

Safety Advisory SA01/23

Protection of electrical circuits on buses

The incident

On 8 August 2022, a NSW bus was conducting a scheduled passenger service when the driver noticed smoke in the passenger cabin. The driver stopped the bus and safely evacuated the passengers. Shortly after stopping, flames were visible inside the bus above the driver's seat. The flames spread, quickly engulfing the bus resulting in its destruction.

The Office of Transport Safety Investigations (OTSI) conducted an initial inspection of the bus and the electrical system as part of an investigation into the incident. During the inspection, OTSI investigators found evidence of an inadequately protected body supply electrical circuit and on further investigation, evidence of an electrical short circuit in one of the main body supply circuits.

Analysis of the shorted supply cable revealed the rated ampacity¹ of the cable was far less than the installed fused² protection. This configuration allowed the cable to overheat which significantly increased the risk of fire from the shorted circuit.

Safety message

When designing and installing electrical circuitry in buses, operators/builders must ensure the fuses are matched correctly to the ampacity of the cables installed. The inclusion of cables with a lower ampacity than the fuse will significantly increase the risk of a fire in the event of a short circuit.

Fuses and circuit breakers should be correctly rated according to relevant electrical standards³ to protect cabling and the equipment creating the load within a circuit.

For further information contact: engagement@otsi.nsw.gov.au

¹ Ampacity: the maximum amount of current a cable or wire can withstand before it heats beyond its maximum operating temperature.

² Fuse: a device for protecting a circuit against damage from excessive current by opening the circuit by melting of the fuse element.

³ The key wiring standard in Australia is AS/NZS 3000. It specifies that the fuse capacity should be not more than 90% of the current carrying capacity of the conductor. AS/NZS 3000 also refers to AS/NZS 3008.1.1 for cable sizes.