

## 特高压交流输电线路工频磁场在人体内的感应电流密度计算分析

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### 摘要

人体处于特高压输电线路附近时, 输电线路的交变电磁场将在人体中产生感应电流, 当感应电流密度超过一定限值后, 人体由于吸收电磁场能量而发热并对神经细胞组织造成刺激或损伤, 影响人体健康。采用三维涡流场的有限元分析方法计算了1000 kV输电线路下方工频交变电磁场在人体中的感应电流, 分析了人体感应电流密度的分布特点, 以及影响人体磁场感应电流大小的主要因素。研究表明, 在1000 kV特高压输电线路工频磁场作用下, 人体内感应电流密度远小于人体电流密度安全限值10 mA/m<sup>2</sup>。得出了磁场感应值不是1000 kV特高压输电线路最小对地高度的控制条件的结论。

关键词 [特高压; 输电线路; 工频磁场; 感应电流](#)

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## Calculation and Analysis on Power Frequency Magnetic Field Induced Current Density within Human Body under UHVAC Transmission Line

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### Abstract

At present, influence of AC magnetic field on human body and zoological environment becomes a focus problem concerned by human beings gradually. The alternating electromagnetic field of UHV transmission line will induce current within human body while human body is under Ultra-High Voltage (UHV) transmission line; when the density of induced current exceeds a certain limitation, it will affect human health caused by the stimulation or damage of nerve cell tissue because the energy of electromagnetic field absorbed by human body turns into heat energy and leads to fever of human body. By means of finite element analysis in three-dimension vortex field, the inductive current within human body induced by power frequency alternating magnetic field under 1000kV transmission line is calculated; the distribution feature of induced current distributed within human body as well as the principal factors impacting the value of induced current within human body are analyzed. Research results show that under the power frequency magnetic field of 1000kV transmission line, the density of induced current within human body is far less than the safety limit of body current density 10mA/m<sup>2</sup>. Thus, the conclusion obtained from this research is that the controlled condition of least height to earth for 1000kV transmission line does not depend on the induced value of magnetic field.

Key words [ultra-high voltage; transmission line; power frequency magnetic field; induced current](#)

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