FIGURE 11.11 All-too-common practice: The interior partition is attached directly to roof purlins without any provision for accommodating vertical deflections. The partition will be forced to behave as a load-bearing wall and could fail when vertical roof load is applied.

11.3 VERTICAL DEFLECTIONS

11.3.1 Provisions of Model Codes

Vertical deflection criteria are less controversial than those for lateral drift: Everybody realizes that the sight of a sagging beam overhead does not make for a happy mood. Apart from such visual impact, uncontrolled vertical deflections can cause damage to interior partitions, windows, and plaster ceilings. Large deflections of low-slope roofs could be dangerous.

Examine the situation shown in Fig. 11.14, where a shallow roof slope ($^1/_4$:12) is insufficient to compensate for the purlin deflection under heavy snow load. The deflection of the first interior purlin caused by snow, and perhaps aggravated by the effects of heavy suspended piping or other items, may result in local ponding.

Consider the numbers. Assume that the roof purlins are designed for a common $L/150$ vertical deflection limit, the first interior purlin is located 5 ft away from the vertically immovable exterior line, and the purlins are 25 ft long. The maximum allowable purlin deflection is

$$\Delta_{max} = \frac{(25 \text{ ft})\ (12 \text{ in})}{150} = 2 \text{ in}$$

Note that this number includes neither any purlin deflection from suspended pipes or other hung items, nor the deflection of the roofing between the purlins. Additionally, if the purlins are not properly

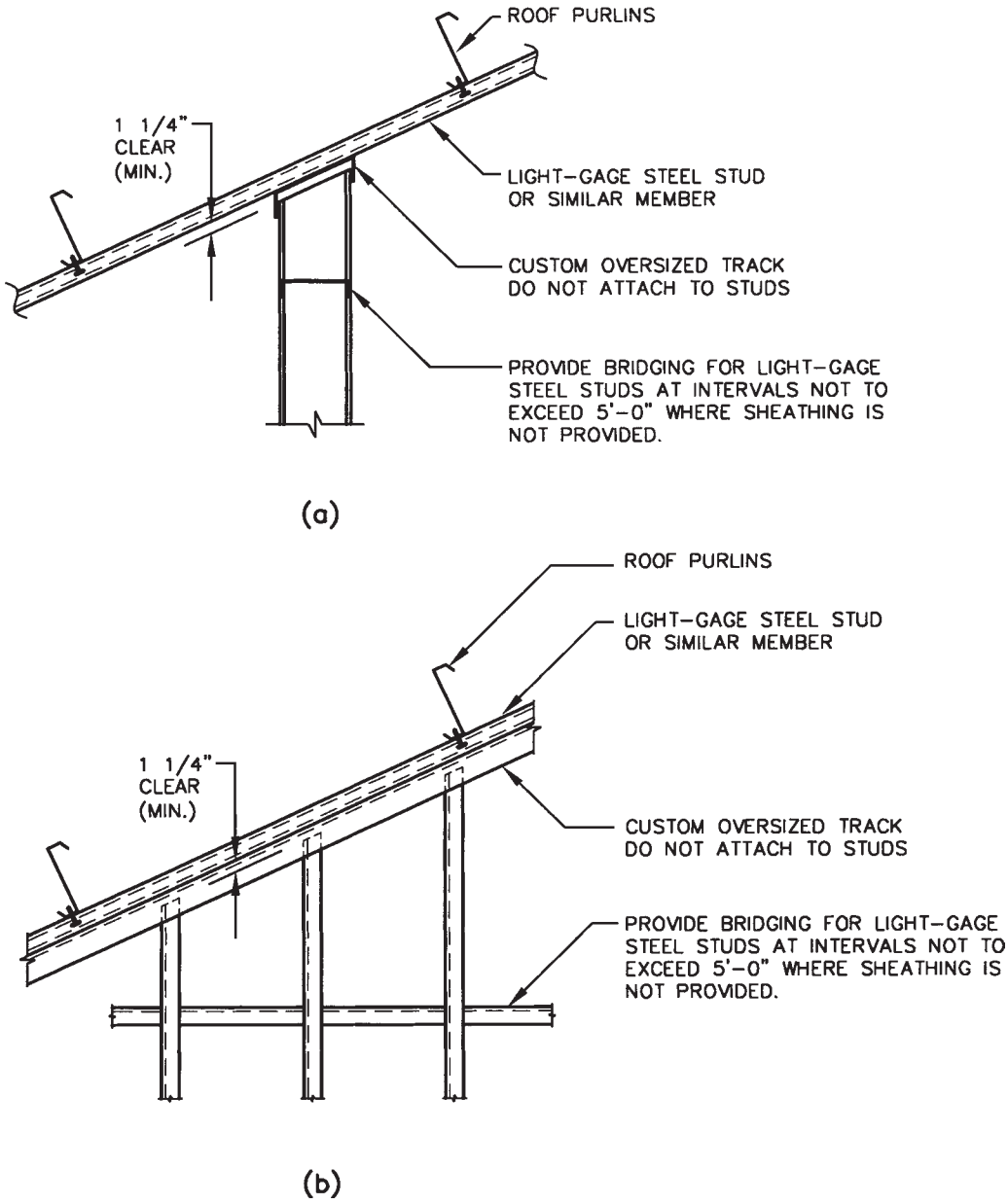

FIGURE 11.12 Examples of custom details at top of steel-stud partitions: (*a*) partition parallel to purlins; (*b*) partition perpendicular to purlins.