С.Сейфуллиннің 120 жылдығына арналған **«Сейфуллин оқулары–10: Мемлекеттің индустриалды–инновациялық саясатын құрудағы бәсекеге қабілетті кадрларды дайындау келешегі мен ғылымның рөлі**» атты Халықаралық ғылыми-теориялық конференциясының материалдары = Материалы Международной научно-теоретической конференции **«Сейфуллинские чтения–10: Новые перспективы подготовки конкурентоспособных кадров и роль науки в формировании индустриально-инновационной политики страны»,** посвященная 120-летию со дня рождения С.Сейфуллина**.** – 2014. – Т.I, ч.2. – С.242-243

CURRENT PROBLEMS OF CAPACITANCE CURRENT COMPENSATION IN 6-10 KV NETWORKS

Ferrari S.,Obeid H., Utegulov B.B.,Utegulov A.B.,
Uakhitova A.B, Suleimenova R.Z.,
Kalikov N.K.

One of the main factors of the three-phase electrical networks with isolated neutral voltage above 1000 V effectiveness reduction is damaging the insulation of any phase due to ground. Since the reliability of the electrical network operation related to the insulation damage in the existing electrical installations 6 kV, it follows that the issues of electrical personnel safety are also open.

It should be noted that staff who works on the renewable electrical power sources and autonomous power station, both in our country and abroad, can receive an electric shock of fatal intensity as a consequence of an accident. During the survey of accidents, just organizational measures were done, in order to prevent the electric shock received by people who work at the station. On technical measures necessary operations were not carried out. Hence, for people working on the renewable electrical power sources and autonomous power station, the possibility of receiving electric shock is still on high level.

Preventing the emergence of single-phase earth fault is possible by monitoring the insulation resistance of the network due to ground, predicting the possible occurrence of a single-phase ground fault and making activities which will exclude that fault mode.

However, nowadays, the insulation parameters determination methods are not widely used. It happens because during the measurements a significant number of transactions should be done, or it is related to the complexity of the electrical quantities measuring schemes for which mathematical relationships are used to determine unknown quantities, as well as the use of ammeter-voltmeter method. All these reasons also contribute to reduce the electrical safety of the personnel occupied to take the measurements.

There is an acute problem of capacitive current compensation in three-phase networks with isolated neutral voltage above 1000 V, that contains electrical network with distributed parameters, where earth fault currents is above 5.0 A. The network operation practice with earth fault currents greater than 5.0 A shows that damage to the insulation of any phase due to the ground leads to a multi-phase short-circuit. This happens because high currents in the place of single-phase circuit, leads to insulation heating and to its destruction.

It should be noted that, the most dangerous type of overvoltage is the internal overvoltage, which are formed after disconnecting the faulty feeder, when single-phase earth fault takes place. The predominant mode of damage in 6 kV electrical networks are single-phase ground fault, with constituting about 75% of total damage.

Modern types of overvoltage protection are ineffective, since overvoltage are not dangerous by its largest peak value, but by its frequency characteristics. This issue is important not only in our country but also abroad.

To develop and implement organizational and technical innovation activities to ensure resources and improve electrical safety during the operation of three-phase electrical networks with isolated neutral voltage above 1000 V, its required to make isolation condition research and to determine the current values of single-phase ground fault on feeders.

Carried out researches on effective ways of overvoltage reduction in 6 kV networks by compensating the capacitive earth fault current indicated that their main disadvantage is its control system. Due to the existing arc suppression coils control methods in the internal power supply of industrial enterprises big accidents happens, which led to the rejection of the compensation of capacitive current in networks of the internal power supply enterprises.

To compensate the capacitive current in the internal power supply, its required to develop an innovative way to control arc suppression reactors that increase the effectiveness against overvoltage arising during the emergency mode of three-phase electrical networks with isolated neutral voltage above 1000 V.

As it is evident from the foregoing, the task of technical reliability and the level of electrical safety increase in the three-phase electrical networks operation with isolated neutral voltage above 1000 V consists in the development of: control methods of the insulation parameters and single-phase short-circuit; Mathematical models models using traditional and computational intelligent methods of insulation condition and compensation of capacitive current, automatic control with a flexible architecture based on the use of neural networks.