Appendix E

BFGoodrich

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November 10, 1992

Ron McCready
Dow USA
2020 Dow Center
Midland, MI 48674

Ron,

For your information, I attached a letter and paper from Joe Zicherman, a fire consultant familiar to the VI. The paper deals with a computer program that helps select firestopping materials, which can be particularly important for through penetration of PVC pipe and conduit. We may consider asking Zicherman to attend a technical committee meeting to discuss this and other code matters.

Separately, we should review the technical committee priorities and determine if we have the proper set of consultants. The attached article from Engineering Times captures the present day hurdles new construction products must jump. Your comments are welcome.

Finally, I am including my report for the VI Board book. Roy Gottesman sent me several pages of suggested revisions to Hirschler's summary paper on HCl decay. I have not received any other input. In addition, I met with scientists from Battelle regarding speciating the corrosive entities in the NBS cone corrosimeter apparatus. My summary memo is attached. This should be taken up at the next Technical Committee Meeting.

Regards,

Olson

A. J. Olson

cc: Bob Burnett

a:\mccready.ncs

R&S 144186

Integrated
Fire&Failure
Technologies
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October 30, 1992

Mr. Alan Olson
BF Goodrich
6100 Oak Tree Blvd.
Cleveland, Ohio 44131

Dear Alan:

Over the past several years IFT has worked extensively combining fire safety engineering, software and CAD [computer aided design] to meet the needs of our clients. The enclosed article published recently in *Fire and Materials* [Vol. 16, 53-60 (1992)] describes one such concept we have developed and I thought might be of interest to you. Some of the source material for the text came from a software system we developed for the Technical Ceramics Group at 3M, which was designed to assist specifiers, engineers, architects, and code enforcement officials to correctly select and/or assess through penetration fire stopping approaches. Applications for the system include a wide variety of electrical and mechanical systems (pipes, ducts, cables, etc.) in fire rated construction.

The most highly developed version of the system uses a menu driven expert approach for application to IBM-PC's and compatibles. Features include a provision to provide standard format-computer graphic (CAD) files of fire stopping systems so that a specifier can incorporate the pre-drawn illustrations directly into their plans. This makes their drawing activities less complicated and the specification process less costly. We introduced the program at the San Diego CSI meeting in July 1991 and it was successfully Beta tested by code officials, architects, and engineers. Unfortunately, 3M has made a business decision not to develop the software further.

In any case, we have the Beta version of the program available and would be happy to provide it to you to get a hands on-look and feel view of how the technology works. It is an exciting approach to insuring quality, reducing specifying time and working to meet safety of parties as well. I look forward to hearing from you.

Sincerely yours,

Joe

Joseph B. Zicherman, Ph.D.
President

Alan — also give me a call r.e. interior design, lining issue — JOE

JBZ:sml
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FIRE AND MATERIALS, VOL. 16, 53–60 (1992)

PC-based Product-selection Systems to Enhance Fire Safety in Construction

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Growing use of PCs in offices has been accompanied by increasing dependence on these systems to accomplish construction/specification and CAD-based design tasks. The combination of product performance and characteristic data with PC-based data storage and retrieval techniques is a newly developed example of this. Storage techniques utilized range from floppy disks on single systems through those loaded to hard disks or ROM systems, such as compact disks containing hundreds of megabytes of information. The combination of artificial intelligence techniques to aid the specifier are particularly useful where complex code-mandated fire performance requirements exist. Using through penetration fire-stopping technology as an example illustrates how such technology can assist architects, designers and specifiers. Computer workstations—both PCs and Macs—are increasingly finding their way into the design and specification work implicit in constructing buildings. Because of the growing complexity of requirements for fire performance of these structures, use of computer-based systems to aid in choosing the right components to maintain fire safety levels makes good sense. Coupling artificial intelligence approaches—i.e. quasi-expert systems—to selection of such products with viewing of drawings can reduce design professionals' work loads and provide increased advantages for designers, specifiers, enforcement officials and product manufacturers and marketers.

INTRODUCTION

From a fire safety standpoint, the most crucial steps in the building design process are selection of appropriate fire-resistive components and careful specification of how they are to be used. Installation, subsequent to selection and specification, rivals the first two processes in importance. For these reasons, *the manner in which fire safety-related building components are eventually put into service, including how quality is controlled and how proper assessment of installation characteristics are made, are of critical importance.*

How is microcomputer technology assisting this process? This paper addresses that question by reviewing developments in the area of PC-based product-selection and specification systems, which are increasingly becoming a part of the design process. Although applications for these systems are extremely broad and by no means restricted to areas related to fire safety, because of the criticality of this function, following an initial review of the underlying technology, the *fire safety aspects of product use* will be the focus in this paper.

