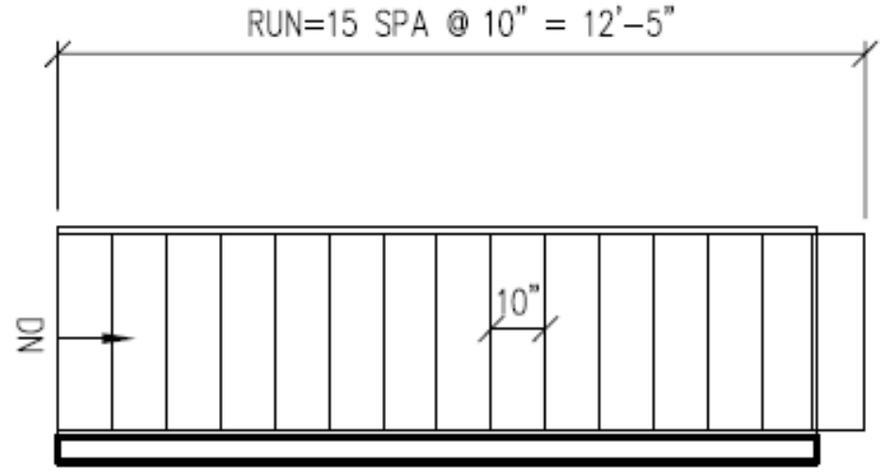
WELCOME TO: ARCH 2331

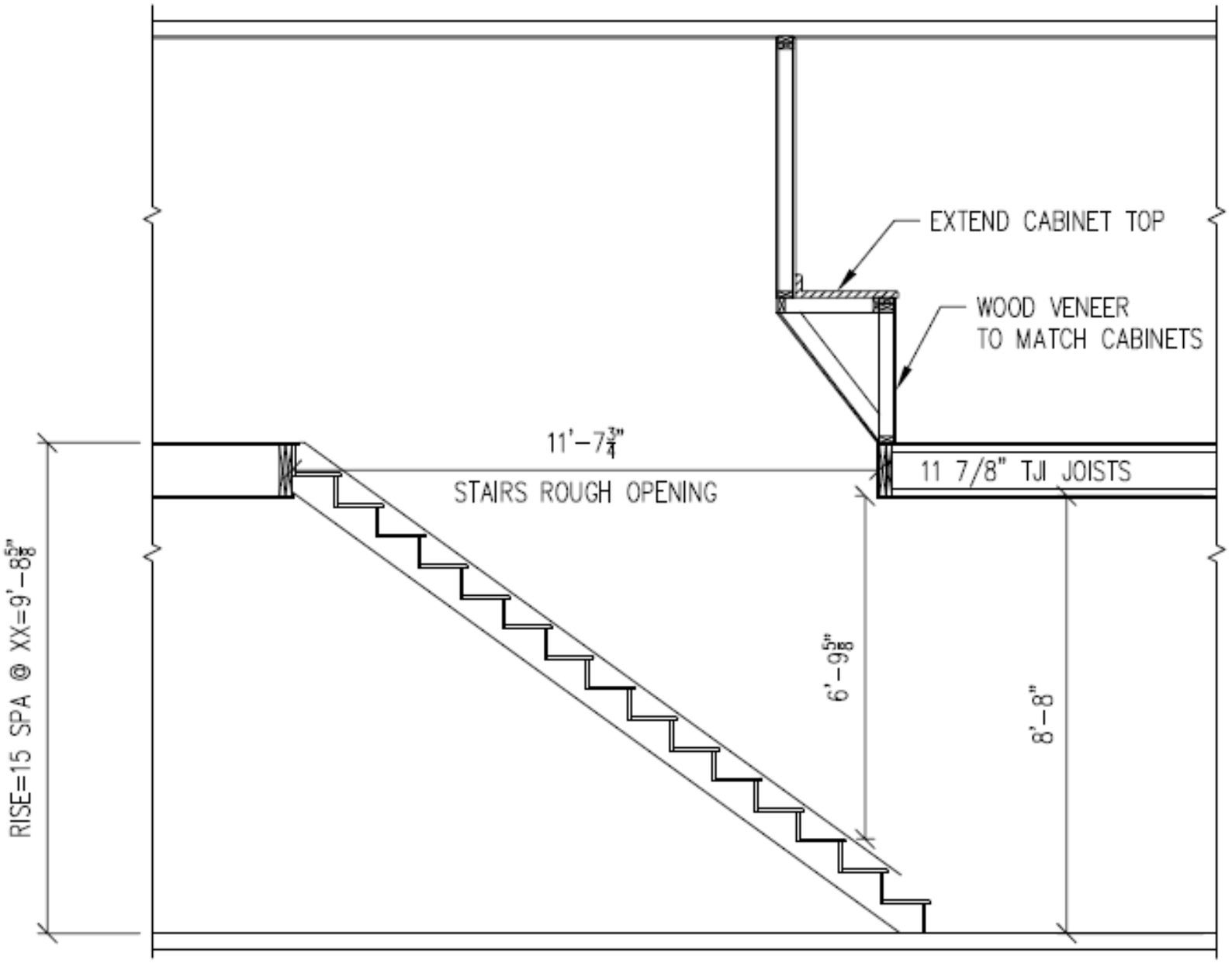
BUILDING TECHNOLOGY II

stairways

Fuksas Staircase Armani 5 Av.

Armani Fifth Ave. / Massimiliano & Doriana Fuksas" 08 Mar 2009. ArchDaily. Accessed 27 Oct 2016. <http://www.archdaily.com/16094/armani-fifth-ave/>

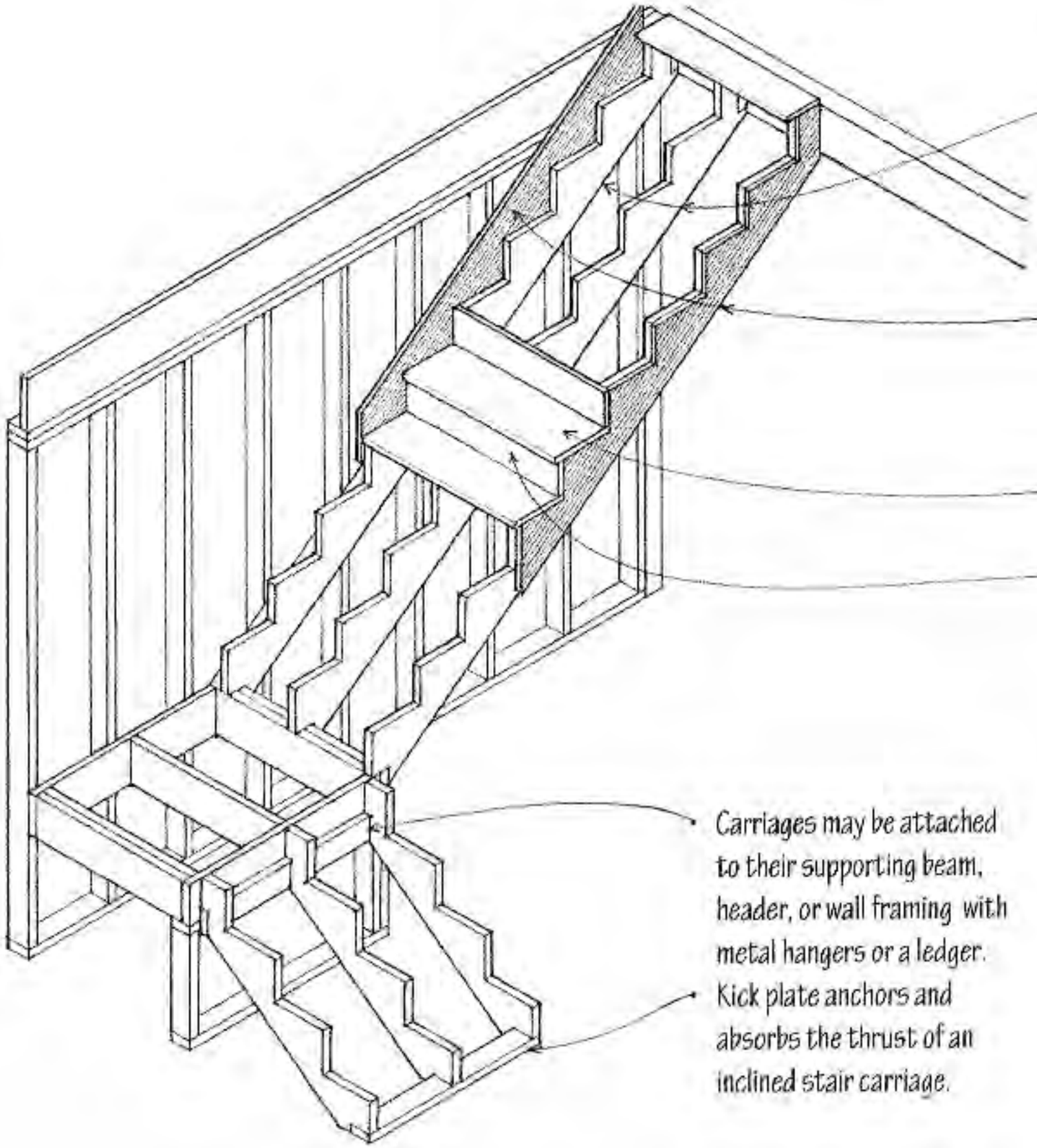




HABITAT FOR HUMANITY
BERTHOUD, COLORADO

STAIR SECTION

SCALE: 1/4" = 1'-0"



