

technical one. Model building codes such as the International Building Code (ICC 2009) and NFPA-5000 (NFPA 2006) contain prescriptive lists of building types by occupancy category. Individual communities can alter these lists when they adopt local codes based on the model code, and individual owners or operators can elect to design individual buildings to higher occupancy categories based on personal risk management decisions. Classification continues to reflect a progression of the anticipated seriousness of the consequence of failure from lowest risk to human life (Risk Category I) to the highest (Risk Category IV). Elimination of the specific examples of buildings that fall into each category has the benefit that it eliminates the potential for conflict between the standard and locally adopted codes and also provides individual communities and development teams the flexibility to interpret acceptable risk for individual projects.

Historically, the building codes and the standard have used a variety of factors to determine the occupancy category of a building. These factors include the total number of persons who would be at risk were failure to occur, the total number of persons present in a single room or occupied area, the mobility of the occupants and their ability to cope with dangerous situations, the potential for release of toxic materials, and the loss of services vital to the welfare of the community.

Risk Category I structures generally encompass buildings and structures that normally are unoccupied and that would result in negligible risk to the public should they fail. Structures typically classified in this category have included barns, storage shelters, gatehouses, and similar small structures. Risk Category II includes the vast majority of structures, including most residential, commercial, and industrial buildings, and has historically been designated as containing all those buildings and structures not specifically classified as conforming to another category.

Risk Category III includes buildings and structures that house a large number of persons in one place, such as theaters, lecture halls, and similar assembly uses; buildings with persons having limited mobility or ability to escape to a safe haven in the event of failure, including elementary schools, prisons, and small healthcare facilities. This category has also included structures associated with utilities required to protect the health and safety of a community, including power generating stations and water treatment and sewage treatment plants. It has also included structures housing hazardous substances,

such as explosives or toxins, which if released in quantity could endanger the surrounding community, such as structures in petrochemical process facilities containing large quantities of H₂S or ammonia.

Failures of power plants that supply electricity on the national grid can cause substantial economic losses and disruption to civilian life when their failures can trigger other plants to go offline in succession. The result can be massive and potentially extended power outage, shortage, or both that lead to huge economic losses because of idled industries and a serious disruption of civilian life because of inoperable subways, road traffic signals, and so forth. One such event occurred in parts of Canada and the northeastern United States in August 2003.

Failures of water and sewage treatment facilities can cause disruption to civilian life because these failures can cause large-scale (but mostly non-life-threatening) public health risks caused by the inability to treat sewage and to provide drinking water.

Failures of major telecommunication centers can cause disruption to civilian life by depriving users of access to important emergency information (using radio, television, and phone communication) and by causing substantial economic losses associated with widespread interruption of business.

Risk Category IV has traditionally included structures, the failure of which would inhibit the availability of essential community services necessary to cope with an emergency situation. Buildings and structures typically grouped in Risk Category IV include hospitals, police stations, fire stations, emergency communication centers, and similar uses.

Ancillary structures required for the operation of Risk Category IV facilities during an emergency also are included in this risk category. When deciding whether an ancillary structure or a structure that supports such functions as fire suppression is Risk Category IV, the design professional must decide whether failure of the subject structure will adversely affect the essential function of the facility. In addition to essential facilities, buildings and other structures containing extremely hazardous materials have been added to Risk Category IV to recognize the potential devastating effect a release of extremely hazardous materials may have on a population.

The criteria that have historically been used to assign individual buildings and structures to occupancy categories have not been consistent and sometimes have been based on considerations that are more appropriate to fire and life safety than to structural failure. For example, university buildings housing more than a few hundred students have been