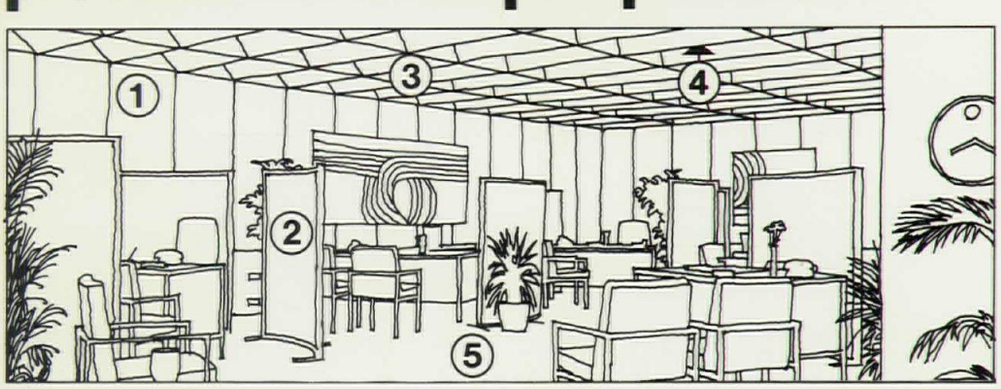
Progressive Architecture

April 1974 A Reinhold publication

Life safety

Armstrong introduces the first pre-engineered package of products for the open plan office.



It combines acoustical and visual privacy, air distribution, and quality lighting, with good looks, too.

Until now, you've had to deal with as many as five or six different suppliers to put together the various elements required for a successful open-office plan.

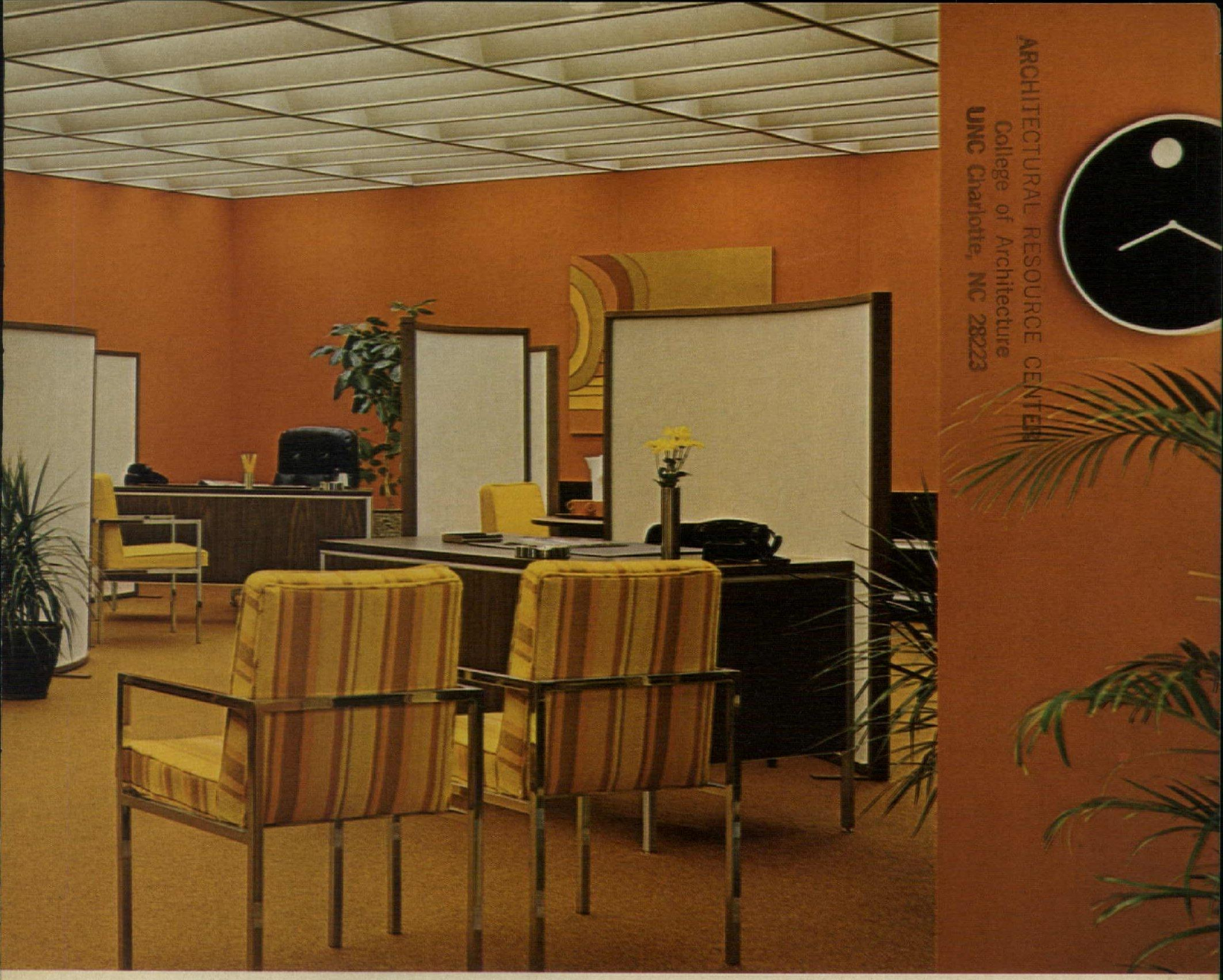
Now, Armstrong offers a complete product package, designed not only to function well but style-and-color coordinated to look as good as it works. Armstrong provides, for the first time, a single-source supply and a single-source responsibility.

1. Soundsoak™ Wall Panels*

These panels are made of an acoustically efficient special mineral fiberboard mated to a soft modacrylic fabric. They can be easily installed on interior walls and other flat surfaces and make a substantial contribution to the control of reflected sound. (NRC range .55 to .65)

Available in a wide choice of modern colors, Armstrong Soundsoak Panels are decorative as well as functional. They're 30" wide and available in either nine- or ten-foot heights.

*Patent pending



2. Soundsoak Divider Screens

Screens are an indispensable element in efficient open-office planning. They provide effective separation of work stations, contribute to acoustical and visual privacy, and add splashes of color to the room. Freestanding and easy to move, they are covered with a tufted-nylon fabric in a wide choice of colors. Both curved and straight types are available in five-foot widths, and there is a choice of five- or six-foot heights.

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4. Sound-Masking System

The Armstrong open plan package includes a completely integrated and matched electronic sound system that introduces into the working area sound of the proper intensity and frequency content to help attain the desired level of speech privacy. The system can be "tuned" to provide evenly distributed, nondisturbing background sound to any open plan space.

5. Armstrong Floors

To complete the open plan visual package, Armstrong offers a selection of flooring materials. If carpet is your choice, there is a wide range of colorful Armstrong Commercial Carpets that will add warmth and quiet to any open plan.

Where the practicality of resilient floors is called for, Armstrong Quiet Zone™ Vinyl Corlon® is the answer. Thanks to its generous foam-cushion backing, it's both quiet and comfortable.

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ED BARKER, Painting Contractor, Atlanta

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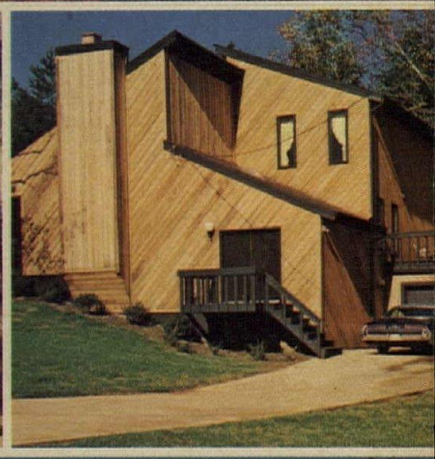

Dramatic transparent colors are typical of "natural look" achieved in Atlanta's Foxmoor Subdivision where nearly 100 prestige single homes (above) were finished by Ed Barker with Spred Latex Stains. Homes are priced from $40,000 to $75,000. Some required up to 70 gallons of stain.

Colony of Stone Mountain, Atlanta, (at right) is a rental apartment complex of 500 units, up and down design, and all exteriors are in natural tones of Spred Latex Stain.

Circle No. 342, on Reader Service Card

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ABP ABC

April 1974

Progressive Architecture

Life safety

Departments

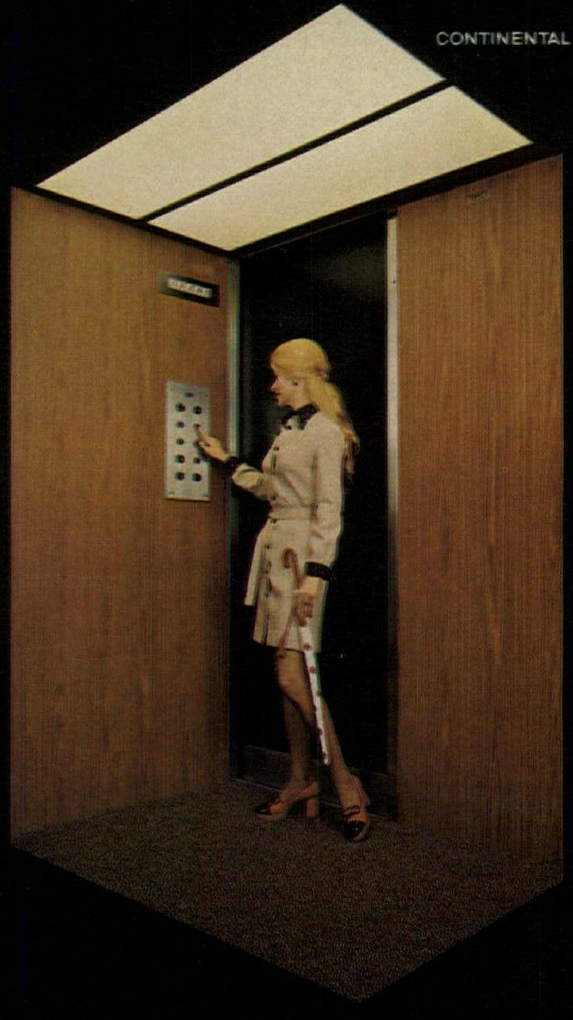
Cover: *Mystery and Melancholy of a Street,* Giorgio de Chirico (Italian, 1888-), collection of Stanley R. Resor, New Canaan, Conn.

KINGSWOOD

MARQUIS

FLEETWOOD

CONTINENTAL



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Continental—For light-traffic situations. Capacity 1500 lbs., car platform 5'2½" wide by 4' deep. Single-slide right-hand door. Plastic laminate or removable panel walls.

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Views

More on design awards

As a faculty member of the Cornell University Department of Architecture I find the commentary by the jurors on page 68 of the January issue insulting and obnoxious. I have been a faculty member at Cornell University for over 10 years and have never known of anybody at Cornell making vicious attacks and spreading falsehoods about other schools or ideological camps. Furthermore, Colin Rowe is not Cornell, but only a member of a diverse faculty. What has Colin Rowe done to merit such venom, other than being an extraordinarily well-informed and perceptive critic and an outstanding teacher with a large following? Though most of us who have had contact with Colin owe much to him, it does not imply in any way a concurrence in thinking and teaching, but rather a fellowship in spirit about architecture and the world of architectural ideas. It is absurd to claim that Cornell is a Le Corbusier academic empire. Even more absurd is the fact that not one of the projects demonstrated had anything remotely to do with Cornell; yet the projects receiving awards on pages 72, 73, 74, and 75 and the citation on page 86 are the products of Cornell graduates, some with Master's degrees from Colin Rowe's Urban Design Studio.

Reviewing the projects on page 68 I am most surprised by the comments. How could one possibly label these projects as Corbusian? Is it perhaps because they exhibit free-standing columns, two-story-high spaces, have funny curved balconies and bull-nosed stairs? That sort of criticism is not very enlightening. It is curiously interesting, that on the adjacent page 69 a project is commended because it responds to site pressures and contextual issues and as the commentary goes, "in contrast to all the Le Corbusier houses on isolated sites," because I always assumed that the unique lesson of Le Corbusier was his sensitive and powerful responses to issues of site. If seen in reference to Cornell, the strength of the teaching, in particular of Colin Rowe, has been making the student aware of site and contextual influences on design decisions, and a strong reaction against buildings as objects and artifacts.

Furthermore, I would like to advise your jurors to be architecturally more literate and to take a closer look at "Corb" (as Le Corbusier is so endearingly referred to)— before making such judgments. For their information, Bijovet and Terragni are not the same as Le Corbusier.

Werner Seligmann
Cortland, N.Y.

[*Although we cannot agree that the P/A jury directed "venom" toward Colin Rowe, we appreciate Mr. Seligmann's thoughtful appraisal of the real situation. It should have been clear that the jury was questioning not Colin Rowe's or Peter Eisenman's teachings, but the many interpretations and misinterpretations to which they have been subjected. Ed.*]

Please be advised that beach houses do not cause anguish. They may, in fact, do no more than bring on a mild case of despair. But let's not talk about anguish. Anguish is cheaply bought in 1974, along with violence. In fact, we've about run through

[continued on page 9]

This could never happen in America, right?

Wrong.

Over 180 people lost their lives in the 22-story office building fire in Sao Paulo, Brazil.

Why?

Because the elevators jammed and they had no way to get out.

Because the fire truck ladders couldn't reach the people trapped on the higher floors.

Because the building contained highly combustible materials.

Because the building had no sprinkler system to put out the blaze quickly once it got started.

Because.

How many high rise buildings in America are fire safe?

How many have jam-proof elevators and smoke-free escape routes?

How many use highly inflammable furnishings and interior finishing materials?

Indeed, how many are sprinkler protected?

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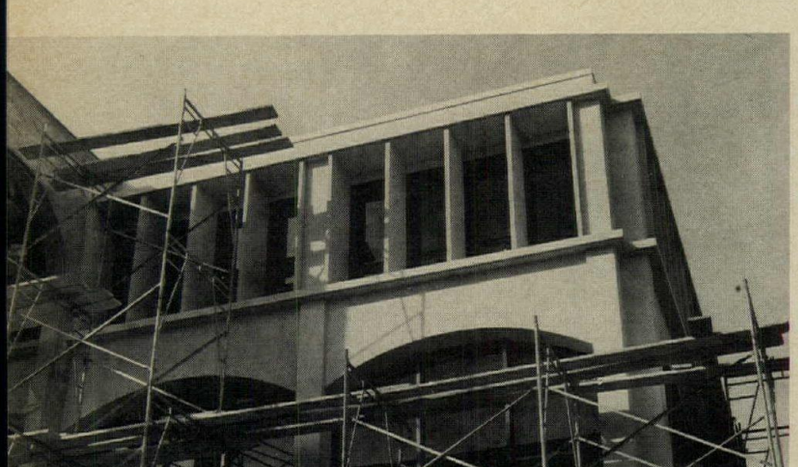

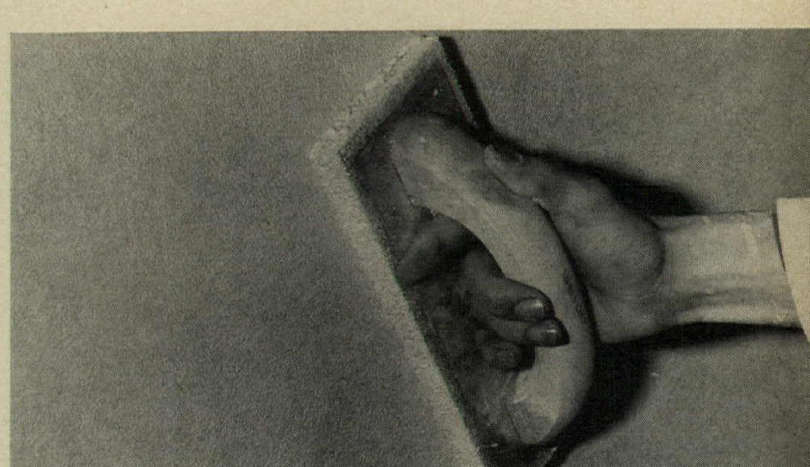

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SDW 160

Views continued from page 6

the whole list by now. Honor, dedication, commitment, concern . . . So, nuthin' left to do but canonize discreetness. But don't be old-fashioned about it. Avoid "less is more" because it makes sense (in the classic sense of "sense," i.e., it made sense then and it makes sense now). Try something snappy and senseless like "do the least you can."

Senseless because building a building can take from 1 to 15 years of more than one life, as well as (usually) anything and everything else anyone is willing to give. Less is more because it takes more. And Joe Esherick knows this because he has more than given. (Architects give at the office, they're not so good at home.)

And the question is not, is this building necessary, but who has the *droit de seigneur* right to make that decision? Or, isn't it possible the other brand has something going for it? Is it up to Jaquelin Robertson to suggest Colin Rowe is not necessary? Is Denise Scott Brown an authority on the "style" of the 70s? (no sexism intended).

All very okay to polemicize on the subject of beach houses, and even more okay to laugh at cheap Corbu copies, provided, of course, that one is equipped with the discernment to tell the difference. This can take considerably longer than 15 years to acquire, and for some, alas, forever.

But I'm not making any judgments. Time will take care of that. And, hopefully the responsible editorial conscience will never be troubled by self-parody.
Dorothy Alexander, architect
New York

Congratulations to the P/A awards jury on another year of awards for non-architecture. You succeeded in allowing Scott Brown to overwhelm the rest of you with her rhetoric.
Adolf DeRoy Mark
Philadelphia

Re: KKBNA Office Building award-winning design. Wow! Architects finally recognize exterior decoration. We interiors people have been doing it to the insides for years!
Kingsley K. Wu
Associate Professor, Interior Design
Department of Creative Arts
Purdue University
Lafayette, Ind.

Congratulations on the fine results of the research award in this first year. The projects recognized are of high quality and point out the appropriateness of initiating such an award at this time.
Donald P Grant
Architect and Planner
San Luis Obispo, Calif.

This year's Awards Program should rate high as the series is viewed as a whole. There is a welcome turning away from the strain of identifying trend-setting form (good form will come along naturally if we stop concentrating so much attention on it for a while). Probably related to this, the jurors seem to have stuck to their business and refrained from talking very much about themselves.

The fact that there was no First Award also says something. It may be because the designs paid attention to a broader range of conditions than has often been the case, with no example of the superlatively attained limited objective which can so easily stand out in a crowd.

P/A is performing a vital service to the profession and improving all the time.
George S. Lewis, Executive Director
New York Chapter
The American Institute of Architects

The 21st annual awards issue warrants some deliberate reading and study. "Is the building necessary?", as John Dixon asks,
[continued on page 10]

Views continued from page 9

is a question that we as architects have hesitated to previously ask. Our responsibility to clients and society cannot be fully examined without that kind of question. The energy crisis condition has, as Dixon noted, caused us to question re-use, recycling, re-evaluation, and rejuvenation, among other considerations.
Robert J. Schaefer, AIA
Schaefer, Schirmer & Associates, PA
Wichita, Kan.

Well, well, well, a colonialistic design appears in P/A's pages, among its January awards even, although presented as a steppingstone to supposedly better things! The implications seem revolutionary. It looks like Denise Scott Brown and Jaquelin Robertson may have pulled the first olive out of a large jar. I'll love to see your submissions next year. In the meantime, would you care to hear the opinion of a hick town practitioner?

The cultural permission from such an authority as P/A and its jury to take less than perfect commissions, and then try one's damnedst, is long overdue. On the other hand, if the smart money all goes unthinkingly in this direction, we may find we have traded superstars for super-symbols without the real architectural benefits of a Joseph Esherick having any great effect.

I was intrigued by Esherick's comments concerning style. I think that, upon reflection, Denise Scott Brown could agree that he was probably *not* saying the same as Mies. Was he saying that after designing for all the considerations that he finds important he uses as little symbolic style as he can, comfortably? I hope so. Mies may have used a minimum of elements, but he formulated a highly communicable style. How about a chance for Mr. Esherick to explain and illustrate fully what he did mean? Hasn't the time now come that modesty can be presented as a model also?
John Blanton, AIA
Manhattan Beach, Calif.

Credit clarified

In the article on the Students' Union Housing at the University of Alberta (P/A, Feb. 1974, p. 46), the proper architectural credits are as listed under data (p. 51): A.J. Diamond and Barton Myers, in association with R.L. Wilkin, Architect. We regret that Mr. Wilkin's name was omitted from the text. [Ed.]

North Seattle Community College
Seattle, Washington
Mahlum & Mahlum, Architects, Seattle

Steel and nature blend at Wellesley Office Park

Aesthetics, environmental concern, construction speed, and economy were key factors influencing the design of this 140,000 sq ft building in Wellesley, Massachusetts.

Known as Wellesley Office Park's Building 5, this four-level "Weathering Steel" project is the fifth and largest office building to be constructed on the 25-acre, woodland site. A sixth and slightly larger structure is in the planning stages.

The project was designed by Pietro Belluchsi and Jung/Brannen Associates, Inc. of Boston, Architects in joint venture. The two firms also designed Building 4, which won a 1970 Architectural Award of Excellence from the American Institute of Steel Construction (AISC).

According to Mr. Robert Brannen, "Great effort was made to retain the park-like setting of the site. We turned to a Weathering Steel exterior, since its matured, natural earthy brown color would blend with the landscape.

"From a practical standpoint Weathering Steel was beneficial for other reasons. Being readily weldable, extraneous connection material could be eliminated, making possible a weathertight building that requires virtually no paint maintenance.

"Construction speed and economy were also important considerations. Once dollars are committed, owners want their building as soon as possible. That's one of the main reasons we selected structural steel framing. We estimate that by using steel Building 5 was completed about six months earlier than would have been possible with other framing materials."

Steel is a natural for speed, ease, and economy of construction. And it can be beautiful, too! For more information get in touch with the sales engineer at your nearest Bethlehem sales office.

An open atrium provides a feeling of spaciousness in the court area. Maximum flexibility of plan and ease of convertibility were design "musts" for this all-rental office.

"We, at Wellesley Office Park, are extremely proud of our newest building," reports Mr. Edward D. Cochran, building manager for the owners. "We have experienced absolutely no problems with the Weathering Steel process, the coloring, or the maintenance. We have received nothing but compliments from the occupants, as well as from visitors who have come to the park just to observe the building."

The 4-level structure is owned by Wellesley Office Park Associates, a joint venture of Beacon Construction Company and State Mutual Life Assurance Company of America. Architects are Pietro Belluchsi and Jung/Brannen Associates, Inc., in joint venture. Weidlinger Associates is the structural engineer. Babcock-Davis Associates, Inc. fabricated and erected the Mayari R Weathering Steel exterior. The structural steel frame was fabricated and erected by Thames Valley Steel Company. Beacon Construction Co., Inc. is the general contractor. Bethlehem furnished all of the ASTM A36 structural shapes and Mayari R Weathering Steel plate for the project.

Bethlehem BETHLEHEM STEEL

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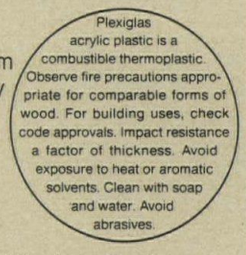

Building codes and Underwriters' Laboratories standards define good practice in the use of Plexiglas acrylic plastic for light transmission and control on a design and engineering basis that takes into account the combustibility and fire characteristics of the material.

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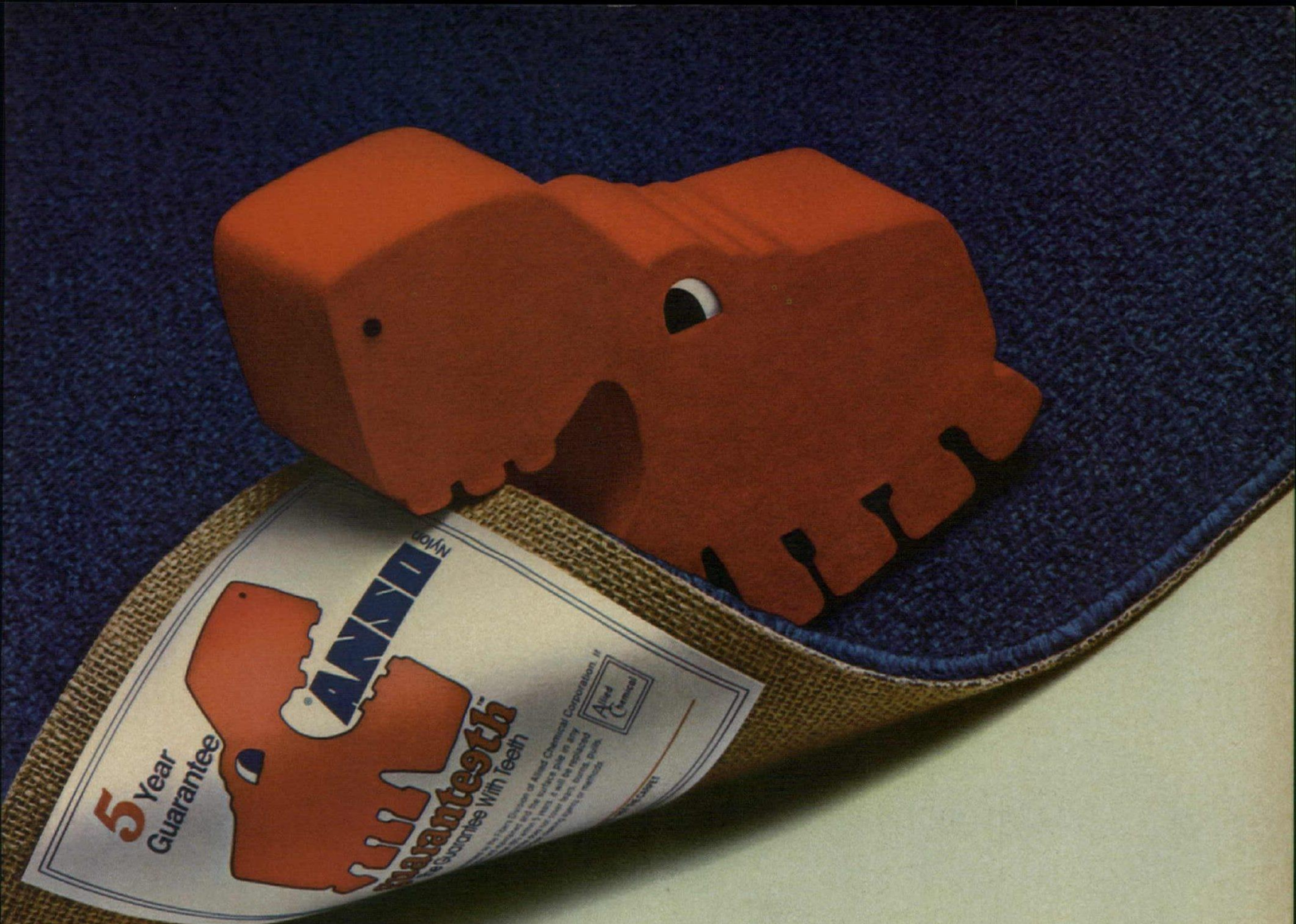

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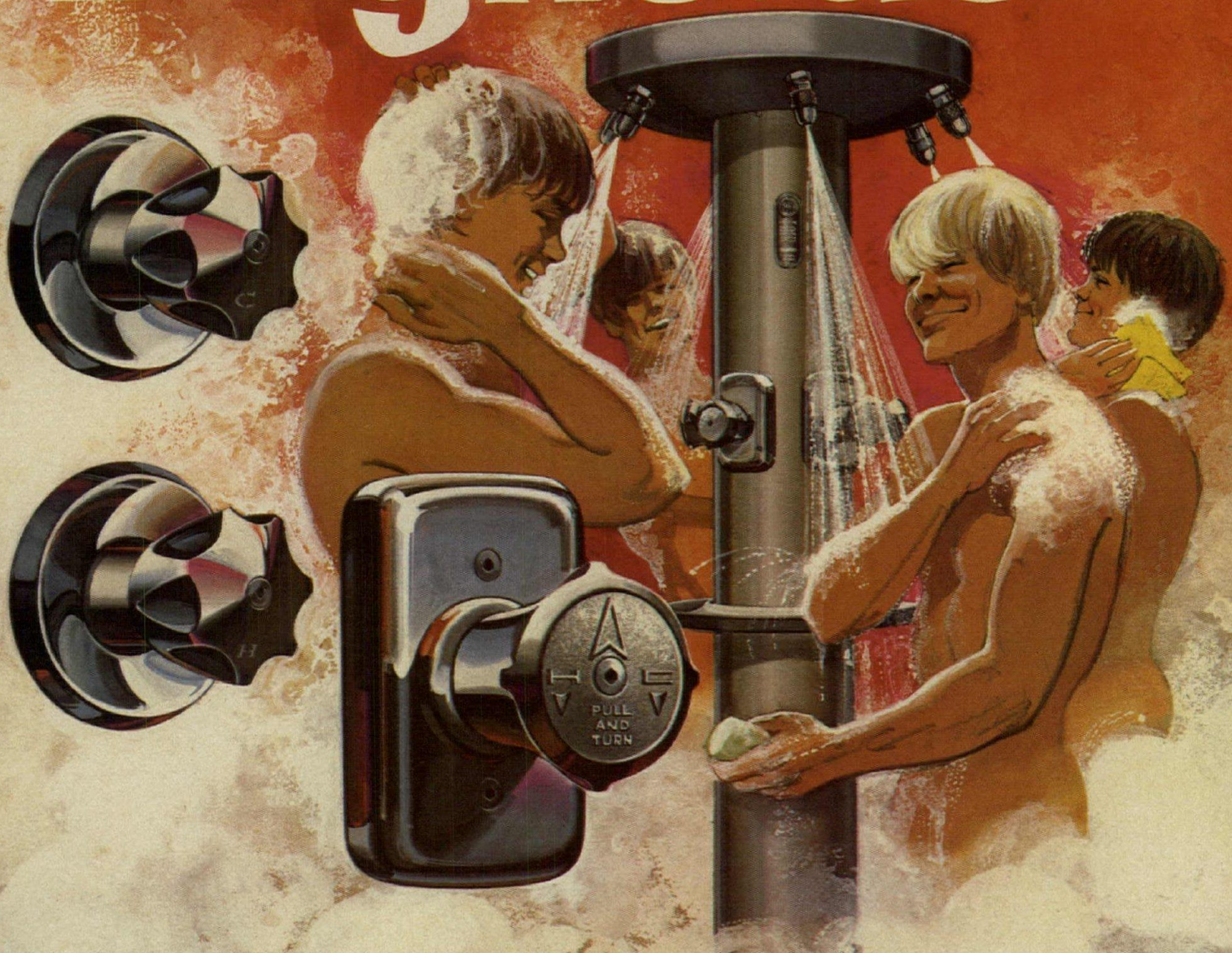

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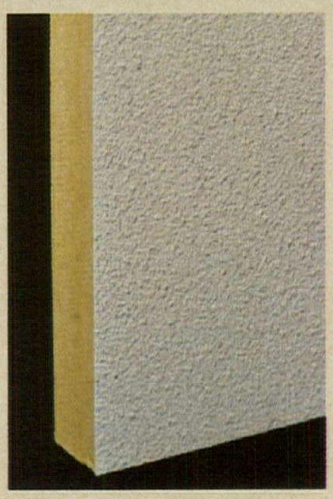
DECISION GRAPHICS

This beach has the 3 essentials Owens-Corning has the system



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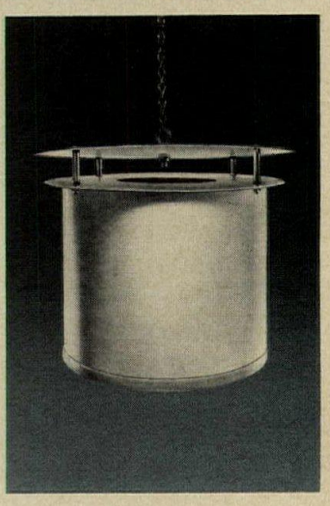

*Reg. T.M. O.-C.F.

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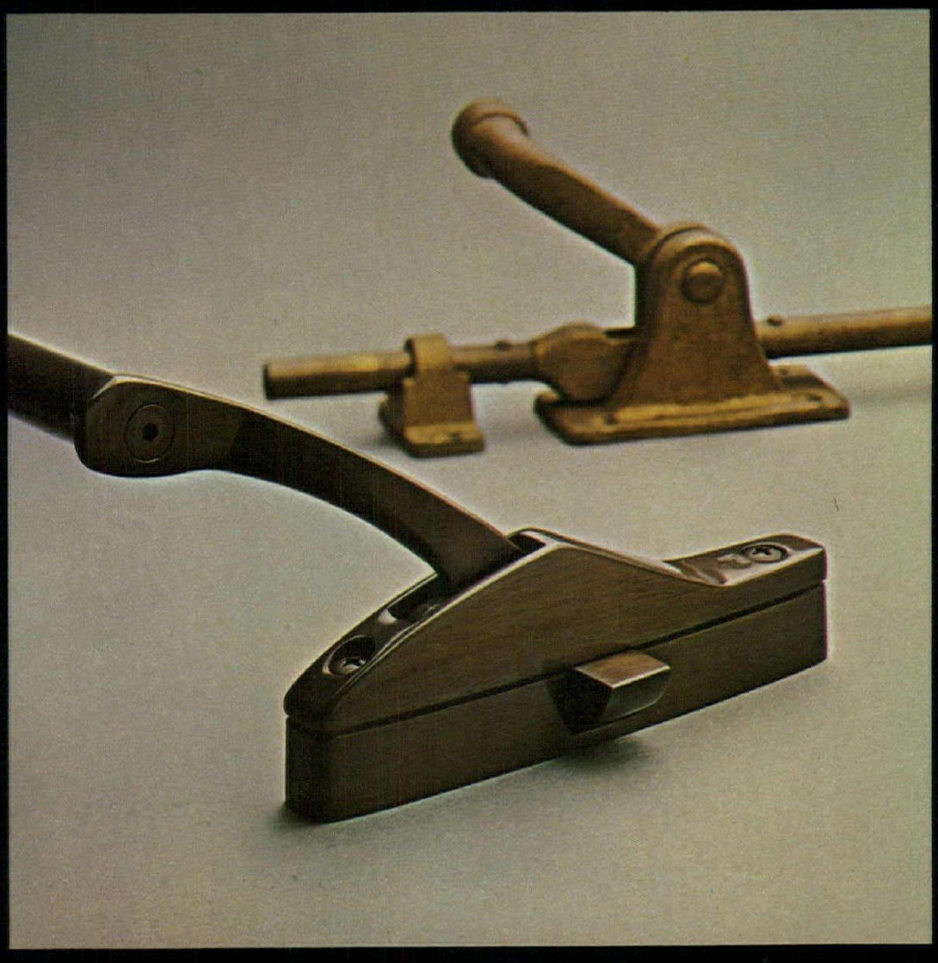

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Contents

News report

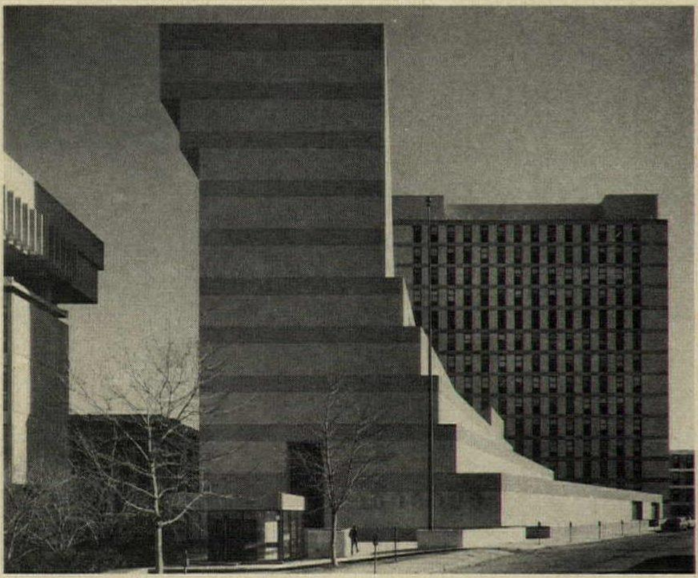
Harvard ascending

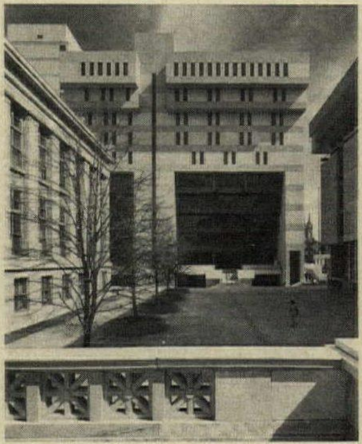
Rising like a tumultuous wave upon rocky shores is the Educational Facilities Building, Harvard School of Public Health in Boston by William Kessler and Associates, Grosse Pointe, Mich. The building is a recent addition to the School, and contains an audiovisual center, assembly/dining facilities, faculty and student workspace, departmental and administrative offices, and teaching laboratories for Tropical Public Health, a total of 140,000 sq ft. Wedged snugly among already close neighbors, Harvard medical buildings and the Countway Library of Medicine (1963, Hugh Stubbins & Assoc.), and facing diagonally Huntington Avenue, it handles its bulk and the site with ease. Maximum volume is concentrated at lower levels to relieve the resulting mass above, and teaching labs are placed on the fifth floor to permit a bridge to reach related activities in the adjacent HSPH research building. The EFB forms the keystone to Countway Plaza by virtue of its commanding height and rugged form.

The building's form is handsome, not to say striking. In its bold upward sweep it recalls Italian Futurist themes like *Casa a Gradinate* from *Citta Nuova* (1914, Antonio Sant' Elia, 1888–1916). It is machined hard, smooth, and battered back in section like the retaining wall of a dam.

Having made so Spartan a statement, Kessler surprisingly moderates it—with color. He encircles the EFB in bands of resin and sand matrix wall and spandrel panels carrying flush windows like stringed beads in a manner not unlike the polychromatic effects achieved by an earlier American architect, Frank Furness (1839–1912). Furness was no stranger to the machine aesthetic; indeed his muscular Provident Life and Trust Co. Philadelphia (1879, demolished 1960) seems to have previewed both the banding of the EFB and the almost overwhelmingly compressive force which resounds in the plaza façade. (Note the two truss chords suspended from floor six to floor five recalling the pistonlike columns above the entrance to Provident Life.) By comparison, the interiors are softer and richer.