A wood stair is constructed of the following elements:

Carriages or rough stringers are the principal inclined beams supporting the treads and risers of a flight of stairs. The number and spacing of carriages required for a stairway depend on the spanning capability of the tread material.

Stringers are the sloping finish members running alongside a staircase, against which the risers and treads terminate.

Treads are the footways that span the distance between the supporting carriages.

Risers are the vertical boards that close off the stair space and help make the construction rigid; some stairs have no risers.

Carriages may be attached to their supporting beam, header, or wall framing with metal hangers or a ledger.

Kick plate anchors and absorbs the thrust of an inclined stair carriage.

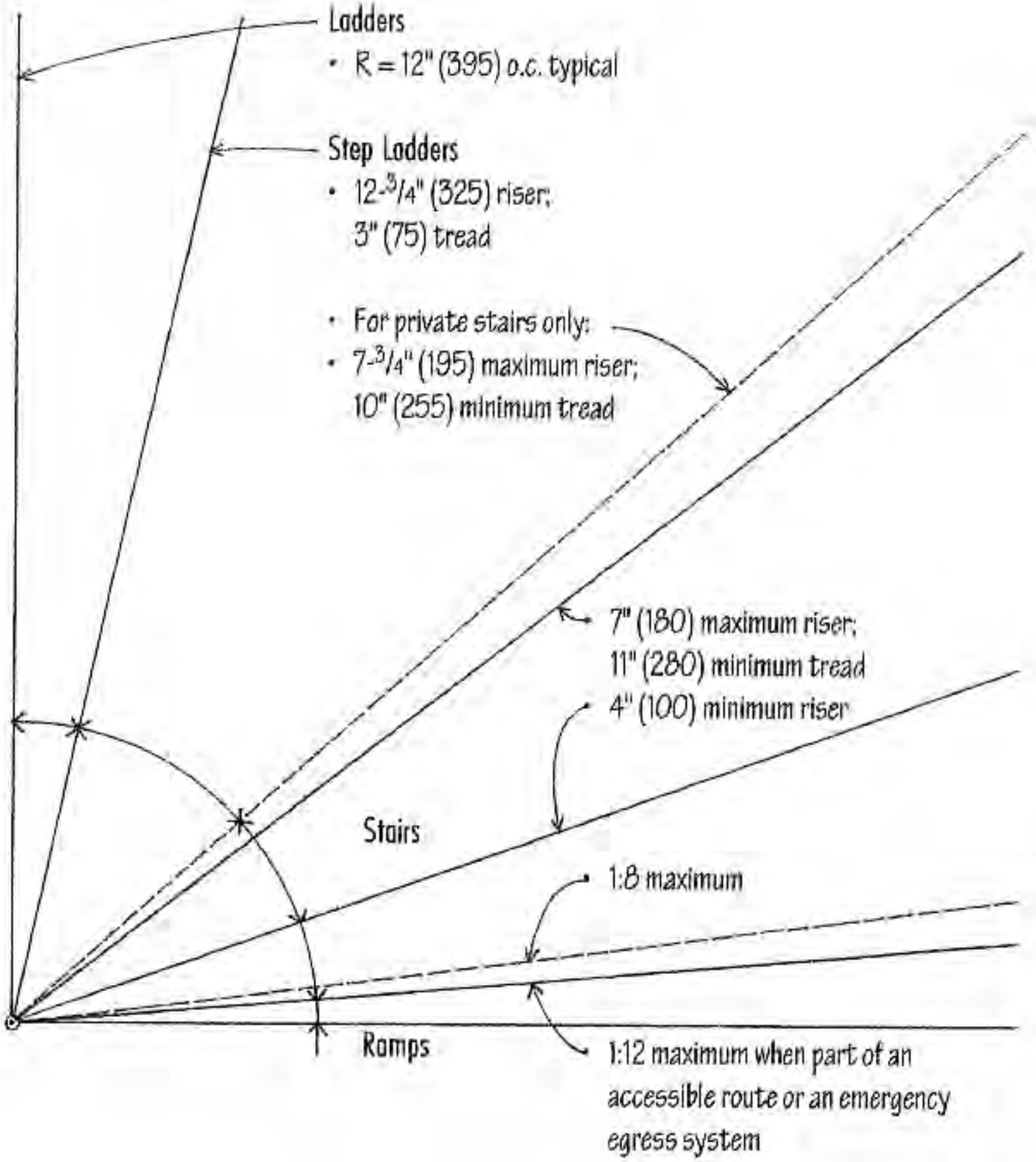
The dimensions of risers and treads in a stairway should be proportioned to accommodate our body movement. Their pitch, if steep, can make ascent physically tiring as well as psychologically forbidding, and can make descent precarious. If the pitch of a stairway is shallow, its treads should be deep enough to fit our stride.

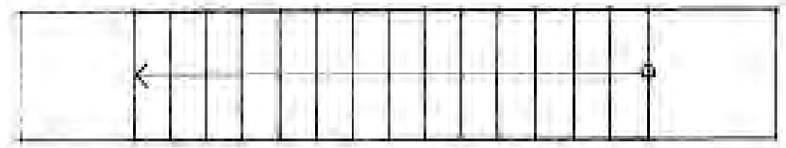
Building codes regulate the minimum and maximum dimensions of risers and treads; see 9.04–9.05. For comfort, the riser and tread dimensions can be proportioned according to either of the following formulas:

- Tread (inches) + 2x riser (inches) = 24 to 25
- Riser (inches) x tread (inches) = 72 to 75

Exterior stairs are generally not as steep as interior stairs, especially where dangerous conditions such as snow and ice exist. The proportioning formula can therefore be adjusted to yield a sum of 26.

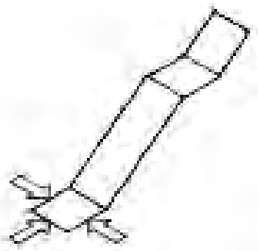
For safety, all risers in a flight of stairs should be the same rise and all treads should have the same run. Building codes limit the allowable variation in riser height or tread run to 3/8" (9.5 mm). Consult the building code to verify the dimensional guidelines outlined on this and the following page.

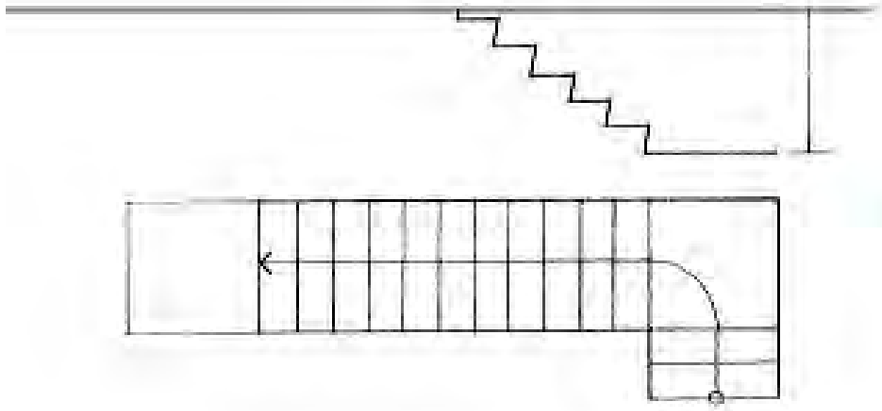




Straight-Run Stair

- A straight-run stair extends from one level to another without turns or winders.
- Building codes generally limit the vertical rise between landings to 12' (3660).

