



Simulating a fire propagation in a switchboard

Dara Switchboards

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Introduction

A computational fluid dynamics (CFD) analysis was carried out to simulate a fire propagation in a switchboard (Figure 1) that initiated due to arc flash.



Figure 1: DaRa main switchboard for Baptcare aged care redevelopment project

Finite element analysis

A fire was predicted on one of the supply capacity control device (SCCD) located at the bottom compartment of the left tier with a maximum temperature of 1000 C.

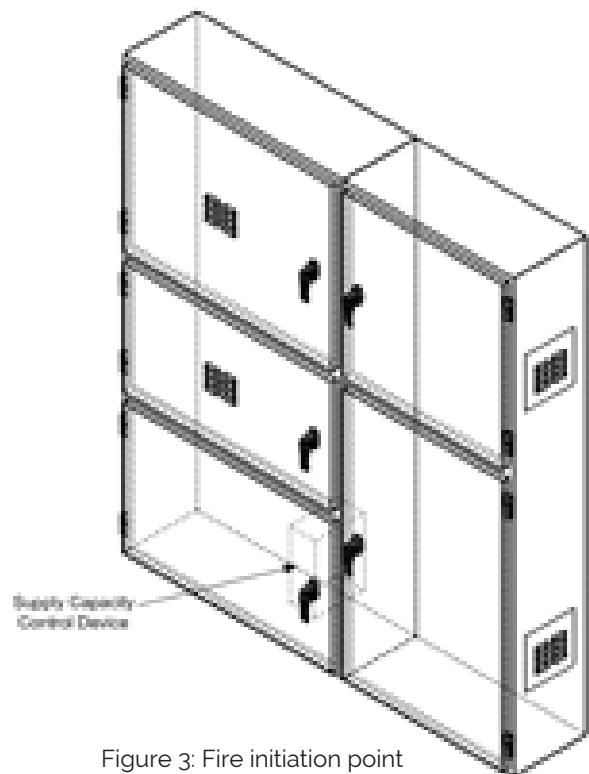


Figure 3: Fire initiation point

Temperatures in flames and fires

According to the Fire Science and Technology Inc [1] USA, typical temperature of a fire in an enclosed area can be reached from 600 C to 1260 C. Hence, it was assumed that the temperature of the fire for the current study as 1000 C.

Results

Results showed that the fire has propagated through all areas of the switchboard with the maximum temperature of 1273.083 K (999.93 C). The temperature near ventilation louvers has dropped approximately by 250 C due to air circulation.

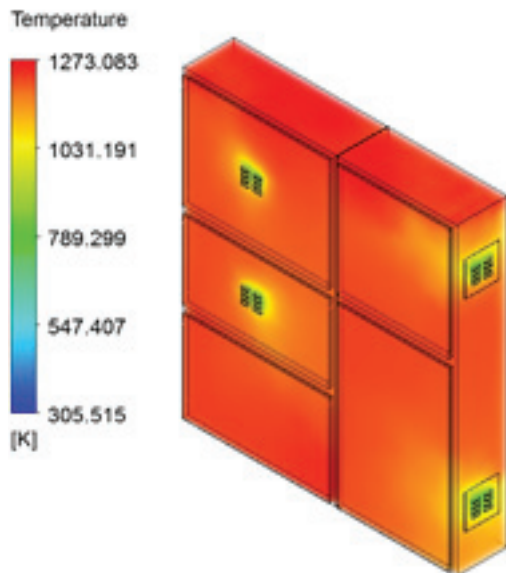


Figure 4: Fire propagation inside the switchboard

Conclusion

In case of a fire inside the switchboard due to arc flash, it propagates to all areas with a maximum temperature of 1000 C. In addition, the fire could propagate to outside through ventilation louvers and gaps between doors and main frame (after gaskets burnt).

References

<http://www.doctorfire.com/flametmp.html>

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