Development and Application of SZ-type double-back straight tower with live replacement overhang insulator suspension line card

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Abstract. In recent years, SZ-type tower and other angular-type cross-bearing head plus slings of the cross-stretcher structure of the tower on-line has been widely used. However, there is currently no special card in line with it. Therefore, this paper puts forward the use of aluminum alloy as a material developed that can be stuck in the cross-stretcher head of the 220 kV SZ-type double-back straight tower with live replacement overhang insulator hanging line card. It includes a screw lever, a wire lever with a hook hook in the lower part of the bar, and a screw lever connected to a crossbar card. The cross-stretcher mount has a cavity in the middle and a screw seat on both sides, with each screw lever standing on the screw seat when used. The cross-load mount holder is on the SZ-type double-back straight-line tower cross-mounted plate, which can be used for installation on the SZ-type tower. It provides a screw hanging point when the SZ-type tower is charged to replace the insulator. It has the characteristics of simple structure, reasonable and safe use.

1. Introduction
In existing technologies, live operation in power production is a special special tying. Due to the different equipment conditions in different regions, a variety of problems are often encountered. The use of training tools produced by manufacturers on certain devices is greatly restricted. Especially on some devices is not available at all, and cannot be used for routine live access. Therefore, when working in the field, we have to take some cumbersome, cumbersome soil methods to carry out the work[1-4]. These methods not only increase the intensity and difficulty of the operation, but also are very detrimental to the safety of production. On-site 220 kV linear double return tower models are: SZ1 type, SZ2 type and SZ3 type. Suspended insulators after voltage damage or external force damage, live replacement of insulators because the current insulation tool manufacturer sits with the special card, So generally use insulated carriage sets for suspension line replacement[5-7]. However, when using insulated carriage group cranes, because the limit of the cross-burden head can only lift a single point, the wire clip on both sides of the force imbalance, the operation is difficult[8-10]. And in the high pressure tower with the use of carriage sling line lifting line can not carry out live replacement of the work of the insulator. At present, the manufacturers of stereotyped cards have not yet suitable for the tower type of products, can only use outdated methods to replace.

Power lines with live replacement insulator suspension tools include screw levers and cross-stretcher straps. There is a hook hook attached to the lower part of each screw lever. Because the cross-burden head of the SZ-type double-return linear tower is a series of plate-attached connections for the two sides of the main burden bending surface, forming a flat triangle[11-13]. The cross-bearing and sling connection through this linkage form a vertical triangle, and the structure of the original
cross-bearing mount is restricted on the 220 kV SZ-type double-back straight tower. Therefore, this paper puts forward the development of SZ-type double-back straight tower with live replacement overhang insulator suspension line, which can effectively solve the problem.

2. Development of SZ-type double-back straight tower with live replacement overhang insulator suspension line card

With live replacement of insulators when there is no stereotype of cross-load card can be used, generally using 2 x 2 carriage set for suspension line replacement. The use of insulated carriage group due to the limit of the cross-stretcher head can only be lifted, the pressure is large, the stability is poor. The insulation rope is flexible, the force on both sides of the wire clip is unbalanced, the operation is difficult, and it poses a great threat to the safety of the live operation. Therefore, the use of aluminum alloy for the material developed can be stuck in the cross-stretcher head of the "220 kV SZ-type double-back straight tower with live replacement overhanging insulator hanging line card", two sides of the wire rod and insulation pull plate to carry out two points lifting, to solve the above deficiencies. The technical solution for the 220 kV SZ-type dual-back straight tower with live replacement overhang insulator suspension line is: 220 kV SZ type double-back straight tower with live replacement overhanging insulator suspension line card assembly includes a screw lever, the lower part of the screw lever is connected with hanging wire hook, the screw lever and the crossbar card connection. The cross-burden card of the SZ-type tower. The cross-burden card 3 has a cavity 5 in the middle, and cavity 5 is used to get stuck on the connection bolt of the tower's cross-burden head. The cross-stretcher card 3 side with the screw seat 4 (see Figure 2), when using each screw lever 1 vertical lying on the screw seat 4, through the ring set 7 on the tie bar 6 and the screw seat 4 on the groove 9.

See Figure 2, which is an open opening for the outside. There is a two symmetrical groove 9 on the screw seat 4.
Fig. 2. An upsing structure diagram of Figure 1

When used, the cross-load card 3 seats in the SZ-type double-back straight tower cross-head of the linkage plate, screw lever 1 on-site assembly on the cross-stretcher card 3, hook hook 2 hook wire, move the handle 10, screw lever 1 up, drive the hook hook 2 up lift wire, release the insulator load, can easily remove the wire connected to the whole string of insulators for replacement.

Fig. 3. The crew lever structure

3. Application of SZ-type double-back straight tower with live replacement overhang insulator suspension line card

Figure 4 is the physical diagram of SZ-type double-back straight tower with live replacement overhang insulator suspension line card.
Fig. 4. the physical diagram of SZ-type double-back straight tower with live replacement overhang insulator suspension line card.

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4. Conclusion
SZ type double circuit straight tower has many advantages in live replacement of suspension insulator suspension clamp. First of all, it meets the installation and use of SZ tower. Secondly, its structure is simple and reasonable, and its use is safe and reliable. Finally, it provides the lead screw hanging point of SZ type tower when the insulator is replaced live. It effectively solves the problem of replacing suspension insulator with live charge in SZ double-circuit linear tower. It is believed that in the future work SZ-type double-back straight tower with live replacement overhang insulator suspension line card will be more widely used[14-15].

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