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INTRODUCTION

Journal of Energy special issue: Papers from International CIGRÉ Colloquium "Application of line surge arresters in power distribution and transmission systems"

Welcome to this special issue, which is based on selected papers presented at the International CIGRÉ Colloquium "Application of line surge arresters in power distribution and transmission systems", held in Cavtat, Croatia, on May 25th–29th, 2008.

The International CIGRÉ Colloquium was organized by the Study Committees C4 (System Technical Performance) in cooperation with the Croatian National Committee and SCs A3 (High Voltage Equipment) and B2 (Overhead Lines). The goal of the Colloquium was to examine the various aspects of line arrester application (LSA) from system aspects to apparatus aspects. Ten main topics were covered in the four Colloquium sessions. The Colloquium extended over four days, organised in half-day sessions. Participants from manufacturers and utilities, along with those from universities and research centres, gave their presentations and took part in discussions. Three invited lectures were held, 38 papers were submitted and the Colloquium was attended by 90 participants from 24 countries.

The Colloquium covered many relevant issues on LSAs and provided the opportunity for all to discuss various aspects of LSA application. The ongoing improvement of surge arrester technology on the one side, and the requirement of higher reliability of much higher utilised transmission lines on the other, lead to an increasing use of LSAs for nearly all system voltage levels worldwide.

The main use of LSAs is to improve transmission line lightning performance or to avoid double circuit outages, but also other purposes for LSA installation have been reported:

- reduction of required insulation level and line compaction;
- reduction of the visual impact of overhead transmission line systems;
- replacement of ground wires to increase the capability of lines to cope with ice storms;
- overvoltage control in the vicinity of HV substations;
- improvement of lightning performance of different voltage level lines (by the installation of the LSA on the lower level insulation circuits only);
- line upgrading;
- security of the population;
- live line working.

Experience has shown that the use of LSAs for the improvement of line lightning performance is more efficient than conventional methods (installation of the unbalanced insulation on the double-circuit line, reducing tower footing resistance, etc.). Many LSAs are in service today and substantial service experience has been accumulated, which indicates that:

- the installation of LSAs have shown a good effectiveness in all reported cases;
- mechanical aspects of LSA installations have turned out to be a dominant root cause of in-service failures;
- only few cases of LSA failures caused by the inappropriate electrical features have been reported.

The important facts about LSAs that can be expected in the future are:

- the LSA design concepts will be further developed and the application of LSAs will grow;
- further development of computational models, procedures and computer programs will help to determine the optimal number, location and rating of LSAs to improve the reliability and availability of a transmission system;
- further development of monitoring systems for LSAs will enable their on-line monitoring and better control in service.

From the 38 papers presented at Colloquium, 16 papers were accepted for publication in Journal of Energy after having undergone the peer-review process. We would like to thank the authors for their contributions and the reviewers who dedicated their valuable time in selecting and reviewing these papers. It was very challenging to collect a balanced overview of the entire Colloquium, but we believe that the papers which were selected represent some of the best research about application of LSAs in power distribution and transmission systems. We hope this special issue will provide a valuable insight into LSA application, as well as a pleasant and inspiring reading.

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