Minimum Height (cm)	Functional Max. Height
Bock stack	225	255
Sacks with lights at right angle to ranges	250	260
Stock with light on range tops functions by ceiling reflection	270	285
Large reading rooms over 30 Meters long broken by Screen or bookcase	285	315
Reading areas under 10 sq. m. Individual seating on large areas	250	285
Floor with mezzanine	465	550



1.20 SPACING: $11.00 \times 1.70 = 13.2$ sq. m.
 280×10 (opposite) shelves = 2,800 books

2,800
 $13.2 = 212$ BOOKS PER SQ. M. STACK CAPACITY AISLE INCLUDED

1.30 |
 1.40 > SPACING: COMPUTE USING THE ABOVE EXAMPLE.
 1.50 |

FIGURE 6-12 DETERMINING STACK CAPACITY

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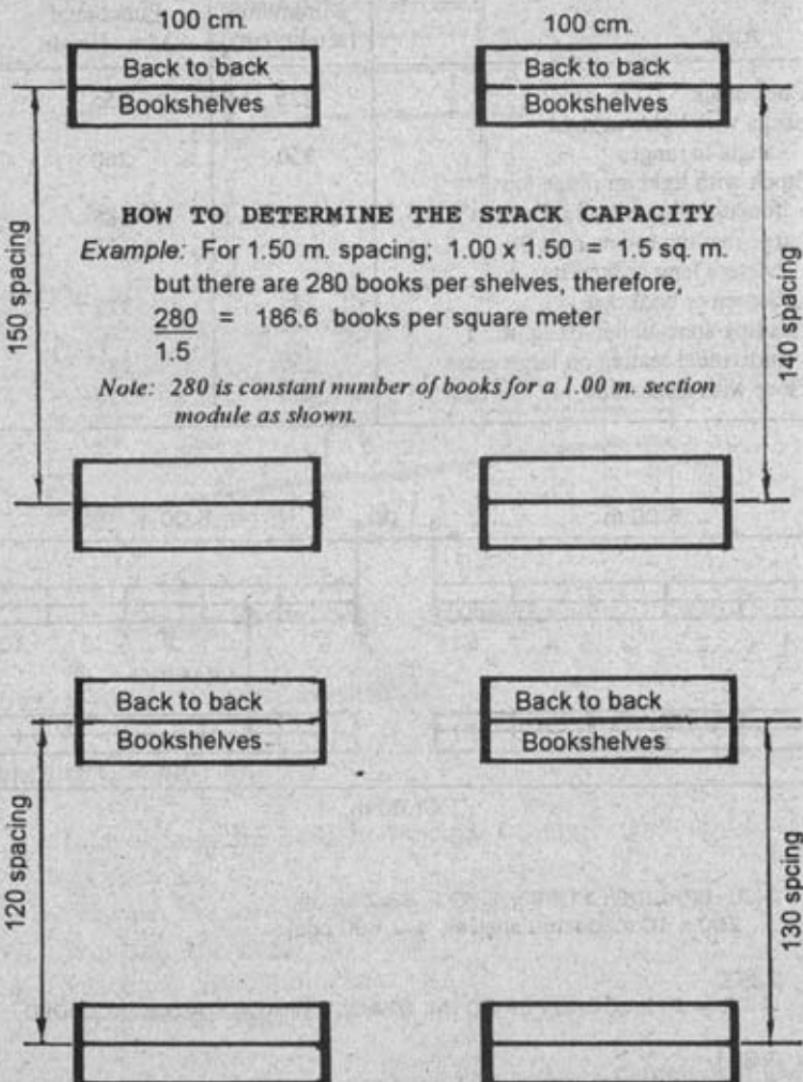
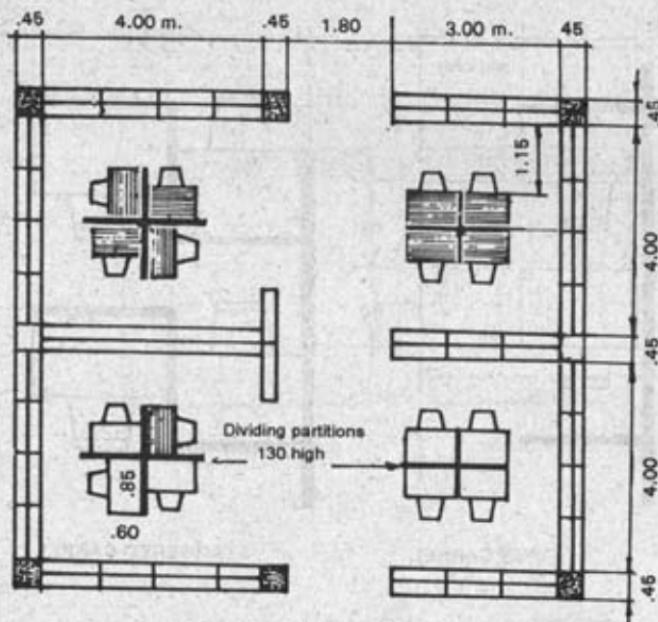


FIGURE 6-13 DETERMINING AREA STACK CAPACITY

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TYPICAL TABLE IN ALCOVES

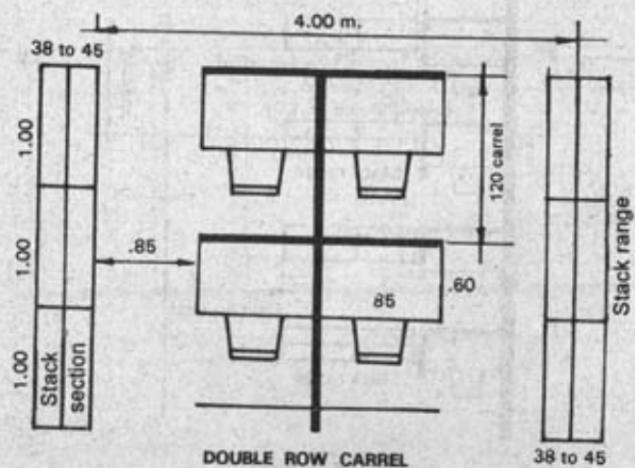


FIGURE 6-14 TABLE IN ALCOVE AND CARREL

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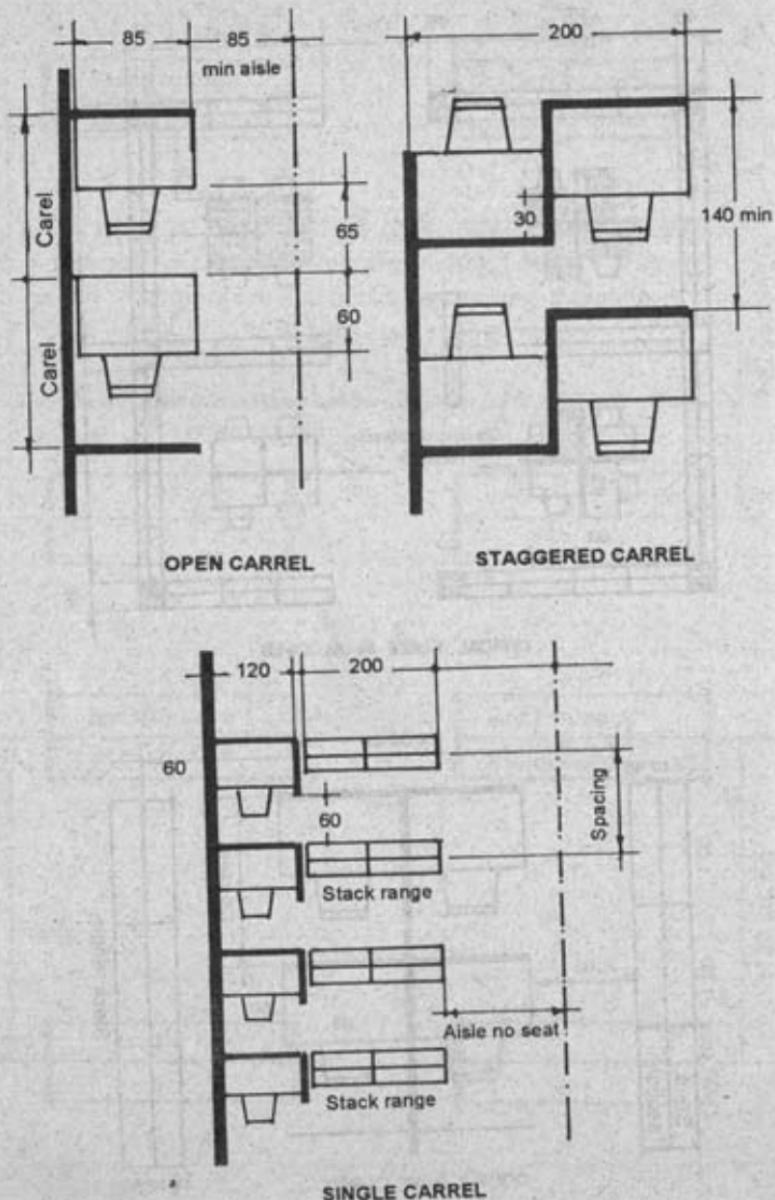
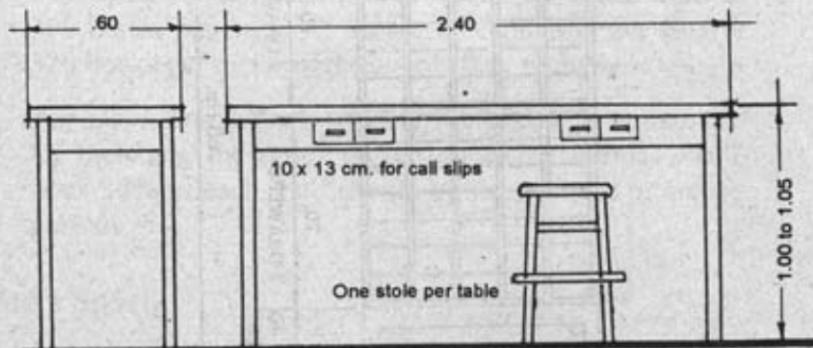
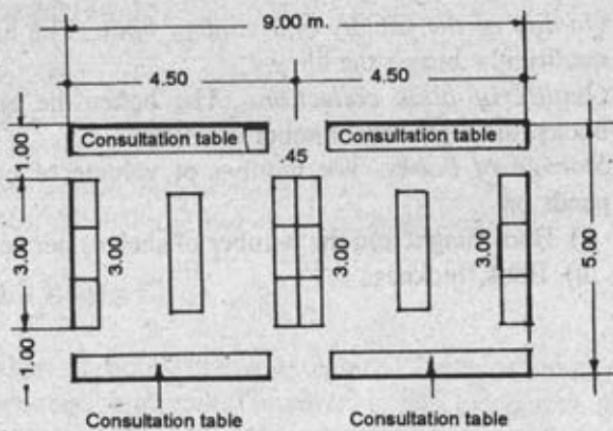


FIGURE 6-15 PLAN OF THE CARREL

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FRONT ELEVATION

FIGURE 6-16 LIBRARY CATALOGUE ROOM

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Readers Accommodation room is the largest space in most libraries, and the area provided depends on:

1. *Quality of the faculty and student body.* The higher the quality, the bigger the library.
2. *Quality of book collections.* The better the quality of books, the higher the number of users.
3. *Storage of books.* The number of volume of books depends on:
 - a) Book height and the number of shelves per section.
 - b) Book thickness

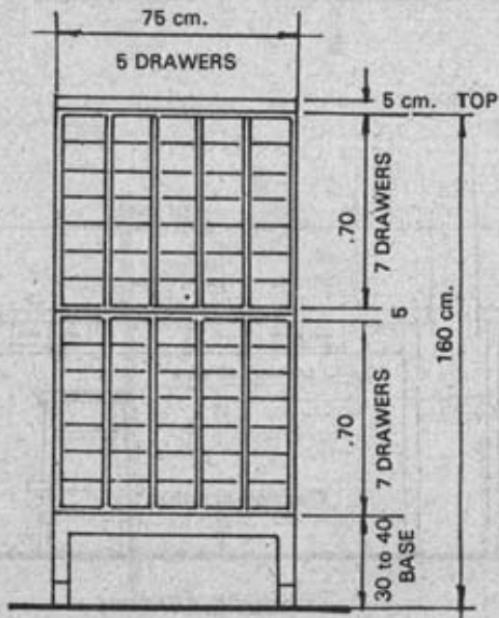


FIGURE 6-17 CATALOGUE CASES

6-4 Community Library

Planning Considerations:

1. Allocate space for the books.
2. Provide space for the readers.
3. Space for the staffs.
4. Group meetings or conference areas.
5. Space for mechanical and electrical operations.

