

EMERGENCY COMMUNICATIONS: INSPECTION & DESIGN GUIDELINES TO MEET NEW CODE REQUIREMENTS, PART 1

by John Beamish

Beginning with ASME A17.1a-2002, the rules for emergency elevator communication systems have become quite a bit more complicated. Unfortunately, the wording in the code is not as clear as it could have been, which has resulted in some confusion as to exactly how these new systems should work.

In Canada, the various provinces generally tend to adopt new codes more quickly than U.S. states do. There has been much debate over emergency communications, and this article will attempt to summarize what has evolved in Canada over the last several years. It will hopefully provide some assistance to U.S. inspection authorities, elevator companies and consultants who are now grappling with the implementation of these new rules.

We have divided this topic into four sections:

Section 1: General discussion of what equipment the code now requires

Section 2: Modernization projects

Section 3: Inspection guidelines for elevator authorities

Section 4: Project-management guidelines for elevator companies and consultants

Section 1 will be covered in this article. Sections 2, 3 and 4 will be covered in next month's issue of ELEVATOR WORLD.

Section 1: Equipment Requirements for Emergency Elevator Communication Systems

We encourage every elevator authority to publish a "plain English" interpretation as to how it requires emergency communication systems to work in its jurisdiction. The following are four key areas that will need to be considered when making these policy decisions.

On-Site Communications

The most controversial element of Section 2.27 has been the opening paragraph (2.27.1.1.1), which states:

A two-way communication means between the car and a location in the building, that is readily available to authorized and emergency personnel shall be provided.

It may be difficult to believe, but there have actually been four different approaches in Canada as to how this one simple sentence should be enforced:

- 1) One province has interpreted it literally. All buildings, regardless of height, must provide a location where emergency personnel are able to communicate with the elevators.
- 2) A second province initially interpreted the wording as above, but then changed its interpretation after receiving

industry objections. The on-site communication station is now only required in buildings with elevator travel over 60 feet.

- 3) A third province has issued an official written interpretation as did the first province, but unofficially has told its inspectors not to enforce the requirement in buildings with elevator travel under 60 feet.
- 4) A fourth province decided from the outset to not require these on-site communication stations unless the building had over 60 feet of elevator travel.

Needless to say, it becomes difficult for contractors, manufacturers and consultants to know what is expected when the rules are not interpreted and enforced in a consistent manner from one jurisdiction to the next. Here are some of the considerations to be made when deciding how to interpret this section:

- 1) The installation of an on-site rescue station will generally add about US\$2,000-3,000 to the cost of a new building. Is this too high a price to pay for low rises to have the same type of emergency communication systems as high-rise buildings?
- 2) Without a rescue station, is it acceptable to have elevator personnel yelling up the hoistway to communicate with trapped passengers in a low-rise building?
- 3) Should fire personnel have the ability to speak between the elevators and the central alarm and control facility in low-rise buildings during a fire?

There is no right or wrong answer here. However, given the relatively minor incremental cost of an on-site rescue station and the improved communications that it provides during an emergency, it would seem reasonable that the literal interpretation of 2.27.1.1.1 be taken and an on-site rescue station be required in all buildings, regardless of height.

It is expected that the next (perhaps 2008) version of ASME A17/B44 will modify the wording of Section 2.27.1.1.1 so that an on-site rescue station is not mandatory for buildings with elevator travel under 60 feet. However, at the same time, there is also active discussion for including an on-site device in all buildings, which will alert building personnel if the emergency telephones are not working normally. Since manufacturers will likely include the latter function in the design of their rescue stations anyway, a simple approach would be for jurisdictions to start installing them in all buildings and just expand their operating requirements as future code updates are issued.

On-Site Ringing

Section 2.27.1.1.2 has also caused some grief in Canada as to what it is supposed to mean:

When the two-way communications location in the building is not staffed 24h a day, by authorized personnel who can take appropriate action, the means of two-way communications shall automatically be directed within 30 s to an additional on- or off-site location, staffed by authorized personnel where an appropriate response can be taken.

Jurisdictions that tend to interpret the code in a literal manner have generally said that outgoing calls from the elevators must first ring at the on-site rescue station. If that call is not answered within 30 seconds, it must be redirected to a permanently staffed location elsewhere. Other jurisdictions that take a more “creative” approach to code interpretation have tended to ignore any requirement for outgoing calls to first ring at the on-site rescue station. From a design perspective, it is important to remember that elevator communication systems are installed not only to assist trapped passengers, but also to assist firefighters in a rescue situation. If firefighters are using the elevator in a building emergency, their radios will not always be able to penetrate the concrete walls of a hoistway. That is why it is very useful if those outgoing calls from the emergency telephone ring first at the on-site communication station. If a passenger is making the call, having the call first ring on site is also a good idea just in case building personnel happen to be available. If not, the extra time it takes for these three or four rings is not likely to create any added risk to the passenger.

Most well-designed rescue stations are able to provide the on-site ringing function. Some less-expensive brands are not capable of using a single telephone line to have outgoing calls first ring on site and then transfer the call off site. Consultants and elevator contractors should therefore make sure that their equipment has the flexibility to provide this “split ring” function if it is required in your jurisdiction.

Hands-Free Telephones

Section 2.27.1.1.3g reads: “The two-way communications means shall not use a handset in the car.”

Thankfully, everyone has been able to agree that the above sentence means that a hands-free device is the only acceptable form of communication hardware now permitted in elevators. However, there is a tremendous range in how the various telephone manufacturers have designed their equipment. Some of the functions which can have a direct impact on passenger safety are:

1) Volume levels: If alarm bell volumes can be specified in the code, there is no reason why emergency telephones cannot have minimum volume requirements.

