DRAWING-11
C/BFA-ID-203

Introduction

STAIR CASE

Lecture-3

BY: MR SULMAN MUNIR
Member The American Institute of Architects (Intl. Assoc. AIA)

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STAIRS

A. Introduction:

- A stairway is a series of steps with or without landings or platforms which is installed between two or more floors of a building.
- Stairs provide easy access to various levels of the Building or Home.
- Prime considerations in stair design should be easy ascent or descent and safety.

STAIRS

B. Types of Stairs

- Eight general types of stairs are commonly used in residential construction.

  They are:

1) Straight flight stairs
2) L stairs (or dog-leg)
3) Double L stairs
4) U Shaped stairs
5) T Shaped stairs
6) Winder stairs
7) Curved stair case
8) Spiral stairs case

STAIRS

1) The Straight flight / Run stairs

- Used mostly in residential construct-ion inexpensive to build but requires a long open space in the floor & / or ceiling to accommodate design
- Straight stairs feature a single linear flight with no change in direction.
- It is used where stair hall is long and narrow.

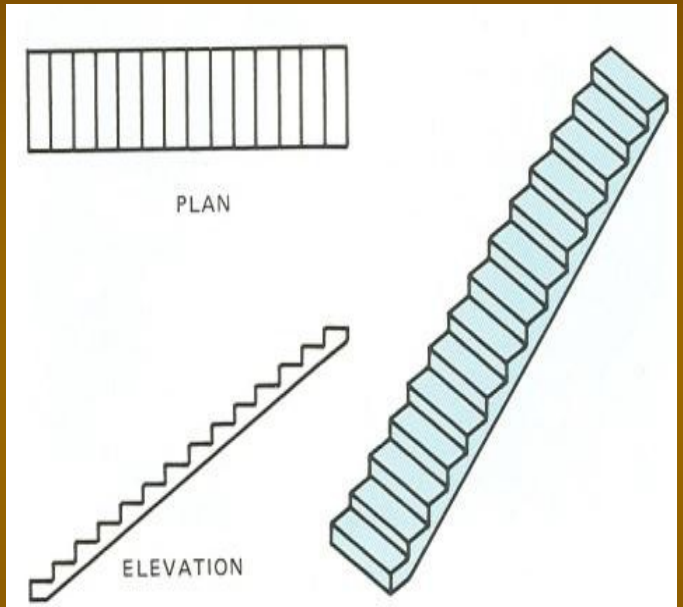


Fig. 14-2. Straight run stairs.

The Straight flight / Run stairs

2) The L STAIRS

- The L Stairs has one landing at some point along the flight of steps
- If the landing is near the top or bottom of the stairs, the term LONG L is used to describe the difference.
- L Stairs are used when the space required for a straight run stairs is not available.

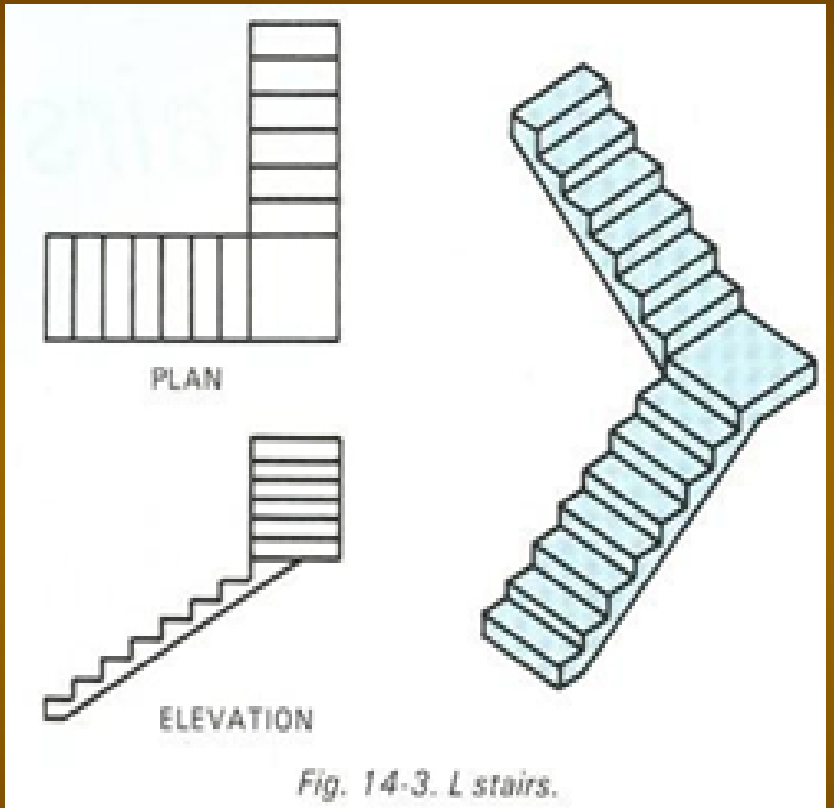
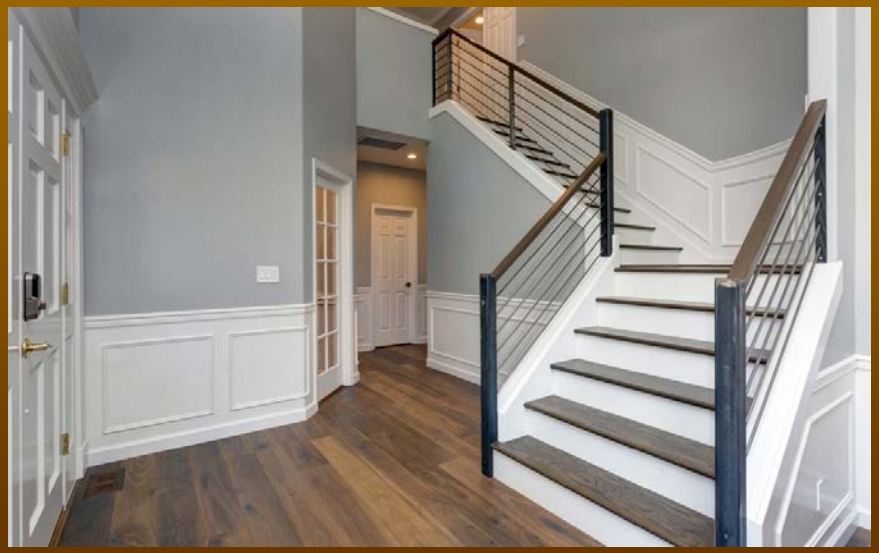