Space for the Books

The number of book shelving required depends upon the kind of library service offered. However, in any categories, sufficient book shelving should be planned for 20 years anticipated growth. Although, there are variations in size of the books, the amount of space required for the shelving of books are estimated as follows:

1. *For Open Reading Rooms*, 22 books per linear meter or 160 books per meter of standard height wall shelving or 320 books per meter of the double face shelving.
2. *For Book Stack Area*, allocate 160 books per square meter including the space for aisles. Under normal conditions 30% of each shelf should be reserved for future expansion.

Readers Space

The reader's space should be planned for at least 20 years ahead. It is best determined by the reading potentials of the population who are expected to use the library.

One problem to be encountered is the number of seats to be used by the readers. It was studied by Joseph L. Wheeler for 30 years and formulated the following formula.

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1. If the standard population of the community is less than 10,000 people, provide 10 seats for every 1,000.
2. For more than 10,000 but less than 35,000 people, provide 5 seats per thousand.
3. For population between 35,000 and 100,000, provide 3 seats for every 1,000.
4. Provide 2 seats per thousand for a population between 100,000 and 200,000.
5. Between 200,000 and 500,000 population provides $1\frac{1}{4}$ seat per thousand.
6. For 500,000 and up provides one seat per thousand.

Based on the established rule of thumb, the minimum space allocation is 2.8 square meters per adult reader and 1.8 square meters per child. These space allocations for readers seating includes the chairs, tables, aisles and service desk.

Space for Staff

The American Library Association recommended that the staff space should be calculated at one staff member full time for each 2,500 people in the service area except the maintenance personnel.

The **Staff Space** is estimated at 9 square meters per staff member. This includes the space for desks, chairs, tables and equipments. The staff work area is composed of the administrative office, workroom, staff lunch, and lounge room.

The **Work Room** area also includes technical processing, references, circulations, subject specialists, supplies storage and other department as required. The staff facilities should be provided with cooking and lunchroom areas, locker lounge areas and toilet facilities for men and women.

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Meeting Room

The meeting room is a multi-purpose room intended for:

1. Children story hours, discussion groups, staff meeting and other sponsored library activities.
2. For various community, educational, cultural and local government activities.

The room should be planned well for efficient and effective use of audiovisual equipment. There should be adjacent storage room for blackboards, folding tables, chairs and related equipments.

Capacity of Books

The formula suggested by R.W Henderson of New York Public Library in computing the volume of space required to shelve the average book in a typical libraries are:

100 volumes	85% of 20 to 25 cm. high 13% books of 25 to 30 cm. high and 2% books over 30 cm. high.
120 volumes	87% books of 20 to 25 cm. high 13% books of 25 to 30 cm. high
130 volumes	Books of 20 to 25 cm. high
70 volumes	Books over 30 cm. long.

To determine the number of book stack section necessary when the number of volumes to be shelved is known, the formula is:

Let $N =$ The number of single face shelving section (say one section accommodate 100 books.)

For shelves intended for books from 20 to 30 cm. high

$N =$ Volume: 120 is the number of single face section

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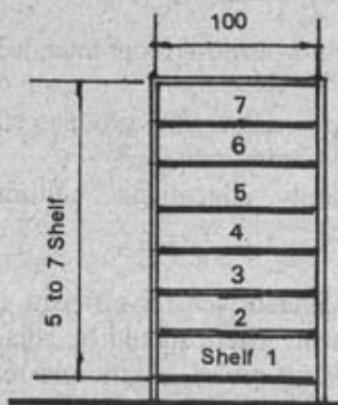


FIGURE 6-18 SINGLE FACE SECTION BOOKSHELVES

TABLE 6-3 SHELVING DATA FOR SPECIAL COLLECTIONS

Types of Books	No. of books / m. length of shelf	Maximum Vol. per single face section	Depth of shelf in cm.	Number of shelf per section
Circulating (non fiction)	26	182	20	7
Fiction	26	182	20	7
Economics	26	182	20	7
Gen. Literature	23	161	20	7
Reference	23	161	20-25	6-7
History	23	161	20	7
Technical and Scientific	26	182	25-30	7
Medical	16	112	20-25	6-7
Laws	13	91	20	7
Public Documents	16	112	20	7
Bound Periodicals	16	112	25-30	5-7
Nat'l Patent & Specs.	7	49	20	7
Art	23	138	25-30	5-6
Braille	13	78	38	5-6

To avoid crowding reduce the number by 10%

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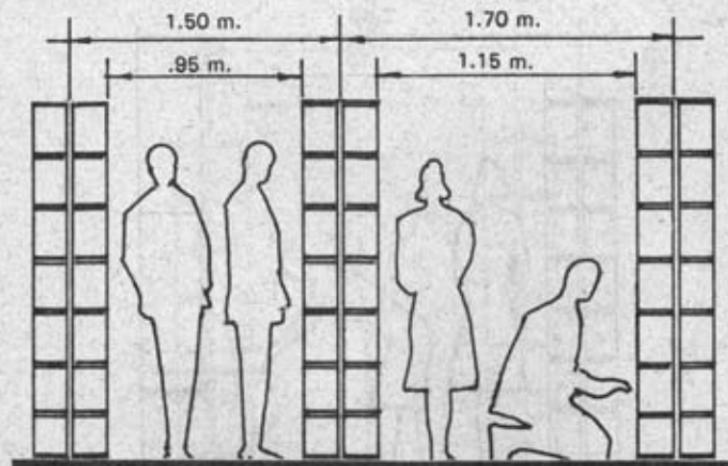
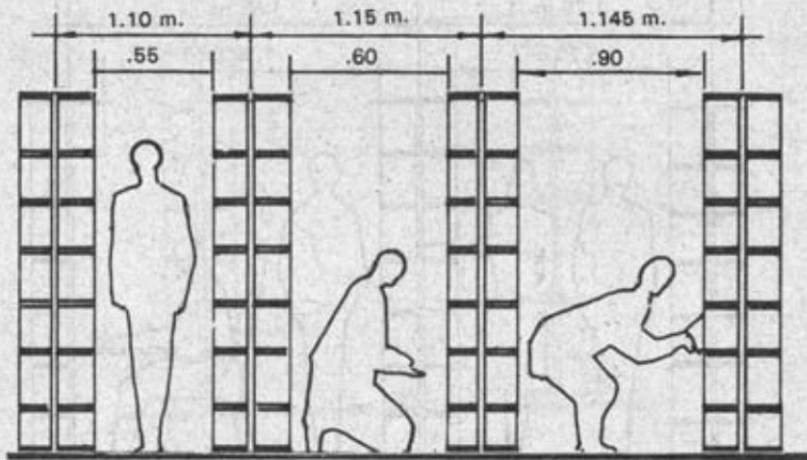


FIGURE 6-19 MINIMUM CLEARANCES FOR VARIOUS POSITIONS IN LIBRARY STACK AREAS

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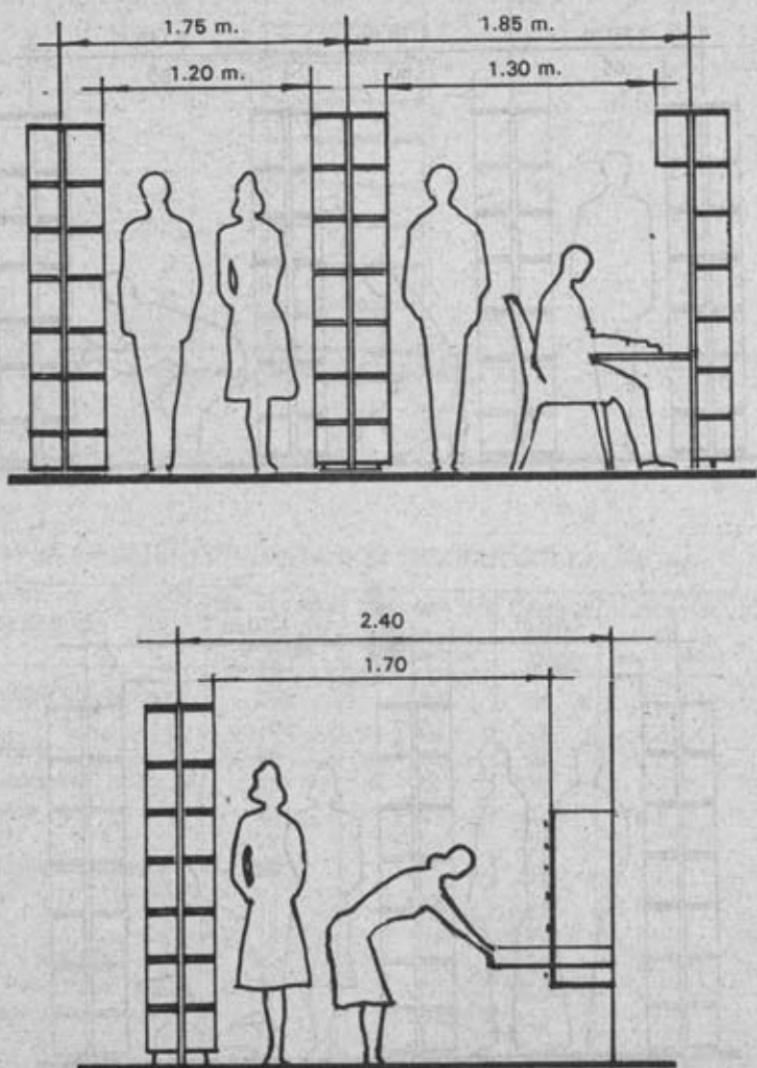


