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Conférence Internationale des Grands Réseaux Électriques à Haute Tension
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333. — REPORT OF THE COMMITTEE OF STUDIES No 8 " LIGHTNING AND SURGES "

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REPORT

Since the 1948 session, the Committee met three times to discuss the basis for statistics relative to surges and their resulting disturbances.

The first meeting was held in Paris in July 1948, shortly after the plenary session of the C. I. G. R. É. The second meeting took place in Lugano on July 6 and 7, 1948; the members of the Committee thus had the opportunity of visiting the installations located on Mount San Salvatore, near Lugano, for the study of lightning phenomena. The third meeting was held in Stressa during the summer of 1949, in conjunction with a meeting of the C. E. I.

The results of these meetings are brought out in a questionnaire, which the Secretary of the C. I. G. R. É. places at the disposition of all those interested and those who desire to assist in the collection of international statistics regarding the disturbances caused by lightning and internal surges. Following is the explanatory text that preceded the questionnaire.

" The Committee on Lightning and Surges of the C. I. G. R. É. decided to establish rules for statistics concerning disturbances in high voltage systems caused by lightning or by overvoltages. These statistics are intended to serve as a guide for power companies interested in the performance of their own installations in comparison to others; particularly as to the design of the system or to atmospheric conditions.

" It is recognised that any reliable comparison calls for identical bases of observation as well as a long period of observation e. g. five years. Only by this procedure the laws of probability are applicable, and there is no doubt that atmospheric overvoltages in a certain point or area of a system are subject to these laws.

" Therefore, it is suggested that all power companies interested in these statistics should send copy of their observations once a year to the " Lightning and Surges-Committee " of the C. I. G. R. É., these copies are to be sent either to the Secretary of the C.I.G.R.É. at Paris, or directly to the President of Committee No 8.

" This Committee will take care, as far as possible, of the interpretation of these data, and make available the results to the companies co-operating in this work, and prepare discussion at the meetings of the C. I. G. R. É. It would be appreciated if power companies interested in this research would present their findings either fully or in part at the meetings of the C. I. G. R. É.

" Exact and reliable observations will be very important not only to compare different designs but also to get an idea of the value of different means of protection.

" The statistics are divided in two parts. The first refers to over headlines only, the second to stations. There is no doubt that statistical work is far more difficult to cover stations than lines, as the practics of insulation and design of stations is less uniform than that of lines. The economic importance, however, of damages of expensive station material and the need for a true criterion of the value of protection calls for special statistics of stations. Power companies can participate either in the first or second part or both of the statistics.

" The statistics are to cover system-voltages higher than 30 kV, an exception being made for alternators connected to overhead lines either directly or through transformers.

" Samples of the form to be filled in are available on application to the Secretary of the Paris Office of the C. I. G. R. É. "

The Committee desires, particularly, to call the attention of the participants to this questionnaire. It is hoped that such a mutual basis will make it possible to compare the observations of the different countries. It is understood that each case has its own particular problems. It seems all the more necessary to call attention to the common basis which influence the behaviour of the networks in reference to surges.

The Committee has also discussed the special problem of a more thorough knowledge of the locations and frequencies of lightning discharges to the earth. There exists in South Africa special instruments developed for this purpose. Information given by an instrument capable of counting the number of lightning discharges to the earth within a certain limited area, for example a square kilometer, would be much better than that now given by the isokeraunic figure, that is to say the number of stormy days per year. Actually, the lightning discharges between clouds, which do not reach the earth, have no important effect on the operation of high tension networks. To judge of the actual severity of storms, or rather the danger from storms, only those discharges which reach the earth should be considered. The problem seems difficult enough to solve in an objective manner, but it merits, all the more, our attention.

The Committee believes, in addition, that the future efforts should concentrate on the following questions :

1. Investigation of lightning phenomena and resulting surges.
2. Investigation of internal surges.
3. Methods and instruments used for the objective measuring of the severity of storms (number of discharges to the earth per square kilometer, for example) in a certain region.
4. Behaviour and tests of lightning arresters.
5. Study of all other means of protection against surges, including their grounding.
6. Vocabularly of the expressions relative to lightning and surges and to the means of protection from them.

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