Fig. 14-3. L stairs.

The L Stairs



3) THE DOUBLE L STAIRS

- **Double L Stairs require two 90 deg. Turns along the flight.**
- **Double L Stairs may be used when space is not available for either the straight or L Stairs.**
- **Double L stairs are not frequently used in residential construction.**

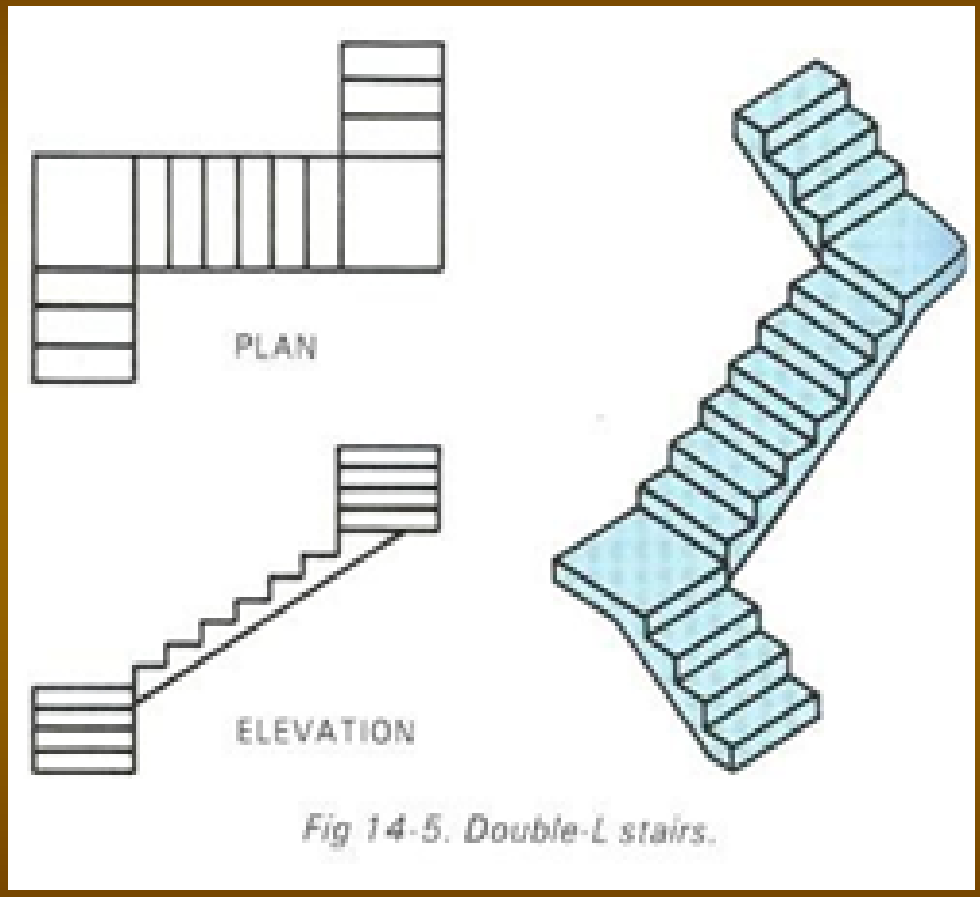


Fig 14-5. Double-L stairs.

4) U STAIRS

- U Stairs may be constructed either as wide U or narrow U Stairs.
- Both have two flights of steps parallel to each other with a landing between.
- The difference between wide and narrow U Stairs is the space between the flights while wide U Stairs have a well hole between.

