Coffee Break Training - Fire Protection Series

Access and Water Supplies: Fire Flow Formulas: Part 12: Insurance Services Office Needed Fire Flow: Exposure Factors

No. FP-2013-47 November 19, 2013

Learning Objective: *The student will be able to explain the "exposure factor" variable, Xi, in the Insurance Services Office (ISO) Needed Fire Flow (NFF) formula.*

We are in the middle of a Coffee Break Training series about the ISO NFF formula:

$$NFF_i = (C_i)\ (O_i)\ [1 + (X_i + P_i)]$$

Where:

X_i = a factor for exposure to adjacent buildings
P_i = a factor for communications (openings) in party-walls

The proximity of these buildings to one another — increasing the potential for fire spread — plays an important role in the fire flow formula to protect exposures.

Now we will introduce the exposure factor variable, X_i, and how it affects the formula. In general, X_i addresses the influence of adjoining and connected buildings on the NFF. These nearby buildings are called "exposures," and as the threat of fire spreading to an exposure increases, the water supply requirements increase as well. In the ISO guidance, a building is considered an exposure if it is within 100 feet (30.5 meters) of the building that is being evaluated for fire flow.

The X_i value is obtained from a table; it depends upon the construction, something called the "length-height value" of the exposure building, and the distance between the exposure and subject building. The length-height value for the exposure is derived by multiplying the length of the wall times the number of stories. An exposed wall that is 78 feet (23.7 meters) long and 4 stories tall would have a length-height value of 312 (78 feet multiplied by 4 stories). ISO considers buildings 5 stories or more in height to be 5 stories.

The exposure distance is measured in a straight line between the exposure and the building being evaluated; it is measured to the nearest foot and at the nearest points of the two buildings. If the exposure and subject building are arranged diagonally from one another, ISO increases the exposure distance by 10 feet (3 meters).

The following exposures are not computed in the ISO NFF formula:

- Buildings that meet the ISO standards for being fully sprinklered.
- Residential buildings, including their outbuildings.
- Buildings that are ISO Construction Class 5 or 6. (See Coffee Break Training FP-2013-40.)
- Buildings that are ISO Construction Class 3 or 4 with C-1 or C-2 contents combustibility class. (See Coffee Break Training FP-2013-45.)

Next week's Coffee Break Training will provide examples of the exposure influence in the ISO NFF formula.