

Acceptance Standards for Seismic-Resistant Cable Tray Supports



Overview

Westinghouse AP1000 Design Control Document Rev. 19 This appendix provides the design criteria for seismic Category I cable trays and their supports. Seism.

Key Takeaways

Seismic-resistant cable tray supports require proper bracing, anchorage, tray selection, and adherence to local seismic codes to ensure system integrity during earthquakes. Key Design Considerations1. Compliance with Local Seismic Codes Cable tray supports must meet the seismic requirements specified in local building codes, which vary by region and seismic risk level.

In high-risk areas like California, Japan, or parts of South America, seismic braces are often mandatory for all cable trays to prevent system failure during earthquakes. Critical facilities such as hospitals, data centers, and emergency power systems require higher levels of seismic resistance. 2.

Seismic Design Basis Before selecting supports, confirm the project-specific seismic design basis. This includes expected ground acceleration, building response, and performance criteria. The seismic design basis influences tray selection, brace layout, splice design, anchor demand, and cable retention strategy.

3. Tray Type Selection Tray type affects seismic performance. Ladder trays are preferred for primary distribution due to their structural stiffness and efficient weight-to-strength ratio.



Perforated or trough trays may be used if evaluated for mass, support spacing, and cable retention. Wire mesh or basket trays require careful review of splice and support details, while channel trays are generally suitable only for light-duty runs. 4.

Bracing Methods Seismic bracing can be cable bracing or rigid bracing: Cable bracing works in tension and requires two opposing braces at each location. Rigid bracing resists both tension and compression, requiring one brace per location, but is limited by drop length. Braces connect the tray to structural elements such as beams, ceilings, or walls to prevent excessive movement during seismic events.

5. Anchors and Building Attachments The performance of a seismic cable tray system depends on secure attachment to the building. Hangers, trapezes, beam clamps, concrete inserts, and post-installed anchors must be verified for seismic forces.

Concrete anchors should be suitable for the substrate and seismic demand, including cracked concrete conditions. Hardware acceptable for gravity support may not meet seismic requirements. 6.

Retention Hardware Cable retention devices should be integrated into the seismic design rather than added later. Proper retention prevents cable displacement, which could interrupt critical power, control, or data systems during an earthquake. 7.

Analytical and Field Verification Seismic performance should be verified through analytical review and field inspections. Shake table tests and past earthquake observations indicate that minor buckling or yielding may be acceptable, but non-ductile connections or unsupported cantilever posts can lead to collapse.

Documentation and final verification ensure that installation changes do not compromise seismic performance.

8.

Cost-

Benefit Considerations While seismic braces increase installation costs, they provide long-term protection against system failure, equipment damage, and safety hazards. The investment is particularly justified in critical infrastructure.

Summary

To ensure seismic-resistant cable tray supports: Follow local seismic codes and project-specific design criteria. Select tray types and bracing methods suitable for expected seismic forces. Verify anchors, building attachments, and retention hardware.

Conduct analytical and field verification to confirm performance. Document all design and installation steps to maintain compliance and reliability. These measures collectively maintain cable tray integrity, prevent service interruptions, and protect personnel and equipment during seismic events.

Article Content

Westinghouse AP1000 Design Control Document Rev. 19

This appendix provides the design criteria for seismic Category I cable trays and their supports. Seismic Category II cable trays and their supports are also designed utilizing the design criteria of this appendix.

Rev 7 to Procedure SAG.CP3, "Seismic Design Criteria for Cable Tray ...

The design requirements for seismic Category I structure are delineated in Regulatory Guide 1.29. This document provides the seismic design guideline for cable tray hangers of Comanche Peak Steam

Understanding the Seismic Resistance of Cable Trays

This article discusses the importance of seismic resistance for cable trays, detailing when seismic braces are necessary, the factors that affect seismic resistance, and how to ensure your

Cable Tray and Conduit System Seismic Evaluation Guidelines

Guidelines are presented here for conducting in-plant seismic ruggedness review of conduit, cable trays, and their support systems. The in-plant review has two purposes.

SEISMIC BRACING OF A DISTRIBUTED CABLE TRAY SYSTEM

Seismic forces for the cable trays, including the cable weights, were calculated using the nonstructural component seismic provisions of the 1994 UBC, which was the applicable design code in effect.

IEC 61537:2023

This document specifies requirements and tests for cable tray systems and cable ladder systems intended for the support and accommodation of cables and possibly other electrical equipment in

Performance-based optimum seismic design of cable tray system

The seismic performance levels of cable tray systems are presented according to current seismic design codes. A performance-based optimum seismic design procedure for cable tray

Design and Installation Manual for Seismic Bracing of Cable Trays

It explains when you need bracing, how you should review support layouts, which components matter, and what you must check before closing the ceiling or energizing the tray route.

Cable Tray Checklist for High-Seismicity Projects

When those elements are coordinated early, cable tray systems can perform far more reliably under earthquake demands. Planning a project in a high-seismicity region? Contact our team

IEC 61537:2023 | IEC

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Smart Cable Tray Covers: A Buyer's Guide to Material,

Explore cable tray cover types, materials & standards to optimize safety and system ROI. Read more in our expert guide.

Cable Tray Technical Guide A practical guide to product selection and ...

A practical guide to product selection and installation This guide for engineers and installers has been developed by ABB as a practical reference regarding cable tray characteristics, installation, and

V.C. Summer Nuclear Station, Units 2 and 3, Rev. 3 to Updated ...

Cable Trays and Cable Tray Supports This appendix provides the design criteria for seismic Category I cable trays and their supports. Seismic Category II cable trays and their supports are also designed

Seismic analysis and design of electrical cable trays and support ...

The design aspects of electrical cable trays and support systems are discussed from the seismic and structural standpoint. The effects of the inherent flexibility of commonly used cable trays

Cable Tray Seismic Performance Testing: What You

Learn why Cable Tray Seismic Performance Testing is essential for infrastructure safety, and what standards ensure your trays can withstand

Test-based approach to cable tray support system analysis and

Nuclear power plant safety-related cable tray support systems subjected to seismic loadings were originally understood and designed to behave as linear elastic systems. This

SEISMIC BRACING OF A DISTRIBUTED CABLE TRAY SYSTEM

Above these cabinets, are cable trays that provide power and communications cabling to the cabinets. Since the facilities were located in a area of high seismicity, the cable tray system was required to be

Cable Tray Installation Quality Assessment Guide

What Is Cable Tray Installation Quality Assessment? When installing cable trays, meeting installation quality standards is vital to guarantee the durability, safety, and performance of

Contact Us

Continue your research online:

Website: <https://ensaa.es>

Technical inquiry: <https://ensaa.es/contact.html>

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

