

# Letters

## Ladder-safety expert wants to correct, add info

(Editor's Note: J. Nigel Ellis served as a source for the article, "A safe climb," which appeared on p. 40 in the March issue of Safety+Health.)

**CONCERNING THE LADDER ARTICLE** in the March issue, I would like to make a few corrections and add what I hope are presented as safety tips for users to consider.

The photograph of the ladder on p. 43 reveals that the ladder is set up back to front, which slopes the ladder rungs in a forward direction, making a slip forward and between the rungs a possibility with an undesired result of falling through the ladder or backward. Also, the portable ladder is much too long for its application for a height approximately half the length of the ladder.

On p. 40, the use of a stand-off is applauded to reduce gutter damage and rain water overflow.

In Step 10, the major correction is that all ladders must be held by rounded horizontal rungs. Side rails of vertical ladders should never be held because while they provide a continuous handhold (static), the hand will slide if a fall occurs (dynamic). Refer to the Ph.D. thesis of Justin Young, University of Michigan 2011, at [www.fallsafety.com](http://www.fallsafety.com) under "ladder improvements." The exception: a sloped ship's ladder such as the LaPeyre Ladder.

All grab bars should be horizontal (exception: vertical grab bars up to 6 inches in length). Examples of practices with horizontal grab bars are found at [www.fallsafety.com](http://www.fallsafety.com) under "ladder

improvements." LePeyre ladders offer grab bar rails, which must be grabbed and provide an adequate handhold.

Step 16, "Access to Upper Landing," talks about the ladder extending 3 feet above the landing. What is intended here is for the ladder to be extended 3 feet, which includes extension accessories. This complies with an OSHA interpretation dated Dec. 22, 2005, permitting the extension principle with an accessory in lieu of the ladder itself. This has the advantage of allowing walk-through without disturbing the ladder handhold and eliminating stepping around the ladder required if the ladder rungs themselves are raised, blocking walk-through. Explaining why the trades frequently do not extend the ladder itself more than a few inches to reach roofs is due to the great shift in center of gravity needed to move from the ladder to the roof, and which is best achieved by walk-through instead of climbing through the rungs with little or no handholds.

Step 11: Three-point control is the engineering term that matches feet and hands to the climbing object (in this case a ladder). Keeping the hands free for climbing is a great principle, but it is not intuitive and must be trained regularly. The possibility of holding side rails effectively, including fixed ladder side rails, has been disproved by Justin Young's thesis. Only rungs should be held on a ladder for effective grip in a dynamic fall.

Note: The uppermost rung of a ladder should be the same height as the step-off point. This will minimize the exposure to the second rung having less than 7 inches of space behind the rung for the workboot to extend into. The climber must also avoid the foot-trap where it is placed in a space where it jams as the foot moves or pivots, tripping the climber and causing catastrophic damage to the climber,

who may fall backward with the foot still trapped.

I would also like to address what happens when you must carry up tools, notepads or instruments and yet climb with nothing in the hands or under the arms. The answer is a backpack, or pull up on a cord, or, for heavy toolboxes, lift by crane or hoist. A system used by one company employs an overhead pulley with a continuous rope to reach the ground and small loops for attaching materials when pulled from above. One caution is to not risk the worker's center of gravity passing over a railing, as material loads get heavier either for lifting or lowering on a large loop through a pulley. Sometimes catching a falling load on a rope has pulled a worker over the railing, with disastrous consequences, or caught fingers in the pulley.

Some construction companies recognize the danger of portable ladder use without constant supervision and have moved to scissor lifts and aerial buckets, which themselves need repeated training but at least provide a steady work surface that a ladder rung cannot.

Extension side rails are the best bet for reducing falls from ladders at transition points.

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## Write to us

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