Construction and Installation Scheme for Seismic Bracing of Cable Trays



Overview

In seismic design, the support and bracing system is often more critical than the tray section itself. A standard gravity-only support layout is not enough for a high-seismicity installation.

Key Takeaways

Seismic bracing of cable trays involves selecting the appropriate tray type, installing lateral and sway braces, reinforcing splice joints, and ensuring cable retention according to seismic design codes. 1.

Confirm Seismic Design Basis

Before installation, verify the project-specific seismic criteria, including seismic zone, design acceleration, and building code requirements (e.g., UBC, AS1170. 4, or local standards) as these dictate tray selection, brace layout, and anchor requirements. 2.

Select Appropriate Cable Tray Type

Ladder trays are preferred for primary distribution due to their structural strength and efficient weight-to-strength ratio. Wire mesh or basket trays can be used but require careful review of splice and support details. Channel trays are suitable only for light-duty runs.

3.

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Install Tray Supports and Trapeze Systems

Use 3/8" threaded rods for trapeze installations to attach trays and cables. Ensure predrilled tabs or anchors are used for direct attachment to concrete decks or structural members. Maintain support spacing as specified by the seismic design, typically every 30 feet or less for long runs.

4.

Lateral and Sway Bracing

Install diagonal bracing between layers of cable trays in the longitudinal direction using proprietary steel members, bolts, and clamps. Use 2-way or 4-way cable braces to allow internal cable movement while maintaining seismic restraint, ensuring a minimum clearance of 150 mm between anchors. Braces should align with trapeze supports and follow the seismic design drawings.

5.

Splice Reinforcement

Splice joints are common weak points; use bolted splice assemblies designed for seismic loads. Verify that splice assemblies are tested or certified for seismic performance and match the intended installation. 6.

Differential Movement and Seismic Joints

Provide flexible connectors or movement allowances where trays cross seismic joints or connect separate structures. Ensure transitions accommodate building drift and differential movement without overstressing the tray or cables. 7.

Cable Retention

Secure cables within trays using hold-down clamps or straps to prevent displacement during seismic events. Ensure that cable retention does not rely solely on tray attachment; cables must remain in place even if trays experience lateral movement. 8.

Verification and Compliance

Confirm that all bracing, supports, and attachments comply with applicable building codes and seismic standards. Consider using pre-approved assembly drawings and engineering services for PE-stamped verification, especially for critical installations. Inspect all connections, braces, and cable retention devices before energizing the system.

By following these steps, cable trays can be effectively braced to resist seismic forces, ensuring both structural integrity and operational reliability during earthquakes.

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Article Content

Cable Tray Checklist for High-Seismicity Projects

In seismic design, the support and bracing system is often more critical than the tray section itself. A standard gravity-only support layout is not enough for a high-seismicity installation.

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Requirement: Each straight run requires a minimum of (2) transverse braces and (1) longitudinal brace.

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Connect cables directly to 3/8" threaded rod in trapeze installations for seismic bracing. Use 2 EZ BN 3/8 to attach cables to FAS PCH for sway bracing. Predrilled tabs allow attachment directly to concrete

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