



Engineering Sciences Section - 2015

D45 Electrical Safety Components Sometimes Cause Damage

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After attending this presentation, attendees will understand that electrical safety devices must be correctly designed and maintained to prevent damage or injury.

This presentation will impact the forensic science community by imparting the value of proper electrical design and maintenance of safety components.

A homeowner had developed the habit of soaking his children's clothes in the washing machine of a stacked washer/dryer overnight and letting the water run into the washer with its top open until the water was stopped by an overflow protective device. His intention was to let the children's clothes soak overnight in the washer before closing the lid and washing them in the morning; however, one evening the water overflow device failed to stop the water flow and his house was flooded with water. The washer/dryer was disassembled to inspect its control components. Lint from the dryer was found blocking the mechanism of the water overflow device and preventing it from stopping the water flow.

The water overflow device's mechanical components should have been enclosed to prevent lint from jamming their mechanical motion, since lint should be expected from the dryer on top of the washer.

Another case involved a computer surge arrestor. The surge arrestor had caused serious smoke damage in a residence. The surge arrestor was rated at 15 amperes and its overload device did not activate. A hole was found burned through its plastic enclosure. Inspection of its interior components found that the overload device was improperly wired to the incoming power line. An electrical power supply wire went to a printed circuit board ahead of a 25-ampere fuse which had not blown. Evidence of electrical short-circuiting was found between the power supply conductor and ground conductor on the printed circuit board. This device was rated at 15 amperes and its printed circuit board should not have been protected by a 25-ampere fuse.

The third case involved a man that was injured and died while operating a motorized scissors-lift vehicle. The gentleman had rented the vehicle to construct a storage structure on his property. While driving it down a hill away from the building, he hit a bump, was knocked off the front of the vehicle with its control box in his hands and dragged down the road underneath the vehicle. He sustained serious injuries and died. The control box was mounted on a removable gate on one end of the unit's platform. The gate had bounced off because it was not secured by a cotter pin beneath the platform that would secure the gate to the platform. The control box had an emergency stop button but no wires or components to activate an emergency stop. Furthermore, wiring diagrams of the control box indicated that it should contain a Mercury reed switch that would stop the vehicle if the control box moved out of position.

The rental company did not provide an operating manual with the unit or maintain it as required by law.

Water Damage, Smoke Damage, Emergency Stop