3 At what point of the design process should the decision about using metal building systems be made?

4 Why is collateral load needed? What value of collateral load is typically used in metal building systems?

5 List at least three types of wind damage to buildings.

6 What part of a metal building system is affected by temperature changes the most?

7 Is the load combination (Dead + ½ Wind + Snow) included in the latest edition of ASCE 7?

8 Name at least three methods of resisting lateral loads used in metal building systems.

CHAPTER 4
PRIMARY FRAMING

4.1 INTRODUCTION

This chapter examines a palette of primary structural systems used in pre-engineered buildings. As discussed in the previous chapter, a complex process of choosing a framing system involves much more than structural considerations. Assuming that a metal building system is selected for the project at hand, the next milestone is choosing among the available types of pre-engineered primary framing. Proper selection of primary framing, the backbone of metal buildings, goes a long way toward a successful implementation of the design steps to follow. Some of the factors that influence the choice of main framing include:

- Dimensions of the building: width, length, and height
- Roof slope
- Required column-free clear spans
- Occupancy of the building and acceptability of exposed steel columns
- Proposed roof and wall materials

After all these factors are considered, the most suitable type of primary framing system frequently becomes obvious.

4.2 THE AVAILABLE SYSTEMS

Manufacturers call their framing systems many different names, often distilled into an alphabet soup of abbreviations. Still, only five basic types of metal building framing are currently on the market:

- Tapered beam
- Single-span rigid frame
- Multispan rigid frame
- Single-span and continuous trusses
- Lean-to

Each type can be supplied with either single or double roof slope. The most common primary frame systems are shown in Fig. 4.1. Primary framing is normally made either from high-strength steel conforming to ASTM A 992 with a minimum yield strength of 50,000 psi or, now rarely, from ASTM A 36 steel.

Each system has an optimum range of clear spans, as described below, but prior to that discussion we should first define the terms related to measurement of metal buildings. *Frame width* is measured between the outside surfaces of girts and eave struts, while the *clear span* is the distance