Research and Application of 66kV Internal Wedge Type Fast Tension Clamp

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Abstract. This research belongs to the field of live working of power transmission line, that is, 66kV internal wedge tension fast clamp fixture. The utility model comprises a clamp cone barrel which can pass through the conductor in the middle, a ring sleeve is fixed on the back of the clamp cone barrel, U-shaped bolts are inserted and screwed on the rear end faces of both ends of the ring sleeve, a line clamp connecting the insulator string is connected on the rear end of the U-shaped bolt, two ends of the line clamp are provided with connecting ring holes, and a connecting pin shaft is inserted in the ring hole. The structure is simple and reasonable, and the use is safe and reliable. It can solve the problem that there is no special clamp for 66kV fast tension clamp.

1. Introduction

In the current existing technology of power transmission specialty, transmission line tower fast clamp is a new type of line fittings which has been put into use in recent years. This kind of equipment is connected and fixed on the transmission line tower by the tension clamp of the transmission line. When it is necessary to carry out live working to replace the 66kV strain insulator, there is no special fixture suitable for this kind of equipment. The common method is to use the clamp pulley to tighten the wire, and the equipotential electrician enters the electric field through the arm ladder to clamp the wire and replace the insulator. There are many defects in this kind of operation method, including large drainage swing, difficult control, small safety distance, large amount of equipotential operators, many auxiliary personnel, long operation time and other adverse factors. Therefore, it is necessary to develop a 66kV internal wedge type fast tension clamp to adapt to such operation problems.[1-3]

When replacing the insulator on line, because there is no special fixture for the insulation tool manufacturer, the insulated pulley group is generally used to replace the hanging wire. However, due to the limitation of cross arm head, the insulated pulley group can only be lifted at a single point, and the force on both sides of the clamp is uneven, which makes the operation difficult. At present, there is no product suitable for the tower type, so it can only be replaced by the method of soil.

2. Technical solutions

The purpose of the research on the clamp of 66kV internal wedge type fast tension clamp is to provide a clamp, which can replace the tension insulator string with conventional live working method on the tension single connection equipment using fast clamp.[4-7]

The 66kV internal wedge type tension fast clamp fixture is characterized in that it includes a clamp cone barrel which can pass through the conductor in the middle, a ring sleeve is fixed at the back of the clamp cone barrel, U-shaped bolts are inserted and screwed at the rear end of the ring sleeve at
both ends, a line clamp connecting the insulator string is connected at the rear end of the U-shaped bolt, a connecting ring hole is provided at both ends of the line clamp, and a connecting pin shaft is inserted in the ring hole. The tool is connected with the original 66kV tension wing clamp (cross arm end) by insulating pull plate, and then the bottle holder is installed on the wing clamp on both sides. The original 66kV tension wing clamp (cross arm end) is installed on the U-shaped hanging ring on the cross arm side, and the 66kV tension fast clamp is fixed on the fast clamp. The tension of the insulator is transferred by adjusting the screw, so as to replace the insulator live.[8-10]

The advantage of 66kV internal wedge type fast tension clamp is that it can meet the needs of live replacement of insulator string for 66kV single tension clamp; the structure is simple and reasonable, and the use is safe and reliable; the problem of no special clamp for 66kV fast tension clamp is solved.

3. Implementation plan

![Fig.1. Exterior structure drawing](image1)

In Figure 1, the names of the parts are as follows: 1 is the taper barrel of the wire clamp, 2 is the ring sleeve, 3 is the U-bolt, 4 is the wire clamp, 5 is the ring hole, 6 is the pin shaft, and 7 is the wire.

![Fig.2. Structure diagram of 66kV tension fast clamp fixture](image2)

The parts in Figure 2 are named as follows: 8 is arched groove, 9 is elliptical shallow groove, 10 is elliptical shallow groove, 11 is the first pin lock, 12 is the second pin lock.

![Fig.3. Top view of structure](image3)

The parts in Figure 3 are named as follows: 13 is the third pin lock.
Refer to Fig.1, the 66kV internal wedge type tension fast clamp fixture is characterized in that it includes a clamp cone barrel which can pass through the wire in the middle, a ring sleeve is fixed at the back of the clamp cone barrel, U-shaped bolts are inserted and screwed at the rear ends of the ring sleeve, a line clamp connecting the insulator string is connected at the rear end of the U-shaped bolt, a connecting ring hole is provided at both ends of the line clamp, and a connecting pin is inserted in the ring hole.[11-13]

Referring to Fig.2, the middle of the clamp is designed with an arched groove according to the outer diameter of the wire clamp cone barrel of the utility model, so that the clamp can span the wire clamp cone barrel.

Elliptical shallow grooves are machined on both sides of the arched groove structure, whose size is slightly larger than the diameter of the U-shaped screw of the clamp in Fig.1, which is convenient for installation and positioning, and also prevents the fixture from displacement after being stressed in the process of use. At the same time, these two points are also used as the stress points of the fixture. Its advantage is that it can transfer the tension of insulator string without changing the original stress mode of fast clamp.

The appliance is connected with the original 66kV tension wing clamp and screw rod with insulating pull plate, and fixed with the second pin lock and the third pin lock. The clamp is straddled on the taper barrel of the quick clamp and fixed by the first pin lock to prevent it from falling out after being stressed; the bolts on both sides of the quick clamp are clamped in the oval shallow slots on both sides of the arch structure to prevent the clamp from displacement after being stressed during use. According to the conventional method, the original 66kV tension wing clamp is reliably installed on the cross arm side of the insulator string. By tightening the lead screw, the distance between the clamp and the original 66kV tension wing clamp is tightened, and the tension of the insulator string is transferred to the clamps at both ends, the lead screw and the insulation pull plate, so as to achieve the purpose of replacing the insulator string.[14-15]

4. Conclusion
Fast clamp is a new type of hardware widely used in recent years. Now there is no special clamp. For example, the replacement of insulators of fast clamp type needs power failure. The invention of this tool fills the blank of live replacement of insulators of fast clamp equipment, greatly improves the safety of live working and reduces the number of power failures. By using this tool, it provides a safe and efficient solution for live replacement of insulators for fast clamp type equipment of 66kV transmission line.

Due to the different tower structure of power towers in different regions, the applicable tools are also different, and even the tower forms applicable in a region are different, which brings great waste
and trouble to power production. Therefore, it is imperative to implement standardized unified design and standardized production in domestic power industry equipment.

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