

Exam 3: Cat Risk Management Insurance Fundamentals

Part C – Module Title: Occupancy Class

Study Note

Learning Objective:

Describe how occupancy class can influence damage to different coverages.

This document contains original content.

Occupancy class is the most commonly reported primary risk characteristic and is one of the four main primary risk characteristics used to differentiate vulnerability in a catastrophe model. When occupancy class is unknown, a general occupancy class can often be derived or assumed based on the general line of business (Residential, Commercial, Industrial or Agricultural).

There are separate vulnerability curves for each coverage type:

- **Building coverage:** Provides insurance coverage for damage associated with the structural and non-structural elements of the building. This includes things like beams, columns, walls, drywall, carpet and ceiling tiles.
- **Contents coverage:** Provides insurance coverage for damage associated with contents on the property. This includes things like furniture, appliances, electronics, equipment and inventory.
- **Loss of use coverage:** Provides insurance coverage for damage associated with additional living expenses incurred or business interruption associated with things like relocation, loss of income, storage and utility interruptions while the physical structure is repaired.

The vulnerability curve associated with building coverage is a function of the hazard of the peril. For hurricane, this is generally wind speed and for earthquake, this is generally spectral acceleration. The vulnerability curves associated with contents and loss of use are typically a function of the building damage. In addition, the occupancy class is used to further differentiate vulnerability.

Occupancy Class to Differentiate Building Vulnerability

Occupancy Classes with Varying Design Standards

Building codes generally require higher design standards for occupancies like large entertainment centers and shopping malls that contain a high number of occupants to protect the life safety of the occupants. Additionally, an occupancy such as a hospital, is also designed to a higher standard to ensure the structure can remain operable during a major catastrophic event. On the other hand, storage facilities or agricultural risks may be designed to a lower design standard where the structure does not house humans on a regular basis.

Some catastrophe models acknowledge the varying design standards for these occupancy classes by differentiating building vulnerability across occupancy classes. Consider a hospital, an office building and a barn and hypothetically built with the same construction materials. Building codes might require the hospital to have larger beams and columns and stronger connections when compared to the office building or the barn. Thus, when the three occupancies are exposed to the same hazard, it is expected the hospital will result in less building damage.

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Occupancy Classes with Similar Structural or Non-Structural Features

Claims data is often used to inform vulnerability curves in a catastrophe model. Claims data is much more available and easy to work with for residential risks. For commercial risks, claims data is less available so model vendors employ engineering judgement along with claims data to differentiate commercial vulnerability. Model vendors study the structural and non-structural features of different occupancy classes to help inform how to differentiate occupancy classes built with the same construction materials.

For example, occupancies such as gas stations and strip malls often have large storefront windows that make these types of structures more vulnerable to wind damage from wind-borne debris. Other occupancy classes, such as a warehouse or an auto repair shop, might have large garage door bays that are highly vulnerable to damage from high wind pressure.

Occupancy Class to Differentiate Contents Vulnerability

The contents within a structure vary greatly between occupancy classes. As a result, two occupancy classes can result in the same level of building damage but have different levels of contents damage. Consider a hospital and an auto repair shop. The hospital has very sensitive equipment that can be easily damaged during an earthquake when subject to high levels of ground motion, or easily damaged during a hurricane when subject to rain and wind. The auto repair shop contains heavy tools, workbenches, etc. that may be able to better survive the elements of a hurricane or earthquake. Assuming both occupancies are subject to the same level of building damage, we might expect more damage to the contents of the hospital than the auto repair shop.

Occupancy Class to Differentiate Loss of Use Vulnerability

Occupancy class heavily influences the additional living expenses or business interruption costs (collectively defined as loss of use). The downtime that results while a home or business is addressing the associated building and contents-related damages will vary by occupancy class. Some occupancy classes, such as a church or a school, may be able to more relocate into temporary facilities to resume operations while repairs are made to the damaged structure. Other occupancy classes, such as a hotel, rely on their location and cannot easily relocate. As a result, these occupancy classes might result in higher loss of use damage for the same level of building damage as other occupancy classes.

Not all event result in significant building repairs. The less severe events might result in limited physical damage but loss of use damage can still be incurred due to utility damage and power outages. A restaurant or a grocery store can result in significant business interruption loss during a power outage, while an office building may only have limited business interruption costs.