



The Firestopping Industry—

The background of the entire page is a close-up, high-contrast image of flames. The colors range from bright yellow and orange at the bottom to deep red and black at the top, creating a sense of intense heat and fire.

today and tomorrow

The firestop market is growing, changing, and becoming more competitive than ever before.

BY BILL McHUGH

(This article is a supplement to the June issue of *Insulation Outlook*.)

Over the past 11 years that I have been watching evolutions that have taken place. Each “evolution” organization, architect/engineer, manufacturer, construction team can improve life safety through better testing. The purpose of this article is to discuss some of the changes today, with a bit of history, and an eye on the future. Firestop Contractors International Association (FCIA) contractor qualifications, code enforcement and legal inspectors, architect/engineers and their roles in

Industry Influences

FCIA

Within the last two years, the FCIA has formed and flourished from 7 members to 85 from around North America. FCIA’s charter has been to be at the forefront of the industry through direct involvement in innovations with program, code and specification development.

Testing and Technology

Manufacturers are constantly improving product technology to optimize application labor, reducing product costs while maintaining the integrity required for the firestop system to perform. These improvements have helped reduce the amount of materials in a firestop system to make firestop system installations easier to install, inspect and meet the actual building design requirements.

Examples of testing and technology “evolutions” the past few years include new firestop spray-on products for top of wall and perimeter fire containment system applications; thinner, smaller wrap strip sizes; testing of reusable fire stop “bricks” and “pillows”; as well as the use of more environmentally and user friendly latex and acrylic sealants, putties and mastics.

Specifications

Since 1997, firestop specifications have also “evolved”. New additions to specifications include: perimeter fire containment, cycling of joint systems, air leakage testing to simulate smoke movement, and STC/NRC ratings for sound.

Where are firestop requirements specified? In the past, Division 7, section 07270 handled all firestopping.

Now, there are multiple sections with firestopping mentioned. The Division is still “7”, with a “master” section of 07840, “Firestopping”. Subsections include 07841, “Through Penetration Firestop Systems” which includes various plumbing, mechanical, electrical and “poke through” openings and 07842, “Fire Resistant Joint Systems”, including expansion joints in buildings, “top of wall” and perimeter fire containment systems applications. Perimeter fire containment systems protect the opening where a rated floor assembly and an exterior wall structure interface. This wall assembly may or may not be a fire resistance rated exterior wall structure abutting the fire resistance rated floor assembly.

Fire resistance, thermal envelope protection, and movement criteria of these independent substrates must be maintained. This multi function purpose serves the building through energy efficiency and preventing fire from moving from floor to floor at the building edge, either through the “safing slot” or “lapping” from floor to floor on the outside. These areas, once protected, are called Perimeter Fire Containment Systems (PFCS). There have been major losses due to lack of, or improper protection systems at the perimeter gap. Examples include the Market Street Building, Philadelphia, PA (total loss), First Interstate Bank and Occidental Towers, Los Angeles, CA, and The Hilton Las Vegas, NV. Numerous articles have been written about these disasters.

In the southeast, FCIA member Renee Woodruff of Seal Systems, Inc., Tallapoosa, Ga. reports that specification language is very specific about firestopping. Although specifications exist, corresponding details on construction drawings (especially for perimeter fire containment systems and top-of-wall applications) on some projects can be conflict-

he firestop systems market, there have been many of the market starts with a new idea by a contractor or a distributor about how the construction technology, process, installation techniques and/or some key issues in the firestop contracting industry are. In the coming paragraphs, we'll discuss the (FCIA), testing and technology, specifications, construction issues, manufacturer/contractor partnerships—the changing firestop industry.



ing. In some cases, the detail on the drawings may show acoustical sealant at the top of the wall rather than firestop systems. When the wall/floor assembly is fire rated, this is a conflict. The situation causes controversy during the bid process as some contractors may bid based on the much less expensive, non-fire rated, acoustical sealant design. We have seen some improvement in the drawings recently, however. Some are now directly referencing the tested and listed firestop system for the application whether it's top of wall, perimeter fire containment system or penetrations.

