hot-rolled beams, bar joists cannot be readily checked for concentrated loads. Keep this nuance in mind when a bidder starts to argue that there is no need for such a close support spacing—the bidder is not responsible for evaluation of the existing roof's strength.

When bearing a support column directly on the existing corrugated steel deck, remember to check the buckling strength of the deck ribs. A bearing plate or channel is frequently needed to spread the column load over several corrugations as shown in Fig. 14.1.

In a more general—and difficult—situation, the existing roof purlins are not spaced 5 ft apart. In this case, another design approach is called for, whereby a grid of base support members, usually C and Z purlins, is provided at 5 ft 0 in on centers perpendicular to the existing roof purlins. The new retrofit columns bear on these members and support the retrofit purlins (Fig. 14.2). Note that the bearing plates are provided under the base support members and that the retrofit columns are located in a checkerboard fashion. Lateral stability of the base support members can be achieved by adequate attachment to the existing deck and by proper bracing or blocking between the points of attachment.

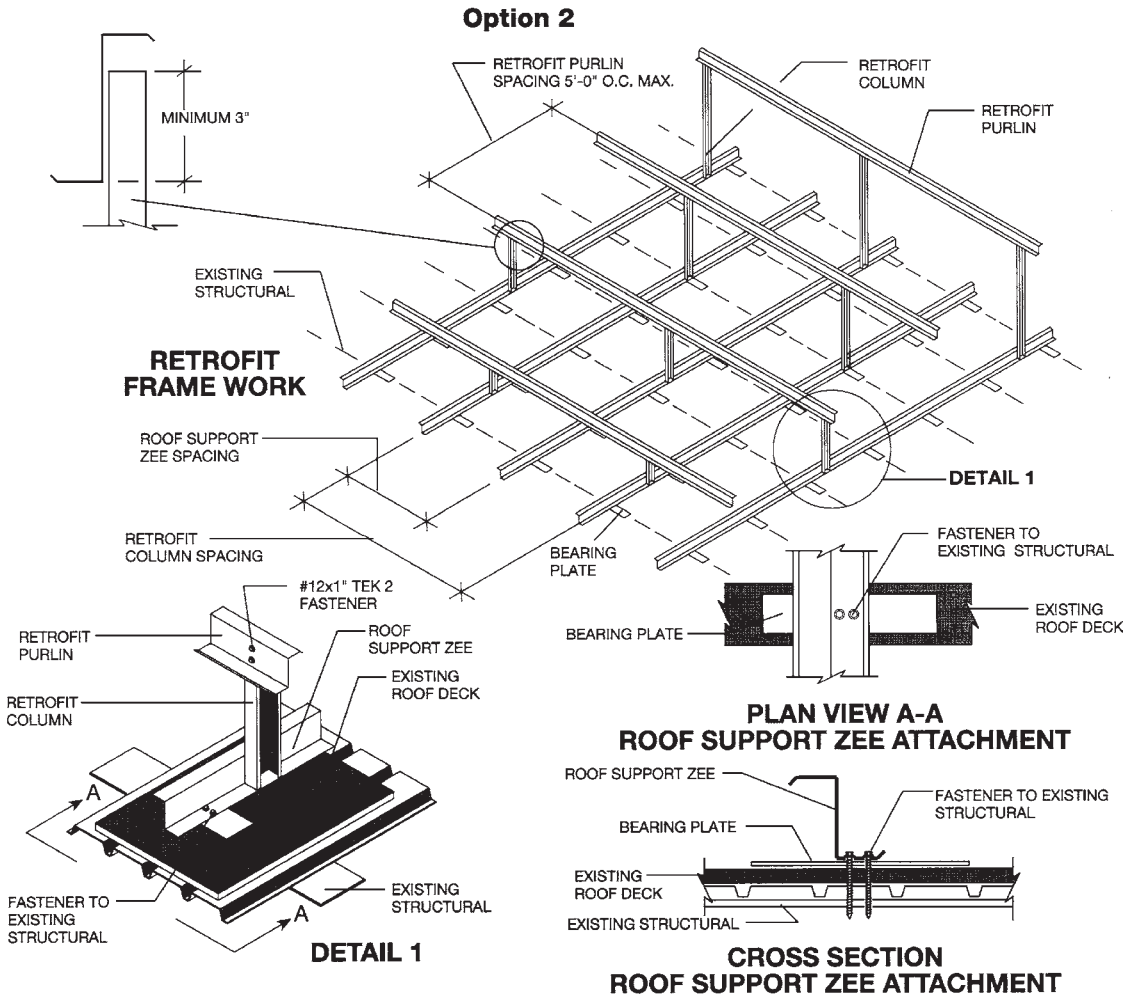

FIGURE 14.2 Option 2: Retrofit framing over existing roof purlins—a general case. (*MBCI.*)

14.2.7 Lateral Bracing Requirements

As was already mentioned, bracing requirements for light-gage C and Z purlins are surrounded by some controversy and misunderstanding. We recommend a closely spaced bracing for these members, perhaps 5 to 6 ft apart. The retrofit columns could be assumed to brace both the upper-level and the base purlins, but purlin bracing is still needed above and between the columns. Some manufacturers seem to agree and provide such bracing at both flanges of the retrofit purlins at a maximum of 5 ft on centers if the columns are spaced over 5 ft on center and standing-seam roofing is present.[4] The strapping locations are illustrated in Fig. 14.3. Consistent with our position expressed in Chap. 5, we would prefer to see the light-gage angles or channels capable of acting in compression instead of the tension-only strapping.

In addition to purlin bracing, cross bracing for lateral-load resistance of the whole assembly is also needed. The primary purpose of the cross bracing is to provide lateral stability to the new framework and to transfer wind loads into the existing building structure. The exact configuration and spacing should be left for the manufacturer to determine, but at least *some* bracing should be provided at regular intervals. Typical cross-bracing requirements are illustrated in Fig. 14.4; some typical details are shown in Fig. 14.5.

