International Journal of Energy, Information and Communications
Vol.11, No.1 (2020), pp.31-36
http://dx.doi.org/10.21742/ijeic.2020.11.1.05

Trends of Possible 2020 Seoul Tracking Fire

Hong-Ki Park

Dept. of Electrical and Computer Engineering, University of Seoul, Seoulsiripdaero, Dongdaemun-gu, Seoul, Korea
krosa777@daum.net

Abstract

In Seoul, tracking fires have been on the rise among fires in commercial and residential buildings for five years. When wires or electrical equipment in old buildings contain moisture from the atmosphere and dust or other objects are attached to conductors, micro discharge progresses gradually, creating challenging passages on the surface to track where fires occur. In this paper, it can be represented as the annual deterioration phenomenon of challenging clause softener in the use of environmental aged electrical equipment. The purpose was to analyze the increase and decrease of electrical fires after 2020 by identifying the insulation and conductivity of the VCTF wires used in aged electricity facilities. Experiments on electrical wires under the environment. Compared to simple correlation, Seoul since 2020.Under the environment, we will predict the increase and decrease of tracked electric fires and use them as basic data for future composite disaster models.

Keywords: *Tracking electric fires, Electrical facilities aging, Insulation, Degradation, VCTF*

1. Introduction

According to the Seoul Institute's latest report, "How many fires occur in Seoul?" a total of 28,000 fires have been reported in Seoul over the past five years (2010-2014), with an average of 5,600 fires occurring annually. Looking at the causes of electric fires from 2013 to 2013, the unidentified short insulation and overload tracking have characteristics that are 2.5 times higher than those of advanced countries.

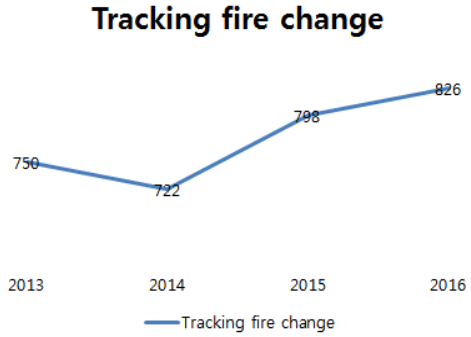

Figure 1. Tracking fire change

Article history:
Received (October 14, 2019), Review Result (December 7, 2019), Accepted (January 10, 2020)

Print ISSN: 2293-9655, eISSN: 2652-1989 IJEIC

In this paper, we want to draw out concrete changes in the external environment, [1] focusing on the tracking fire hazard of aged electrical facilities. After establishing the basic content for tracking fires, which are the main phenomena of electrochemical, we want to link the relationship with the increase in tracking fire phenomena by comparing the data of aggregated electrical fires with the data of external environmental changes that can put a load on the tracking phenomena. To this end, the Seoul Metropolitan Government will analyze and compare the 2012-2016 fire increase statistics, fine dust increase phenomenon data and the Seoul Metropolitan Government's climate change data.

Table 1. Seoul 2012.05.01. ~ 2016.04.40 the number of fire incidents [2]

	2012.05.01 2013.05.01	2013.05.01 2014.05.01	2014.05.01 2015.05.01	2015.05.01 2016.04.30
Ground fault	450	430	381	301
Poor contact	985	946	904	941
Insulation degradation	2508	2544	2459	2297
Over current	1149	1001	984	870
Crimp damage	679	602	608	609
Interlayer short circuit	112	102	94	101
Tracking	750	722	798	826
Half line	162	153	159	171
Unidentified	2668	2409	2363	2178
Etc	958	835	790	713
Sum	10441	9744	9540	9007

2. Environmental factors

Experiment with aged 0.75 SQ mm2 insulated wire samples sampled at the site and new 0.75 SQ mm 2 insulated wire samples under the same conditions. How the load changes after 10 minutes were compared and observed.

