

CONDITION BASED MAINTENANCE OF LV CABLE NETWORK OF PUBLIC LIGHTING

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ABSTRACT

The improving of public lighting generally means replacing of lightning sources to newer ones, but in many cases, the degraded cable network causes reduced quality of street lighting. However, the total rejuvenation of the low voltage cable network of public lighting is impossible from the economic point of view, but the quality of the network can be improved by the systematic replacement of the weakest cable lines, which are selected by the result of reliable diagnostics. In this paper, the practical experiences of the examinations on low voltage cables of public lighting are summarized. The steps of the field measurement are introduced and the results are discussed.

KEYWORDS

Low voltage cables; Voltage response measurement; Public lighting cables; PVC insulated cables.

INTRODUCTION

The improving of public lighting generally means replacing of lighting sources to newer ones e.g. sodium lamps to LED lamps. But, in many cases, the degraded cable network causes lower quality of street lighting. However, the total rejuvenation of the low voltage cable network of public lighting is impossible from the economic point of view, but the quality of the network can be improved by the systematic replacement of the weakest cable lines.

The condition assessment of cable lines was based on testing of three important parameters:

- The measurement of grounding resistivity.
- Testing of continuity of the networks.
- Examination of insulation

From the point of view of electrical safety, the first test is the most important, while the last two ones are keys of the reliable service. Besides electrical measurements, the columns were tested by 3D stability measurement.

BUILT UP OF PUBLIC LIGHTNING NETWORK

The public lightning network is built up from cable lines, which can be divided into four groups:

- Underground cabling — T-jointed: The oldest lines of networks are built up with T-joints.
- Underground cabling — Looped: The newest lines of lighting cable networks are looped from column to column.
- Overhead cabling
- Mixed: This type of cable lines is built up different sections.

The older sections are built up with T-joints. An example of this type of network can be seen in Fig.1.. The cables to columns are connected to supplying line by T-joints.

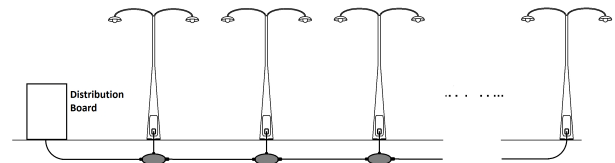


Fig. 1: T-jointed public lighting cable line

This type of lines is typical in older parts of the networks and T-jointed cabling is also used on renewed lines, which supplies old-time candelabra. Usually, these columns are thinner than the newer ones and looping of cables requires more space inside the column. Therefore, it is impossible to assemble the looping in lines, which consists of old candelabra.

In most cases, the T-joints are sources of problems e.g. moisture can easily penetrate inside the damaged joints (Fig. 2.). In this photo, T-joint with removed cover can be seen. The ingress of water has oxidized the metallic components inside the joint.



Fig. 2: Water ingress in T-joint

The looped cable line can be seen in Fig. 3. The newer cable lines are built up by this technology. Lacking of T-joints eliminates the problem of water ingress.

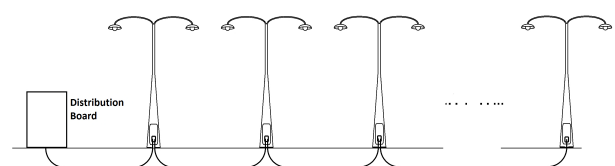


Fig. 3: Looped public lighting cable line