PC-BASED PRODUCT SELECTION SYSTEMS REVIEW

In the design process, whether building a multi-story hotel, housing tract or an oil refinery, there are certain common factors. These include the fact that a specifier (architect, engineer, or draftsman) will, at various points, make the transition from designing the structure to determining products required with (a high degree of) specificity.

In the past, in the construction industry this part of the 'project process' work has involved going to a catalog or catalogs, individual product brochures, or supplier representatives. Such work impacts project budgets both through time consumed in the process and the degree of cost-effectiveness eventually attained with the specified products. Through the latter there is also ripple effect which extends to subcontractors through the bids they produce; these affect overall project cost.

Various new techniques involving computer systems have been developed to facilitate the specification process. Approaches to using these are intrinsically different from the *ad hoc*, highly individual techniques which product specifiers have relied upon in the past. Part of the move to PC processes is driven by the need for more information about selected products, since much construction detailing—as in fire-stopping applications to prevent fire spread from one fire-resistive component of a building to another—is relatively new and involves complex features unheard of years ago.[a]

Using fire-stop systems[b] as an example, we show how information on types of available products, installation requirements, building details, and code-required performance may be successfully integrated by the specifier. These demands for information handling have accelerated the move to computer-based systems with the capacity to store and analyze large quantities of data in a variety of ways. In the last year or two, data-handling systems to accomplish such tasks have begun to be used by a significant number of professionals in the construction industries. They have come from three different main segments of that industry: (1) manufacturers of building products, (2) building code and trade organizations, and (3) companies which compile specification catalogues. Each of these groups has differing requirements for their

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system and targeted users vary, as does the intended purpose—and, therefore, design—of the system.

Amounts of information handled by systems and complexity of tasks performed determine hardware and software requirements. Thus, many types of systems are emerging, as opposed to many versions of one type of system. Systems available vary in sophistication, ranging from simple listings of product data on single floppy disks through menu-driven and/or so-called 'expert' interactive systems. In addition, systems may contain drawings which are viewable on PCs and Macs with various graphics cards. Further, CAD (computer-aided design) drawings which possess the advantage of being directly useable in the project design process are available in some cases where end use has required CAD software. Size of these systems vary widely, and drawings, in general, use more bytes per file. The range extends from kilobytes on a single diskette to hundreds of megabytes with CD-ROM (compact disk) based systems.

A review of systems available for the construction industry

The National Institute of Building Sciences (NIBS), working in conjunction with several organizations, including the Construction Specification Institute (CSI), is distributing a computer-based information system. The NIBS system was not specifically developed for *product* selection or specification. Rather, it is a database of building technology information on compact disk (CD), which includes a variety of specification language and information along with other diverse construction-related data. It initially included government specifications such as the MIL and NAV SPEC series and has been enlarged through addition of other specification formats such as the American Institute of Architects (AIA) Master Spec System. Model building code text from the Building Officials and Code Administrators (BOCA) code series is now included, as is other construction information which end-users may wish to access. Because of copyright considerations, however, the BOCA Code is presented in a read-only format, so that it may be used for reference but not copied. The NIBS package can be bundled initially with a CD-ROM reader which acts as an additional disk drive for the end-user's computer. Updated CDs are produced and provided to subscribers at regular intervals.

While several types of graphics are included in the system, these are not particularly product-based; i.e. they do not play a role in assisting a user to choose or identify a particular product for a particular end-use. Graphics presented are available in two formats: one having viewable graphics directly available and the other providing fields which can be read and manipulated on CAD systems in architectural and engineering offices.

The NIBS system also allows access to and manipulation of much of its text. As such, these text files can be viewed and printed as-is and users can also download the text to specific word-processing programs for editing.

A related but separate system is available from CSI. This provides Master Specification data (which normally consists of about 3800 pages of text) in electronic form reduced to 20 to 30 floppy diskettes, depending on the particular word-processing system and computer being used. This CSI system is most useful for the end-user who specifically wants to generate specification language for a project. The large number of floppy diskettes needed, however, may be a drawback from convenience, disk wear and expense standpoints. Conversely, loading that amount of data to a hard disk would use up a substantial allocation of storage space which might be unacceptable unless that particular computer was routinely used in specification preparation.

A broad-spectrum, product-based system is available from Sweets Catalog and utilizes CD-ROM for storage. It provides an in-depth product-selection system for materials listed in the familiar multi-volume Sweet's Catalogs. In addition, a specification writing system (called 'Sweet Spec') is included to prepare appropriate specification language *after* a particular product has been chosen. Further, the Sweet's system includes an interesting feature which provides information on adopted codes and standards. It not only makes available references to the Model Codes (and the related text requirements relating to products chosen) but also details codes adopted in many local jurisdictions. In this way, the user is aided in specifying products which are acceptable to local code officials. Interestingly, however, in spite of the copious graphics found in the hard-copy version of Sweets Catalog, the electronic version currently does not have graphics.

