

INTEGRATED ANTI-FOG MONITORING METHODS OF POWER TRANSMISSION LINE ICE COVERING

Lu Jiazheng, Xu Xunjian *, Luo Jing, Zhang Hongxian, Li Bo, Fang Zhen

1. Power Transmission and Distribution Equipment Anti-icing & Reducing-disaster Technology key Laboratory of State Grid, Hunan Electric Power Test and Research Institute, Changsha, China, 410007

*Email: bearxxj@126.com

Abstract: The method of video surveillance system has been widely used to monitor the ice covering of power line. This paper firstly presents two monitoring methods of ice covering, “close-up photography” and “simulated power transmission line” under bad environments of freezing rain, snow and heavy fog. The monitoring devices with the two methods are developed and manufactured. The clear visibility of them is demonstrated by the experimental result.

1. INTRODUCTION

The monitoring of ice covering of power transmission line is a difficult technical problem in the world. The method of video surveillance system has been widely used to monitor the ice covering of power transmission line. The system was installed on the tower of power transmission system with a relative long distance between the camera and transmission line. Because of bad operating environments with poor visibility, such as freezing rain, snow and heavy fog, the ice covering can not be effectively monitored by the video surveillance system and can not be grasped by the operating personnel. This paper firstly presents two monitoring methods of ice covering, “close-up photography” and “simulated power transmission line” under bad environments of freezing rain, snow and heavy fog. The monitoring devices with the two methods are developed and manufactured. The clear visibility of them is demonstrated by the experimental result.

2. RESULTS AND DISCUSSION

For the ice covering monitoring method of “close-up photograph”, the device consists of pinhole camera, embedded model, battery, flexible solar panels and on-line energy supply, and the field test result shows the good visibility of this method, as shown in Fig. 1.

For the ice covering monitoring method of “simulated power transmission line”, the device consists of a simulated power transmission line as same material and size with the real line, and video surveillance system; and the field test result shows the good visibility of this method as shown in Fig. 2.

If there is not a normal video surveillance system near the place where should be selected to install the ice covering monitoring system, the method of “close-up photograph” should be choose for monitoring ice covering. Otherwise, the method of “simulated power transmission line” should be used.

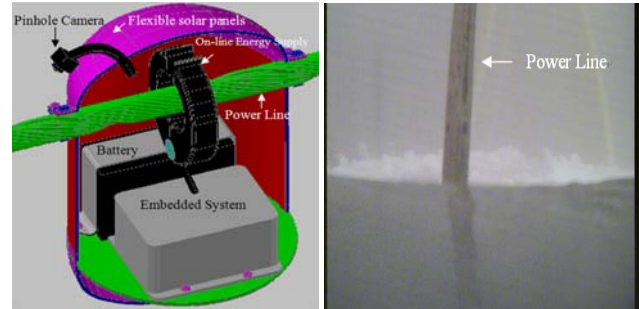


Figure 1: The device and result of ice covering monitoring by the “close-up photography” method

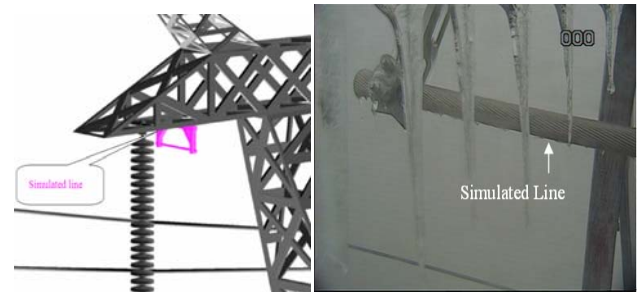


Figure 2: The device and result of ice covering monitoring of by the “simulated power transmission line” method

3. CONCLUSION

By using “close-up photography” and “simulated power transmission line” two methods for ice covering monitoring of power transmission line, the experimental result demonstrates the clear visibility of this monitoring system in heavy fog.