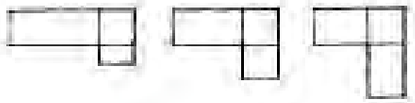


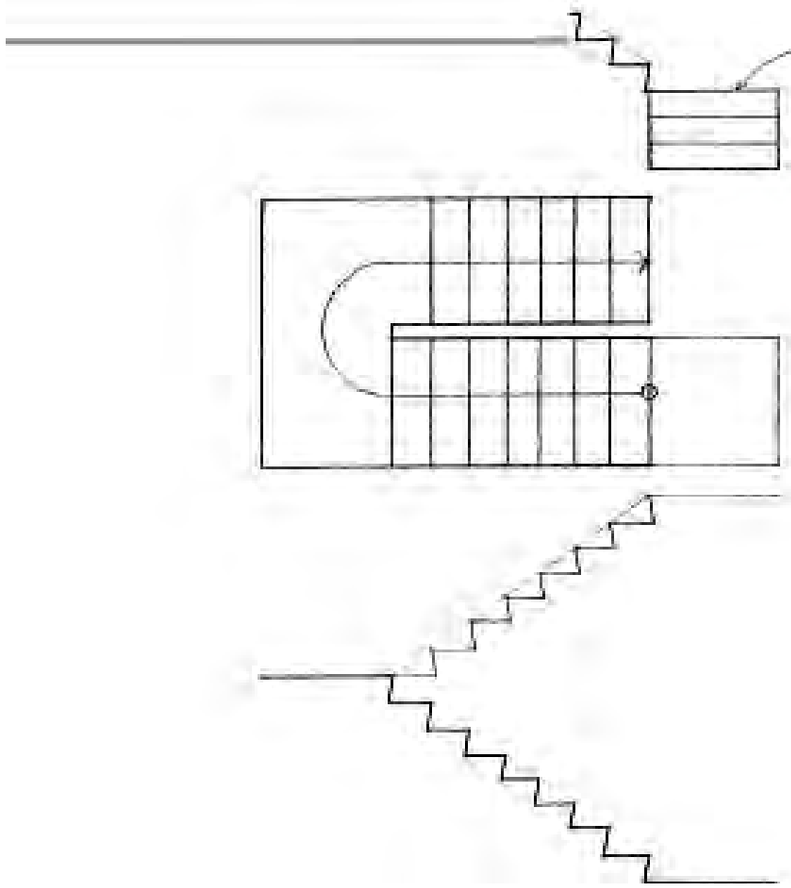


- A stairway may be approached or departed either axially or perpendicular to the stair run

Quarter-Turn Stair

- A quarter turn or L-shaped stair makes a right-angled turn in the path of travel.
- The two flights connected by an intervening landing may be equal or unequal, depending on the desired proportion of the stairway opening.

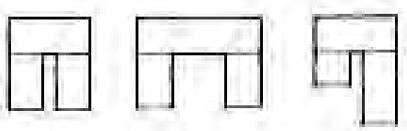


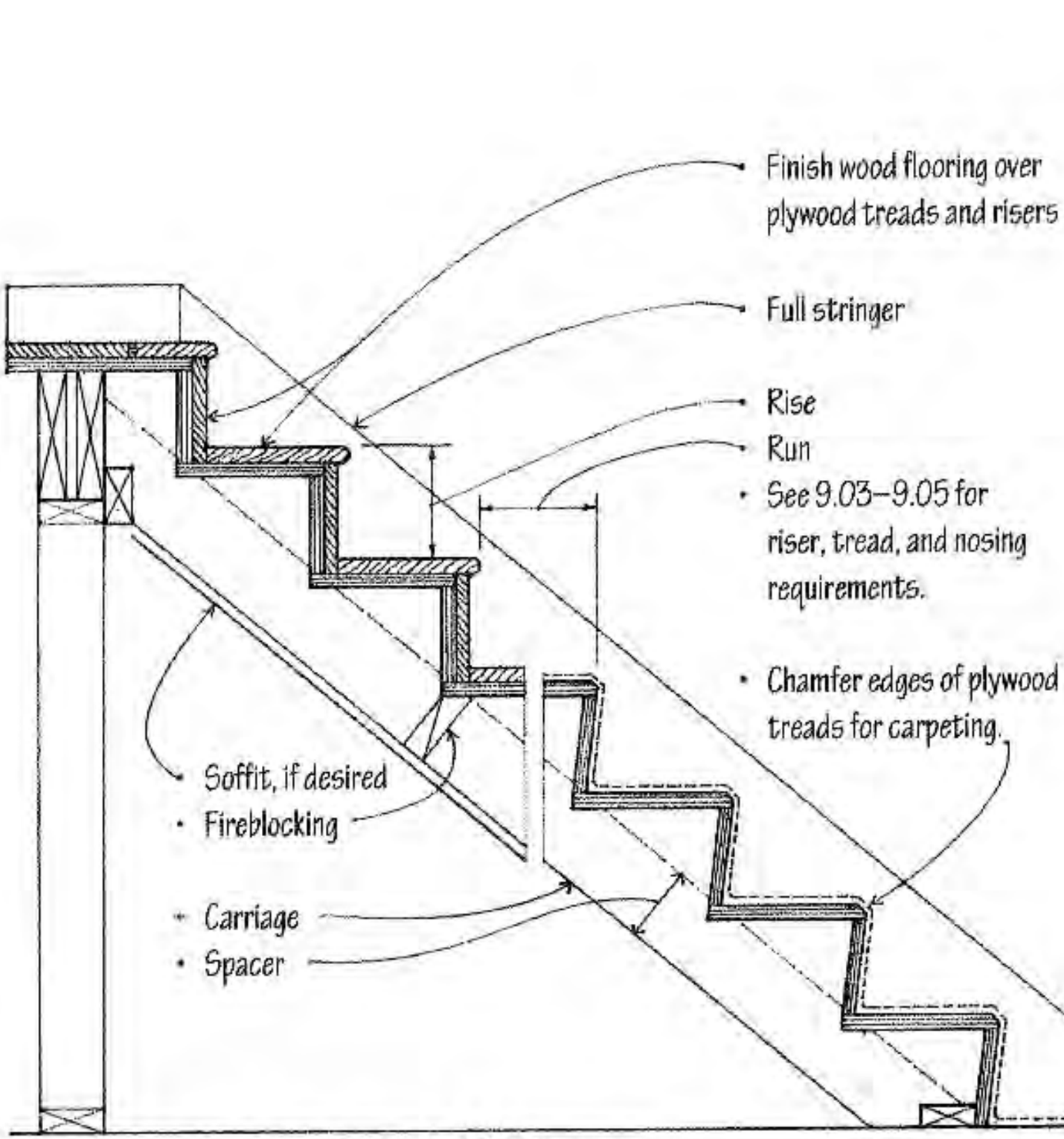


- Landings that are below normal eye level and provide a place to rest or pause are inviting.