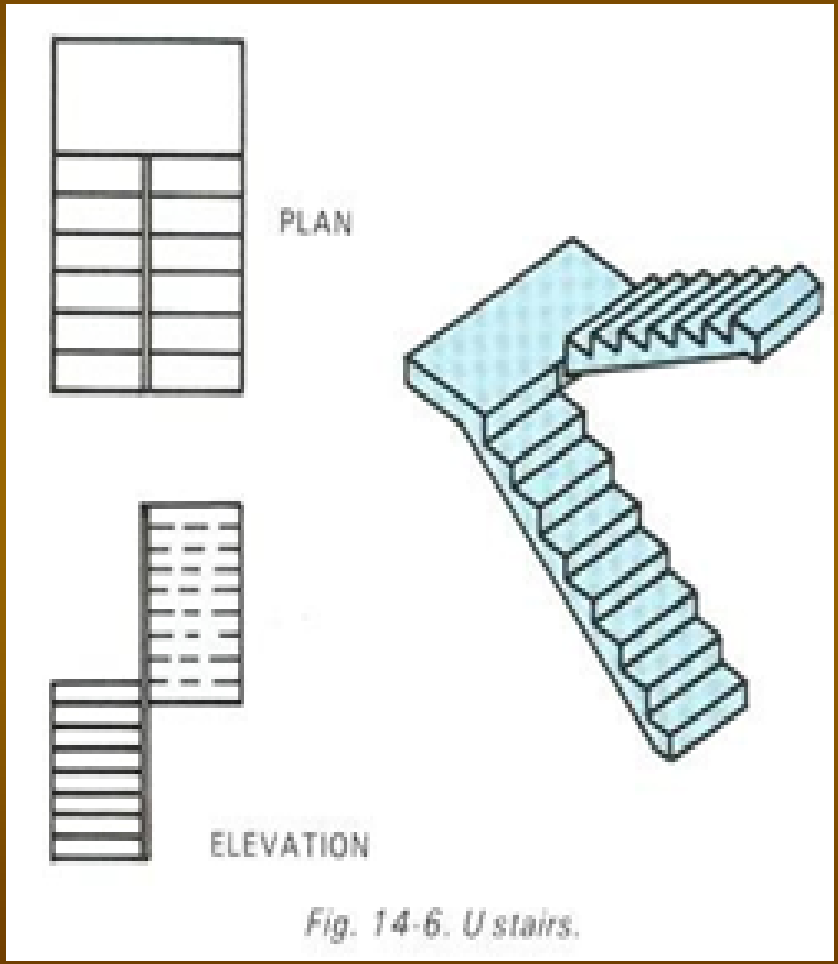
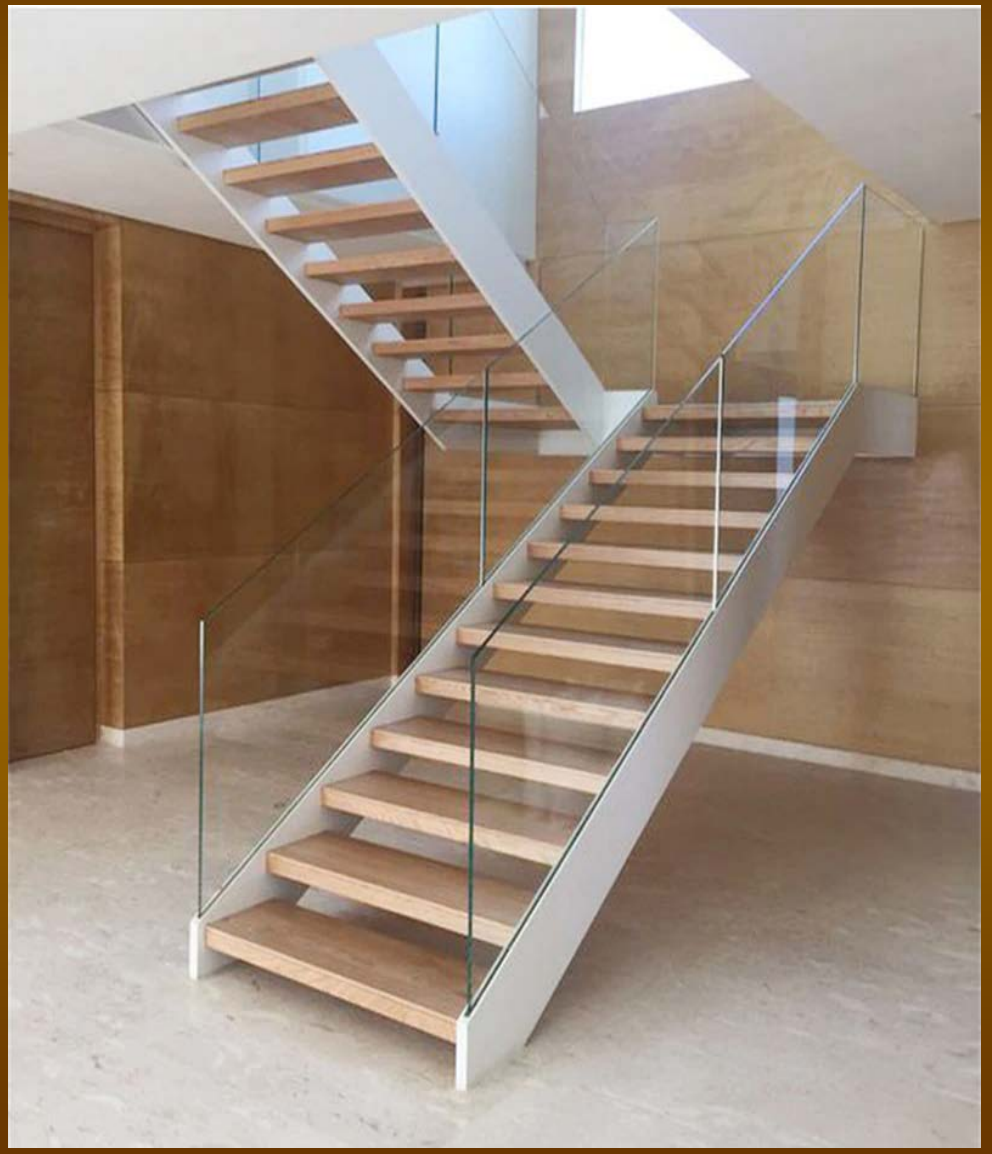