At the other end of the spectrum in terms of size are selection systems many product manufacturers are providing to assist specifiers in choosing specific products for a project, while hopefully promoting use of their products as well. Such systems may also aid in correct specification of products in that they often show when a product or system *will not* perform the task needed. Industry segments having such systems available include the following:

(1) Manufacturers of window and plumbing equipment who have systems to assist specifiers in making the best product choices from within their product lines;
(2) Manufacturers of component materials and products who offer systems which can define particular types of equipment or components needed for individual applications by guiding the user through software routines.

An example of the latter is a system to specify air-handling equipment that will detail and specify models *and accessories* needed for complete installation when input parameters, specific to a project, are provided.

Another example is the program described in depth in the following section. This program has been completed by the authors for specification of through-penetration fire-stop devices, systems and materials. It will assist in selection of correct systems and access several hundred detail drawings of selected systems with descriptive text. The drawings are formatted for easy import into CAD systems for use by specifiers in preparing working drawings.

PRODUCT SELECTION FOR ENHANCED FIRE SAFETY

For selection systems-handling information concerned with *fire safety* the most important guiding principle in design work is that the end-product should maintain levels of life and property safety. The model-building codes mandate that when fire-resistive assemblies in buildings (e.g. walls or floor/ceilings) are penetrated by objects such as pipes, tubes, ducts, conduits, etc., fire-resistive integrity must be maintained. Section 302 (d), shown below, of the *Uniform Building Code*, for example, requires that the manner in which fire-resistive integrity is to be preserved be shown on plans.

> Uniform Building Code, *Sec. 302 (d) Information on Plans & Specifications*: '*Plans* for buildings more than two stories in height of other than Groups R, Division 3 and M occupancies *shall indicate how required structural and fire-resistive integrity will be maintained where a penetration will be made for electrical, mechanical, plumbing and communication conduits, pipes and similar systems.*'

Thus, the designer needs to carefully show area separation walls, other fire-resistive walls and floor/ceilings, *and* penetrations made in these and other fire-resistive assemblies in detail. In order to assist in meeting such requirements, product-selection and illustration systems are very useful, including the one described here.

The example presented here was developed by the authors for fire-stopping applications of through-penetrations in building construction. It was designed primarily for use by specifiers of these materials and is organized around selecting appropriate systems or groups of systems by specifying relevant parameters of the penetration (i.e. what kind of wall is being penetrated, what is the penetrating object, etc). Because such a selection system can provide information necessary to elucidate often complex, multi-component fire-stopping systems, it can also be useful to code-officials and manufacturers of companion products.

Significant features included in this product selection approach are depicted in the 'screens' which follow:

(1) Following introductory warnings related to product liability and program use, an initial screen displays a main menu. From here the user can access general information about the program, learn how two get started, locate data about fire-stopping technology, or go directly into the selection process.
(2) Help screens are available to explain keyboard functions and to aid the architect or designer unfamiliar with fire-stopping and/or associated building technology and terminology.
(3) When the selection is begun, a list of penetrating items is called to the screen (Screen 1). From there, the program displays a Specification Screen designed for the class of penetrating objects which has been chosen (Screen 2). Any of the specification categories—building component, fire rating, opening size, etc.—can be used as a first choice.
(4) For each specification category chosen, a window opens to show choices. An explanation of the category is also available (Screen 3).

Choices made are recorded on the screen. At the top of the Specification Screen, the number of fire-stop configurations available for the particular penetrating material

```
Page 3 [Main : 1]          Main                    [F1: Help]

              Through Penetration Firestop Selector System
   Use the Arrow Keys to move the highlight to one of the families of
       penetrating items and the <ENTER> Key to go to that family.

     System Info and Overview
     Insulated Metal Pipe
     Plastic Pipe/Conduit
     Metal Pipe/Conduit
     Glass Pipe
     Insulated Cables
     Steel Vent Ducts
     Bus Ducts
     HVAC Ducts
     Cable Trays                    Heat Shields
     Construction Openings          Curtain Wall Openings

     [F9 or Q to Quit the Selector System]
```