This is not a historical apologia. The EFB develops an extremely difficult site through sensitive design responses. Street and plaza (which form the legs of an acute angle), are reaffirmed by rotating the building's "steps" from one to the other. Stone-colored banding over steel framework relates
[continued on page 26]

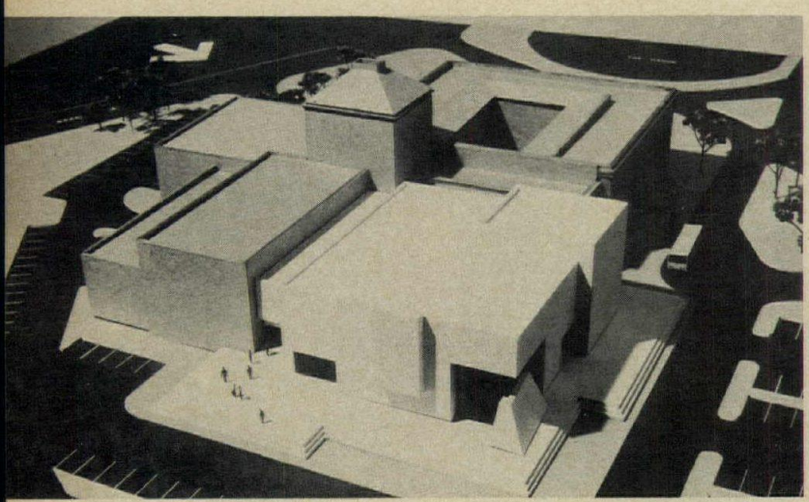




Harvard's new public health building emerges inexorably like some natural force

Buildings on the way up

1



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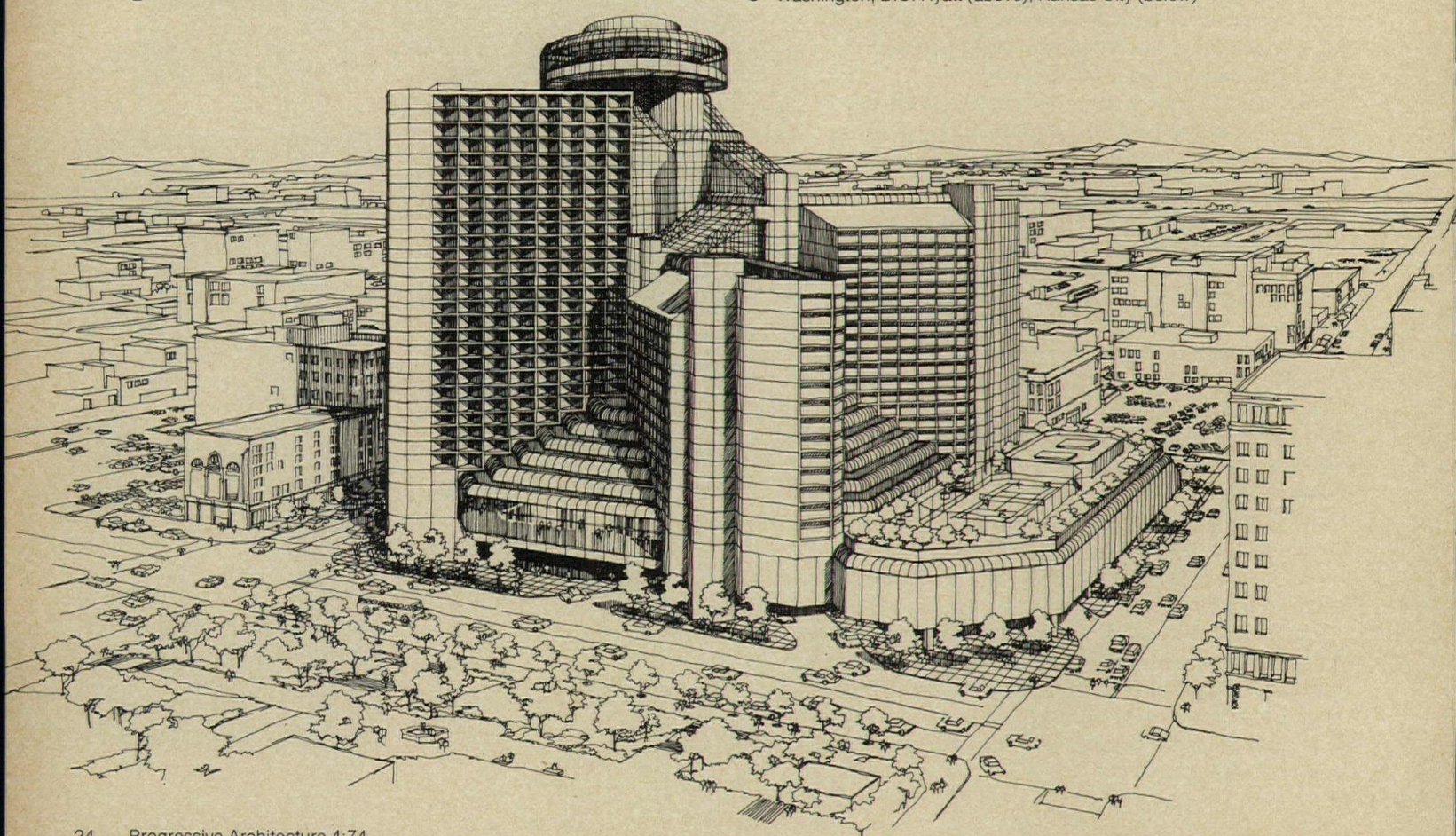
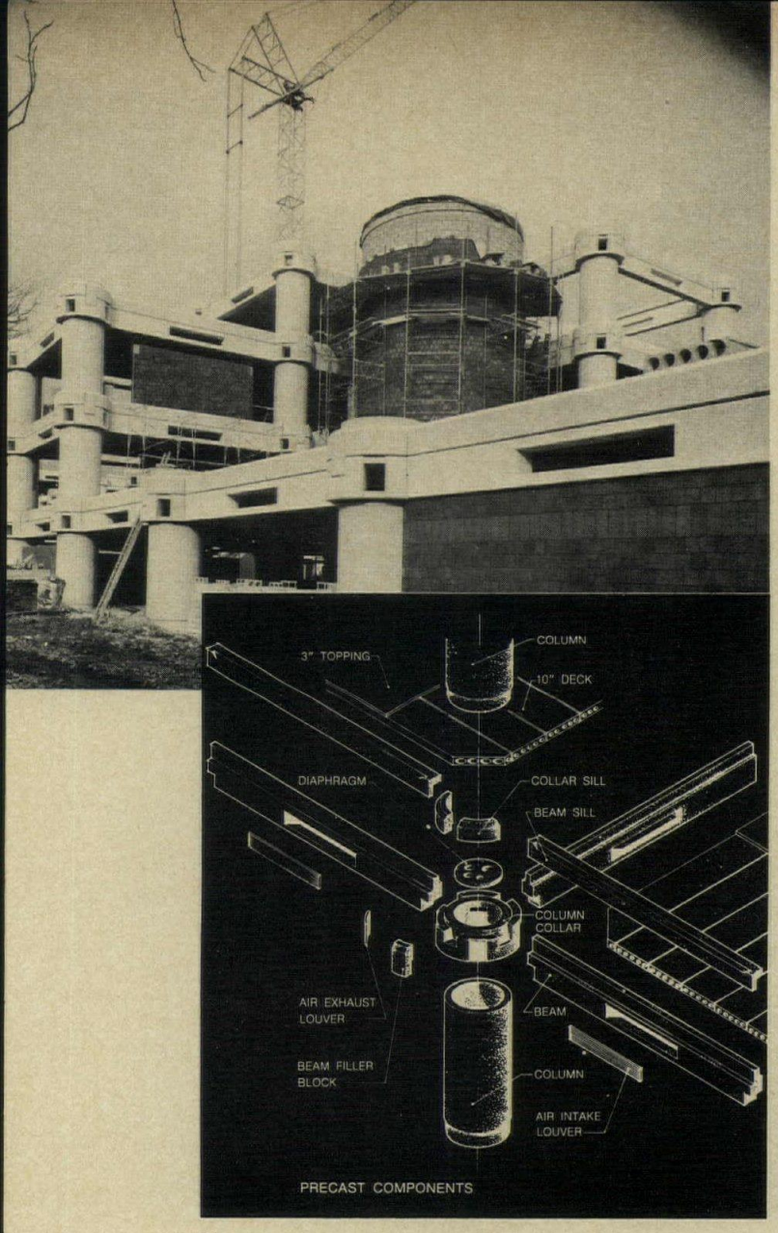
3 Washington, D.C. Hyatt (above), Kansas City (below)





4

5

1 Centre Square's twin towers will be ready for occupancy this month in downtown Philadelphia serving as a hub for business, shopping, and socializing. Designed by Vincent G. Kling and Partners of Philadelphia, the architectural concrete structures will be joined by a four-level rotunda galleria, a promenade of stores and restaurants. In addition, the all-weather arcade will give access to the city's underground shopping concourse and to all points of transportation, including rail and bus lines. Vincent Kling also designed nearby the Fidelity Mutual Life building and an urban plaza, under construction, on the west side of City Hall.

2 Redesign of traffic patterns rendered the front of Norfolk's Chrysler Museum obsolete, and in recent years the public and patrons have entered through the back door. Now with a $1 million wing designed by Williams and Tazewell & Associates of Norfolk, the museum will say farewell forever to its Italian palatial entrance overlooking a boat basin and adjust on the opposite side to such modern conveniences as nearby parking. While contemporary in design, the new addition of 17 galleries will maintain the same granite limestone façade and scale of the old building. Construction is scheduled to begin next month with completion a year later.

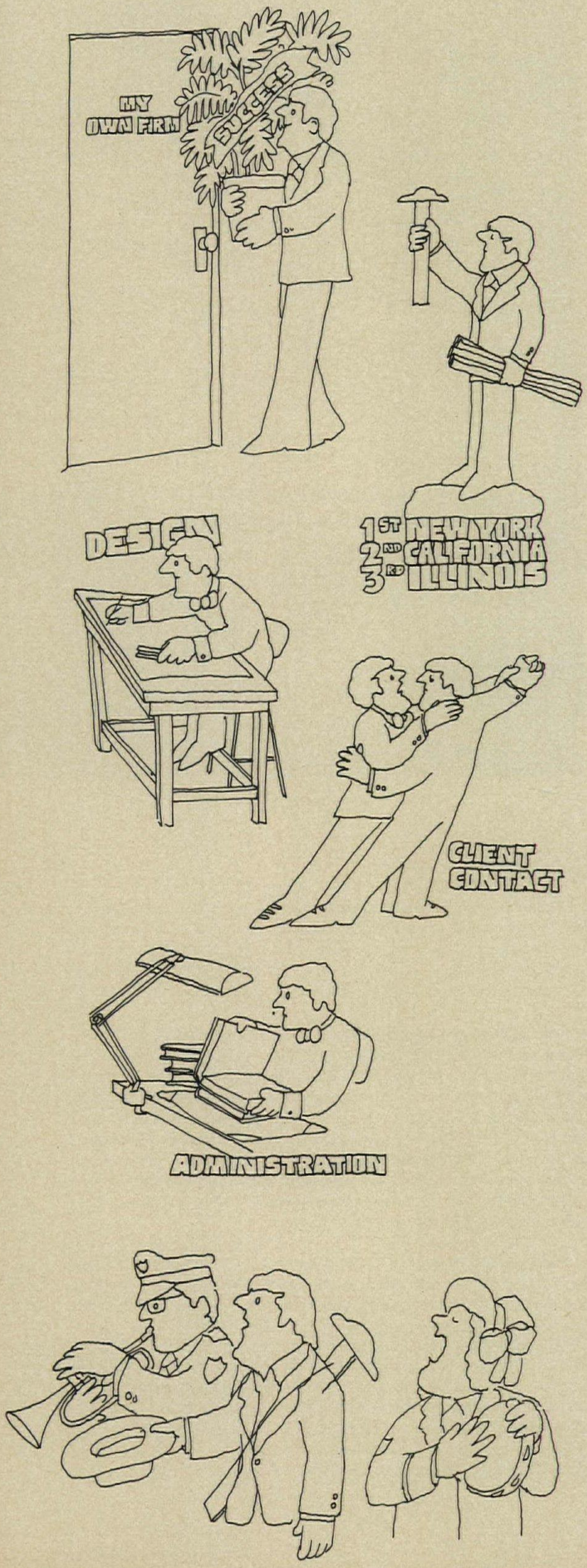
3 Welton Becket and Associates is firmly into the luxury convention hotel business with two Hyatt Regency projects on the boards—one for Kansas City, Mo., and the other for Washington, D.C. In Kansas the 1000-room hotel will have four in-stepped spiraling towers pinwheeling over a 290-foot high atrium; the tallest of the four towers will be 29 stories. Associate architect is Horner & Blessing Architects of Kansas City.

The Washington hotel will be 13 levels tall including 900 rooms. Its architectural distinction will be two seven-foot high exposed girders which will span the lobby just below the ninth floor to support the VIP suites—four of them—each having 26-foot wide living rooms and two bedrooms. The Washington hotel, when complete in the fall of 1975, will be the closest convention hotel to the proposed Eisenhower Memorial Bicentennial Civic Center (P/A, Feb. 1974, p. 23), also designed by Welton Becket.

4 Precast concrete components interlock to form the versatile structural system of the Center for Creative Studies, Detroit. William Kessler & Associates of Grosse Pointe, Mich., had two objectives in mind when establishing this intricate system: having a finished building at any stage of construction and providing an easy-to-add-onto skeleton. Since the building is for teaching both visual and performing arts, space for interaction between the two disciplines received utmost consideration. Moreover, the architects planned on simplified, unfinished interiors so as not to "inhibit" students in their own creative endeavors. The $6 million first phase of construction will be ready in August this year.

5 The Ypsilanti Township Civic Center by O'Dell/Hewlett & Luckenbach, Inc. of Birmingham, Mich., is planned to give the Ypsilanti citizen a sense of activity and multiplicity—even if he stops by only to return an overdue book. But, he may also in the same visit talk with any municipal official, pay a traffic fine, play a game of tennis, or participate in a town hearing. The city administration, recreation department, library, police department, and courts are housed in one reinforced concrete building whose components are connected by a two-story skylit galleria. The grouping overlooks a man-made pond on 75 acres of land—20 of which are densely wooded and 20 reserved for a future high school. Completion of the first phase, the administration, was last summer.

News report continued from page 23



the structure directly to the skin of the earlier and unbeautiful HSPH building. It also introduces a dynamic sense of scale to a plaza which was largely without focus, even in the massive presence of a Harvard Medical School building—and the overscaled Countway cornice.

Kessler acknowledges that aesthetics shaped his final response to the Harvard complex. The two projecting upper floors of the plaza façade are intended to echo other cornice lines and besides, "A building has to have a top." As for indenting the lower floors, Kessler considered both the actual needs for floor area and the desire that so much wall not "begin its full rise all at once, but act as a receptor of plaza energy," diverting it above and away.

The interior is designed around highly sophisticated audiovisual facilities and results from the architects' lengthy discussions with administrators, faculty, and students. The first step for the architects was "starting at zero with the school catalog." To begin the dialogue, WKA projected space requirements for the 130 subjects offered by the school. Kessler cites the dean of the school (who has since departed) for his enthusiastic and knowledgeable support of the building program. EFB cost about $8 million, roughly $57 psf.

Coming at this time, the EFB cannot be said to span the aesthetic interlude of the *fin de siecle* which its exteriors seem to know so well. Without doubt, Harvard has acquired a memorable building. [RY]

Profile of the architect

If you are an architect, more than likely you hold a 5-year degree as opposed to a 4-year or master's degree, you own your own firm, and your primary work is in the area of commercial buildings—with office and industrial buildings taking second and third place. These are some of the findings of a questionaire sent a year ago by the National Council of Architectural Registration Boards (NCARB) to nearly 11,000 architects holding NCARB certificates.

The profile which emerged showed by far the heaviest concentration of registered architects have offices in the state of New York; California came next with less than half that number, followed by Illinois in a close third place. The vast majority of respondents hold membership in the American Institute of Architects and own their own firms rather than being in a partnership or corporation. Although design work ranks first among their activities, these architects indicated that administration is almost equally demanding and contact and business promotion not far behind.

Those who have firms reported the average staff size is from one to nine people. Only 12 percent have from 20 to 50 employees, and barely 9 percent over 50.

Almost a third of the questionnaire was devoted to reactions to young, incoming architects, and here the majority who responded indicated satisfaction and only 39 percent rated them "poor."

Nonprofit profession?

Al Werolin of Case Management Consultant, speaking at a professional development seminar, said that since 1950, studies by his firm indicate a steady decline in architects' profits with the trend only recently being arrested. Nearly 25 years ago the architect was earning about 23 cents out of every dollar—that's 23 cents clear profit after he paid overhead, sala-

[continued on page 30]

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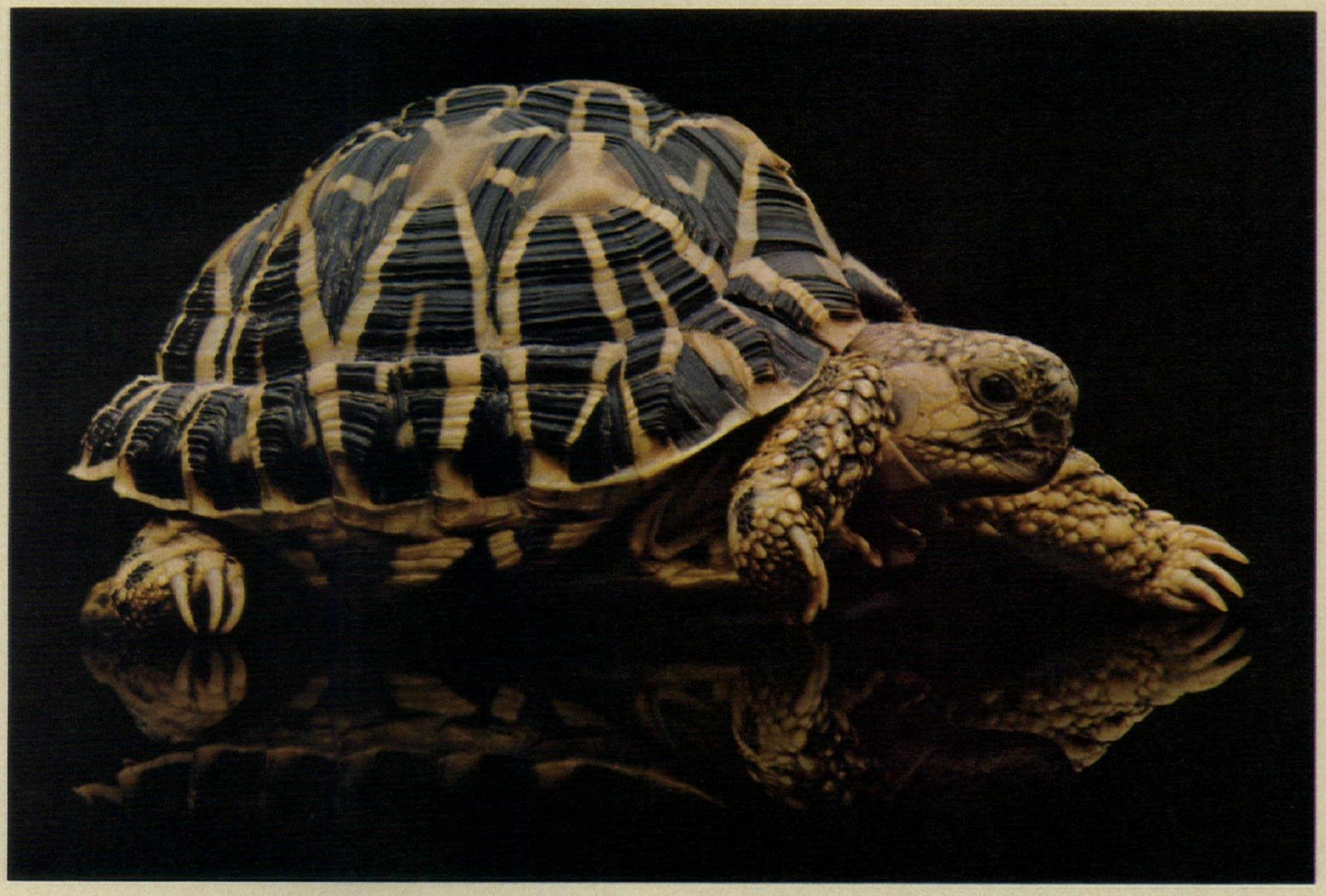

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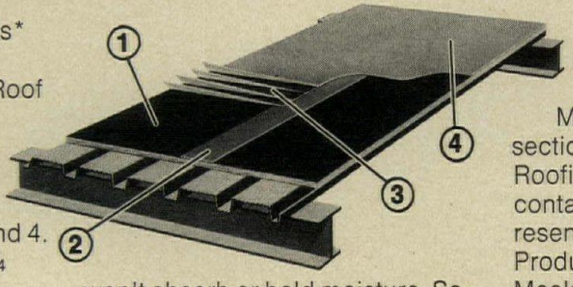

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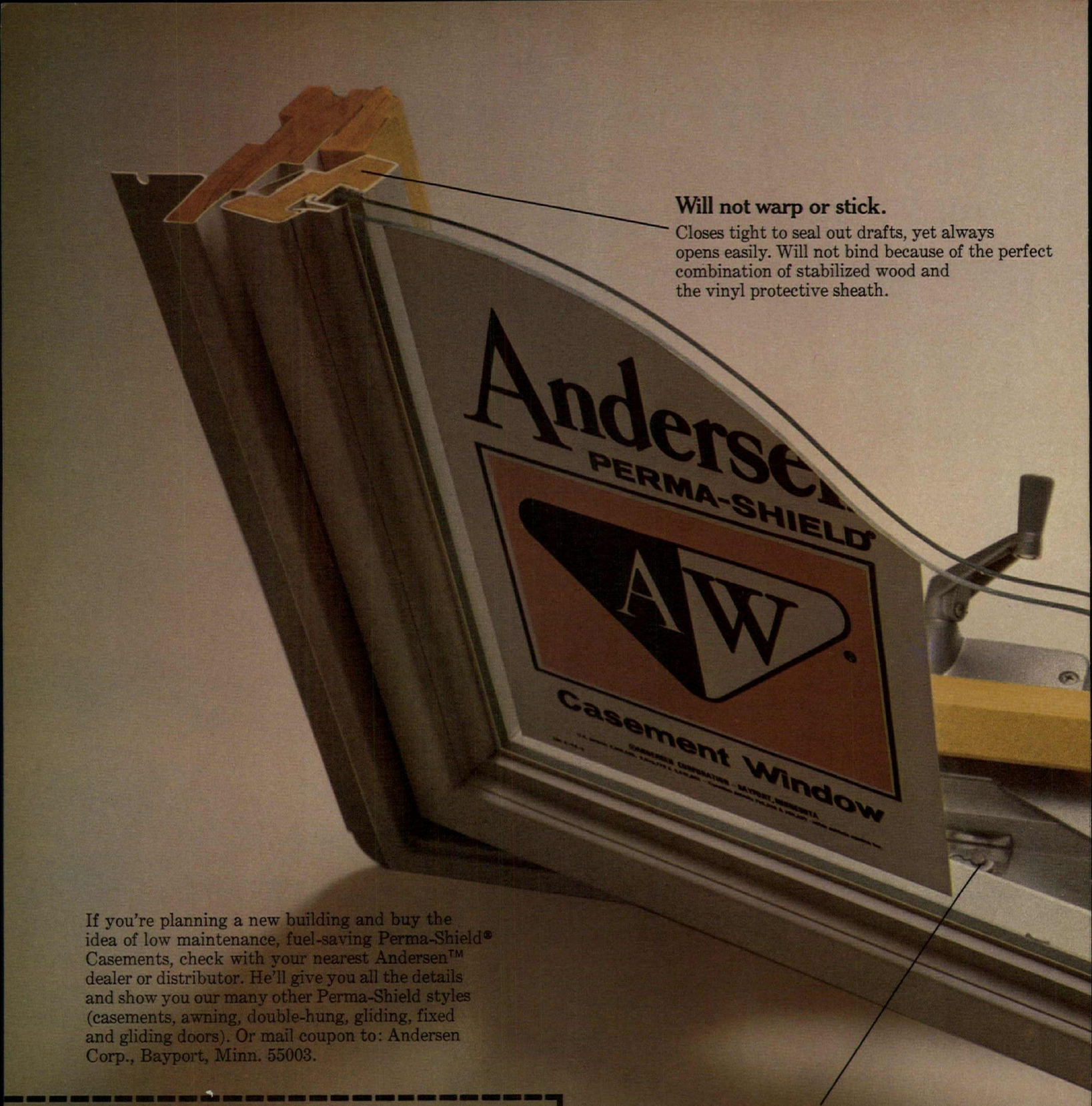

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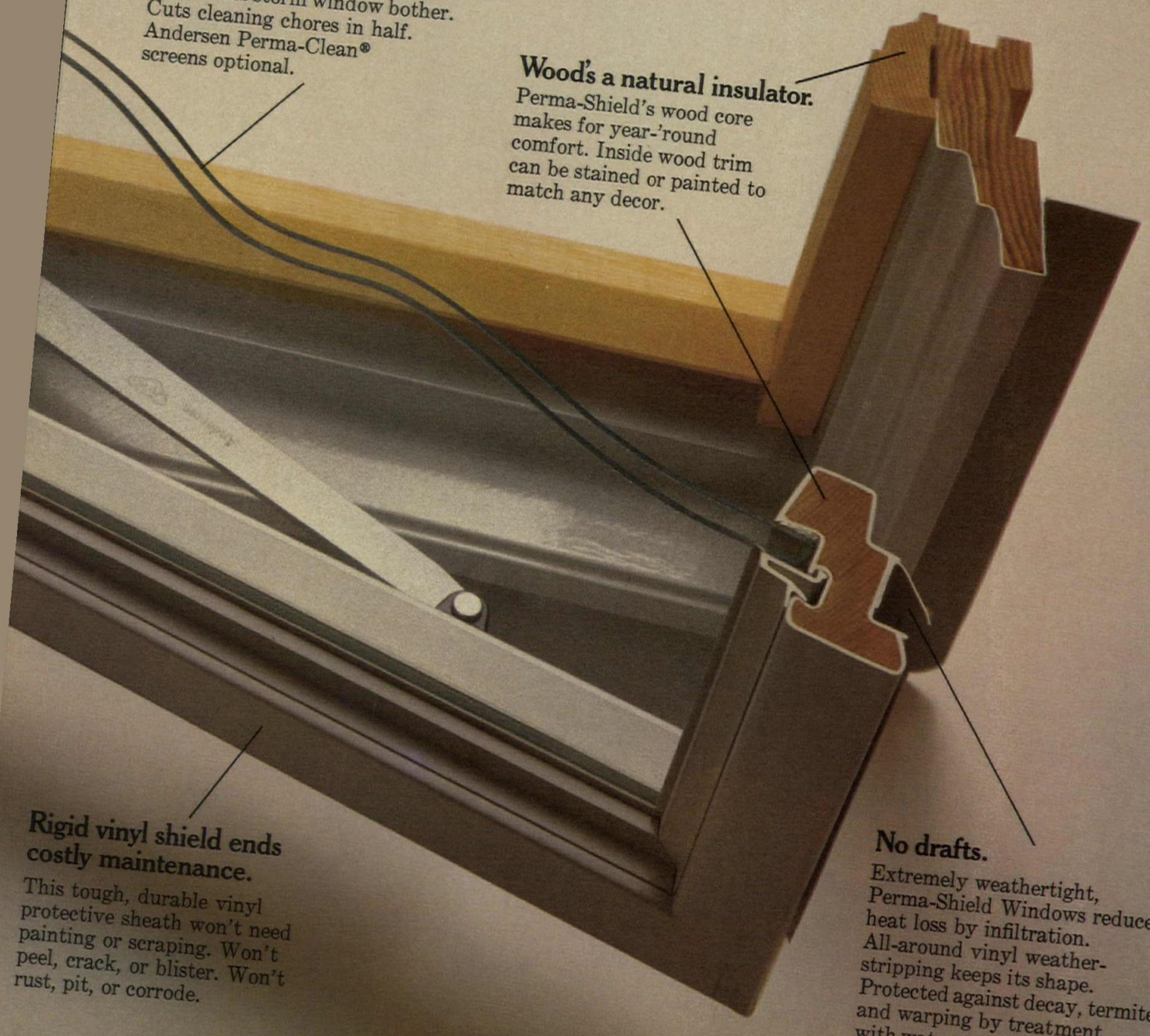

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News report continued from page 26

ries, and his own draw. By 1960 it was down to 16 cents, and in 1966, the closing year of the study, it was 8 cents.

Werolin likes to quote an associate of his who once predicted that at 3 p.m. on June 25, 1977, "all architects in this country will be working for nothing." While decreasing profits have leveled off, the causes have not been remedied. What needs to be updated, he said, is the method for determining professional fees.

On the same subject at an AIA press conference, AIA president Archibald Rogers had a "personal comment" on the percentage fee system usually associated with city and state projects. The more a project costs the more the architect receives, he said, so there's no incentive for him to economize. Observed Rogers: "You're *penalized* if you do a good job and bring down costs."

Women in architecture exhibit

The New York City chapter of the American Institute of Architects is sponsoring an exhibit of work by women designers. The exhibition opening will be at 5:30 p.m., April 30 at the NYC/AIA headquarters, 20 W. 40 St., and in October the works will be exhibited at the NY/AIA state convention. Deadline for entries is April 15.

Architectural drafting for the deaf

Men and women handicapped by deafness may now train in technical fields including architectural drafting at the National Technical Institute for the Deaf. The school is the only national post-secondary technical college for the deaf and is located on the campus of Rochester Institute of Technology in upstate New York.

In the six years since its inception, the Institute has placed nationwide 193 graduates, 10 of whom are architectural draftsmen. NTID is funded and was established by Congress. Both deaf and hearing students attend classes together; teachers, not deaf themselves, are experienced professionals trained in communicating with the deaf. The Institute grants certificates, diplomas, and associate degrees.

OPPOSITIONS 1

Oppositions bows

The first issue of a new architectural journal has recently been published by The Institute for Architecture and Urban Studies in New York. Called *Oppositions: A Journal for Ideas and Criticism in Architecture,* it will regularly feature articles and reviews that critically examine a building, a book, or a theoretical position, with the hope of encouraging a dialogue about the nature of architecture and design in relation to the man-made world. The initial issue—avowedly weighted in favor of the fellows and friends of the Institute—includes articles by Colin Rowe, Peter Eisenman, Kenneth Frampton, Anthony Vidler, Diana Agrest and Mario Gandelsonas. The less parochial, soon-to-appear *Oppositions* 2 will include articles and reviews by Stuart Cohen, Colin Rowe, Rosalind Krauss, Wil-
[continued on page 33]

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News report continued from page 30

liam Ellis, Philip Johnson (including some hitherto unpublished works), and Rem Koolhaas, and a bibliography on the works and writings of Alison and Peter Smithson edited by Julia Bloomfield. Editors for the new journal are Peter Eisenman, Kenneth Frampton and Mario Gandelsonas, and P/A senior editor David Mortin is Executive Editor. Massimo Vignelli designs the handsome journal, which is available from The Institute for Architecture and Urban Studies, 8 West 40 St., New York, N.Y. Single copies are $5; a four-issue subscription is $15. Or, you can patronize the effort for $100.

Washington report

Congress may say 'no'—anytime

There's an important "second look" at federal construction projects embodied in that new "Water Resources Development Act" (HR10203) setting a precedent that could be very important to A-E's concern with federal projects.

The legislation—passed as a conference report by both Houses of Congress—provides that Congress can review, after it has authorized but before it has funded a project, and could kill it at that point. It also provides that some projects may be "de-authorized" annually when federal departments submit lists for approval by congressional committees.

There seems little doubt that something of the same idea rapidly will find its way into additional bills dealing with other forms of federal construction. Such a general practice could mean cutoff of work, at Congress' discretion, not long after it passes through initial design stages.

The idea got general congressional acceptance as Congress tried to establish an image of frugality to present to voters in the fall. It also answers one of the most frustrating problems for any fiscal officer in the federal government: that once a project of almost any kind has been authorized, it normally remains on the roster in a sort of blank-check status, nearly forever, presenting an ever-present possibility of added spending which gets out of control.

Legislators on both sides of the Capitol seemed taken with the idea. It isn't quite the "line item" discretion that both the executive and legislative branches have sought for many years—but it is a step toward budgetary control of vast sums of money approved over the years but never spent.

This legislation—along with the unexpected death in the House Rules Committee of a Senate-passed federal land-use law—was almost the only work accomplished on anything that didn't have a direct connection to the energy problem. The land-use bill, strongly backed by architects and other professionals, would have spent $800 million over an eight-year period to aid states in developing land-use regulations that would have significant environmental impact. It fell principally because the House objected to interference with local governmental powers and rights of individual landowners.

On energy, Congress continued to thrash about in a sea of bills that had swelled to more than 1000 by early March—ranging from measures that would create a virtual energy dictatorship to calls for heavy investment in projects demonstrating use of solar and thermal energy. The executive branch—
[continued on page 36]

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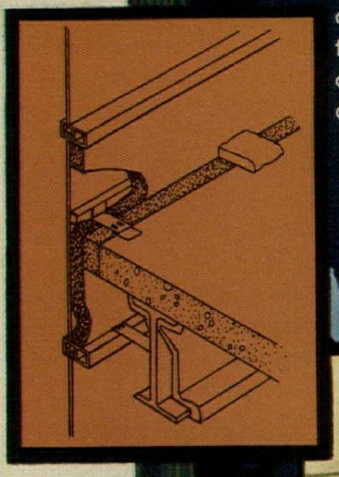

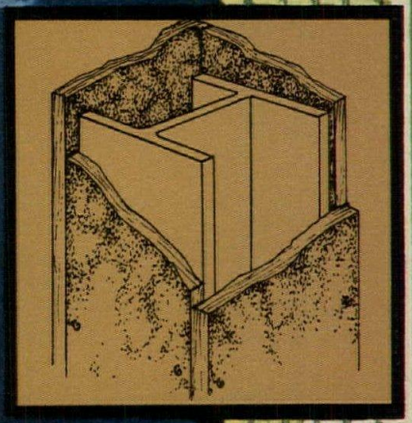

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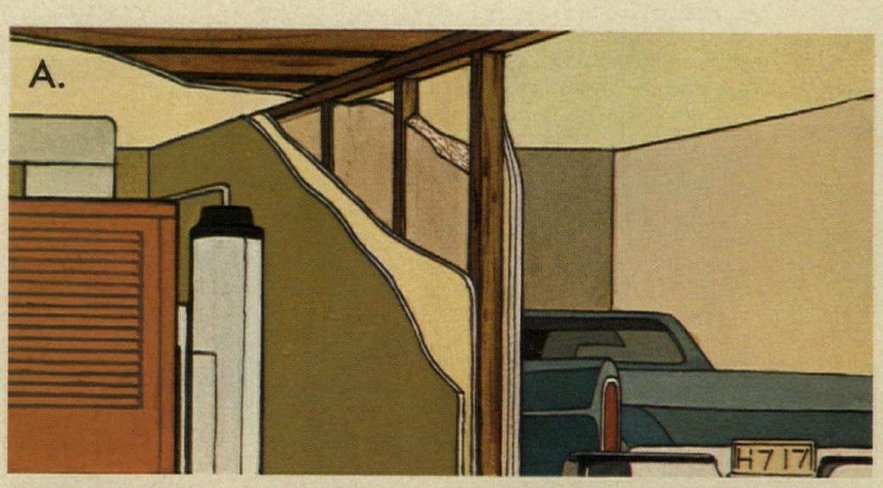
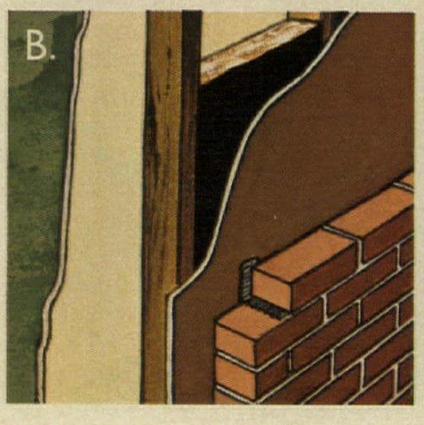
In the U.S.G. laboratory, tests proved the material that best meets these criteria is THERMAFIBER Mineral Wool. Our new high-density THERMAFIBER Safing Insulation, for instance, tested out for over three hours at 2,000°F. It is noncombustible and produced no smoke when exposed to fire. As a result, today's high-rises, protected by a "security blanket" of THERMAFIBER, are as safe as U.S.G. innovation can make them.





A. SHEETROCK FIRECODE* "C" Gypsum Panels, with a special core, provide partition fire ratings as high as two hours. Basic fire protection for furnace areas and garages.

B. A typical U.S.G. wood-frame exterior wall system consists of SHEETROCK Gypsum Panels, THERMAFIBER Insulating Blankets and USG® Gypsum Sheathing. A truly effective fire shield at an affordable price.

C. CONCORDE Shingles look like expensive hand-split wood shakes but are actually made of noncombustible minerals. Unlike wood, they won't burn or rot. And they're termite-proof, warp-resistant and completely weatherproof.

For details on any of these systems, write to Dept. PA-44 , 101 S. Wacker Drive, Chicago, Ill. 60606.

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News report continued from page 33

plagued by a poor statistical base that was used for lack of any other as a standard for allocations—seemed to plunge deeper into rather than to pull out of the situation.

Nearly every professional and trade association in Washington has planned an "energy briefing," and the same government and congressional speakers seem to appear at all of these sessions making the same speeches. Federal agencies like the General Services Administration got involved, too, as they began publicizing proposed standards for energy conservation which elicited almost unanimous criticism from industry and from some professionals. The private sector is beginning to look askance at any federal standards—wondering whether industry suggestions will have any influence on the standard-setting decisions.

Shortages are beginning to show up—other than fuel and plastics—that affect the construction industry in the form of costs that architects must also consider. For one, steel mills reportedly were cutting down on production of light-gauge, zinc-coated sheets used for ductwork because some have been unable to pass along rising costs of zinc (up as much as 43 percent). Specialty contractors who install heating, ventilating, electrical, and similar building systems increasingly were worried over shortages of copper, aluminum, boilers, and pumps—as well as ductwork.

The apparently very good prospect that all wage-price controls (except on petroleum, the health industries, and possibly the construction industry) would be allowed to die or recede to a standby basis of some kind wasn't an unmixed cause for joy either. Some construction observers gloomily predicted that wage rates would jump 7 to 10 percent almost immediately as new contracts come up for negotiation this spring and summer, compared to the 5.5 percent increase over the past year. [E. E. Halmos]

Personalities

Lawrence B. Anderson, dean of the Massachusetts Institute of Technology School of Architecture and Planning, emeritus has been appointed to the Council for the Arts at MIT. **Donlyn Lyndon**, head of the MIT Department of Architecture and chairman of the MIT faculty arts advisory committee, was appointed to the council's executive committee.

Lewis Davis and **Samuel M. Brody** of Davis, Brody & Associates, New York City, have been named to the Yale School of Architecture and will hold the Davenport professorships.

Lewis Cenker, Atlanta, Ga., is the new president of the National Association of Home Builders, Washington, D.C.

C. James Hewlett, FNSID, has been elected chairman of the Board of Trustees of the Foundation for Interior Design Research, McLean, Va.

Ken Mahal, president of Ellerbe, Bloomington, Minn., has been appointed to the Advisory Council for the College of Engineering at the University of Notre Dame, South Bend, Ind.

Lynn C. Bender has been named university planner at the University of Chicago.

Peter S. Sabin, Palo Alto, Calif., is the new president of the Santa Clara Valley chapter of the AIA.

Richard Mayer, associate of EDAW, Inc., Newport Beach, Calif., has been elected president of the Southern California chapter of [continued on page 40]

This is our new spring hinge.

Or is it this one?

Stanley's new spring hinge* is, in fact, the one on the left. But you must admit it looks as handsome as our LifeSpan® hinge shown on the right. Obviously, it blends in perfectly with other hinges on the job. It doesn't look bulky, out of place. It even has a concealed bearing.

Add to that, our spring hinge is UL listed, complies with codes, is factory pre-set and permanently assembled. Because it fits a standard 4½" mortise, it's also ideal for simple replacements in existing buildings.

Cut-away view of No. 2050.

For still more convincing facts, write Stanley Hardware, Division of The Stanley Works, New Britain, Conn. 06050. In Canada: The Stanley Works of Canada, Ltd.

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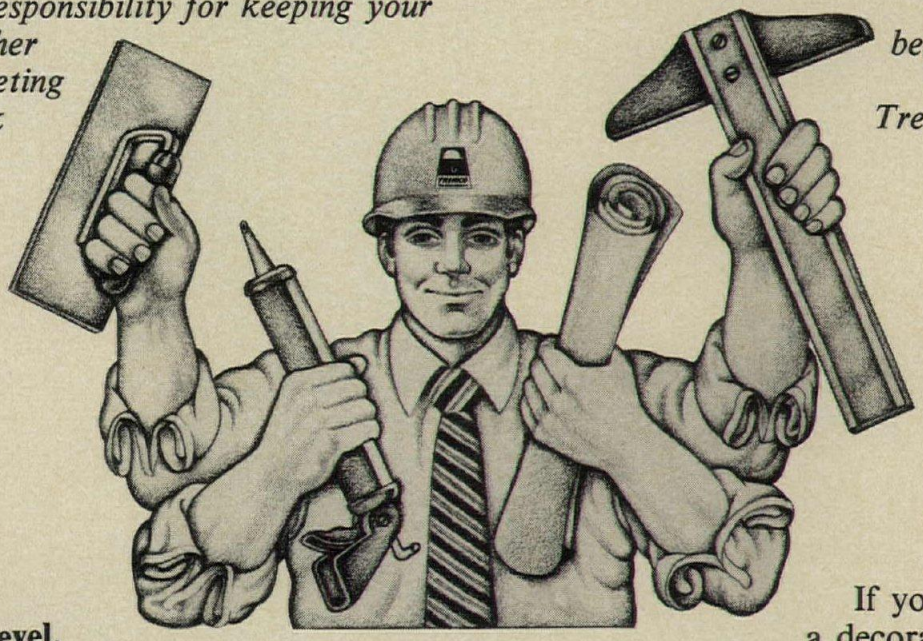
people about a lot of different waterproofing systems. Or you can talk to us about it all.

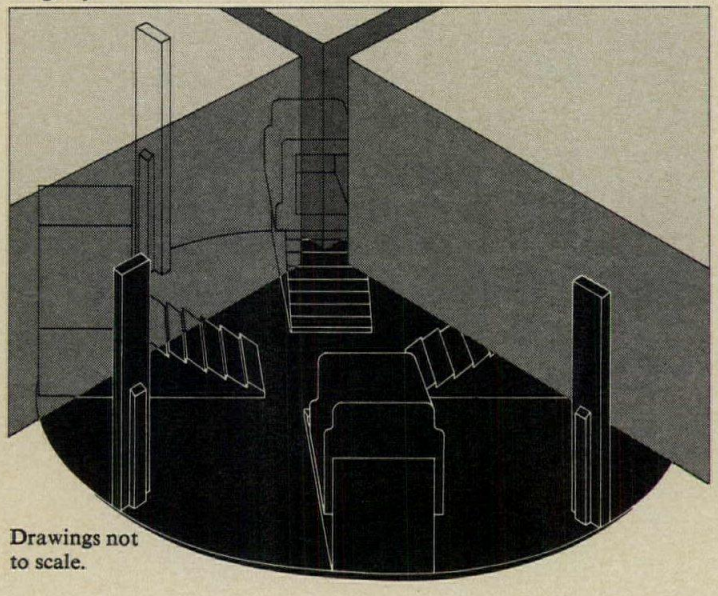
Think of all the advantages there are to having one source for all your waterproofing needs —convenience, assured system compatibility and one overall responsibility for keeping your building dry. Rather than 3 or 4 competing sources, you work with just one. Tremco's representative assists you with specifications, information and service from drawing board to job site instruction. And wherever you need waterproofing — below, on or above grade—there's a Tremco system that will do the job effectively.



