

Deciding to Build Above Minimum Code Requirements

Appendix B

Model building codes provide minimum requirements on how buildings should be designed and built. Minimum design requirements included in building codes are customarily based on standards necessary to prevent loss of life, rather than the economic impact to the building owner from a damaged building, loss of business, loss of inventory, or loss of jobs. A building owner may decide that more stringent requirements are needed to sustain a business or protect a building.

In areas susceptible to damage from hurricanes and tornadoes, most commercial buildings are required to be built to withstand a wind speed that has a 2 percent annual probability of being met or exceeded. *[Note: this is often referred to as a “50-year event” (1.00 divided by 0.02). The term “50-year event” should not be interpreted to mean that the event can only occur once every 50 years, however. This event could occur at any time.]*

Table B-1 shows the chance of a naturally-occurring event (such as a flood or high winds) calculated over a range of values for the expected life or use of a building. Using this table, owners can make informed decisions about whether or not to design buildings or operate their businesses in a way that exceeds the minimum building code requirements.

Table B-1 Risk to a Building Based on Life of the Building and Design Event

Life of Building (years)	Chance of this or a more severe event				
	10%	4%	2%	1%	0.2%
Annual occurrence probability	(10 Year)	(25 Year)	(50 Year)	(100 Year)	(500 Year)
10 year life	65%	34%	18%	10%	2%
20 year life	88%	56%	33%	18%	5%
30 year life	96%	71%	45%	26%	6%
50 year life	99%	87%	64%	39%	10%
100 year life	100%	98%	87%	63%	18%

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For example, in many parts of the country vulnerable to hurricanes or tornadoes, designing to higher wind loads may contribute to the sustainability of the business. If a building owner is considering designing a building to withstand a 2 percent annual occurrence wind load to meet local codes (e.g., the “50-year event” and the code minimum for most commercial buildings), and plans on owning the building for 20 years, there is a 33 percent chance that the building will experience that severe a wind event or a more severe event. By choosing to design for a 1 percent annual occurrence event (a “100-year event”), the building owner will reduce the risk to 18 percent. The building owner may decide that the additional cost of designing to this higher level is reasonable based on reduced risk. An experienced design professional (in this case, a structural engineer or an architect) can determine how to design for higher winds and the cost associated with such a design.

Another relevant example involves the choices to be made in anticipation of or during recovery from flood events. Flood frequencies are usually determined through statistical and engineering analyses performed by floodplain management agencies and other organizations that require information on which to base engineering designs and flood insurance rates. The results of those analyses define the probability, again expressed as a percentage, that a flood of a specific size on a specific water course will be equaled or exceeded in any year.

For example, floods that have a 1 percent annual occurrence probability (e.g., a 1 in 100 chance of being equaled or exceeded in any particular year) are particularly important for property owners because they are the basis for most National Flood Insurance Program (NFIP) flood insurance rates and regulatory floodplain management requirements.

Using the same table, a business owner within the “100-year” floodplain, who intends to remain in business at that location for as many as 30 years, could decide to relocate all or part of its business operations to be above an elevation corresponding to a 0.02 percent annual occurrence probability (or a “500-year” event).

In so doing, the chance of experiencing damage to those parts of the business operation would be reduced from 26 percent to 6 percent. Implications for reducing potential lost business revenue as well as reducing flood insurance cost could be compelling for many businesses when the information is easily available.