Screen 1

```
Page 1 [ IMP : 2 ]            IMP                      [F1: Help]

        23 Firestop Penetration Systems for Insulated Metal Pipes

        Show the 9 systems consistent with the requirements below.

 Type of Assembly . . . . . . . . . . . . . . . (in.) Concrete Floor
 Minimum Assembly Thickness . . . . . . . . . (in.) 4.5
 Sleeves used at Penetration . . . . . . . . . . . . Unspecified
 Minimum F rating . . . . . . . . . . . . . . (hours) 2
 Max Diameter of Circular Opening. . . . . . (in.) 12
 Max Area of Rectangular Opening . . . . (sq. in.) Unspecified
 Max Side of Rectangular Opening . . . . . . (in.) Unspecified
 Type of Pipe . . . . . . . . . . . . . . . . . . . . Unspecified
 Multiple pipes allowed. . . . . . . . . . . . . . . . Unspecified
 Maximum Pipe Diameter . . . . . . . . . . . (in.) Unspecified
 Maximum Insulation Thickness. . . . . . . . (in.) Unspecified
 Pipe Insulation Type . . . . . . . . . . . . . . . . Unspecified
 Annular space . . . . . . . . . . . . . . . . . (in.) Unspecified

 [M returns to the Main screen]

 5300-IMP Systems
 [1,2,6,10,11,18a,18b,19,20]
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Screen 2

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Page 1 [ IMP : 2 ]            IMP                      [F1: Help]

        23 Firestop Penetration Systems for Insulated Metal Pipes

        Show the 2 systems consistent with the requirements below.

 Type of Assembly . . . . . . . . . . . . . . . (in.) Concrete Floor
 Minimum Assembly Thickness . . . . . . . . . (in.) 4.5
 Sleeves used at Penetration . . . . . . . . . 
 Minimum F rating . . . . . . . . . . . . . . (hours) Unspecified
 Max Diameter of Circular Opening. . . . . . (in.)    1
 Max Area of Rectangular Opening . . . . (sq. in.)    2
 Max Side of Rectangular Opening . . . . . . (in.)    3
 Type of Pipe . . . . . . . . . . . . . . . . . . . .    4
 Multiple pipes allowed. . . . . . . . . . . . . . . .    Explain
 Maximum Pipe Diameter . . . . . . . . . . . (in.)
 Maximum Insulation Thickness. . . . . . . . (in.) Unspecified
 Pipe Insulation Type . . . . . . . . . . . . . . . . Unspecified
 Annular space . . . . . . . . . . . . . . . . . (in.) Unspecified

 [M returns to the Main screen]

 5300-IMP Systems
 [ 2,6 ]
```

Screen 3

end-use combination specified are shown. As the specification is determined with increasing exactitude, this listing at the top of the screen decreases as the number of fire-stopping systems which satisfy all the specifications is reduced. This 'scoreboard' type of numbering system allows the user to see systems being eliminated by making more exacting specifications. If no systems satisfy the entered specifications, a '0' appears on the 'scoreboard'. Numbers of systems which do satisfy the (current) spec sheet are displayed at the bottom of the screen. These change as the spec screen is filled out further.

The specifier determines the number of categories defining the specification. If information is limited, the list of systems will satisfy a broad specification. The program can offer a continuum of options based on the increasing degree of specificity, and is flexible on this point.

(5) As specification for a particular penetration type is completed, the program lists the systems satisfying the specification.
(6) The full 'spec sheet' for each system can be displayed (Screen 4).
(7) Fire-stopping product materials in the chosen system are listed (Screen 5).
(8) When the user selects one of these products, Information screens on the product chosen are available.

An important aspect of any such program is how it handles input errors. For example, in the current case, if an incorrect penetrating opening and pipe size combination is entered, the specifier needs to be found to that effect.

CAD options

Having selected a system from the options provided, if an end-user is not a CAD user the work of the product selection system has been completed and they will refer to hard-copy specification information and drawings illustrating the product. For the CAD user, however, the following options exist:

(1) A system can provide references to files of CAD-readable drawings of assemblies with the chosen fire-stopping materials and through-penetrating elements (Screen 6).
(2) The user may then import the detail into his drawing utilizing CAD drawing (.dxf) files which accompany such selection systems (Screen 7).
(3) The program can also be configured to insert a 'symbol' (or marker) within plans for the particular system specified.
(4) The symbol can be keyed both to detail sheets and the product location in the building. This provides a basis for a schedule of fire-stopping systems which records total numbers of the systems required in preparing specifications for the project.

Such symbol and schedule features can be expanded to include a 'bill of materials' function with calculation capabilities, to determine amounts of (fire-stopping) materials required, as on each floor of the building, or for total numbers needed for the various systems chosen. This would be useful to subcontractors in preparing their bids and to purchase and install these products.

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Page 2 -[IMPprint : 3]-------- Main ------------------[F1: Help]-

