An Experimental Study on the Fire Retardant Performance of Class 1E/Non-Class 1E cables in accordance with ambient temperature condition

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Abstract

There are a lot of facilities and equipments in a nuclear power plant(NPP) and various electric cables are installed for their power supply, control and communication.

Among the cables Class 1E/Non-Class 1E cables need fire retardant performance to suppress the flame propagation in case of fire and the fire retardant performance shall be verified through a fire test in accordance with IEEE-383 by the regulation guide of NRC, the US.

According to some test reports for the electric cables in NPPs, different test results were shown by ambient temperature condition in spite of the same kind of cable, so it seems that more reasonable verification method must be considered.

In this study, an effect of ambient temperature condition on the fire retardant performance of electric cables was considered by conducting fire tests according to four seasons for 2 kinds of Class 1E and Non-class 1E cables respectively. The standard temperature condition is as belows.

- Spring/Autumn : 17.5 ~ 22.5 ℃
- Summer : 32.5 ~ 37.5 ℃
- Winter : 5.0 ~ 10.0 ℃

From the test results, it appeared that charring length in case of winter condition was shorter than that of non-winter condition. It is thought that this study could be applied to improve the fire retardant test method and establish reasonable evaluation methodology.

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Keywords: *Electric cable, Fire retardant, Ambient temperature condition*

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