

Collar and rafter ties

BY DEBRA JUDGE SILBER

Builders have been installing collar ties for years, and for years, space-starved homeowners have been asking to have them removed. The proper thing to do, of course, hinges on knowing why they're there in the first place.

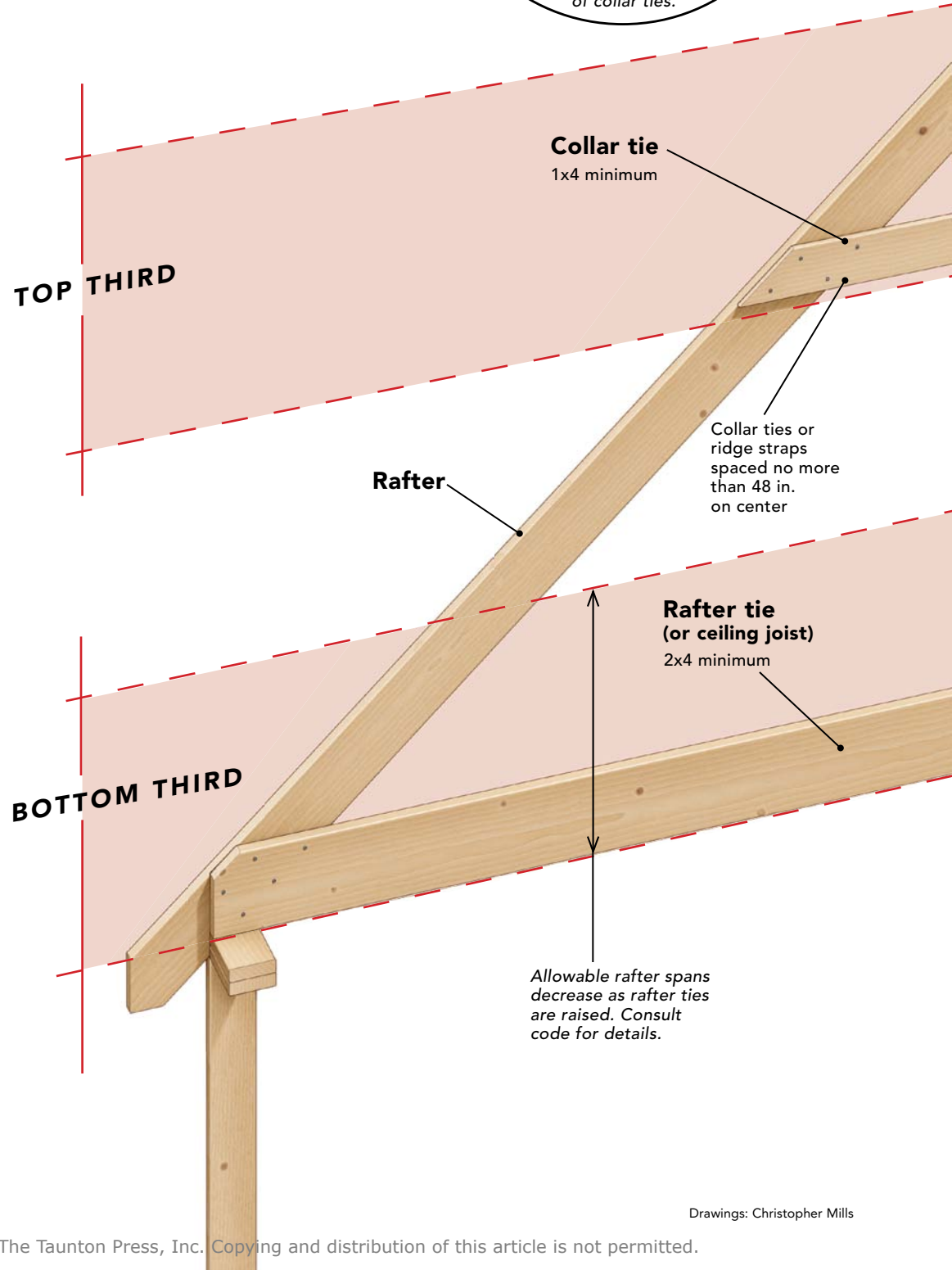
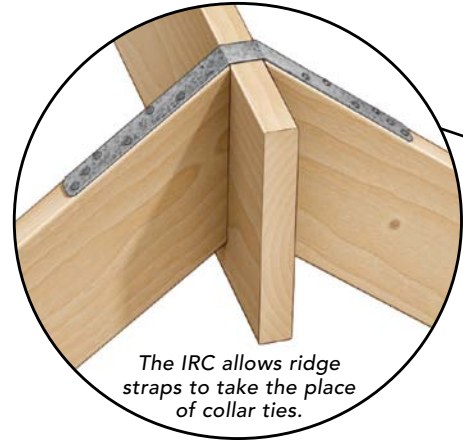
Contrary to popular belief, collar ties are not there to support rafters or to keep walls below from spreading under the weight of the roof. That's the job of the rafter ties or the ceiling joists.

