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A study on detection of distribution facilities deterioration with the active thermography method

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Abstract

An exchange cycle of distribution facilities built in large quantities in the high economic growth period is prolonged by stagnation of a recent economic growth.

Clacks of porcelain which are used as an insulating material such as the porcelain insulator and trackings of the organic insulator which are used as insulated wire, exist under the influence of a setting environment and an use situation potentially. Therefore, those may cause the supply trouble by a system failure. But we have exchanged facilities with clacks and trackings each discovery of those, because it was difficult to detect those from the ground.

Here, the detection technique of facilities deterioration using thermography images is classified roughly into the passive method using heat that an object generates by oneself, and the active method using temperature distribution which occurred by giving thermal load. The passive method can't detect surface deterioration because it don't generate heat by oneself. In addition, it is difficult to apply the active method to facilities built in the upper position of a concrete pole such as distribution facilities from a viewpoint of workability, because heating is generally used as thermal load. Therefore, a technique that can give facilities thermal load more easily than heating is expected.

Of the active method, the writers examined the detection method of facilities deterioration using an effect of heat absorption and temperature distribution generated when liquid which is sprayed on an object evaporated, which can give facilities thermal load more easily than heating.

Here, when liquid is splayed on a surface of a sample, liquid disappears early by water-repellency and evaporation on the normal part. On the other hand, an effect of heat absorption by evaporation continues because a liquid layer stays on the abnormal part. Therefore temperature of the abnormal part lower more than one of the normal part at that time. The proposal method detects facilities deterioration by a change of a thermography image with time. In this examination, a sample is the primary cutout switch (the PC) with cracks on its surface that are removed from the scene.

As a result of this examination, when we sprayed ethanol on the PC or we sent air to a surface of it after immersing it in water, we clarified that the difference of temperature between the abnormal part and the normal part appeared, and the proposal method could detected facilities deterioration.