What's in the firestop specification today that might not have been before, and how might things change in the future?

Special Firestop Inspections & Contractor Qualification
Code language allows building officials to require a special inspection for any building component. The "special inspections" section of the model and International Codes has been an option available to jurisdictions for many years. Systems include structural steel fireproofing, welding, heating/ventilation/air conditioning (HVAC) fire and smoke damper systems, sprinklers and alarm systems.

Firestop systems are an important life safety item, part of a balanced strategy to protect building occupants, property and continuity of operations inside the structure. Firestopping is a "Systems Specific Containment Construction Program". Firestop products need to be installed to the detailed parameters tested and listed in a system drawing. In cases where there is not tested and listed system for the particular application in ANY listing directory, from ANY manufacturer, an "Engineering Judgement" (EJ) or "Equivalent Fire Resistance Rated Assembly" (EFFRA) must be obtained either from the man-

ufacturer of the tested and listed system or an engineer from the testing laboratory. The EJ/EFFRA is needed because one or more parameters in the tested and listed system are compromised by the actual dimensions in the field. Possibly an annular space was too large, the insulation on the pipe too thick or a type different than described, or maybe the gap larger than tested.

In the firestopping business, if an installer, estimator or other person misses a parameter, whether intentional or not, it could potentially cause loss of life, property damage or interruption in continuity of operations. Therefore, it's important to install to the tested and listed system, and, EJ/EFFRA parameters. Firestop installing really must be viewed as a "zero tolerance" item. If the parameters of a tested system or EJ/EFFRA are not followed, the system may not work, rendering the investment in building protection useless. The detail oriented processes to "get this done" can be complicated if the "zero tolerance mindset" is not understood. The "zero tolerance" process may be complicated, but not impossible. Many firms have trained themselves to "demand zero tolerance", with the end in mind of increased efficiency and less chance for architect/engineer or authority having jurisdiction rejection.

To accomplish this "Zero Tolerance" attitude, FCIA and Factory Mutual (FM) have developed the "Approval of Firestop Contractors Standard, FM 4991". This new "contractor quality" standard, much like an ISO 9001 process for manufacturing firms, assesses the installation quality process of a firestop subcontractor. This "up front" qualification, coupled with Inspection (discussed below), assures the owner that quality procedures and follow up were performed on an important life safety system, firestop systems.

In some areas of the country, a code official and/or



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independent inspector verifies that the owner and general public are actually receiving the firestop system (life safety) bought and paid for in the scope of work, and required by code. Many specifications exist with independent inspection for firestopping, usually paid for and hired by the owner. However, specifications generally have yet to address inspector qualifications or the inspection procedure used for the process. Variations of inspection methodology and thoroughness from inspector to inspector on projects can lead to difficulties on the jobsite for the construction team.

To help solve inspection variance problems, the technical committee of the Firestop Contractors International Association (FCIA) has written and proposed a standard for Special Firestop Inspection that has been submitted to the ASTM (American Society for Testing and Materials) E-06 Committee. In ASTM, the Special Firestop Inspection Standard is being reviewed and in process of becoming an ASTM Standard. FCIA and NIA Member, Don Sabrsula, Firesafe of Houston, Katy, Texas, originator of the document, is chairing the ASTM task group responsible for converting it to a consensus document suitable for use in the industry. "FCIA recognized that there is a lack of awareness by all parties on the construction team that firestop is a "zero tolerance" systems application. "Zero Tolerance" starts with choosing the right product, proper system instal-

lation, inspections and providing documentation that the firestop systems installation process has been followed. And, our industry's inspectors need to be operating in a standard manner that provides consistency and compliance." Building officials from the authority having jurisdiction or an independent inspection firm can accomplish this process. Don reports, for example, that Austin, TX has seen the need for special inspection of firestop systems installations. It's required by ordinance that an independent third party agency performs the special firestop inspection. This ordinance has been in place for a number of years.

Firestop Contractor Qualifications

Currently, contractor qualification language in specifications vary, depending on the area of the country. Typically, we see requirements such as: contractor "approved by the manufacturer", "contractor with experience in the type and size of work specified; with three or more years of experience; with a reference projects for the owner/architect/GC to visit; and "a manufacturers' willingness to sell product to a contractor does not solely qualify the firm to install the product."

