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EXPERIMENTAL COMPARISON OF STEEL REBARS JUNCTIONS IN CONCRETE COLUMNS USED AS DOWN CONDUCTORS IN LIGHTNING PROTECTION SYSTEMS.

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Abstract: The Brazilian standard on lightning protection systems, the NBR5419 FEB/2001 version [1], allows the utilization of the structural steel rebars on concrete columns as a part of the protection system. In this paper is compared, by means of tests and verifications, several types of steel rebars junctions. Basically four types of junctions are studied: the most commonly used, steel wire knotted junction; electrical are welded junction; exothermal welded junction and threaded sleeve junction.

Initially it was measured the value of the electrical resistance of each type of junction. One sample of each type of junction was assembled inside of a wooden box and then the box was filled up with concrete in order to simulate small concrete columns. Such columns were then x-ray pictured and had its every electrical resistance measured again.

Tests with impulsive currents and direct current pulses are performed for every column and then each column was x-ray pictured and it was measured the electrical resistance again.

The aims of this study are: compare the behavior of each type of junction concerning a lightning discharge current flow and the estimation of the steel rebars impedances to be used as part of a protection system.

Beyond this, an extra concrete column was assembled with its internar steel rebars not joined and 5mm spaced. This column was also x-ray pictured and impulsive current tested.

Test results and verifications are presented in this paper, as well as the conclusions and the impedances calculations of steel rebars structures of buildings to have its structures used as part of the protection system.