

电力系统

降低高压交流输电线路地线损耗的运行方式

李本良¹, 袁兆祥¹, 惠旭², 刘玉孝³, 邹军⁴

1. 国网北京经济技术研究院, 北京市 宣武区 100052; 2. 河南省电力公司, 河南省 郑州市 450007; 3. 河南省电力勘测设计院, 河南省 郑州市 450007; 4. 清华大学 电机工程与应用电子系, 北京市 海淀区 100084

摘要:

为降低高压交流线路因电磁感应导致的地线损耗, 提出了光纤复合架空地线(optical fiber composite overhead ground wire, OPGW)换位和普通地线分段绝缘的地线连接方式, 并与常用地线运行方式的地线损耗进行了定量比较, 计算结果表明: 该地线连接方式的地线损耗仅为常用运行方式的25%, 节能效果明显, 同时OPGW电气上保持连续, 其通信功能不受影响。

关键词:

Operation Mode of Ground Wire to Reduce Ground Wire Loss of HV AC Transmission Lines

LI Benliang¹, YUAN Zhaoxiang¹, HUI Xu², LIU Yuxiao³, ZOU Jun⁴

1. State Power Economic Research Institute, Xuanwu District, Beijing 100052, China; 2. Henan Electric Power Company, Zhengzhou 450007, Henan Province, China; 3. Henan Electric Power Design Institute, Zhengzhou 450007, Henan Province, China; 4. Department of Electrical Engineering, Tsinghua University, Haidian District, Beijing 100084, China

Abstract:

To reduce the ground wire loss caused by inductive coupling in high voltage AC transmission lines, a new ground wire connection mode, in which the transposition of the optical fiber composite overhead ground wire (OPGW) is combined with sectionalized insulation of common ground wire, is proposed and quantitatively compared with the loss of ground wire adopting commonly used operation mode. Calculation result shows that the loss of ground wire adopting above-mentioned operation mode is only 25% of commonly used ground wire operation mode, so the effect of energy conservation is evident. Meanwhile, the electrical connectivity of OPGW is still kept under the new operation mode, thus its communication function is not influenced.

Keywords:

收稿日期 2010-02-24 修回日期 2010-10-11 网络版发布日期 2011-03-11

DOI:

基金项目:

通讯作者: 李本良

作者简介:

作者Email: lb3170@sohu.com

参考文献:

[1] 刘振亚. 特高压电网[M]. 北京: 中国经济出版社, 2006: 11-30. [2] 胡毅, 刘凯. 输电线路OPGW接地方式的分析研究[J]. 高电压技术, 2008, 34(9): 1885-1888. Hu Yi, Liu Kai. Analysis and research of grounding modes of optical fiber ground composite wire[J]. High Voltage Engineering, 2008, 34(9): 1885-1888(in Chinese). [3] 李杰, 陈希, 林卫铭. 光纤复合架空地线(OPGW)热性能的研究[J]. 电网技术, 2006, 30(1): 89-93. Li Jie, Chen Xi, Lin Weiming. Study on heat properties of optical fiber composite overhead ground wires[J]. Power System Technology, 2006, 30(1): 89-93(in Chinese). [4] Keri A J F, Nourai A, Schneider J M. A method of reducing power loss in ground wire of overhead transmission lines[J]. IEEE Transactions on Power Apparatus and Systems, 1984, 103(12): 3615-3624. [5] Nourai A, Keri A J F, Shih C H. Shield wire loss reduction for double circuit transmission lines[J]. IEEE Transactions on Power Delivery, 1988, 3(4): 1854-1864. [6] 王学峰, 吕艳萍. 减小避

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(308KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

本文作者相关文章

PubMed

雷线中电能损耗方法的研究[J]. 高电压技术, 2005, 31(9): 28-30. Wang Xuefeng, Lü Yanping. Research on reducing the power loss in lightning shield line[J]. High Voltage Engineering, 2005, 31(9): 28-30(in Chinese). [7] 李振强, 戴敏, 娄颖, 等. 特高压线路地线布置方式对地线电能损耗及潜供电流的影响[J]. 电网技术, 2010, 34(2): 24-28. Li Zhenqiang, Dai Min, Lou Ying, et al, Effect of UHV ground wire disposition on its electric energy loss and second arc current[J]. Power System Technology, 2010, 34(2): 24-28(in Chinese). [8] 熊一权. 超高压线路架空地线降耗措施[J]. 内蒙古电力技术, 2001, 19(2): 33-34. Xiong Yiquan. The measure for lowering the loss of the overhead power lines with super high voltage[J]. Inner Mongolia Electric Power, 2001, 19(2): 33-34(in Chinese). [9] 周响凌. OPGW与输电线路损耗之间的关系探讨[J]. 电力系统通信, 2001(6): 14-16. Zhou Xiangling. The discussion of the relationship between OPGW and power line transmitting loss[J]. Telecommunications for Electric Power System, 2001(6): 14-16(in Chinese). [10] 程慕尧. 架空输电线路导线换位及绝缘地线运行方式的优化方案[J]. 中国电力, 2000, 33(1): 57-58. Cheng Muyao. Optimization of conductor transposition and configuration of insulated ground wire on overhead transmission line [J]. Electric Power, 2000, 33(1): 57-58(in Chinese). [11] 吴伯华, 张孝军, 方瑜. 超高压线路绝缘地线的研究[J]. 中国电力, 1997, 30(3): 11-12. Wu Bohua, Zhang Xiaojun, Fang Yu. Study on the performance of insulated ground wire on EHV transmission lines[J]. Electric Power, 1997, 30(3): 11-12 (in Chinese). [12] 郭建国. 排列导线相序降低送电线路避雷线的电能损耗[J]. 黑龙江电力, 1994, 16(1): 5-8. Guo Jianguo, Reduction of electric energy loss in overhead ground wire for transmission line by arrangement of traverse phase-order[J]. Heilongjiang Electric Power, 1994, 16(1): 5-8(in Chinese). [13] 韦钢, 陈广, 张子阳, 等. 多回输电线并架时避雷线损耗的研究[J]. 电力建设, 2006, 26(3): 39-44. Wei Gang, Chen Guang, Zhang Ziyang, et al, Study on consumption of ground wire for multiple[J]. Electric Power Construction, 2006, 26(3): 39-44(in Chinese). [14] 邹军, 刘元庆, 袁建生, 等. 光缆复合地线系统故障电流分布的计算与讨论[J]. 电网技术, 2005, 29(10): 61-64. Zou Jun, Liu Yuanqing, Yuan Jiansheng, et al. Calculation and analysis of fault current distribution for compound optical ground wire system[J]. Power System Technology, 2005, 29(10): 61-64(in Chinese). [15] 江辑光. 电路原理[M]. 北京: 清华大学出版社, 2002: 42-100.

本刊中的类似文章