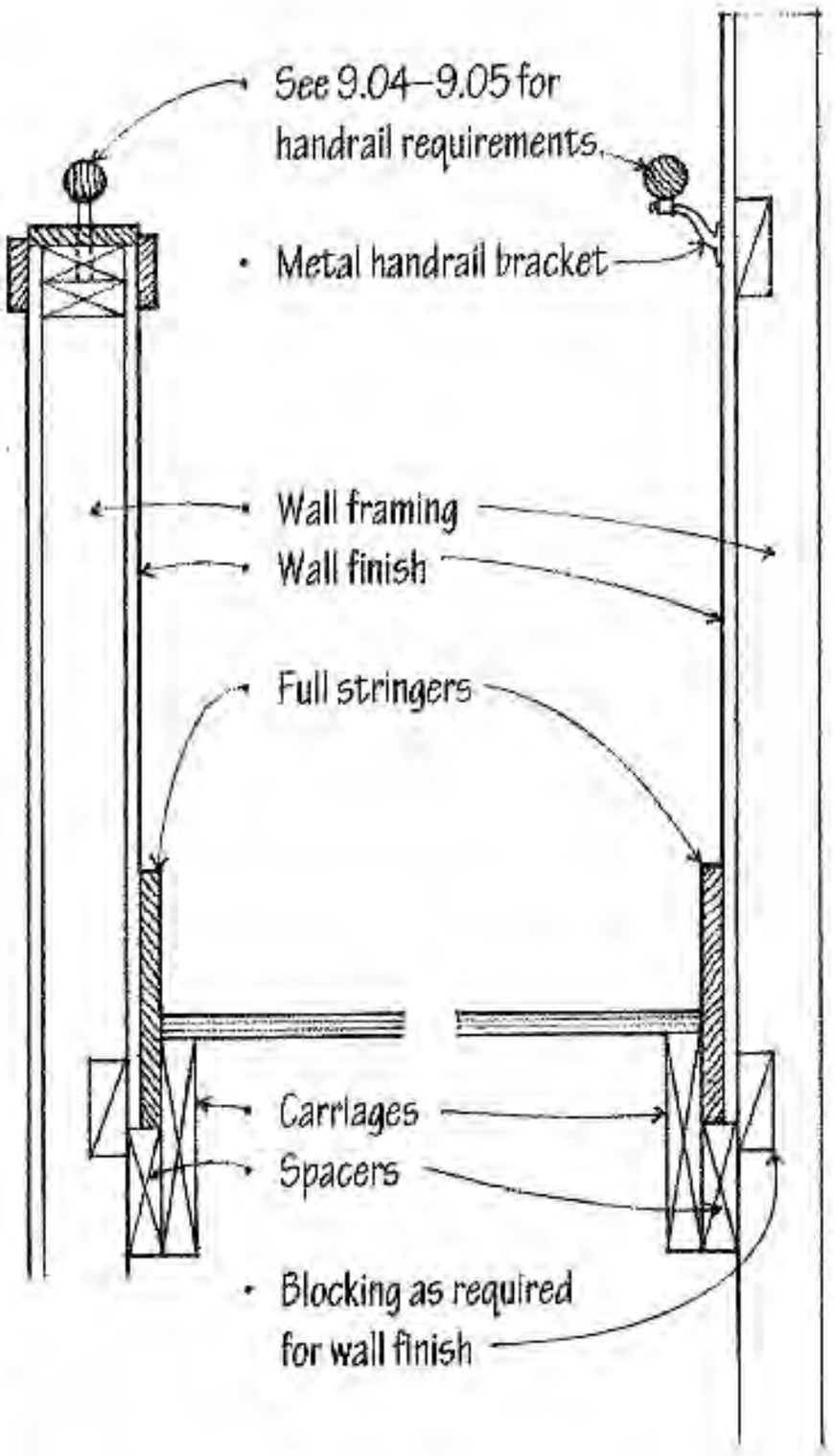
Half-Turn Stair

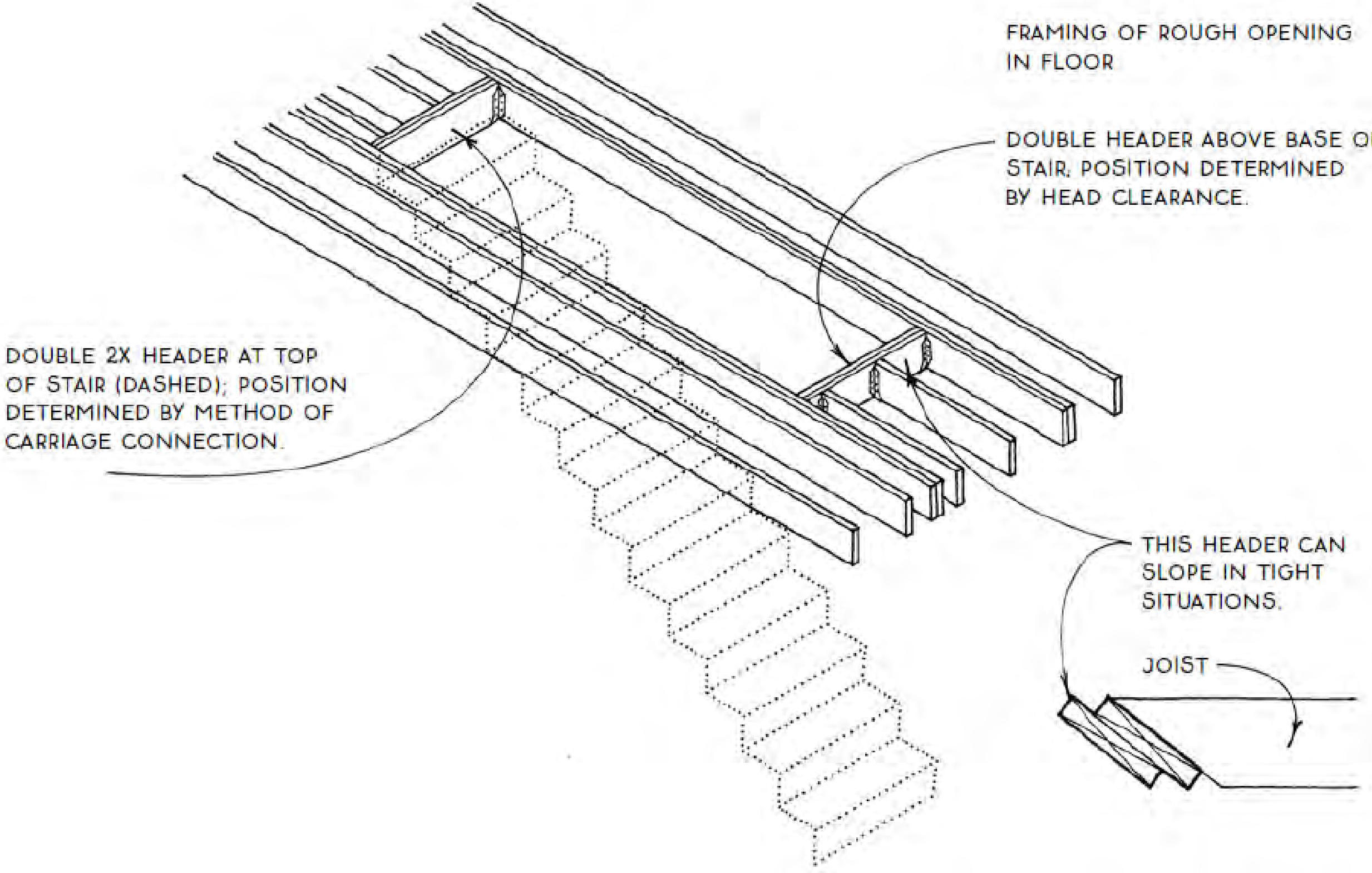
- A half-turn stair turns 180° or through two right angles at an intervening landing.
- A half-return stair is more compact than a single straight-run stair.
- The two flights connected by the landing may be equal or unequal, depending on the desired proportion of the stairway opening.



