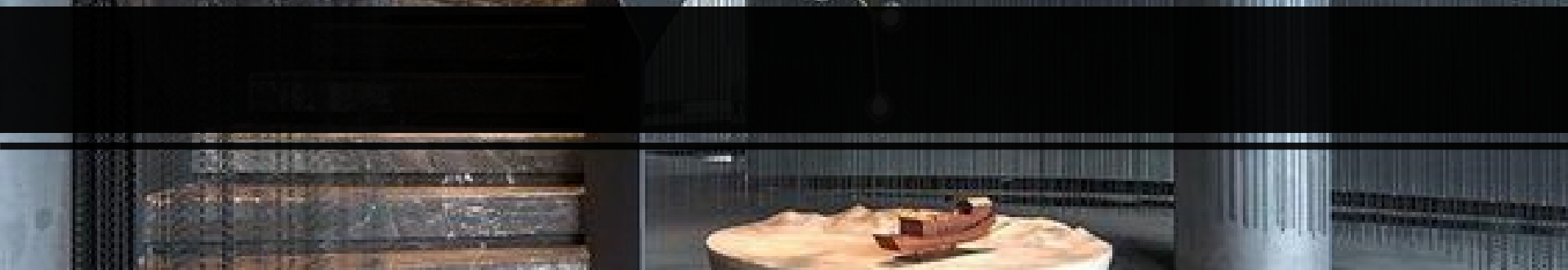


STAIRS

Design and Construction



References

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- Architectural Wood Institute (AWI). (2003). Architectural woodwork quality standards (1999). Reston: Architectural Woodwork Institute.
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- Ching, F. D. K. & Adams, C. (2001). Building construction illustrated (3rd ed.). New York: John Wiley & Sons.
- Harmon, S. K., & Kennon, K. E. (2001). The codes guidebook for interiors (2nd ed.). New York: John Wiley & Sons.
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Types of Stairs

As per layout / form:

L- shaped

Doglegged

Bifurcated

Spiral

Circular / geometric

Straight

As per

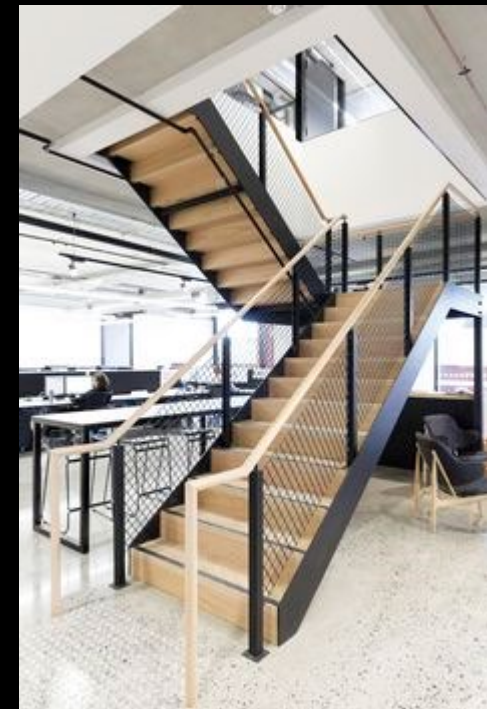
Method of construction:

