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## **SAFETY CUTOUT DEVICE WHILE BREAKING AERIAL CONTACT WIRE IN TRACTION NETWORKS**

### Problem

Major task of servicing exploitation networks power supply is:

- Warning about damage of the nets;
- Timely showing up and removal faultiness, and then immediate elimination that damage, which be able to call stopping in power supply.

One of the reason origin monophas locking on the ground in system of power supply is a abruption of wire at air line electricity transmission or contact line. Scurf ice-slick in the wire is a big danger for normal working, as air line, as well as contact wire, since call considerable overload, approach, intensive vibration with influence of the wind, short circuit, fusion and abruption of wire.

At the precipice air line electricity transmission or contact wire and falling his on the ground or sleeper grating origin step-type voltage, what being dangerous for people life's.

Aim of the article is a view possibility improvement condition electro security witch depend of methods and means by defence distributive networks at stated damage and not admit to further evolution damage.

For air line network electricity transmission exist method defence by break phase wire.

At that, such defence disables line from source to moment contact ragged wire to ground.

Defence starting when phase wire LED is a break, when in one phase is absent current or sharply reducing.

System of power supply electrify railroad consist in two parts:

1. Tractive
2. Outward

In tractive network get in tractive substation and tractive network. Main element in tractive network is aerial contact wire and rail way. Outside diagram of power supply provide connecting with tractive substation and power supply source. In railway power supply system most important element is contact network. She can't have reserve, and so work reliability trying go up by means compartmentation. It's permit at damage cut off not all contact network but only defective district. In exploitation be present chance a covering neutral inserts. At the same time make up powerful electrical arc, with this happen burning wire contact network, and when in line case, and most heavy damage. Current in the network stipulate covering, like (400-600 A), what lower current burden. Relay protection on tractive substations and position slice, divorce from current burden and don't sensible for this procedure. In case of abruption of wire and falling his on the ground or sleeper grate intermediate resistance can arrive at 20 OM or more. Big arc resistance is complicate protection work, especially her steps which react to phase corner short-circuit current. Analyse efficiency protection methods show to us, what possible emergency procedure, of which probably nonoperation the most widespread protection methods from locking. If considered intermediate resistance in locking point and complication determination, where happen locking, this probably don't abrasion equipment protection sharply growing up. For exclusion indicated problem suggest defence from breaking contact line. At the same time this protection be able to avert line-to-ground locking by break contact wire at the expense disconnection section before contact moment ragged wire to the ground.

Disconnection time for emergency section be determine:

$$t_{omk} = t_{c.3.} + t_{o.3.} + \Delta t$$

where  $t_{c.3.}$  - own operation time protection (0,1 s);  $t_{o.3.}$  - switch operation time (0,1-0,2 s);  $\Delta t$  - protection delay. Time lag from break contact wire moment to touching his to the ground:

$$t = (2 \cdot h \cdot g^{-1})^{0.5}$$

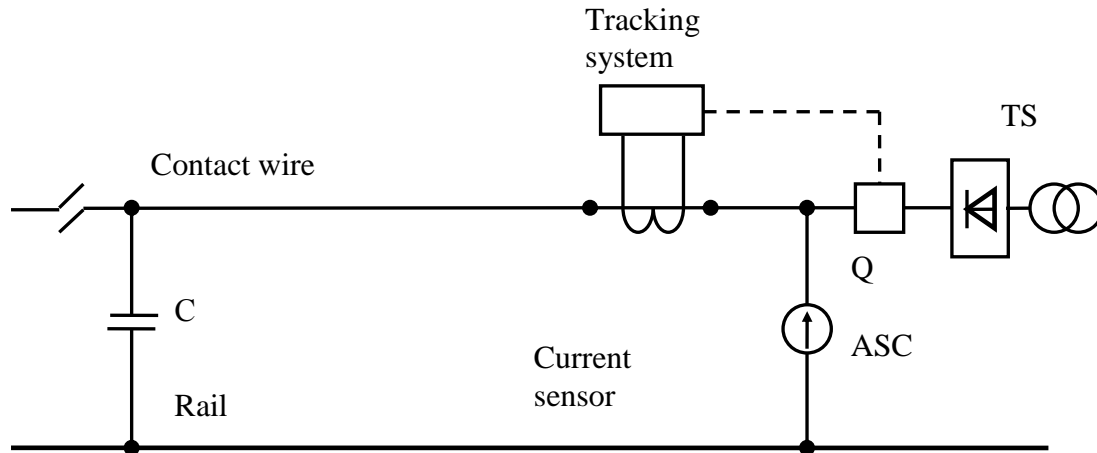
where  $h$  - Height aerial contacts wire (5750 – 6800 mm);  $g$  - free fall acceleration.

