Eddy Currents in Cable Trays and Cables

Summary of Content

Eddy currents in cable trays are circular currents induced in metallic trays by alternating magnetic fields from power cables, generating additional heat that can affect cable ampacity.

How Eddy Currents Are Generated

Eddy currents occur when alternating currents in power cables produce changing magnetic fields, which induce circular currents in nearby conductive materials, such as galvanized steel or other metallic cable trays. These currents flow within the tray material and generate Joule heating, contributing to the overall thermal environment around the cables . The magnitude of these currents depends on the tray's material conductivity, magnetic permeability, and geometry, as well as the frequency and arrangement of the cables.

Effects on Cable Ampacity

The heat generated by eddy currents can increase the temperature of the cable tray, which in turn affects the ampacity of the cables. While for typical trays the additional heat is usually small compared to the cable conductor losses, improper cable arrangement or phase sequence can lead to significant localized heating, sometimes reaching temperatures around 70°C . This is particularly critical for magnetic metal trays, where the combination of eddy currents and magnetic hysteresis can exacerbate heating.

Mitigation Strategies

Article Content

Reducing Eddy Currents in Cable Installations

To reduce these losses, the sheath/armour can be bonded at only one end to prevent circulating currents while splitting or alloying

Ampacity of Power Cables Installed in Cable Trays

Explore the factors affecting cable ampacity in trays, including thermal and electromagnetic effects. Learn calculation methods and

How to Avoid Severe Heating of Metal Cable Trays The eddy currents

In the case of cables on magnetic metal such as galvanised steel tray: The alternating currents in the cables produce changing

Reduction of Eddy Current Losses in Pipe-Type Cable Systems

The pipe is exposed mainly to a circumferential time-varying magnetic field created by the three phase current in the cables inside

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(PDF) A study on the overheating of the power cable tray

The influences of the power cable arrangements and material of the tray were analyzed to find the best solutions using

Proximity Heating Effects in Power Cables

Fig. 1. ty II. THE PROXIMITY EFFECT IN ELECTRIC CABLES conductors by elec-tromagnetic induction. The eddy currents in each

Eddy Currents with single power cables

Long cables and/or high current would tend to have larger voltages between the armour ends if single point bonded -

How to avoid eddy currents during the installation of mineral-insulated ...

However, improper installation can easily generate eddy currents, leading to cable overheating, increased losses, and

A Study on the Overheating of the Power Cable Tray

When the magnetic materials are exposed to a time-varying field, the induced voltages from the time-varying field cause currents as

Contact Us

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