Journal of Electronic Research and Application
OPEN

Maintenance of Operation Faults of Distribution Line in Power System

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Abstract: At this stage, influenced by the rapid economic, China's electricity demand is also increasing at an average annual rate of more than 10% which has posed great challenges to the power industry, so ensuring the stability and reliability of the power system has gradually become a common requirement of society. The characteristics of 10kV distribution network which is as the basis of power system structure features wide coverage, long lines, high risk of fault in the operation, therefore, a good daily maintenance work and high reliability of its operation are becoming one of the most urgent task.

Key words:Power system; Distribution line; Operation fault; Maintenance
Published online: 30th Nov 2017

1 Analysis of Common Fault of 10kV Power Distribution

1.1 Line-to-Ground, Strip Fault

Grounding fault and strip fault are common faults which occurred in general during the rainy season and autumn typhoon rainstorm, in addition to the misoperation of relay protection and the touch of trees below the line which may lead it to happen, the insulator itself is also an important factor leading to this fault. Moreover, it is often hard to find the fault in time in patrolling process and also the insulation resistance reduction and micro cracks caused by surface discharge flashover. Once grounding and strip fault of the 10kV distribution line happens, the normal supply of electric energy will be seriously affected.

1.2 Short Circuit Fault of 210kV Distribution Line

In the operation process of distribution network, 10kV distribution fault short circuit is also common, which mainly caused by lightning breakdown and external damage, and if the weather is too bad, the wire rods down or fractures and swingling cross which are all likely to lead to the short-circuit fault of the 10kV distribution line. And when they occur which mainly are quick break protection of outlet switch in substation or over-current protection action and switch tripping. The short circuit fault may lead to burnout of the whole line, which poses a serious threat to people's life and property safety.

1.3 Line Break Faults

In the running process of 10kV distribution line, line disconnection may happen, and the main reasons which lead to this failure is due to the impact of external forces, such as the lightning conductor and other external factors damage. It may make the switch station, power station, box change and end user lack phase, causing serious abnormal operation of the 10kV distribution line and affecting people's life and work.

1.4 Imperfect Lightning Protections and Grounding Connection

Imperfect lightning protection and grounding connection is also a kind of common faults. It generally uses 10kV lightening protector in the 10kV distribution circuit which may have lost efficacy after long time operation, and thus cannot effectively avoid lightning. Secondly, if the grounding device which is not measurement for its grounding resistance in strict accordance with the provision, it is very easy to cause the grounding fault. If

grounding lead wire and earthing main line of distribution transformer of lighting protection faults to ground which also may cause the 10kV distribution lines lighting protection and grounding problems.

2 Effective Measures to Prevent 10kV Distribution Network Accident

2.1 Strengthen Fault Prevention of Natural Disasters

For the distribution line fault caused by natural disasters, it has to be fully examined the geographical environment and weather factors of erection area before distribution line installation. If it is windy weather, the distance between the tower should be shortened, thus to reduce the vibration line caused by wind and which is also applicable to the Doolittle and area line construction work with serious icing phenomenon. Because the ice disaster will last for a long time, so the line patrol officers need to determine the arrival time of ice catastrophe according to past data, strengthen the inspection work, and do maintenance in advance.

2.2 Against External Damage Management

To improve the emergency response mechanism and plan of preventing external force from breaking accident for distribution lines, clear all levels of staff responsibilities, specific lines, hidden qualitative classification, problem reports and countermeasures. On patrol line, illegal construction, illegal construction site, high trees, roads, tailings and dredged soil every day, finds out the basic creation file. To strengthen key areas, key facilities, special inspection, special inspection, do immediate detection, prevention and treatment. Large scale construction should meet the early intervention of underground pipeline construction and multi sectoral linkage of construction party. For example, a housing estate is planning to build reporting electric power construction of Power Supply Bureau. Market department may inform the construction units ahead of time to enter the territory of the construction party to carry out an underground pipeline test. You can also actively mobilize and organize the masses to undertake the line maintenance work, and establish a positive public support line in each village and key areas of hidden trouble, strengthen the mass protection basis, improve work efficiency.

2.3 Strengthen Dispatching Management of Distribution Line

Distribution line operation becomes more and more complex which are puting forward higher requirements. To keep safety and stability of distribution line, the electric power dispatching and power dispatching agencies at all levels should start-up operation management, strengthen reasonable operation mode of operating management further, distribution lines,monitoring prediction and load and improve emergency plans which will effectively deal with all kinds of unexpected accident prevention of distribution line and resolve the risks, and formulate corresponding standard distribution line dispatching. Dispatcher should implement production plan and generate electricity in accordance with the relevant standards and requirements strictly and actively cooperate with the grid operation do safety evaluation work.

2.4 Strengthen the Maintenance of Power Distribution Network Equipment

In the maintenance process of distribution network equipment, if the faults and problems it has discovered need program recording, maintenance work should be approved by the competent authorities in order to keep the stability of the grid operation effectively.

2.5 Strengthen the Maintenance Management of the Distribution Network

In the process of related management, it has to strengthen load monitoring of distribution network and adjust the load of the feeder in order to avoid overload and short circuit fault of the line. To install fault indicator, and find fault point in time which can reduce the short circuit fault of line operation and the loss caused by it, reduce the loss brought by it. It can be mounted on the vacuum switch circuit to help to isolate the fault area quickly.

In short, it is of great significance to strengthen the quality and safety management of the distribution network project

which can provide a solid foundation for the construction of urban civilization in China. Because of many factors, 10kV distribution network often has faults in China, which has serious harm to the development of China's power grid. For this condition, we should strengthen the project safety supervision to enhance and improve the nature and quality of projection construction of the power distribution network and reduce the negative interference coming from external environment and distribution network to ensure the normal and orderly operation of power system.

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