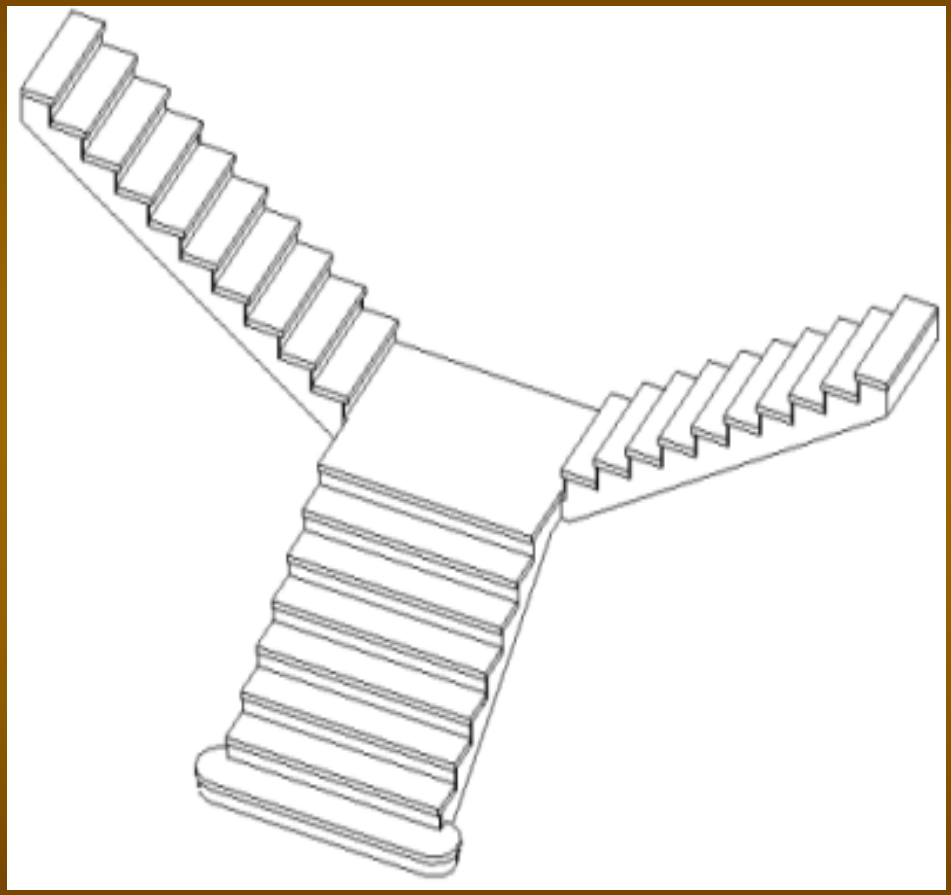
Fig. 14-6. U stairs.

U SHAPED STAIRS



5) T SHAPED STAIRS

- **Both have two flights of steps parallel to each other with a landing between.**
- **The difference between wide and narrow U Stairs is the space between the flights while wide U Stairs have a well hole between.**



T SHAPED STAIRS

6) The Winder Stairs

- Winder stairs have “Pie-shaped” steps which are substitute of a landing.
- If winder stairs are used, the width of the triangle steps should be sufficient at midpoint to provide a tread width equal to the regular steps.
- For example if the regular tread width is 10 inches then the winder step should also be 10 inches at its midpoint.

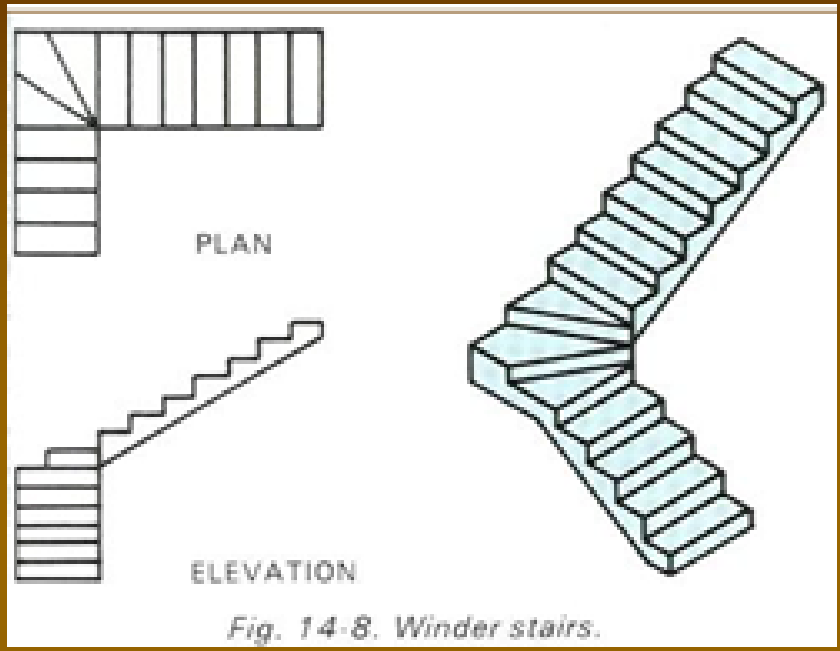


Fig. 14-8. Winder stairs.