Prefabricated

Cast-in-situ

Floating

Suspended



STAIRS PARTS

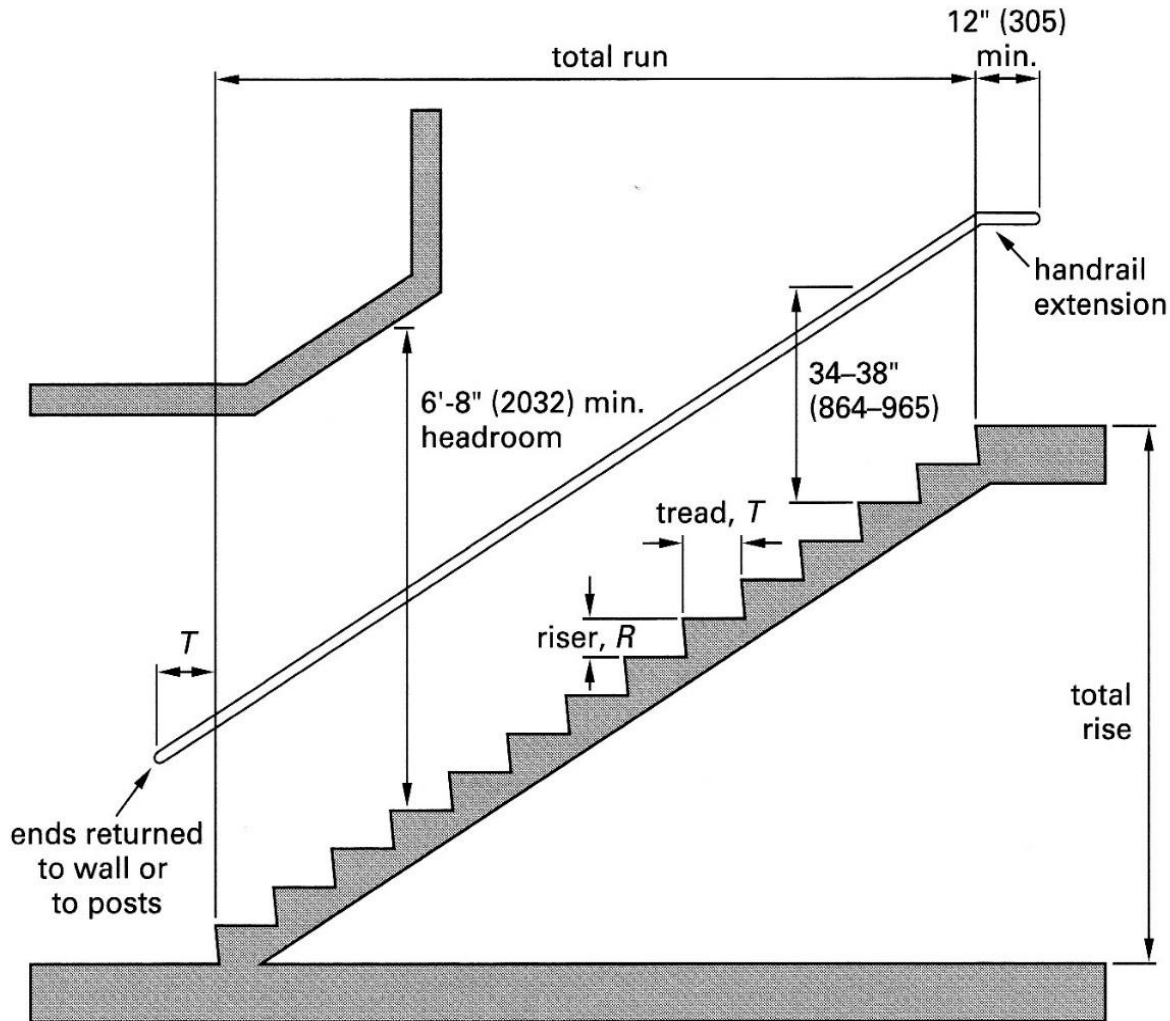


Figure 12.6
Stair Section
Design
Guidelines

STAIRS

Code Requirements

Width of Stairs

Occupant load **50** or more – Minimum width is **44" (1118)** or
.3 x occupant load, whichever is greater

Risers

Commercial - **4" to 7" [ADA - maximum – 7"]**

Tread (nosing to nosing)