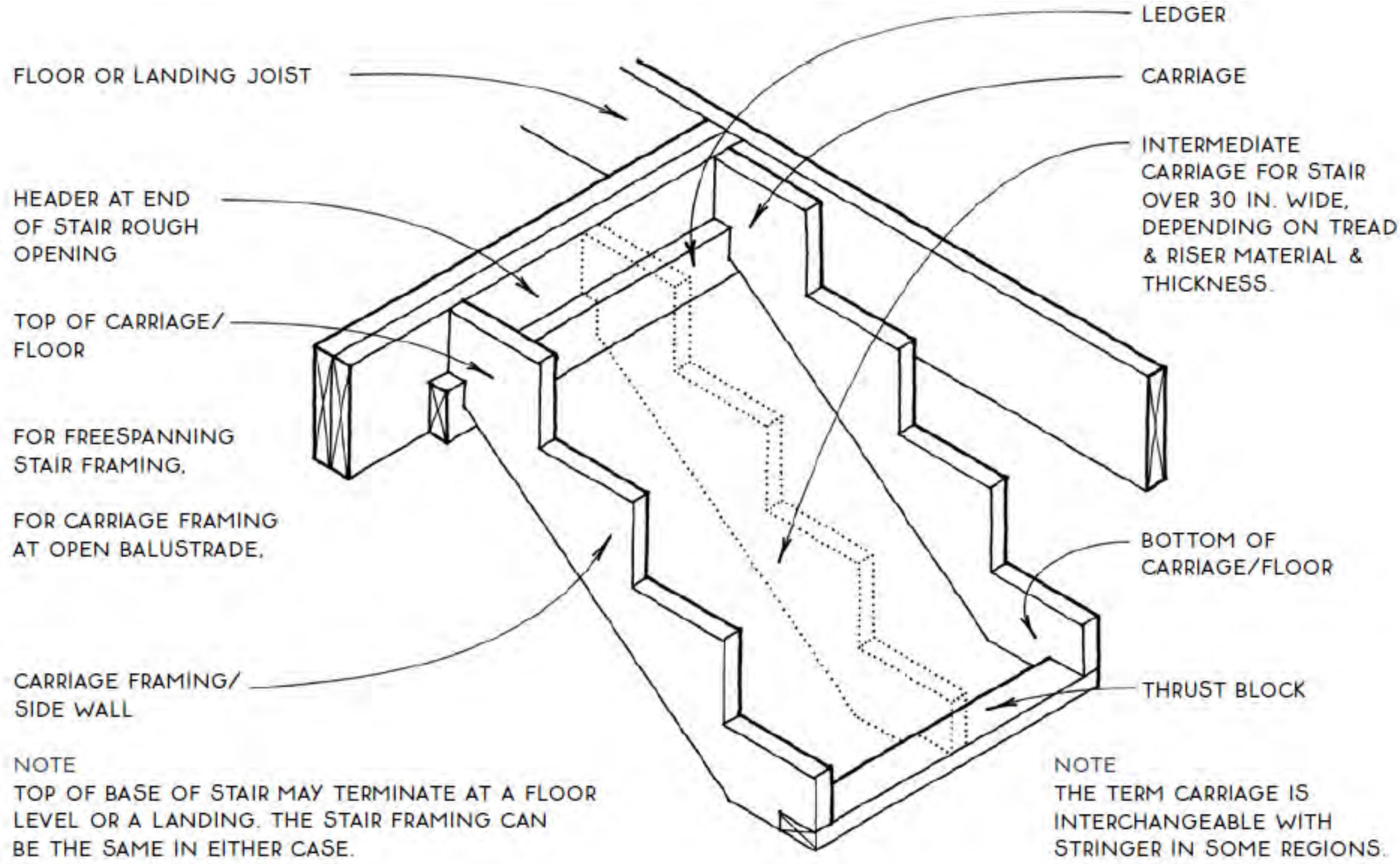


Closed-Riser Stair with Full Stringer




FRAMING OF ROUGH OPENING IN FLOOR
DOUBLE HEADER ABOVE BASE OF STAIR, POSITION DETERMINED BY HEAD CLEARANCE.
DOUBLE 2X HEADER AT TOP OF STAIR (DASHED); POSITION DETERMINED BY METHOD OF CARRIAGE CONNECTION.
THIS HEADER CAN SLOPE IN TIGHT SITUATIONS.
JOIST

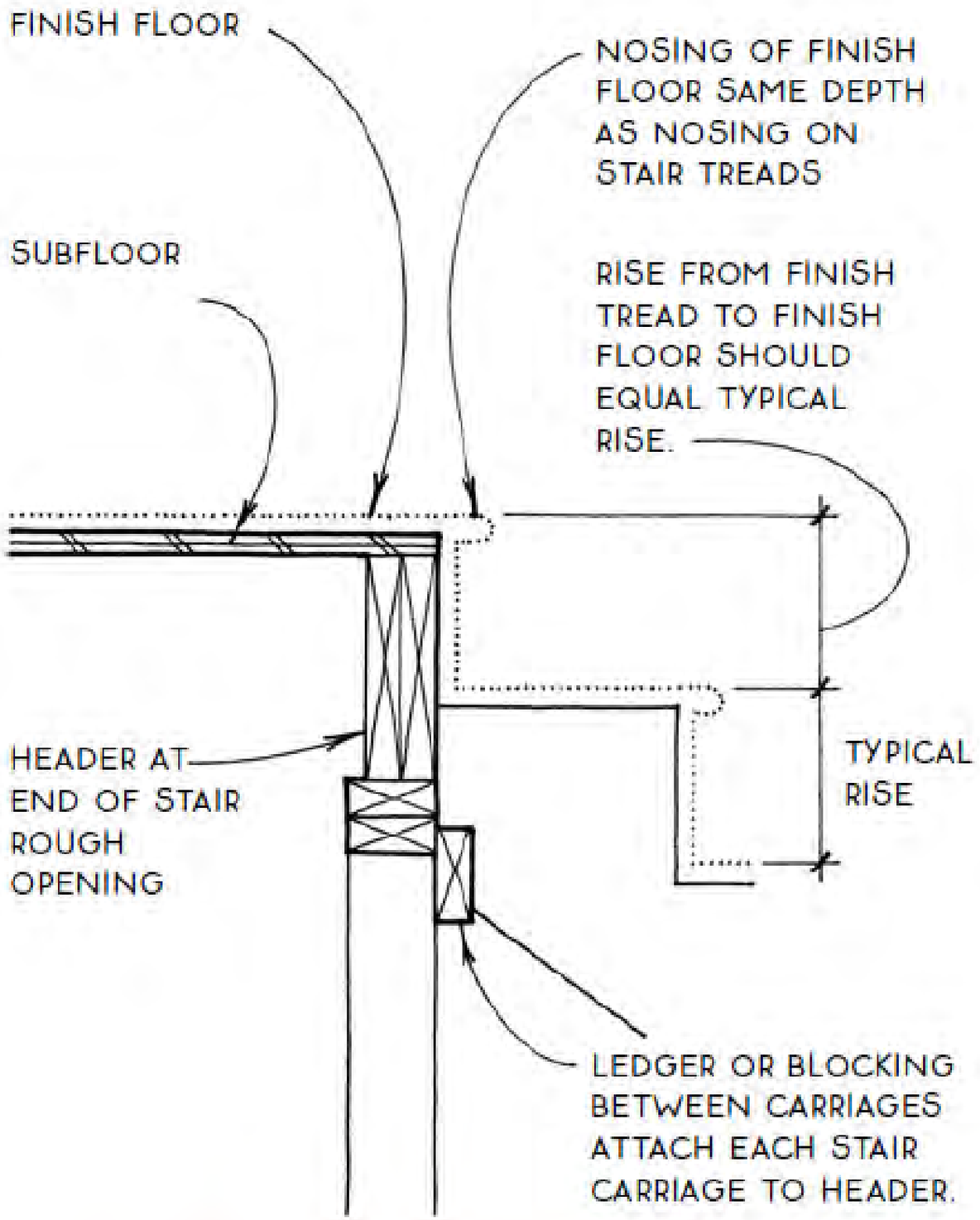
Rob Thalon



NOTE
TOP OF BASE OF STAIR MAY TERMINATE AT A FLOOR LEVEL OR A LANDING. THE STAIR FRAMING CAN BE THE SAME IN EITHER CASE.