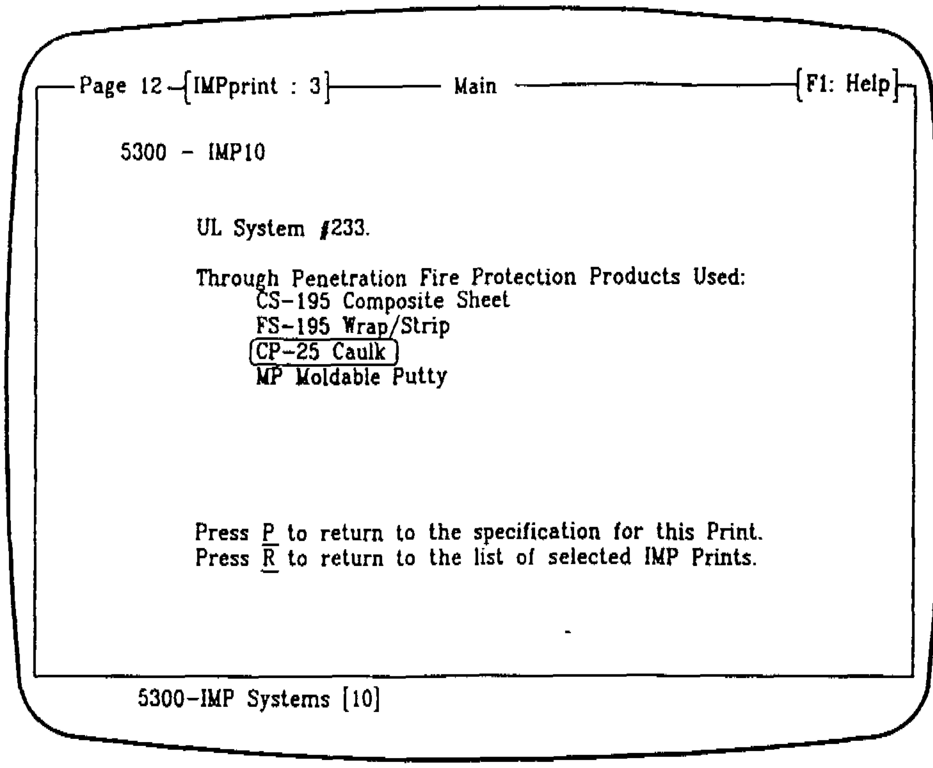
                       Print: 5300-IMP10

Type of Assembly . . . . . . . . . . . . . . (in.) [Concrete Wall, Concrete Floor]
Minimum Assembly Thickness . . . . . . . . . (in.) 8
Sleeves used at Penetration . . . . . . . . . . .  No
Minimum F rating . . . . . . . . . . . . . (hours) 4
Max Diameter of Circular Opening. . . . . . . (in.) N/A
Max Area of Rectangular Opening . . . . . . (sq. in.) 1500
Max Side of Rectangular Opening . . . . . . . (in.) 50
Type of Pipe . . . . . . . . . . . . . . . . . . . [ Steel ]
Multiple pipes allowed. . . . . . . . . . . . . . . Yes
Maximum Pipe Diameter . . . . . . . . . . . . (in.) 4
Maximum Insulation Thickness. . . . . . . . . (in.) 2
Pipe Insulation Type . . . . . . . . . . . . . . . [Fiberglass, Foamglass]
Max annular space . . . . . . . . . . . . . . (in.) 3 / 16
Min annular space . . . . . . . . . . . . . . (in.) 0

A for additional info on this System.     R returns to the list of IMP Prints.
I prepares an AutoCAD script for insertion of this Print into a drawing.