Firestop product manufacturers, many who are members of the International Firestop Council (IFC), (an industry trade association of manufacturers and other interested parties) have spent time and money educating contractors on the installation of their products to meet code and specification requirements. Additionally, FCIA has recently published the first edition of the *Firestop Industry Manual of Practice*, a book focused on the firestop contracting specialty profession. *Manual of Practice* topics include codes,



materials, tested systems selection and EJ/EFRRRA's, firestop testing qualification, contractor process for quality control, project management and a glossary of terms. This document, a firestop industry first, is used as the basis for the FM 4991) Approved Contractor, "Designated Responsible Individual" test (see below).

Architects in key major cities have reviewed the new "FM 4991 FM Firestop Contractor Approval Standard" and offered their support for better contractor qualification language. Major architectural firms, code officials and contractors have offered comments to make the FM 4991

Firestop Contractor Approval Standard a consensus document for the industry. Feedback from major specifiers is that as the number of FM 4991 Approved Contractors reaches three to five per major city, the contractor approval standard will become commonplace in specifications.

It makes sense to use a specialty firm with expertise in this area of life safety construction as there truly should be "zero tolerance" for deviations from tested and listed systems installations.

Ken Hercenberg of RTKL Architects, Baltimore, Md. has been so concerned with the contractor quality issue in firestopping that he wrote an editorial, published in the Construction Specifications Institute's *Construction Specifier* magazine asking "Where are the Certified Firestoppers?". Firestop Systems are a life safety item and there were not many requirements available for qualification of firestop contractors prior to the FM 4991 Firestop Contractor Approval Standard.

Firestop Installer Training

Over the years, firestop contractor firms have had their own training for installers, either on the jobsite or in-house, done by their own personnel, a manufacturer's representative or distributor, or a firestop specialist person during special seminars. Union companies and installers may have access to training through their apprenticeship training programs as part of their collective bargaining agreements.

In Chicago, the Heat and Frost Insulators Union Local 17 Apprentice Training Program, has included firestop systems in their curriculum for over 10 years. In other areas of the country, the carpenter and laborers' unions offer training for their craftspersons. Watch for specifications to require specific training of installers in the future, done in a generic manner, including requirements for ongoing continuing education of workers to keep up with fast changing product and testing requirements.

The FCIA Education Committee, formed in 2000, will be working on training packages for FCIA members to use as tools to educate the construction marketplace about the need for proper firestopping practices. The IFC has also developed some generic training programs for fire/code officials, architects/engineers and the rest of the construction team.

Smoke Rated Construction

Although codes require smoke protection, they are not very clear about what is sometimes termed by the industry as "smoke sealing". There are requirements in most specifications to resist the passage of smoke and gasses. In the International Building Code (IBC), smoke protection is referenced in chapter 7, and refers to the penetrations section for requirements.

Currently, the firestop industry standard to simulate smoke movement restriction is the "L" (Air Leakage) Rating, tested as part of UL 1479 (UL's version of ASTM E 814) at Underwriters Laboratories. Many specifications already call for treatment of walls/floors with fire, smoke and hot gas resistant firestop systems. However, not all firestop systems have an "L" Rating. Watch out for this smoke requirement when submitting firestop systems to the Authority Having Jurisdiction or architect/engineer. There could be added business risk to the contractor if the specifications have smoke requirements, yet the submittal fails to address this area.

Smoke generated from fire can cause damage, injuries and loss of life just as fire can. And, with higher fuel loads due to furnishings, computers and components, finishes, paper in cabinets and other items con-





teristics include joint systems, perimeter fire containment and mechanical/plumbing/electrical penetrations as well.