The Winder Stairs

7) The Curved Staircases

- Curved Staircases are similar to Spiral Staircases in that they both make turns without utilizing landing platforms.
- Curved staircases do not make a full circle, and instead “curve” subtly to a new direction.
- The Advantages of a Curved Staircase Associated with elegance and grand designs Easy to comfortably navigate
- The Disadvantages of a Curved Staircase is that it is the most difficult staircase configuration to build.

The Curved Stairs

8) Spiral or Circular Stairs

- Spiral or Circular stairs may be used where little space is available.
- Most spiral stairs are made from steel and welded together, however it is possible to construct them from wood and concrete.
- Spiral stairs, as a rule, are not very safe since they generally have winder steps.

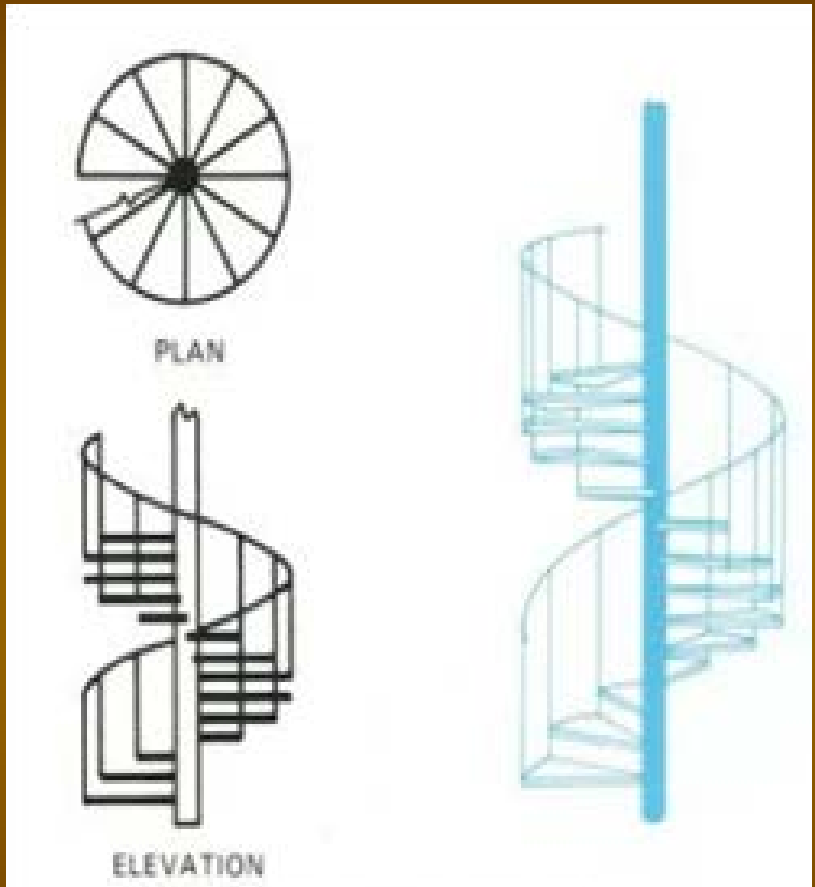


Fig. 14-10. Spiral stairs.

Spiral or Circular Stairs

STAIRS TERMINOLOGY

Several terms are associated with stairs which must be understood before considering design.

The following list includes most of these terms.

1. BALUSTERS
2. HANDRAIL
3. NEWEL
4. ENCLOSED STAIRS
5. HEADROOM
6. LANDING
7. OPEN STAIRS
8. STAIRWELL
9. TREAD
10. RISER
11. RISE
12. TOTAL RISE
13. RUN
14. TOTAL RUN

STAIRS TERMINOLOGY

BALUSTERS

- Balusters are vertical members which supports the handrail on open stairs.

HANDRAIL

- The railing attached to a wall next to a stairway and is used to help people steady themselves as they travel along the stairway.

NEWEL

- The main posts of the handrail

STAIRS TERMINOLOGY

ENCLOSED STAIRS

- Stairs which have a wall on both sides also known as closed, Housed, or box stairs.

HEAD ROOM

- The shortest clear vertical distance measured between the nosing of the treads and the ceiling.

LANDING

- The floor area at either end of the stairs and possibly at some point between , as in the case of L Stairs.

STAIRS TERMINOLOGY

OPEN STAIRS

- Stairs which have no walls on one or both sides

STAIR WELL

- The opening in which a set of stairs are constructed.

TREAD

- The horizontal member of each step is called tread.