        5300-IMP Systems [10]
```

Screen 4



Screen 5

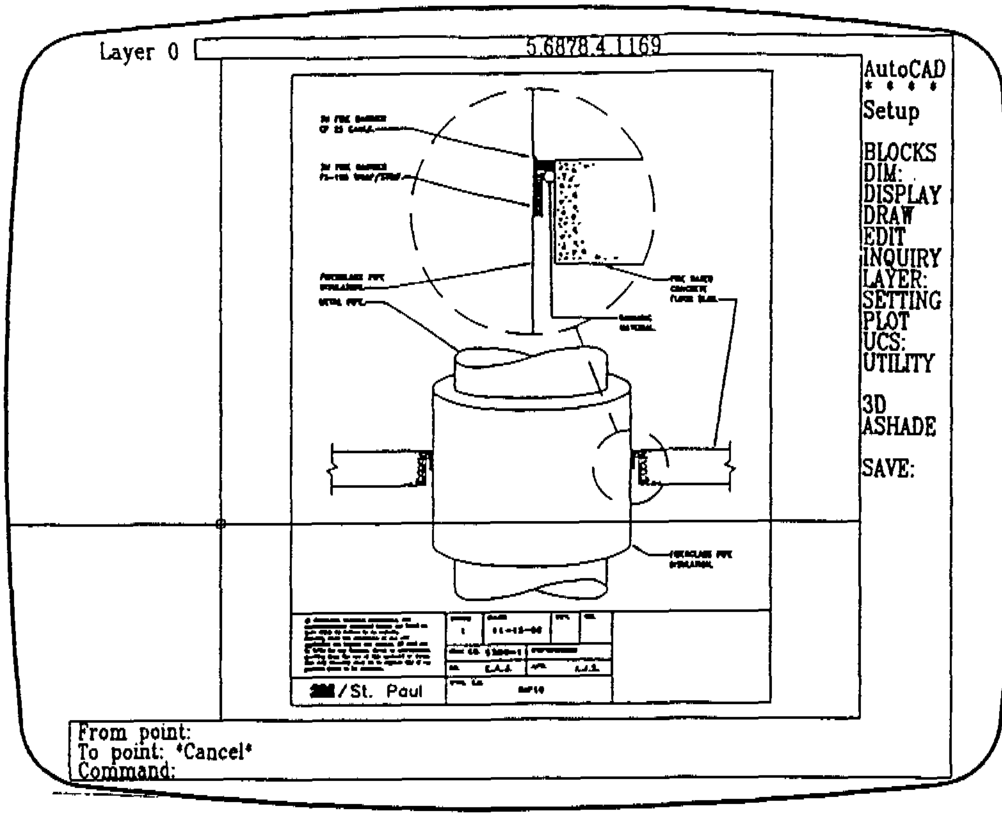
USE OF PRODUCT-SELECTION SYSTEMS WITH INTEGRATED CAD DRAWING FILES

Integration of files of CAD drawings for use with product-selection systems simplifies and speeds the work of the architect or designer. Given the time required to prepare such detailed drawings, specifiers tend to call out products available with PC-based selection/drawing file systems to augment their productivity. These software systems ease their work by reducing the need to prepare detailed drawings from scratch, a costly and time-consuming process. Thus the impact of having such drawing files available for a product specifier is significant. In particular, since each Model Code now requires plans to demonstrate how fire-resistive integrity will be maintained at building locations where fire-rated assemblies are required, availability of such pre-drawn details save architects and engineers considerable time and money.

One of the questions that arises in conceptual development of product selection systems is how CAD-readable files (drawings) may relate to them. Some systems are designed to run from within a particular CAD software environment as an 'add-on' program. Others are run only from DOS, and require the user to leave the CAD system/environment to run the selection system. Following this, the users re-enters their CAD system to import selected drawing files which are not directly viewable in DOS.

Systems which depend on the parameters of a particular CAD program uniquely are ill advised, since new versions of the 'host' system may render such an add-on system unuseable. Likewise, systems which operate on any IBM PC or compatible clone (regardless of graphics and/or CAD capabilities) are most widely applicable. As part of the output from such selection systems, subroutines can be included which allow drawing files (in standard CAD file formats) to be imported into CAD systems for immediate use, or reproduction to hard copy on a laser printer or plotter. In this way, changes which a particular CAD software or hardware manufacturer may make (as well as the graphics capabilities of a particular end-user's computer) have a minimal effect on the running of a system. Text and product selection information are ASCII-based text fields; drawings are separated since these are most likely to be a source of incompatibility. Finally, the generalized format drawings produced for CAD use can be accessed in major CAD programs, such as Generic CADD®, AutoCAD® & Intergraph®, for use with DOS-based computers *and* on Apple (Mac) workstations.

With regard to making CAD files integral with these selection systems, certain judgments need to be made. For highly generic products, or simple designs, little is gained by their inclusion because of attendant costs for program design and storage. However, where products and systems involve complex or substantial detailing, inclusion



Screen 6

of such files will provide distinct advantages to the specifier *and* can lead to more consistent use of the product in the field.

FURTHER DISCUSSION

Beyond the needs of the specifier, the primary target end-user of such selection systems, another important end-user is the regulatory or code official who wants to make sure that such products are being properly installed in their jurisdiction. By having the selection system available, installation instructions, specification screens, drawings and notes, along with relevant information are organized in a useable, easily available form.

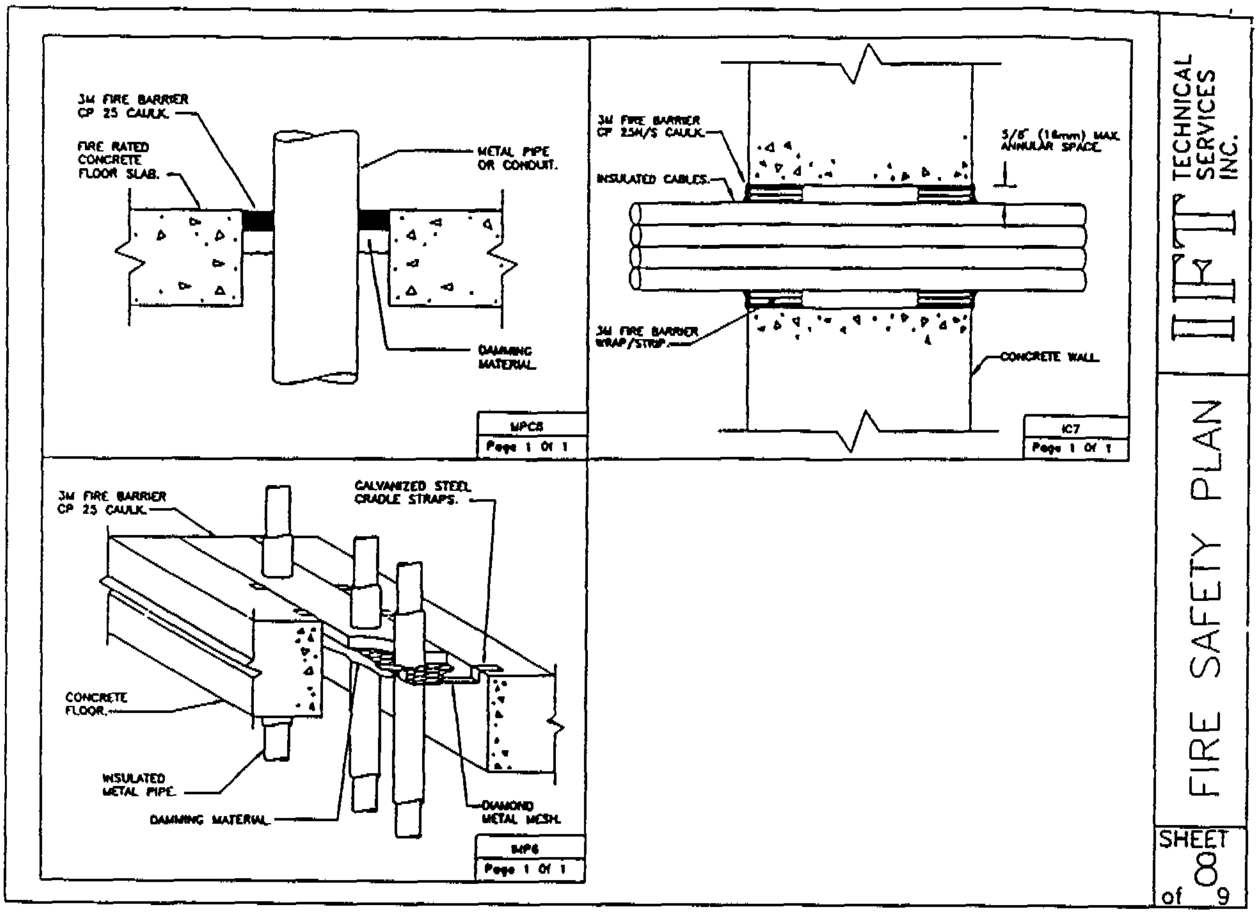
Product manufacturers can benefit through use of this type of system in ways beyond providing assistance in marketing. Examples include use of these systems by internal staff to address product capabilities and properties, for training and in providing assistance to field personnel. In addition, standardized drawing formats for products benefit R&D through sales. Installers or subcontractors also benefit from use of such systems, by taking advantage of the flexibility of selection programs to choose groups of (fire-stopping) products to satisfy specifications *and* choose the most cost effective combination of fire-stopping materials for the job.