FIGURE 6-20 MINIMUM CLEARANCES FOR VARIOUS POSITIONS
IN THE LIBRARY AREAS

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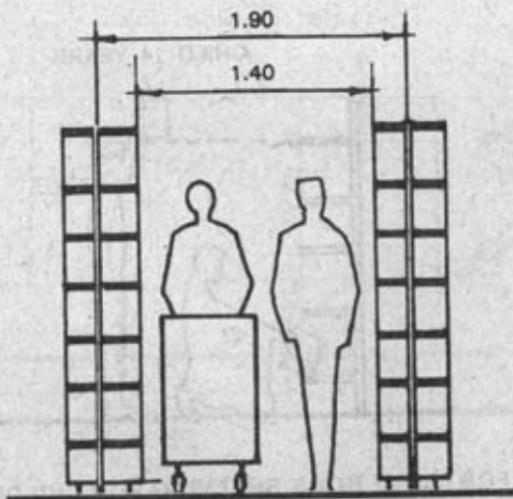
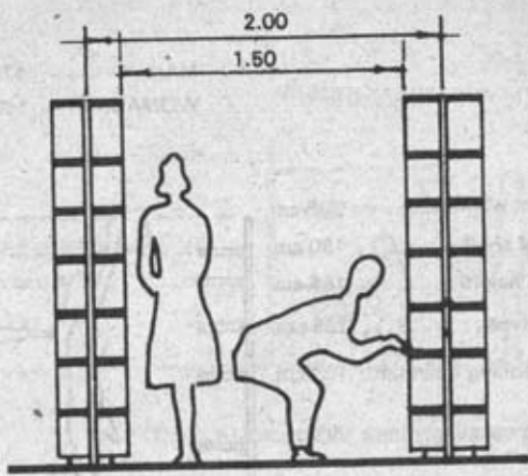
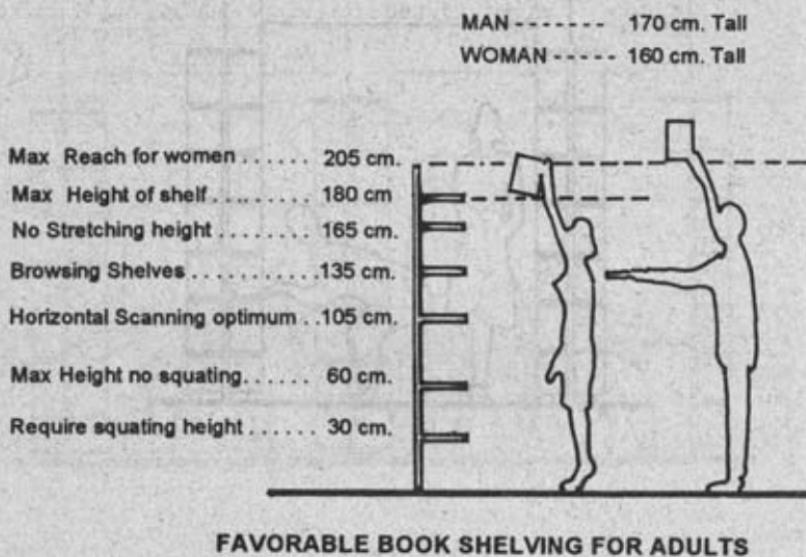
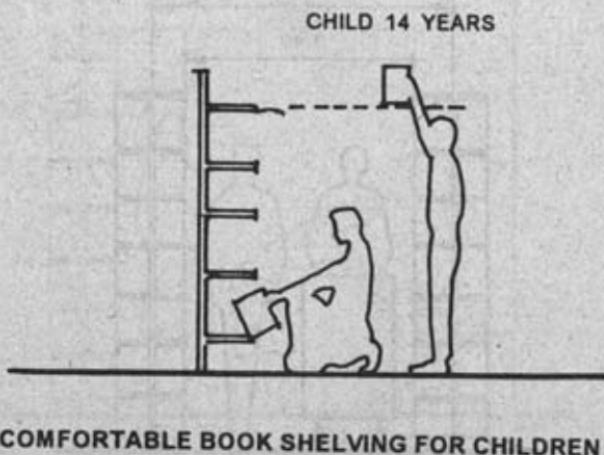


FIGURE 6-21 MINIMUM CLEARANCES FOR VARIOUS POSITIONS
IN LIBRARY STACK AREAS

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FAVORABLE BOOK SHELVING FOR ADULTS



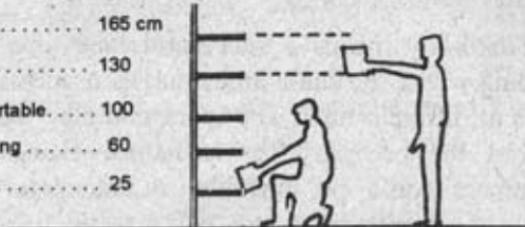
COMFORTABLE BOOK SHELVING FOR CHILDREN

FIGURE 6-22 COMFORTABLE BOOK SHELVINGS

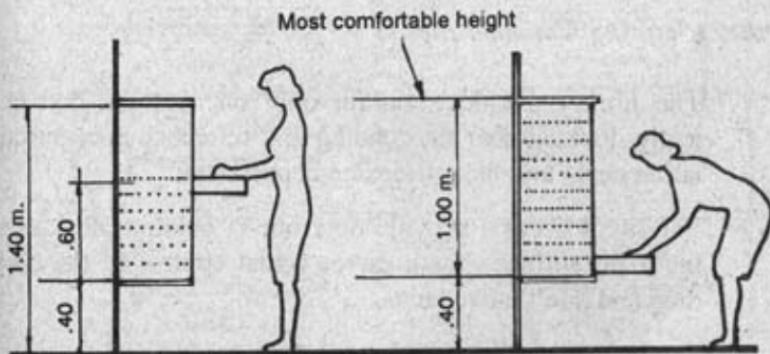
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CHILD 6 YEARS, OLD 115 cm.

Highest shelf	165 cm
Browsing shelf	130
Hor. Scanning comfortable.....	100
Min. height no squatting	60
Squatting shelves	25



COMFORTABLE BOOK SHELVING FOR CHILDREN



TRAY CONSULTATION AVERAGE FEMALE HEIGHT 160 CM.

FIGURE 6-23 COMFORTABLE HEIGHT FOR CATALOGUE

Library Service and Space Relationship

One objective in planning a library is to arrange the required elements that will allow maximum flexibility.

Flexibility means a successful long time utilization of the building where the same areas maybe used for one or more purposes at different time. The space could be reduced or expanded without the necessity for structural changes. Furniture and equipment could be movable to anticipate relocation in the events of rearrangement.

As much as possible, the public area should be located at the main floor of the library for convenience of the users, economy and ease of operations. The planner must also anticipate the traffic flow inside the library from the entrance of the building up to the departure, because this is the fundamental aspect of developments for a successful service and space relationship.

Other Planning Considerations:

1. The library should maintain only one catalog conveniently, located near the reading and reference area, circulation desk, and the processing department.
2. For small library, provide only one circulation desk near the main entrance for a direct visual control of the children and adult movements.
3. Reading rooms should be grouped for efficient service by the common book storage, office and working area. There should be only one public entrance near the circulation desk.
4. Public toilets, telephone, and display should be located within the supervisory range of the librarian or attendant, at a distance of approximately 15 meters only.

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6-5 Physical Education Locker Room

Locker room is one of the busiest spaces for students in a hurry. Thus, a functional planning for physical education locker room requires special data information on the traffic flow, body clearances, swing of locker doors, clothing storage, uniform drying, supervision and discipline.

Likewise, planning a locker room requires good provision for durable lighting, plumbing layout, ventilation and fine finishes for it requires facilities that is hard to maintain.

The use of swing door in locker rooms is not advisable. It serves as an obstruction to traffic especially during rush hours. The use of sliding door is preferably recommended because the door shutter can be concealed along the wall or partition.

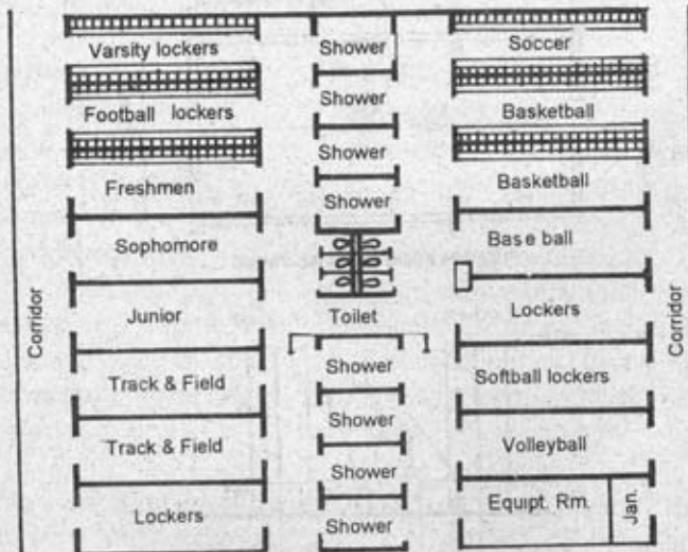
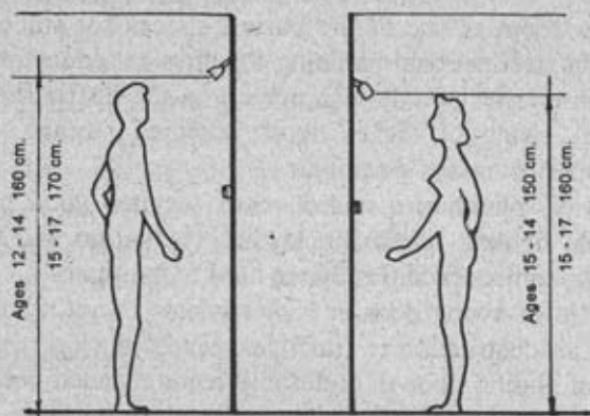
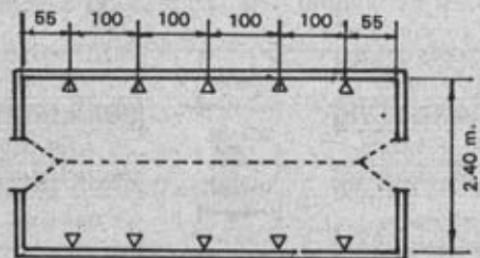


FIGURE 6-24 TEAM LOCKER ROOM WITH SHOWER

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RECOMMENDED SHOWER HEAD HEIGHTS



SHOWER ROOM IN-WALL PIPING

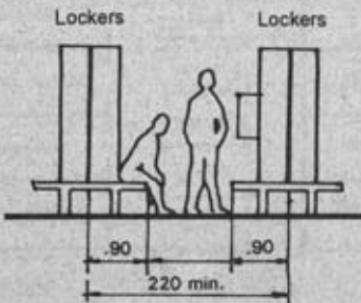


FIGURE 6-25 SHOWER AND LOCKER ROOM

INDUSTRIAL

7-1 Industrial Building

Site Selection

Site selection is the initial step prior to the layout and construction of industrial building. But in most cases, the management select the plant site, then hire consultants to design for it.

Site Selection Includes the Following Informations:

- | | |
|------------------------------------|--|
| 1. Physical | 11. Public utilities and water |
| 2. Economic | 12. Freight and transportation |
| 3. Legal aspect | 13. Protection; fire, police, legal |
| 4. Source of materials | 14. Local politics and attitude |
| 5. Climate | 15. Local industrial mix |
| 6. Land topography | 16. Local living facilities |
| 7. Soil conditions | 17. Local educational facilities |
| 8. Source of raw materials | 18. Local recreational facilities |
| 9. Accessible & Transport | 19. Free from natural disasters |
| 10. Labor supply and union history | 20. Population mix growth and projection |

The consultant must be well informed of the kind of products to be manufactured, the volume produced, and other informations relative to the production and manner of processing.

- a) *Production Layout* is necessary if the plant produces large quantity of a few products.
- b) *Processing Layout* if the company produces a great

Planning and Designers Handbook

number of a few product each, relatively small runs but similar in processing.

Management considers the need on a long range plan, not just for immediate needs only. The entire plant site are laid out for at least 20 to 25 years duration with particular building structures built to serve only the needs for the next 5 years.

