



All Fire Alarm Wiring is Supposed to be Supervised, Right?

Submitted by Bob Hill and the New England Section of IMSA

Supervision of a fire alarm notification appliance circuit (NAC) means that if an open or a short circuit exists on a circuit, the fire alarm control unit will indicate a trouble condition until the malfunction is corrected. Right? Well, that depends.

If a NAC consists of DC operated appliances (horns, strobes and their combinations) then the above statement is true. Before or after the circuit has become activated, if a short circuit occurs on a DC NAC, the fire alarm control unit will isolate that circuit and shut it down preserving the integrity of the rest of the control unit. However, if the NAC is a voice alarm circuit, it's a different story.

UL 864, listing the manufacture of fire alarm control units, requires that a voice NAC which has a short circuit will be identified by the control unit and in turn will prevent the NAC from operating. However, UL does not address a voice circuit that develops a short circuit after it has been activated. Therefore, a short circuit will prevent voice evacuation/relocation messages from being received by the people in or adjacent to the area of the fire. Furthermore, a short circuit in one area of the system's NAC wiring could even compromise the entire voice evacuation of a building.

Consider the following. A flaming fire starts in an electrical room or closet in which the NAC wiring has been installed for the appliances on a floor of a high-rise. It's a fast evolving fire. The alarm sounds, and the fire floor, the floor above the fire floor and the floor below are evacuated automatically as programmed by the fire command center. The fire service arrives and after investigation they find that occupants on additional

floors need to be relocated to other areas. However, the fire has advanced in the fire's area of origin and has destroyed the NAC wiring, and as a result the conductors of the NAC on that floor have been shorted together. The circuit and the amplifier to which the circuit is connected has been put out of service due to the short. If the amplifier happens to be of the bulk variety where one amplifier provides the audio for the entire building, the audio evacuation portion of the system for the entire building has now been compromised if not rendered inoperative. Unlikely? Although this scenario may not occur within the first few minutes of the alarm, at some point during the evacuation/relocation process, it is quite possible.

UL should include supervision after activation in the UL864 standard. However, on a performance based design, the interim fix to this problem is to install all NAC wiring, not just risers, in a 2-hour rated enclosure, or all NACs should be wired using circuit integrity (CI) cable. In addition, two NACs should be provided per floor or area of a building, each on a different audio power amplifier, with the two circuits wired to alternating speakers throughout the space so that only every other speaker would fail if a circuit failed.

Whatever phase of this business you're in...design, code enforcement, approval, installation, maintenance....we all know that the failure of even one NAC can be catastrophic. On your next project then, maybe you should think about protecting all NACs with CI cable until our national testing laboratories and our codes and standards people recognize this as a problem that needs their attention.