

电工理论与新技术

舰船钢板地电流干扰传播方向的确定方法

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摘要: 舰船钢板地电流通过地回路公共阻抗在不同电气电子设备之间形成电磁干扰, 严重时将使敏感设备无法正常工作, 因此必须对舰船钢板地电流的分布和传播方向进行深入研究。该文指出了确定单频率点钢板表面电流方向的旋转法不适用于频率扫描测量, 提出了一维3次测量和二维2次测量确定钢板表面电流方向的新方法, 并经电流集中效应理论分析及实艇实验进行了验证。实验时, 只需计算出钢板表面磁场的方向, 然后根据电流与磁场的垂直关系即可确定出钢板表面电流的方向。提出的钢板表面电流方向的确定方法, 可在舰船钢板地电流干扰传播方向的辨识中得到应用, 具有重要工程应用价值。

关键词: 钢板地电流 传播方向 表面电流 表面磁场 电流集中效应

Interference Propagation Orientation Determination of Steel Plate Ground Current in Vessels

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Abstract: The Electromagnetic Interference (EMI) among various electrical and electronic equipment formed by ground current in steel plate in vessels via common ground loop impedance could even result in the malfunction of the sensitive devices under some serious conditions. The paper pointed out that the rotational means to find the surface current direction of single frequency is not applicable in frequency scan measurements of large-scale steel plate. Therefore, one-dimensional triple-measurement and two-dimensional double-measurement methods were put forward to determine the surface current directions of steel plate at various frequencies simultaneously, which were verified by the theoretical analysis of current constriction effect and a designed test in a vessel. Provided that the surface magnetic field orientation is calculated, we can get the corresponding surface current direction easily according to the perpendicularity between current and magnetic field. The achievements can be applied to the propagation path determination and identification, which is significant in the practical engineering application.

Keywords: ground current of steel plate propagation orientation surface current surface magnetic field current constriction effect

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