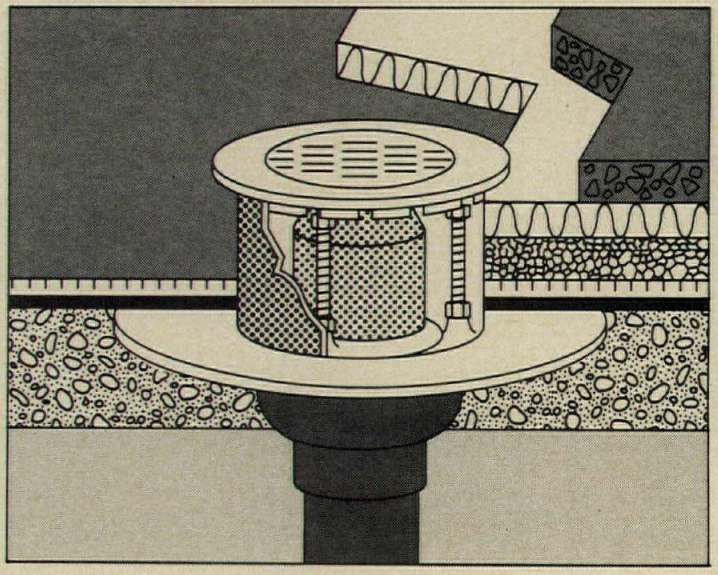
Two systems for keeping water out at the ground level.

TREMproof™ liquid polymers form a monolithic seamless blanket. They are adaptable to insulated or non-insulated applications, exhibit excellent cold weather flexibility and elongation properties, and will withstand continuous water immersion. These properties make them perfect for use with either of the following waterproofing systems.

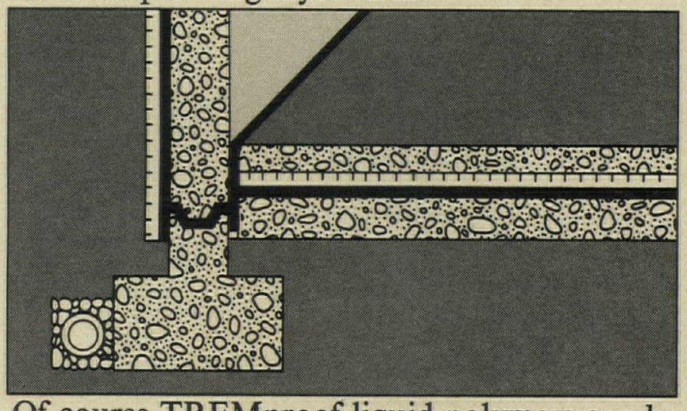
If you're considering a decorative plaza, deck or terrace, you should consider pavers. Our KingPin™ pedestal gives you design freedom, a level paver surface and uniform open joints between pavers. The KingPin supports the paver surface above the structural slab waterproofed with TREMproof. Water runs through the open joints in the paver surface and down the drains at the structural slab level.



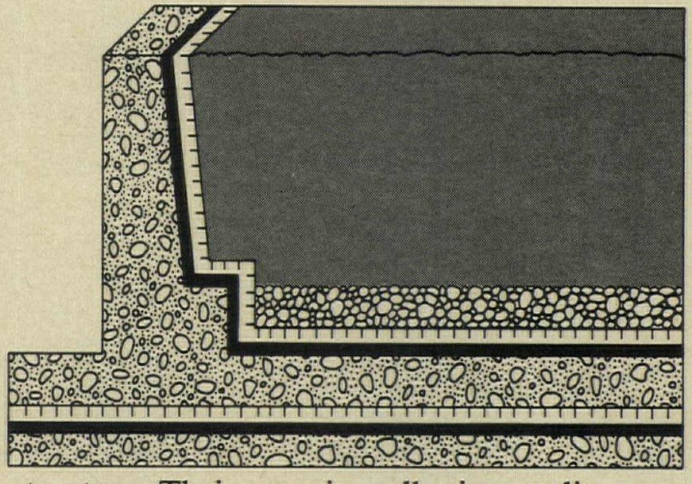
Drawings not to scale.



If you're designing a poured concrete wearing slab, our unique All-Level Drain used with TREMproof assures positive drainage on all levels. Water is taken off the traffic surfaces, the insulation layer, the percolation layer, and the waterproofing layer itself.



Of course TREMproof liquid polymers can be used for the waterproofing of foundations, planters, reflecting pools, etc. They're self-adhering and become an integral part of the

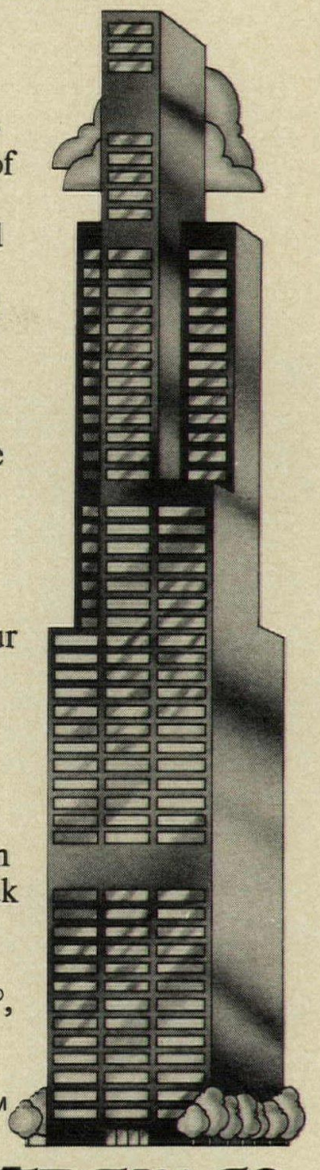


structure. Their superior adhesive quality prevents any lateral movement of water between the substrate and waterproofing blanket.

Systems to waterproof traffic-bearing surfaces. TREMproof Systems also come in a decorative, moisture-curing liquid polymer for the traffic-bearing surface of plazas, balconies, terraces, interior floors, etc. It cures to a flexible, seamless blanket and becomes an integral part of the structure. It's easy to use and has excellent resistance to abrasion, chemical spillage and ponded water.

Systems for interior waterproofing. For those difficult interior waterproofing jobs such as washrooms, and mechanical equipment rooms, TREMproof Systems make for easy, labor saving application in single- or twin-slab construction.

A variety of masonry preservatives. To complete the waterproofing job, Tremco can provide you with a wide variety of preservatives to keep water out of masonry walls. You can select from heavy-bodied decorative preservatives available in architectural colors. Or, choose from our clear, transparent preservatives that retain the natural beauty of the masonry.



A complete system, one source. Is there any reason why Tremco shouldn't be your one source for waterproofing?

We've waterproofed some of the world's largest buildings. For over 45 years, we've been providing top quality leak proof systems and products, such as our job proven sealants MONO®, DYmeric® and Lasto-Meric®, and our roof-edging system, Tremline.™

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TREMCO®
The water stoppers

News report continued from page 36

the American Society of Landscape Architects.
Anne Coffin Hanson has been named chairman of the Department of History of Art at Yale University, the first woman ever named chairman of an academic department at Yale.
Hanan A. Kivett of Kivett & Myers, Kansas City, Mo., has been selected to serve as an aviation facilities planning consultant to the Department of Transportation, Office of Facilitation, Washington, D.C.
William Lukacs, RA, FCSI of The Eggers Partnership, New York City, was elected president of the New York Society of Architects.
Leon Bridges, AIA, Baltimore, was one of three honored as "outstanding young Marylanders" by the Baltimore Junior Association of Commerce.

Calendar

Through May. Architectural models, drawings, and objects from the architecture and design collection of the Museum of Modern Art, New York City.
Apr. 15. Deadline for submissions for Women in Architecture exhibit sponsored by New York City AIA. Exhibit is open to all women who are either AIA members or employees of members.
Apr. 19. Deadline for submission of design for LeBrun Traveling Fellowship competition, sponsored by the New York City AIA.
Apr. 20–28. International Bicycle/Pedestrian Planning and Design Conference, London, England/Amsterdam, Netherlands.
Apr. 23–25. National interfaith conference on religion, architecture and the arts, Stouffer Inn, Cincinnati, Ohio.
Apr. 28–May 1. Annual convention of the American Wood-Preservers' Association, Chase Park Plaza Hotel, St. Louis, Mo.
Apr. 28–May 3. National Conference of States on Building Codes and Standards, Austin, Tex.
Apr. 29–May 1. Sixth annual Apartment Builder/Developer conference and exposition, Chicago.
Apr. 30. Women in Architecture exhibit, New York City AIA.
May 2–4. International conference on "The Professions and the Built Environment," sponsored by the Harvard Graduate School of Design, Cambridge, Mass.
May 13–17. Third South African Building Research Congress, "Research for Better Building," City Hall, Durban, Natal. S.A.
May 19–24. AIA national convention, Washington, D.C.
May 21–23. Middle Atlantic Health Congress, Convention Hall, Atlantic City, N.J.
May 26–June 1. International congress of the Federation Internationale de la Precontrainte and the Prestressed Concrete Institute, New York City.
May 26–June 14. Tour of Moroccan architecture sponsored by the Society of Architectural Historians.
May 27–30. Third biennial symposium on lower-cost housing problems, Montreal.
May 30–June 1. Fifth international conference of the Environmental Design Research Association, University of Wisconsin, Milwaukee.
June 16–21. Twenty-fourth International Design Conference, Aspen, Colo.
June 17–19. Eleventh annual Design Automation Workshop, Denver, Colo.
[continued on page 42]

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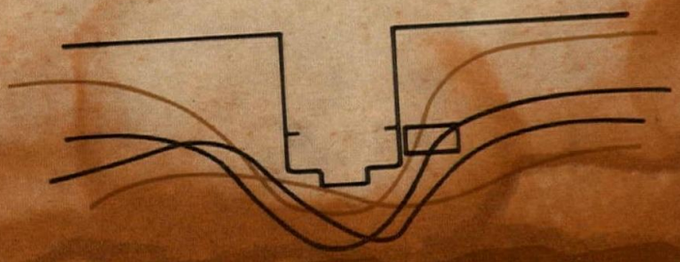

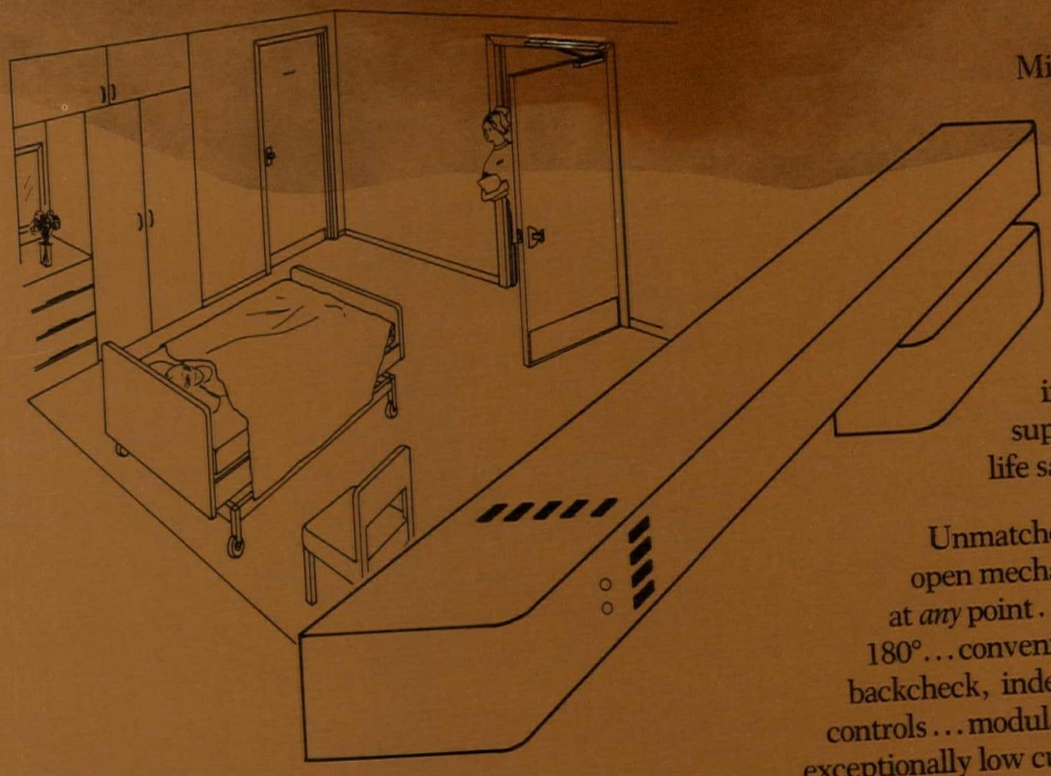

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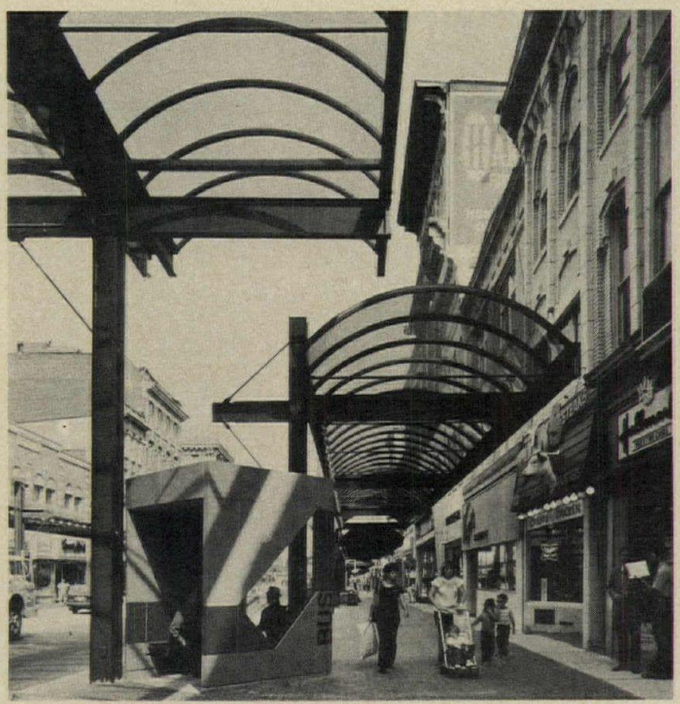
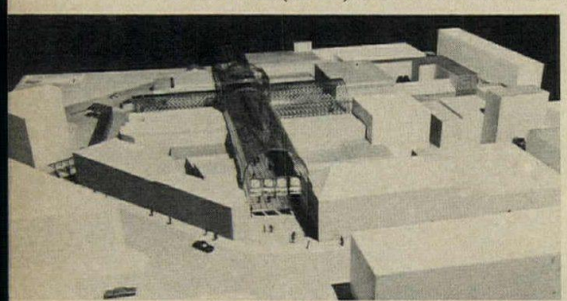
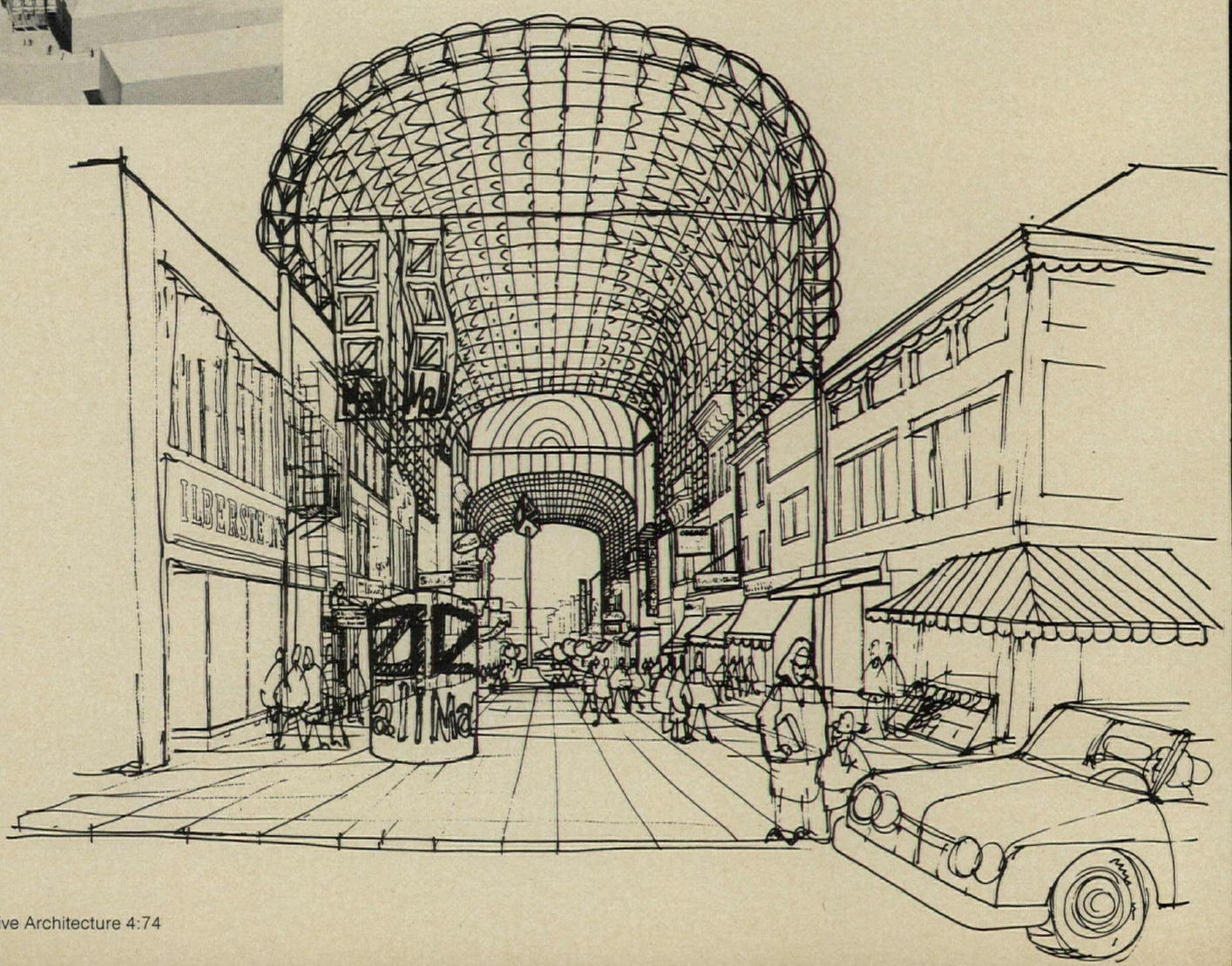


Hamilton Mall (above) and Lower Main Street Mall





Downtowns adopt suburban look

Two downtown improvement projects, similar in concept, are bringing the "mall" treatment to existing shopping streets. The one in Allentown, Pa. is by Cope, Linder, Walmsey of Philadelphia and was completed last fall. The Paterson, N.J. mall by Beyer, Blinder, Belle of New York is now adding the finishing touches to its 76-foot-long galleria. Since "Operation Comeback," a federally assisted program, started a year ago in Paterson's lower Main Street area, individual owners have spruced up their stores in the spirit of restoration. The street is closed to vehicular traffic and paved in yellow tile.

The larger of the two malls, Hamilton Street in Allentown, requires a 2000-foot-long panoply. The covering is 14 ft high, has built-in heating cables to melt snow accumulation and is free standing—leaving stores accessible for maintenance and repairs. In addition, the steel frame holding the plastic panels doubles as a support for scaffolding, saving store owners time and money when they need to renovate.

Vacancies in the four-block Hamilton Street district have dropped from 14 to 2 since construction on the mall began. "Everybody's trying to get in on the action," said a member of the Allentown Redevelopment Authority. The school is building a new administration office two blocks away, and the art museum will start a $2.5 million addition this spring.

Philosopher-in-residence

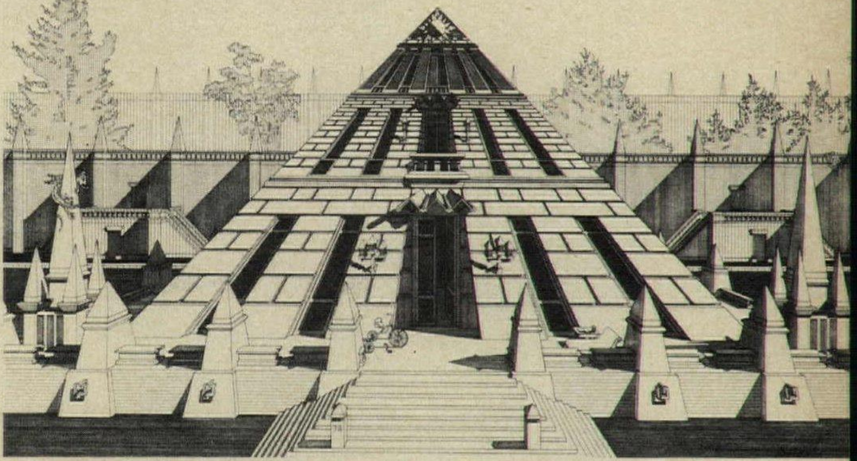
Rooms around the interior, sky-lit *cortile* of the old federal courts building in St. Paul, Minn., are being renovated into offices for the building's new owner, the St. Paul Council of Arts & Sciences, which has designated one suite for a prospective philosopher-in-residence. "I don't know what is the appropriate interior design expression for such an office," said a member of the design team led by Stahl/Bennett, Inc. of Boston, "but we'll find out."

Among other amenities, the project will include a restaurant and Rathskeller, a gallery for traveling exhibitions, theater and concert chamber. The building is one of the first to be transferred from the U.S. government to local possession through the historic preservation bill signed by President Nixon in 1972. Originally built as a post office, court and customs house in 1902 by architect Willoughby J. Edbrooke (who also did the U.S. Treasury and a post office in Washington, D.C.), the St. Paul landmark was the center of preservationists' efforts throughout seven years and three city mayors. The building's five-story granite exterior was cleaned and its red tile roof restored through supervision of Brooks Cavin Architect Inc. of St. Paul. Completion is scheduled for next year.

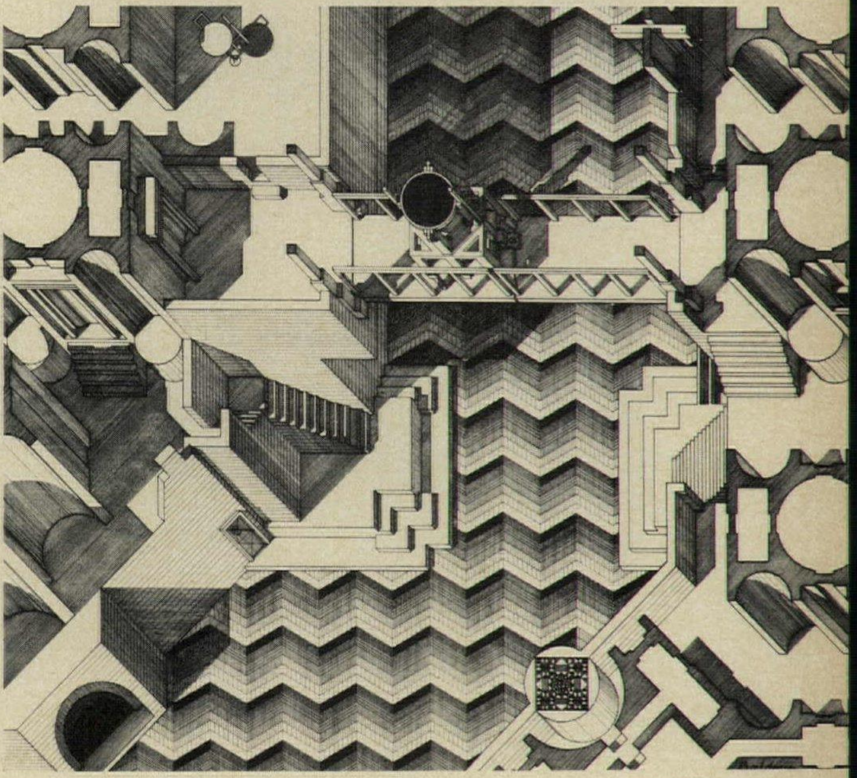
Old Federal Courts Building, St. Paul

The mayor was an architect

Gordon Baldwin, mayor of unincorporated Bolinas, Calif.—population less than 2,000, mostly poets—recently began exhibiting his architectural drawings in the East at Shepherd Gallery Associates in New York. He studied for three years at Harvard Graduate School of Design before deciding he was more the artist than the engineer and went West. There Baldwin started using his equipment from school to produce intricately wrought black and white ink drawings fused with fantasy, humor, and optical illusion. Now he's talking about blowing up one of his drawings to wall-size proportions—which may lead into a whole new phase of his work. Baldwin's drawings are in several private collections and in the collection of Amherst College, where he was an undergraduate.



Architectural ink drawings by Gordon Baldwin



AIA convention May 20-30

The American Institute of Architects will convene in Washington, D.C. on Monday, May 20, to hold a four-day meeting with the theme, "A Humane Architecture." Los Angeles Mayor Thomas Bradley will be keynote speaker at opening ceremonies, 1:30-4:30 p.m., in the DAR Constitution Hall on Virginia Avenue. This will be followed by the Honor Awards presentation, and in the evening the first party in a series of gala soirées will be held at Octagon House, the AIA headquarters, 1735 New York Ave. NW.

The theme session on "A Humane Architecture" will constitute the Tuesday programs led by Robinson F. Barker, PPG Industries chairman of the board; Judith Roeder, AIA, Pittsburgh Department of Planning; John Eberhard, president of the AIA Research Corporation; and Theodore Liebman, chief architect of the New York State Urban Design Corporation.

"Marketplace of New Ideas" will be the topic Wednesday followed in the evening with a ball in the Pension Building, Washington's red brick version of the Palazzo Farnese.

Thursday Liebman and Harry Weese, FAIA, of Chicago will hold workshops on the humanity theme, and the convention will end with the annual ball in the Sheraton-Park Hotel at which time election results will be announced.

[continued on page 46]

Cork parquet without the cost of cork parquet.

Introducing Gold Bond Mediterranean Parquet Durasan

New Gold Bond® Mediterranean Parquet® paneling offers the look of cork, the wearability of vinyl, and the price of Durasan.

If you like cork, but can't afford what cork does to your budget, here's a solution.

New Gold Bond Mediterranean Parquet Durasan® gypsum wall panels.

Like all Durasan panels, Mediterranean Parquet is available on standard ½-inch and ⅝-inch thick Gold Bond

regular, or Fire-Shield® gypsum wallboard. All panels are standard four-foot width. And your choice of lengths from six to 14 feet. Its variegated cork patterns are available in three distinctive colors: Spanish Cork in gold tones (see main illustration); Grecian Cork in shades of off-white and tan; or Moroccan Cork in varying densities of rich dark brown.

Mediterranean Parquet Cork . . . like all Durasan . . . saves money. Because the vinyl is factory-laminated, drywall mechanics can install these new Cork Parquet panels fast. Once they're up, they're finished. Costs less than building a wall and job-applying most comparable grades of vinyl wall coverings.

So, for the look of cork, without the cost, why not look over Gold Bond Mediterranean Parquet Durasan?

For the look of wood, there are simulated grains . . . in Woodgrain Durasan.

Have elegant-looking Walnut, Teak or Pecan vinyl surfaced paneling anywhere you want it for less than the price of elegant real wood paneling.

With their tough vinyl surface, these panels resist dirt, dust or even scuffs. Wipe clean with just soap and water.

Woodgrain patterns, like most Durasan panels, are available in 8-foot, 9-foot and 10-foot lengths, ready for shipping.

All standard prefinished panels are ½-inch thick Gold Bond gypsum wallboard, in four-foot widths. Special orders include ⅜-inch or ⅝-inch Gold Bond gypsum wallboard or a Fire-Shield core in ½-inch or ⅝-inch thicknesses. Special order lengths run from six feet to 14 feet.

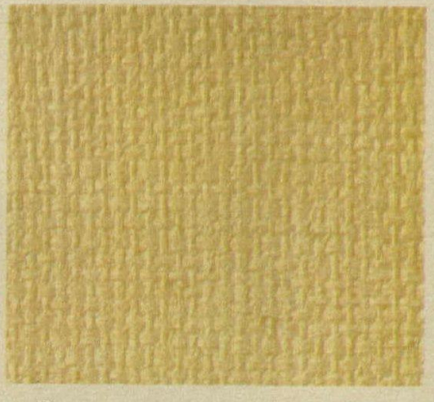
So for a wood panel look with the toughness of vinyl, look to Gold Bond Woodgrain Durasan.

Or, for the look of burlap, there's Burlap Durasan.

Odd, isn't it, how something as inexpensive as burlap can get very expensive when it takes special labor to put it up.

Gold Bond solved that with the texture of burlap embossed on high-quality vinyl film. Then factory laminated it to standard Gold Bond gypsum wallboard.

The result is a panel we can offer in 9 popular burlap colors, and one popular price.



So from our standard Burlap Straw (shown) to any of 8 other decorator colors, Durasan can help you put up nearly any shade, for just a shade more than regular wallboard.

Mediterranean Cork Parquet, Woodgrain or Burlap Durasan is available through your local building materials dealer who handles Gold Bond Products.

For more details, write Gold Bond Building Products Division, Dept. PA-44G National Gypsum Company, 325 Delaware Avenue, Buffalo, N.Y. 14225.

We're gypsum, and then some.

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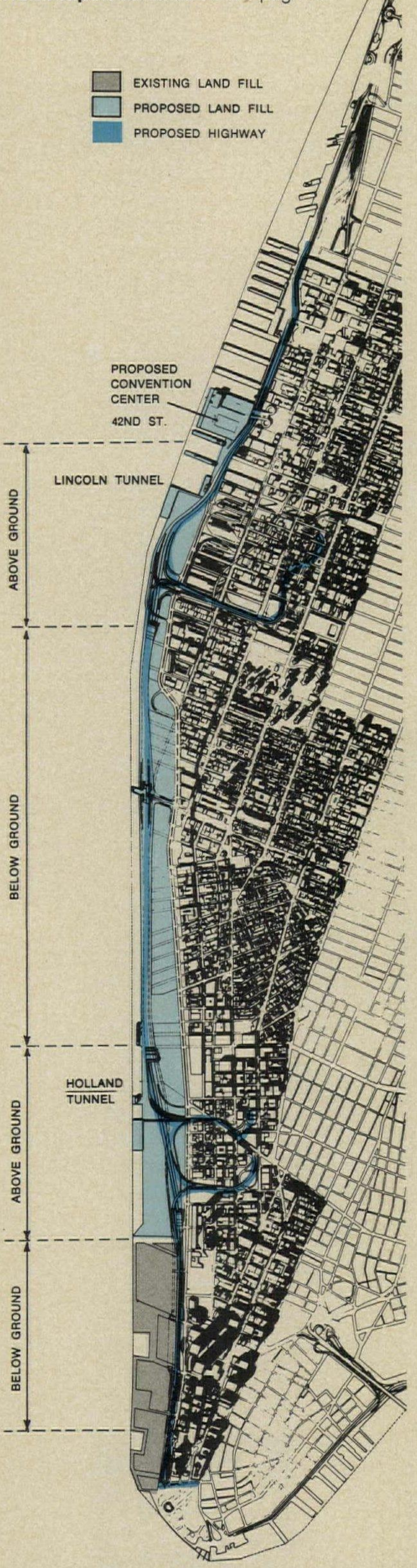

Outboard proposal for Manhattan's West Side Highway

At least 30 tours of all sorts, from hard hat inspections of Washington's new Metro, under construction, and excursions to the new towns of Reston and Columbia and the old port of Baltimore, to visits to embassies, private homes, and Washington's social circuit are planned daily starting Sunday, May 19 through Saturday, May 25. Highlights will include historic sites and new buildings; "The Red Velvet Swing," a seafood supper-dance to measures of brass Baroque music at Stanford White's Garrett-Jacobs mansion in Baltimore (May 21); several museums under construction by I.M. Pei and the firms Hellmuth, Obata & Kassabaum and Skidmore, Owings & Merrill (May 23); Arena Stage theater by Harry Weese and the Kennedy Center by Edward Durrell Stone (May 23).

Registration for both the convention and tours is open to members and nonmembers of the AIA—students may register for $1. Headquarters will be in the Sheraton-Park Hotel.

Island sculpting

Manhattan, the country's most famous island, is under the artful study of architects who are deciding what to do with a sagging, broken, and rusty West Side Highway, which edges up the Hudson River shoreline. They have advanced five major proposals of which the most ambitious is an architectural sculpting of the island's western boundary involving demolition of the exiting, but nonfunctional, piers, tunneling a six-lane highway in *landfill,* and bringing parts of New York to the hitherto remote waterfront.

The five proposals will go to public hearing late in April or in May pursuant to the Environmental Impact Statement prepared by the West Side Highway Project, a distinct "amalgam of every conceivable level of government and private consultant," according to a project staff member.

Briefly, the five plans range from a "what you see is what you get" basic repair and maintenance program of the existing six-lane elevated road to the landfill proposal just mentioned and an inboard project—similar, but not involving such sweeping changes to the land configuration—with two varied schemes in between. The comparative advantages involve whether or not a rapid transitway is included, whether the city or federal government pays for the road, and whether or not the highway meets federal interstate standards.

Proposal	Who Pays	Features	Extras
Maintenance	C or CS		
Reconstruction	C or CS		
Arterial	C or CS	T	
Inboard	F S	T I	
Outboard	F S	T I	W L

C-City S-State F-Federal T-Transitway (rail or bus) I-Interstate W-Waterfront development L-Landfill (parks)

As the foregoing chart indicates, the first two plans make few changes, do not meet interstate standards and therefore are not eligible for financial assistance from the federal government. The arterial system calls for tearing down the elevated road and building a ground-level boulevard with provision for a transitway for either rail or express bus service below the new street. Both the Inboard and Outboard proposals qualify for Interstate funds—the federal government paying 90 percent of the cost and the state the remaining 10 percent. The Inboard plan would leave intact most of the existing waterfront construction, such as major piers, and would involve little new development along the west side riverbank. [continued on page 48]

The most beautiful roofing material you can use just happens to be the best insulation, too.

Residence, Michigan. William Kessler and Associates Inc., Architects.

Red Cedar shingles and handsplit shakes are twice as resistant to heat transfer as asphalt shingles. Three times more resistant than built-up roofing. In fact, red cedar out-insulates such roofing or siding materials as asbestos-cement shingles, slate, aluminum and architectural glass.*

Red cedar deserves close consideration for architects and builders concerned with the energy conservation of their structures. Its unique cellular structure makes it even more insulative than many other woods.

And the traditional overlapping application method effectively multiplies cedar's resistance to heat transfer.

Add to this the design flexibility and durability of red cedar on residences and commercial structures. It's no wonder the most beautiful roof and sidewall covering you can possibly use is also most efficient.

For more details, write Red Cedar Shingle & Handsplit Shake Bureau, 5510 White Bldg. Seattle, Washington 98101. (In Canada 1055 West Hastings St., Vancouver 1, B.C.)

These labels under the bandstick or on cartons of red cedar shingles, handsplit shakes and grooved shakes are your guarantee of Bureau-graded quality. Insist on them.

*ASHRAE Handbook of Fundamentals, 1972 ed., Chap. 20 "Design Heat Transfer Coefficients" Table 3A, pp. 362-63.

Red Cedar Shingle & Handsplit Shake Bureau

One of a series presented by members of the American Wood Council.

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News report continued from page 46

The Outboard proposal, the most daring plan of the five alternates, would involve "three-dimensional architectural work." This would include complete removal of all piers except the Consolidated Passenger Ship Terminal at 48 St., just north of the proposed convention center and would initiate major development on off-shore landfill. For nearly 2 of its 4.5 miles the highway will be out of sight, buried, in deference to wishes of the majority of community groups consulted during the research phase. Concealing the highway would be accomplished by creating 235 acres of landfill between Battery Park City on the south and 38 St. and then tunneling the road through leaving the surface unobstructed for waterfront parks and people-oriented developments.

It's a wry comment on human antipathy towards the automobile that pleasurable situations such as a waterfront are not associated with cars. In fact, the assumption is that only by *excluding* vehicles can these amenities be enjoyed at all. Beaches, parks, and other eye-appealing environments increasingly are being saved for on-site users—preferably those close enough to arrive on foot, which would spare covering more land with parking lots. But in Chicago, for example, the exception is true (at least for the present), and Lake Shore Drive gives superb views of the city skyline, Lake Michigan, and Lincoln Park to thousands of commuters and city dwellers each day, and provides easy access to park beaches for families arriving by car on weekends. Some sights are even enhanced by distance, and such panoramas do much to relieve the tedium of highway hours spent daily by millions who otherwise may never "see" the natural or urban landscape.

At present the West Side Highway Project only goes from Battery Park at the southern tip of Manhattan up to 42 St. where it joins the Lincoln Tunnel, but a third—and completely separate—component of the study involves how to extend the highway 6.5 miles further north up the coast to meet with the George Washington Bridge at 178 St. This phase is particularly challenging because it involves traversing the length of the well-to-do Riverside Park area which consists primarily of homes and park land. Here architects propose another man-made tunnel at the water's edge over which a park would be extended to link the riverfront to the community. This plan also would call for the creation of 40 additional acres of parks in two different locations as a tradeoff for land on which to construct the highway as it goes above ground to meet the George Washington Bridge, itself 200 ft up in the air.

AIA forecast: "synergistic" national policy

Tomorrow's environment will be shaped from the raw material of today—such as affluence, metamorphosis from introverted into sophisticated culture, multi-minority society, increasing telecommunications, and drop in the birth rate. These are among nine areas which the American Institute of Architects (AIA) has identified as peculiarly of our times and unavoidable forces which must be reckoned with in establishing a national growth policy. In a report released earlier this year, the AIA called for a "synergistic national policy" having "integrity" and being capable of flexible implementation."

The policy goals should be to attain a higher living standard increasing our freedoms "to live where and how we choose" without losing democracy and the free-enterprise economy. The report suggested four tools for achieving these objectives: the "growth unit," which is a new or renewed neighborhood that acts like a community, greater involvement of government agencies, greater interaction among architect, client, and society, and a broader tax base as an alternative to the property tax.

Relaying feedback on a previous report, the AIA said most objections involved the report's endorsement of broader government powers rather than local power, acceptance of continued population growth, and lack of clarity.

In rebuttal the AIA said growth is inevitable. "Whether this is good or bad is academic." However, it does assume Zero Population Growth by 2040, the time when the anticipated "stable state" economy will be achieved. On the question of increased federal powers, the AIA refuted its critics by saying it doesn't favor government expansion per se but supports the renewal of government institutions so that work may be performed more competently.

The newest report, "Structure for a National Growth Policy," is the AIA's third in the area of national issues and is available from AIA headquarters, 1735 New York Ave. NW, Washington, D.C.

In late 1974 the AIA will release findings of its survey of the architectural profession, and high on the list of priorities this year is a self-study of the AIA's own future.

Architecture critic honored

Walter McQuade, a member of the board of editors of *Fortune* magazine, has been named recipient of the Architecture Critics' Medal presented by the American Institute of Architects. Himself an architect, elected a Fellow of the AIA in 1967, McQuade began his literary career in 1947 when he joined the staff of *Architectural Forum*. Since then his articles have appeared in such national magazines as *The Nation, Life, Reader's Digest* and the *AIA Journal*. Subsequent to a report, "The Threatened City," 1967, he wrote as a member of an urban crisis committee appointed by Mayor John Lindsay, McQuade accepted the mayor's appointment to the City Planning Commission.

AIA awards

The American Institute of Architects has selected David Hirsch of New York City, a frequent contributor to *Progressive Architecture*, to receive the 1974 Architectural Photography Medal. Hirsch also is an architect and currently is involved in urban design for the mayor's office in Brooklyn.

Ralph Knowles, professor of architecture and acting dean at the University of Southern California's School of Architecture and Fine Arts, has been chosen by the AIA to receive the Medal for Research. Knowles is a pioneer in ecology and energy conservation and for 12 years has conducted research into the effects of climate, energy consumption, and technology on land development and the configuration of buildings. His findings have been widely published.

The New York State Urban Development Corporation was cited by the AIA for special recognition for its accomplishments in low to moderate income housing. Since formation in 1968, the UDC has worked to meet housing needs through cooperation between builder and client . . . local officials and citizens' groups. Its approach includes imaginative site planning.