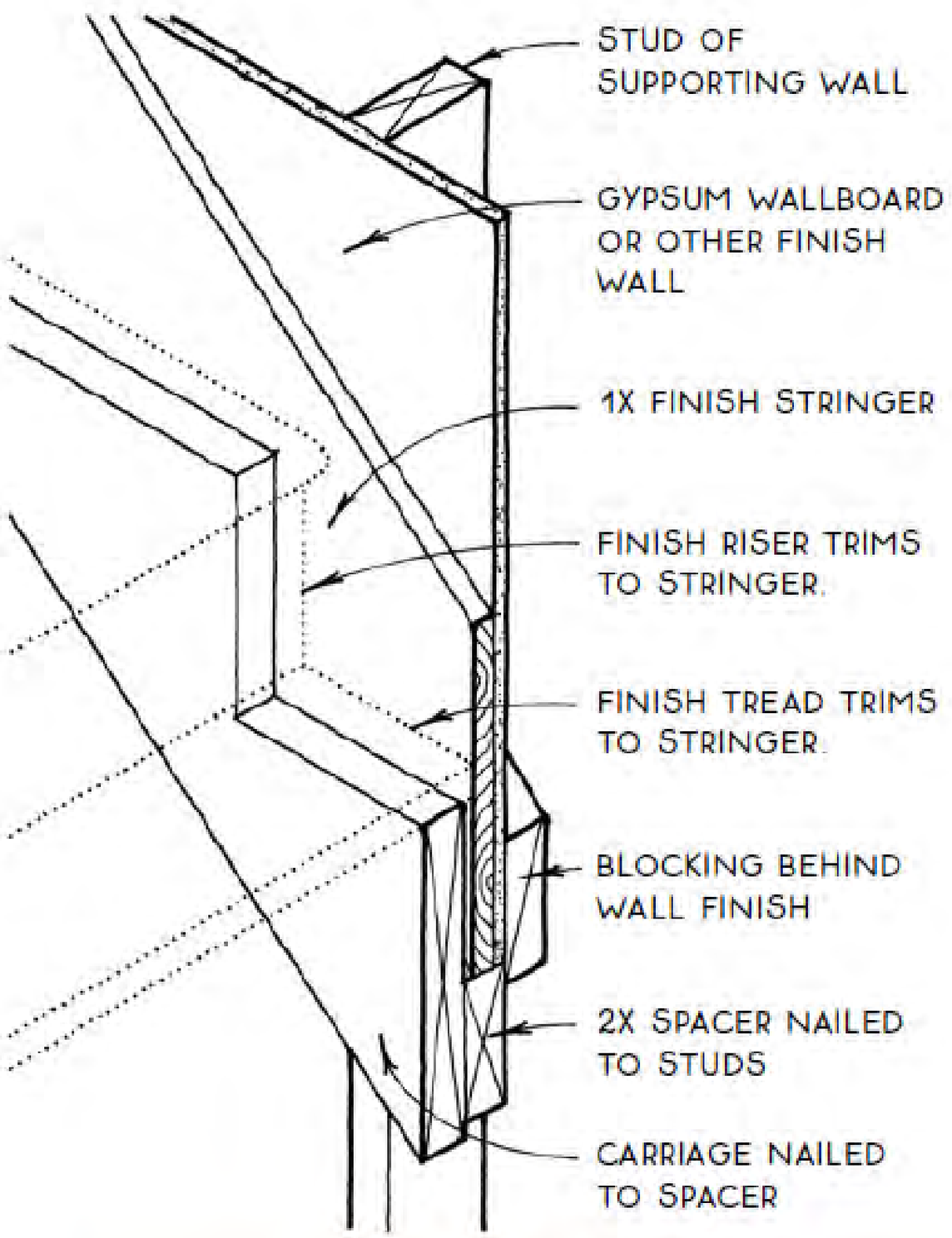
NOTE
THE TERM CARRIAGE IS INTERCHANGEABLE WITH STRINGER IN SOME REGIONS.