Returning to use of this product by specifiers, the system can include important details for product use along with the installation directions. These can include warnings which relate to *consequences* of not using the product properly. This is of particular import for products with fire safety-related aspects. For example, effective warnings for a product need to (1) be visible to end-users, (2) describe the hazards in question to end-users *with care*, and (3) describe to the end-user the *consequences of not heeding the warning*. PC-based product selection systems can provide the specifier of the product (as well as the regulatory official involved) the opportunity to view all these kinds of information.

While through-penetration fire-stopping systems (with their inherent complexity of specification requirements) make a good case study on application of computer technology to the specification process, they could also be extended to other components of a fire-rated nature, i.e. doors, fire dampers, flame spread of coatings and finishes, etc. The technology is here. It awaits continuing appropriate applications.

CONCLUSION

For manufacturers of fire-stopping products, selection systems for use with PC technology by specifiers, code



Screen 7

officials, subcontractors and installers show great promise. The programming approach described here is unique in terms of depth and qualities of variables considered. However, as the technology continues to evolve, an increasing number of building industry professionals will find uses for selection and specification systems and develop new approaches to these tasks using various product-selection techniques.

NOTES

[a] A reflection of this can be seen in the fact that the UL *Fire Resistance Directory* did not contain *any* sections dealing with through-penetration firestops only 4 years ago, had less than 100 such systems in 1987, and in 1990 has 325 such systems.

[b] These systems are used to provide needed integrity where pipes, raceways and other objects penetrate fire-resistive assemblies (halls, floor/ceilings, shaftways) from one section of a structure to another.

FOCUS: Specifying

Do Engineers Nix New Products Just To Be Safe?

By Alan Chapple
Associate Editor

If an engineer or architect has to choose between specifying adequate-though-tried-and-true Product A or the much-ballyhooed-but-brand-new Product Z, in most cases innovation loses.

"New products are kind of a chicken-and-egg situation," says engineer Steve Bruning, a partner with Newcomb & Boyd in Atlanta. "We're hesitant to use them until we can see that they have been used other places and have performed as advertised, yet it's difficult for new product manufacturers to get them specified the first time. That's a difficult situation."

Mark Kalin, a nationally known architectural consultant based in Newton, Massachusetts, explains that most designers want to see a new product's "track record" before they will feel confident enough about its performance to specify it. "The cutting edge of technology tends to be risky," he says. "If a design professional doesn't investigate a product fully, or just takes a manufacturer's word that it will work, there's more liability there."

The dreaded L word.

"There was no accountability in the old days. If something happened you just said, 'That's the way it goes.' Nowadays, engineers are being held accountable [for product liability]," says engineer Stephen Squillace, president of Lighting & Electrical Technologies in St. Clair Shores, Michigan.

No Small Risk

Kalin adds, "Recent court cases have shown that the architect has liability, a real responsibility, for product selection. They can't take this lightly."

To minimize the risk of liability, firms investigate manufacturers and their new products.

"When we find a product that is brand new that we may want to use, we will review the manufacturer's

Michael Katzin, an associate with the Atlanta architectural firm Thompson Ventulett Stainback and Associates. "Sometimes we will be more stringent in our specifications, requiring a preinstallation meeting" involving the design team, manufacturer, and all contractors.

Bruning explains, "Our approach is to protect the owner's interests in specifying new products. We want to feel confident that a new product is field proven and has sufficient experience to represent the best value to the owner."