[continued on page 51]

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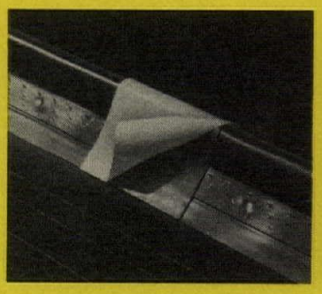

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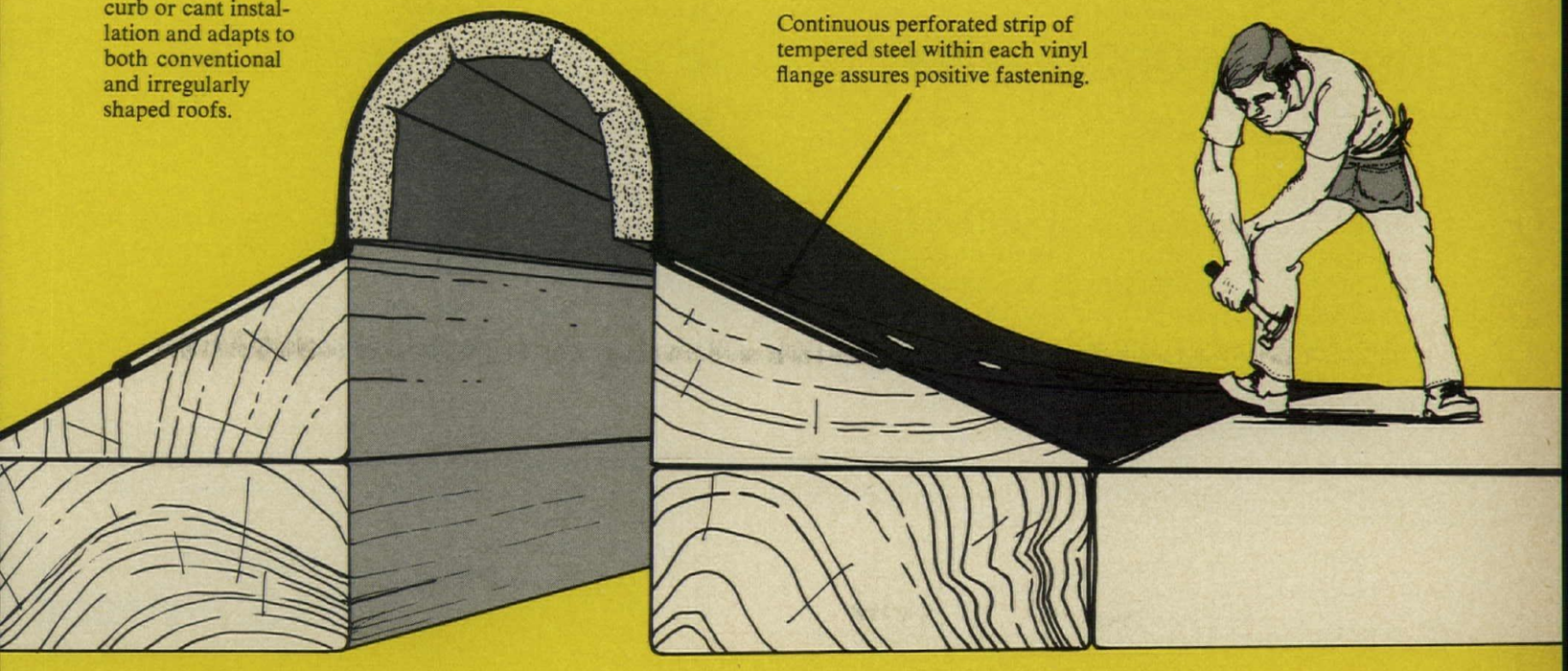

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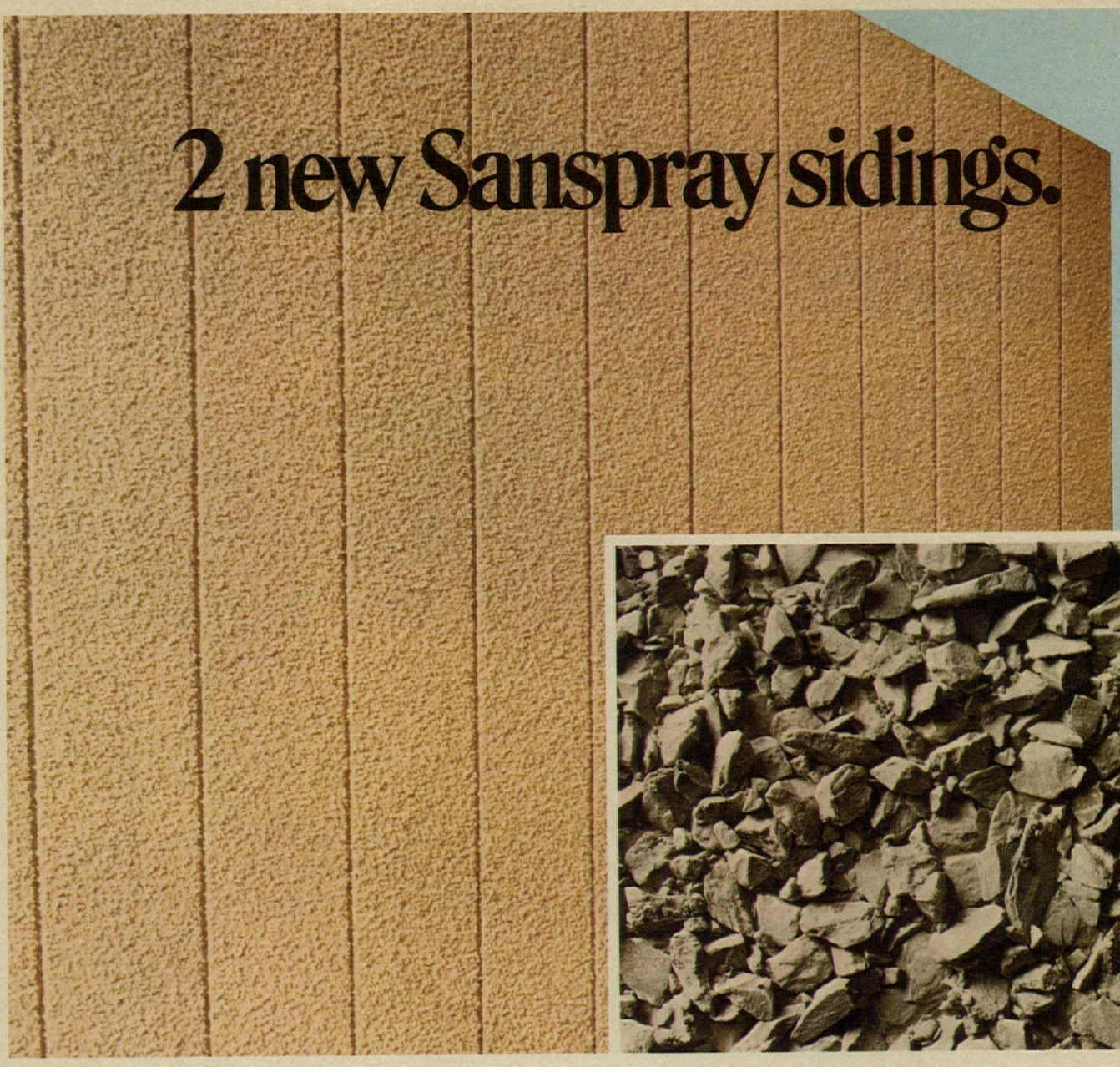

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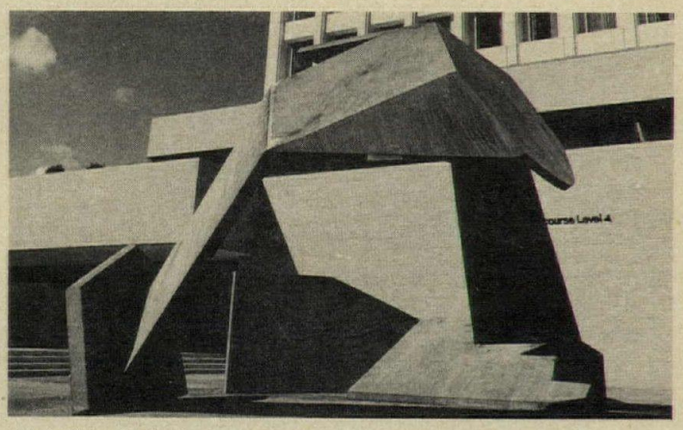
News report continued from page 48

The Regional Plan Association, New York City, is recipient of the AIA's Architecture Critics' Citation. The award was presented for the group's multimedia television series, "Choices for '76," exploring solutions to urban problems.

Making it rugged in Houston

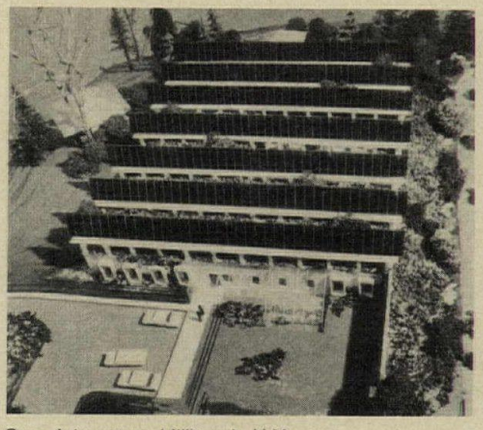
"High Plains Drifter," the 7-ton Corten steel sculpture by New Yorker Peter Reginato, upholds the theme of prairie vigor in an invitational competition to find a monument for Houston's Allen Center. The center commemorates city founders John and Augustus Allen. "Drifter" was constructed in Bennington, Vt., and took a week to assemble in the plaza entrance to Allen Center. Other sculptors participating were Kenneth Greenleaf, Michael Steiner and Roger Williams, all of New York City; Isaac Witkin of Bennington, Vt. and James Wolfe of Shaftsbury, Vt.



"High Plains Drifter"

Botanical garden—putting plants to work

The life of ease will soon be over for plants and other vegetation at the new greenhouse of Cary Arboretum, Millbrook, N.Y. Architect Malcolm Wells of Cherry Hill, N.J. has designed a structure that will use plant-humidified air to provide additional heat for nearby New York Botanical Garden administrative offices and laboratory area, which will have additional heating from its solar roof. Energy from the sun also will cool the building and provide hot water. In turn for the plants' contribution to the cycle, carbon dioxide exhaled by occupants of the building will be pumped into the greenhouse for the plants to "breathe."



Cary Arboretum, Millbrook, N.Y.

Louis I. Kahn, 1901–1974

Louis Isadore Kahn, born in the then Russian province of Estonia on the Baltic Sea, Feb. 20, 1901, died on March 17 in New York, having just returned from a business trip to India. He was enroute to his home in Philadelphia from Ahmedabad where he was working on a complex of buildings for the Institute of Management. Although he was 73 years old, Kahn still was carrying a full schedule of practice and teaching as if in mid-career.

Kahn was brought to the United States in 1905, became a citizen, and in 1924 received his bachelor's in architecture from the University of Pennsylvania, where he taught since 1956. In Philadelphia he worked with architects Paul Cret, George Howe, and Oskar Stonorov, and from 1935 had his own practice although he did not complete his first major building, the Yale University Art Gallery, until 1954. As a member of the U. of Pa. faculty, and before that as a design critic at Yale, his influence on emerging graduates shaped the look of architecture for the following two decades.

He was an author and contributed to magazines and journals the substance of his deeply metaphysical philosophy of design. Among his major works are the Salk Institute of Biological Studies, La Jolla, Calif. (1959), dormitories for Bryn Mawr College (1960), the First Unitarian Church addition, Rochester, N.Y. (1969), and the Kimbell Museum of Art, Forth Worth, Tex. (1972). Kahn received the American Institute of Architects' Gold Medal in 1971, the highest award in the United States that can be bestowed in the profession.

In December Kahn was elected to the American Academy of Arts and Letters, a select group of individuals cited for achievement and drawn from membership in the National Institute of Arts and Letters to which Kahn was elected 10 years ago. He was to have been inducted into the Academy at ceremonies in New York on May 22. The exhibition of his work will be held as planned starting May 22 at the Academy's gallery, Audubon Terrace between 155 and 156 Sts., New York, and will continue for a month.

Architectural Forum suspended

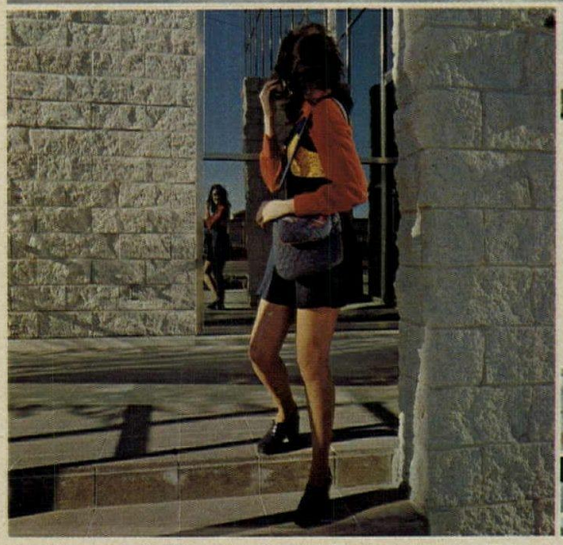
On March 22, Billboard Publications announced the end of publication for the 82-year-old *Architectural Forum,* certain assets of which were to be purchased by Informat Publishing Corp., owners of *Architecture Plus.*

For readers of the *Forum,* the simple effect will be that their subscriptions will be fulfilled with copies of *Plus.* Most readers, however, will recall the *Forum* somewhat wistfully, as an inspiring resource at some stage in their professional lives. More complex reactions of nostalgia and relief will be felt by the many writers and architects who have worked on the *Forum* staff—including the editors of both *Progressive Architecture* and *AIA Journal,* as well as the editor of *Plus* and most of his staff.

The *Forum* has "died" before, in 1964, when Time, Inc. suspended its publication. Since its revival in 1965, ownership has changed hands several times. [JMD]

INSULATIO
SEE THROUG

Minnesota residence. Architect: Martin F. Gould, Duluth



The Silver State Building, Las Vegas, Nev. Architect: Leo F. Borns. Owner: Disposal Investments, Inc.

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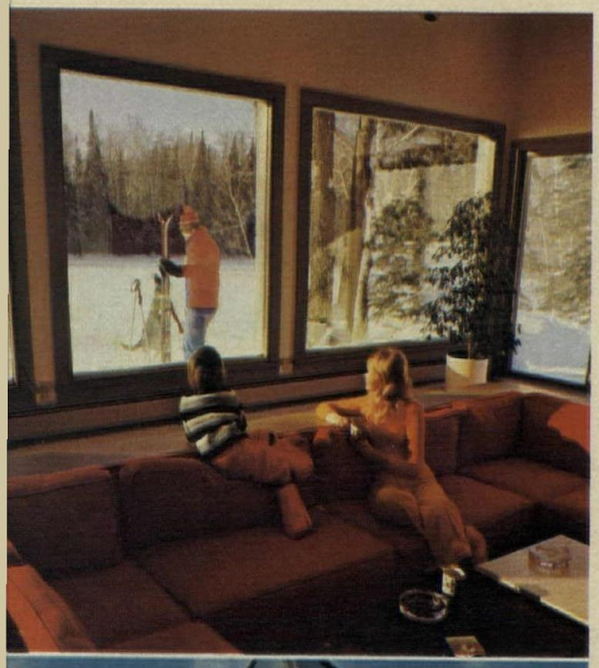

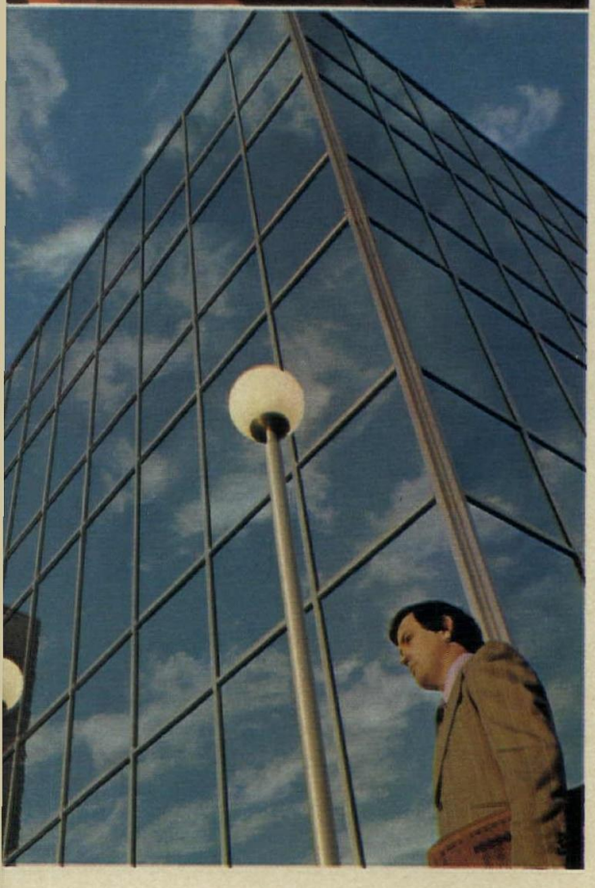

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In the Las Vegas building, reduction of cooling load is the most impressive energy and dollar savings story, though Thermopane units have reduced baseboard heating requirements in winter months. Peak solar radiation was reduced by 264,000 Btu's per hour. This reduction of solar heat gain by silvery-coated Vari-Tran effected an initial savings of $28,600 in construction costs because of a twenty-two-ton reduction in air-conditioning needs compared to ¼"-tinted glass. It also made possible continuing savings in lower electrical costs for operation.

And in both cases, the unobstructed view and the natural light available were bonuses that continue to pay dividends.

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Architecture west

Environmental action, already big in the Northwest particularly, has begun to hit the region's cities full force. Among the special bits of good news come two big successes in recapturing downtown riverfronts for people. Spokane has ripped out two railroads which for generations had walled off and made invisible the magnificent gorge and waterfall that run right through downtown. In Portland that long awaited event has begun: the State Highway Commission itself jackhammering the riverside expressway into oblivion!

As long ago as 1913 the Olmsted Brothers went to Spokane, Wash. to make a plan for parks and urban beautification. Number one, they recommended opening up the gorge to make a park downtown. "Nothing is so firmly impressed on the mind of the visitor to Spokane," they reported, "as the great gorge into which the river falls near the center of the city. It is a tremendous feature of the landscape and one which is rarer in a large city than river, lake, bay or mountain." Even then it was walled by buildings and railroads. The Olmsteds lamented, "How much better it would have been if the gorge had been reserved from commercial development."

Lament no more. Spokane, in a wave of civic enthusiasm, has begun the great works necessary to recapture the gorge as a pleasure garden just a lunchtime stroll from all the downtown offices. Like Seattle in 1962, and San Antonio in 1968, this city turned to World's Fair building to generate the charisma necessary for this important transformation. It worked. Already they have dislodged the railroads and turned the gorge back to the people.

Right now the vista is open but access is not. Fair building has turned the area into a giant construction yard. Expo '74 opens May 4, and after it closes Nov. 3 the temporary structures come down and the permanent park goes in. Spokane architect Tom Atkinson planned the fair with Trogden-Smith-Grossman, also a local firm, as associates. The "residual use"—in the planner's unhappy language—should follow a set of exciting concepts and designs by Portland and landscape architect Bob Perron. Both fair and park promise a lot. For now, hats off to Spokane and the many people, leaders, laymen, and architects who did it.

Portland, Ore. at this stage, has only just taken the first baby steps toward tearing out Harbor Drive expressway. Never fear, everyone there says the decision is irrevocable. The State Highway Commission and Commissioner Glen Jackson took the lead in it. Bridge ramp rerouting has started. It is but a matter of time before a new park embellishes the riverside here, too.

The demise of Harbor Drive signals an explosion of civic energy concerned with downtown Portland. Several major building projects, the rehabilitation of the Skidmore Fountain-Old Town district, and a fancy one-way pair of landscaped transit malls suggest the range of action underway.

Most interesting, though, because it is so unusual, is Portland's transportation plan which was derived from Oregon's Clean Air Act. It puts the full force of state government behind tough development control. It raises the possibility of halting large office buildings, for instance, unless they sit on established transit corridors. (To approve major employment centers not served by transit in the central district would encourage additional automobile commuting, thus generating more air pollution.) Altogether, the public has a powerful new kit of tools to coordinate and harmonize downtown building.

Expo '74 replaces railyards and opens view of gorge

This planning got its first test last summer at the unveiling of the new Wolff-Zimmer-Gunsul-Frasca-designed, three-block Portland General Electric project. The project consisted of a tower office block, a lower service building block, and an "open block" with pedestrian and community facilities. Controversy evolved over the location and height of the tower. The architects, with a lot of heavy arguments and analysis to back them up, placed it near the river on the edge of the new park that will replace the expressway. The downtown plan said height "should be stepped down from the core to the river." The debate began.

Behind the anti-Portland GE side appeared a latent or unexpressed, but very strong, antidevelopment bias. The argument actually may not concern location and height so much as a grasp-at-any-straw to harrass and hopefully halt development. Since Portland GE is a major Portland utility, and its architects had labored mightily to produce a public-serving design, the project could not be totally stopped. Predictably, the city ended the dispute by forcing a compromise, and urban design consultant Rai Okamoto helped work out an accommodation that moved the tower one block back from Front Street where the architects originally placed it.

Reasonable arguments support both sides of this controversy. The settlement doubtless leaves both sides somewhat bitter. This should not take away from the bigger picture. The land is cleared and ready for excavation this spring. In Portland, as at Spokane, a big chunk of riverfront has come back to people on foot to use in their everyday life. Tidings of similar worthy happenings come from other Pacific Northwest cities. The area bears watching. [Roger Montgomery]

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Life-or-death architecture

April 1974

Guardian, Horyuji Temple, Japan. Photo: J. Dixon

Anyone who turns to architectural journals for pretty pictures and reassurance is not going to like this issue. It is full of sobering photos, demanding charts, and serious text.

We haven't forgotten that the architect has three eternal objectives: Commodity and Delight are our constant concerns (although we frankly don't see much Delight in the arrogant image-making that architecture keeps lapsing into). But, for this month only, we are concentrating strictly on Firmness—on the safety considerations so often jeopardized in the name of those other goals—or for that overriding goal: Budget.

Architects have traditionally viewed building codes as cruel restrictions and fire marshals as spoil-sports. Many a grand scheme for a Piranesian interior—with mysterious level-to-level penetrations—has had to be cluttered with wired-glass barriers and structural bracing. Paul Rudolph's spatial concept for the Yale Art and Architecture building was partially thwarted by the fire laws, but those required barriers must be credited for limiting the disastrous fire there to a couple of floors. We can be sure, in the wake of recent fires, that John Portman's soaring hotel interiors are getting ruthless scrutiny by building officials, and we can only hope that no unimagined threat is being overlooked. (The resurgence of covered courts and gallerias is one of the most promising current trends, and it would be a great loss if some unrecognized hazards discredited them.)

What is needed from architects is an attitude towards life safety that goes beyond checking the design for hazards and making necessary compromises. A positive approach could make life safety one of the generative forces in the design. P/A's cost analyst, Brian Bowen, wrote in the February issue about making *cost* a design tool rather than a mere constraint—about "cost planning" as against mere "cost control." Similarly, planners such as Ian McHarg and architects such as Beverly Willis talk of making *environmental impact* a basis for the design process rather than just a test applied to the solution.

This Life Safety issue is the first in a facing-up-to-reality series scheduled for P/A in 1974. It will be followed in June by a special issue on Environmental Impact—on the relationship of construction to land—and in September by an issue on Material Resources—a stock-taking of physical means at the architect's command. All of these issues will include some serious reading; and other issues will give you more serious reading—even on aesthetics—than you may have learned to expect (taking care never to say in words what can be said more succinctly with graphics or photos). Architecture is a serious profession; our lives depend on it, and so do everyone else's.

John Morris Dixon


H.P.
TEL

Life safety

Architects are not unaware, as we thread our way through the building design process, that our license to practice is required for human life safety. Nor is our mandate limited to structural integrity, although that important aspect is given special emphasis in our training. But what of all the other potentially hazardous situations which arise, despite our good intentions, in and around our buildings? Are they our responsibility? Can we reasonably be expected to counter them all? And what about conflicts, such as those Oscar Newman pointed out in his book *Defensible Space* (Newman, Oscar, Macmillan, 1971 and P/A, Oct. 1971)? If fire codes require stair configurations that present security problems, must we opt for *either* fire *or* crime protection, sacrificing one for the other? If we choose to cover all eventualities, who will pay the price? Some of these questions already have answers, some evoke several distinct points of view, and some, alas, require more study.

P/A recognizes that fire, crime, accidents, and earthquakes are the cause of ever-greater attention to being focused on hazard-preventive design. The answers are not all here, nor are all of the viewpoints. Perhaps, after reflecting on the examples and ideas that follow, after hearing all of the nuances of opinion that surround each subject, we will either flock to follow Max O. Urbahn Associates' example (p. 68), or give up and go fishing. But life safety is *our* responsibility, and we may not have the luxury of deciding whether or not it becomes an everyday consideration in the architect's work. The alternatives are disastrous, in terms of human lives or happiness or both.

Fire

Although not the top hazard numerically, probably the most clearly discernible fear experienced by building occupants is that of fire. The National Fire Protection Association (NFPA), the American Society for Testing and Materials (ASTM), and the American Iron and Steel Institute (AISI) have been joined by hundreds of other federal, state, local, and industry groups in the search for fire-preventive procedures. There are some gaps in knowledge and its application, some strong and (sometimes) well-motivated differences of opinion about what works best and, more importantly, a lack of a comprehensive, coordinated, unbiased effort to get all available information together.

For example sprinkler systems, long known for their value at suppressing actual fires, have been incorporated in many codes. As far as it goes, that's great; sprinklers *are* effective in many cases. Now, however, agencies such as HUD require detector-activated door closers in housing (elderly and multi-family) and nursing homes, ensuring both fire compartmentation and smoke safety for those farther away. It has become increasingly clear that smoke and relatively invisible toxic fumes and gasses are responsible for far more serious injuries and deaths than actual flames. Therefore, *fire extinguishing* systems must be joined by devices capable of detecting *life extinguishing* fire by-products. Coupled with alarm notification provisions, detectors and detector/closers are adding sensory input to protect human lives. Other equipment packages, discussed later, allow all of that and more.

Properties of materials have also made news. Questions have been raised concerning possible health hazards of spray-on fireproofing. Misunderstandings and inaccuracies labeled all of the spray-ons dangerous while, in fact, application techniques and available material alternatives went unnoticed. Conversely, building contents have only recently come under scrutiny, and their combustion by-products have become increasing cause for concern. Testing methods are being challenged for either not covering actual fire situations, or for failing to foresee possible combination effects.

Still other deficiencies in building design are pointed out by fire officials. Lt. Edward Le Blanc, Chief of the Bureau of Fire Protection, Shaker Heights [Ohio] Fire Department, is outspoken in his call for clearer appraisals of fire considerations. As he appropriately points out, fire departments must live with design limitations for a building's lifetime. In a recent talk, Le Blanc called for: limitations on fire loading (fuel), either by compartmentation or extinguishing systems, or both; provisions for smoke movement controls; provisions and maintenance of exitways; provisions for systems to control eleva-

tors and mechanical functions; adequate communication provisions for information dissemination; occupant education and leadership; and direct fire department communication. Le Blanc also said that codes do not demand private hydrants, adequate accesses for fire equipment, etc., nor do they consider the support base needed by large aerial ladder trucks for their outriggers.

Security and the machines

Although fire and smoke protection is still an imperfect science, it *has* benefited from being a recognized concern for years. Security design, in many ways as complex, is not yet as mature. Impressive systems for reducing risk in crime-ridden areas have increased man's technological abilities; card-activated entry systems make our locks pickproof; closed circuit TV allows one guard to watch entire complexes; combinations of cards and TV double the security. But, others hastily point out, we may never be assured of security by technical devices alone. We also need a better understanding of social and behavioral reactions which motivate both an intruder and the resident.

Still, technical expertise and industrial response to security/life safety needs have produced some intriguing machinery. Now on the market there are machines that can monitor fire/smoke detectors; if required, they can locate the source. They will pinpoint an attempt by an intruder to enter an unauthorized area, or prevent a fan from distributing smoke. They can override elevator controls, returning cabs to the lobby for firemen, or tell an attendant how many people need evacuation from the fire location, allowing voice communication. The most intricate of systems can do all of these, as well as control normal mechanical functions within a building, thereby saving time, fuel, and finally money.

The new emphasis on life safety is upon us. Intensified efforts to prevent us from hurting ourselves and others are not a fad. Our buildings will be looked upon more and more as a type of product which should perform in a certain way. We are responsible for that product, and will be looked to for the answers. [Jim Murphy]

Programming earthquakes

Henry J. Lagorio and Karl V. Steinbrugge

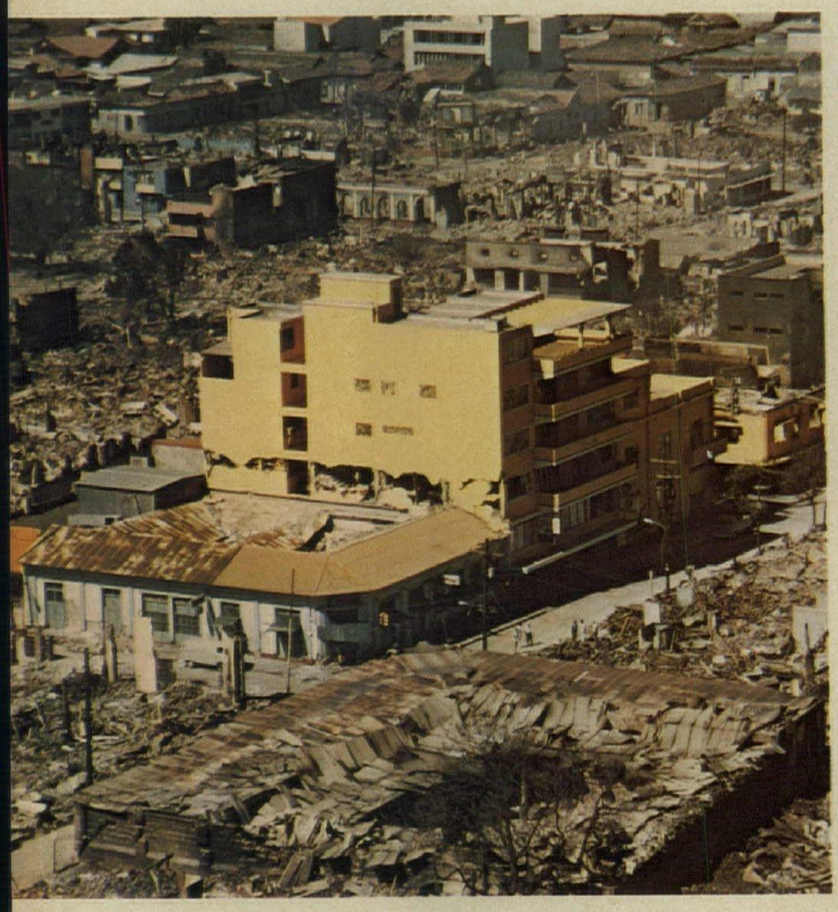
As intensive development increases the potential casualties, earthquake precautions must make finer distinctions between differing local risks and building demands, place more reliance on basic structure than special devices.

California and the West Coast currently face a critical stage in seismic safety planning. As urbanization pressures reach hitherto untouched areas, it is clear that land use decisions as well as design considerations hold fundamental relationships to seismic risks. The 1971 San Fernando, Calif. earthquake and the one in Managua, Nicaragua in 1972 demonstrated the vulnerability of many urban areas and the necessity of new initiatives in structural design and environmental planning.

Pre-earthquake programs intended to restrict hazards are necessary public policies. But these programs do not normally eliminate the hazard.

The most effective hazard-reduction program conceivable would be to avoid building in any area of seismic risk. Generally speaking, this would rule out all of the West Coast and practically all of the nation (fig. 1). The need is apparent for other ways to mitigate earthquake disasters.

Earthquakes are part of California's environment—a threat suffused across the state. Seismic experts reasonably assume that a great earthquake similar to the magnitude 8.3 San Francisco event of 1906 occurs every 50 to 100 years along the major San Andreas fault zone crossing the state. This emphasizes the urgency of significant efforts to reduce hazards



Managua, Nicaragua, 1972: burned out section of downtown area (left), roof elevator penthouse (above), and Banco Centrale exit stair debris (right). Photos: Karl V. Steinbrugge.

San Fernando, California, 1971: Olive View Hospital lost stair tower (top), ambulance structure (above) and columns (below). Photos: Henry J. Lagorio.

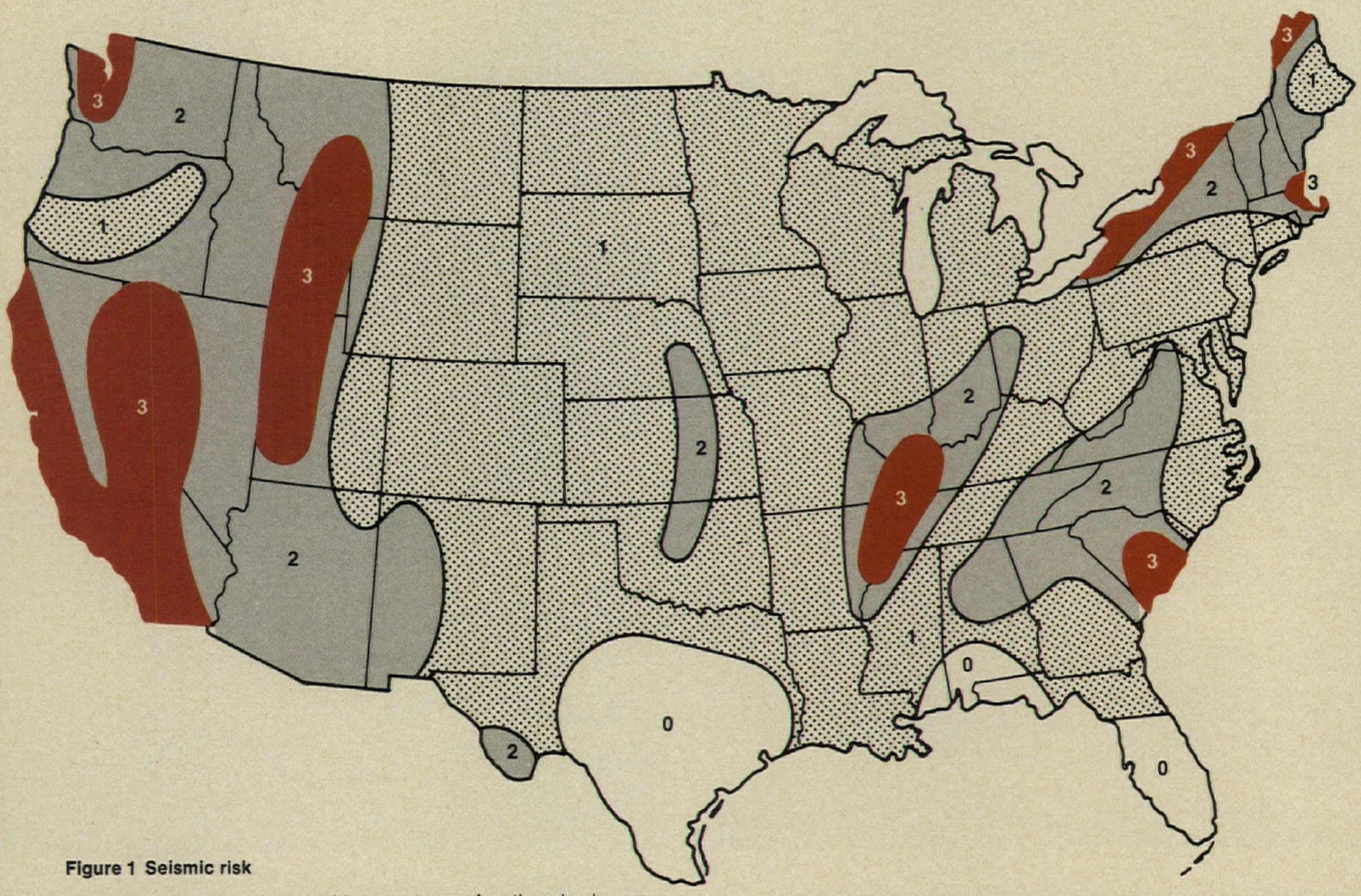


Figure 1 Seismic risk

Zone 0 Areas with no reasonable expectancy of earthquake damage
Zone 1 Expected minor damage
Zone 2 Expected moderate damage
Zone 3 Where major destructive earthquake may occur

Source: National Oceanic & Atmospheric Administration

through design and environmental planning. Currently the scientific and engineering community is making large expenditures of time and money on earthquake research. These relate to: 1) predicting the time, place, and magnitude of single earthquake events, 2) analyzing the dynamic behavior of structures in relation to underlying geological conditions, 3) studying the dynamic behavior of different types of ground, 4) examining the probable impact of fault hazard planning and risk zoning on community development, 5) assessing the psychology of human responses to earthquake disasters, and 6) developing earthquake response planning projects. The following paragraphs present some recent developments on these themes.

With respect to preventive land use planning, there is growing recognition of a complete range of geological hazards rather than a single problem limited to an active fault line. The actual fault break in an earthquake may be confined to a very narrow band. The 1906 San Francisco faulting had the appearance of a restricted furrow as if turned by a plow, although the horizontal fault displacement reached as much as 21 feet longitudinally. On the other hand, the width of the disturbed zone has been known to vary considerably and for certain types of faulting can amount to hundreds of feet, as was the case in the 1971 San Fernando earthquake. The greatest hazard to structures, and therefore lives, comes from ground shaking. This covers a wide area depending on local geological conditions, and endangers many buildings in comparison to the relatively few exposed to direct fault displacement. The intensity of ground shaking produced by an earthquake correlates directly with the underlying geologic conditions. The hazards to which structures are subjected derive directly from the dynamic behavior of the different types of ground on which they are built.

One of these geologic hazards, usually in coastal locations, concerns structurally poor ground areas composed of weak, compressible materials. In such areas earthquakes can result in liquefaction. The effect on structures can be as bad as or worse than direct displacement by a fault. Evidence confirms the fact that the ground motion amplitude becomes substantially greater in structurally poor soils. Accordingly, there is an urgent need for a major revision of both building codes and land use regulation to incorporate recent findings on the direct relationship between dynamic performance of buildings and the specific underlying geologic conditions.

Landsliding forms another major geologic hazard. It can become significant in the event of a major earthquake during or immediately following a period of heavy rainfall. Earthquake-induced landslides are normally independent of other annual landslide problems in time and location and may not be located within the active fault zone.

Land-use planning acts are being expanded to include all such geologic hazards in addition to those related to active fault breaks. The time is short. In California, subdivisions and planned unit developments continue with a moderate amount of overall geologic-seismic control. The recent Alquist-Priolo Geologic Hazards Zones Act in California has resulted in the delineation on preliminary maps of special studies zones for the San Andreas, San Jacinto, Calaveras, and Hayward faults. On December 31, 1973, the law gave cities, counties, affected state agencies, and private citizens 90 days for comment and review of the zones proposed by the State Geologist and the State Mining and Geology Board. Additional zones for other faults in California will be delineated in the future (fig. 2).

Building damage and structural collapse cause the deaths and injuries during an earthquake. Consequently, building codes emphasize life safety, not damage control and maintenance of building functions. Severe earthquake damage that can render the structure useless does not necessarily imply an equivalent hazard to currently life. During the 1964 Alaskan earthquake, major multistory buildings suffered damage ranging up to 40 percent of their replacement value, without accompanying loss of life.

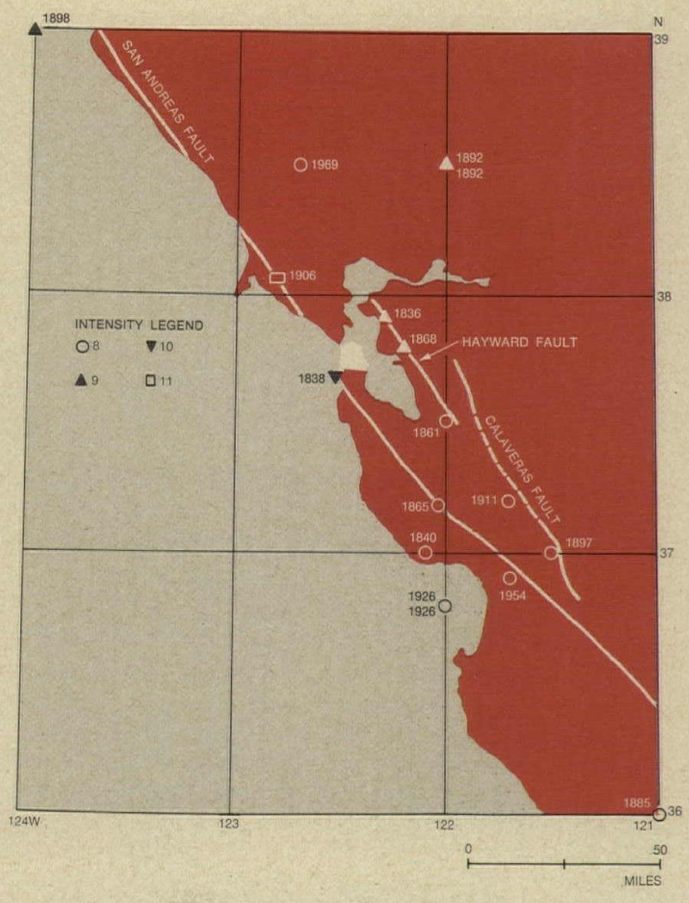


Figure 2: San Francisco Bay Area, showing location of major historical earthquakes

Source: a study of earthquakes losses in the San Francisco bay area, 1972, a report prepared for the Office of Emergency Preparedness.