Rob Thalon



TOP OF CARRIAGE/FLOOR

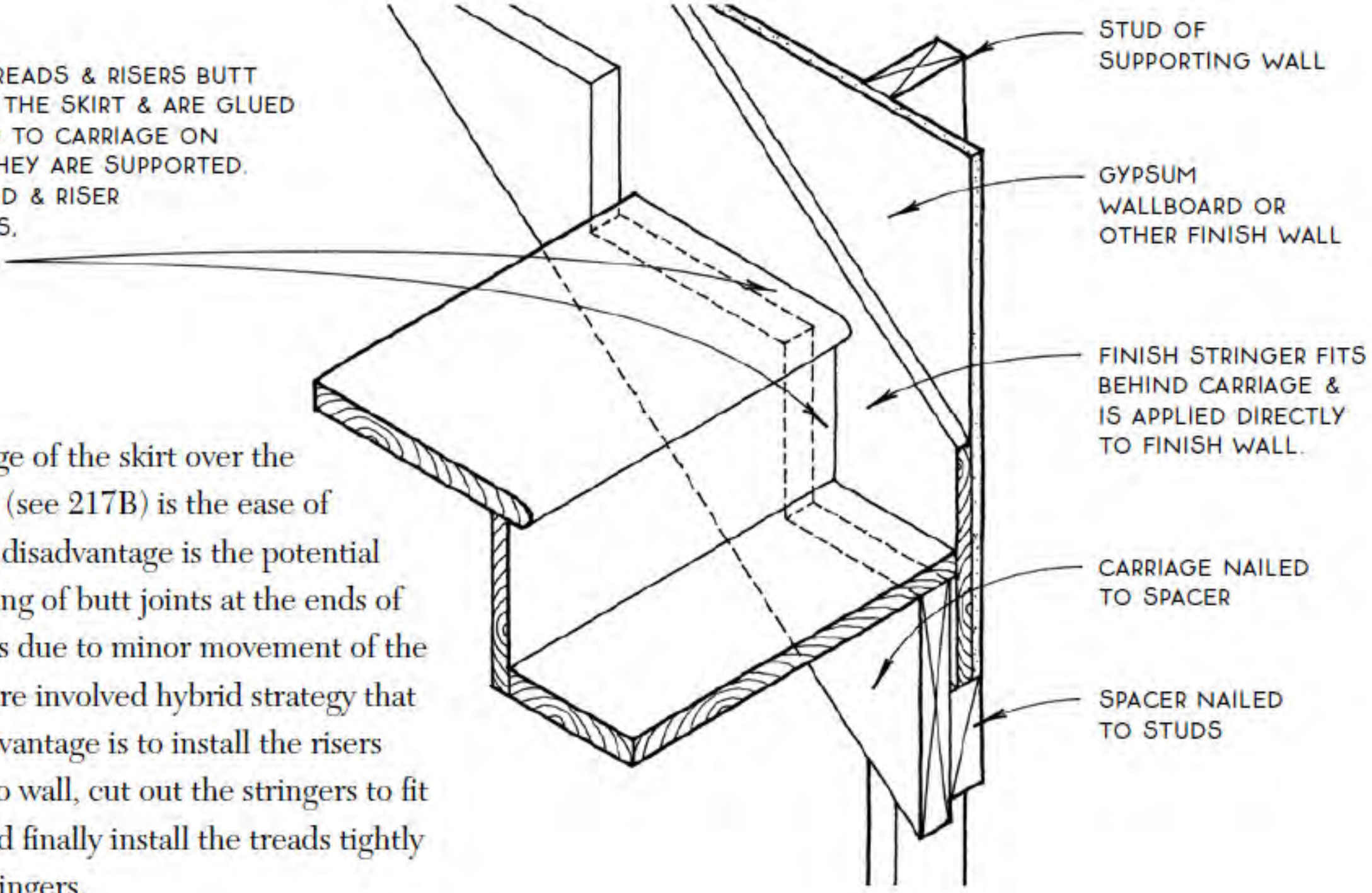
Wall Supports Top of Stair



CARRIAGE FRAMING/SIDE WALL

Continuously Supported Stair

Rob Thalon

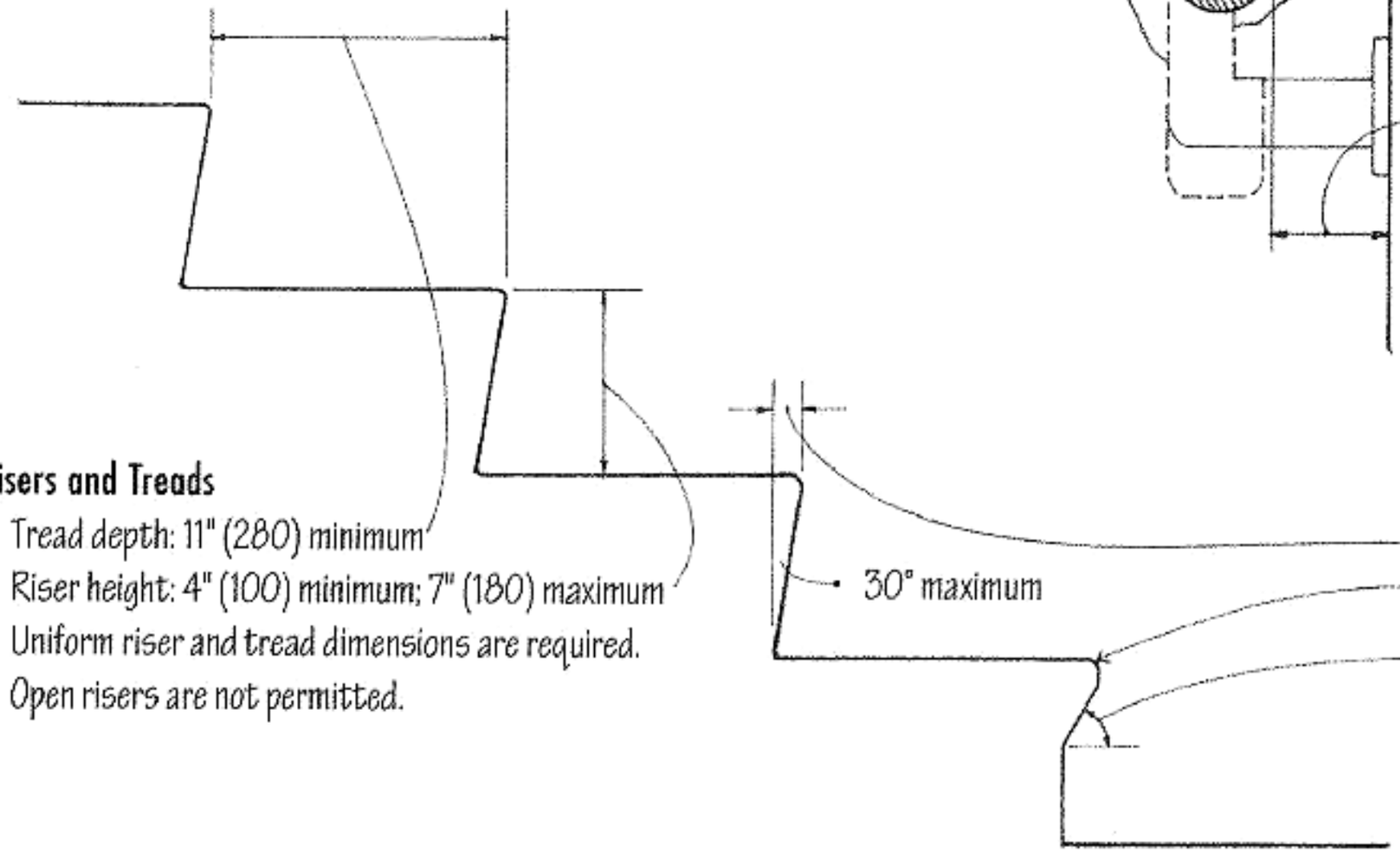


The advantage of the skirt over the housed stringer (see 217B) is the ease of construction. A disadvantage is the potential for minor opening of butt joints at the ends of treads and risers due to minor movement of the structure. A more involved hybrid strategy that limits this disadvantage is to install the risers first from wall to wall, cut out the stringers to fit to the risers, and finally install the treads tightly between the stringers.

FINISH STRINGER (SKIRT) AT FINISH WALL

ADA Accessibility Guidelines

Accessible stairs should also serve as a means of egress during an emergency, or lead to an accessible area of refuge where people who are unable to use stairs may remain temporarily in safety to await assistance during an emergency evacuation.



Risers and Treads

- Tread depth: 11" (280) minimum
- Riser height: 4" (100) minimum; 7" (180) maximum
- Uniform riser and tread dimensions are required.
- Open risers are not permitted.

Handrails

Handrails should be free of sharp or abrasive elements and have a circular cross section with an outside diameter of 1-¼" (32) minimum and 2" (51) maximum; other shapes are allowable if they provide equivalent graspability and have a maximum cross-sectional dimension of 2-¼" (57).

1-½" (38) minimum clearance between handrail and wall

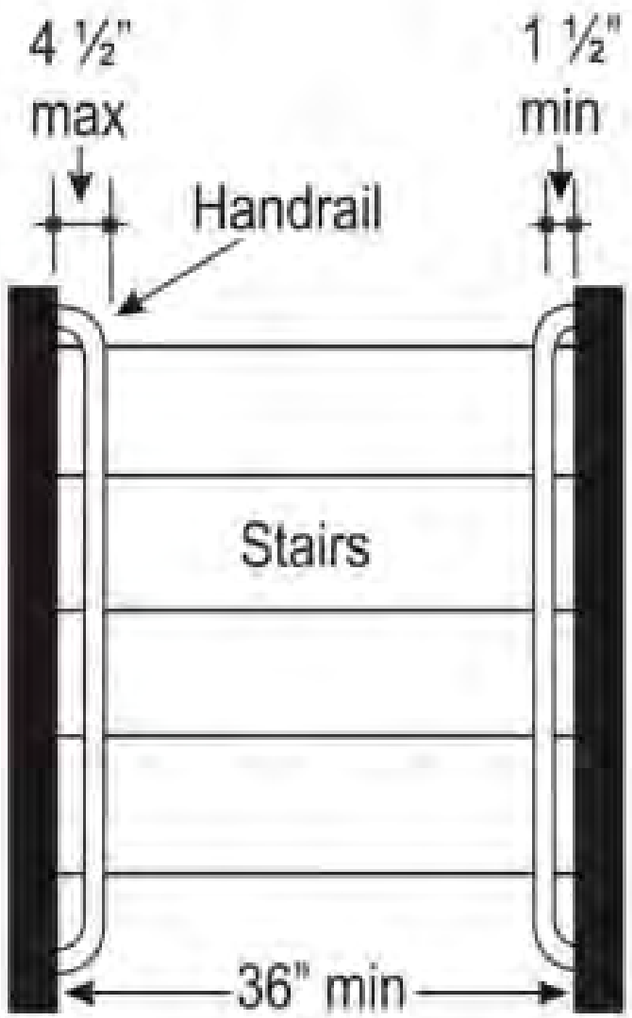
Nosings

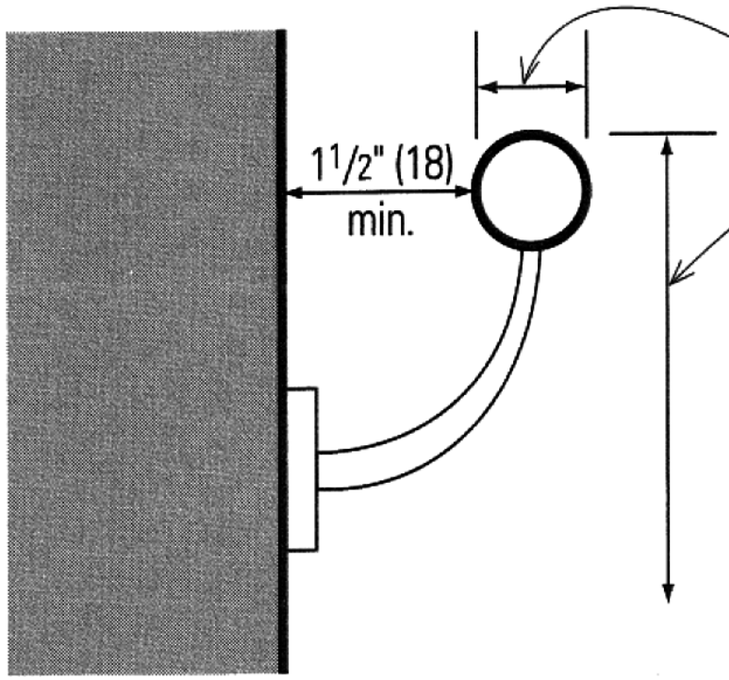
1-½" (38) maximum protrusion

½" (13) maximum radius

Risers should be sloped or the undersides of the nosings should have a 60° angle minimum from the horizontal.

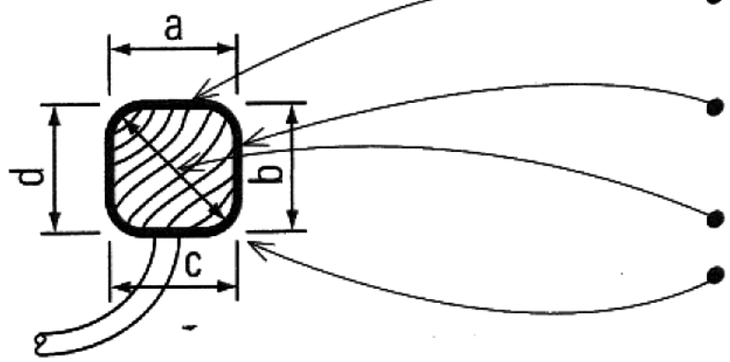
The rail is to have a handgrip clearance of 1½" (38) between adjacent walls and the handrail. Stair handrails are a safety feature for stairs, allowing occupants to maintain stability in using them. Therefore the handrails are to be graspable. Various configurations are allowed, divided into regular-shaped Type I rails, and irregular-shaped Type II rails.