Unfortunately, there are no mandatory volume levels for emergency-communication equipment at this point in time. Line-powered telephones, while being a little less expensive and slightly faster to install than AC-powered phones, are well known for having volume levels that can sometimes be so low that passengers cannot hear what is being said to them.

- 2) Location announcement: Hands-free telephones must be able to automatically transmit a location message to monitoring personnel, which is played *on demand* (2.27.1.1.3d). Some inexpensive phone brands will simply play the message when ringing has stopped, then go into two-way communications. However, real life doesn’t work that way: an elevator call will often be put on hold for a short period of time by the monitoring station before an operator is available. In the above case, the location message will have already played and the operator will not know where the call is coming from.
- 3) Call extension: Hands-free telephones all have programmable internal timers that dictate how long a conversation will continue. After that time period, the telephone will automatically hang up. However, Section 2.27.1.1.3f says that the emergency telephone must not hang up until the operator is ready for it to hang up. This means that the phone must provide some means to alert the operator when call time is about to expire and instruct him or her on how to extend that call. Some manufacturers have reduced costs by not providing this capability and, fortunately for them, most inspectors do not check to make sure that this function is provided.
- 4) Call activation: It only makes common sense that if a distressed passenger happens to push the call button more than once, the emergency telephone is not going to shut off. Yet, that is exactly how some hands-free telephones are designed.
- 5) Multiple calls: What happens to an emergency-communications system if more than one passenger is trying to call out at the same time, as would undoubtedly be the case if a building’s power were to fail? Some systems will simply have all calls join in the same conversation. The problem with this is that hands-free telephones often do not function well when a number of them are trying to talk at the same time. More advanced systems will actually queue the individual calls and put each one through when the line is free, while at the same time alerting the operator to finish the call as quickly as possible because another call is being attempted.
- 6) Self-diagnostics: Unfortunately, emergency telephones are usually not checked on a regular basis by anyone.

The result is that over one half of all service calls to elevator telephones come about as a result of someone getting stuck and discovering that the phone did not work for some reason. This general lack of attention places the passengers in danger and significantly increases the owner's liability risk. While self diagnostics are not yet mandatory, some brands of equipment are already capable of providing this function. For example, Webb Electronics Inc. equipment can automatically generate an e-mail to the building manager if any problem is detected with the emergency telephones. Since the technology is available, take the opportunity to consider requiring some form of self diagnostics now rather than waiting several years until it is included in the safety code.

Calling into Elevators

Section 2.27.1.1.4 states:

Where the elevator travel is 18m (60 ft) or more, a two-way voice communications means within the building shall be provided . . . The means shall enable emergency personnel within the building to establish two-way voice communication to each car individually . . . The means shall override communications to the outside of the building.

First of all, it is important to recognize that there is no longer any relationship between the building's height and the requirement for an on-site rescue station. (In previous versions of ASME A17, one was required only in high-rise buildings.) Now, a building with four stories of underground parking and two stories above ground would need to have a rescue station included in its design. Earlier discussion focused on the need for a rescue station in terms of *outgoing* calls from the elevators. This section is basically saying that in buildings with over 60 feet of elevator travel, there must also be a means for rescue personnel to call *into* the cabs.

Many jurisdictions used to accomplish this call-in function by installing a separate intercom system. In other words, there was a telephone in the elevator for passengers to call out on and a separate intercom provided so that rescue personnel could call into the cabs from the on-site location. Canadian jurisdictions have ruled that Section 2.27.1.1.4 no longer permits a separate intercom system for the on-site communication function.

The reason for this is that a separate intercom system cannot override any existing telephone conversation that is taking place between a passenger and the monitoring station. An intercom can only blare away in the background, which is potentially confusing for passengers with two people trying to talk to them simultaneously through two separate speakers. A modern "integrated" rescue station is what is now installed in most buildings. It is integrated in the sense that the hands-free telephone in the elevator is used for both outgoing calls by the passenger and incoming calls from the on-site rescue station. Incoming calls to the elevator from the rescue station will

automatically take priority over any existing telephone conversation that may be going on with the off-site monitoring station.

In addition to meeting the new code requirements, the experience of building owners is that installing a single integrated communications system often costs less than it used to cost for the two separate systems. Some rescue stations also have the ability to tie in area-of-refuge telephones and parking-garage telephones into the same device, which makes for a very efficient and compact command post for all of the building's emergency-communication devices.

It should be noted that the preceding was not meant to imply that intercom systems are never acceptable for elevator communications. As long as there is 24-hour on-site security within the building and off-site dialing is not required, we have found that intercoms are usually accepted as long as the equipment is capable of providing all Americans with Disability Act features. There are undoubtedly some higher-end intercom systems on the market today which can provide all integrated features provided by the telephone-based systems. These would also be acceptable. Our point is that in Canada, installing one communications system for passenger calls and another separate system for on-site rescue calls is no longer okay with inspectors.

Conclusion

Next month, we will discuss when the new rules for elevator communications apply to modernization projects. We will also provide a guide so that inspectors can better determine how well a particular system is complying with the new operating requirements. Finally, a project-management checklist will be provided to help contractors and consultants ensure that none of the elements of these more complicated communication systems have been overlooked.

The opinions expressed herein are based on over 20 years of performing field installation and repair to all brands of telephone (not just Webb Electronics products), so we have developed a very good insight as to what works well in the field and what doesn't. However, having said that, we don't know everything, so we'd be happy to hear from any readers who would like to bring any omissions or errors to our attention. Contact information is phone: (604) 501-6652, fax: (604) 501-6653 or website: www.webbelectronicsinc.com.

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