Inspection, FM 4991 Firestop Contractor Approval and continuing education of industry participants are very important to increase life safety in the firestopping arena. Although there are many firestop specialty firms that work hard to embrace a “zero tolerance” company culture, we still hear horror stories from FCIA members who report unscrupulous contractors using things like red Kool-Aid added to drywall compound to make an inexpensive generic “product” look like a tested and listed system product, or who transfer generic sealants that resemble the color of firestop sealant from an inexpensive bucket to an empty firestop material pail. And, the altered product may

contributing to the smoke generation from a fire, it can be impossible to visually find a way out of a fire due to smoke migration to unprotected areas. Using firestop systems in conjunction with fire walls/floors, and smoke/fire dampers, alarm systems and sprinklers in balanced approach to firestopping seems to be the way to protect buildings and life safety proactively. Many articles, usually appearing after a disaster, continually promote the balanced approach to fire prevention, incorporating many types of protection into protection strategies.

Physical Capabilities

Specifications, for the most part, also call for firestop system products to be environmentally compatible while appropriate to the specific application. Included physical capabilities could be traffic, moisture resistance, sound attenuation, and physical damage resistance. These charac-

have only a fraction of the fire resistance of the tested system product. Better contractor qualification (FM 4991) and third party inspection can help reduce the occurrence of these practices.

Code Language

Clearly, Firestop Systems requirements are in the BOCA, (BOCA National Building Code), SBCCI (Standard Building Code), and UBC (Uniform Building Code) codes and have been for a number of years (since the early to mid 80's). The last publication of these three separate codes is behind us. Over the next few years, the IBC, written by the International Code Council (consortium of the BOCA, SBCCI and UBC) will be adopted by states and municipalities.

For firestopping, code language has mentioned maintaining the wall and floor ratings for years. Currently, the IBC states that the wall and floor ratings must be main-

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tained using a tested and listed system suitable for the specific purpose. Typically ASTM E 814 is the referenced standard. (See section 709, 711 and 712, IBC) Also, Smoke Barrier Penetrations are to be sealed per the “penetrations section”.

According to Kelly Reynolds, Building Code Consultant, over 1200 U.S. jurisdictions are now “on the International Codes”. Kelly also reports that Alaska, Florida, New York and So. Dakota are preparing to go on the ICC codes with more considering the change.

The 2000 IBC has new language, being debated by industry, architects, code officials and contractors. As it was with the three model codes, each code’s writing and editing cycle brings a new twist to the codes, and the International Codes are no different.

Enforcement Issues

Enforcement for firestopping varies from area to area. In general, building code officials, inspectors and owners’ organiza-

tions are becoming better educated about the “zero tolerance” issue pertaining to firestopping. Building owners who have been shorted on firestop systems before, are now asking prospective contractors “what systems do you plan on using here?” Alec Rexroat, Executive Director of the Illinois Regional Insulation Contractors Association, finds that institutional owners in the Midwest are well educated about how to “buy a firestop project.” However, the Firestop Industry must do much more work to further the industry enforcement education.

In Nevada, the state is in the process of taking steps to understand what it is purchasing when buying firestop systems installations through conventional methods. It seems they’ve had too many applications fall outside tested and listed system parameters, spending considerable money on corrections.

Firestop contractors also must pay particular attention to local jurisdiction requirements for EJs or EFFRA’s used in lieu of a tested and listed system. Some



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areas of the country do not want to accept EJ/EFRA's, period! FCIA and IFC Standards must be maintained when no "tested and listed system" exists to deal with a particular job site condition.