Functional priorities

Recent legislation passed in California now requires functions of buildings to be taken into account. As a result of the lessons learned from the San Fernando earthquake, in which several medical facilities were rendered useless and vacated—becoming liabilities rather than maintaining emergency service—the new law requires that hospitals, including all their life-support systems, remain functional after a disaster. (p. 63) This is a significant departure from the pre-San Fernando point of view and is exerting a strong influence on new hospital design. The Managua earthquake destroyed or rendered useless all the hospitals in the city, thus confirming the importance of such legislation. In California, similar laws are being considered for other emergency service structures such as police stations, fire stations, emergency communications facilities—vital public buildings whose functioning is considered indispensible in rescue and recovery efforts. Such required earthquake resistance should have a powerful effect on building form.

The potential for earthquake disasters has increased tremendously since the 1906 San Francisco earthquake, which resulted in over 700 deaths. Two recently completed vulnerability analyses and studies of potential losses by the Federal Disaster Assistance Administration and the National Oceanic and Atmospheric Administration indicate that a major earthquake in the San Francisco Bay Area could cause more than 10,000 deaths, over 40,000 injuries, and several billion dollars in damage. A similar event in the Los Angeles Basin could result in over 20,700 deaths, with over 82,000 injuries. Both of these figures exclude deaths and injuries from dam failure during the event of earthquakes.

Yet, increased earthquake safety, which would radically cut these predicted losses, can be attained with today's technologies at relatively low cost in contrast to the total budgeted for construction. Table 1 lists estimated increased costs to provide adequate earthquake resistance in buildings. These costs are obviously not excessive. Rather than "safety at any cost" the question is what level of "unacceptable risk" will those in design and policy-making roles wish to assume? What level will the public accept? Clearly, seismic risk can be viewed from different standpoints, with quite diverse results.

The relative damage level experienced by a building during an earthquake is a direct function of 1) the earthquake resistance of its materials of construction, and 2) its architectural

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Table 1

Estimated increased costs to provide earthquake resistance in buildings

Prepared by the Structural Engineers Association of California

Building type \ Area (zone)	Areas where earthquake regulations are now enforced	Areas which now enforce design for hurricane, cyclone, tornado or abnormally high winds	Other areas to meet zone 3 requirements	Other areas located in zones 0, 1 & 2 to bring up to 2 requirements as a minimum
1 & 2 story wood frame	0	1/2%	2%	1%
1, 2, 3 story brick or conc. block	0	4%	8%	4%
4 story & up brick or conc. block	0	5%	10%	5%
Concrete	0	2%	5%	2%
Steel frame	0	1/2%	3%	1%

1 Zones are those shown in Figure 1.
2 Percent increase includes design, inspection, and construction cost.
3 Table assumes:
A Basic design requirements of the Uniform Building Code (or equivalent) for wind forces as recognized and enforced at present in the area where the building is located.
B Includes extra architect and engineer design and inspection costs.
C Compared construction is of same quality, construction material, and fire resistance.
Source: *Task Force on Earthquake Hazard Reduction*, 1970, Office of Science and Technology, Executive Office of the President.

design. Experience has determined that some building types are more susceptible to damage than others. Table 2 indicates the relative damageability of a select listing of structural systems with different types of materials of construction not specifically designed for earthquake resistance. The reliable designer in areas where no earthquake codes exist must be cognizant of such damage scales in order to act responsibly in his decision-making role.

The overall architectural concept has a direct input in structural hazard mitigation. Certain fundamentals hold just as true in designing earthquake-resistant structures as for designing all functional objects. The final concept must be a logical articulation of all design components as a total system with complete continuity of structure, rather than an assembly of unconnected parts. Inherently, its system should resist lateral forces. Complexly shaped building volumes, reverse pendulum effects produced by placing heavy or overhanging loads at the upper stories, structural discontinuity, drastic changes in the system's rigidity or flexibility all make the problem of reducing seismic risks more difficult.

Methods used in the production process are just as critical. The construction details developed by the architect to connect the building components must relate to feasible work tasks in fabricating and assembling the building. Impossible work tasks which look good on paper only produce weak connections. The lateral forces generated by an earthquake quickly put such weaknesses to the test.

One of the most perplexing challenges in earthquake safety occurs in high-rise buildings. Although outright structural collapse will be rare, damage to exterior veneers and other cladding materials is expected to be spectacular due to the inherent flexibility produced by the height-to-width ratios of such buildings. Deaths and injuries on adjacent streets from falling cladding and debris may be more severe than life loss in the buildings. Approximately 350 such buildings exist in the San Francisco Bay Area alone, and another 370 in the greater Los Angeles area. Many of them are apartment house complexes occupied by large numbers of people for 24 hours a

day, seven days a week, representing a high exposure risk. Many types of multistory buildings have yet to be tested under severe earthquake conditions. Experience data are lacking. But studies made after recent moderate earthquakes indicate that the buildings would be virtually impossible to evacuate in anticipation of fire in their lower stories. Most elevators will be out of commission: after the San Fernando earthquake, 90 percent of the elevators in the entire Los Angeles Basin were inoperable. Exit ways could be blocked with fallen debris and emergency exits shattered and rendered impassable (p. 63). Usually under such severe conditions the utilities are also out. A fire can reasonably start in the mechanical room on the 20th floor of an average high-rise building due to damaged equipment. With all the normal and mechanical circulation systems rendered inoperable or impassable, and mobile fire-fighting equipment seldom able to reach above the 75-foot level, the occupants of the upper stories would be at the mercy of the fire (p. 62).

It will be interesting to see the results of research-related steps now being taken. How, for example, will California's Alquist-Priolo Geologic Hazards Zones Act influence land values in affected areas? What will happen to the tax base of the cities and counties involved? What will be the reaction of the public or the individual who holds land in the defined hazards zone? To take another example: the next 5 to 10 years will see earthquake prediction methodology developed to a sophisticated level, yet no one knows how the public will respond psychologically when predictions give the time and place of a major event. Do public officials order the evacuation of an entire city of 400,000 population? Will the individual respond and leave his home, or will he insist on remaining behind to protect his property? It will take an interdisciplinary effort of all concerned professions to solve all these problems. □

Table 2

Hazard comparison of non-earthquake-resistive buildings

Note: This table is intended for buildings not containing earthquake bracing, and in general, is applicable to most older construction. Unfavorable foundation conditions and/or dangerous roof tanks can increase the earthquake hazard greatly.

Simplified description of structural type	Relative damageability (in order of increasing susceptibility to damage)
Small wood-frame structures, i.e., dwellings not over 3000 sq ft, and not over 3 stories.	1
Single or multistory steel-frame buildings with concrete exterior walls, concrete floors, and concrete roof. Moderate wall openings.	1.5
Single or multistory reinforced-concrete buildings with concrete exterior walls, concrete floors, and concrete roof. Moderate wall openings.	2
Large area wood-frame buildings and other wood-frame buildings.	3 to 4
Single or multistory steel-frame buildings with unreinforced masonry exterior wall panels; concrete floors and concrete roof.	4
Single or multistory reinforced-concrete frame buildings with unreinforced masonry exterior wall panels, concrete floors and concrete roof.	5
Reinforced concrete bearing walls with supported floors and roof of any materials (usually wood).	5
Buildings with unreinforced brick masonry having sandlime mortar; and with supported floors and roof of any materials (usually wood).	7 up
Bearing walls of unreinforced adobe, unreinforced hollow concrete block, or unreinforced hollow clay tile.	Collapse hazards in moderate shocks

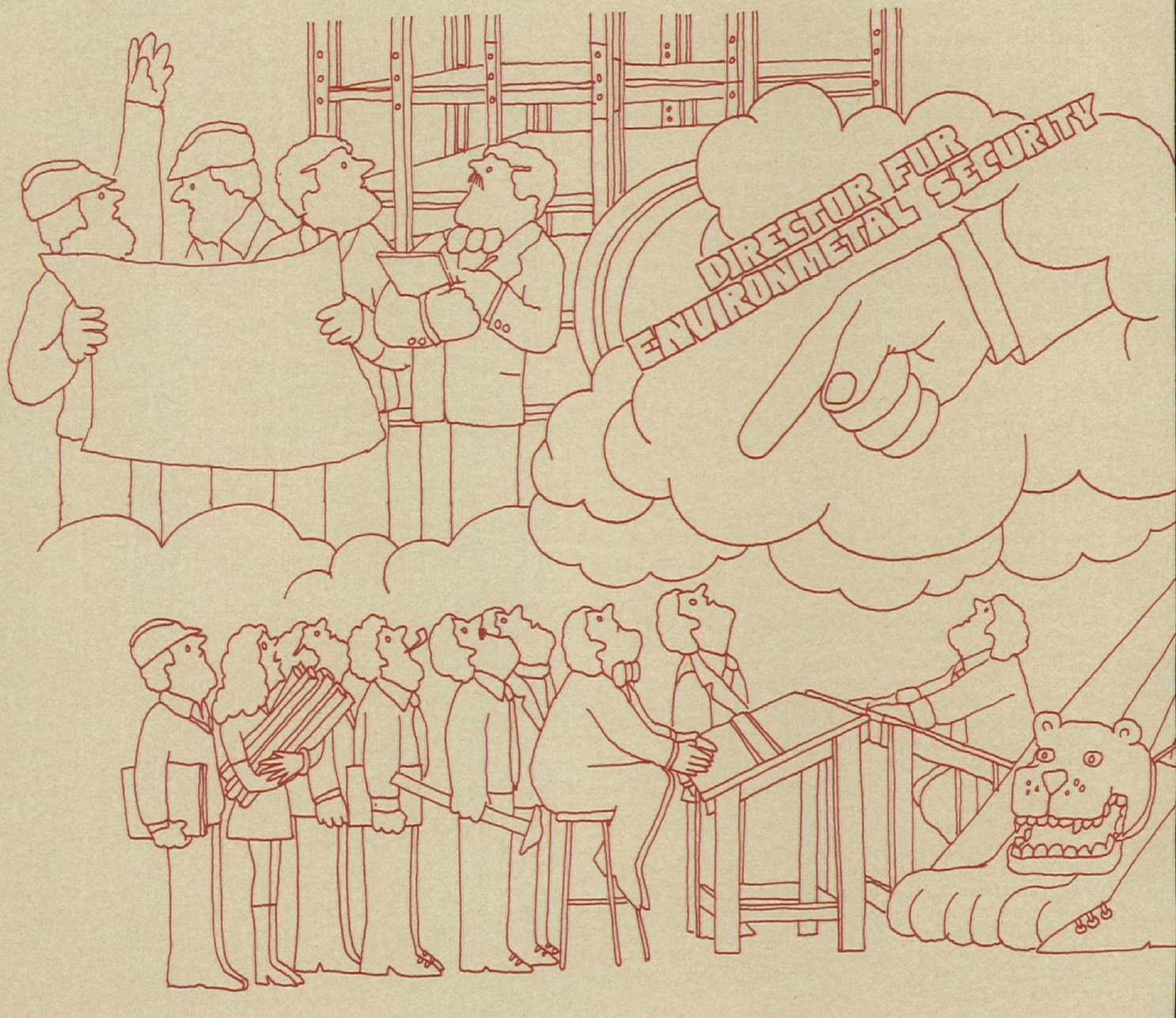
Source: Abridged from Pacific Fire Rating Bureau Tariff Rules.

Selected bibliography

1 *Meeting the Earthquake Challenge,* January 1974, Final Report to the Legislature, State of California, by the Joint Committee on Seismic Safety.
2 *Earthquake Country,* April 1969, Robert Iacopi, Lane Magazine and Book Co.
3 *A Study of Earthquake Losses in The San Francisco Bay Area,* 1972, Report prepared for the Office of Emergency Preparedness, National Oceanic and Atmospheric Administration.
4 *A Study of Earthquake Losses in the Los Angeles, California Area,* 1973, Report prepared for the Federal Disaster Assistance Administration, Department of Housing and Urban Development, National Oceanic and Atmospheric Administration.
5 *Earthquake Hazard in the San Francisco Bay Area: A Continuing Problem in Public Policy,* 1968, Institute of Governmental Studies, University of California, Berkeley.
6 *Earthquake Risk,* October 1970, Interim Report of the Special Subcommittee on the San Fernando Earthquake Study, Joint Committee on Seismic Safety of the California Legislature.
7 *Seismic Hazards of High-Rise Buildings in the Los Angeles Area,* October 1972, Public Hearing by the Joint Committee on Seismic Safety of the California Legislature.
8 *Seismic Hazards of High-Rise Buildings in the Los Angeles Area,* January 1973, Public Hearings by the Joint Committee on Seismic Safety of the California Legislature.

A new face on the team

Philip F. Moyer, PE, AIA



For possibly the first time, an architectural firm has appointed a director of environmental security to marshall the necessary expertise for handling hazards.

Why would an architectural firm appoint a Director for Environmental Security? The answer for our office was to appoint a "specialist generalist" whose job it is to use his talents and the talents of other specialists to help us assure that 1) all projects provide the safest possible environment for occupants and their contents; and 2) all projects have the minimum adverse impact on their environment—be it cityscape or landscape.

We are always trying to improve our ability to funnel all necessary special requirements and information through the architect/planner's mind and onto the paper, adding new staff capabilities as new needs develop or as clients become increasingly concerned with certain kinds of problems. For example, more than a year ago, we added an environmental psychologist to our staff to increase our insight into what pleases and satisfies the occupant of a space—whether it be hospital patient, elementary school student, public housing dweller, or corporate executive.

Now environmental security and environmental impact are ever widening concerns among clients. Mounting vandalism and expanding threats of street crime, civil disobedience, and international terrorism are prompting architectural clients to re-evaluate their risk/loss to value/cost of safety and security in design and planning. Many clients who suffered losses in the street violence of 1967/68 found their losses far exceeded their insurance coverage. They became painfully aware that in the event of massive street violence, firefighting and police protection responses are constrained, and in many instances absent, until the loss has exceeded the limits of normal

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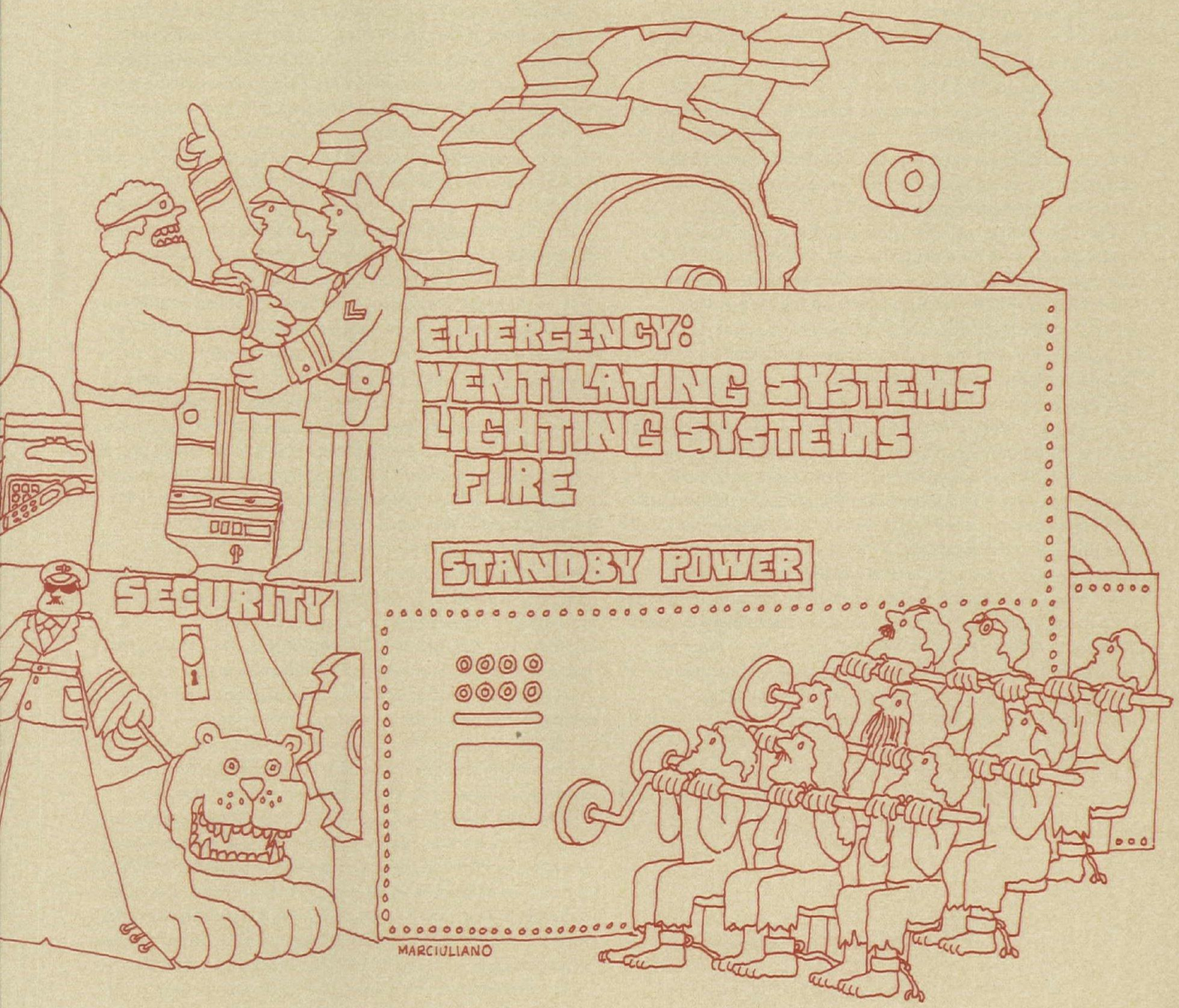


risk/loss protection planning.

Recognizing the need for improved self-protection design often prompts over-reaction. It is well within the technological state-of-the-art to achieve fire safety, and a high degree of self-protection from street crime and civil disorders, without sacrificing aesthetic values. "Fortress" designs are neither necessary nor desirable. What is needed is application of the most sophisticated analysis of each individual project to provide owners and occupants with the optimum security solution for their circumstances.

For some time, an idea had been developing in our firm that we should add to our knowledge of security measures against crime and vandalism in our projects. The idea grew as we traveled the nation and witnessed everywhere not only the costs of crime and vandalism, but also the costs of security systems—many hastily created and ill-planned—to prevent or decrease crime and vandalism.

It was obvious to us that, unfortunately, too many buildings designed before the problems of crime and vandalism grew to their present dimensions (and, sadly, many designed since) were out of step with their security systems. In addition, we could see the quality of the environment slipping another notch or two as public buildings locked their monumental entrances and cordoned off their grand staircases; at our air terminals travelers said goodbye to their families and waited in long lines for security checks that were never envisioned when the terminals were designed.

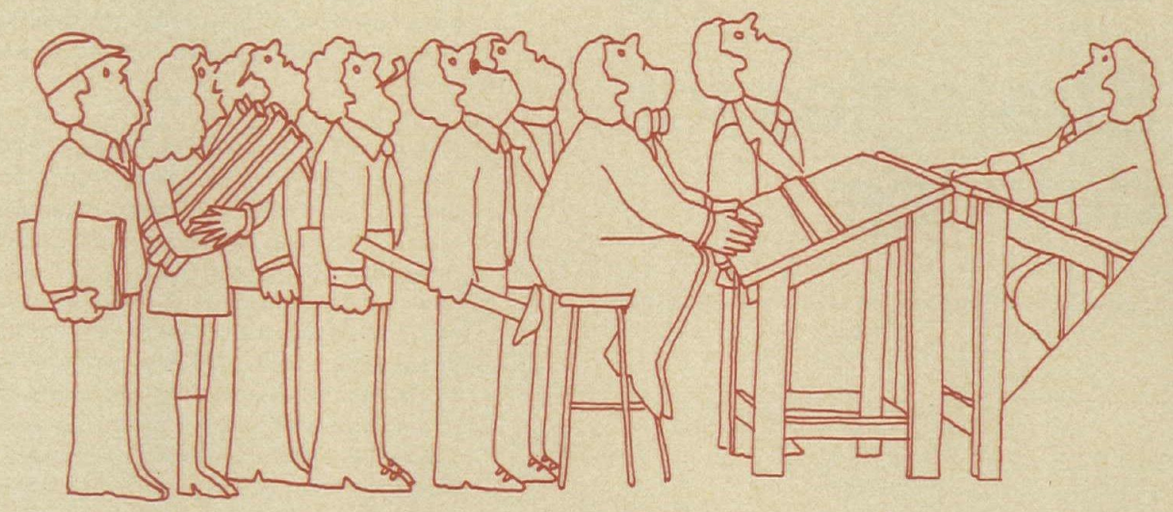
Life was relatively simple when a single special consultant could be retained for a single special problem, even such a complex one as an energy conservation study or a still more complicated environmental impact statement. But now, the need for anticipating as well as solving a whole family of special problems—security against crime, vandalism, and pilferage; fire prevention and fire safety; the security of the handicapped, the young, the old, etc., etc.—is everywhere on every project. Meanwhile, the public is not only quick to point out the shortcomings of architects and planners in these areas, but also equally quick to demand more and more legislative acts, laws, and codes to be complied with as new problems arise or old problems proliferate. Our own planners and designers could not become expert in all the varied disciplines involved nor take the time to keep up with all the related new products and systems available. So, as our concern with these problems deepened, we launched a low-key talent search for a staff specialist. Low-key, because at that time, our budget simply could not justify a full-time specialist in the limited area of security against crime and vandalism.

Although we were still on the horns of the budget dilemma,

problems of safety, energy shortages, manpower, reliability, and the like were mushrooming. Our idea matured; our new "specialist generalist" could be a master checker, throughout the design process, of the whole range of special problems that might pose threats to occupant or content safety in a building, or might make the building an ecological hazard to its surroundings. In an office of our size, this would be a full-time job; we ended our search with a full-time Director of Environmental Security, Ralph H. Murphy, knowing that we had a qualified specialist to provide immediate responses in disciplines where the type and quality of consulting services to the architect can vary widely. (Mr. Murphy is an electronics engineer with 20 years of technical experience and operational background in analysis of environmental security systems and the hardware that makes them work—or not work.)

Now that we have our full-time Director of Environmental Security, we are experiencing additional benefits, some anticipated and some not. We have greatly strengthened our capabilities for planning certain types of facilities with tight security requirements throughout, such as correctional facilities, banks, post offices, and governmental facilities. We had not entirely foreseen our improved insight into safety and security for office buildings, office and industrial parks, hotels and motels, institutional facilities and grounds, shopping centers and stores, and small business concerns which are so often victims of street crimes due to their public accessibility. This knowledge and understanding brought us to a professional appreciation of valid building security codes. Such codes have already been adopted in Oakland, Calif., and Montgomery County, Md. The National Bureau of Standards is conducting an investigation looking into establishment of basic requirements for building security codes; and in Switzerland, a national code has already been adopted.

We did not realize how much this new capability would also spur our firm's determination to investigate the functions of all facility elements and the materials of which they are made—doors, windows, stairs, elevators, lighting systems, etc.—not their traditional functions, but their performance in situations where the safety or security of the tenants and/or the facility is threatened. The questions are familiar to all architects, but we find it very convenient to have an assigned responsibility for asking them throughout the design process. Would escape from the building be blocked or limited by inoperable windows so designed (in either size or style) that

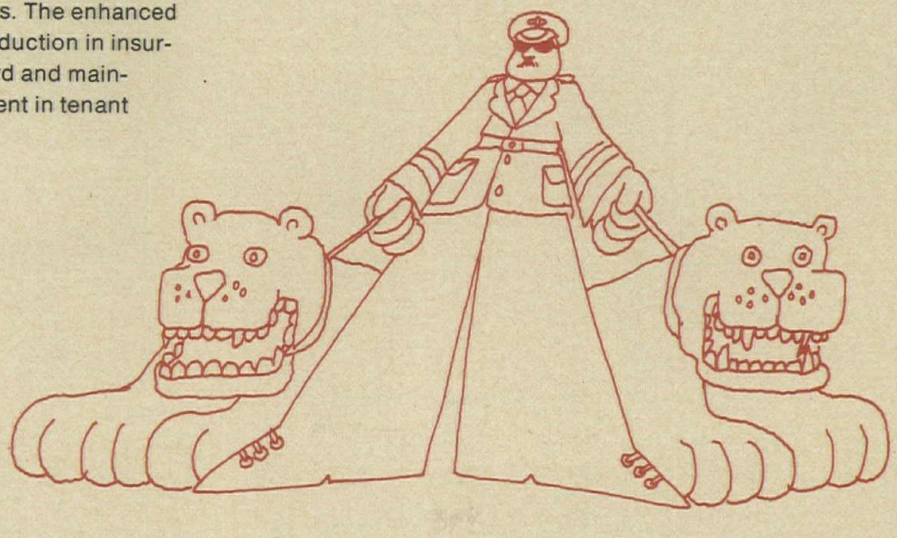


only an athlete could get through them? In these days of energy crisis, how would the building operate if its ventilating system—or its lighting system—failed? In case of fire, what happens to the elevators, whether people are in them or not? What provisions should there be for emergency lighting or standby power? Is the lighting system so inflexible that a whole floor must be lighted for a lone night worker? Must a whole building be alerted for security? We are discovering new things each day about all kinds of products and are strengthening an attitude our firm has always tried to develop: that "it ain't necessarily so."

One role of our Director of Environmental Security that has worked out exactly as planned is his responsibility, from the beginning of design, to see that the project meets all of the known requirements, acts, and codes for every aspect of environmental security. Where other disciplines are involved, he is responsible for marshalling those disciplines for the checking process.

Another unanticipated benefit is our capability to undertake expert planning surveys and subsequently upgrade the environmental security systems in existing buildings and facilities: So far as we know, few architects have tackled those problems until now; that reason, coupled with the architect's instinct to concentrate on aesthetic and human values, is why we're still only contemplating crossing the threshold of that market.

The integrated design approach to environmental security will achieve a considerable savings for the client/owner when viewed in terms of life cycle operational costs. The enhanced self-protective concepts should provide a reduction in insurance rates, a reduction of manpower in guard and maintenance forces, and a substantial improvement in tenant safety and the security of facilities. □



Strategies for defense

Ovadia Salama in collaboration with Alexander Tzonis

Ways of reducing crime and increasing security in high-rise housing are receiving appropriate attention. Taking earlier studies into other use areas will require a framework.

In order to build upon the seminal work of Oscar Newman (Newman, O., *Defensible Space,* Macmillan, New York, 1972 and P/A, Oct. 1972, p. 92), the authors have developed a framework for generating crime-reducing design features in a variety of environments. Our approach uses the potential for generalization and for cross-environmental transfer of Newman's findings in the area of public housing. The result of our investigations will enable us to delineate, for each of the four environments of concern—private residences, schools, transportation systems, and commercial areas:

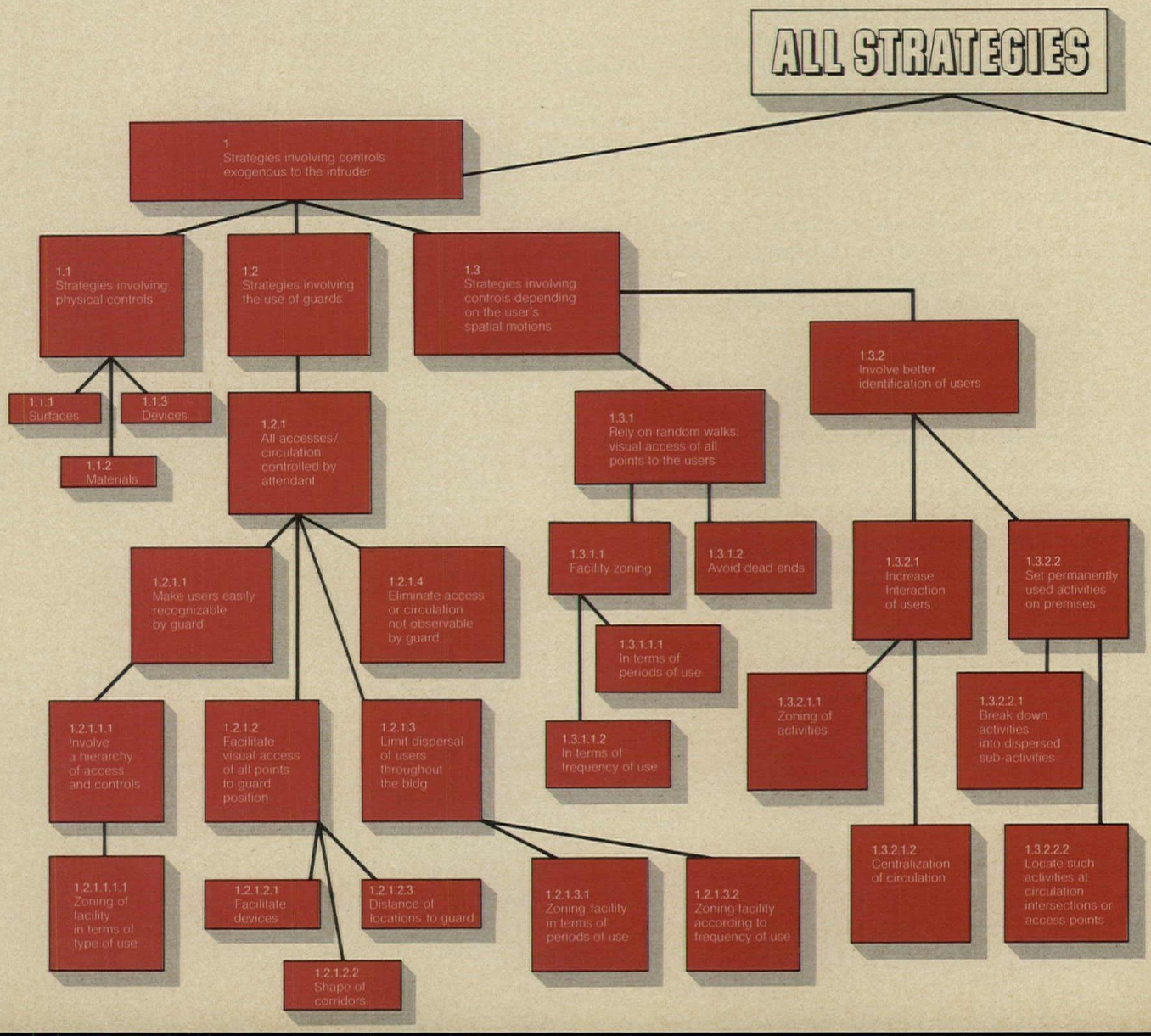
Which environmental functional characteristics are associated with crime occurrence or nonoccurrence;

Which functional characteristics are to be included in, or excluded from, successful designs; and

What specific physical features these functional characteristics suggest as programmatic components in the design of experimental projects.

Our approach is outlined in the light of three general examples drawn from Newman's experience. The general concepts underlying these examples are stated, using his empirical evidence and theoretical approach as guides to our analysis.

This enables us to outline a systematic framework of logi-



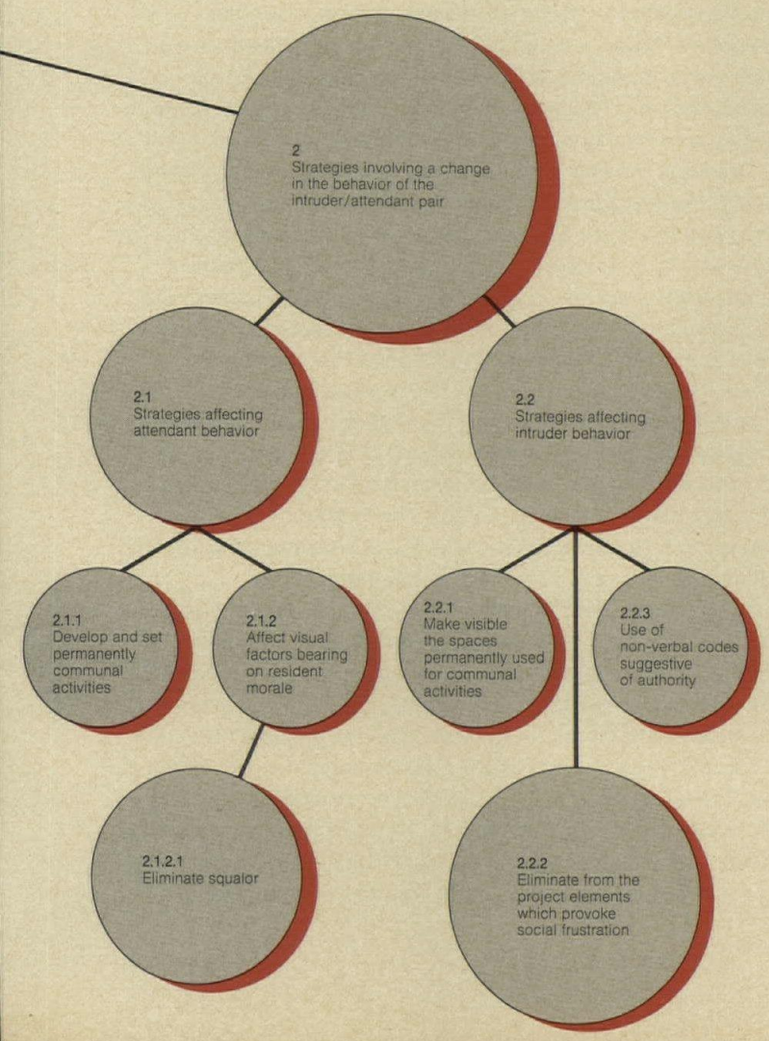
cally interrelated concepts, describing generic environmental design conditions that impede crime. The framework takes a "tree" structure form including alternative strategies for making the environment more defensible. It will then be possible to show how the three examples from Newman's book fit into this structure and how they represent particular cases of fecund generic conceptual approaches. In the near future, we plan to infer from these generic concepts specific design consequences which can be tested in experimental projects.

In analyzing Newman's suggestions we must first illustrate the distinction introduced above between functional characteristics and design features. For example, if "restrict access to the building through the roof" is the functional characteristic, the associated specific design features include: "eliminate skylights, fortify lock on roof door, install electronically assisted visual and/or auditory surveillance of roof door, post guard on roof, eliminate exterior fire escapes," etc. By functional characteristics, therefore, we mean the functions achieved by the design features as they relate positively or negatively to the criminal activity.

The first example we analyze is the presence of an elevator in the building. Newman points out that this design feature indicates the existence of a circulation channel which offers limited visual access to anyone watching the building and consequently provides good surveillance potential to superintendents. The functional characteristic of interest here is "visual access by supervisor." The presence of an elevator can, however, reflect more general relationships than the specific relationship between the elevator user and the building supervisor. Such relationships (also functional characteristics) pertain to interactions between user and device and can be characterized as direct feelings towards the device. For example, feelings of gratification could result from the user's association of the elevator with technological progress and social improvement: he may feel socially improved since he belongs to the community in which social progress has meaning associated with technological advance. Conversely, feelings of alienation could result if the user associates the mechanical nature of the elevator with his own exclusion from the larger community; it could be seen to emphasize isolation, anomie, and ultimately rejection of the individual from the group. Whether gratification or alienation will result depends on the "many differences in family structure and lifestyles" (Oscar Newman, *Defensible Space,* p. 189) which lead individuals to interpret design features according to their own unique "codes."

High-rise buildings, our second example from Newman's work, can also be viewed in similar light. Currently these buildings can be recommended or rejected on the grounds of their having a fragmented circulation network and multiple accesses, both of which are difficult to supervise. Newman, however, introduces a distinction which goes beyond this level of analysis and states that some factors which make high-rise buildings workable for middle-income housing make them unworkable for low-income housing. The functional characteristic involved here is related to the difficulty (in a low-income housing development) of distinguishing an intruder from a resident. This functional characteristic suggests the possibility of having the building supervision carried out by the community of users itself, and not by a professional who, generally, is not a regular resident. Newman points out that efficient control by the residents is contingent upon social-psychological variables (op. cit., p 193), such as gratification, belongingness, and respect for order. Implementation of design features which reinforce these social-psychological characteristics can deter intruders—and residents—from crime and vandalism.

Let us consider finally the example of setting "play facilities for infants at each floor level of an apartment building." Newman has established that these are desirable features for crime prevention in public housing (op. cit., p. 206). The factors involved here are 1) the increased number of actors in the process of supervising circulation and access, 2) their presence on the premises during work hours, and 3) the increased probability of recognizing intruders resulting from a high level of interaction—and therefore of cognizance—among residents. All of these factors, of course, refer to the control of circulation channels. However, in addition to these factors, play facilities often increase the cohesion of the resi-



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dent group and the individual's sensitivity to the common interests to the group. This reduces the chances of criminal behavior from within the community of residents but, more importantly, it gives the potential intruder an image of cohesion which strongly deters him from selecting this community as a target. At the same time, the residents gain encouragement to act as a group in the face of an intruder.

From the above discussion of some examples drawn from Newman's experience, we can infer that strategies for reducing crime occurrence in public housing projects include one or more of the following functional characteristics: 1) observability of the movements of the individuals, 2) identification of intruders, 3) willingness to act to apprehend the intruder, 4) ability to act to apprehend the intruder, 5) development of an image of community that acts as a deterrent, 6) reduction of provocation, and 7) a reminder of the protective and punitive nature of society.

These functional characteristics can be achieved in various ways by introducing alternative design features. The examples discussed include design features which contribute in varying degrees to the achievement of one or more of these functional characteristics. However, the advantage of introducing the concepts underlying specific design features (as opposed to working directly with the design features themselves) is that they suggest alternative design options and thus are more easily generalized and transferred between the areas of housing, schools, transportation, and commerce.

A procedure for the systematic generation of all relevant functional characteristics involves a feedback process between the literature on environmental design and crime prevention on one hand, and the progressively refined logical classification of the design features of these environments, in terms of the functions they achieve, on the other hand. For example, two broad categories can first be identified among the multiple strategies used for crime reduction through environmental design. These two categories are 1) those actions which are exogenous to the intruder (such as those involving tighter protection of accesses) and 2) those actions which are internal to the intruder, such as those which tend to modify his behavior. The former are effective immediately after they are implemented but present various shortcomings because they may tend to transfer crime to alternative areas, they are not self-enforceable in every case, and they may have negative consequences on other environmental features, particularly on the social-psychological impact of the environment on its habitual users. In contrast, strategies oriented toward modifying the behavior of the intruder have effects that become apparent in the longer term, but these effects are longer lasting, self-enforcing, and have more positive effects on the users' social-psychological climate.

Within the first category (i.e., actions exogenous to the intruder), one can further distinguish controls exerted by professionals who are not residents (or, more generally, users) and those which are exerted by the residents themselves. In the first case, circulation channels, accesses, and egresses are supervised by professionals—guards, superintendents, policemen, doormen, etc.—who are assigned specific locations to control, and who may or may not be assisted by various technological, visual, and auditory surveillance tools. These professionals must be on the premises at a given time or all the time. In the second case, control is provided by residents who are present on the premises at random times, stay on these premises for a short duration, and leave. They may or may not be replaced by other persons coming on the premises for the same or different purposes. In general, these purposes are not primarily related to building supervision. Continuity in the presence of some resident is a random process, as opposed to a deterministic process in the first case.

In the "tree" diagram, the concepts which emerged from the above discussion have been numbered as items 1, 2, 1.1, and 1.2. Then, as examples of the way the procedure can be developed, we have indicated additional branches and blocks. The tree can thus be expanded step by step. Each step of this expansion requires, in addition to systematic reasoning, inputs from architects, planners, and designers as well as from a literature review, along the lines we have followed to analyze the examples from Newman's work. The development of this alternative strategies tree (generic approaches for organizing space to reduce crime incidence) is a fundamental step toward the identification of specific design features. The next steps are to generate classifications of crimes according to type, to the circumstances of their occurrence, to the four environments of interest, and to the places in those environments where the crimes can occur. Then, considering each of these environments in turn, one can match the classification of crimes with the various functional characteristics which are the block entries in our "tree" structure. This matching can lead to the identification of a number of desirable alternative design features in order to prevent crime. The most promising of these features are to be included in trial projects to determine their efficiency.