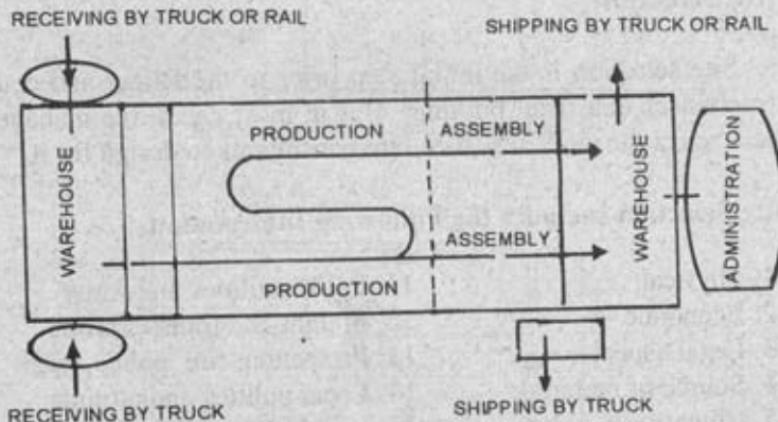


FIGURE 7-1 LAYOUT BY PRODUCT

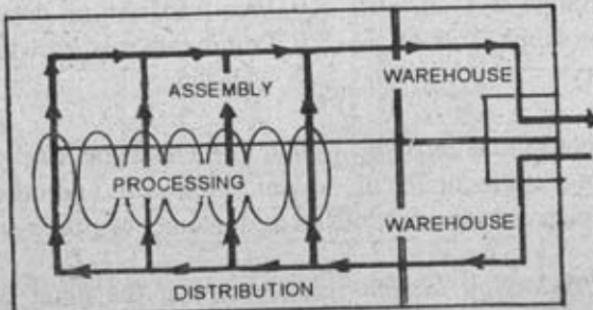


FIGURE 7-2 PROCESSING LAYOUT

Industrial

All of which are projected from sales reports and anticipated markets. The expansion by growth is fairly accurate projection although expansion by acquisition cannot be determined easily.

After the selection of the site, the initial breakdown of area allocation for buildings include:

1. Administration offices
2. Employees facilities
3. Research and control
4. Manufacturing
5. Warehousing
6. Internal Engineering
7. External Engineering

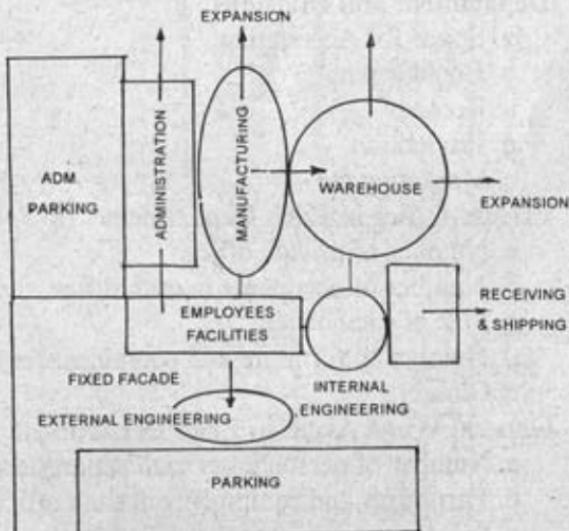


FIGURE 7-3 BASIC AREA RELATIONSHIP

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Planning Considerations

A. Administration

The administration organizational relationship includes the space requirements for the following.

1. Reception room

- a. Determine the number of seats.
- b. Receptionist - special or part of the general office.

2. Executive area

- a. Determine the number of offices.
- b. Size of each office.
- b. Number of occupants in each office.
- c. Furniture and equipment for each office.
- d. Closets and other facilities.

3. Department and Divisions

- a. Space for Accounting.
- b. Bookkeeping.
- c. Records.
- d. Production.
- e. Marketing etc.

4. Private Office in Each Department

- a. Number of private offices.
- b. Number of occupants in each office.
- c. Size of each office.
- d. Number of furniture and equipment for each office.
- e. Closets.

5. General Work Areas in Each Department

- a. Number of personnel in each department.
- b. Furnitures and equipments in each office.
- c. Storage requirement for each department.

6. Special Purpose Rooms

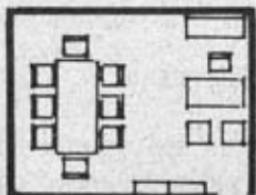
- a. Conference room
- b. Library
- c. Projection room

Industrial

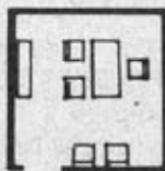
- d. Mail and shipping
- e. Reproduction room
- f. Secretarial pool
- g. Telephone equipment room
- h. Hospital areas
- i. PBX room- type of board, number of positions
- j. IBM room
- k. File room
- l. Private toilets
- m. Stock room
- n. Rest room

7. General Information

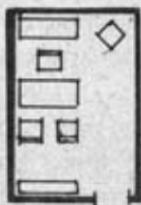
- a. Interrelationship of persons and department
- b. Clothing space
- c. Time clock
- d. Water coolers
- e. Special lighting requirements
- f. Intercom requirement



PRESIDENT 30 SQ. M.



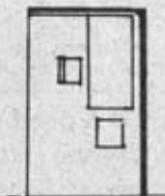
COMPTROLLER &
SENIOR VP 20 SQ. M.



ASST. VP ON
MANAGEMENT 15 SQ. M.



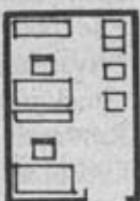
SUPERVISOR
DEPT HEAD 8 SQ. M.



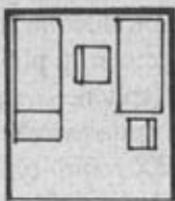
GEN. OFFICE SPACE
6 SQ. M.

FIGURE 7-4 GENERAL OFFICE AREAS

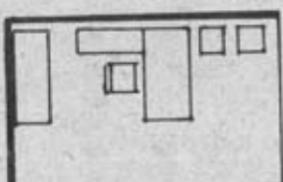
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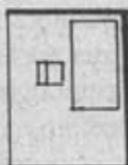
AUDITORS 15 SQ. M.



EXEC. SECRETARY 8 SQ. M.



ACCOUNTING 15 SQ. M.



GEN. OFFICE SPACE NO
OUTSIDE CONTACT 5 SQ. M.

FIGURE 7-4 GENERAL OFFICE AREAS

Usually, department heads request for space in the administration area was based on subjective judgment, based on ego-oriented judgment of function, rather than, objective judgment of functions. Functional office plan can be develop through the following information:

1. Know the existing personnel, furniture and equipment.
2. Determine the approximate area of each department in square meter.
3. Determine space analysis through interview with supervisors and personnel to know the existing space problems. Get their suggestions on the future projections and the functional adjacencies of the department.
4. Review factors that affects present and future department space requirements, and recommend area standard.
5. Determine the area required by all department with itemized breakdown by the type of space such as:

Industrial

- (a.) Private office space (b) General office and (c) Miscellaneous space.

The projected requirements gathered assumed that the policies and procedures will continue to apply in the future.

Facilities for Employees

The quantity and quality of the products depend not only on the sequence, precision, and efficiency of the factory tools and machines, but on the proficiency, pride and fitness both mental and physical quality of the personnel. The problems might be interesting and the solution varies, but the reigning criterion is constant cheerfulness, comfort and durability. Employee's facilities should be near the working space for accessibility. A quite lounging place, recreation and cafeteria, should be properly distinguished.

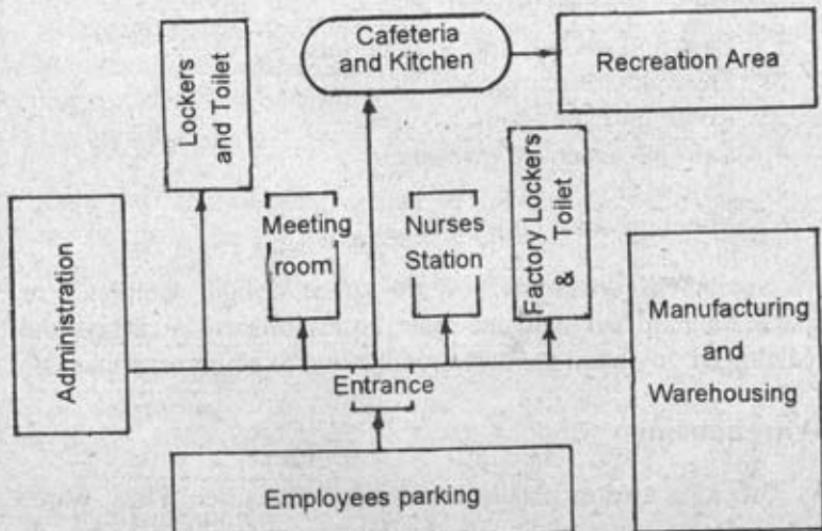


FIGURE 7-5 EMPLOYEES FACILITIES FLOW

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Areas Under the Employees Facilities are:

1. Cafeteria and kitchen.
2. Coffee lounge.
3. Recreational area (indoor and outdoor).
4. Quite lounge area.
5. Factory men and women lockers and toilet.
6. Office men and women lockers and toilet.
7. Meeting rooms.
8. First aid and nurses station.

Production and Processing

A plant can be designed under two different concepts depending upon the kinds and number of products.

1. Production layout could be linear.
2. Processing layout is parallel.

Planning Criteria for Linear Production Evaluation

1. Easy and smooth flow of materials.
2. Flexibility to rearrangement.
3. Room for expansions.
4. Easy movement of personnel.
5. Ease of supervision.
6. Minimum initial investment.

Similar to the administration space design, templates or space standard per machine must be established, arranged and rearranged, to obtain the best organization of equipment spaces.

Warehousing

Stocking creates problem to the manufacturer. Thus, warehouse design must anticipate the future expansion program. It must be compressible adopting a completely flexible warehousing operation concept that would allow combination of raw

Industrial

materials and finished products. The concept of a public warehouse becomes more realistic with the increasing adaptation of the automation control.

Buying is not done at the same time. It is possible that as raw materials increases, seasonal storage of finished products would be on decline. Warehousing is not expensive construction it can be scheduled after the expansion of manufacturing.

Internal and External Engineering

The placement of Internal Engineering facilities in a plant design is not advisable. A centralized design for the heating and air conditioning plant will only create big problem on future expansion. This old concept originated from a desire to economize in the piping and wiring runs of the equipment, but it was proven as false economy.

Internal Engineering facilities should be planned in a linear relationship with the fixed facade preferably on its extremity for "*what is extreme today is centralize in the future expansion*"

Adequate spaces for mechanical and electrical installations are the primary consideration in industrial design. Internal engineering space should be constructed 100% larger or double than what is initially required.

External Engineering refers to all outside utilities and storage facilities needed for a plant to operate efficiently. External Engineering includes:

1. Parking space.
2. Truck docks.
3. Tank farms.
4. Sewage disposal plant.
5. Electrical transformer pads.
6. Pumping station.
7. Water storage facilities for sprinkler system and industrial waste dispersal plant etc.

External Engineering structures are classified as permanent expensive installations. It should not be located in the way towards possible expansion. Like Internal Engineering, the external engineering facilities should be placed along fixed facade.

7-2 Industrial Plant

The present trend towards large one floor industrial plant building is the result of time changing conditions. Some manufacturers however, prefer to have upper floors to utilize their land economically. When products are small and relatively valuable as in jewelries, watch making, and the like, it is really economical by concentrating rather than by spreading.

Industrial Plant Layout includes the following:

1. Special or general purpose building.
2. Single or multi-story construction.
3. Shape of the building.
4. Basement or balcony.
5. Types of window.
6. Kinds of floor.
7. Types of roof and ceiling.
8. Walls and columns.

Special or General Purpose Building

1. Less initial cost.
2. Can be sold later for profit.
3. Frequently changing products, materials, machinery and equipment processes or methods.
4. Fast of getting the layout into production.

Single or Multi-Story Construction

A single story construction is used under the following conditions:

Industrial

1. When products are large, heavy or relatively not very expensive per item.
2. When weight of equipment impose greater load on floor.
3. Large item that requires unobstructed space.
4. Lower cost of land.
5. Land is available for expansions.
6. Construction time is limited.
7. Frequent changes in layout are anticipated.

Shape of Building

Industrial building today are generally square or rectangular in shape and not honeycombed or obstructed by walls. Expansion is done at the side or end portion. Those that are dirty, odorous, noisy or producing vibrations are segregated in separate buildings. Likewise hazardous operations with fire or explosion possibilities are also isolated.