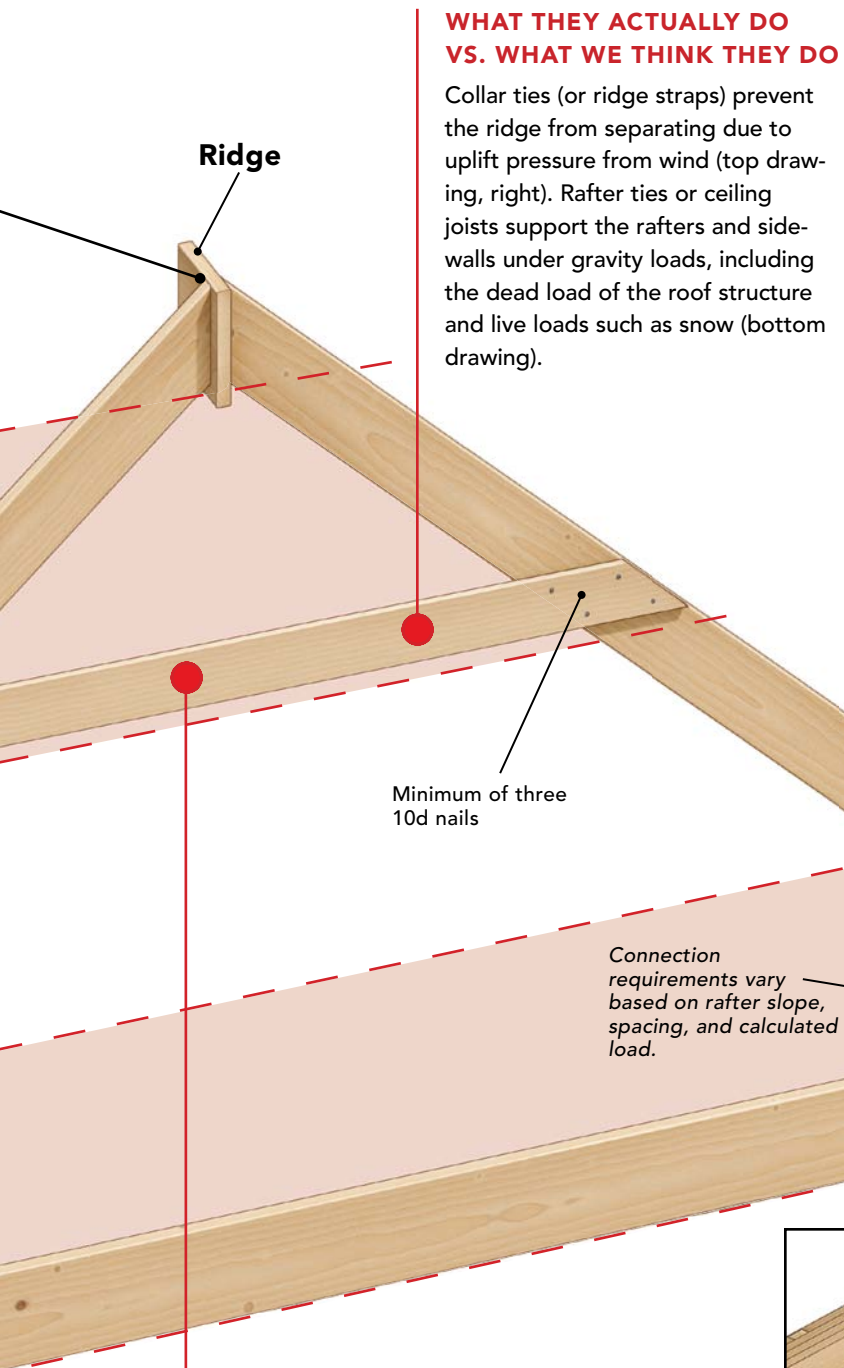
Located in the bottom third of the roof structure, rafter ties effectively resist the horizontal forces caused by gravity loads that would otherwise cause the roof to pancake, pushing the sidewalls out. Rafter ties (or ceiling joists acting as rafter ties) are required by code unless the house is designed so that the walls or a structural ridge beam carries the full load of the roof.

