Function of Seismic-resistant Cable Tray Supports



Overview

Understanding the Seismic Resistance of Cable TraysThis article discusses the importance of seismic resistance for cable trays, detailing when seismic brac.

Key Takeaways

Seismic-resistant cable tray supports use coordinated bracing systems, including strut channels, clamps, anchors, and diagonal braces, to transfer seismic forces from the tray to the building structure. Key Components and Load PathSeismic-resistant cable tray supports are designed to prevent lateral sway, longitudinal movement, anchor pullout, and cable spill during earthquakes. Unlike standard trapeze supports that only carry gravity loads, seismic bracing systems create a continuous load path from the cable tray to the building structure using: Strut channels and clamps to connect trays to bracesAnchors embedded in structural elements (beams, walls, or slabs)Diagonal bracing between tray layers to resist longitudinal and lateral forcesBolted tray splices to maintain structural continuity across sections This coordinated system ensures that seismic forces are safely transmitted to the building without overstressing the tray or its supports ( ).

Tray Types and Support Considerations

The type of cable tray affects seismic support design: Ladder trays are preferred for high-density power or critical communication lines due to their strong structural form and efficient weight-to-strength ratio ( ). Perforated or trough trays may be used but require careful evaluation of mass, support spacing, and cable retention. Wire mesh or basket trays are suitable for light-duty runs but need reinforced splice and support details in high-seismic zones.

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Support spacing is reduced compared to standard installations, and the tray's self-weight, cable fill, and route elevation must be considered when designing braces ( ).

Installation and Bracing Layout

Seismic bracing is typically required when: Trays carry critical power, emergency, or communication cablesRoutes are suspended above occupied areas, equipment rooms, or evacuation pathsThe system must remain operational after an earthquake ( ) Bracing layouts often include: Vertical supports from structural elements to tray layersDiagonal braces connecting multiple tray layers for longitudinal stabilityCross-bracing to resist lateral forcesAnchors and clamps verified for seismic load capacity All components must be traceable and documented, and installation should comply with local seismic codes, IEC 61537, or project-specific design criteria ( ).

Practical Examples

In high-seismicity facilities, such as telecommunications buildings: Multiple layers of ladder-type cable trays are supported by proprietary steel channels and threaded rodsDiagonal bracing connects tray layers longitudinallyBolted connections and clamps maintain tray integrity during seismic events ( ) Performance-based design and full-scale testing are often used to verify that the system can withstand expected seismic accelerations ( ). SummarySeismic-resistant cable tray supports are engineered systems that combine structural elements, braces, anchors, and tray interfaces to ensure safety and continuity of critical electrical and communication systems during earthquakes.

Proper tray selection, bracing layout, and adherence to seismic codes are essential to prevent damage, maintain service, and protect personnel and equipment.

Article Content

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 Supports

Seismic Supports Cable trays are systems used for the safe transportation and protection of electrical cables, designed to fit the pathways within buildings and

Seismic MEP Solutions | Eaton

Eaton''s TOLCO seismic bracing solutions help protect people and non-structural components during an earthquake. For over 60 years, the mechanical, electrical, and fire protection trades have relied on

SEISMIC BRACING OF A DISTRIBUTED CABLE TRAY SYSTEM

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Since the facilities were located in a area of high seismicity, the cable tray system was required to be braced to resist seismic forces. In addition, the owner of the facility imposed additional design criteria

Design and Installation Manual for Seismic Bracing of Cable Trays

Seismic Bracing improves cable tray stability, controls sway, and protects critical power and data systems in seismic zones.

Performance-based optimum seismic design of cable tray system

The cable tray systems designed according to the proposed procedures can derive the cost-efficient solution and meet the expected seismic performance objectives for cable tray systems

Cable Trays Seismic Design: Protecting Power in

Learn how I approach Cable Trays Seismic Design to protect power and data in earthquake-prone areas. Understand key principles, methods, and

Cable Tray Checklist for High-Seismicity Projects

High-seismicity projects place much greater demands on cable tray systems than ordinary installations. During an earthquake, cable trays are exposed not only to gravity loads and

How Cable Trays and Seismic Bracing Systems Mitigate Earthquake

As manufacturers of cable trays, seismic brackets, and light steel keels, we recognize that integrating purpose-built seismic support systems into buildings and critical facilities can dramatically

Cable Tray and Conduit System Seismic Evaluation Guidelines

Seismic ruggedness of raceway systems is defined as protecting electrical cable function and maintaining overhead support. Minor damage, such as member buckling or connection yielding, is

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

Most cable trays in nuclear power plants are classified as seismic category I components. Current safety requirements dictate that all such components be adequately designed in order to

Vogtle Electric Generating Plant (VEGP) Units 3 and 4 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

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Performance-based optimum seismic design of cable tray system

The results show that the proposed performance index (drift ratio between adjacent supports) for cable tray systems is a reasonable criterion for performance-based seismic design 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

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

Circuit Integrity of Cable Tray Wiring Systems During Natural Disasters

For those installations, Seismic Restrained Cable Tray Wiring Systems may be obtained by providing the proper multidirectional bracing for the cable tray supports. Fig. 1 The 0 to 4 values show the

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

Seismic Supports for Electrical Cable Systems

Seismic Category I supports for electrical conduit and cable tray systems are described. Types of supports and their analysis, design, and installation are also presented. Approximate formulas for

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