



FIGURE 10.25 The bottom part of this interior wind-bracing bent was partly removed during previous alterations. This condition jeopardizes lateral-load resistance of the building.

7. Duane Miller and David Evers, "Loads and Codes," *The Construction Specifier*, November 1992.
8. John L. Ruddy, "Evaluation of Structural Concepts for Buildings: Low-Rise Buildings," BSCE/ASCE Structural Group Lecture Series at MIT, 1985.
9. Kevin Westervelt, "Tips for Engineers Working on Pre-engineered Metal Building Projects," *Structural Engineer*, July 2001, p. 24.
10. *Metal Building Systems Manual*, Metal Building Manufacturers Association, Cleveland, OH, 2002.
11. Frank Zamecnik, "Errors in Utilization of Cold-Formed Steel Members," *ASCE Journal of the Structural Division*, vol. 106, no. ST12, December 1980.
12. David B. Peraza, "Lessons from Recent Collapses of Metal Buildings," *Proceedings*, 15th International Specialty Conference on Cold-Formed Steel Structures, St. Louis, MO, October 19–20, 2000.
13. *Minimum Design Loads for Buildings and Other Structures*, ASCE 7, American Society of Civil Engineers, Reston, VA, 1998.

14. Erling Murtha-Smith, Howard I. Epstein, and Jason D. Mitchell, "Improved System Response to Abnormal Snow Loads," Final Report for Research Project MBMA 96-04, April 30, 1998.
15. "Preventing Roof Collapse from Snow Loading," *Record*, P.O. Box 9102, Norwood, MA, Fall 1994.
16. Source: Correspondence between the author and the FM Global public relations personnel.
17. Wesley G. Britson and Emile W. J. Troup, "Structural Forum: Specialty Structural Engineers," *Structure*, May, 2003, p. 22.
18. Herbert S. Saffir, discussion on the article "Residential Construction Failures Caused by Hurricane Andrew," *Journal of Performance of Constructed Facilities*, August 1996, p. 137.
19. *A Survey of Structural Damage Caused by Hurricane Iniki, September 11, 1992*, Structural Engineers Association of Hawaii, Honolulu, HI.

REVIEW QUESTIONS

- 1 What are some of the concerns with specifying exposed framing in metal building systems?
- 2 List the most common reasons of metal building failures.
- 3 Which challenges confront the specifiers of pre-engineered buildings with complex configurations?
- 4 What are the two basic approaches for dealing with the weight of heavy sprinkler mains if the exact pipe layout is not known in advance?
- 5 What is the potential side effect of single-side primary frame bracing?
- 6 The metal building supplier proposes using a single 8-in cold-formed channel at each jamb of an overhead door measuring 20 by 20 ft. Is this acceptable? Why or why not?
- 7 What might be the problem with adding a rooftop curb after the roofing is in place?
- 8 Explain what progressive collapse is. Why is it desirable to avoid?