

## CHAPTER 12—DIAPHRAGMS

## CODE

## COMMENTARY

**12.1—Scope**

**12.1.1** This chapter shall apply to the design of nonprestressed and prestressed diaphragms, including (a) through (d):

- (a) Diaphragms that are cast-in-place slabs
- (b) Diaphragms that comprise a cast-in-place topping slab on precast elements
- (c) Diaphragms that comprise precast elements with end strips formed by either a cast-in-place concrete topping slab or edge beams
- (d) Diaphragms of interconnected precast elements without cast-in-place concrete topping

**R12.1—Scope**

**R12.1.1** Diaphragms typically are horizontal or nearly horizontal planar elements that serve to transfer lateral forces to vertical elements of the lateral-force-resisting system (Fig. R12.1.1). Diaphragms also tie the building elements together into a complete three-dimensional system and provide lateral support to those elements by connecting them to the lateral-force-resisting system. Typically, diaphragms also serve as floor and roof slabs, or as parking structure ramps and, therefore, support gravity loads. A diaphragm may include chords and collectors.

When subjected to lateral loads, such as the in-plane inertial loads acting on the roof diaphragm of Fig. R12.1.1, a diaphragm acts essentially as a beam spanning horizontally between vertical elements of the lateral-force-resisting system. The diaphragm thus develops in-plane bending moments, shears, and possibly other actions. Where vertical elements of the lateral-force-resisting system do not extend along the full depth of the diaphragm, collectors may be required to collect the diaphragm shear and transfer it to the vertical elements. The term “distributor” is sometimes used to describe a collector that transfers force from a vertical element of the lateral-force-resisting system into the diaphragm. This chapter describes minimum requirements for diaphragm and collector design and detailing, including configuration, analysis models, materials, and strength.

This chapter covers only the types of diaphragms listed in this provision. Other diaphragm types, such as horizontal trusses, are used successfully in buildings, but this chapter does not include prescriptive provisions for those other types.