Service building for administration, sales, personnel and power plant building that do not directly participate in the processing of production is separated.

Building Shape is governed by the following conditions:

1. When changes in production design is frequent.
2. When the process improvement is frequent.
3. When layout rearrangement is also frequent.
4. When restrictions on materials or savings is desired.

The use of other shape or separate building when any of the following conditions exist.

1. Physical land limitations.
2. Property land at curious angle.
3. Building for operations that create dirt, odors noise etc.
4. Buildings that house operation not part of production.
5. Buildings that house operations susceptible to fire.

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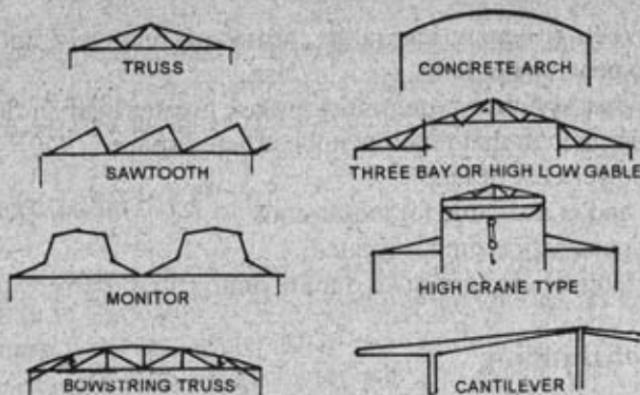


FIGURE 7-6 TYPICAL TYPES OF ROOF STRUCTURES

Basement or Balcony

Industrial plant build on slopes cannot avoid having a basement. This type of construction gain advantage of entry to two or more levels with a minimum ramp construction and allows receiving at one level and shipping another with a U shaped flow thru the plant on the vertical plane.

The desired features of building with basement are:

1. Higher headroom.
2. Good ventilation.
3. Sufficient lighting.
4. Waterproofed walls.
5. Unfolded floor and free ground water seepage.

Basement floor is suited for:

1. Heating plant.
2. Compressors.
3. Pumps and other auxiliary equipment.
4. Washrooms, locker rooms and toilet.
5. Transportation aisles for material handling.
6. Storage for moving parts and inactive tools etc.

Industrial

Balcony

Cases where balconies are used:

1. Where sub assembly operation of large units are done at the ground level.
2. Assembly operations with heavy machineries below.
3. Light machine operations with heavier machines below.
4. Treating operations and assembly of bulky units on the ground level.
5. Operating or servicing upper parts of tall high machinery
6. Materials storage and preparation area including bulk materials blending or packing box and distribution.

Windows

Old factories adopted small windows for economy. Today, windows are generally cheaper than walls because of large steel window frames. Generally windows make buildings more subject to change due to outside temperature. Plant with products or processing that are subject to change in temperature, light or humidity, disregard windows. For instance, chocolate factory demand good ventilation or air conditioning with artificial lighting. Other plants reject windows because of dust.

Factors where windows may affect the layout.

1. Brightness or glare.
2. Orientation of the sun.
3. Effects of sunlight to personnel or materials.
4. Windows not resistant to wind, shock, fire, acids and rust
5. Access for repair, washing and cleaning.

Floor

Floor level and strength are the most important consideration in layout. One floor level of the buildings for ease movement of personnel and efficient handling of finished products

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are better than the use of ramps and elevators. Concrete floor is preferred for economy and durability. It wears less, strong, and easy to clean.

Floor Characteristics Desired in a Factory

1. Have the same level for various buildings.
2. Strong enough to sustain machineries and equipment.
3. Made from inexpensive materials.
4. Lesser cost of installation.
5. Not slippery under any condition.
6. Noiseless, sound absorbing, and nice to look at.
7. Available in various colors.
8. Not affected by temperature change and humidity or by oils, acids, alkali, salt, solvent or water.
9. Odorless, sanitary and easily cleaned.
10. Resilient, soft underfoot and minimize damage to articles dropped on.
11. Will dissipate static electricity and is non-sparkling when struck.
12. Easily removed in mass and replaced.

TABLE 7-1 GENERALLY RECOMMENDED CEILING HEIGHTS

Types of Production	Without Overhead Installation*	With Overhead Installation **
Small product assembly on benches, offices	3.00 to 4.30 m. Max. height of product + 75%	3.00 to 5.50 m. Max. height of Product + 125%
Large product assembly Floor or floor fixtures	Height of Machine + 100%	Height of Machine + 150%
Small product forming	Height of Machine + 125%	Height of Machine + 125%
Large Product forming		

* Other than lighting and sprinkler

** Air ducts, unit heater, conveyors etc.

Industrial

Roof Ceiling

The type and conditions of the roof is related to natural light, heat conduction, and dust accumulation. There are plants that suspend materials handling equipment, service pipe or wiring and other equipment but very few hang their machinery from the roof or ceiling. Roof structural design therefore, must anticipate either condition.

Walls and Columns

The new concept of industrial plant building places the roof load on beams and columns that are generally made of steel or reinforced concrete. Walls only serve to keep out the elements of weather. Inner walls only serve as partition built up in standard sections that could be easily installed or removed. Columns for roof support, causes two basic problems:

1. The line up columns tend to confine the basic flow pattern and divide the valuable spaces. Their location, limits the position of all facilities particularly large equipment.
2. Columns are considered lost floor space, thus, all non-productive equipment that takes floor space such as drinking fountains, drains, fire fighting equipment, time clock and the like should be place against them and in between them.

7-3 Warehouse

Warehousing is focused on the maximum use of the "cube" rather than the square meter of:

1. Warehouse space.
2. Distribution rather than storage.
3. Power handling equipment rather than hand labor.

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Warehouse designs are based on the most economical approach as to:

1. Material handling.
2. High stacking.
3. Minimum use of aisles for maximum cube utilization.
4. Clear height spans ranging from 18 to 30 meters or higher.
5. Shipping and receiving areas should be at boxcar or truck level height.

Definition of Terms

Warehousing is the receiving, storage, and delivery of goods.

Receiving is the acceptance of goods with a degree of accountability.

Storage is the safekeeping of goods in a warehouse or other depository.

Delivery is the transfer of goods to transportation carrier or customer.

Distribution is the function of warehousing that includes preparation and delivery of goods according to plan or special order.

The fundamentals of modern warehousing are:

1. Decisions to construct one or multi-floor building.
2. Flexibility of layout and equipments.
3. Selection of materials handling equipment.

Planning Considerations for One Story Building

1. Low cost of the site.
2. Available land for expansion.
3. Less time for construction.
4. Less area lost on sidewalk, columns, elevator and stair.

Industrial

5. Capability to long span construction.
6. Strong floor to sustain heavy loads.
7. Flexibility for changes of layout.
8. Possible greater handling efficiency.
9. Easy and effective supervision.
10. Maximum use of day light and natural ventilation.
11. Easily isolated from hazardous areas.

Planning Considerations for Two or More Story Building:

1. When the cost of lot is high.
2. Limited site area.
3. Land contour that will allow entrance in different levels.
4. Foreseen ease of expansion.
5. Limited floor load in upper floor.
6. Lightweight products are stored.
7. Small and lightweight handling equipments.
8. Shorter distance of handling by gravity flow.
9. Less dirt and better ventilations on upper floor.
10. Lower heat loss through roof.

The overall economic evaluations of one floor level warehouse showed a lower investment cost per square meter area of storage space due to:

1. The low cost type roof construction and the reduction of steel and masonry for additional upper floors.
2. Demand for stronger floor capacity to support industrial truck equipment and heavy unit load.

Other Planning Considerations:

1. As much as possible, design the shipping and receiving areas for two-way operation over the same platforms.
2. The main aisles of transportation inside the warehouse should allow the passage of material handling equipment in opposite directions.

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3. Materials handling and movements efficiently accomplished by a wheeled vehicles in the warehouse during peak demand hours.
4. Goods can be stored prior to shipping during non-peak hours. Fork trucks with variety attachments are adoptable for special purpose handling.

Selecting Warehouse Materials Handling Equipment

The typical handling methods to maintain warehouse operations efficiency includes:

1. The tow conveyor (draggling conveyor)
2. Pallet system (skids, bins, racks, unit load etc.)
3. Tractor trailer and fork truck (wheeled vehicles)
4. Overhead system (monorail, bridge crane, stacker crane and the like.)
5. Conveyors (vertical and horizontal movement)

The *Tow Conveyor System* is installed on warehouse and truck terminals where order makeup or sorting operations require maximum flexibility.

Tractor Trailer Trains is installed on where long horizontal movements are required.

Overhead Bridge Crane requires no aisles with the use of lifting devise to stores or handle goods.

Monorail system installed for general purpose methods of handling bulky, extra long or heavy loads in congested areas.

Conveyors are designed for specific size and weight of products.

Warehouse and Storage Layout

The space utilization principle is defined as operating in three dimensions. The overall receiving, storage and shipping costs are classified as: Occupancy or fixed overhead charges and Labor or handling expenses.

Industrial

The volumetric efficiency of space utilization is calculated as follows:

$$Su (\%) = \text{Area Utilization} \times \text{Vertical Height Utilization}$$

$$= \frac{\text{Net storage area}}{\text{Gross storage area}} \times \frac{\text{Height utilization}}{\text{Usable vertical height}} \times 100$$

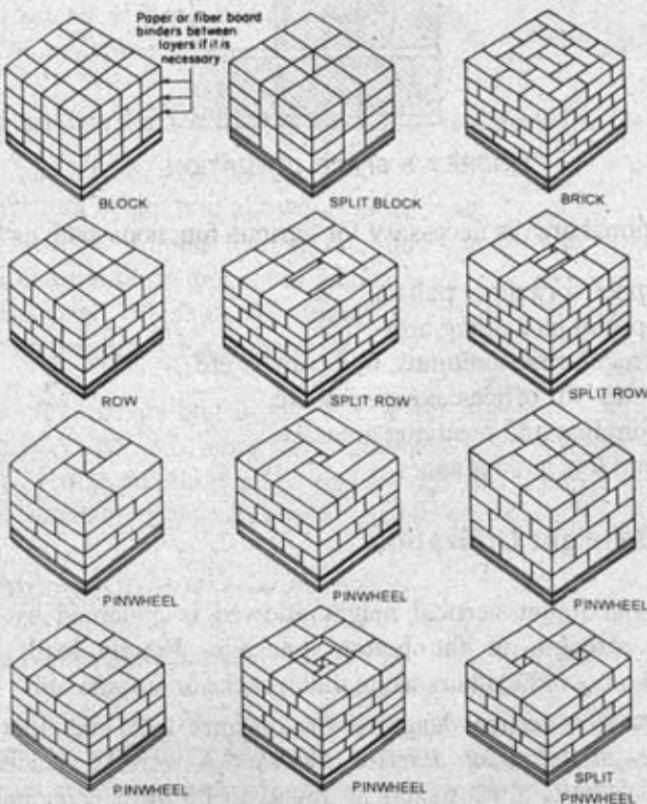


FIGURE 7-7 STANDARD PALLET PATTERN

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Net Storage Area is the floor space actually occupied by goods. **Gross Storage Area** is the usable area plus adequate operating aisles.

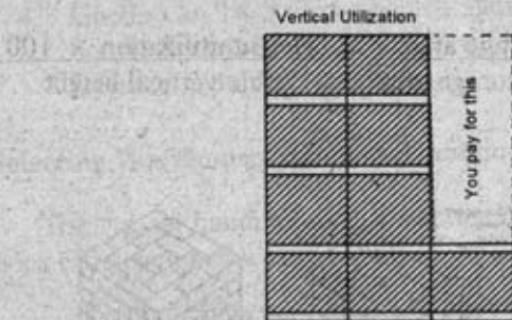


FIGURE 7-8 SPACE UTILIZATION

Additional area is necessary for various functions such as:

1. Space for empty pallets
2. Special packaging area
3. Irregularities columns, odd corners etc.
4. Space for offices, equipment etc.
5. Shipping and receiving areas
6. Odd lots and balances

Vertical Height Utilization

The maximum vertical height allowed is governed by the breaking strength of the bottom package. Fragile loads are tiered one above the others using pallet racks or storage aid.