RISER

- The vertical face of a step is called Riser

STAIRS TERMINOLOGY

RISE

- The distance from the top surface of one tread to same spot on the next.

TOTAL RISE

- The total floor-to-floor vertical height of the stairs

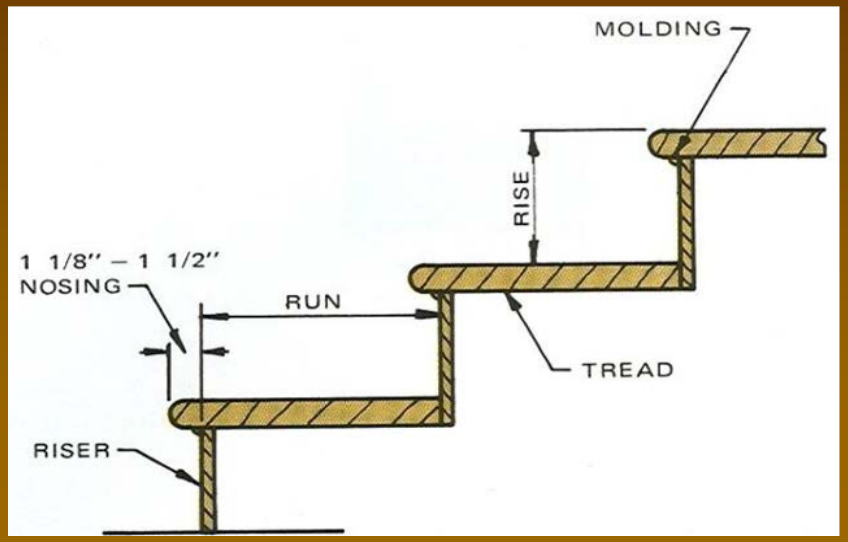
RUN

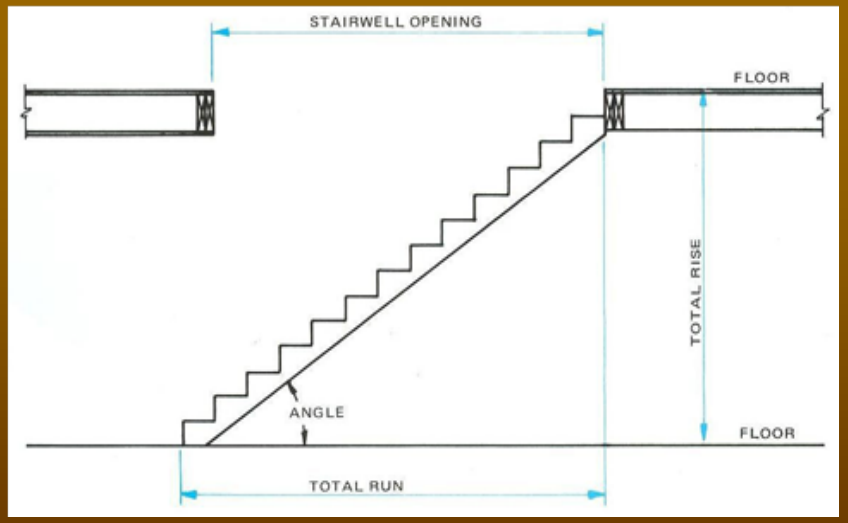
- The distance from the face of one riser to the face of the next.

