



# Navigating Under-Designs and Over-Designs:

## *Advice from a Fire Protection Design Consultant*

Warren Olsen is well qualified to know whether or not a fire protection design is going to be approved – or more importantly, help to adequately protect lives and property.

Olsen is vice president of Fire Safety Consultants, Inc. (FSCI), an Elgin, Illinois-based leader in fire and building code review and consulting. With 44 years of experience, he has reviewed hundreds of fire protection plans, conducted scores of training programs, and consulted with a multitude of building owners, architects, and builders on code compliance. He's worked closely with fire marshals, city governments, and fire protection system designers. Based on his experience, Olsen understands that not everybody is as knowledgeable as they should be about NFPA and local building codes.

"The simple fact of the matter is that 95 percent of people designing fire protection systems are not fire protection engineers," noted Olsen. Without that background and training, errors are inevitable.

Warren Olsen has some helpful advice for those system designers who want to make the process of designing and gaining approval of fire protection systems as smooth, stress-free, swift, and profitable as possible.

### **Avoid under-designing to save costly delays**

In a competitive marketplace, there is a tremendous incentive to be as thrifty as possible in designing a fire detection system. A lower bid can win the business. For design/build firms, a bare-minimum fire protection design can help keep total estimated costs within clients' expectations.

However, don't think that cutting corners will pass muster.

Some of the typical under-design issues Warren Olsen sees include:

- Improper installation of initiating devices. When ceiling assemblies are not smooth – for example, featuring beams or joist construction – local codes may require those initiating devices to be spaced closer together than on a smooth ceiling.
- Incorrect spacing of heat detectors on ceilings higher than 10 feet. As ceiling heights rise, heat detectors need to be spaced closer together. The required number and spacing of smoke detectors is also affected by ambient conditions, such as room temperature, humidity, air flows, and the burn characteristics of the building material.

These errors are usually caught in the review process, but multiple design iterations can cause costly delays. Worse yet, if an under-designed system were to receive approval, lives and property could be put at greater risk due to a potential delay in detector operation.

To preclude the delays and risks of under-designed systems, Olsen offers several recommendations:

- Take a three-day NFPA or similar course. You don't have to become a full-fledged fire protection design engineer to master the basics of code requirements for designing. Courses are available nationwide from a variety of reputable sources, including the NFPA.
- Engage a fire protection design consultant to review your design before submission. Fire protection design consultants are experts at spotting both issues and opportunities. A design review does not take long and can save you time and effort.

These recommendations do require some up-front costs, but they will be worth it compared to the time and labor costs of redesigns, additional reviews, and occupancy delays.

### **If you don't over-design, you may win more business and avoid long-term costs**

Strange as it may seem, according to Olsen, over-designs are as much of a problem as under-designs.

"Designers sometimes include more smoke detectors than necessary, either because they're not aware of code variations due to physical factors, or because they want to ensure they're covered," noted Olsen. "While plans will not typically be rejected during the review process for over-design, the increased cost of installing and maintaining an over-designed system is shouldered by the building owner."

Building owners aren't the only ones to pay. For independent fire protection system companies, the impact of over-designs can be especially costly. If you consistently over-design systems, you may be underbid on projects, unnecessarily pricing yourself out of contention for business.

One over-design issue that Warren Olsen often encounters is incorrect spacing of smoke detectors.

"For example, according to code, the nominal spacing for smoke detectors is every 30 feet," noted Olsen. "However, if you're designing a fire detection system for a building with five-foot-wide corridors, those detectors could be spaced every 42 feet. If those corridors are long and it's a multi-story building, your design could specify dozens more smoke detectors than necessary to provide adequate protection."

The negative ramifications of over-designs can be significant. There is the greater cost to the building owner to purchase and install the extra smoke detectors. There is the increased cost of annual inspection and testing. If you specify 30% more detection devices than necessary, that's 30% more potential sources of nuisance alarms.

Olsen recommends that designers don't simply add extra devices to their designs to cover themselves.

"Instead, take the time to become better acquainted with code requirements," he suggested. "A short course will more than pay for itself over time. Second, learn how to use innovative products to solve design challenges and simplify your overall network. Suppliers like Johnson Controls provide a wealth of information and design resources that you can take advantage of."

### **Get to know your fire marshal**

Warren Olsen's final piece of advice requires no out-of-pocket expense at all: get better acquainted with your local fire marshal.

Why should that be recommended? You might think that meeting local code requirements would be straightforward; all it should take to get a plan approved is to find out which version of NFPA the jurisdiction has adopted, what the local building codes mandate, and design to those requirements.

But it's not that simple.

Olsen notes that individual fire marshals often have their own standards that go above and beyond NFPA and local codes.

"For example, a fire marshal may insist on including fully automatic detection even when a building is fully equipped with sprinklers and is not a residential facility with people sleeping through the night and therefore not in need of automatic detection," he said.

Olsen therefore recommends that fire detection system designers get to know their local fire marshals and learn their particular preferences for design features above and beyond code requirements.

"In addition, the level of training among fire marshals can vary greatly," said Olsen. "If you think your local fire marshal could use a little extra fire alarm training, try offering to sponsor them in a training class to increase their knowledge."

### **A little knowledge goes a long way**

Above all, Warren Olsen stresses that it doesn't take years of intensive training or large investments to become knowledgeable about effective fire protection system design. An affordable three-day course can impart the basics and keep you up-to-date on the latest innovations, while experts like Simplex offer resources, webinars, videos, and other training programs that can be extremely helpful – and many of them are free.

To learn more, visit [www.simplex-fire.com](http://www.simplex-fire.com)