Controls exerted by professionals differ from residents' influence

We must note here that a given design feature can contribute to the realization of more than one functional characteristic and therefore can be more effective than a design feature which contributes only to a single strategy. The play areas discussed previously exemplify this fact. Furthermore, by using the "tree" structure, it becomes easier to measure interaction effects of the design features recommended. Thus, if feature A is present and increases the security by its contribution say, to strategy 1.1 and if simultaneously B is present and contributes to strategy 1.2, it is possible to identify the joint effect of A and B by looking at the way strategies 1.1 and 1.2 are interrelated in the tree hierarchy. In other words, the combined effect of A and B is estimated by looking at interactions of functional characteristics.

There are two additional types of effects which the tree allows us to isolate. First, there can be negative interactions. For example, as discussed above, exogenous controls may have a negative impact on the development of some types of internal controls. Secondly, the existence of some functional characteristics is a prerequisite for the effectiveness of other functional characteristics. The clearest example here is the Kitty Genovese incident that occurred some years ago in New York. In this incident both visual and auditory surveillance of the incident occurred, but there was not, tragically, enough

sense of community to motivate any of the observers to intervene in any way. Thus, those mechanisms which depend on the casual surveillance of user (i.e., those in branch 1.3 of the tree) depend on the development of certain attitude and behavior sets on the part of users (i.e., those in 2.1).

In order to better understand the tree structure, it is necessary to examine how the examples drawn from Newman's work fit in it, and then to show how the tree can be used to generate testable design features.

From our analysis of the effect of an elevator's presence in a building, we concluded that the elevator's negative effect on security stems from the fact that it creates a channel of circulation which is not visually controlled. The elimination of the elevator falls then under strategy 1.2.1.4. Other effects of the elevator associated with feelings of alienation relate the absence of the elevator to strategy 2.2.2. Thus, eliminating an elevator from the program of the building contributes to these two functional characteristics. The presence of an elevator, however, may also have positive impacts according to strategy 2.1.2. In addition, of course, the elimination of elevators may be highly undesirable in view of other design considerations, primarily building height. In the same way, the effects of building high-rise structures can be seen to fall under 1.2.1.4 (accesses and circulations which are numerous with respect to the number of attendants), under 1.2.1.2 (accesses and circulations which are not visually controlled) and under 1.3.1 (accesses and circulations which require "random walk" as a means of supervision). Finally, the inclusion of play facilities in a building contributes clearly to strategy 1.3.2.2 (setting permanently used activities on premises) to strategy 1.3.1 (use of "random walk" of resident as a means of supervision) and to strategy 2.1.1 (changing the behavior of residents by increasing their cohesion as a group through the development of communal activities).

Let us note that our tree structure allows us to explore several alternative strategies within the same generic group. For example, 1.3.2.2.2 suggests that it may be more effective to locate the play facilities, not on every floor as recommended by Newman, but close to circulation intersections; strategy 1.3.1.2 used in combination with 1.3.2.2.2 suggests that laundry facilities can be placed close to play facilities, so that mothers can watch their children play, while the fact that the children are present and playing deters the intruder. In addition, the juxtaposition of these two activities addresses functional characteristic 2.1.1.

We have mentioned that the value of the functional characteristics isolated to build our tree structure lies in the fact that they are potentially easy to generalize and transfer to and among environments such as schools, transportation systems, commercial centers, and private residences. We shall illustrate this statement by developing examples of physical features which can be associated with strategy 1.3.2.2.2 which consists of setting permanently or frequently used facilities at intersections or access points.

In the case of a school, let us assume that the crimes to be avoided are burglaries during which photographic equipment or typewriters are stolen. Let us further assume that the most frequently used facility is the cafeteria. Application of strategy 1.3.2.2.2 suggests, then, locating the cafeteria close to the intersection of heavily frequented corridors and preferably as close as possible to egress (or access) points. Note, however, that we may choose, due to social-psychological considerations, to employ a functional characteristic very different from 1.3.2.2.2, such as 1.2.1.2, physically controlling all access and egress by attendants. If we assume, however, that the crimes to be avoided are assaults, rather than burglaries, then functional characteristic 1.3.2.2.2 suggests that we seek to prevent the school from being deserted during part of the day by calling for activities on its premises which will take place when children are away. Such activities can be community meetings, family movies, continuing education, etc. The presence of such activities can be made possible if the school facilities are adaptable. Hence, a variety of physical features are required which can be specified.

In the case of transportation systems, strategy 1.3.2.2.2 would suggest setting newsstands (or other similar, busy activites operating most of the day) at various locations in the corridors of a subway station. When considering commercial centers, we may find that drugstores are the best facilities for locations close to entrances, with visual access to parking lots and/or storage areas, where most crimes take place. Drugstores indeed remain open longer hours than other shops and usually sustain a high degree of activity. (Of course, anonymous crowds of users may not tend to discourage crime the way groups of users identified with the environment would and thus, by considering functional characteristics in branch 2.1 we may not choose 1.3.2.2.2).

Finally, private residences offer a more complex situation where privacy, status, and comfort requirements conflict with such crime preventing strategy as 1.3.2.2.2. Nevertheless, this functional chracteristic has possible applications here, too. It suggests considering the street itself as "the most frequented" place of activity. Using this concept, we find that maximum security might be achieved by removing all landscaping from the street (if it restricts visibility) and by shaping the lots so that they present shorter fronts and more depth than normal. This tends to intensify the use of the street in a sense that the number of doors per linear foot is greater. Visual access is thus heightened, as is the probability of having neighbors coming in and out, using the street, and identifying intruders. (Naturally, this trades off with functional characteristics that help the user identify with his space and set up symbolic barriers; it is, however, an alternative that should at least be considered in the context of its virtues and liabilities.)

In general, since there is a continuum of the concept of privacy from private residences to schools, to commercial areas, to transportation systems, each functional characteristic, such as 1.3.2.2.2, which relates to user surveillance (and, desirably, the possibility of intervention) must be examined closely before transfer is attempted. And in those cases where such functional characteristics *are* transferable, the design features appropriate for implementing them may be very different for different environments.

Although the above illustrations are not suggested security features, they point out the method's potential. When this procedure is actually put to use by a team of architects, planners, and engineers, it will generate creative solutions in a systematic way more effectively than by trial and error. □

Anonymous crowds of users may not discourage crime as would the residents of the environment

The hidden epidemic

Michael Brill, Bonnie See, and Terry Collison

This century has seen great reductions in impairment and death from disease, but those consequences have been essentially unchanged for accidents in the home.

Accidents are our hidden epidemic. Each year 12 million accidents, severe enough to restrict activity or require medical attention, including some 28,000 deaths, occur in the home. The direct cost to society in wages lost, medical care, and overhead on insurance is $1.7 billion each year; additional indirect costs include welfare, hospital construction, etc. Further, there is the enormous pain and the psychic costs to victims which we do not measure or include (although criminal negligence juries seem always to consider them).

Who are the victims?

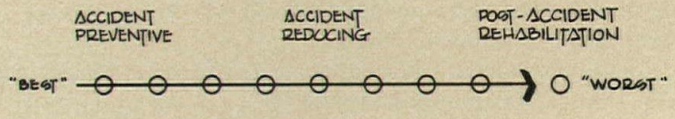
There are many different kinds of accidents. Some of them happen to everybody and some of them involve predominantly certain groups. Men have more accidents in the basement and yard. More women than men are involved in kitchen accidents and more children than adults are accidentally poisoned in the bathroom. The very young and the elderly have far more than their share of all accidents, especially very severe ones. It is also interesting to note that they are the groups who historically have gotten least attention as clients in the design of housing. Although the statistical picture is not always clear, the frequency of accidents seems to have nothing to do with housing quality or condition nor with density or the quality of housekeeping. Home accidents are phenomena seemingly without socio-economic bias.

Why such a problem today?

We believe that the home accident rate is linked to two things: the rapid rate of change in the diffusion of technology (in the form of products for the home) and the emerging patterns of home-use by the family. This deserves some elaboration. On the one hand, we are increasing the number of demands on our homes through multimedia home entertainment "centers" and communications devices, hobbies, increased availability of consumer goods, and more leisure time. Yet the number of rooms or total amount of house space per person has not increased. This leads to what psychologists call "activity crowding." Further, more and more time is spent outside the house by all family members. The new effect is "time-compressed activity crowding." People are engaged in a wider variety of activities in a shorter time period in the same space. Such a state places increased safety burdens on the home and its residents, thereby increasing risk. Housing codes and standards, with their rising quality, seem insensitive to these risk-increasing societal conditions.

What can we do?

Our options are clear for reducing risk. We must 1) remove accident-inducing hazards or 2) make them more recognizable and improve our capacity to recognize and avoid them. As architects and researchers, we feel the best strategy must be the removal/reduction of accident-inducing hazards. Therefore we must treat the human being as essentially "passive" in an accident-risk situation—like the strategy behind the automobile crash air bag. At least drivers' tests certify that drivers have unimpaired faculties under normal conditions. We do not "certify" home-users; children have undeveloped faculties, and many elderly have impaired ones, while the rest of us have faculties which alter in use from day to day. Improving the safety potential of the home environment is the only viable strategy.



A CONTINUUM OF STRATEGIES

What efforts are being made?

In contrast to our public perceptions that "we can do something about" motor vehicle and occupational accidents, there has been an underlying sense that most home accidents just cannot be prevented and therefore it would be fruitless to study them. This attitude, coupled with the fact that resource allocation is often hinged to public outrage at some long-unattended condition, have made home-accident reduction a fairly low priority on the nation's agenda. There is no single focus of responsibility for research, development, and policy planning for reducing home accidents. Responsibility is spread thinly throughout a number of federal agencies, the building industry, and various bodies which set standards and codes. Now, however, there seems to be an emerging multifold trend which is altering the attitudes toward the waste and pain of home accidents.

Toward increased concern

Some of the parallel trends which are moving home accidents into a position of public concern are:

1 A series of legal decisions that have recently increased architects' liability for design responsibility. We can expect this liability to be extended to include home accidents in the

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same way manufacturers' liability for accidents has increased. (The law has established that manufacturers are not only liable for manufacturing defects, but for design defects and poor operating instructions as well, where it can be shown that general knowledge of the problem exists.)

2 "Consumerism" in general has increased public awareness that man-environment system malfunctions are not primarily the fault of the human user, and that much more protective responsibility by designers can and should be designed into the products used.

3 There is an increasing willingness within the federal government to investigate accidents, to set standards for safety, and to regulate their application. The creation of the National Consumer Product Safety Commission in 1972 is emerging as the keystone effort. The Commission sees the house as both a "product" and a collection of products and its accident potential will be a major concern in its work. Its National Electronic Injury Surveillance System (NEISS) is the first operational national accident data gathering mechanism. It is an indictment of our previous level of concern that this data gathering is a "first."

4 The emergence of complex skills teams to deal with complex problems in systematic ways seems to have been successful in enough areas to warrant approaching the complex phenomena of home accidents. Research-oriented architects and engineers, manufacturers, epidemiologists, operations researchers, and human factors engineers are accelerating their research and development on the "safe home." The following is a description of such an effort.

Basic concepts and assumptions

For the past three years, BOSTI has been conducting research to reduce home accidents. This work by a multidisciplinary team is based on the following concepts and assumptions:

1 All accidents can be prevented; the issue is economic rather than technical or metaphysical.

2 Accidents can profitably be analyzed as *systems* of man-environment interactions—as sets of conditions and actions with predictable interactions and results—although in another sense, accidents are manifestations of systems failures.

3 It is possible to *intervene* in those accident systems through the proper design of the environment.

4 Intervention strategies should be stated in *performance terms* so architects, human factors engineers, and manufacturers can use their design skills to the fullest.

5 It is possible to intervene in an accident at a number of points; although an early *preventive* mode is seen as always desirable, it is not always feasible. We presently have somewhat more knowledge about injury-reducing modes.

6 That the most effective intervention strategies are those not depending upon the user's willing choice between al-

Accident environment:	Stairs area	Accidents:	1 Person walking/ moving from level-to-level Slips/trips (falls) over objects left on stairs	2 Person walking/ moving from level-to-level of exterior stairs Slips/trips (falls); slippery walking surface	3 Person walking/ moving from level-to-level of interior stairs Slips/trips (falls); slippery walking surface	4 Person walking/ moving from level-to-level Slips/trips (falls) while wearing slippery or awkward footwear	5 Person walking/ moving from level-to-level Slips/trips (falls) dimensional problems of stairs

Possible intervention strategies:

General:*	Specific: †						
To prevent the initial marshalling of the form of energy	A	No (interior) or (exterior) stairs (single-level construction and flush entrances only)	●	●	●	●	●
	B	Provide mechanical transport from level-to-level	●		●	●	●
	C	Ramps instead of stairs					●
To reduce the amount of energy marshalled (or released)	D	Limit permissible length/height of (interior) and (exterior) stairs	●	●	●	●	●
	E	More frequent landings	●	●	●	●	●
To prevent the release of energy	F	Design houses to minimize level-to-level carrying req'd.					
	G	Warning system to indicate presence of object on stairs	●				
	H	Prevent accumulation of slippery substances on stairs by physical design		●			
	I	Maintenance-free (or reduced) stairs areas					
	J	Alternative means of transporting objects from levels	●				
	K	Built-in or "plug-in" mechanical *aids* to stairs use		●	●		●
	L	Adequate, appropriately located, safe storage space for those things that tend to be stored on stairs	●				
	M	Garbage storage/disposal system as physical part of house	●				
	N	Prevent unsupervised access of children to stairs	●				
	O	Lighting sources reachable from safe position for any needed maintenance, cleaning, etc.					
	P	Human factors specifications for entire stairs-area design		●	●	●	●
	Q	Human services provided as part of housing		●			
	R	Public education campaigns on safe stairs use	●			●	
	S	Product safety legislation		●	●		
	T	Liability legislation fixing responsibility for housing management					
To modify the rate or spatial distribution of release of energy from its source	U	Increase "co-efficient of friction" of tread to slow down skidding or slipping	●	●	●	●	●
	V	Provide handholds easily reached by all users, both while walking up/down stairs & during a fall.	●	●	●	●	●
To separate in space or time the energy being released from the person							
To separate the energy being released by the person by interposition of a material barrier							
To modify the contact surface, subsurface, or basic structure which can be impacted	W	"Soften" all parts of stairs area involved in the interface at the point of energy exchange	●	●	●	●	●
	X	"Cushion" all floor/tread areas with "added" surface	●	●	●	●	●
To strengthen the living structure which might be damaged by the energy transfer	Y	Teach people "how to fall" to reduce injury	●	●	●	●	●

* William Haddon, Jr.

† See preceding page for more detail on specific strategies

The hidden epidemic

ternative actions. The user should be *passive*, since people do not always make right decisions under the stress of an accident. Nor do they necessarily anticipate an accident consequential to some action that in itself is only one element of an accident "system" (which often does not result in an accident), such as leaving objects on stairs.

7 Thus, behavior should be channeled or shaped by design.

At least two of these are uncommon concepts and warrant further explanation.

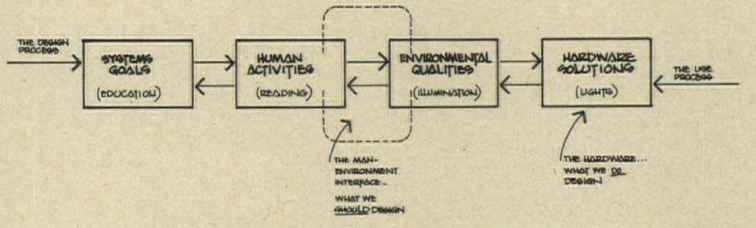
Accident as system. We view an accident as a system which produces an unplanned energy exchange injuring humans. An accident, thought of as a system, has: a) an environment, or a set of boundaries; b) a set of elements (e.g., people, stairs, lights); c) which are in a certain state (e.g., handicapped or healthy, slippery or abrasive, on or off); d) and which interact; e) according to known rules (the laws of physics, biomechanics and others); f) over time (often compressed); g) creating a damaging energy exchange; h) and producing statistically predictable results (injury or death).

The fact that these results (or systems outputs) are unwanted or unplanned does not affect the systems approach to an accident. As a system, an accident has inputs, components, and outputs. Any intervention strategy must be viewed not only in the way it alters one element but also in the way it affects the system as a whole; the solution to one type of accident might be the cause of another. A great deal of the credit for our development and use of this concept is due to the elegant work of William Haddon, Jr., who has formulated 10 hierarchial generic strategies for preventing or reducing the damage. (The reader is referred to "On the Escape of Tigers: An Ecologic Note," by William Haddon, Jr., MIT *Technology Review*, May 1970.)

The performance concept for designing and procuring buildings and building subsystems is fairly well known, but still probably accounts for less than 5 percent of all building

6	7	8	9	10	11	12	13	14	15
rson walking/ oving from vel-to-level ps/trips (falls); or maintenance	Person walking/ moving from level-to-level Slips/trips (falls); inadequate illumination of stairs area	Person walking/ moving from level-to-level Slips/trips (falls); faulty perception of beginning/ ending of, or changes in, stairs	Person walking/ moving from level-to-level Slips/trips (falls); physical infirmity,. disability, fainting, dizziness, muscle failure	Person walking/ moving from level-to-level Slips/trips; is unable to stop fall because of inability to grasp and hold handrail	Person carrying things from level-to-level Slips/trips (falls); inability to see over; changes in body position; attempting to recover loose or falling objects being carried	Person (child) playing on stairs Slips/trips (falls) while crawling, playing, pushing, fighting, etc.	Person Slips/trips (falls) over objects stored on stairs; or while carrying objects to be stored on stairs	Person cleaning stairs Slips/trips (falls) over cleaning objects on stairs	Person cleaning stairs Slips/trips (falls) because of unusual body position req'd.

KEY ● Complete intervention ● Partial intervention



procurement in the United States. Yet, it is an intellectually powerful and useful notion for residential accident prevention. The performance concept is a way of looking at (and even assuring) how systems achieve goals. It describes objectives in terms of the desired performance of the system to be designed, together with criteria and test methods, while permitting the generation of many alternative solutions which yield this performance.

In direct contrast to this, our "normal" specifications often prescribe the materials of which the object is to be made, the dimensions it must have, its finishes and shape, how it shall be installed, and in many cases who shall make it. Human beings want performance, not "things." We want comfortable temperatures. What we specify is boilers, pipes, and radiators, and are surprised when we don't always get comfortable temperatures. In normal use, traditional, or "prescriptive" specifications are a way of assuring that what is procured will be identical to some "model" which has given satisfactory performance in the past. Every conventional material specification is based on an implicit performance specification. Prescriptive specifications are only a convenience. They are also a constraint to innovation, in that only a very narrow range of solutions to any one problem is acceptable at any given time, even though many solutions are available (or could be designed) which would give equal (or better) performance.

Accident environment: stairs

We offer here an example of a partially developed performance statement for the safe design of one aspect of stairs. (It relates to preventing one accident, and needs further experimentation to obtain the measures to complete it.)

The hidden epidemic

Accident: A person, moving from level to level on stairs, slips or trips and falls, and is unable to stop or interrupt fall.

Performance requirement: To enable a person to interrupt a fall (at its onset) through reaching, grasping, and holding a restraint with either hand.

Commentary: In ascending and descending stairs, tripping will tend to pitch the body forward, while slipping tends to pitch the body backward. In either case, injury is often reduced if a restraint is offered to interrupt the fall and regain equilibrium and, more importantly, to prevent a tumble down a flight of stairs. Graphic mapping of falls, and arm positions during them shows that a "normal" handrail is only one of many required positions and further, that its direction is only useful in falls forward while going up. It is very poor in all other cases. The sequence of activities in using a restraint is: *reach* for it, *grab* it, *hold* it, and interrupt the fall.

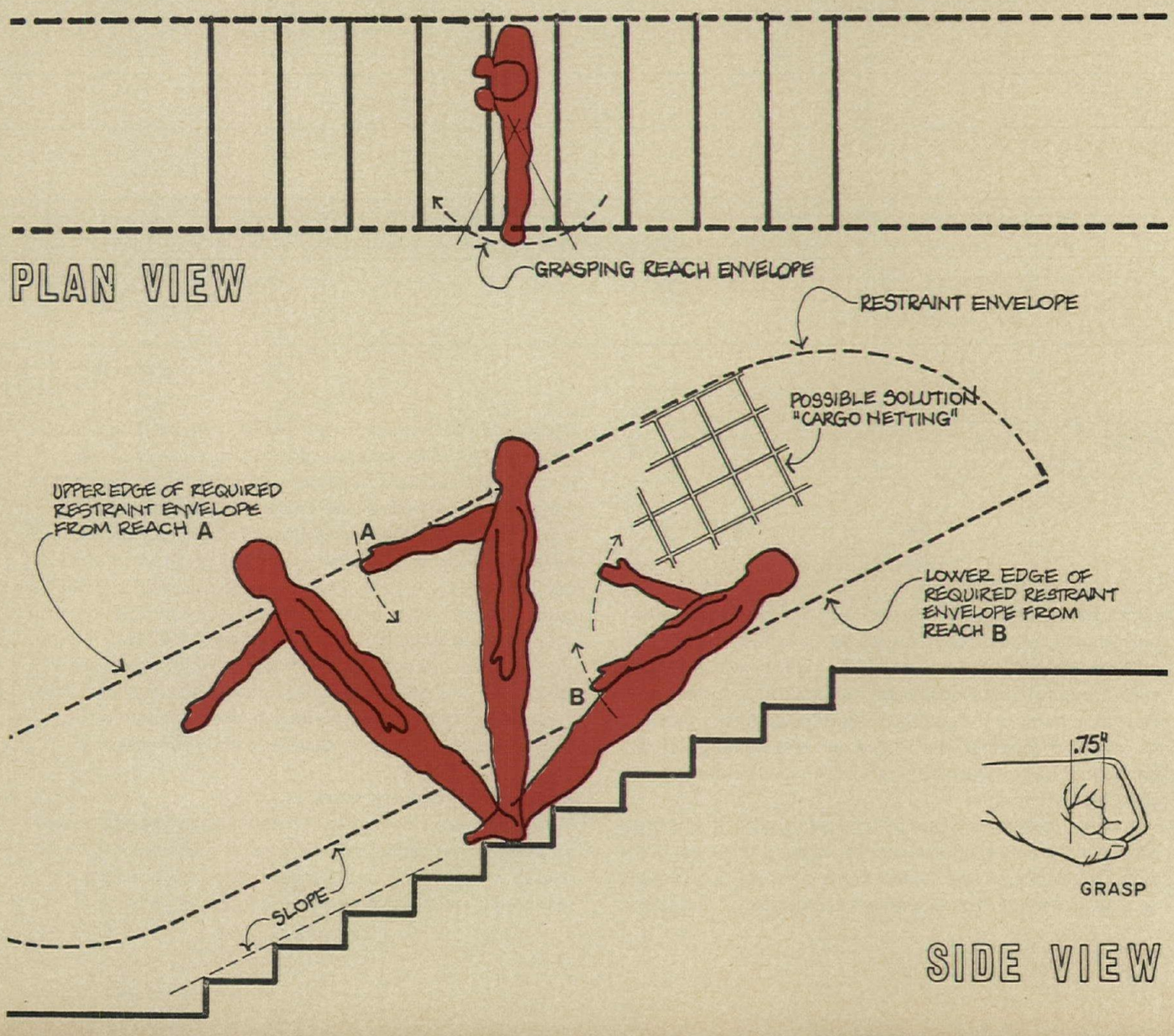
Performance criteria

Reach: A restraint shall be within the "grasping reach envelope" of the lowest 5 percent of the adult population. This implies that the restraint shall be no further than 34 in. from the opposite stair boundary. To include children 10 years and older, this dimension would be 26 in.

Grasp: A restraint shall be graspable by the lowest 5 percent of the adult population. This implies that the graspable element of the restraint shall be approximately ¾ in. diameter.

Hold: a. Where restraints are unyielding, they must resist a maximum horizontal force of (a) and a maximum vertical force of (b). b. Where restraints yield upon being held, they must resist a maximum horizontal force of (a) and a maximum vertical force of (b). c. Where restraints yield upon being held, they are permitted to deform at any rate, but must reach maximum deformation in less than (c) seconds and must aid in the deceleration and recovery of equilibrium of the falling person. d. The surface of the restraint must generate a sliding friction of (d) and be able to generate friction of (e) perpendicular to the restraints axis. e. The surface and the substrate of the restraint must generate no injury potential. f. The frequency of restraint must be at least 50 percent greater than hand insertion dimensions (for the bottom 95 percent of adult population) and more than one restraint must be within the grasping reach envelope at all times. This implies that the space between restraints, horizontally and vertically must be at least 6¾ in. with a probable maximum of 9 in.

Test: 1 Inspection. 2 Inspection. 3 (a) Loading tests; (b) Loading tests; (c) ?; (d) ?; (e) ?; (f) Inspection. (We have not designed the specific design response to this research. However, it would appear that something like cargo netting, held several inches away from the wall and fastened at a series of



points with its bottom at 10 in. and its top at 52 in. might be a useful "first-cut" at a solution. These dimensions are measured perpendicular to the slope of the stairs.)

A multiphase program

BOSTI's research is being done to generate performance-based, accident-reducing physical design of residential components. Full realization of this goal depends upon continued access to the creativity and experience of systems analysts, epidemiologists, human factors engineers, product designers, architects, engineers, manufacturers, and codes and standards setting bodies. To date, two phases of this work have been completed. The first phase, completed in Sept. 1971, was sponsored by the National Bureau of Standards. The second phase, completed in Jan. 1974, was sponsored by the Bureau of Community Environmental Management, U.S. Public Health Service.

Phase I was an epidemiological analysis of home accident statistics in the literature, through which the team classified accidents into discrete types. Phase II developed a number of performance requirements, criteria, and test methods for accident-preventive designs, based on human factors information. Performance statements for safety have been developed for certain accidents occurring in each of five top-priority accident areas: stairs, windows, doors, bathrooms, and kitchens. At the same time, BOSTI has developed and tested a replicable methodology for writing performance statements for safety in residential design, and has defined the next steps needed to advance the procedures to the point where such specifications can be formulated and implemented. An extensive report on this work has been prepared, including detailed analyses of accidents occurring in each of the five areas, and state-of-the-art reports on accident data collection, human factors information, and performance test methods.

A proposal for Phase III, now being evaluated by the National Consumer Product Safety Commission, involves narrowing the focus to develop a complete and precise set of performance guidelines for window environments only, including the necessary task of designing and performing original human factors laboratory experiments. The project would establish a "working group" of window manufacturer trade associations and various codes and standards setting groups to assure industrial feasibility and dissemination. We also envision a Phase IV to attempt to solve some major problems.

Some major unsolved problems

Our own work (and the work of other home accident researchers) has a number of external limitations. As we are in a relatively immature field, this is to be expected, but is a bother nevertheless. Fortunately, we believe all these problems to be solvable in the near future.

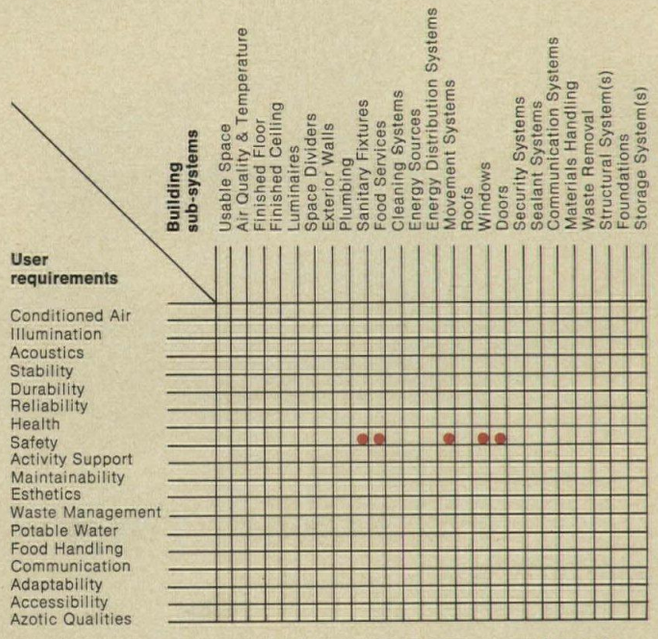
The data base is very poor. Because very few people have been concerned with home accidents, the effort to collect information on "what's really happening out there" has been low-key and fragmented. Until NEISS, the two best data sources have been surveys from California and Michigan, taken 17 and 21 years ago respectively. There has been little "reward" for hospital emergency room people to collect really useful information. To best focus our efforts and resources to prevent accidents, we must know, a) which are most frequent, severe, and costly and b) what really happened in the accident sequence. NEISS, while helpful, is still a very incomplete source of this information.

Previous human factory work is too narrow in focus. The formal study of the man-equipment-environment interface called Human Factors Engineering had its start in Great Britain during World War II. The populations studied most, then and now, are military personnel. The bulk of our information on human performance comes, therefore, from healthy males between 18 and 30 years of age and under certain circumscribed behavioral conditions. There is very little information on the performance capabilities of women, children, and the elderly—groups at great risk in the home environment. Clearly, we must expand the concerns of the human factors field to include these people.

The laboratory can't reproduce certain accidents. An example: 40 percent of all home accident deaths are from falls on floors and on stairs, and is a fatal "disease" of the elderly. We cannot subject people to (perhaps fatal) risk by making them unexpectedly fall in the laboratory, and conversely, if you tell people they are going to fall in an experiment, their behavior is altered and essentially useless in the study of falls. Mental reconstructions of falls with an interviewer are not very successful for many reasons. We can define "slipping" and "tripping" but still have great difficulty in knowing precisely why and how it happens.

Performance-based safety guidelines must be translated into products and used. Research alone can't save lives or reduce injury. Only when the research results are translated into products which home owners safely use can we claim success. A process to do this must be established which involves architects, product designers, and manufacturers, their salesmen, codes and standards bodies, and the continuing concern of government. The economics of safety responsibility and liability must be established and accepted. And the people who live in homes must want to live safely.

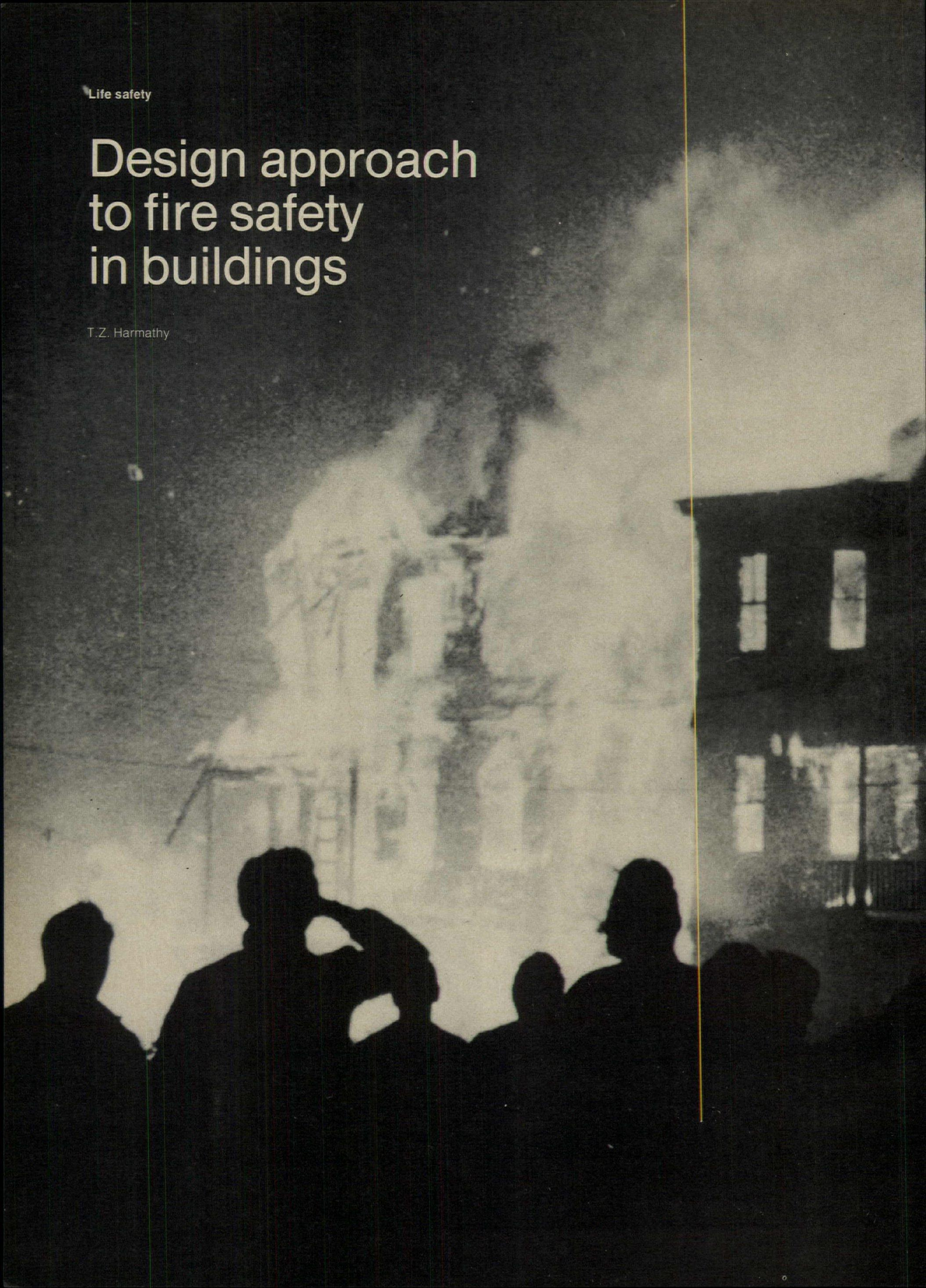
There is no formal learning procedure for accident researchers. There are no university-based programs mandated to educate people in the complexities, challenges, and rewards of creating safe environments. It is hoped that Schools of Architecture, Public Health, Industrial Design, and programs in Human Factors Engineering see this as a field of emerging public concern and as an opportunity to channel the energies of socially concerned and technically competent young people. □

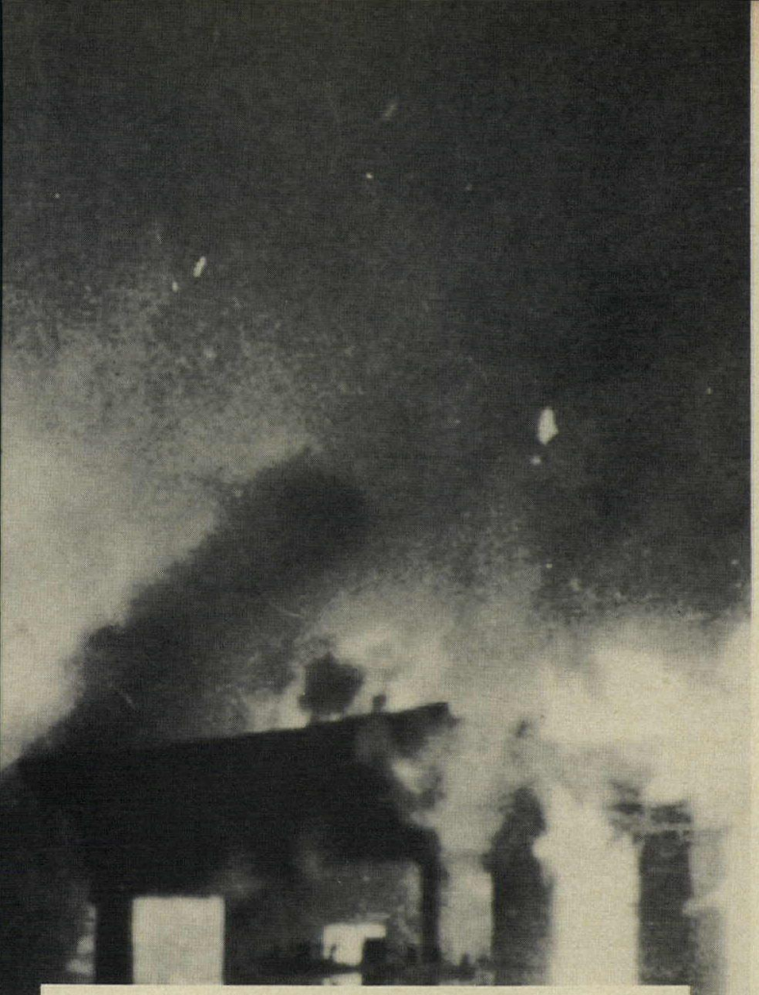


This project's focus within the full spectrum of performance requirements

Design approach to fire safety in buildings

T.Z. Harmathy





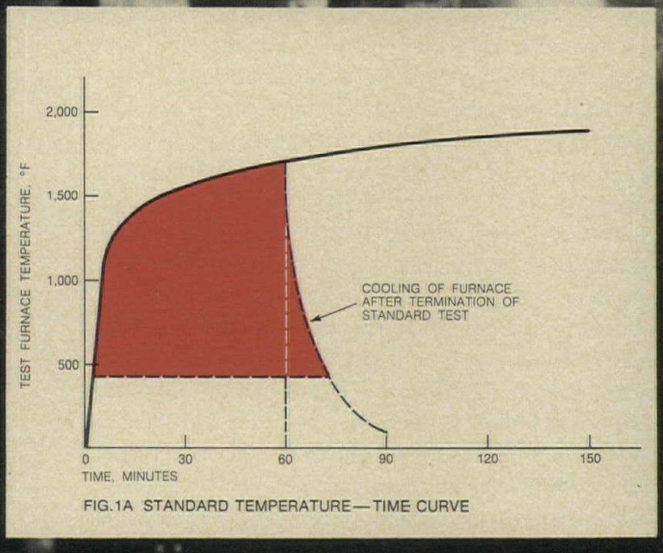


FIG.1A STANDARD TEMPERATURE—TIME CURVE

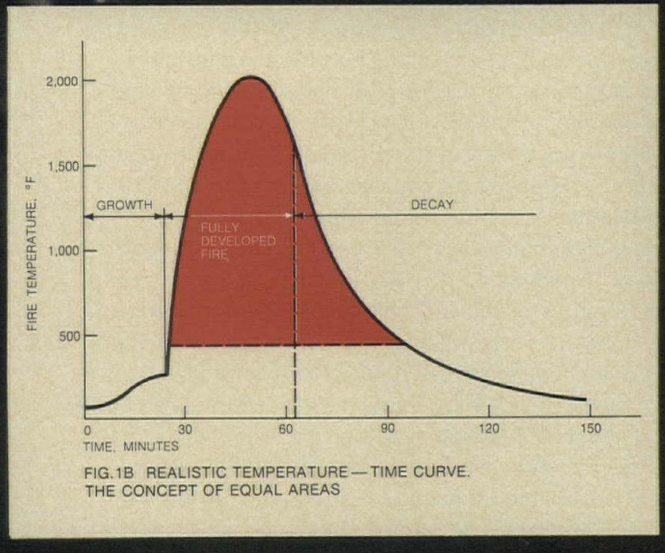


FIG.1B REALISTIC TEMPERATURE—TIME CURVE. THE CONCEPT OF EQUAL AREAS

Fire safety as provided for by present building codes is examined critically and the characteristics of building fires are reviewed. A new design approach is suggested.

In some respects, the process of designing a building for fire safety may be described as faithfully executing code regulations, since the most important aspects of providing fire safety in buildings are governed by strict codes. There are encouraging signs, however, that this situation will change during the coming years and the designer will be free to select the most effective means of coping with the fire problem.

Traditionally, building compartmentation provided functional units or offered occupants some degree of privacy. From the point of view of fire safety, however, compartmentation is regarded as the means for breaking up total building volume into small cells where, with an efficient protection system, fires can be localized and suppressed. To prevent fire from spreading from one compartment to another, various building codes require compartments be made structurally sound enough to withstand a more or less full fire exposure without major damage, and that boundaries be capable of acting as heat conduction barriers. During the past several decades, standard fire tests have been developed to determine whether the structural and boundary elements of the compartment (beams, walls, floor, etc.) fulfill these requirements. In North America ASTM Method E119 specifies the conduct of these tests and the interpretation of the findings.

In a fire test, a representative sample of the compartment element is exposed on one side (walls, floors, ceilings, beams) or on all sides (columns) to the heat of a test furnace. Test conditions are required to follow a temperature-time curve assumed originally to reproduce the temperature history of a fully developed compartment fire (fig. 1a). The length of the element's exposure to the test fire is the period for which "fire endurance rating" (expressed in hours, ¾, 1, 1½, 2 etc.) is desired. Required minimum ratings are specified by the various building codes for identified building types. (Penalties are imposed on buildings having excessively large floor areas or unusual heights.) If the specimen element withstands the simulated fire exposure for ¾, 1, 1½, etc. hours without major structural damage and substantial heat transmission (see ASTM E119–71 for the interpretation of these expressions), it is "rated" as a ¾-, 1-, 1½-hr etc. fire-resistant element. A compartment built entirely of elements with fire endurance ratings (fire ratings, for short) not less than the minimum specified by the building code for the type of building is referred to as a fire-resistant compartment. The essence of the "building code approach" is to rely entirely on the building code specifications to provide fire safety.

