

CHAPTER 5

Design of Wood Framing

5.1 General

This chapter addresses elements of above-grade structural systems in residential construction. As discussed in Chapter 1, the residential construction material most commonly used above grade in the United States is light-frame wood; therefore, this chapter focuses on structural design that specifies standard dimension lumber and structural wood panels (i.e., plywood and oriented strand board sheathing). Design of the lateral force resisting system (i.e., shearwalls and diaphragms) must be approached from a system design perspective and is addressed in Chapter 6. Connections are addressed in Chapter 7, and their importance relative to the overall performance of wood-framed construction cannot be overemphasized. The basic components and assemblies of a conventional wood frame home are shown in Figure 5.1; the reader is referred to Chapter 1 for more detailed references to house framing and related construction details.

Many elements of a home work together as a system to resist lateral and axial forces imposed on the above-grade structure and transfer them to the foundation. The above-grade structure also helps resist lateral soil loads on foundation walls through connection of floor systems to foundations. Therefore, the issue of system performance is most pronounced in the above-grade assemblies of light-frame homes. Within the context of simple engineering approaches that are familiar to designers, system-based design principles are addressed in this Chapter.

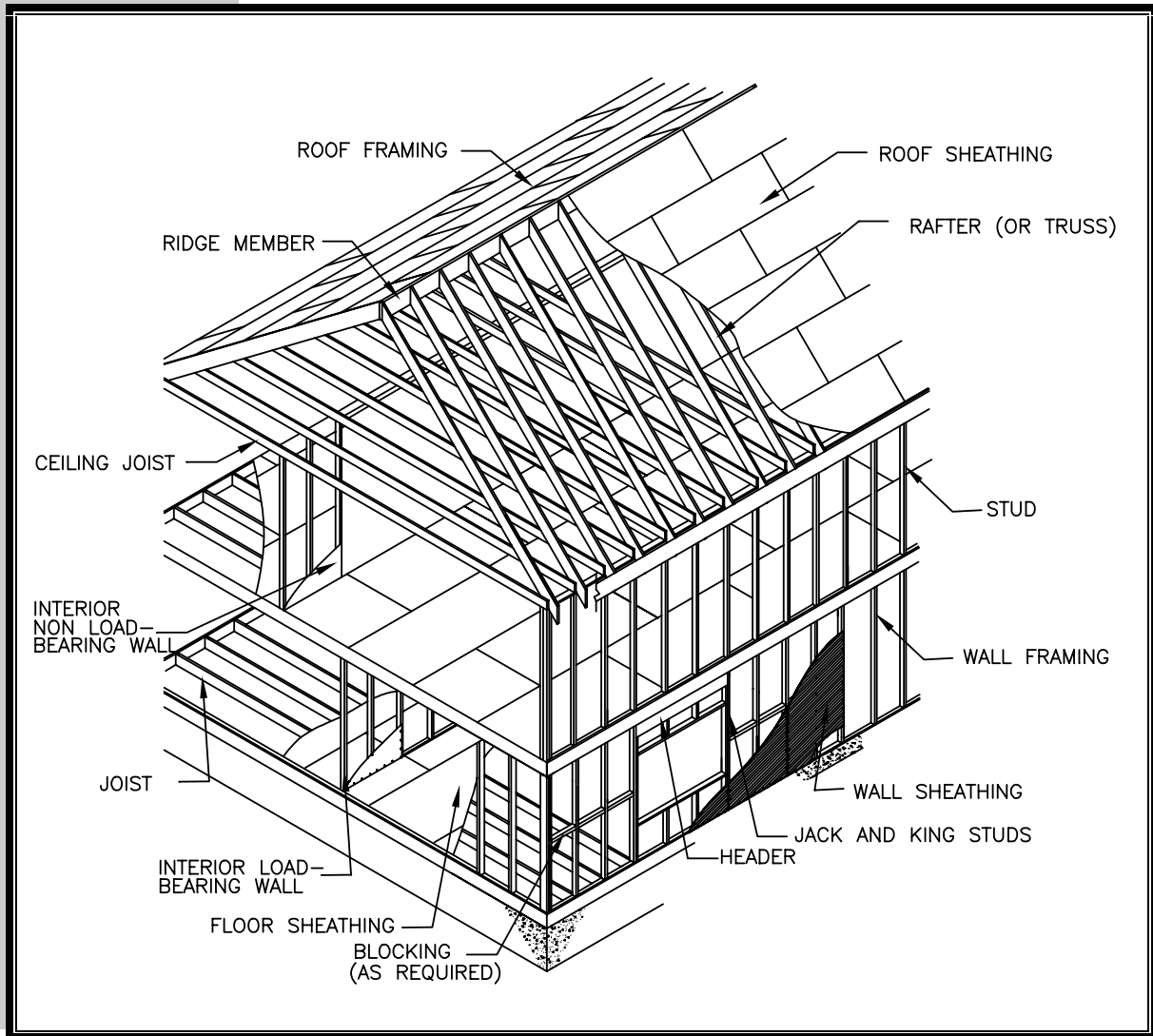
The design of the above-grade structure involves the following structural systems and assemblies:

- floors;
- walls; and
- roofs.



FIGURE 5.1

Components and Assemblies of a Conventional Wood-Framed Home



Each system can be complex to design as a whole; therefore, simple analysis usually focuses on the individual elements that constitute the system. In some cases, “system effects” may be considered in simplified form and applied to the design of certain elements that constitute specifically defined systems. Structural elements that make up a residential structural system include:

- bending members;
- columns;
- combined bending and axial loaded members;
- sheathing (i.e., diaphragm); and
- connections.