Table 1.3-1. Target Reliability (Annual Probability of Failure, P_F) and Associated Reliability Indices (β) for Load Conditions That Do Not Include Earthquake, Tsunami, or Extraordinary Events.

	Risk Category			
Basis	**I**	**II**	**III**	**IV**
Failure that is not sudden and does not lead to widespread progression of damage	$P_F = 1.25 \times 10^{-4}$ per year $\beta = 2.5$	$P_F = 3.0 \times 10^{-5}$ per year $\beta = 3.0$	$P_F = 1.25 \times 10^{-5}$ per year $\beta = 3.25$	$P_F = 5.0 \times 10^{-6}$ per year $\beta = 3.5$
Failure that is either sudden or leads to widespread progression of damage	$P_F = 3.0 \times 10^{-5}$ per year $\beta = 3.0$	$P_F = 5.0 \times 10^{-6}$ per year $\beta = 3.5$	$P_F = 2.0 \times 10^{-6}$ per year $\beta = 3.75$	$P_F = 7.0 \times 10^{-7}$ per year $\beta = 4.0$
Failure that is sudden and results in widespread progression of damage	$P_F = 5.0 \times 10^{-6}$ per year $\beta = 3.5$	$P_F = 7.0 \times 10^{-7}$ per year $\beta = 4.0$	$P_F = 2.5 \times 10^{-7}$ per year $\beta = 4.25$	$P_F = 1.0 \times 10^{-7}$ per year $\beta = 4.5$

Notes:
[1]The target reliability indexes are provided for a 50-year reference period, and the probabilities of failure have been annualized. The equations presented in Section 2.3.6 are based on reliability indexes for 50 years, because the load combination requirements in Section 2.3.2 are based on the maximum loads for the 50-year reference period.
[2]Commentary to Section 2.5 includes references to publications that describe the historic development of these target reliabilities for earthquake, tsunami, or extraordinary events.

Table 1.3-2. Target Reliability (Conditional Probability of Failure) for Structural Stability Caused by Earthquake.

Risk Category	Conditional Probability of Failure Caused by the MCE_R Shaking Hazard (%)
I and II	10
III	5
IV	2.5

Table 1.3-3. Target Reliability (Conditional Probability of Failure) for Ordinary Noncritical Structural Members Caused by Earthquake.

Risk Category	Conditional Probability of Component or Anchorage Failure Caused by the MCE_R Shaking Hazard (%)
I and II	25
III	15
IV	9

Table 1.3-4. Target Reliability (Conditional Probability of Failure) for Structural Elements Subject to Tsunami Inundation.

Risk Category	Conditional Probability of Failure Caused by the Maximum Considered Tsunami Hydrodynamic Pressure (%)
I	Not applicable
II	10
III	5
IV	3
Tsunami Vertical Evacuation Refuge Structure	1

including knowledge of the expected performance, the structural and component behavior, the particular loads considered, structural analysis of the type performed, the materials of construction, and laboratory testing of elements and components to determine structural resistance and performance characteristics. The review shall include assumptions, criteria, procedures, calculations, analytical models, test setup, test data, final drawings, and reports. Upon satisfactory completion, the peer reviewers shall submit a letter to the Authority Having Jurisdiction indicating the scope of their review and their findings.

1.3.2 Serviceability Structural systems, and members thereof, shall be designed under service loads to have adequate stiffness to limit deflections, lateral drift, vibration, or any other deformations that adversely affects the intended use and performance of buildings and other structures based on requirements set forth in the applicable codes and standards or as specified in the project design criteria.

1.3.3 Functionality Structural systems and members and connections thereof assigned to Risk Category IV shall be designed with reasonable probability to have adequate structural strength and stiffness to limit deflections, lateral drift, or other deformations such that their behavior would not prevent function of the facility immediately following any of the design-level environmental hazard events specified in this standard. Designated nonstructural systems and their attachment to the structure shall be designed with sufficient strength and stiffness such that their behavior would not prevent function immediately following any of the design-level environmental hazard events specified in this standard. Components of designated nonstructural systems shall be designed, qualified, or otherwise protected such

Table 1.3-5. Target Reliability (Maximum Conditional Probability of Failure) for Structural Strength and Stability Limit States Caused by Extraordinary Load Events.

Risk Category	Conditional Limit State Probability (%)
I	15
II	10
III	5
IV	2

Table 1.5-1. Risk Category of Buildings and Other Structures for Flood, Wind, Tornado, Snow, Earthquake, and Ice Loads.