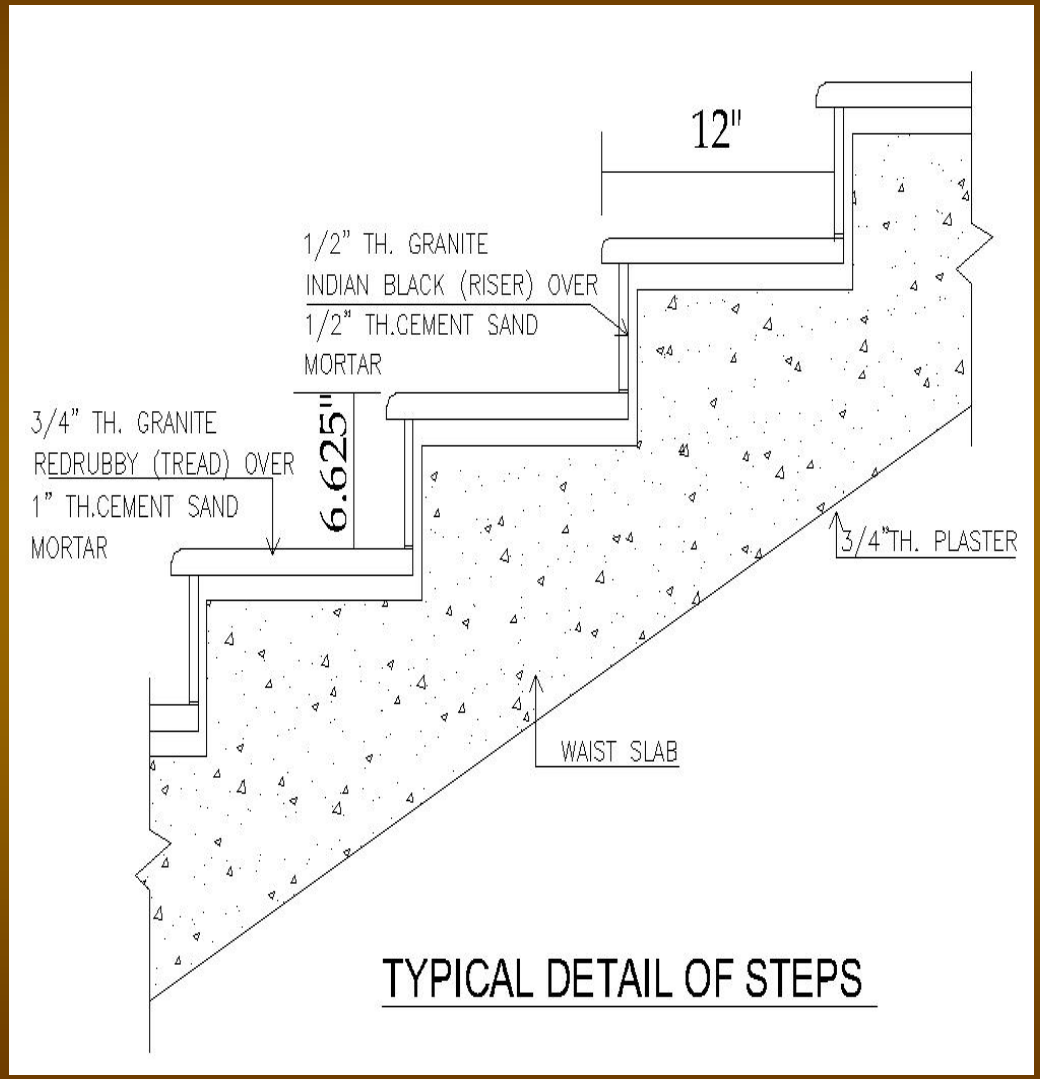
TOTAL RUN

- The Total horizontal length of the stairs is termed as total run.

STAIRS TERMINOLOGY







STAIR CALCULATIONS & DRAWING PROCEDURES

Several rules have been devised for calculating the rise-run (riser-tread) ratio. Three of these rules are:

Rule No.1.

The slope of the stairs (Rise-run ratio) should be between 30 and 35 degree.

Rule No.2.

The Sum of two risers and one tread should equal to 25 inches.

Rule No.3.

The sum of one riser and one tread should equal to 17 to 18 inches.

STAIR CALCULATIONS & DRAWING PROCEDURES

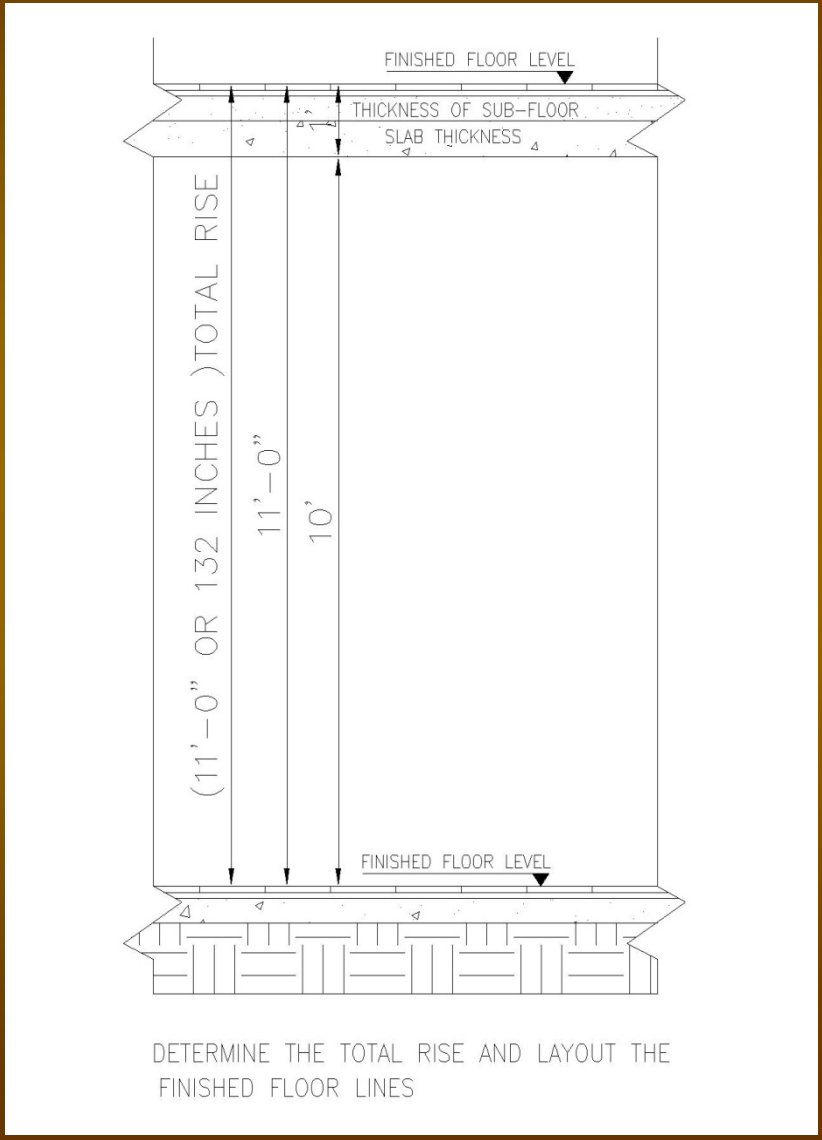
The Following procedure may be used to determine the number and size of treads and risers for a set of stairs.