Commercial - **11" – minimum [ADA – 11" minimum]**

Guardrails

Height - **42"**

As side of stair – **42"**

**4" ball – maximum opening, (6" max opening at triangle
formed by tread and riser)**

Code Requirements

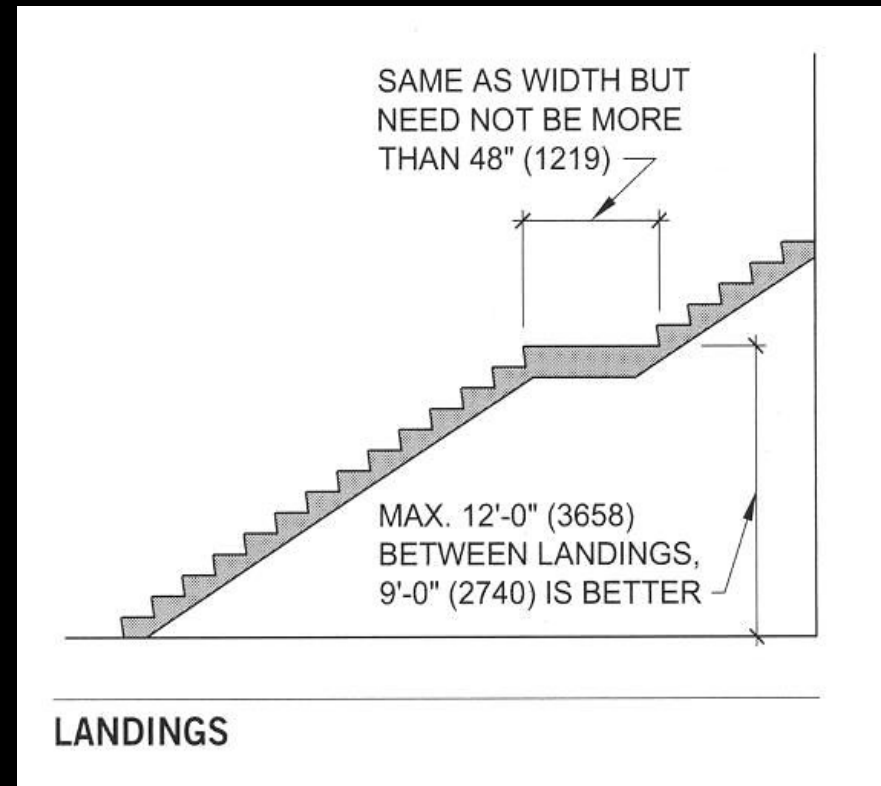
Landings

must be provided at the **top and bottom** – must not be less than the width of the stair

Need not be more than **48"**

if straight run

Landing every 12' vertical



Ballast, D. K. (2013)

Code Requirements

Tread and riser formula

$$**2 \times \text{riser} + \text{tread} = 24'' \text{ to } 25''**$$

Design and Construction

Calculations

$$2R + T = 25 \text{ (original 24-25, now may increase to 26)}$$

Risers:

Determine **total rise – in inches**

Divide by **7** (maximum riser height) to determine total number of risers

If this is not a round number **then add one riser** (so you will not end up with risers greater than 7")

Divide this number into the total rise to determine the **actual riser height**

Tread – Run:

Determine number of treads – will be **one less than Number of risers – because????**

Multiply Number of treads by the desired tread dimension to determine total run (**11 “ minimum tread**)

Example (straight run):

Total rise: 15'

$15' \times 12'' = 180''$

$180'' / 7'' = 25.7$ risers, so there will be 26 risers

$180'' / 26 = 6.92''$ riser height

of treads = 25 (why?)

Total run = 11'' (minimum tread) \times 25 = 275''

$275'' / 12 = 22.9'$

$22' \times 12 = 264''$

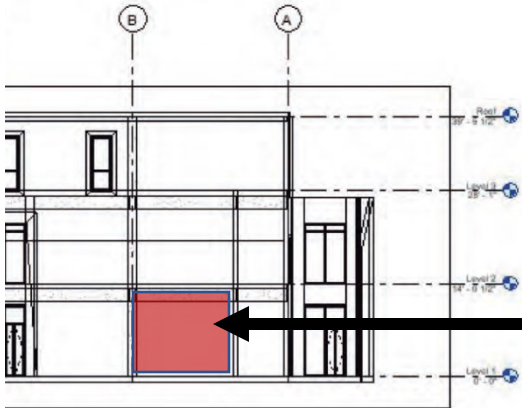
$275'' - 264' = 11''$

So, total run = 22'11''

Is this correct??

Calculations

4100 NE 2nd Avenue



Make sure you design your stairs within
These volumes so they do not interfere with the
beams or columns.

Make beams visible and create a section view to rectify the design

Let's make the calculation

Floor to floor range 14' convert to inches

$14' \times 12'' = 168''$

$168'' / 7''$ (maximum raiser for commercial spaces) = **24 raisers**

Stairs over 12' - must have a 48" landing at 9' (preferably)

If your stair is not landing properly the raisers might be higher than it needs to be
Commercial:

- 4" minimum
- 7" maximum