The usable vertical height is the distance from the floor to underside of sprinkler nozzles system. A vertical stacking height of 5.50 to 6.00 meters is found to be most economical from a cubage cost estimates. Warehouses are designed as a rule for floor level operation both rail cars and trucks.

1. Rail cars – 107 centimeters above top of rail
2. Trucks – 130 centimeters (average) above ground.

Industrial

3. Doors – 2.40 to 3.60 meters wide and 3.00 m. high for use with stacking equipment.
4. Door spacing for boxcars can be set at 13.50 meters for a 12.00 meters rail.
5. Truck delivery door is 4.50 meters center to center.

Effective Layout also Includes:

1. Turnout of item warehoused.
2. Bulk and weight of package or unit load.
3. Number of items and quantity of each.
4. Shape, value, hazard etc.

The Capacity Factor of storage layout is determined by:

1. Load capacity of the floor.
2. Ceiling height and allowable stock height.
3. Location of doors loading facilities, elevators & firewall.
4. Location of columns, size and spacing between centers.
5. Location of aisles for operating space, access to stock and protective equipment.

The cost of handling in and out of the storage is an operating expense that can never be recovered. The efficient warehousing system determines the overall cost per unit or volume of stack that can be reduced by systematic handling methods.

The Shipping and Receiving Areas

Planning Considerations:

1. The receiving area of a warehouse is adjacent to incoming rail or truck facilities convenient to the storage areas.
2. The receiving dock is separated from the shipping area to minimize cross traffic and possible confusion.
3. The number of unloading platform depends on the volume of receipt or maximum number of cars or trucks present at the same time

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4. Weather protection at the loading position permit continuous handling operations.
5. The size of the shipping area depends on the make up time of filling orders and the quantity of simultaneous loading operations during peak period.

How to Determine the Area Utilization

Gross Warehouse Area = Inside warehouse area in sq. m.

Net Storage Area = Actual area occupied by inventory
excluding aisles, empty pallets, shipping and receiving area honeycombing and inventory.

Interference = Irregularities due to column, odd corners etc.

Miscellaneous = Space for offices, equipment etc.

Rule of Thumb for general package warehousing

$$\frac{\text{Gross warehouse area}}{\text{Net storage area}} = \frac{3}{2} \text{ or}$$

Net Stor. Area + 50% net stor. Area = Gross Warehouse Area

Honeycombing is a warehouse term used when the space is not fully occupied due to partial withdrawal of inventory. The maximum honeycombing factors are in the range of 75 to 90% of maximum capacity depending upon the activity number and quantity of items stored.

General Dimensions of Warehouse

Warehouse in connection with transit shed should be comparable in size with the gross area of 6,450 to 8,365 sq. m. The width and length can be found from the dimensions of the lot and the space required for access roads. For fire protection, divide the buildings into compartments separated by firewall equipped with fire doors. A height of 6.60 to 7.50 m. is sufficient to allow automatic sprinklers and pendants electric light.

Industrial

The loading platforms should be roofed wide enough to allow easy maneuvering of mechanical equipment in time of loading and unloading operations.

Column Spacing

Columns inside a warehouse no doubt interfere with the movement of cargos. Wide spacing of columns is advantageous. One row column at the center causes less interference to cargo handling and staking. It allows two side aisles for trucks and equipment. The width of the building in most instances is the deciding factor in selecting the most economical span for the roof structures.

Clear span construction is no doubt the best from an operating activities but the additional cost may not be bearable. The spacing of column bays is a controversial matter, the type of roof construction in most cases determine the economical span for roof purlins and joists. A 6.00 to 12.00 meters bay spacing is commonly adopted for economy

Structural Frame

Steel frame is popularly used for warehouse framing due to the following advantages:

- 1. Availability
- 2. Economy
- 3. Simplicity
- 4. Strength and durability

Prefab buildings of lightweight steel frames are now available. It comes in various span and bay spacing offering a choice of truss, arch, or rigid frame. It offers an economical solution to certain specific warehouse requirements.

Reinforced Concrete

The advantages of reinforced concrete structures are:

- 1. Low maintenance cost.

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2. Long life and ability to withstand rough treatment by heavy stevedore equipment.
3. High resistance to fire.
4. Pre-stressed concrete beams, columns and thin shell, and barrel arches were successfully proven in the past.

Doors

Planning Considerations:

1. The finest type of door for warehouse is the vertical rolling steel doors. Large doors are generally motor operated controlled by limit switches.
2. Door type requires moderate headroom between the door head and ceiling or roof beam.
3. Door is recommended on each side of the building opposite each other. Likewise, at the end for the truck to enter and leave using the center aisles.
4. Symmetrical spacing of doors allow efficient traffic pattern throughout the building.
5. Door size depends on the size and type of equipment and cargo that will be used. The 4.80 x 4.80 m. high doors are commonly used.
6. An even door 5.40 x 6.00 meters high is becoming popular to accommodate bigger cargo trucks or vans.
7. Ventilator is a local requirement either continuous ridge type or individual round types distributed over the roof.

Protective Devices

Structural columns inside the warehouse should be protected by encasing the lower portion 1.35 m. high by setting heavy steel pipe guards around them from damage caused by collision with vehicles.

The main switch board shall be protected by barricades of either pipe railings or concrete filled steel posts set about 90 centimeters in front to act as protection against equipment.

Industrial

Warehouse should be provided with automatic sprinkler system in accordance with building code and local ordinances.

7-4 Industrial Parks

Planning specific building sites in industrial development area includes the following considerations:

1. Know the setback requirements.
2. Truck loading and maneuvering depth.
3. Vehicular parking needs.
4. Building area and coverage area.
5. Rail service requirements.

Physical Design Guidelines

1. For parking in front and one side of building, provide 12.00 to 15.00 meters for the delivery and parking stalls.
2. If parking is allowed on both sides of the driveway, provide 18.00 to 20.00 meters space.
3. Warehousing operation can be successful with 26 meters of truck docking and maneuvering depths.
4. Recommended depth of trucking terminals for larger trucks (13.50 m. trailer length) is 40 meters.
5. For parking and landscaping of one aisle and parking stall on either side, 23.00 meters will be sufficient.
6. Parking space should be standard in size provided with sufficient storm drainage facilities.
7. For parking and landscaping of one aisle and parking stall on either side, 23.00 meters will be sufficient.
8. The ratio of parking spaces required for building is proportional to the number of employees and employee's commuting habits.
9. Building coverage above 50% can be allotted for warehouses while offices and light manufacturing with ample parking space requires 30% of building area coverage.

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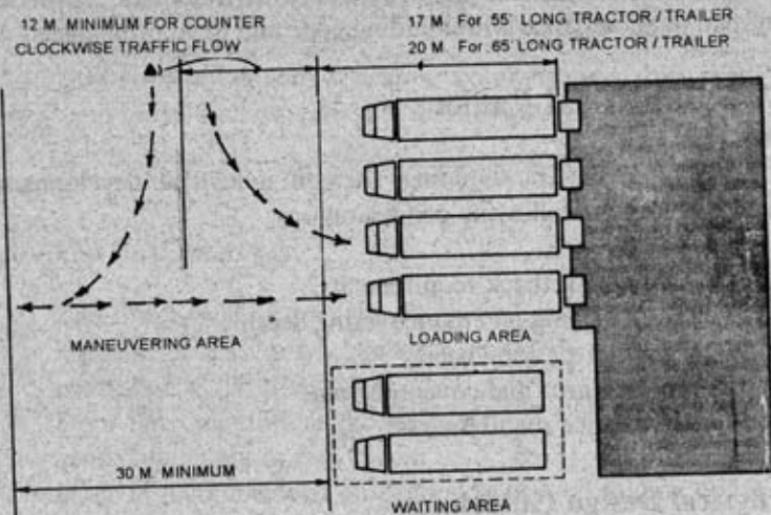


FIGURE 7-9 TRUCK LOADING AND MANEUVERING LAYOUT

TRANSPORTATION

8-1 Bus Terminal

The fast growth of population has proportionally increased transport demand that triggers transportation development and advances in automotive technology. In response to these demands, the government augmented the national budget appropriation for the construction and improvement of the roads and highway networks.

The expansion of roads and expressway network attracts more capital investment in transportation business. Air-conditioned buses offer a more suitable and reliable services over a long distant trip. Consequently, the efficient and more comfortable high-speed buses transformed land transportation as the leading means of public transport.

Types of Bus Terminal

Bus terminals are classified into the following categories:

1. **Inter City Bus Terminal** is usually located in downtown core accessible directly by local bus, taxi and auto. This type of terminal includes long haul or package express services and provides greater number of bus movements.
2. **Urban Suburban Commuter Terminal** is a passenger collection and distribution center or a rapid transit feeder station. It is characterized by a diversified bus route and high turn over commuter type bus operations.

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3. **Airport City Terminal** is primarily intended for the transport of airline passengers from the urban center to the major airport it is serving. The terminal is accessible by local transit system, taxi and autos. It gives information of the scheduled departure and arrival of flights including the pre-ticketing and check-in facilities.
4. **Suburban Inter Province Terminal** is a peripheral type designed to avoid traffic congestions. It is sometimes referred to as park and ride terminal because the access is primarily served by auto. This type of terminal is usually one story building of simple construction.

Planning Considerations:

1. The functional organization of bus terminal is governed by the site and locations.
2. Area and shape of the lot.
3. The volume and type of bus operations.
4. Passengers and bus traffic circulations.

With respect to the airport city bus terminal, the primary considerations are:

1. Provisions for efficient check-in facilities.
2. Baggage handling.
3. Flight information.
4. Extensive counter space that includes weigh-in provisions and conveyors for easy handling of baggage.
5. Provisions for auto and taxi access.

The most significant planning requirement in Bus Terminal is the provisions for parking space. The area should minimize walking distance to the terminal provided with a covered walk connecting the parking area to the terminal building. The in and out movement should avoid traffic congestions along the adjacent arteries. The movement of both passengers and vehicles at

Transportation

the same level is inevitable. Hence, it is imperative to provide a safety measures separating the two movements.

Space Requirements for Bus Terminal

A. Public Seating

Public seating should be directly accessible to the concourse area provided with drinking fountain, trash baskets, and clocks. For Inter City Bus Terminal, provide one seat for every three passengers. The number of passengers is calculated by multiplying the number of loading berths by an average bus capacity between 35 to 38 persons. An 8 berths loading platform terminal requires seating between 93 to 101 persons.

$$\begin{array}{r} 35 \times 8 = 280 \\ \quad \quad \quad \quad \quad \quad 3 \\ \hline 3 \\ 38 \times 8 = 304 \\ \quad \quad \quad \quad \quad \quad 3 \\ \hline \end{array} \begin{array}{l} = 93 \text{ passengers} \\ = 101 \text{ passengers} \end{array}$$

B. Ticketing Facilities

The new concept of terminal ticketing facility is the open counters in contrast with the old caged window. The number of selling positions or station agents varies with the operation policy. On the average, one position is provided for each 25 to 30 waiting room seats. The length of the counter space depends on the individual carrier operation and the ticketing equipment used which varies from 90 cm. to 150 cm. per position or about 4.5 to 5.5 sq. meters per position. The counter height is usually 105 centimeters.

C. The Baggage Room

Baggage room must have an area of about 10% of the total building area or contain about 4.5 sq. meters for each bus loading berth or whichever is higher.