STEP-1

1. **Determine the distance from finished floor to finished floor.**

2. **This is the total rise of the stairs.**

3. **The total rise is computed by adding the distance from finished lower floor to finished ceiling which includes the thickness of slab + the thickness of the subfloor and finished floor.**



DETERMINE THE TOTAL RISE AND LAYOUT THE FINISHED FLOOR LINES

STAIR CALCULATIONS & DRAWING PROCEDURES

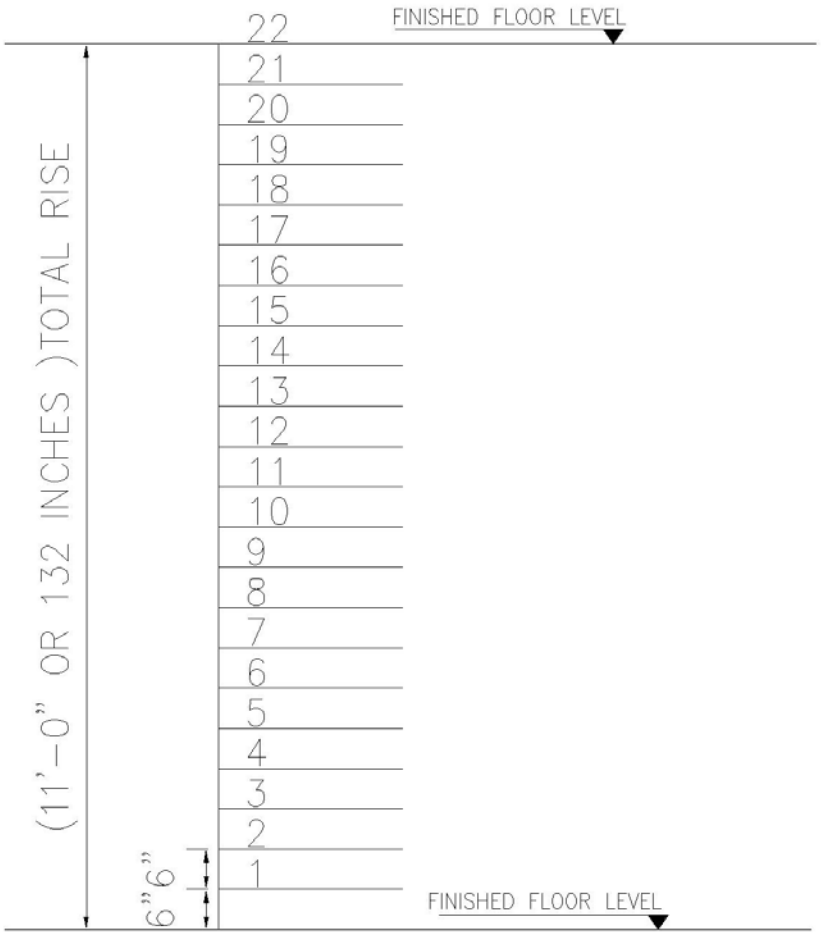
STEP-2

4. Determine how many riser will be required by first dividing the total rise by 6.

5. The reason 6 is used is because 6 inches is an ideal riser height and it is logical place to start

6. When 132 inches is divided by 6 the result is 22 risers.

7. Each riser must be exactly the same height.



Divide the total rise into the specified number of risers
The number of risers in this example is 22

STAIR CALCULATIONS & DRAWING PROCEDURES

STEP-3

8. Using Rule no 1 determine the tread size and total run which will yield a stair slope between 30 and 35 degree.

9. It was determine earlier that a 12 inches tread was a commonly used width so it will be used for a trial calculation.

10. There is always one less tread tan the number of risers. This is because the floor serves as the top tread.

11. Using Rule No 2 the sum of two risers (6 in. + 6 in.) and one tread (12 in.) equal to 24 inches. This is very close to the required sum of 25 and indicates that this combination will be acceptable.

STAIR CALCULATIONS & DRAWING PROCEDURES

STEP-3

12. Rule no 3 indicates that the sum of one riser and one tread should equal to 17 to 18 inches.

13. If 6 inches (Riser) is added to 12 inches (Tread) the result is 18 inches . This is within the required range. The tread width will be 12 inches.

14. The Total run is determined by multiplying the tread width (12inches) by the number of treads (22). The product is 264 inches for the total run.

Reference
Architecture: Residential Drawing and Design
Clois E. Kicklighter,

Stairs Assignment

- Design or Select a basic types of stairs for a house which has a finished to finished floor distance of 12'-0".
- The Width of the stairs shall not be less than 6'-0".
- Provide the necessary drawings with dimensions and notes Including plans, elevation and section.
- Build a scale model of stairs as accurately as possible in scale of 1/2"=1'-0". Display this model along with the detail drawings of the stairs.

PURPOSE OF ASSIGNMENT:

To better understand the different types of stairs, stairs terminology, stair designs, stair calculations & drawing procedure in detail with model.

Time Duration: 4 week

THANK YOU