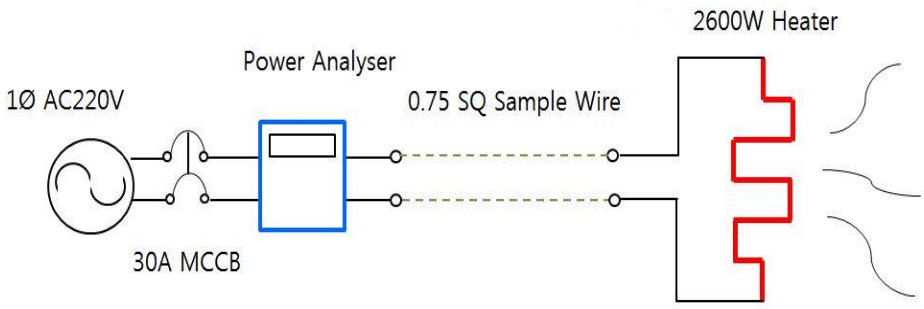

Figure 2. Experiment circuit of old wire heating

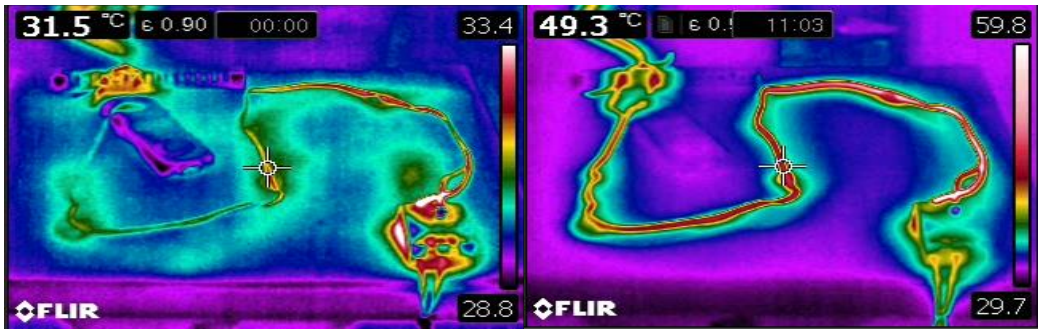

Figure 3. Old heat wire heat image change, previous (left) / after (right)

It was possible to verify that the temperature of the entrance to the electric heat at 18.2°C increased by a difference of 26.4°C under the load conditions of 600W.

3. Temperature Characteristics in Seoul

According to the characteristics of the Seoul Metropolitan Government, the number of insulation deterioration cases decreased 8.42 percent from 2,508 to 2,297 in the period of 2012.05 to 7,50 in the period of April 2016 [3]. The number of fires caused by tracking has increased by 101.053 percent from 2,012.01 (750) to 2,014.30 [4].

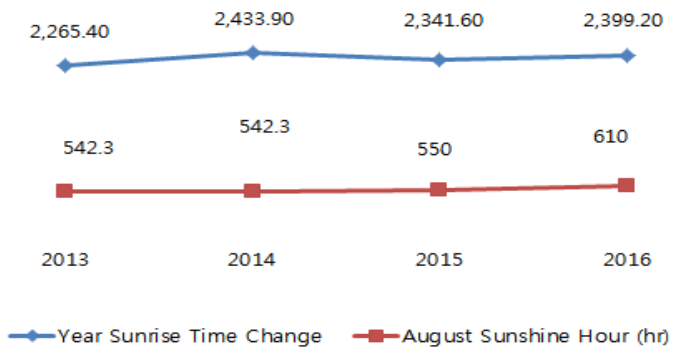

Figure 4. 2013-2016 Sunrise time increase and tracking fire [5]

The 2013-2016 tracking fires were able to identify similarities in the pattern of increasing the annual sunlight time from 2,265.40 to 2,399.20 over the same period, from 7,750 a year to 826 a year. If the change in August temperature during which the heatwave lasts for the same period is confirmed, there is a similar pattern with a 2.3 °C increase from 25.7 °C to 28 °C in 2016, and a pattern of increase in daylight hours and temperature [6]. Considering the nature of tracking progressively, statistics show the similarity between the major environmental change characteristics and the increase in tracking fires [7].

The average annual average of 561.1 hours between 2013 and 2016 for the summer months. It has increased by 1.1238 times per year for 4 years to 610 hours in 2016 [8].

It is increased by 16.795 hours per year by 3.095% per year. Over the past four years, 67.2 hours of sunshine per year has been increasing. During the same period, the number of tracking fires has risen +11.053 percent from 750 to 828, increasing +2.763 percent.