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The baggage room should be accessible to both public and concourse equipped with standard metal racks about 4 or 5 tiers high or baggage storage. A certain portion of the baggage room is sometimes used for package express service functioning without interfering with the concourse traffic.

D. The Dispatch Office

The dispatch office controls all buses movements. It is located at the concourse for direct observation of the loading berths. The office size could be from 4.5 to 14 sq. meters. The public lockers and telephones are revenues producing facilities. As to the quantity, it is a matter of management prerogatives.

F. Office

All terminals require an office space regardless of its type. The area depends upon the type and size of the terminal.

Design of Pedestrian for Terminal Passengers

The design of pedestrian facilities depends upon the type of terminal and its pedestrian traffic layout. Commuter passenger terminal has extreme but short peak traffic and repetitive passengers flow. Unlike the long distance travel terminal, passengers are unfamiliar with the facilities and peak traffic level that may stay for several hours.

According to John J. Fruin "The challenge to the terminal designer is to balance the space requirement for a comfortable and aesthetically pleasing human environment against the space restraints caused by building configuration and cost.

The Corridor

Corridor minimum width is based on the pedestrian traffic flow volume minus the allowance for disruptive traffic elements

Transportation

Such as: columns, newsstand, stairways, and window shoppers.

The corridor is sometimes used as waiting area or passenger line up to purchase tickets. Under this condition, the length could be estimated at 50 cm. per person spacing. The minimum practical flow through a corridor is about 80 persons per meter width per minute (PMM).

For a normal walking speed and avoidance of traffic conflicts, the flow volume is equivalent to 15 PMM or less. For commuter terminal where repetitive peaks and space restraint occurs, the value could be from 35 to 50 PMM.

The Entrance

The maximum capacity of a free swinging door is about 60 persons per minute with expected frequent traffic congestions due to stand and wait at the entrance area. An estimated 40 persons per minute flows will be considered as busy situation with occasional traffic disruptions. Where free flowing is desired, 20 persons flow per minute should be adopted.

The Stairs

According to the study made by John J. Fruin, "*The human locomotion on stairs is much more stylized and restricted than walking at level floor because of the restraint imposed by the dimensional configuration of the stairs, physical exertion, and concerns for safety.*

The maximum flow of people on stairway is about 52 persons per meter width of stairway per minute in the upward direction. An average of about 1.8 square meters per person or more is required before stair locomotion becomes normal and traffic conflicts with other pedestrian can be avoided. This is equivalent to 15 PMM volume flows that usually used in terminal that do not have acute peak pattern.

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The riser of stair has a great significance impact on human locomotion. A standard 17 cm. riser height or less per step will increase pedestrian speed contributing to traffic efficiency.

Types of Platform Loading

1. **Parallel Loading.** This type of platform loading requires large amount of space. Buses has to wait until after the first bus exits. Large terminal requires overpass or underpass pedestrian to protect the passengers from crossing the lanes.
2. **Right Angle Loading.** This type of platform loading has difficulty in the maneuvering of bus.
3. **Straight Saw-tooth Loading** is proven efficient where lot is comparatively narrow and deep. The passenger has direct approaches to the loading door and baggage truck can operate between buses for side loading.

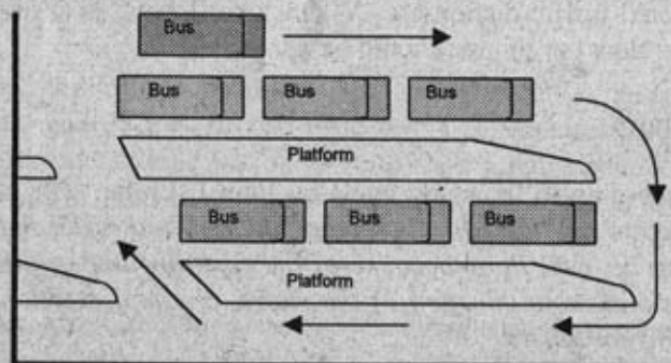


FIGURE 8-1 PARALLEL LOADING

4. **Radial Saw-tooth Loading** is considered the most efficient type of platform loading that requires a minimum front. The wide space at the rear permits an easy maneuvering of the bus.

Transportation

The physical dimensions and maneuverability of the bus dictates the measurements of:

1. Width of the roadway.
2. The shape of platform.
3. The column spacing.
4. The ceiling heights.
5. Bus level design.

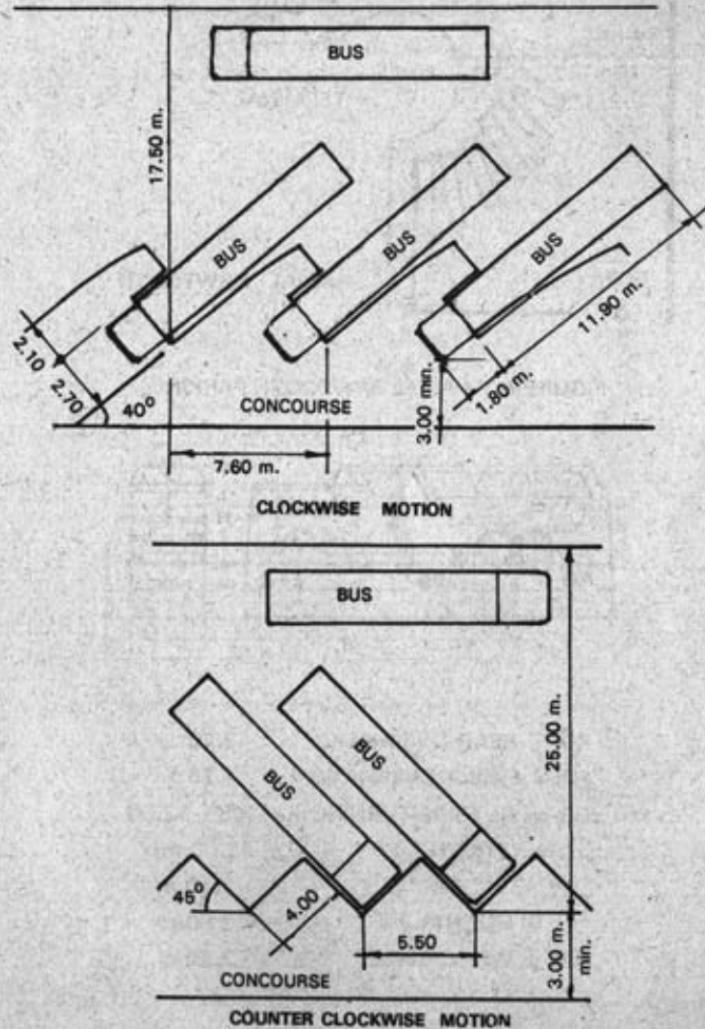


FIGURE 8-2 SAWTOOTH LOADING

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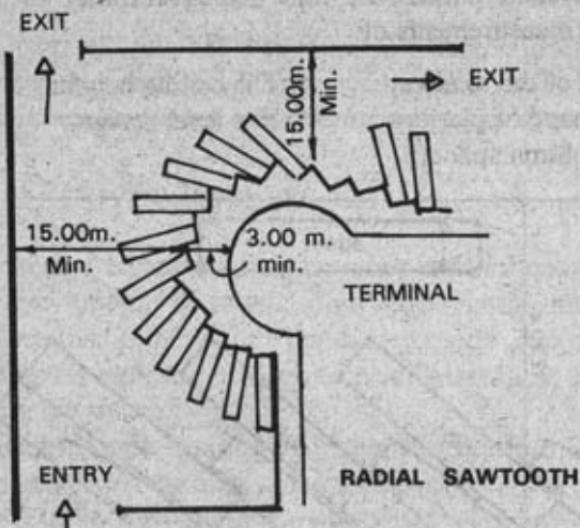
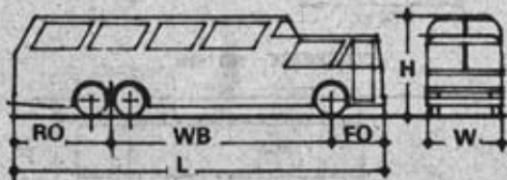


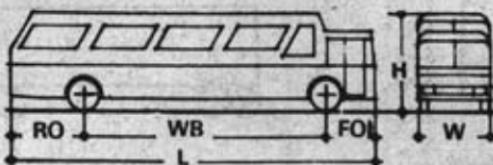
FIGURE 8-3 RADIAL SAWTOOTH PARKING



RO = REAR OVERHANG	- 3.20
FO = FRONT OVERHANG	- 1.75
OR = OUTSIDE TURNING RADIUS -	12.80
L = LENGTH	- 12.00 m.
W = WIDTH	- 2.40 m.
H = HEIGHT	- 3.60 m.
WB = WHEEL BASE	- 7.10 m.

FIGURE 8-4 BUS DIMENSIONS

Transportation



GMC INTERCITY COACH

$L = 12.00$ m.

$W = 2.40$ m.

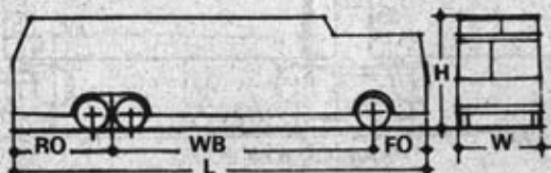
$H = 3.60$ m.

$WB = 8.60$ m.

$RO = 2.40$ m.

$FO = 1.70$ m.

$OR = 13.50$ m.



$L = 13.50$ m.

$W = 2.70$ m.

$H = 3.60$ m.

$WB = 8.60$ m.

$RO = 3.30$ m.

$FO = 1.75$ m.

$DR = 15.20$ m.

FIGURE 8-5 BUS DIMENSIONS

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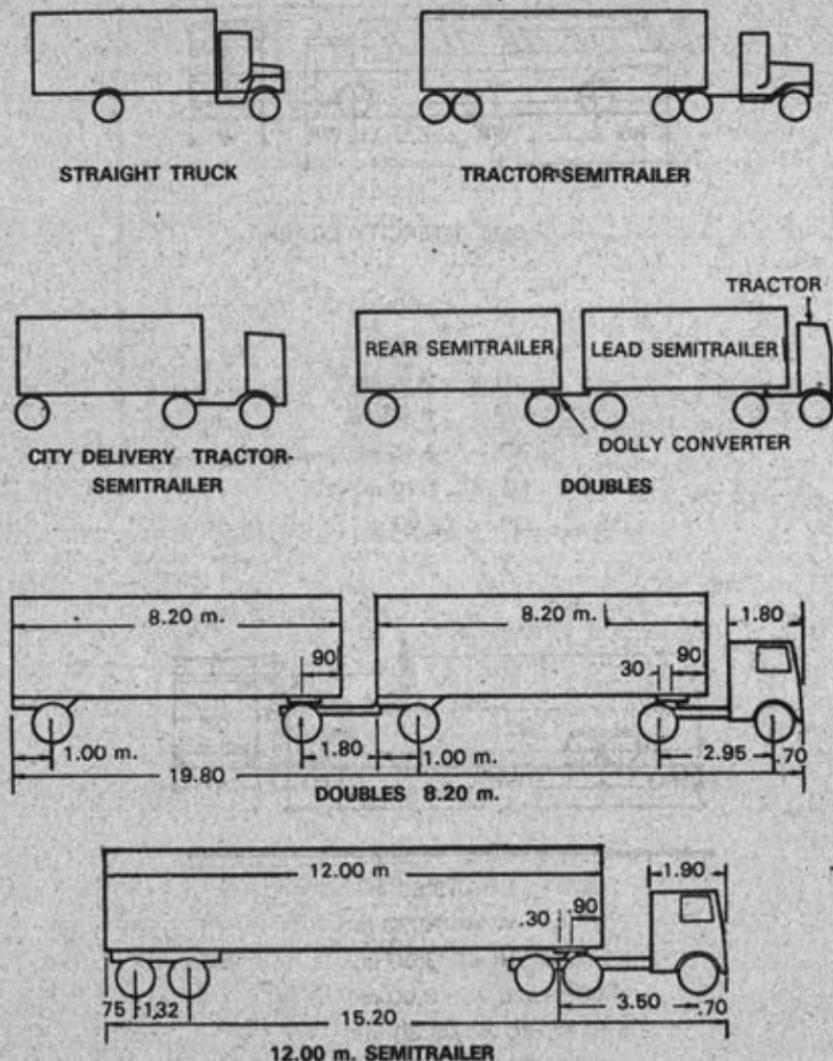


