

## - The Report of Open Experiment -

Research Center for Fire Safety Science,  
Center for National Joint Usage/Joint Research, Tokyo University of Science

### Introduction of Research Center for Fire Safety Science and Open Experiment

Research Center for Fire Safety Science of Tokyo University of Science (TUS) was recognized as Center for National Joint Usage/Joint Research by Ministry of Education, Culture, Sports, Science and Technology in 2009. Thereafter, the Center carries out various collaborative research projects with many researchers of the outside including a student, a researcher carrying the next generation. The full-scale experiment of an “Electric Panel” fire as an open (exhibition) experiment, which is one of research projects in FY2011, was performed at the Fire Research and Test Laboratory of TUS. It was participated in this open experiment 70 people.

### Overview of experiment

Date; 13:00-14:30, January 17<sup>th</sup>, 2012

Participant; 70 [persons]

Venue; the Fire Research and Test Laboratory of TUS



Photo 1 State of the experiment operation

### Experimental outline

It is expected that data obtained through this experiment and analysis and the knowledge help the fire safety improvement in the nuclear power plant. In this open experiment, the gas burner as shown in Photo 2 which reproduced an overheated state by ground fault, the electrical short circuit phenomenon of the electric accidents in a panel was used as a fire source. The burning behavior of the panel and the stability function of an adjacent panel were confirmed, and thermal influence on panel outside was observed by this experiment.



<adjacent panel> <panel (ignition side)>      <adjacent panel> <panel (ignition side)>

Photo 2 Inside and outside view of the panels

(1) Experiment (fire source) condition, measurement item

**Fire source;** 55 [kW](500 [sec.]) by linear gas burner as shown in Photos 3 and 4.

(Expected maximum heat release rate at the ground fault, the electrical short circuit phenomenon of the electric accidents)