Legal Perspectives

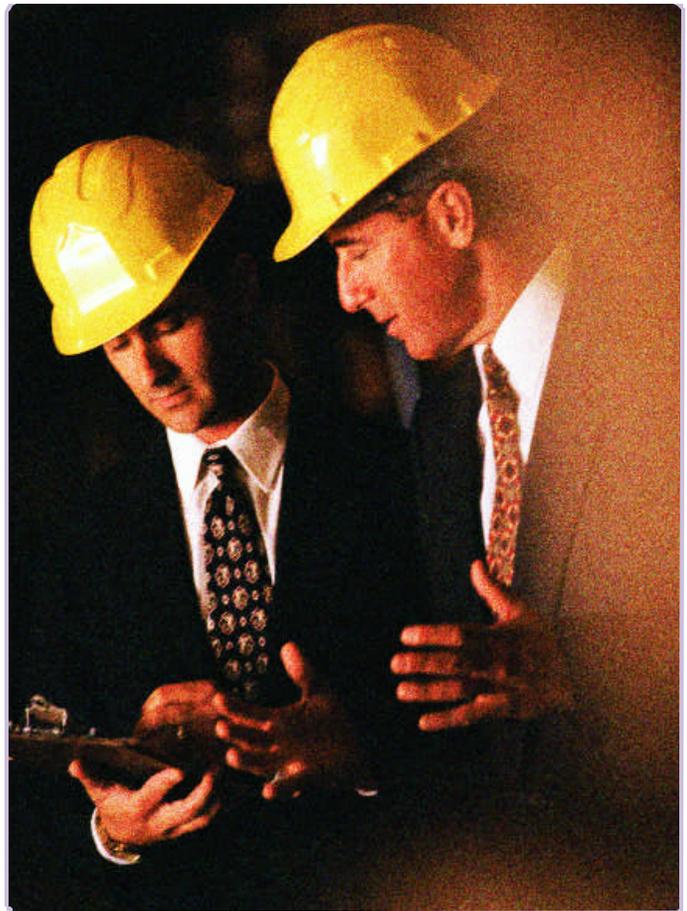
Contractors really need to know the correct protocol to use when installing firestop systems. With all the training, seminars, associations like FCIA and IFC, the FM 4991 Contractor Approval Standard Program, and Internet education opportunities available, the courts and insurance industry wouldn't look lightly on mistakes made that cause losses of life, property or continuity of operations due to workmanship. There's just been too much written and presented in the industry for uneducated contractors to use the "we were unaware" or "didn't understand the firestop installation zero tolerance process" excuses.

Manufacturers

While the market for firestop products is still growing, there are manufacturers continually looking at entering the market. Longtime suppliers have been joined by some big names in the insulation and fireproofing businesses. This larger supplier base means more options for the firestop contractor. However, it also means contractors need to stay abreast of more information to keep competitive. Throughout the industry, tested systems knowledge and the desire to learn more seems greater than ever among all the participants in the industry, contractors, distributors, manufacturers, code officials and architect/engineers. Competition based on tested systems detailed drawings instead of "product" and price is the trend in the industry. Lower installed costs will become evident due to tested system optimization and a larger pool of manufacturers and contractors competing in the marketplace.

What Does All This Mean?

The firestop market is growing, changing, and becoming more competitive than ever before. However, the competition now and into the future will take place more on a "tested systems" level instead of "product" level, requiring contractor brainpower to decipher the multitude of systems available to a particular application down to those that make financial and physical sense. The playing field of manufacturers, distributors, contractors and inspectors is better educated about the business and its requirements. However, the professional firestop contractor will still have to deal with individuals in the industry that do not have the depth of knowledge required to implement "zero tolerance" firestop systems installations.



These players may try to skirt the system for whatever reason adding risks such as loss of life, property protection and loss of operational continuity to the building occupant's risks. With improved contractor qualification specified, (FM 4991 Approved Firestop Contractors), inspection consistency increased due to the industry's pursuit of a consensus inspection standard, industry education by FCIA, IFC, manufacturer, distributor and interested party programs about the firestop installation protocol, the firestop team's risk may be reduced.

Most importantly, building occupants (that's us) will be pleased to know they can sleep at night... with a building well protected by a balanced approach of both passive and active fire protection systems utilized for optimum safety and performance. ☺

Bill McHugh, CSI, has been leading seminars and writing about the firestop industry nationally for the past 11 years. He has presented firestop seminars to various contractor, architect and insurance audiences, written several articles, a handbook, been involved in the development of the FCIA Manual of Practice, FM 4991 Firestop Contractor Approval Program, and is an FM Designated Responsible Individual (DRI). Bill is also an "Institute Director" in the Construction Specifications Institute (CSI). Written by Bill McHugh, with edit comments from the FCIA Board of Directors, Breck Spain—Performance Contracting, Inc., Sacramento, CA & Don Murphy, PPMI Firestop, principal editing delegates. You may reach Bill through the FCIA web site at www.fcia.org or call him at 630-690-0682.