14.2.8 Reroofing over Existing Metal Roof

For an old metal roof deteriorated beyond repair, reroofing may be considered. Whenever the existing slope is sufficient, a new buildup framework is not needed; the new roofing can be installed directly over the old.

A common situation involves standing-seam metal panels plus fiberglass insulation installed on top of an old through-fastened roof. Here, the only new structural framing consists of light-gage hat channels—sometimes even pressure-treated wood two-by-fours—located directly above the existing purlins (Fig. 14.6). For added insulation value, thermal spacer blocks may be installed over the hat channels where the insulation is compressed.

A weak point of this design is the existing metal roofing: if it is corroded or structurally deficient for the new loading—two very common scenarios—it can hardly serve as a proper support for the structure. A direct attachment to the purlins via some filler material that fits within the roofing profile is then the only solution.

One product that makes this attachment possible is Roof Hugger,* basically a small-height Z purlin notched out at the bottom flange and the web to fit over the existing roofing corrugations (Fig. 14.7). According to the company, this product has been proved in numerous applications and is becoming extremely popular.

14.2.9 Design Details

Each manufacturer involved in reroofing applications has developed its own details for various conditions, such as shown above and in Fig. 14.8. (The details from the MBCI catalog[4] are used for consistency's sake.) The details reproduced here cover only the condition when the existing roof purlins are perpendicular to the new roof slope; slightly different details are used if the existing framing runs parallel to the new slope. Still, the general concepts discussed in this chapter should be applicable to any manufacturer and to any roof condition.

One design detail that should not be forgotten deals with a treatment of additional insulation which might be needed to meet the code-mandated U values. Quite often, rigid foam or fiberglass blanket insulation is laid on top of the existing roof between the new supports. The issue facing the specifiers is whether to provide a vapor retarder on such insulation. If the existing roofing system has

*Roof Hugger is a registered trademark of Roof Hugger, Inc.