FIGURE 8-7 TRUCK TYPES AND DIMENSIONS

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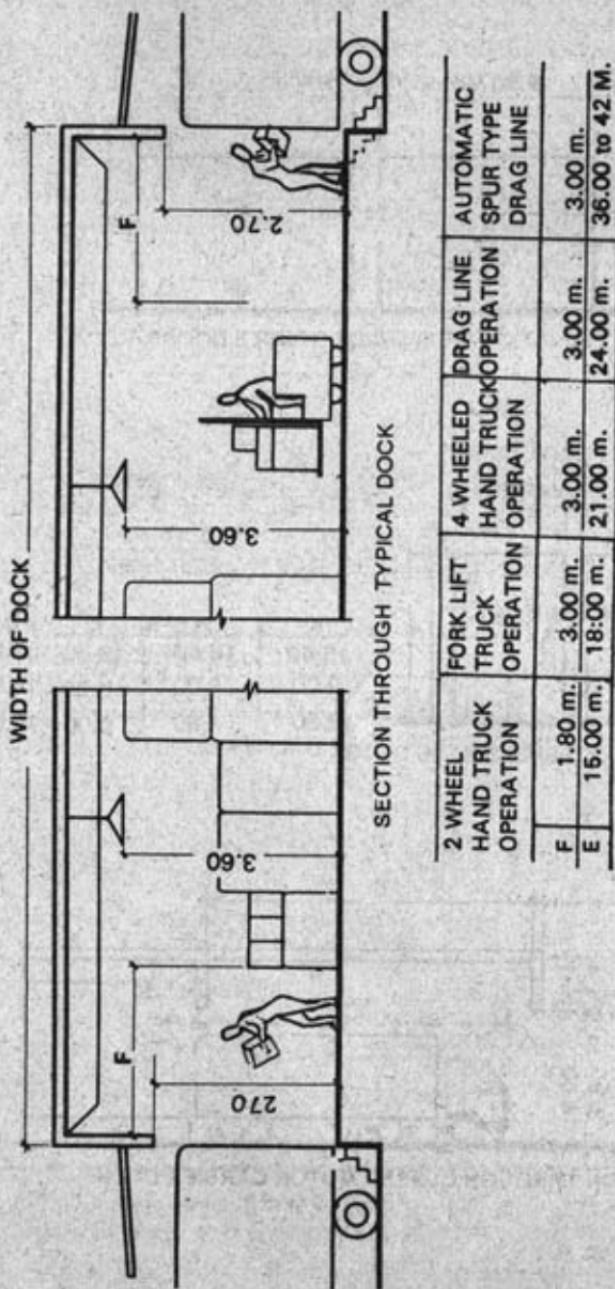
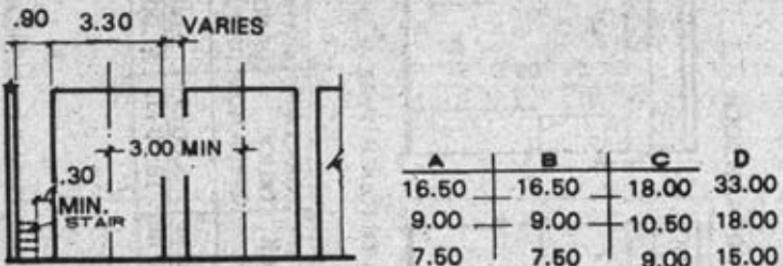
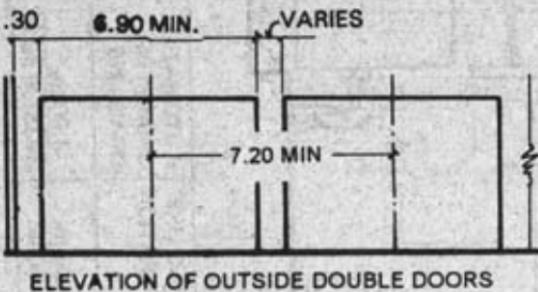
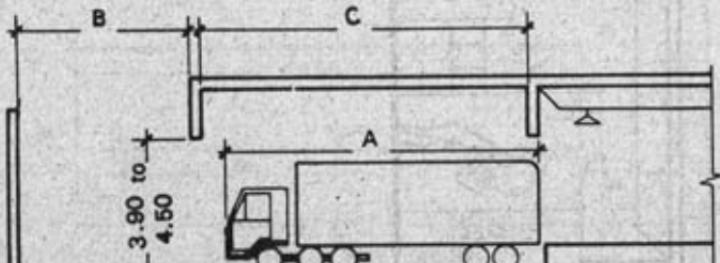


FIGURE 8-8 DIMENSIONS OF TYPICAL DOCK

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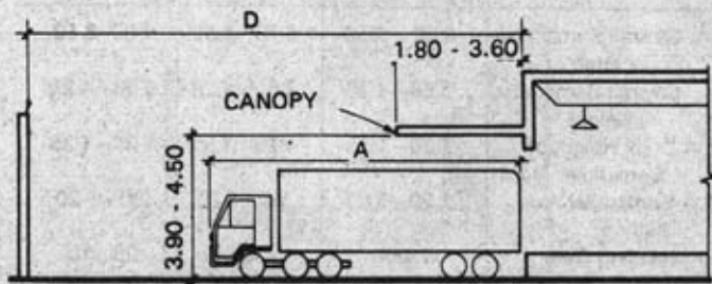
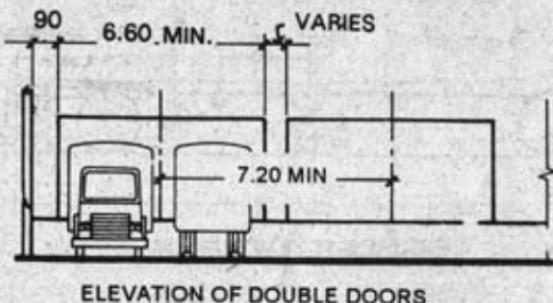
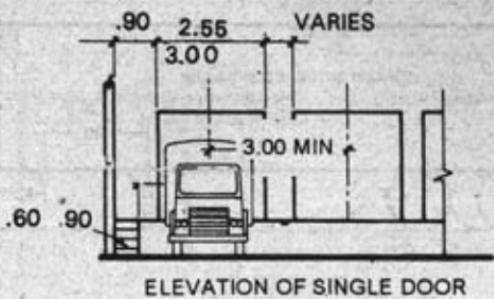
ELEVATION OF OUTSIDE SINGLE DOOR



SECTION THROUGH CLOSED MOTOR CARRIER DOCK

FIGURE 8-8

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SECTION THROUGH OPEN CARRIER DOOR

FIGURE 8-10 DOOR HEIGHT AND DIMENSIONS

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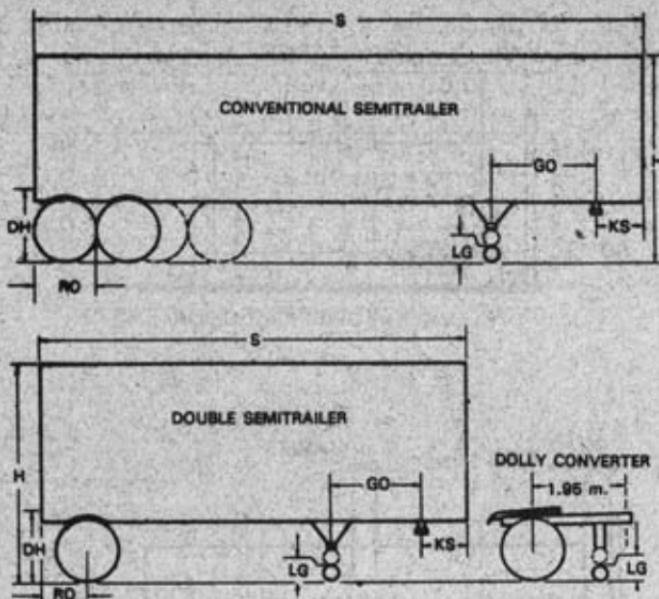


FIGURE 8-11 SEMITRAILER

TABLE 8-1 TYPICAL SEMITRAILER MEASUREMENTS

	CONVENTIONAL SEMITRAILER	DOUBLES SEMITRAILER	CITY DELIVERY SEMITRAILER
S = Overall Semicrailer Length	9.60 - 1350	6.70 - 8.50	6.00 - 8.50
H = Overall Semicrailer Height	3.60 - 4.20	3.60 - 4.20	3.60 - 4.20
DH = Dock Height of Semicrailer Floor	1.20 - 1.35	1.20 - 1.35	1.20 - 1.35
RO = Semicrailer Axle Setting	1.20 - 3.60	.90 - 1.20	.90 - 1.20
LG = Landing Gear Raised Height	.25	.25	.25 .10 10 for dolly converter
GO = Landing Gear Offset	2.10	2.10	1.60
KS = Kingpin Setting	.90	.90	.90

Transportation

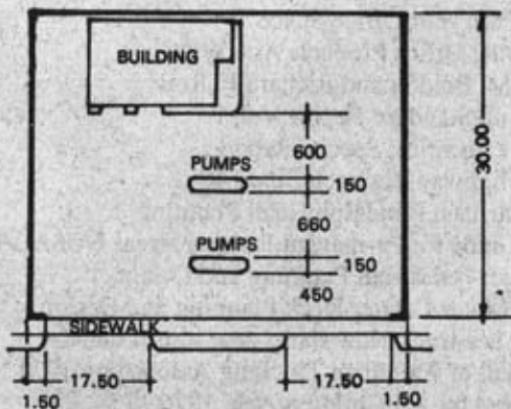
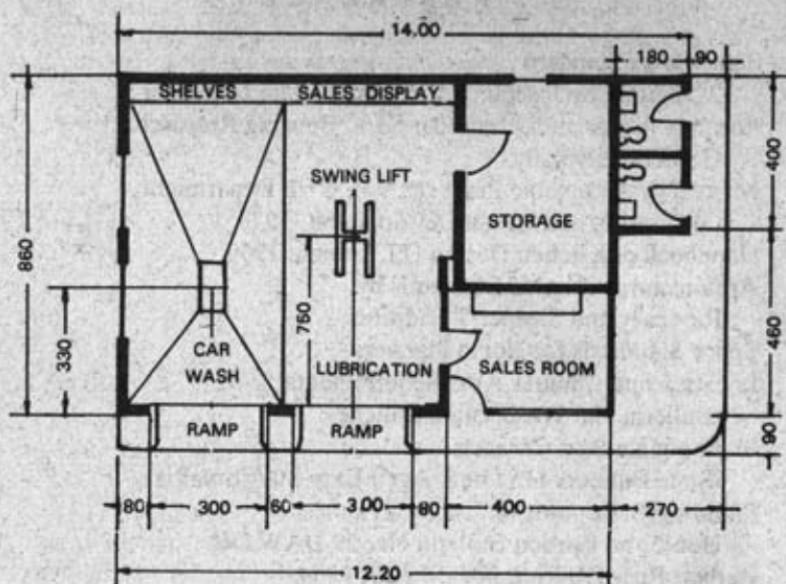


FIGURE 8-12 TWO BAY GAS SERVICE STATION