Gaining that confidence and knowledge doesn't always come easily. Gershon Meckler, whose Herndon, Virginia, engineering firm specializes in indoor air work, complains about a lack of "standard procedures for testing new products." It's enough of a problem, Meckler says, that he'd be willing to pay his share to establish a testing body, modeled perhaps along the lines of the federal Food and Drug Administration.

Watch and Wait

In the absence of such a testing mechanism, engineers are forced to "either do their own evaluation . . . or watch others who are using a new product, and if they don't have problems perhaps pick it up in four or five years," Meckler says.

Meckler has found, however, that he can't always wait until his competitors have tested a ventilation product or system he wants to use. Instead, he's established his own testing facility, installing new systems his firm wants to evaluate.

Since Meckler's in-house testing lab is a luxury available to few design firms, most engineers and architects rely on trial-and-error and data collection. Even a favorable report, though, can be misleading.

When using "something new," there's no guarantee that it will

Along the same lines, Meckler notes that brand names can't always be trusted. "Engineers and architects shouldn't rely on a manufacturer's reputation as a guide for trusting a product's integrity," he says. "In today's world, big names are abused."

Not all new products carry the same degree of risk, however.

"It's one thing to change style, it's another thing to change function," Kalin says. "The implications are different for different materials. But if you're coming into something structural, there's very little incentive to take the risk."

"Obviously the potential liability depends on the nature of the product," Bruning says. "Some products have a greater liability if they fail or have an operations problem than others.

"Something like a ceiling diffuser—which has gone through standard laboratory tests, is a static device and has no moving parts—does not present a lot of liability as a new product," he adds. "On the other hand, a centrifugal chiller—which may have hundreds of thousands of dollars of the owner's money tied up in it and on which the entire building may depend—would make it very difficult to accept an untried new product. Typically, that sort of equipment has to be field tested or demonstrated at sites where there's an opportunity to fall back on other systems. Once its reliability is proven, then it becomes accepted in the marketplace."

Another risk—a relatively new

> ***"New products are kind of a chicken-and-egg situation."***
>
> —Steve Bruning

the environmental conditions in Europe are different," Kalin explains. "Most parts of Europe are like our Pacific Northwest, so those products might not be applicable for Florida or Maine."

Not all designers are so cautious. Consider Michigan's Squillace. "Engineers tend to stay with what they know best. But I'm adamant about using new products," he says.

There are a few caveats, though. First, like other designers, Squillace conducts research to learn about new products he might use. Then, he communicates the advantages and risks to the client.

"They have to understand that what you're doing may not work out," Squillace explains. "Sometimes clients say they don't want to try a new product. However, many clients are willing to try new things, and will set aside money in their budgets to make corrections if necessary."

Squillace defends the use of new, perhaps untested, products by pointing out that many innovations are driven by the "clients and their creativeness, their wanting to move ahead. New products can instill in a client the feeling that they're number one."

Despite their caution in specifying new items, engineers and architects acknowledge that new products are the key to advancement.

"They help spur new directions," Katzin says. "As new designs and technologies for buildings come along, we need new products to keep up with them."

Bruning agrees. "We try to be open to new products because they represent the state of the art and can give the owner more value for the dollar," he says—then lapses back into cautiousness. "But by the same token, we've seen projects that have been burned because folks jumped too soon. So we try to take a middle-of-the-road approach to it, and only specify products that we have very high confidence in."