Use or Occupancy of Buildings and Structures	Risk Category
Buildings and other structures that represent low risk to human life in the event of failure	I
All buildings and other structures except those listed in Risk Categories I, III, and IV	II
Buildings and other structures, the failure of which could pose a substantial risk to human life	III
Buildings and other structures not included in Risk Category IV, with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure	
Buildings and other structures not included in Risk Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing toxic or explosive substances where the quantity of the material exceeds a threshold quantity established by the Authority Having Jurisdiction and is sufficient to pose a threat to the public if released*	
Buildings and other structures designated as Essential Facilities	IV
Buildings and other structures, the failure of which could pose a substantial hazard to the community	
Buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing sufficient quantities of highly toxic substances where the quantity of the material exceeds a threshold quantity established by the Authority Having Jurisdiction and is sufficient to pose a threat to the public if released*	
Buildings and other structures required to maintain the functionality of other Risk Category IV structures	

*Buildings and other structures containing toxic, highly toxic, or explosive substances shall be eligible for classification to a lower risk category if it can be demonstrated to the satisfaction of the Authority Having Jurisdiction by a hazard assessment as described in Section 1.5.3 that a release of the substances is commensurate with the risk associated with that risk category.

the building or other structure having a lower risk category, those portions shall be assigned to the higher risk category.

1.5.3 Toxic, Highly Toxic, and Explosive Substances Buildings and other structures containing toxic, highly toxic, or explosive substances are permitted to be classified as Risk Category II structures if it can be demonstrated to the satisfaction of the Authority Having Jurisdiction by a hazard assessment as part of an overall risk management plan (RMP) that a release of the toxic, highly toxic, or explosive substances is not sufficient to pose a threat to the public.

To qualify for this reduced classification, the owner or operator of the buildings or other structures containing the toxic, highly toxic, or explosive substances shall have an RMP that incorporates three elements as a minimum: a hazard assessment, a prevention program, and an emergency response plan.

As a minimum, the hazard assessment shall include the preparation and reporting of worst-case release scenarios for each structure under consideration, showing the potential effect on the public for each. As a minimum, the worst-case event shall include the complete failure, for example, instantaneous release of the entire contents of a vessel, piping system, or other storage structure. A worst-case event includes, but is not limited to, a release during the design wind, design tornado, or design seismic event. In this assessment, the evaluation of the effectiveness of subsequent measures for accident mitigation shall be based on the assumption that the complete failure of the primary storage structure has occurred. The off-site impact shall be defined in terms of the population in the potentially affected area. To qualify for the reduced classification, the hazard assessment shall demonstrate that a release of the toxic, highly toxic, or explosive substances from a worst-case event does not pose a threat to the public outside the property boundary of the facility.

As a minimum, the prevention program shall consist of the comprehensive elements of process safety management, which is based on accident prevention through the application of management controls in the key areas of design, construction, operation, and maintenance. Secondary containment of the toxic, highly toxic, or explosive substances—including, but not limited to, double-wall tank, dike of sufficient size to contain a spill, or other means to contain a release of the toxic, highly toxic, or explosive substances within the property boundary of the facility and prevent release of harmful quantities of contaminants to the air, soil, groundwater, or surface water—is permitted to be used to mitigate the risk of release. Where secondary containment is provided, it shall be designed for all environmental loads and is not eligible for this reduced classification. In hurricane-prone regions, mandatory practices and procedures that effectively diminish the effects of wind on critical structural elements, or, alternatively, that protect against harmful releases during and after hurricanes, are permitted to be used to mitigate the risk of release.

As a minimum, the emergency response plan shall address public notification, emergency medical treatment for accidental exposure to humans, and procedures for emergency response to releases that have consequences beyond the property boundary of the facility. The emergency response plan shall address the potential that resources for response could be compromised by the event that has caused the emergency.

Table 1.5-2. Importance Factors by Risk Category of Buildings and Other Structures for Earthquake Loads.

Risk Category from Table 1.5-1	Seismic Importance Factor, I_e
I	1.00
II	1.00
III	1.25
IV	1.50

Notes: The component importance factor, I_p, applicable to earthquake loads is not included in this table because it depends on the importance of the individual component rather than that of the building as a whole, or its occupancy (see Section 13.1.3).

1.6 IN SITU LOAD TESTS

An in situ load test of any construction shall be conducted when required by the Authority Having Jurisdiction whenever there is