

## Chapter 1

---

# Construction

**Construction** is one of four interdependent elements that commercial property underwriters analyze when evaluating submissions for property insurance. The other three elements are *occupancy*, *protection*, and *external exposures*. These four elements are collectively referred to by the acronym **COPE** and are discussed in this and the two following chapters.

Of the four COPE elements commonly used by property underwriters, construction stands out as a key factor in underwriting property insurance. Construction is a tangible property characteristic that underwriters can evaluate. A property's construction is less likely to change than are the nature and quality of occupancy, protection, and external exposures.

Fire is usually considered the most likely cause of loss to occur, and underwriters commonly evaluate first the desirability of an insured based on its susceptibility to this cause of loss. Other causes of loss such as windstorm and earthquake could have a significant effect on the underwriting decision in some parts of the country. If, however, a risk is not acceptable because of the possibility of a loss caused by fire, it will not be acceptable for the less likely causes of loss included in commercial property policies.

The construction of a building has a direct bearing on the extent of damage a fire can cause as well as the building's ability to resist damage from other perils. When considering construction, underwriters are concerned with far more than the basic construction classification used in pricing property insurance.

(The building construction classification system used by Insurance Services Office is described in depth later in this chapter.) Underwriters should be concerned with how various structural features will resist the effects of a fire and how the structural features contribute to the spread or containment of fire. Additionally, structural features are important in analyzing the effects of other perils on the structure.

Underwriters often treat construction incidentally because applications normally provide information about construction. Underwriters should not, however, treat construction superficially. Construction features are not standard, and additional investigation by the underwriter will usually reveal information that will make a risk either more or less desirable.

## *Fire Resistance and Flame Spread*

In determining the appropriate classification for a particular structure, underwriters often analyze the fire resistance of materials used in construction. In the interior of buildings, the flame spread of the interior construction materials or finish is important. **Interior finish** consists of materials used to form the exposed interior surfaces of walls and ceilings in a building. Interior finish includes such items as carpets, ceiling tiles, wallboard, insulating materials, and decorative materials.

### *Fire Resistance*

**Fire resistance** refers to the ability of a structure or material to withstand the effects of a large-scale, severe fire. Fire resistance is evaluated by exposing structural elements to fire in a controlled setting. Materials are classified by their fire-resistance capabilities, according to the Standard Methods of Tests of Fire Endurance of Building Construction and Materials, NFPA Standard Number 251. Such an evaluation is conducted by using a test tunnel developed by Underwriters Laboratories, Inc. (UL). NFPA standards are established by the National Fire Protection Association, which is an organization dedicated to safeguarding people and property from destruction by fire. In this test tunnel, materials are exposed to a standard fire so that their performance can be measured and classified relative to other materials.

Those specimens are exposed to a reproducible standard fire following a time-temperature curve, as shown in Exhibit 1-1. The structural elements being evaluated are loaded with the weight that they are supposed to hold when put into actual use. The unit passes the test if it resists its prescribed superimposed

## 4 Underwriting Commercial Property

---

load. Partitions, walls, floors, and roofs pass the test if they resist the spread of fire for a specified period of time. Underwriters Laboratories conducts most of the tests. The minimum sizes for test specimens are the following:<sup>1</sup>

- Columns 9 feet
- Beams and girders 12 feet
- Partitions and walls 100 square feet
- Floors and roofs 180 square feet

Structural elements or materials are rated in terms of hours, depending on the time that the tested unit survives. These ratings, however, can be confusing. A two-hour fire resistance does *not* mean that the materials being tested can survive a two-hour fire unscathed; the fire damage might be severe, even with exposure of short duration. The rating refers to structural integrity, not to the degree of damage.

The test evaluates the likelihood that an actual structure composed of the same materials would survive a fire under like conditions. The underlying assumptions are that the specimens tested are the same type as those used in a structure, that the actual fuel load does not exceed the fuel load tested, and that the duration of the fire does not exceed the time tested.

**Fuel load** (sometimes referred to as **fire load**) is the expected maximum amount of combustible material in a given area. In a normal building, the fuel load consists of the combustible structural elements and the combustible contents contained within the area. Fuel load is usually expressed as weight of combustible material per square foot. It is, in essence, a measure of the maximum heat that would be released if all the combustibles in a given area were to burn.

### *Flame Spread*

The **flame spread** of materials is also determined by using a test tunnel. As with measuring fire resistance, a standard gas fire is applied at one end of the tunnel, and the rate of flame spread is measured. Exhibit 1-2 illustrates a test tunnel used for measuring flame spread.

As a baseline of the evaluation of materials and to determine whether the test tunnel is set to the uniform conditions, a relative scale has been created using a piece of red oak and a piece of asbestos cement board. The results obtained from testing those materials are classified as 0 (asbestos cement board) and 100 (red oak flooring). The volume of smoke that the fire generates and the amount of fuel that the fire consumes are also measured.<sup>2</sup>