4. REFERENCES

- [1] J. Luo, J. Z. Lu, Z. Fan, B. Li, 2009, “Development of an embedded power transmission line icing monitoring equipment in the fog,” *Microcomputer Information*, accepted, 2010

Integrated Anti-fog Monitoring Methods of Transmission Line Ice Covering

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Keywords—Ice covering; power transmission line; monitoring method; anti-fog

I. INTRODUCTION

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II. PRINCIPLE OF ICE COVERING MONITORING SYSTEM

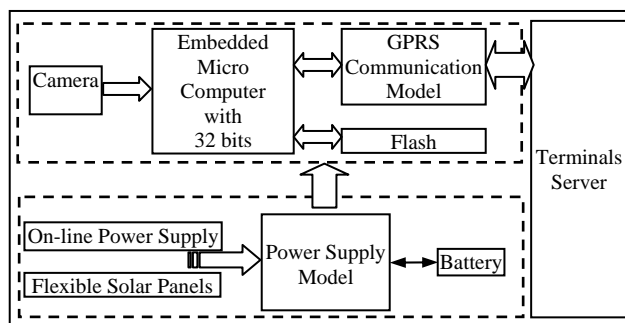


Figure 1. Principle of ice covering monitoring system

The principle of ice covering monitoring system is shown in Fig. 1. This system combines of two kinds of power supply devices, on-line power supply which can take electrical power from the transmission line and flexible solar panels which can produce electrical power under the sunshine. And this system stores the power by using a high energy battery. That means this system can produce the electrical power by itself.

This system uses the high performance embedded micro computer to process the photography from the camera, and sends the photo to terminals sever by GPRS model. That means this system, which is installed in the tower of power system, takes a photo for monitoring the situations of ice covering of power line through the public wireless communication network.

III. ANTI-FOG ICE COVERING MONITORING METHODS AND RESULT

A. Monitoring Method of “Close-up Photography”

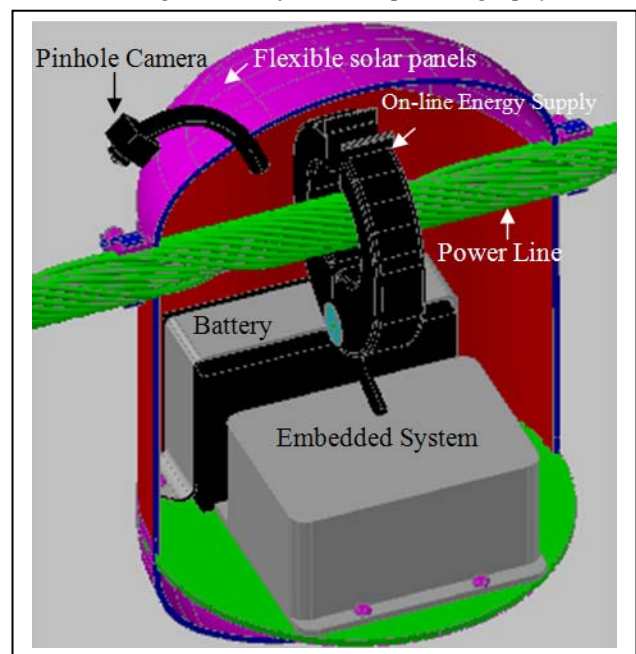


Figure 2. Schematic of ice covering monitoring system of “Close-up Photography”

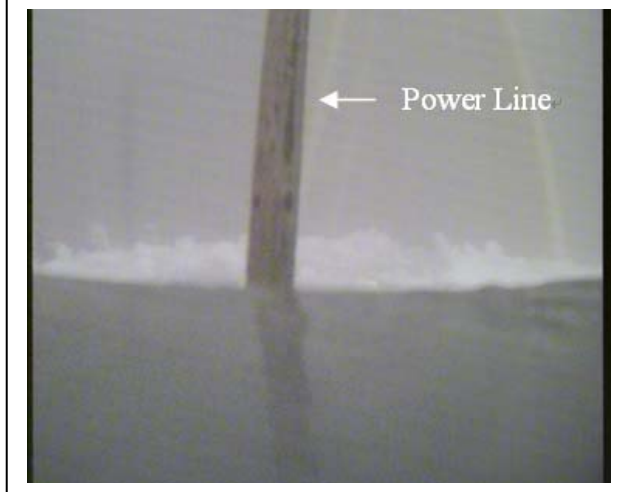


Figure 3. Field test result in heavy fog

For the ice covering monitoring method of “close-up photograph”, the device consists of pinhole camera, embedded model, battery, flexible solar panels and on-line energy supply, as shown in Fig. 2. And the field test result shows the good visibility of this method, as shown in Fig. 3.