**Location of fire source;** near cables as shown in Photos 3

**Measurement item;** [Temperature] thermocouples and infrared thermography

[Heat flux] by heat flux gages

[Heat release rate] by oxygen consumption method

[Video and Picture] recorded by digital video and CCD camera

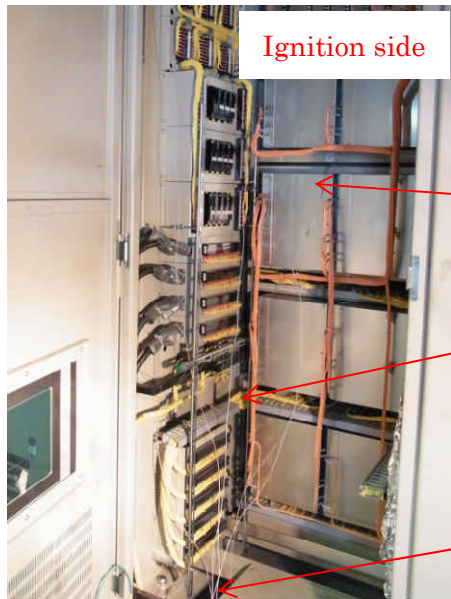


Photo 3 Detail of the linear gas burner

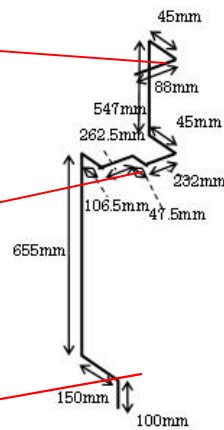


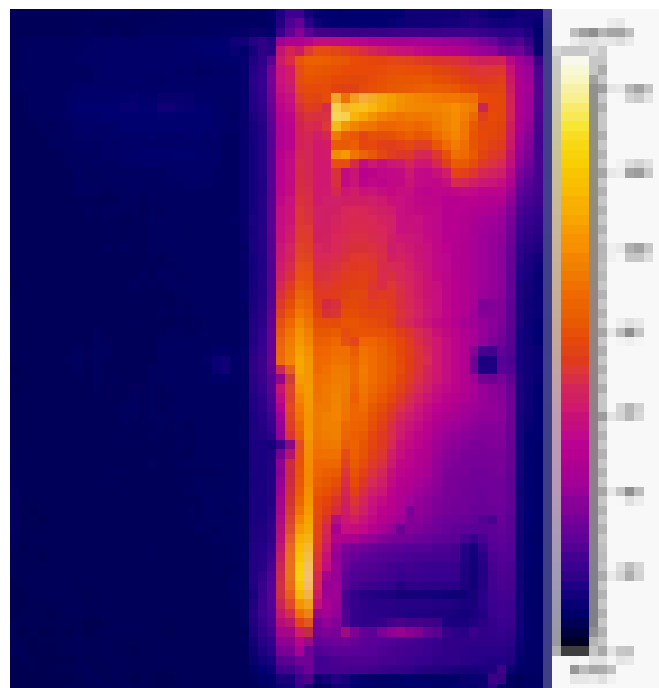
Photo 4 Free burning of the linear gas burner

## (2) Experimental results

The burning behavior, flame spread and temperature distribution in the panels during the experiment are shown in Photos 5, 6, 7 and 8.



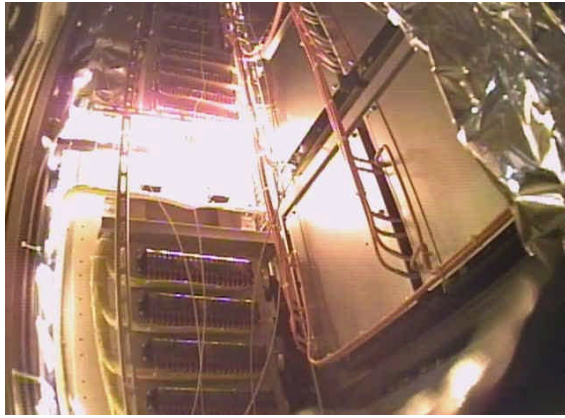
a) outside view of the panels



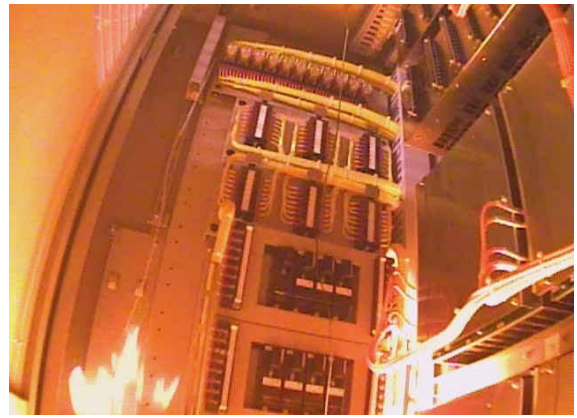
b) temperature distribution by infrared thermography

Photo 5 outside view of the panels during heating by gas burner





a) captured by CCD 1



b) captured by CCD 2

Photo 6 Inside view of the panel after ignition



a) captured by CCD 1

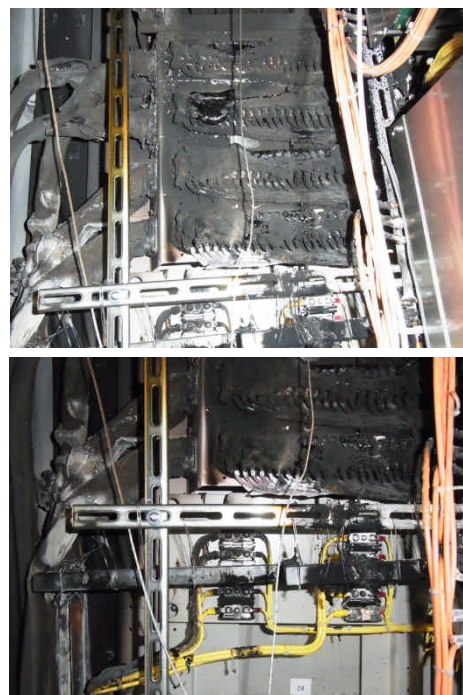


b) captured by CCD 2

Photo 7 Inside view of the panel when the burner extinguished



a) Inside view of the panel



b) detail of the cables

Photo 8 Inside view of the panel after experiment