Fire load concept

Although the bases on which fire endurance ratings are assigned by the writers of building codes are, by now, not clearly recognizable, the underlying concept unquestionably rests on pioneer work by S.H. Ingberg[1] more than 40 years ago. Ingberg suggested that fire endurance requirements

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should be determined on the basis of potential "fire severity" (to be discussed later). He believed, further, that fire severity is uniquely related to "fire load" (weight of combustible materials per unit floor area) characteristic of the occupancy considered. The expected magnitude of the fire load may be judged from data collected in England a few years ago. The mean fire load in modern office buildings is 4.1 lb/sq ft and in 95 percent of rooms it is less than 12.0 lb/sq ft. (In storage rooms the fire load may be 25 lb/sq ft or higher.[2]) His suggestion was equivalent to advocating that fire endurance requirements be prescribed on the basis of characteristic fire loads.

Ingberg's experiments seemed to indicate that, with fire loads up to 30 lb/sq ft the fire endurance requirement is approximately 0.1 hr for every 1 lb/sq ft fire load. Thus, for a fire load of 7.5 lb/sq ft the required minimum fire endurance would be taken as ¾ hr, that for 20 lb/sq ft as 2 hr, etc. (Fractional fire endurance requirements are always rounded upward to the nearest ¼ hr in practice; for example, the requirement at a fire load of 12.4 lb/sq ft is 1½ hr rather than 1.24 hr.) The concept of the fire load as the only significant factor determining the severity of fire and, in turn, the fire endurance requirement, seems to be founded on two basic premises: 1) that all compartment fires burn at approximately the same rate; 2) that a definite portion of the combustion heat is always absorbed within the compartment by its elements.

The room shown in fig. 2 contained a great deal of combustible material, so that the fire will be very severe. If built according to building code regulations, the elements of the room must therefore have high fire endurance, that is, all load-bearing components must be protected by thick insulating covers. Research during the past 10 to 15 years has shown conclusively that the fire load concept, which still forms the basis of the "building code approach," is inaccurate and may result in both under-protected and grossly over-protected buildings.

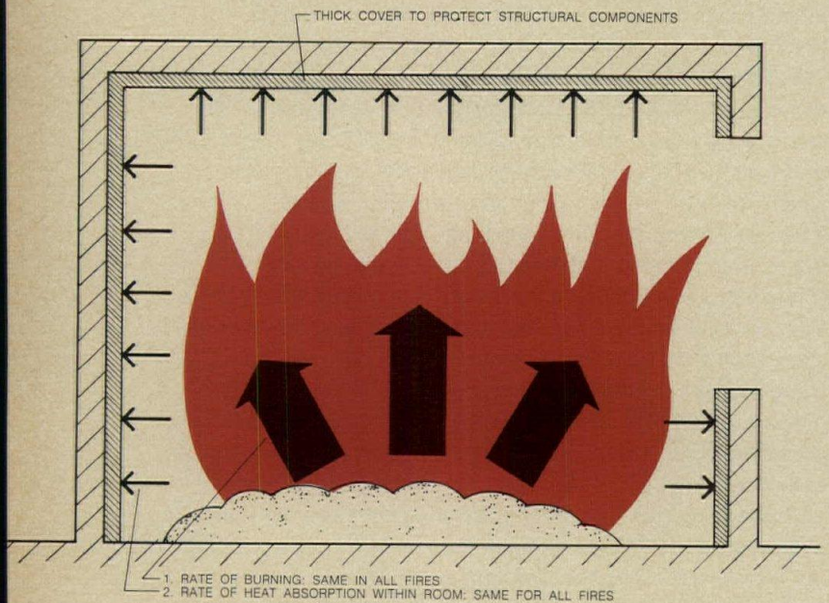


FIG. 2 CONVENTIONAL FIRE PROTECTION PHILOSOPHY

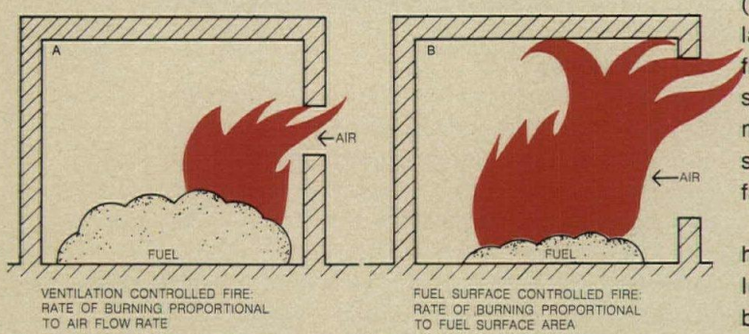


FIG. 3 TWO TYPES OF FIRE FROM THE POINT OF VIEW OF RATE OF BURNING

Characteristics of compartment fires

On the basis of research results from all over the world, the author has recently offered a more realistic picture of the process of compartment burning.[3] Fig. 1b shows a typical temperature-time curve for actual compartment fires that may be divided into three periods: growth, fully developed fire, and decay. The beginning of the period of fully developed fire is readily recognized by a sudden rise of temperature; its end is, by definition,[3] the point at which the fire temperature drops to 80 percent of its maximum value. As the bulk of the fuel (furnishing and other contents) burns away during this period it is the only period that deserves consideration from the point of view of structural fire damage. Contrary to earlier beliefs, the rate of burning in a compartment (during the fully developed period) may vary within very wide limits. Two major factors determine the rate of burning: fire load and ventilation, the latter usually expressed in terms of rate of fresh air flow into a compartment. With natural ventilation the air flow rate, U_a (lb/sec), can be calculated from the equation: $U_a = \frac{1}{15} A_W \sqrt{h}$ where A_W is the total area of windows, in sq ft, and h is the height of windows, in ft.

This equation has been derived on the assumption that all window panes break and fall out at the beginning of the fully developed fire period. Sometimes, especially with double-glazed windows, breakage remains incomplete and the actual air flow may be less, by 30 to 50 percent, than the calculated value. On the other hand, the flow of outside air through the window can be increased or decreased by pressure differences due to building stack effect, depending upon building height and outside temperature. With forced ventilation, the rate of air flow is interpreted as that produced by mechanical means (provided that failure of the mechanical device during the fire is unlikely).

Depending on the relative magnitude of the fire load and on ventilation, two types of conditions may exist in a burning compartment (fig. 3).[4] 1) If the fire load is high and ventilation poor (fig. 3a), the amount of combustible material burning at any one time is controlled by the rate of air flow. As ventilation (window area) increases, combustion extends to larger and larger parts of the fuel and the rate of burning increases. The fire is "ventilation controlled." 2) If the fire load is relatively small and ventilation good (fig. 3b), air entering the room is more than enough to keep all combustible materials burning simultaneously. The rate of burning is controlled by the surface area of the fuel; the fire is "fuel surface controlled."

The fire load concept implies that the same proportion of heat of combustion is always absorbed within a compartment. In reality, two conditions may exist (fig. 4): 1) If the rate of burning is low and the room has a high ceiling (fig. 4a), the combustion process will develop entirely within the compart-

ment and a large portion of the heat of combustion will be absorbed by the various structural and boundary elements of the compartment. 2) If, however, the rate of burning is high and the room has a low ceiling (fig. 4b), flames will issue from the windows and a considerable portion of the fuel energy, sometimes 50 percent or more, will be released outside. Thus the heat flux (amount of heat [in Btus] that passes through a unit area [sq ft] in unit time [hr]) available for the destruction of the structural components of the room becomes less intense.

Concept of equal areas

An essential part of Ingberg's concept[1] was a specific way of defining "fire severity" (destructive potential). Although his second fundamental idea, the assumption of a unique relationship between fire severity and fire load, is not appreciated today, his definition of fire severity (sometimes in slightly modified forms) is still widely used among research workers. Ingberg defined fire severity as the area under the curve of fire temperature (above some reference level, usually 301 or 572F) versus time, for actual compartment fires or standard test fires. This definition implies that long, relatively cool fires and short, intense fires are similar with respect to destructive potential and, therefore, that the requirements for fire endurance of compartment elements should also be similar.

The most attractive feature of this definition is that it is a convenient way of assigning supposedly more realistic fire endurance requirements to elements of any compartment whose expected fire temperature history can be predicted (from experiments) or can be estimated (by heat balance calculations).[3,5,6] This concept of establishing fire endurance requirements may be referred to as the "concept of equal areas." In the illustration of this concept (fig. 1) 437F was selected as the reference level for the calculation of areas (the average of the two values suggested by Ingberg). It may be seen that a 1-hr exposure to a standard fire test will match the severity of the compartment fire shown (fig. 1b) and, therefore, that the elements of this compartment should be of at least 1-hr fire endurance. Because the fire temperature versus time curve faithfully reflects ventilation effects, compartment dimensions, and properties of lining materials (in addition to that of the fire load), replacing the fire load concept by the concept of equal areas in determining fire endurance requirements is undoubtedly a step forward.

Fire severity parameters

Unfortunately, the concept of characterizing fire severity by some area under the fire temperature versus time curve cannot be strictly justified on scientific grounds. In general, temperature plays a more important part in the structural failure of compartment elements than does fire duration. It might be thought that the average temperature of the fire alone would be a better indication of fire severity, but this view also would be incorrect. For example, the temperature climbs higher in a compartment lined with good insulating materials than in one that is not, but the fire damage is lighter; in other words, the fire appears to be less severe.

According to recent studies,[3] there are at least three independent parameters whose values have substantial bearing on expected fire damage (fig. 5): 1) duration of fully developed fire (τ in hrs or min), 2) average fire temperature: average temperature of the gases in the compartment during the fully developed period of fire, T_g (in °F), and 3) "effective" heat flux: average heat flux available for penetration of the elements of the compartment during the fully developed period of fire, $\bar{q}_E$ (in Btu/sq ft hr).

It is no surprise that these parameters depend primarily on fire load and ventilation. Fig. 6 shows the variation of fire duration and average fire temperature with increasing ventilation (increasing window areas) for three different fire loads: 12.4, 6.2 and 3.1 lb/sq ft. This information is related to a room 25′ x 12′ in area, 9′ -5″ high and lined with concrete and vermiculite plaster.[7,8] Arrows indicate the critical air flow at which, with increasing ventilation, the fire ceases to be ventilation controlled and becomes controlled by the surface area of fuel (combustible contents of the room). (Critical air flow can be calculated from the equations presented in Ref. 3. One can assume, as a rough guide, that with natural ventilation fuel-surface-controlled conditions will prevail if the ratio of the total fire load [in lb] to the total window area [in sq ft] is less than about 30 lb/sq ft. See also Ref. 2 and 9.)

As expected, the fire temperature is always higher for higher fire loads. Starting with zero air flow, the fire temperature increases sharply with increasing ventilation (or window area). On reaching a maximum, generally still within the ventilation-controlled regime, it begins to decline owing to the fact that an increasingly larger portion of the burning will occur

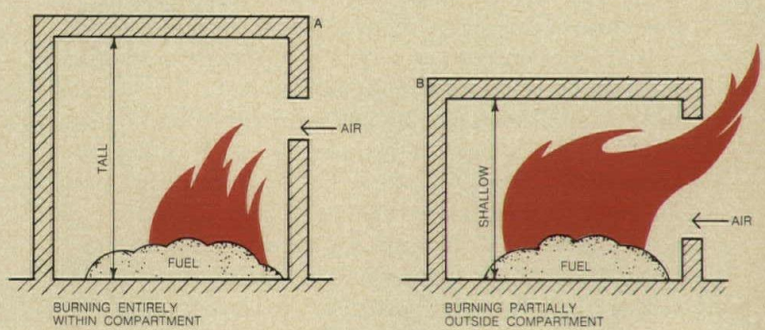


FIG. 4 TWO TYPES OF FIRE FROM THE POINT OF VIEW OF HEAT EVOLUTION WITHIN COMPARTMENT

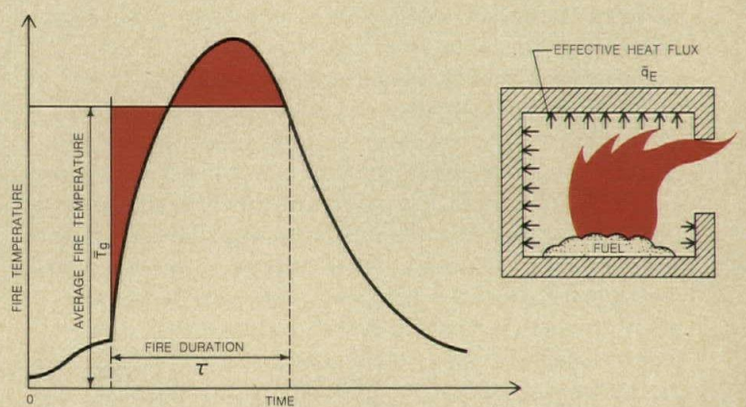


FIG. 5 ILLUSTRATION OF THE MEANING OF THE THREE FIRE SEVERITY PARAMETERS

outside the windows. As the air flow rate increases beyond the critical value, the temperature decreases steadily, because the rate of heat evolution is no longer affected by ventilation. The increasing inflow of cool air produces increasingly lower temperatures. As shown by thin dashed lines (fig. 6), any air flow over 15 lb/sec will keep the average fire temperature below 1000 F (generally accepted as the temperature level detrimental for steel) provided the fire load is not higher than 3 lb/sq ft. It is clear, therefore, that at lower fire loads even unprotected steel can be used safely if window areas are properly sized.

It may be seen that in the ventilation-controlled regime, the duration of the fully developed period of fire depends strongly on fire load and decreases sharply with increasing ventilation. In the fuel-surface-controlled regime, fire duration is very short, typically 20 min, and is independent of fire load. If, however, the fire load is high, it may not be possible to choose sufficiently large window areas to ensure that fuel-surface-controlled conditions prevail with natural ventilation.

Fig. 7 shows the variation of the third fire severity parameter, effective heat flux, with increasing ventilation. Again, the critical air flows are indicated by arrows. From the point of view of intensity of heat penetration into the boundary elements of the compartment, the borderline between ventilation- and fuel-surface-controlled fires seems to represent the most adverse condition.

Engineering design of fire protection

At which stage of design can knowledge about compartment fires be best put to use? In present practice, the provision of fire safety consists of little more than incorporating in the design some building code requirements. The responsibility for this is usually shared by the architect and engineer. There is a trend, however, to give the engineer greater responsibility, at least with respect to the structural fire safety of the building. Many believe that the problem of fire protection of structures should be handled by specially trained engineers. As visualized, the design of building elements for fire resistance by these engineers may consist of three principal stages: 1) calculation of the fire severity parameters for all compartments of the building from information concerning compartment dimensions, lining materials, ventilation, and fire load; (This information can be deduced from the building plans and from statistical data concerning the fire load in various occupancies.) 2) heat flow and stress-strain studies, using the fire severity parameters as input data; 3) decisions concerning the appropriate fire protection.

The advantage of this kind of engineering approach is clear. The engineer is not bound by any preconceived concepts, code regulations, or stereotyped testing requirement and can select the fire protection most suitable under the prevailing circumstances. It is worth noting that the engineering design of fire protection of load-supporting steel components is already an accepted practice in Sweden.[10] The main weakness of the approach is that the engineer commences his study toward the end of the overall design process. The available knowledge of the nature of potential fires could be used more effectively if it were considered from the beginning, during the architectural design. By changing some of the variables under his control, while satisfying the basic practical and aesthetic requirements, the building designer (architect) could drastically reduce the potential severity of building fires and thus could help the engineer save on (or completely dispense with) the costs of fire protection. This is why the author feels that this paper should be addressed to architects rather than to engineers.

Defensive and offensive design approaches

As has been pointed out,[1] the building designer can predetermine the nature of possible fires by proper selection of certain dimensions of the compartment, ventilation, and lining materials. This suggests a new, preventive approach to fire safety, based on decisions made at the architectural stage of the building design. The most important aspect of this approach is as follows: If calculations indicate that window areas can be large enough to ensure fuel-surface-controlled conditions in case of fire, and if such a selection is not objectionable from other points of view, *the designer can ensure that any fire will not last longer than 30 min.* Because, with certain restrictions, any noncombustible building element is capable of yielding at least 30-min fire endurance, it seems logical (as an introductory step) to allow the building designer the freedom to choose certain ventilation requirements instead of fire endurance. This deliberate use of dimensioning to improve fire safety can be called a "defensive" approach. It recognizes that although the building designer cannot prevent the occurrence of fires, he can ensure that fire will not spread to other compartments due to structural failure. He makes certain that any fire will be of short duration and of relatively low temperature, even at the expense of giving up entirely the contents of the fire compartment.

It is clear that this philosophy will not be practical if the contents of a building are of any appreciable value. In such cases an "offensive" design approach is appropriate, characterized by the use of special devices and facilities to detect fire and suppress it at an early stage. Numerous other situations may also rule out the use of the defensive approach. It may interfere with some fundamental requirement concerning the use of the building or it may result in increased energy consumption in certain climates. The defensive design approach to fire safety is only one of many design components the designer can use in producing functional, economical, attractive, and safe buildings.

Correct compartment design

Although the graphs presented in fig. 6 and 7 relate to a specific set of conditions, it is possible to generalize to some extent, to derive "rules" for the correct compartment design. It cannot be emphasized too strongly, however, that these rules are valid only from the point of view of structural fire protection. They may well be overruled by other considerations. The basic rule for designing compartments for minimum structural damage in fire is as follows: provide sufficient ventilation (natural or forced) to ensure that any fire will be fuel-surface-controlled. In this way it will be of short duration and the fire temperature will not rise excessively high.

If unprotected steel is to be used, check (by calculations described in Ref. 3) whether it is possible to provide suffi-

ciently high ventilation to reduce the average fire temperature well below the critical 1000F limit. It is entirely probable that this cannot be done if the fire load is higher than 4 to 5 lb/sq ft. If unprotected steel is used in a compartment, do not use good insulating linings on other components of the compartment. Such linings are bound to raise the fire temperature and thus adversely affect the performance of the load-bearing steel components.

Finally, low ceilings are an effective means of forcing fire to burn outside the compartment. Recognition of this rule may be especially important in storage building design. Naturally, consideration must be given to the possibility of increased danger to the surroundings of the building, and to the danger of flames jumping from floor to floor along the façade.

Summary

It has been pointed out that stereotyped measures for fire safety specified by various building codes are inadequate in that they can result in both under-protected and over-protected buildings. With a better understanding of the characteristic features of compartment fires, the building designer will be in a better position to predetermine the nature of fire and to select the most appropriate way of dealing with it. He can either design compartments for minimum structural damage without the installation of special equipment (defensive approach), or he can provide special equipment for detecting and suppressing the fire (offensive approach). Although the best ways of improving fire safety in buildings depend on the particular circumstances, there are general rules that may help the building designer in his deliberations. It is hoped further work will shed more light on this area, especially on the relative merits of defensive and offensive design approaches.

[This paper is a contribution from the Division of Building Research, National Research Council of Canada, and is published with the approval of the Director of the Division.]

References

1 Ingberg, S.H. Tests of the Severity of Building Fires. Quarterly of NFPA, Vol. 22, 1928, p. 43.

2 Baldwin, R., M. Law, G. Allen, and L.G. Griffiths. Survey of Fire-Loads in Modern Office Buildings—Some Preliminary Results. JFRO, Fire Research Note No. 808, 1970.

3 Harmathy, T.Z. A New Look at Compartment Fires, Parts I, II. Fire Technology, 8 Vol. No. 196, 1972, p. 326.

4 Thomas, P.H., A.J.M. Heselden, and M. Law. Fully Developed Compartment Fires; Two Kinds of Behaviour, JFRO, Fire Research Technical Paper No. 18, 1967.

5 Kawagoe, K. Estimation of Fire Temperature-Time Curve in Rooms. Building Research Institute, Japan, Research Paper No. 29, 1967.

6 Heselden, A.J.M. Parameters Determining the Severity of Fire. Paper 2, Proceedings of a Symposium at Fire Research Station, January 1967, JFRO, 1968, p. 19.

7 Butcher, E.G., T.B. Chitty, and L.A. Ashton. The Temperatures Attained by Steel in Building Fires. JFRO, Fire Research Technical Paper No. 15, 1966.

8 Butcher, E.G., G.K. Bedford, and P.J. Fardell. Further Experiments on Temperatures Reached by Steel in Buildings. Paper I, Proceedings of a Symposium at Fire Research Station, January 1967, JFRO, 1968.

9 Magnusson, S.E., and S. Thelandersson. Comments on Rate of Gas Flow and Rate of Burning for Fires in Enclosures. Lund Institute of Technology, Sweden, August 1971.

10 Pettersson, O., written discussion in "Ignition, Heat Release, and Noncombustibility of Materials," ASTM Spec. Techn. Publ. No. 502, Philadelphia, Pa., 1972, p. 153.

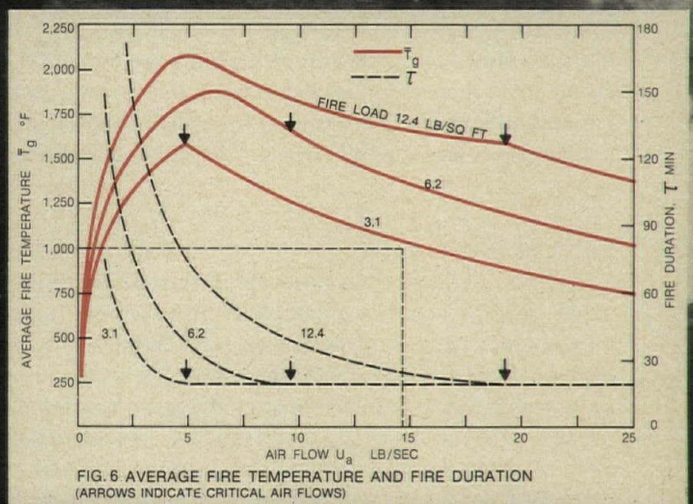


FIG. 6 AVERAGE FIRE TEMPERATURE AND FIRE DURATION
(ARROWS INDICATE CRITICAL AIR FLOWS)

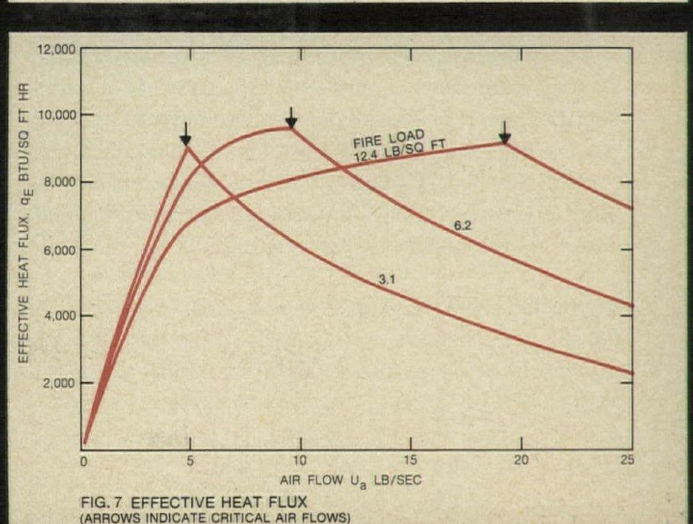
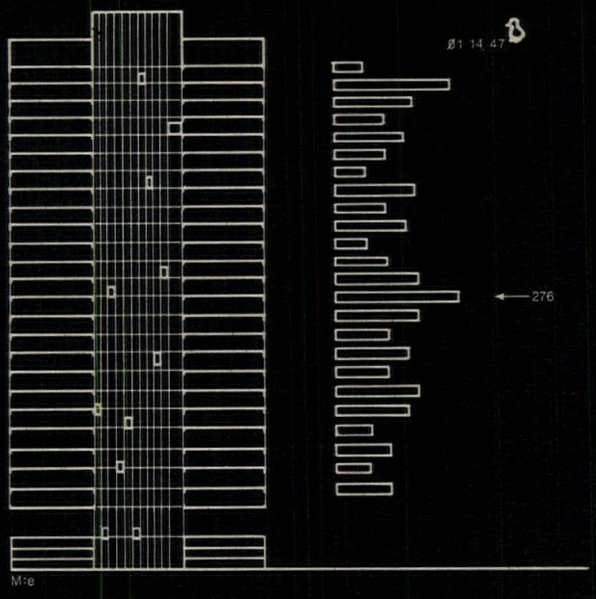


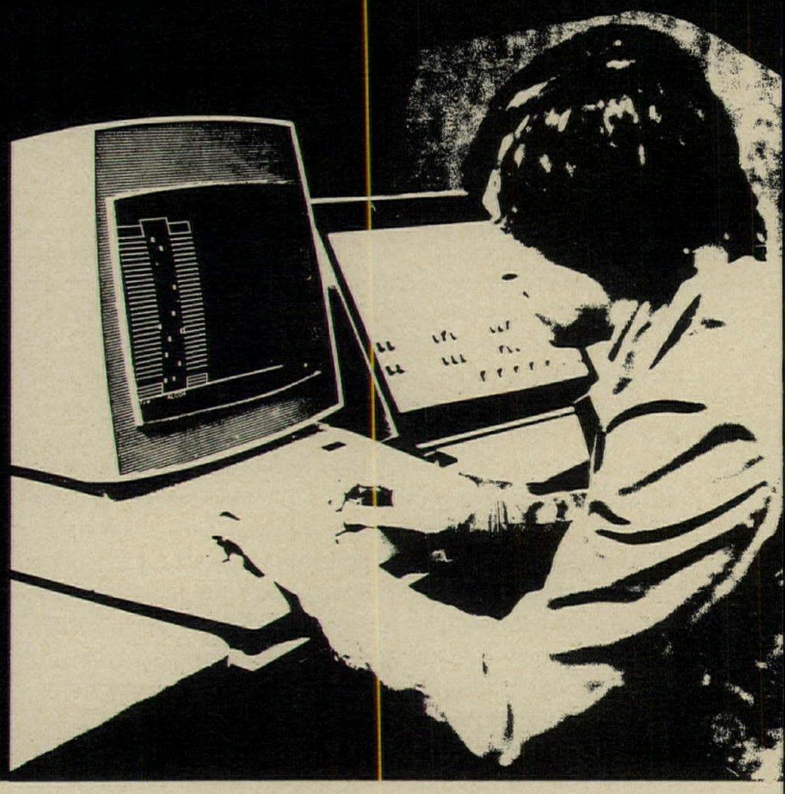
FIG. 7 EFFECTIVE HEAT FLUX
(ARROWS INDICATE CRITICAL AIR FLOWS)

Elevators in evacuating high-rise buildings

Another way out?

by Vladimir Bazjanac





Must the elevator systems on which high-rise buildings depend be no more than potential death traps in fire emergencies? Experiments at the University of California seek to give them a vital role in evacuating people from endangered areas.

Recent fires in high-rise buildings in São Paulo, New Orleans, Tokyo, and elsewhere have repeatedly raised the question of safety for large numbers of people in tall buildings. The common characteristic in all these fires is the failure of the evacuation system to get *everyone* safely away from the danger. In other words, facilities in the building designed as means of escape—stairways, elevators, and ladders—did not accomplish what the occupants of the buildings had expected.

Modern high-rise buildings depend on several means of evacuation, some of which are part of the building itself, others involving help from the outside. It is generally held that, in case of emergency, stairways are the safest of all evacuation facilities and that everybody in an endangered building should use them. Unfortunately, stairways do not work very well for the handicapped and elderly. Since movement is on foot, evacuation is slow and, though designed for safety, stairways are rather conducive to panic.

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Fire department ladders, slides, and similar equipment, are quite effective when the population in danger is very small, but only people who find themselves at the perimeter of the building and within their limited reach can use them. Helicopters are sometimes used in evacuation too; they require a landing surface on the top of the building which must also be reachable to the population inside.

Elevator systems comprise some of the most expensive installations in high-rise buildings, and certainly the single most expensive movement facility. In theory, elevators could provide people in danger with what is missing in stairways: fast, reliable service for *everyone* with little possibility for panic. Yet, under the present codes this expensive equipment is not used when it is most needed!

Critics of the use of elevators in evacuation of high-rise buildings claim that elevators (as presently designed and built) are quite unsafe. They may stop at the wrong floor, they may stop where not desired, doors may open or close at the wrong place and time, cabs may have to pass through a fire zone, etc. Elevator systems are easily crippled and, in the case of power failure, their operating efficiency on emergency power is reduced to an insignificant level. They are designed for average, not critical conditions—to handle peak loads within the normal operation of the building, not the peak loads resulting when *everybody* in the building tries to get out *at the same time.* In the cases of buildings designed with interior cores (for efficiency) the population waiting to board the elevator may be cut off from the perimeter of the building and

thus be out of reach by exterior means.

Current thinking about emergencies in high-rise buildings is rapidly changing from goals of total or partial evacuation (which may take too long or be impossible) to goals of redistribution of the population within the building and away from danger zones. With that in mind, one could provide "refuge areas"—areas within the building which will withstand fire for a length of time and provide safety during the fire.

This "refuge" strategy provides two major challenges in the design and operation of high-rise buildings: a) how to design and build such refuge areas and b) how to get all people in danger to them. Meeting these challenges will mean finding answers to important questions on how long such refuge areas should withstand fire, how large they should be, where in the building they should be dispersed, how to control the movement of the population from the endangered area to refuge areas, how to inform *everyone* where they are, etc.

Priorities of movement

It is very difficult, if not impossible, to control the movement of population in emergencies under current practices, which exclude the use of elevators. Fire escape drills, as important as they appear, have some serious shortcomings: there is always somebody in the building who has not participated in the drills, there is always the possibility of running into an emergency situation which has not been covered in the drills, and most important, panic can nullify their effect. Some recently finished buildings have rather sophisticated public information and control systems, through which it is possible to communicate with the building population from a central post. Their use, however, depends on everyone's ability to understand the message and to act accordingly.

There is no serious reason why elevators could not become the primary means of movement in cases of emergency. Present technology could be improved—elevators could be made much safer and they could be provided with better control systems to work even if a particular configuration is crippled through lack of power. Dynamic allocation of emergency power to cabs only while in movement could make it possible to maintain vital service: emergency power could be switched from the cab which is in the process of loading or unloading to the cab which is ready to travel—thus, almost doubling the capacity of the crippled system.

Remote controls dispatch cabs

If the objective is to redistribute (not to evacuate) the population, trips can be shortened. Shorter trips with a minimum number of stops (a stop at the floor with people in danger and a stop at the floor with a refuge area) will also increase the capacity of the system. Cabs could be dispatched from a central intelligence post to floors with the most pressing need for service and then directly to the nearest available refuge area. All elevator movement could be controlled from the outside, where better intelligence about the emergency situation is available. Such remote control of movement would minimize confusion within the building and would reduce the chance for panic. Many different strategies could be "preplanned" for different possible conditions of emergency, and appropriate action could be taken almost instantaneously after the emergency condition is recognized. Elevator cabs could be continuously "rezoned" during the emergency: all cabs in the same zone could be directed to the floor most in need of service then automatically sent to *different* refuge areas.

Elevators in simulated emergencies

The strategy of redistribution of population to refuge areas is being seriously considered at various institutions and by the elevator industry. Research related to the use of elevators in emergencies is now under way in the Architecture Experiment Laboratory of the Department of Architecture, University of California in Berkeley. The project is sponsored by the National Science Foundation-Research Applied to National Needs.

The research consists of the experimentation with a computer-based elevator simulation model (designed specifically for the simulation of evacuation) to determine the optimum operating strategies under various emergency conditions for existing or newly designed configurations. The main objectives of the research project are: to gain insight into how elevator configurations can be better designed and better used; to learn how particular configurations can be most effectively used in emergencies within their current operating constraints; to investigate the significance of instantaneous or semi-instantaneous response to conditions of emergency; and to develop evacuation strategies for building management, building operation, and control personnel, building security staff, and fire departments.

Experiments consist of creating hypothetical emergency conditions, then observing and measuring the performance of the building's elevator configuration under constraints defined in the simulation. "Subjects" in experiments are existing or proposed high-rise buildings.

The computer-based elevator (simulation) model simulates the operation of the entire system: the supervisory system for the particular elevator configuration, the movement of elevator cabs, the allocation of service, and the loading and unloading of passengers. All decision-making on the part of the building population is *simulated by the experimentor;* the person using the simulation system decides on the characteristics of the emergency for each individual experiment and decides what the human response to the emergency will be. The building is displayed in section on a cathode ray tube (the elevator core is folded out so that all cabs in the system can be observed) and the movement of elevator cabs can be followed up and down as it occurs in the experiment. Congestion on particular floors, delays, movement of population, duration of that movement, and other significant parameters are continuously measured during the experiment.

Elevator experiments could be conducted in real buildings. That would necessitate the interruption of the regular operation of the building and would require a large number of human subjects and complex measurement procedures. Experimentation with the computer-based simulation model causes no interruption of building operation, requires no human subjects, provides automatic measurements, takes much less time, allows for more flexibility in experiments and in general provides considerably better control and understanding of experiments. Intensive experimentation with the simulation model, using existing high-rise buildings as "subjects" gives researchers an understanding of how a particular elevator configuration can most effectively be used, under which emergency conditions.

Through this work, elevators may be given a real role in helping people escape from endangered areas. □

A hazardous policy

Opinions pro and con ignite over OSHA's widening power as government officials vow to protect the worker and architects stagger under multiplying building rules.

The government

"I don't think even I was prepared for some of the shocking accidents that our inspectors are investigating," exclaimed John H. Stender, Assistant Secretary of Labor who is head of the Occupational Safety and Health Administration (OSHA), one of the most controversial new federal programs.

He's determined to "stamp out" on-the-job hazards and safety violations which result in such tragedies as those of an employee who fell to his death while working on a metal beam without safety equipment . . . a construction worker electrocuted . . . an unsecured wall panel which fell on an electrician causing fatal injuries . . . a construction worker killed by a falling A-frame . . . a painter dead in a fall from an unguarded scaffold.

These are actual incidents reported by OSHA investigators who, late last year, passed the 100,000 mark in jobsite inspections, doubling the number of monthly visits since enactment of the Occupational Safety and Health Act in 1970. During the same period the number of industrial hygienists has risen from 54 to 80.

One out of every 10 inspections is the result of a complaint while accidents account for only 4 percent of the visits. In a recent month, nearly 4000 citations were given and $400,000 collected in fines—almost twice the amount for the same period the year before. The greatest number of inspections, 2326, occurs in the construction industry—compared to, for example, 184 in transportation and 5 in the area of finance, insurance, and real estate.

Charged with setting standards to make the workplace safe, OSHA has produced numerous regulations and publishes them in a subscription service which also includes the additional feature of interpreting the rules. "You'll know what the inspector has as his guide when he comes to look over the premises," explained George Yatsko, chief of the Office of Standards' technical information division which provides the service. The rules periodically are compiled into volumes. Volume I ($21) pertains to general industry, and Volume III ($8), not yet available, will cover construction. Purchase of either book entitles the buyer to the subscription service for up to three years.

"In no place is there a neon sign that lights up and says: *This is for architects,*" said Yatsko. To find what parts of OSHA apply to design, several hundred pages must be screened—admittedly "dull reading," he agreed, except when it "hits the pocket."

The OSHA subscription service is available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. The official OSHA magazine, Job Safety and Health, is available on subscription from the Superintendent. Additional information is provided by 10 regional offices.

The architect

Well-intentioned as it is, the Occupational Safety and Health Act (OSHA—architects say O-sha and government officials say Osh-a) has created a negative stir among architects, some of whom are ready to have the law repealed.

Congressman William A. Steiger (R-Wis.) whose bill became law in 1970, admits he had no intention of corraling the government into the building code business. "As a matter of fact," he told an AIA-sponsored conference on OSHA last year, "the legislation is very clear on this. There is no effort to establish a National Building Code. . . . We will work very hard to preclude OSHA's becoming a building code."

Yet a vocal number of architects claim that it already is. "The intent of OSHA was for industrial safety and tech-

niques—for which there are no standards—but the law left the door open, and OSHA is getting into the arena," said Elmer Botsai, a partner in his own San Francisco firm. He thinks the worst twist is that federally owned buildings are excluded from the law. An OSHA regional safety engineer, L.A. Carvey, commenting on this irony, explained that OSHA shouldn't have jurisdiction over other federal agencies. But, he added, they are *expected* to maintain OSHA standards.

The confusion stems from the vast number of OSHA requirements and their vague, fragmented nature, said James R. Dowling, director of the AIA's Codes and Regulations Center. Among all the rules pertaining to job safety and procedures, it's hard for the architect to determine which ones apply to design. He alone of the architects queried had a good word for OSHA: he was encouraged over the fact that OSHA came to the AIA for recommendations on part of the code dealing with "walking and working surfaces." Dowling also pointed out that OSHA regulations are performance standards and not the specifications type of standard which traditionally have limited innovative use of materials and methods.

Jasper Hawkins of Los Angeles, chairman of the AIA codes and standards committee which reviewed code proposals at OSHA's request, said nevertheless most of the regulations are drafted "behind closed doors." At the May 20–23 AIA convention in Washington, D.C., his committee will propose legislative changes for OSHA.

Previously that committee considered compiling a list of the new rules which apply specifically to design, "but it would take hundreds and hundreds of manhours so we gave it up," said Hawkins. Instead, the AIA devotes at least a page of its newsletter to "OSHA Alerts," a brief summary of new regulations affecting the architect. The AIA also has a 15-item bibliography on OSHA—from a copy of the law and its explanation ($3 to nonmembers) to where to obtain private subscription services on OSHA news ($160-180 per year) . . . "expensive, but worth the price. . . ." [Ann Carter]

School fire safety in Chicago

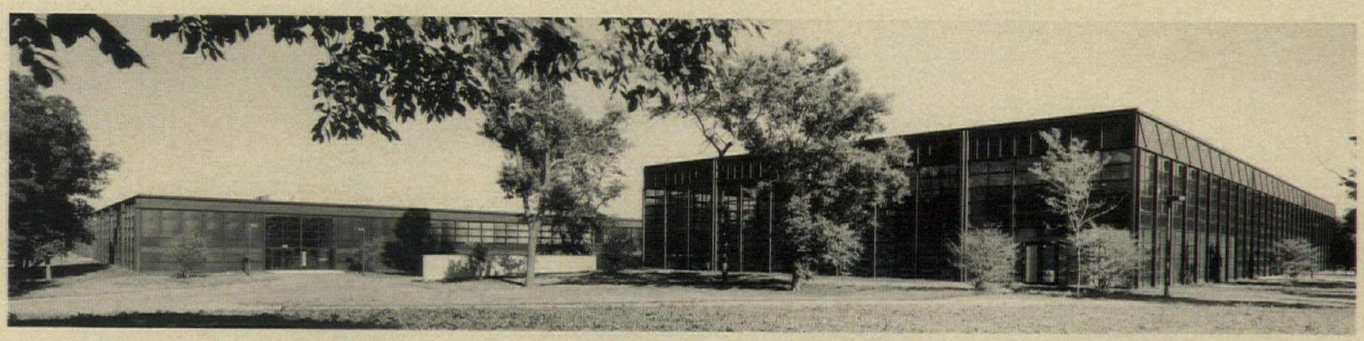
The schoolhouse is raining

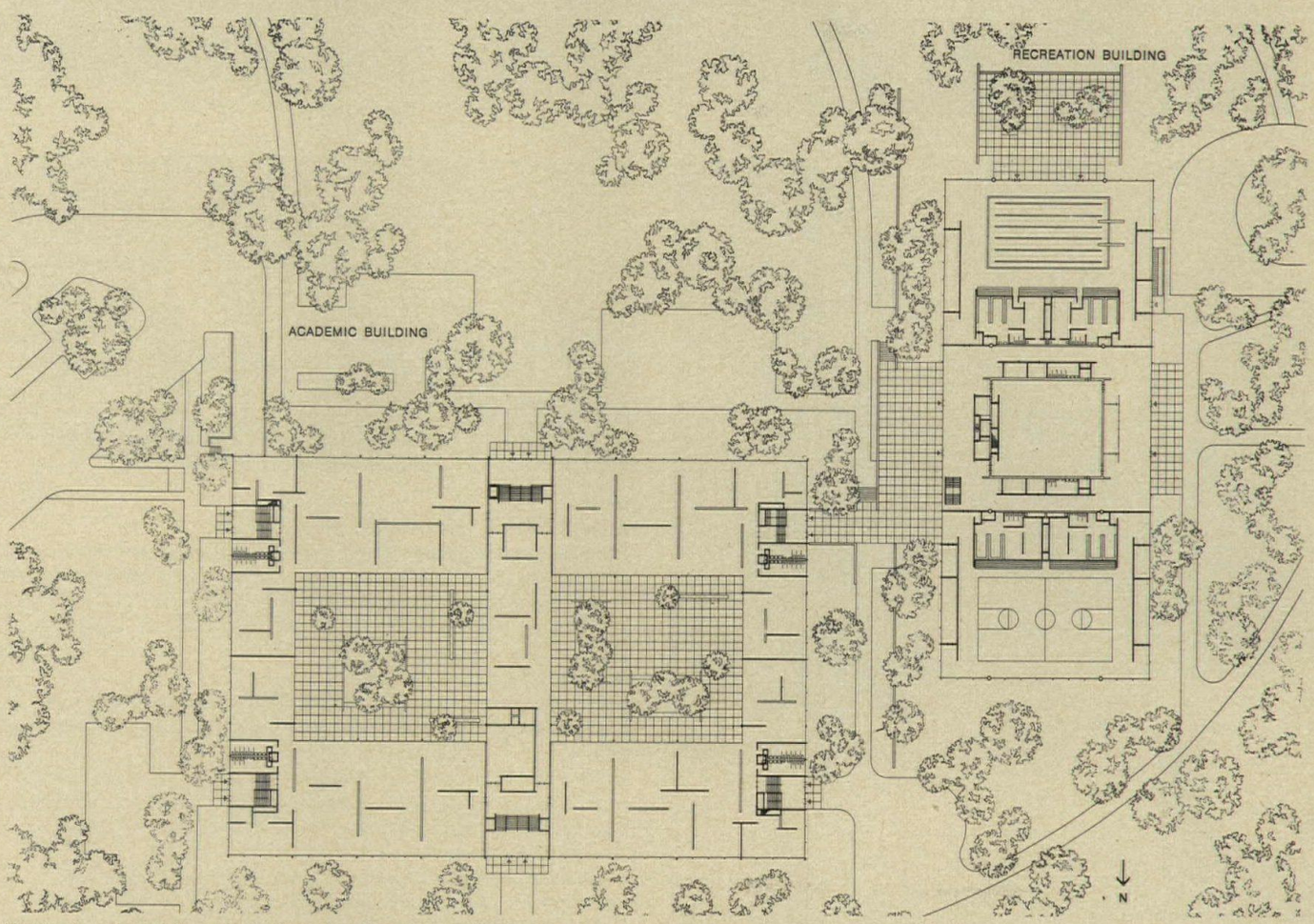
By emphasizing the preservation of life over property in school fire safety provisions, the Public Building Commission of Chicago has given educators a truly flexible schoolhouse.

