



The NDS recognizes in NDS•7.1.1.4 that “extensive experience” constitutes a reasonable basis for design; therefore, the designer may use Table 7.1 for many, if not all, connections. However, the designer should consider carefully the footnote to Table 7.1 and verify that the connection complies with local requirements, practice, and design conditions for residential construction. A connection design based on the NDS or other sources may be necessary for special conditions such as high-hazard seismic or wind areas and when unique structural details or materials are used.

In addition to the conventional fasteners mentioned above, many specialty connectors and fasteners are available on today’s market. The reader is encouraged to gather, study, and scrutinize manufacturer literature regarding specialty fasteners, connectors, and tools that meet a wide range of connection needs.

7.2 Types of Mechanical Fasteners

Mechanical fasteners that are generally used for wood-framed house design and construction include the following:

- nails and spikes;
- bolts;
- lag bolts (lag screws); and
- specialty connection hardware.

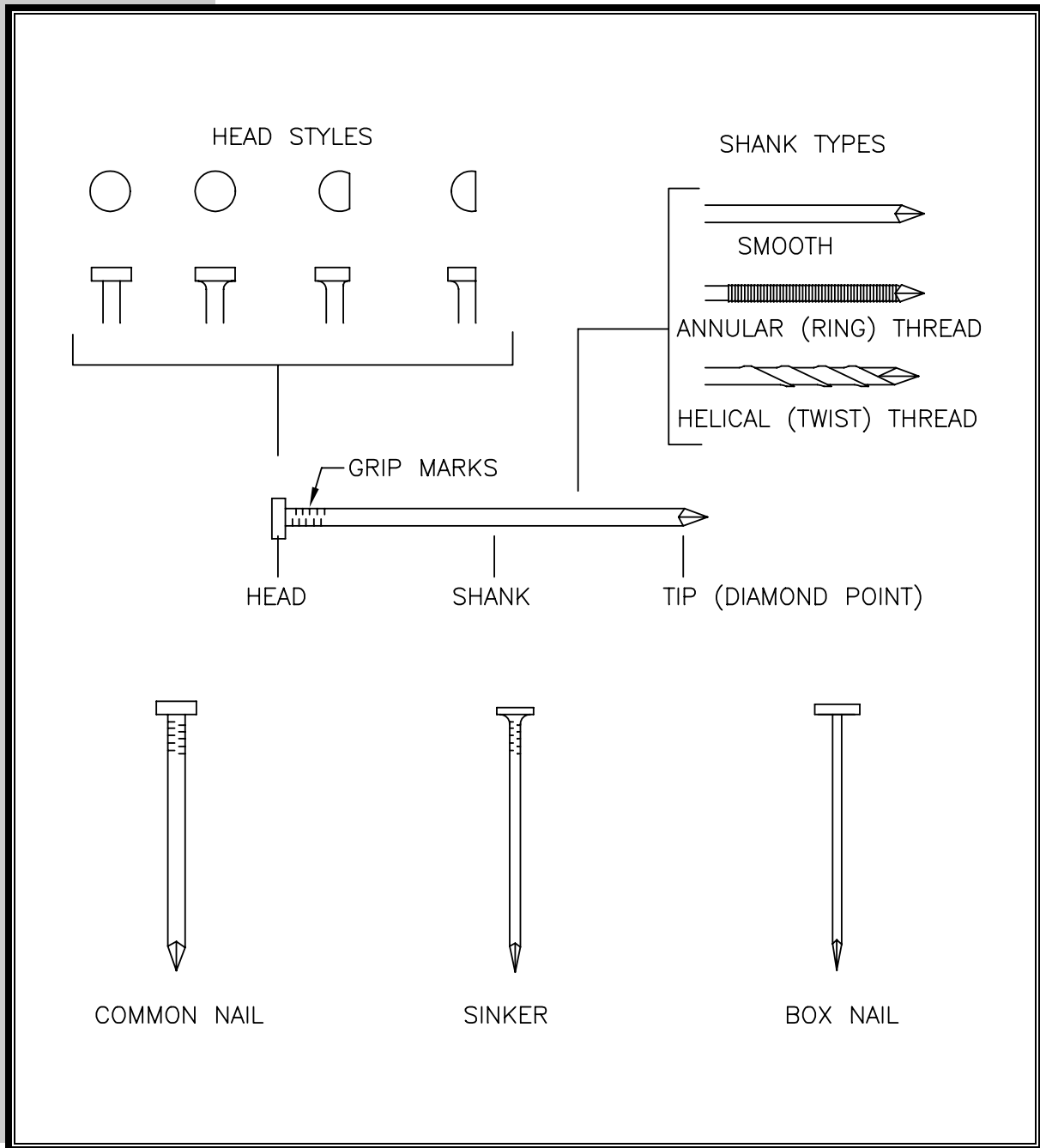
This section presents some basic descriptions and technical information on the above fasteners. Sections 7.3 and 7.4 provide design values and related guidance. Design examples are provided in Section 7.5 for various typical conditions in residential wood framing and foundation construction.

7.2.1 Nails

Several characteristics distinguish one nail from another. Figure 7.1 depicts key nail features for a few types of nails that are essential to wood-framed design and construction. This section discusses some of a nail’s characteristics relative to structural design; the reader is referred to *Standard Terminology of Nails for Use with Wood and Wood-Base Materials* (ASTM F547) and *Standard Specification for Driven Fasteners: Nails, Spikes, and Staples* (ASTM F 1667) for additional information (ASTM, 1990; ASTM, 1995).



FIGURE 7.1 *Elements of a Nail and Nail Types*



The most common nail types used in residential wood construction follow:

- *Common nails* are bright, plain-shank nails with a flat head and diamond point. The diameter of a common nail is larger than that of sinkers and box nails of the same length. Common nails are used primarily for rough framing.