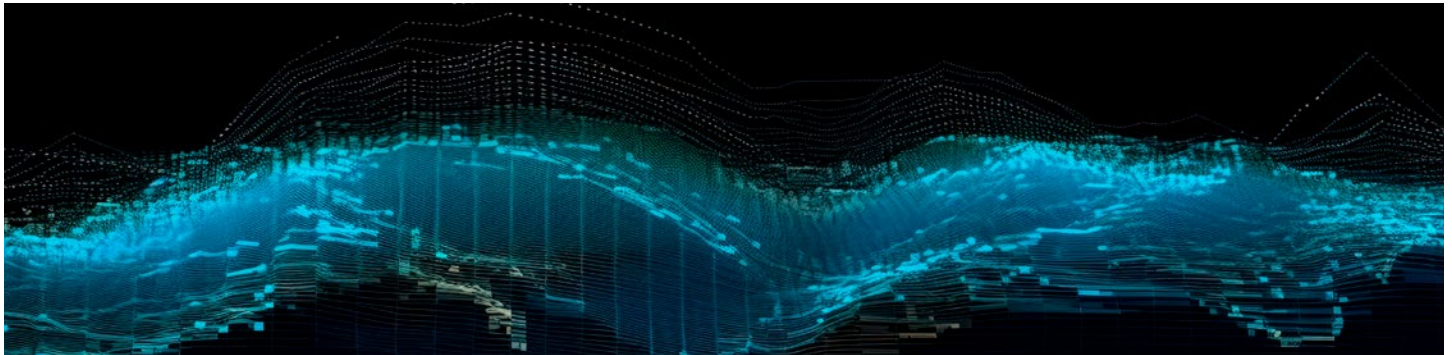


JULY 2023



From Experience

All Shook Up? Understanding Seismic Design Categories

Seismic activity can occur throughout the United States: In the first half of 2023, seismic epicenters were recorded in Alaska, Hawaii, Washington, California, Nevada, Utah, Texas, Oklahoma, Arkansas, Ohio, and New York. The International Building Code (IBC), which is currently adopted in all U.S. states, uses Seismic Design Categories (SDCs) to help building designers ascertain the risk and magnitude of seismic activity for different building types across different regions of the country. The code provides design coefficients for building projects to be able to withstand potential seismic activity.

SDCs, which are derived based on a combination of soil analysis and ground motion and acceleration data, aid in determining the lateral load for a building and its components based on coefficients and the self-weight of the structure or component. That's right: The structure is not the only thing that must be considered in seismic areas! Everything inside the building must be addressed as well, including partition walls, ceilings, hung piping, equipment, and tanks, etc. This is why, particularly in areas where earthquakes are a relatively rare occurrence, companies may be surprised during a new build or renovation project to find that the engineer and/or architect has taken seismic activity into account in their designs. Seismic design may indicate an increased need

for bracing and anchoring, all of which is intended to help companies protect their occupants as well as their property.

The following information provides a look at the SDCs as related to architectural, mechanical, electrical, and process components. SDCs range in classification from "A" through "F", with "A" being areas with the weakest seismic activity and "F" being those with the strongest. Depending on the category assigned to building, the

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The IBC component importance factor "I_p" (not to be confused with the building importance factor "I") is given a design coefficient of either 1.0 or 1.5. The magnitude of seismic design load is 50% more for high importance components, which include:

- Life safety components required to function after an earthquake.
- Components containing hazardous material in quantities greater than exempted amounts, e.g., ammonia, chemicals, gas lines.
- Components that are in, or attached to, structures required to function after an earthquake and that are needed for the facility to continue operation, or the failure could impair the operation of the facility.

building itself and its components must be designed and constructed to resist lateral forces and displacements unless exempted as noted below.

- **SDC A:** These buildings have the lowest chance of seismic activity. Architectural and mechanical/electrical/process components are exempt from seismic design requirements.
- **SDC B:** These buildings have a fairly low chance of seismic activity. Mechanical/electrical/process components are exempt from seismic design requirements. Most architectural components are exempt from seismic design requirements, with the exception of parapet walls, as historically these have performed deficiently during seismic events.
- **SDC C:** Architectural components in this category do require seismic design, and examples include parapet walls, ceilings, cabinets, and laboratory equipment. Mechanical/electrical/process components are exempt from seismic design requirements provided they have an importance factor of 1.0 (i.e., they don't transport or contain toxic or explosive substances and are not required to remain functional for life-safety after a seismic event).
- **SDC D, E, F:** These are areas with the greatest seismic potential. All architectural components require seismic design and most mechanical/electrical/process components do as well, although there are some mechanical/electrical/process exemptions. These include lightweight (<20 pounds) items, light- to medium-weight items (<400 pounds) anchored within 4 ft. of the floor, and lightweight distribution piping weighing (<5 pounds per ft.) that conveys non-toxic, non-explosive substances.

To determine what SDC area your plant is categorized under, contact your structural engineer.

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