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**LIGHTNING SURGES TRANSFERRED TO THE SECONDARY OF  
DISTRIBUTION TRANSFORMERS DUE TO DIRECT STRIKES ON MV  
LINES, CONSIDERING DIFFERENT LV LINE CONFIGURATIONS**

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**Abstract** - This paper aims at analyzing the behaviour of lightning surges transferred to low-voltage lines due to direct strikes on medium voltage networks considering two cases: open wire and twisted conductor low-voltage lines. The analysis considers the influences of parameters such as stroke current front time ( $t_f$ ), ground resistance ( $R_g$ ) and ground resistivity ( $\rho_g$ ) on the overvoltages transferred to low-voltage lines. The overvoltages are calculated employing the Alternative Transients Program (ATP) and the simulations refer to a typical rural distribution network of the Electrical Distribution Company of the State of Tocantins (CELTINS), Brazil. To evaluate the surges transferred to the low-voltage line, a high frequency model was developed for the distribution transformer. The results show that the use of twisted conductors configuration for the secondary circuit can reduce the magnitudes of the surges transferred through the distribution transformers.