4. National temperature characteristics

The national average temperature during the summer season is 24.8℃, 1.2℃ higher than the average temperature of 23.6℃. Average highs and lows are 9.7 ℃ and 20.9 ℃, respectively, which tend to be 1.3 ℃ and 1.2 ℃ higher than usual. August 2016 marks the largest record since 28℃ recorded 27.8℃ in 1943.

Table 2. Temperature characteristics

Seoul			
Heat days		Tropical days	
1994 year	29	1994	36
2016 year	24	2016	32
2000 year	18	2013	23

The number of days of summer heat wave in Seoul recorded for tropical nights on Monday, with average tropical nights hitting 6.6 days and tropical nights at 8.4 days. The table below shows that the number of days in Seoul has increased from 22.4 days and 10.8 days, respectively, in 2016 [8].

5. Precipitation

The precipitation in Seoul in the 2000s (2001-2010) was 1550.2 mm, down from 1,231.5 mm in the 1970s (1971-1980). Precipitation in 2014 tends to decrease to nearly half the level of 52% compared to 1550.2 mm in the previous year 2001 mm.

Table 3. Seoul has the lowest precipitation since 1992

Year	2015	1994	1982	2014	2016
Minimum precipitation	397.9	457.2	467.0	478.8	479.7
Tranking	1	2	3	4	5

With 28.9 mm of precipitation in Seoul, the city recorded the lowest rainfall of 27.3 percent compared to the average year of 105.9 mm. Based on the August 2016 heat wave, precipitation has been 671 mm since 1973, indicating a sharp drop in precipitation in 2015.In terms of the minimum amount of precipitation in the summer months since 1994, the first place is 397.9 mm in 2015, second place 457.2 mm in 1994, third place 467.0 mm in 1982, fourth place 478.8 mm in 2014 and fifth place in 2016 479.7 mm [9].

Table 4. 2013 ~ 2020 Tracking fire in Seoul and main environment Simple correlation analysis

	Fire change	Change in dayligt
Fire change	1	-
Change in daylight	0.868922	1
	Fire change	Average temperature
Fire change	1	-

Average temperature	-0.023782	1
	Fire change	Maximum temperature
Fire change	1	-
Maximum temperature	0.94564	1
	Fire change	Precipitation
Fire change	1	-
Precipitation	-0.312203	1
	Fire change	August sunrise time
Fire change	1	-
August sunrise time	0.957329	1

6. Conclusion

Through a simple correlation, we attempted to predict the possible increase and relationship of tracking fires between 2017 and 2020 and the following conclusions were obtained. By using VCTF 0.75SQmm2 of the wires for fluorescent lights that are actually exposed to the outside world, the analysis was made to correlate with the basic data for changes in the climate environment up to 2016 and to predict the possibility of an increase in tracking fires after 2010.

First, based on actual external exposure wires, we compared the change in thermal imaging temperature in a similar overload environment after 10 minutes. Second, 18.2°C pre-heated entrance with initial wire temperature under the load conditions of 2,600W could be increased by a difference of 26.4°C. Third, the increase in tracking fires was seen in August as an increase in the number of tracking fires and an increase in tracking fires. As of 2013-2016, tracking fires are increasing at an annual rate of 11.053%, and the average monthly sunshine time during the heatwave period is increasing at 12.38% over four years.

Second, based on the actual external exposure wires, we compared the change in thermal imaging temperature in a similar overload environment after 10 minutes. We could see that there was a continuous solar time, or heatwave, in changing the environment.

Based on these results, if the heat wave duration, which is a part of the environment, is extended, the possibility of tracking electric fires increasing for wire use older than 25 years can be seen. To prevent tracking fires, it is believed that regulations on the criteria and timing of replacement of exposed wires of buildings that have aged for more than 15 years should be legislated and replaced by a mandatory step by step. Further research is needed on overloading experiments on insulation strength of old wires in the future.

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Authors

Hong-Ki Park
Department of Electrical and Computer Engineering, University of Seoul, Seoul siripdaero.
Ph.D. Candidate in Ergonomics (Instrumentation Control Network) Lab.