Installed in the top third of the roof structure, collar ties prevent separation of the roof at the ridge due to wind uplift.

Here's how collar ties and rafter ties work.

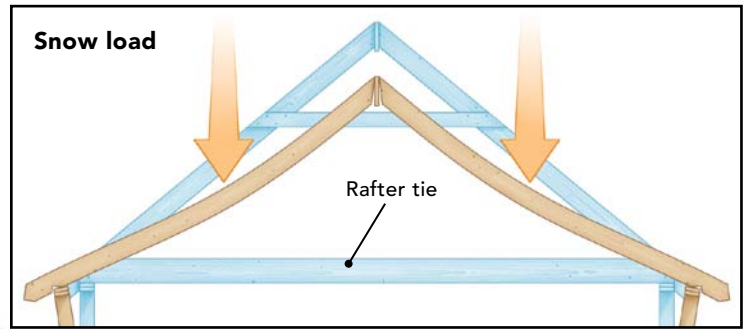
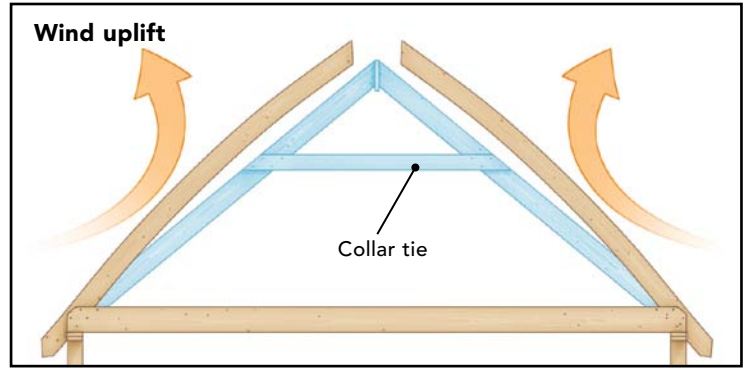
Debra Judge Silber is managing editor.





WHAT THEY ACTUALLY DO VS. WHAT WE THINK THEY DO

Collar ties (or ridge straps) prevent the ridge from separating due to uplift pressure from wind (top drawing, right). Rafter ties or ceiling joists support the rafters and side-walls under gravity loads, including the dead load of the roof structure and live loads such as snow (bottom drawing).



Minimum of three 10d nails

Connection requirements vary based on rafter slope, spacing, and calculated load.

DO WE EVEN NEED COLLAR TIES?

Theoretically, no—if rafters are correctly sized and properly joined by rafter ties, and if other means to resist uplift, such as ridge straps, are present. Some engineers theorize that collar ties may minimize deflection of undersize rafters, particularly under heavy loads, such as snow. In this scenario, the load on one side is partially transferred to the rafters on the other side across the collar ties. If rafters are sized correctly, this shouldn't be needed, though it might explain why collar ties have been a part of roof structures for a long time. If you're unsure of whether you can safely remove collar ties, consult your local code official or engineer.

