



FIGURE 14.12 Second-story addition above existing metal building.

Collateral load: 5 psf

Wind load: Per BOCA 1996, Exposure C, basic wind speed 85 mph

Allowable soil bearing capacity: 2 tons/ft²

Concrete strength (both new and existing): $f'_c = 3000$ psi

A part of the addition was scheduled to receive drywall finish. The design intent was to separate the finished part from the rest of the building by 2 in, so as not to penalize the whole building by limiting its drift to $H/500$ (see discussion in Chap. 11). For a 20-ft eave height, a 2-in separation would theoretically limit the allowable drift to $H/120$. However, there was no assurance that the real-life construction details would provide a complete separation, so a more stringent limitation on lateral drift was judged necessary. A limit of $H/200$ was selected as a good compromise, even though a 2-in separation was expected.



FIGURE 14.13 Proprietary framing envelops an old building. (*Coronis Building Systems*.)

14.6.3 The Framing Challenges

Since the existing endwalls were of nonexpandable design, one of them had to be removed and replaced with a rigid frame similar in span and roof slope to the existing frames. The existing girts and purlins originally supported by the endwall had to be temporarily shored and eventually supported by the new frame. The new frame columns could not fit on top of the existing foundation wall corners and still be able to develop the required anchor bolt forces, because the drilled-in anchor bolts would have insufficient edge distances. Instead, new piers and footings had to be provided at the new frame column locations.

It was less clear how to span the 34-ft length of the addition. A review of Z-purlin load tables similar to those included in Appendix B suggested that the proposed span and loading was beyond the economical range of cold-formed purlins. Therefore, two other choices for a framing system were considered:

1. Two 17-ft purlin spans, which would require an additional rigid frame, column foundations, and tie rods for resisting lateral column reactions
2. A single 34-ft span framed with open-web steel joists having custom seat details, as explained below.

Both these options were equally acceptable. For this project, a decision was made to proceed with the second system. The roof plan for the combined building is shown in Fig. 14.14 and the foundation plan for the addition on Fig. 14.15.