Fire Alarm Systems and Elevator Safety Functions

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You have just been awarded a fire alarm project in a building that has an elevator. Do you know the requirements for how the fire alarm system and the elevator respond to each other? Sure, you may have heard of and possibly done a few buildings that an elevator has been installed into but are you doing them according to code?

Some of the primary safety functions that are required by code will be addressed in this article and although, in some instances, a more stringent code requirement may be required by an authority having jurisdiction, some basic code requirements need to be addressed.

Codes are developed and made requirements because something has happened that may have caused death, injury or loss of property. We use the term “DDM” Death, Destruction and Mayhem. Codes are put in place to prevent these DDM’s from happening or at least diminishing the effect on society. Properly following these codes during our design and installation along with the enforcement that should follow brings life safety to front and center of our attention.

In most commercial buildings that are being built elevators are requirements for the building owner. In high rise occupancies they are a must. Think about that. How could a building owner entice a potential renter to rent an office on the 25 floor if there was not an elevator in the building? So it is fitting that elevators in this day and age are required to move the general population into upper floors of a building. Our concern is life safety and how that interacts with the fire alarm system that we install in this building. Let’s address some of the key and critical safety functions between an elevator and a fire alarm system

**Elevator Car Recall**

Smoke detectors installed in the elevator lobby area within 21 shall provide a recall function of the elevator car whenever the detector goes into alarm. We provide a primary floor recall when the smoke detector goes into alarm on floors above the designated primary floor. In most cases this is the first floor of the building and the level of exit discharge. This will signal the elevator equipment through a safety programming function of the fire alarm system to send the elevator car to this floor. A secondary floor recall is provided if the smoke detector on the primary floor elevator lobby area goes into alarm. This will signal the elevator equipment through a safety programming function of the fire alarm system to send the elevator car to a floor above the primary floor.
We would not want to signal an elevator car to a floor that was possibly on fire or allowing the
general public to exit into a potential life threatening environment. Once the car has been sent
to either the primary or alternate floor it is then locked out and cannot be operated unless
overridden by the emergency personnel that respond. The elevator technician will ask you the
fire alarm company to provide two circuits to accomplish this process.

**Shunt Trip**

Heat and smoke detectors could be a requirement in the top and bottom of the elevator hoist
way, if the hoist way has a sprinkler head in the top and or bottom of the shaft. Heat and smoke
detectors are also required in the elevator mechanical room that houses the elevator control
equipment. Heat detectors shall be installed within two feet of the sprinkler heads in these
locations and have a lower temperature rating and a higher sensitivity rating than the sprinkler
head. If the heat or smoke detector goes into alarm in any of these area through a safety
function of the fire alarm control unit a signal will be sent to the elevator control equipment to
recall the elevator car to a designated floor and provide a relay function that will supply the
required voltage to the shunt trip breaker.

The shunt trip breaker is a safety device that de energizes the elevator car removing all
potential risks of danger to its occupants during a fire scenario. In some cases that I have seen
more recently, the elevator company will want you to time out the shunt trip allowing the
elevator car to travel the total distance of the hoist way before sending the relay function to
the shunt trip breaker. You are providing a higher level of life safety to the occupants of the
elevator car by allowing them to exit at a designated level rather than without this timed
function, being potentially trapped in the elevator car. The code doesn’t address this function.
It should be done on a case by case basis. The elevator technician will confirm with you what
circuits are needed for this process.

**Other Safety Functions**

You are required to monitor the voltage integrity to the shunt trip breaker assuring that voltage
is present and available to provide the required action to the shunt trip breaker. You will need
to provide a relay function to flash the fireman cap in the elevator indicating to the responding
firemen when identifying with this a potential danger. The firemen cap shall flash whenever any
detector has been activated in the hoist way. This visual signal tells the firefighter not to
operate the car because a detector within the hoist way has gone into alarm. These areas of
concern address the basic integration of the elevator and the fire alarm system, but as with all
codes and authority having jurisdiction a more stringent requirement could be demanded
based upon risk to life safety.