Accounts showed what exit real possibility with the help with this equipment, we can avert locking system on the ground, as time lag from abruption of wire to contact his to the ground equal (1,2-1,3 s), and time disconnection will be 0,3 s.

Protection from break contact wire working at the absent current in contact wire, but as rolling-stock moving relatively traction substation and possible conditions absence load current in one feeder contact network, as

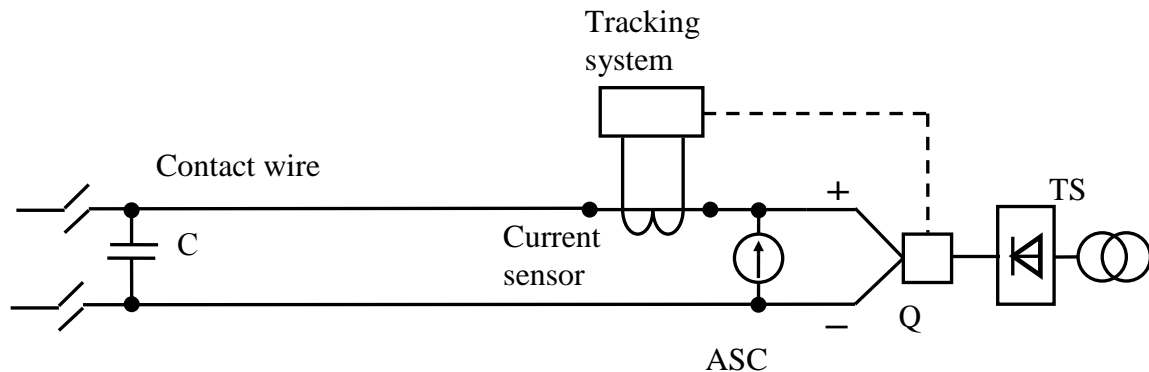
be exist slice aerial contact wire. That why it is possible to use imposition active current. Efficient current necessary to choose such frequencies, so as to he don't create trouble.

At this picture introduce scheme to explain principle of operation protection system.



**Pic. 1. Schematic circuit equipment from broken contact wire.**

To feed systems connect up another source active current (ASC). So as to current flowing don't depend from burden in the end of feeder zone to install condenser (C). In normal conditions from current sensor on entry system come signal, as soon as the signal is break, the tracking system cut off switch (Q). At the same time power supply from traction substation (TS) abandon. This tractive rail network scheme we can use at the city. Tractive network electricity transport in town working in special condition. Tractive network rail transport asymmetrical. Big distinguish parameters contact and rail network (Rail network shunt ground and depend on weather condition), At the same time on this region of network use mobile composition different system effecting different influence on the network.



**Pic. 2. Schematic circuit equipment from broken contact wire trolleybus network .**

Loading of highways increased thus. Cars in city are under a trolleybus network and in case of precipice of pin wire of this network possible falling live wire(0,6 kV), on a car that can cause material losses, and also hit of simple citizens under tension. The use of this system is therefore offered there is a fundamental chart in a trolleybus network presented that on a Pic. 2.

**Conclusion**

Maybe, by means of this device to prevent the mode of earth-fault and increase electrosecurity of the systems of feed of public and main transport.

**List of literature**

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