B. Monitoring Method of “Simulated Power Transmission Line”

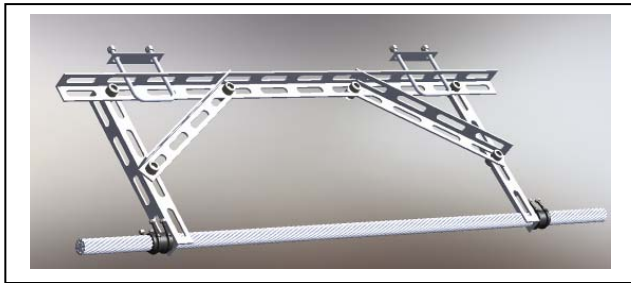


Figure 4. Schematic of ice covering monitoring system

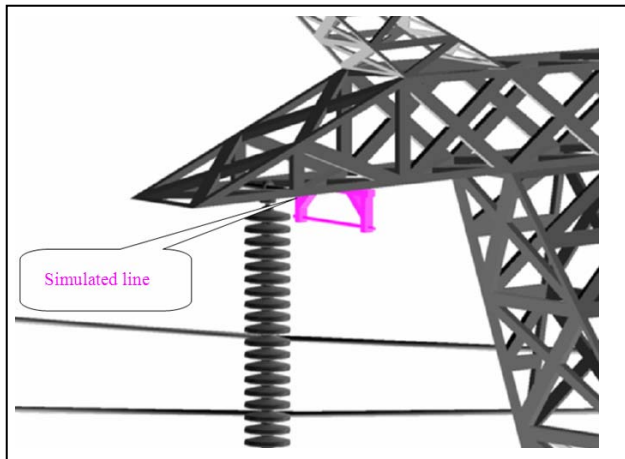


Figure 5. Schematic of ice covering monitoring system

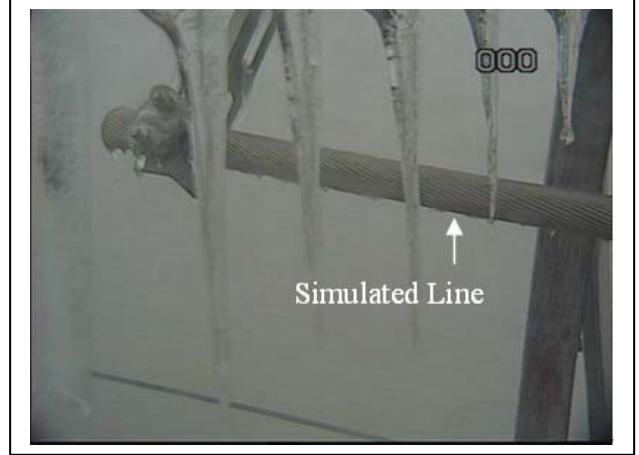


Figure 6. Schematic of ice covering monitoring system

For the ice covering monitoring method of “simulated power transmission line”, the device consists of a simulated power transmission line as same material and size with the real line, and video surveillance system as shown in Fig. 4; the installed place of simulated power line is shown in Fig. 5; and the field test result shows the good visibility of this method as shown in Fig. 6.

IV. DISCUSSION

The two ice covering anti-fog monitoring methods are used during the different situation. If there is not a normal video surveillance system near the place where should be selected to install the ice covering monitoring system, the method of “close-up photograph” should be choose for monitoring ice covering. Otherwise, the method of “simulated power transmission line” should be used.

V. CONCLUSION

By using “close-up photography” and “simulated power transmission line” two methods for ice covering monitoring of power transmission line, the experimental result demonstrates the clear visibility of this monitoring system in heavy fog.

REFERENCES

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