Achieving Competency - Part 2

by Dean K. Wilson, P.E.

Question: What really achieves competency in a fire alarm installation?

Answer: As I explained last issue, competency in every area of life involves a series of interlocking, interdependent variables. When these variables function interactively to strengthen each other, one can achieve the highest level of competency. Industrial psychologists call this a "holistic approach."

Concerning fire protection, these variables include: manufacture, design, specification, installation, testing, maintenance, and use. Last issue I discussed the first three. This time I will examine the remaining four.

You might imagine that those who install fire alarm systems have taken the time to become well versed in proper installation techniques. An examination of a significant number of installed systems calls this assumption into question.

Proper installation has two relatively simple, yet crucially important components: knowledge and skill. That's right. The installer must possess knowledge of NFPA 72-1996, *National Fire Alarm Code;* knowledge of the equipment manufacturer's installation instructions;

knowledge of the designer's goals; knowledge of the specifications for the installation; and knowledge of installation techniques and related standards of practice. Added to this composite knowledge, the installer must possess sufficient skill to apply that knowledge. This skill must include both mechanical and electrical ability. And, this skill must include the strength, patience and care to use such ability successfully.

Contrary to the cartoon image I saw years ago in an somewhat egotistical engineering magazine, the installer cannot be Thumbs Noodleman with a ballpeen hammer. It takes genuine applied intelligence to install a fire alarm system properly. A building owner does well if he or she carefully chooses a fire alarm installer who exhibits the qualifications of a professional.

NFPA 72-1996, *National Fire Alarm Code*, offers five ways of determining the qualifications of someone who will test or maintain a fire alarm system. Section 7-1.2.2 reads as follows:

> 7-1.2.2 Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals who are:
>
> (a) Factory trained and certified.
>
> (b) National Institute for Certification in Engineering Technologies fire alarm certified.
>
> (c) International Municipal Signal Association fire alarm certified.
>
> (d) Certified by a state or local authority.
>
> (e) Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems."

These requirements can equally apply to installers. Notice, if you will, that one of the suggested programs is our own IMSA fire alarm certification. I tip my hat to those who have labored so long and hard to create this program; and who work equally hard to maintain its high level of quality.

From this list, an owner can choose an installer/maintainer who can truly perform the intended function. Once having assured the quality of the installation, the baseline level of that quality can be measured through a complete initial acceptance test. Again, NFPA 72-1996, Chapter 7, contains the details on what this test must cover, how to conduct the test, and how to witness it.

Dr.Deming suggested that the overall quality of a system, process, or product derives from benchmarked standards of quality and from the effort made to continuously improve the system, process, or product. Applied to fire alarm systems, NFPA 72-1996, *National Fire Alarm Code,* provides the benchmarked standard of quality. By comparing the installed quality of any particular fire alarm system against the requirements of the *Code,* you can determine that system's baseline level of quality.

You can achieve continuous improvement of that system's quality by properly testing and maintaining the system. Using the requirements of the *Code* to outline the necessary tests and needed maintenance, you can assure that the fire alarm system will perform its intended function throughout its useful life.

In between the intaller/maintainer's service calls and visits to test the system, the user of the system largely controls the effectiveness of the fire alarm system's performance quality. This starts when the installer provides the user with proper system documentation. The *Code* requires:

> 1-7.2.2 Every system shall include the following documentation, which shall be delivered to the owner or the owner's representative upon final acceptance of the system.
>
> (a)* An owner's manual and installation instructions covering all system equipment; and
>
> (b) Record drawings."

The Appendix section amplifies:

> A-1-7.2.2(a) The owner's manual should include:
>
> (a) A detailed narrative description of the system inputs, evacuation signaling, ancillary functions, annunciation, intended sequence of operations, expansion capability, application considerations, and limitations.
>
> (b) Operator instructions for basic system operations, including alarm acknowledgment, system reset, interpretation of system output (LEDs, CRT display, and printout), operation of manual evacuation signaling and ancillary function controls, and change of printer paper.
>
> (c) A detailed description of routine maintenance and testing as required and recommended and as would be provided under a maintenance contract, including testing and maintenance instructions for each type of device installed. This information should include the following:
>
> 1. A listing of the individual system components that require periodic testing and maintenance;
>
> 2. Step-by-step instructions detailing the requisite testing and maintenance procedures, and the intervals at which these procedures shall be performed, for each type of device installed;
>
> 3. A schedule that correlates the testing and maintenance procedures recommended by A-1-7.2.2(c)2 with the listing recommended by A-1-7.2.2(c)1.
>
> (d) Detailed troubleshooting instructions for each trouble condition generated from the monitored field wiring, including opens, grounds, and loop failures. These instructions should include a list of all trouble signals annunciated by

the system, a description of the condition(s) that causes such trouble signals, and step-by-step instructions describing how to isolate such problems and correct them (or how to call for service, as appropriate).

(e) A service directory, including a list of names and telephone numbers of those who provide service for the system."

I think that you can see that by providing the user with this depth of material, and by training the user to actually use this information, you can greatly enhance the quality of an installed fire alarm system.

The seven golden elements of fire alarm system quality: manufacture, design, specification, installation, testing, maintenance, and use. Which element will you start to "polish" today?

IMSA member Dean K. Wilson, a licensed professional fire protection engineer, is Principal and Chief Engineer of the consulting firm: D. K. Wilson Associates in Windsor, CT. The opinions expressed in this article are strictly his own. You can reach him by phone at (860) 687-1009 or by e-mail at DeanKWilso@aol.com.