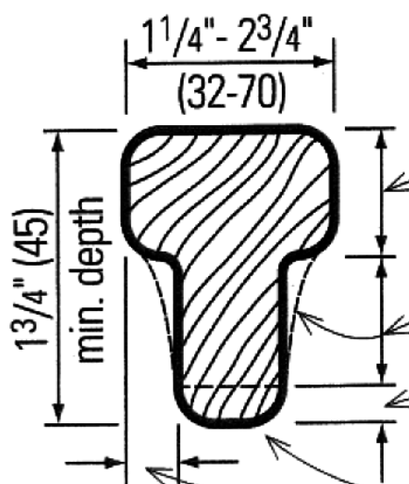
Type I circular rail

- *1¼" to 2" (32 to 51) diameter*
- *34" to 38" (864–965) handrail height above nose of tread*



Type I Non-circular handrail

- *4" (102) minimum perimeter dimension (a + b + c + d)*
- *6¼" (160) maximum perimeter dimension (a + b + c + d)*
- *2¼" (57) maximum diagonal dimension*
- *Minimum radius of 0.01" (0.25)*

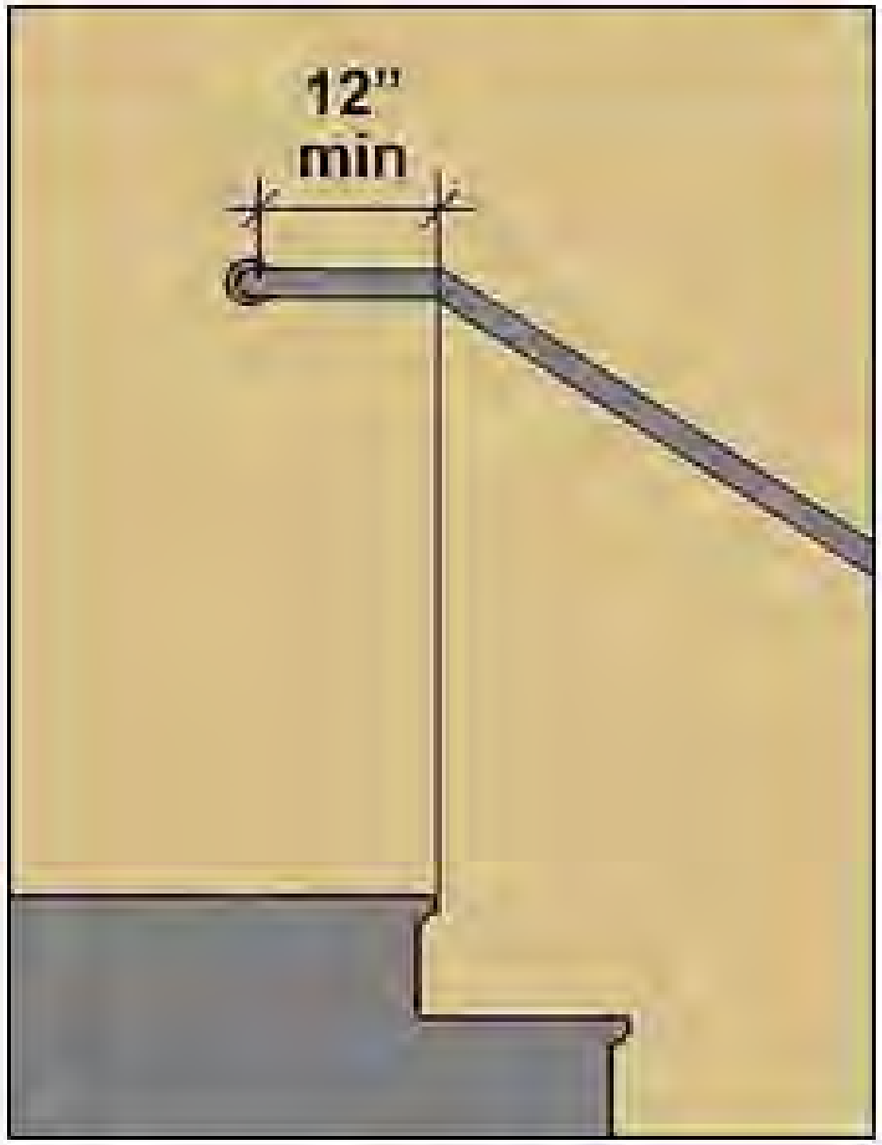


Type II Non-circular handrail

[handrail perimeter > 6¼" (160)]

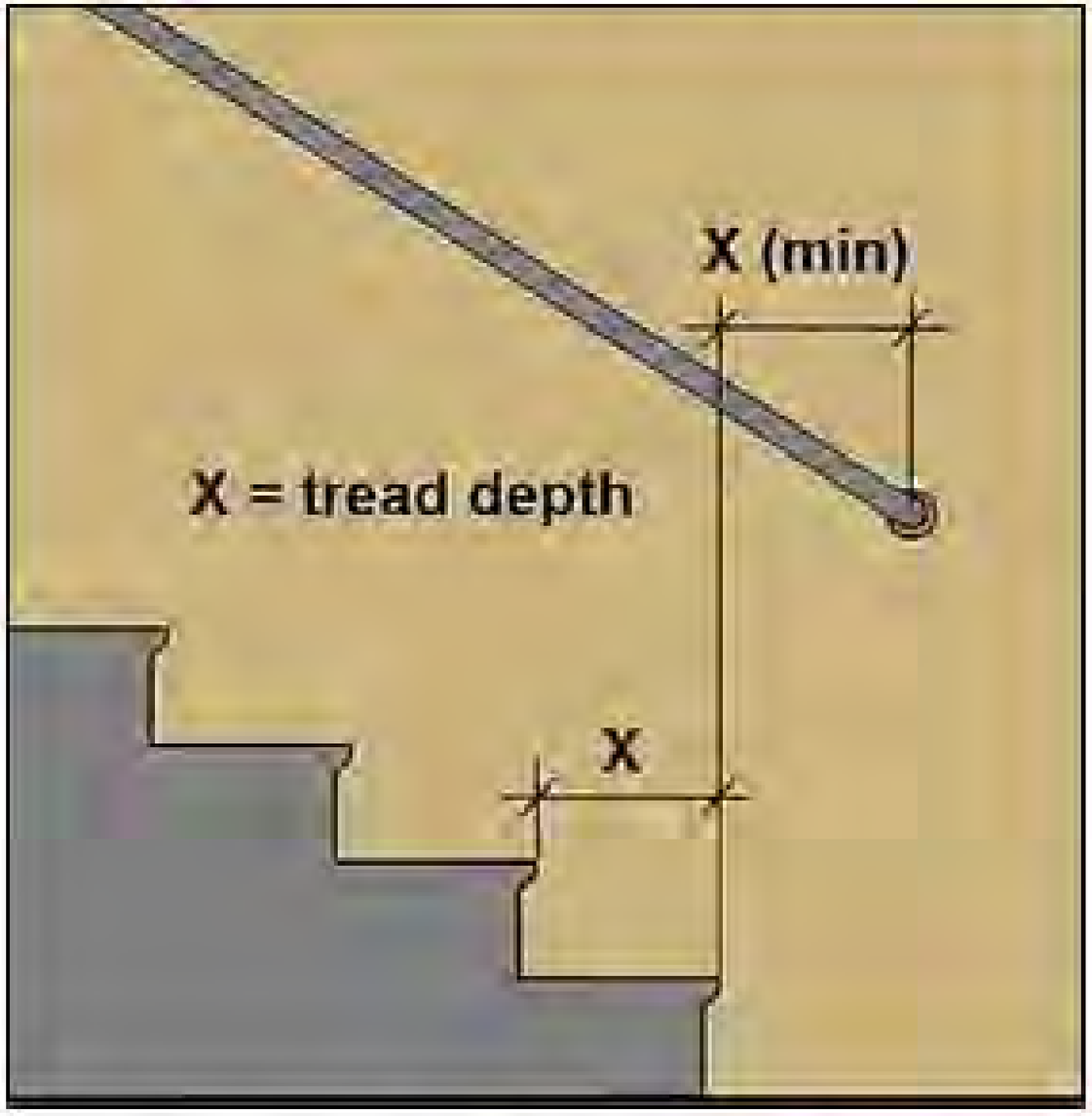
- *¾" (19) maximum to top of finer recess from top of rail*
- *⅞" (22) maximum distance to achieve finger recess depth*
- *⅜" (10) minimum vertical extension below finger recess*
- *0.01" (0.25) minimum radius*
- *5⁄16" (8) graspable finger recess [both sides]*

Top Handrail Extension



Handrails at the top of stairways must extend 12" minimum horizontally above the landing beginning directly above the first riser nosing or be continuous to the handrail of an adjacent stair flight (§505.10.2).

Bottom Handrail Extension



Handrails at the bottom must extend beyond the last riser nosing at the slope of the stair flight for a distance at least equal to one tread depth or be continuous to the handrail of an adjacent stair flight protruding objects.

https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/guide-to-the-ada-standards/chapter-5-stairways