On the evening of Oct. 8, 1871 Mrs. O'Leary's famous cow was dining in Chicago, Ill. blissfully unaware of the fire which would sweep the city with speed and cruelty. Whether she kicked the lantern to initiate the terrible chain of events may never be known. However, generations of Chicago architects and engineers have designed by the light of that fire, which consumed some 300 lives, 18,000 buildings and 2000 acres in its 27-hour life. Chicago has consequently led the nation in requiring fire-resistant design in its buildings.

Now comes a new generation of public elementary and secondary schools with one-hour fire ratings on many structural components for which codes originally dictated four-hour ratings. Some schools are open planned and some expose their exterior structural steel. One even links its nine floors by escalator. Has Chicago forgotten the lesson of 1871? Despite the lower fire ratings, the schools commissioned by and for the Public Building Commission of Chicago are probably *safer* for their occupants than many a traditional structure.

Serendipity—perhaps. PBC, "a municipal corporation established (in 1956) to make possible the construction, acquisition or enlargement of public improvements, buildings, and facilities for use by governmental agencies," has played a unique role in Chicago's building bureaucracy as both a political expediency to deliver space and as a think tank for architecture. Its bias towards architectural problem-solving comes from Jacques Brownson, its managing architect of many years and designer of the Chicago Civic Center (1960–1966, C.F. Murphy Associates, SOM and Loebl, Schlossmann, Bennett & Dart), working with Robert Christensen, PBC executive director. When the Board of Education turned to PBC for fresh bonding capacity to create some 26 new schools in



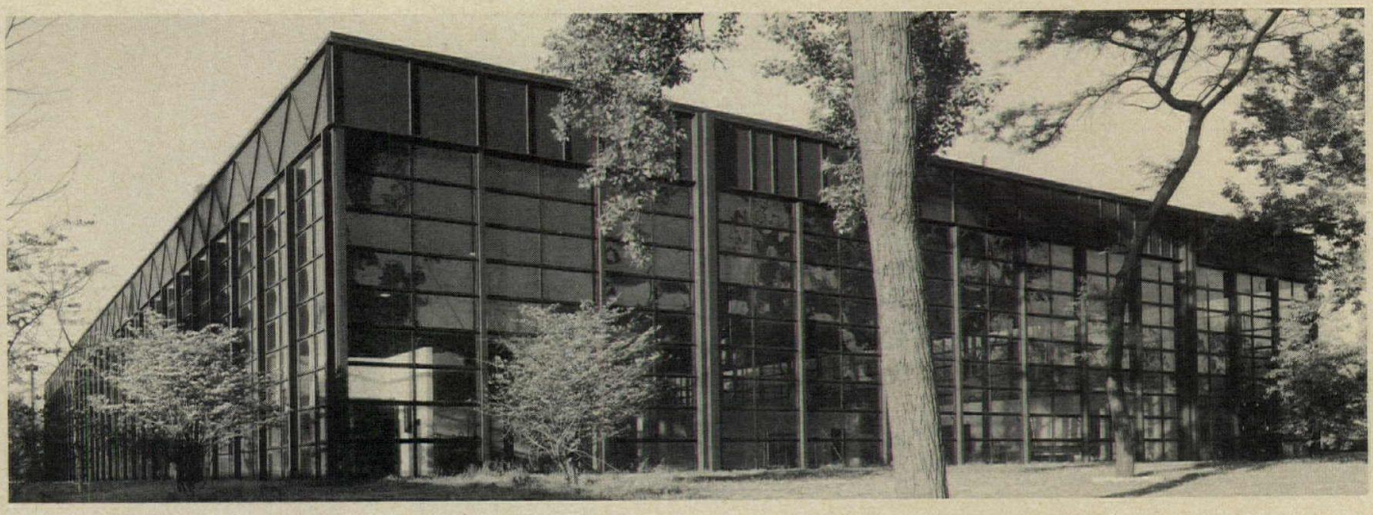


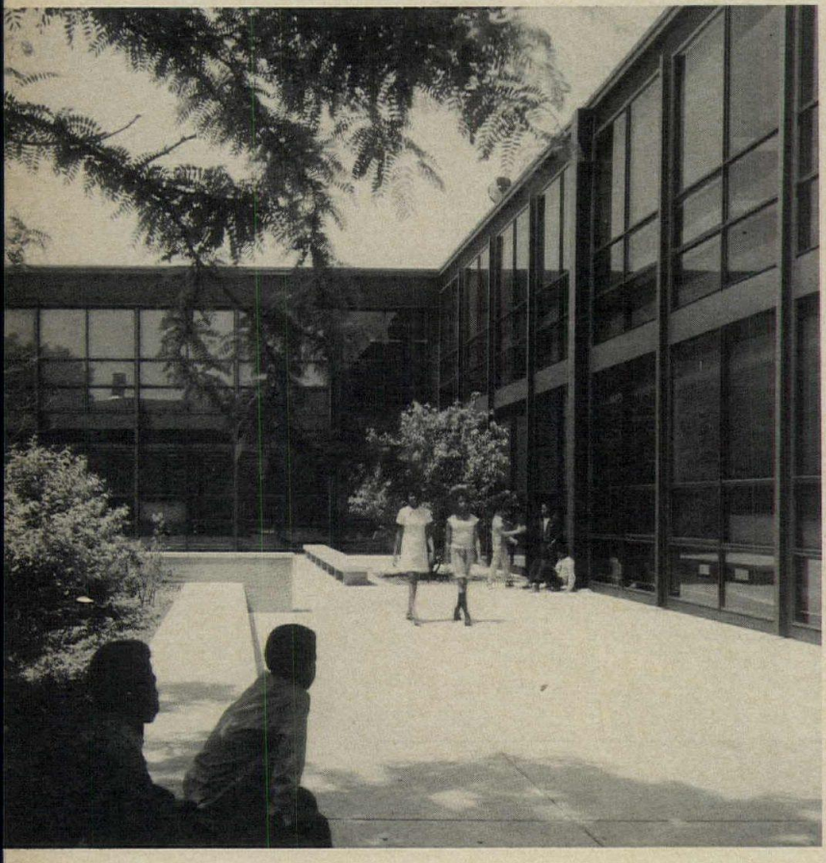
Harmonious proportions, meticulous detailing, and intelligent placement on a sloping, wooded site distinguish PBC's Walter H. Dyett Middle School by David Haid. Recreation building curtain wall (opposite) is punctuated by load-bearing columns supporting three 100′ x 130′ bays.

1968, it was anticipating 26 "nice," i.e., competent but uneventful, design solutions. This gave the philosopher's stone to the alchemists. PBC examined the 26 proposals and decided to set new design standards for public school planning and construction. The goal: to generate physical plants offering educators latitude to remove nearly all internal partitions for open plan teaching, or to scurry back to a traditional "eggcrate" format if need be.

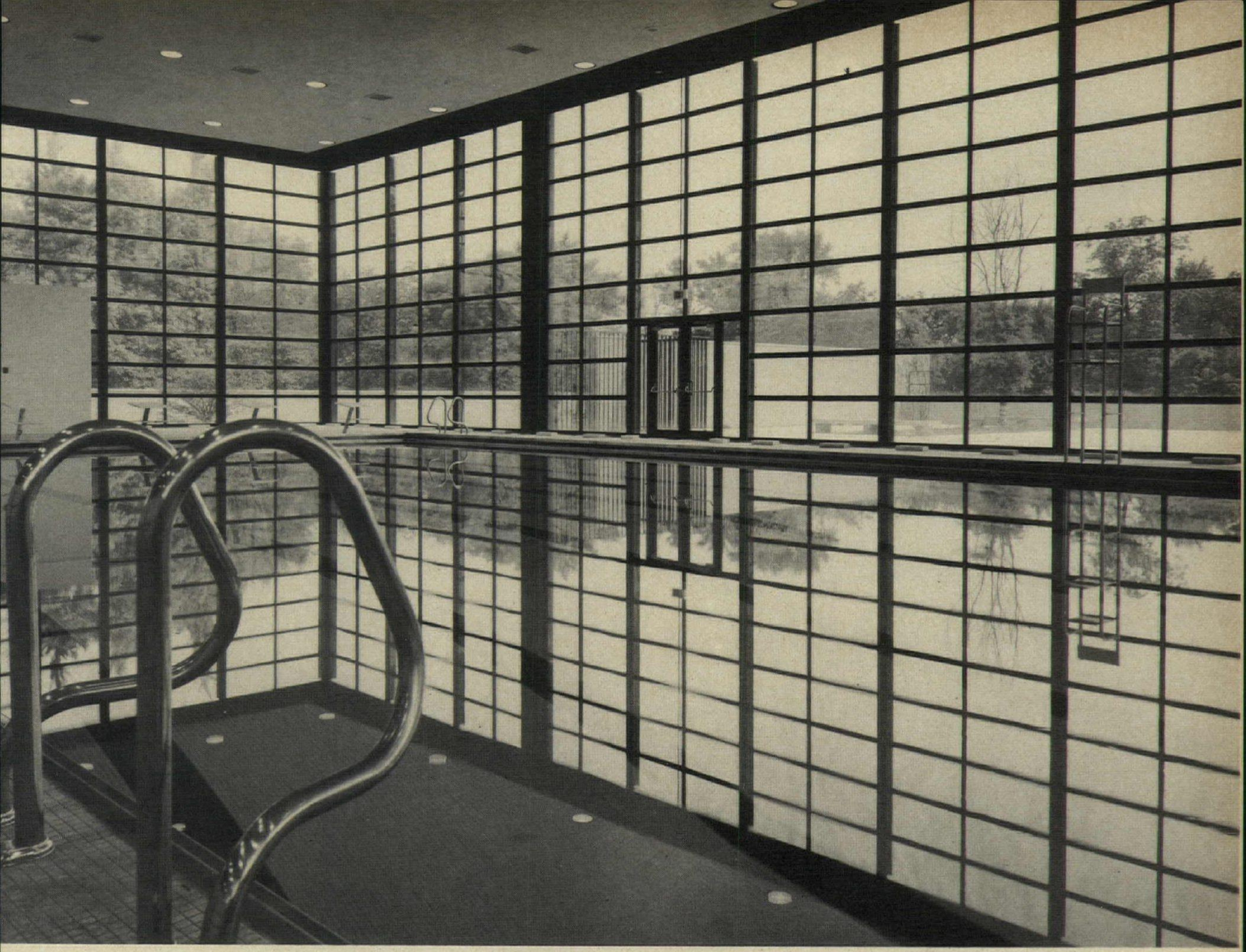
Among the numerous consultants assisting the agency in writing the new guidelines was National Loss Controls Service Corp., an environmental health and safety research firm based in Chicago, which examined the question of fire safety in open planned schools. Code specifications called for a static, conservative architectural response to fire, stressing a building's ability to withstand heat, prevent flame spread, and minimize property loss. NLCSC concluded that new fire control technology could shift the emphasis in fire safety to a dynamic one, placing a building on electronic alert for immediate reaction to dangerous symptoms with automatic alarm systems and automatic fire fighting apparatus. David Grupp, engineer and manager of NLCSC's fire protection engineering services, describes this transition as "the maturing of an art into a science."

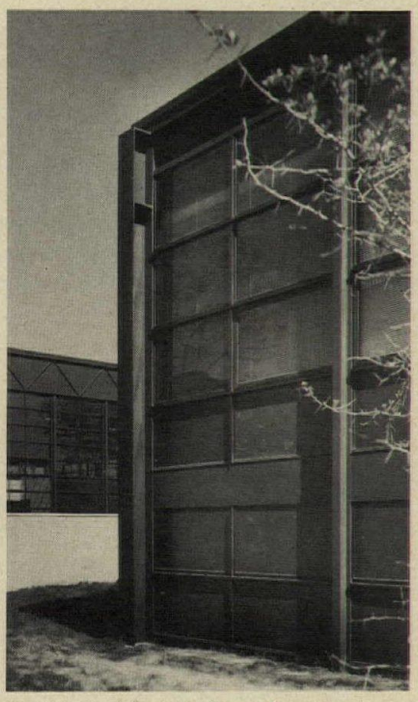
The preservation of life now stands clearly before other priorities in PBC's guidelines. Architects commissioned by the agency are charged with meeting four essential fire safety performance criteria: early fire detection with alarm transmission to the fire department and all building occupants, in-



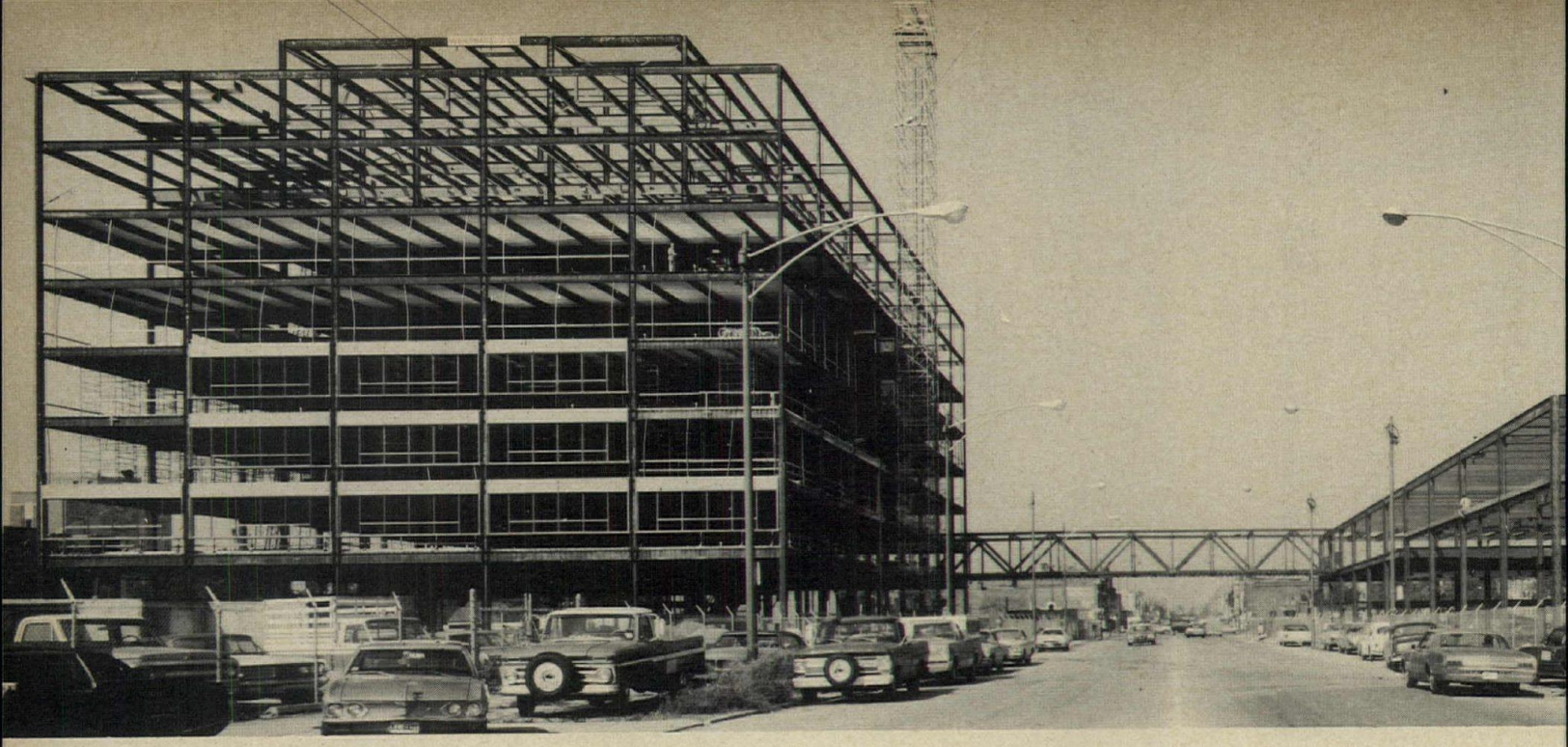


Data
Project: Walter H. Dyett Middle School.
Architects and engineers: David Haid, architect; Wiesinger-Holland, structural engineers; Wallace and Migdal, mechanical engineers.
Program: school for 1500 students of 6–8 grades in four "houses," with community recreation facilities for Chicago Park District's "School-Park" program.
Site: Washington Park, Chicago, Ill.
Structural system: exposed structural steel; recreation building roof, plate girder and truss system; roofs, built-up metal deck; floors, reinforced concrete structural slab or slab on grade.
Major materials: exterior, steel mullions and fascias, anodized aluminum window frames, metal panels, glass or polycarbonate glazing; interior, brick walls, metal demountable partitions, floors of terrazzo, carpet, resilient tile, suspended acoustical ceiling tile.
Mechanical system: rooftop multizone HVAC units, complete sprinkler protection, complete electric-electronic audiovisual system.
Costs: not available.
Photography: Hedrich-Blessing.





Dyett is flexible. Main floor of academic building is column-free; lower level, with access to interior courts, has fixed spaces for special uses. Recreation building is an airy pavilion featuring gym and pool.



The schoolhouse is raining

ternal building configuration that restrains rapid spread of smoke, heat, and other combustion products through the interior, adequate exit capacity in dire circumstances, and adequate access for fire fighting.

Of course, there is more than one path to righteousness. To assure architects that they enjoy considerable design flexibility, the commission urges them to comply with the spirit of the guidelines, and to seek needed compromises in consultation with NLCSC. However, a fairly well-defined prototype manifests itself in the official literature. It is at least a Type II "Noncombustible Construction" which the Chicago Building Code defines as "construction in which all structural elements, including walls, bearing partitions, floors, ceilings, roofs, and their supports are of noncombustible materials but which are generally not fire protected except as required. . ." With complete sprinkler protection it can extend vertically and horizontally beyond traditional design confines: open stairwells may be permitted for more than two continuous floors; floor space may stretch unpartitioned by fire-resistive barriers for up to 30,000 sq ft with smokestop barriers at intervals of up to 300 ft, and maximum exit travel distance is lengthened from 100 ft to 150 ft. Schools of three or more stories may be open planned if completely protected by sprinkler.

Obviously the automatic sprinkler system in concert with detectors and alarms forms the credo of the new dispensation. This faith is hardly a gamble. Fire loading (weight of combustible material psf) in school buildings is relatively low among building types, except in special "warehouse" conditions as characterized by performing arts activities (which can pour out a cornucopia of combustible stage properties), and in special vocational or scientific facilities. Sprinkler protection of a school's physical plant thus ably copes with the actual source of many fires, its live fire loading. And sprinkler detection systems are "more than 95 percent reliable," says Grupp.

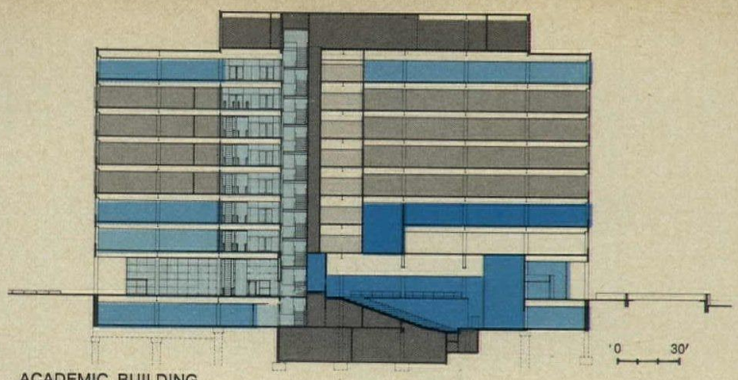
The burden of withstanding intense heat is lifted from floors, ceilings, and walls. Floor and ceiling assemblies can be rated as an integral whole for a one-hour rating, and PBC has made mass purchases of demountable metal panel partitions for most interior enclosures. (As before, fire stairs are protected with fire-resistant walls and doors. HVAC ductwork is guarded by fusible link closures.) This leaves truss girders and beams exposed within the floor/ceiling plenum, offsetting to some extent the cost of sprinklers.

Going one step further, PBC developed a suggestion from U.S. Steel into specifications for "flame shield" design, which permits exposure of the web section of an exterior spandrel beam. U.S. Steel's pioneering tests and applications of flame shield design (One Liberty Plaza, New York City, 1968–1973, Skidmore, Owings & Merrill) have demonstrated that the spandrel beam flange, given adequate fireproofing and width (8 in. from beam center line to edge of flange), can divert heat and flame issuing from a building to a "plume"-shaped area safely removed from the critical beam web. (The internal side of the spandrel is conventionally fireproofed.)

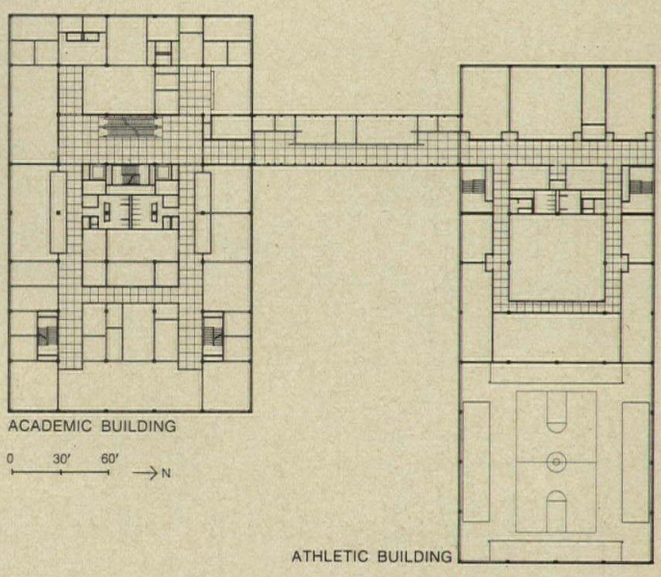
NLCSC and PBC, like many other organizations, have also reviewed performance standards for building materials and furnishings, evaluating submissions for their ability to support combustion. Window specifications are a typical example; PBC has called for at least two outside windows in each classroom to provide egress through minimum openings (32"w x 48"h) whose lower edge is not greater than 32 in. above the floor. A tough, vandal-resistant polycarbonate glazing which oxidizes and produces a heavy black smoke is restricted to a building's lower three floors and must be easily removable for firefighting—but is retained to combat the high rate of damage currently sustained in Chicago schools.

The guidelines deal with procedural and methodological matters as well as fire safety, and architects regard them with varying degrees of enchantment. Those professionals who can design comfortably in a systems context have adapted most readily to the guidelines, because the commission has actually created a building system. Architectural design has been strongly influenced by the commission's decision to standardize much of the schools' planning and physical assemblage. (C.f. SCSD in Calif. and EFL, inspirations for PBC's

Roberto Clemente High School, by The Office of Mies van der Rohe, houses 3000 students in a nine-story academic high-rise serviced by escalators. This is tied to two-story athletic building. Floors 4–7 in high-rise are organized on "house" plan, providing separate dining/commons, activities rooms, and class space for four groups of 750 students each.



ACADEMIC BUILDING

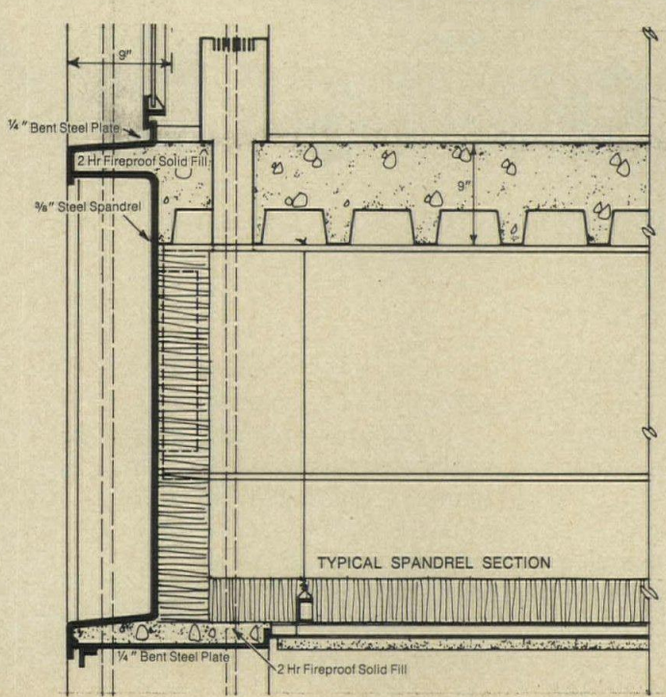


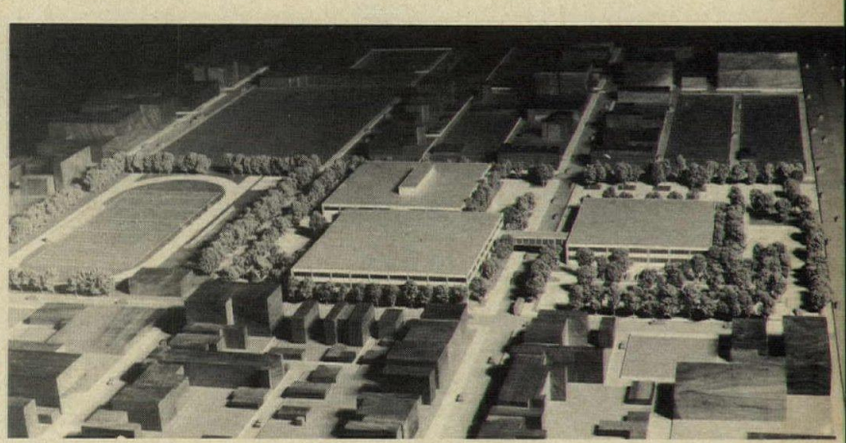
design and theory.) Formal evidence of this desire is shown in the 5′-0″x5′-0″ module underlying all floor plans. Also, there is the repeated appearance of hardward components acquired by the commission through the Mass Purchase Program, which seeks to achieve quality performance for groups of schools at reduced costs.

Fire and police officials, the Dept. of Buildings, and insurance underwriters and appraisers have supported PBC's innovations. Ironically, it is the educators who question change. Part of their reluctance naturally stems from displaced political prerogative. The initiative resides in PBC, as the client for schools the Board is obliged to lease over a 20-year amortization period. There has also been concern that antisocial behavior would upset social equilibrium in the schools through false alarms, maliciously triggered sprinklers, and arson.

What most troubles the educators may be the open plan, which Chicago does not presently embrace in its educational philosophies. In the Sojourner Truth Elementary School, teachers felt threatened by open space. Recalls John Callanan, present managing architect of PBC, "They immediately set up little pigpens with the Hauserman demountable partitions and tried to cram their students and everything else inside. It took them six months to open up the . . . floor space."

Schoolmen's philosophies are a restless amoeba. The "eggcrate" school building predominates American educational planning, but the open plan has found enthusiastic champions across the nation. In sponsoring schools that provide safety for their occupants, potential for open planning, and frequently handsome design, PBC has planted state-of-the-art building technology and educational theory in Chicago soil. Callanan mentions this in the matter-of-fact tone of the commission, "We simply wanted the flexibility for whatever educational needs may arise." [Roger Yee]





Whitney M. Young Jr. High School, by Perkins & Will, is a campus of three structures for academic, physical education, and fine arts activities. Typical section of exterior wall reveals "flame shield" spandrel flange.

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Thermal properties of building materials—Part I

Harold J. Rosen, PE, FSCI

For a refresher course, the writer lists below some definitions of the most prevalent terms used to describe the thermal properties of building materials.

The energy crisis is compelling architects and specifiers to reacquaint themselves with the fundamentals concerning the thermal properties of building materials. All building materials are conductors of or resistors to heat flow, and the extent to which this is accomplished is in direct proportion to a material's thermal properties and its thickness.

In designing structures to minimize heat loss and heat gain, heat conducting materials are undesirable while those materials that resist the flow of heat or are heat insulators are desirable. A material's resistance to the transfer of heat depends upon its composition and physical characteristics, values which, for most building materials, are available and published by building materials' manufacturers. However, the basic definitions of some of the most widely used terms are restated here for reference.

Btu (British thermal unit). This unit represents the actual heat loss through a structure or a material. One Btu is the amount of heat required to raise the temperature of 1 lb of water one degree F.

C or C factor or C value (thermal conductance). The amount of heat expressed in Btu transmitted in 1 hr between the two surfaces of a material 1 foot square, for each degree temperature difference between the two surfaces. (Note: This value is not expressed in terms of per inch thickness but from surface to surface.)

K or K value (thermal conductivity). The amount of heat expressed in Btu transmitted in 1 hr through 1 sq ft of a homogenous material 1 in. thick for each degree F of temperature difference between the two surfaces of the material.

R or R value (thermal resistance). The amount of resistance to heat flow offered by x inches of a homogenous material between its surfaces; the reciprocal of a heat transfer coefficient (R = 1/C, 1/U). A most useful factor in calculating heat flow because resistances are additive, whereas conductances and conductivities are not.

1/K (thermal resistivity). The amount of resistance to heat flow offered by 1 in. of a homogenous material between its surfaces. The reciprocal of thermal conductivity.

U or U value (thermal transmittance). The amount of heat expressed in Btu transmitted in 1 hr through 1 sq ft of a building section (wall, floor/ceiling, roof) for each degree F of temperature difference between the air on both sides of the building section. Often termed the "overall heat transmission coefficient" or the "overall coefficient of heat transfer."

Building materials rated by their K values or C values are good insulators if these values are low, i.e., 0.25 and poor insulators or good conductors of heat if their values are high, i.e., 1.0. Conversely materials rated by their resistance to heat flow R are good insulators if their values are high, i.e., 4.5 and poor insulators if their values are low, i.e., 1.0.

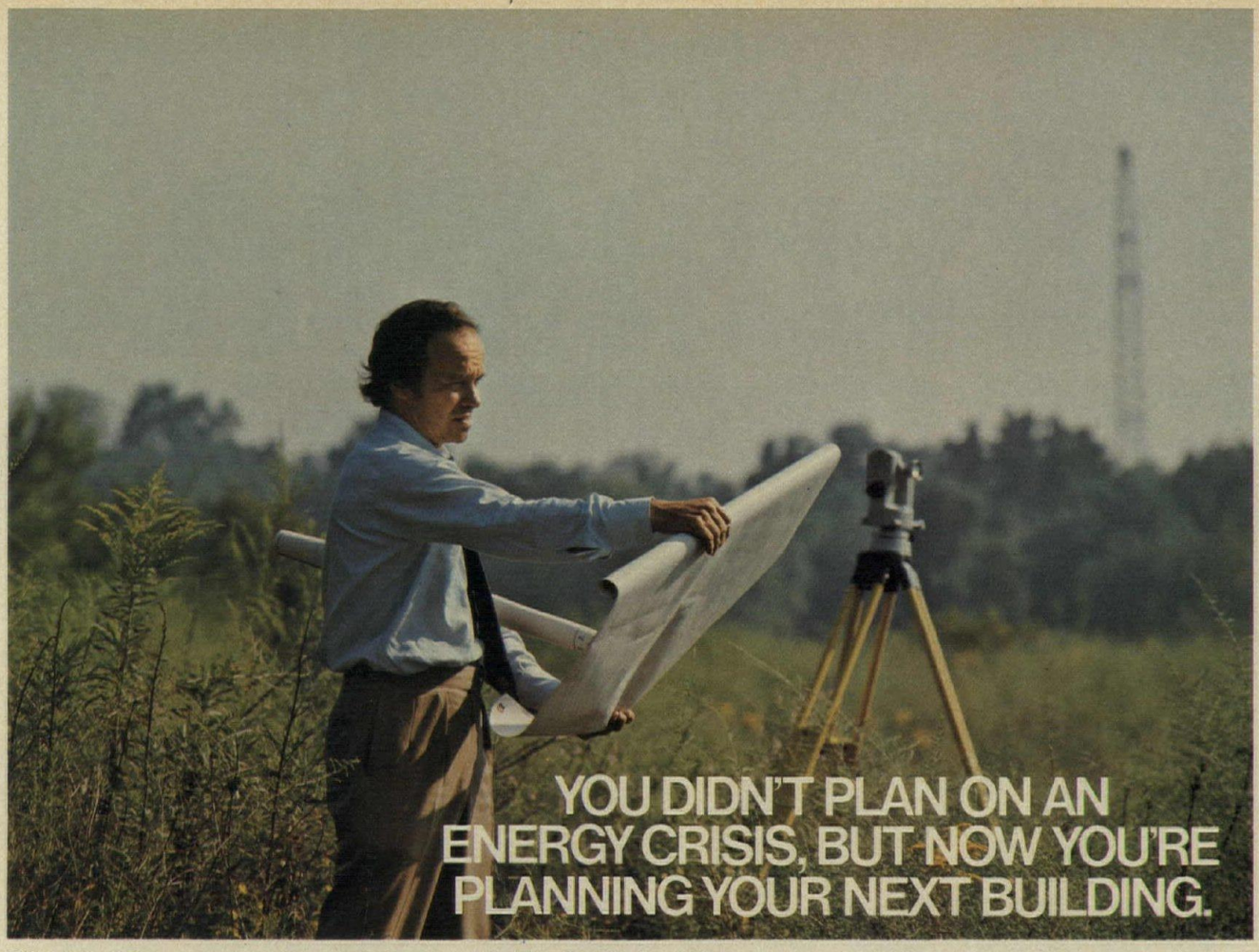
Composite materials or building sections consisting of various materials are rated thermally by their U value. The higher the U factor of the composite, the more heat will flow through it; the lower the U value the more resistive it will be to heat loss or the better its insulation properties.

In addition to using building materials as insulators, the designer and the specifier should be aware that air spaces and reflective surfaces can likewise be employed as insulators. There is also a considerable difference in the thermal performance of an ordinary air space and one within which a reflective surface has been introduced. The use of a single sheet of reflective paper or foil in a wall air space can reduce the heat transmission by 50 percent. However, circulation of air between spaces must be prevented by adequate sealing of each dividing reflective sheet. To be truly effective, air spaces must be at least ¾ in. wide, but effectiveness is not increased by additional air space up to 4 in. In ceilings, however, the heat gain in summer is markedly reduced by the insertion of a reflective surface as compared to heat loss through the same configuration in the winter. The reflective-surfaced air spaces result in less resistance to heat flow upward in winter.

With the cost of fuel increasing, expending additional dollars for insulation or in good thermal design will result in reduced initial equipment costs for heating and cooling as well as in annual operating costs of heating plants and air conditioning and refrigeration plants.

Next month's article will discuss the various types of available insulating materials.

Author: Harold J. Rosen is an independent construction specifications consultant in Merrick, New York.



Which building material will you use?

You've got energy shortages to think about. Air-conditioning costs. Heat gain through the long, hot summers. Heat loss in the winter months. Heating equipment costs. The whole set of energy-use factors suddenly has become critically important. The building material you use affects all of them.

Compare the energy conserving capability of masonry, for instance, with double-plate glass walls.

At 4:00 P.M. on a hot August day in Washington, D.C., the heat gain through a square foot of west-facing insulated brick and concrete block wall will be 2.2 Btus an hour.

The heat gain through a double-plate glass wall in the same location will be 173 Btus a square foot in an hour. A big difference.

Project this differential over 10,000 square feet of wall. You come up with a heat gain through masonry of 22,000 Btuh, while the heat gain through double-plate glass is 1,730,000 Btuh.

In the case of the masonry wall, cooling equipment with a two-ton capacity can handle the heat gain. But with the double-plate glass wall, about 143 tons of cooling capacity will be needed.

An analysis of a typical 10-story building shows that over its useful life, the air-conditioning cost for a square foot of our masonry wall will be about 23 cents. For the double-plate glass wall, it will be $7.60.

It takes a lot of money to buy, install and create space for all the extra air-conditioning equipment required by the double-plate glass wall. A lot of money and a lot of energy to run that equipment.

Compare the heat loss in winter. It has a dramatic effect on energy consumption and building operation costs.

Our masonry wall, for example, has a "U-value" of .12. The double-plate glass wall has a "U-value" of .55. (U-values are used to determine heat loss through one square foot of wall area in Btuh per degree Farenheit differential across the wall.)

This means that the masonry wall is about 450% more efficient, on the average, than the glass wall in reducing heat loss.

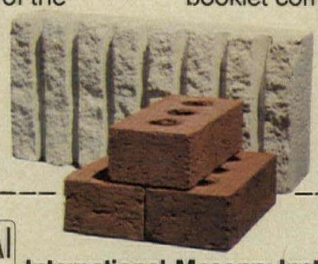
Over the useful life of the building, the heating cost per square foot of wall area for masonry will be about 30 cents. For double-plate glass, about $1.38.

In a time of one energy crisis after another, masonry makes eminently good sense as a good citizen.

The masonry industry believes that the thermal insulating qualities of masonry are an important economic consideration to building designers, owners and investors, and all citizens.

Masonry walls save on air-conditioning and heating costs. And just as important, they are less expensive to build. The masonry wall we've described would have a 38% lower initial cost than the double-plate glass wall.

If you'd like to find out more, write to us and we'll send you a booklet comparing the thermal insulating qualities of masonry walls with double-plate glass walls, metal panel walls and pre-cast concrete walls.



International Masonry Institute P/A

823 15th Street, N.W., Washington, D.C. 20005 / (202) 783-3908

Please send the booklet comparing insulating qualities of masonry with other building materials.

Name

Title

Company

City State Zip

Nature of Business

Circle No. 349, on Reader Service Card

BERLIN STEEL WAS IN BUSINESS SEVENTY THREE YEARS BEFORE THEY SPECIFIED JOIST GIRDERS FOR THE FIRST TIME. ELEVEN DAYS LATER, THEY DID IT AGAIN.

Joist Girders. The advantages they had over I-beams were more than enough for Berlin Steel to specify them for the Sage-Allen Department Store they were building in West Hartford, Connecticut. So much

Joist girders have a simple span design. Which explains why ponding calculations are easier. And why design time is shortened.

more, that eleven days later they specified them again. Only this time for National Plastics and Plating Supply Co. in Plymouth, Connecticut.

Where did Berlin Steel learn about those advantages? From meeting with Vulcraft. The people who knew as

Joist girders need fewer foundations and columns. Which means less work for you and larger bay areas for your clients.

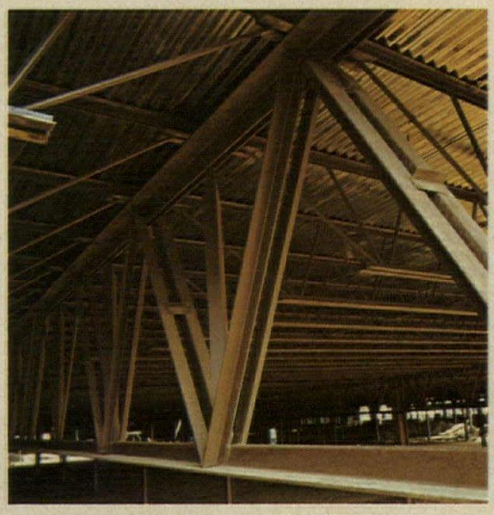
much about joist girders as Berlin did about steel fabricating.

And the first thing the Vulcraft engineers did was show Berlin Steel why joist girders are easier to specify and erect. By explaining that the simple span design of joist girders make ponding calculations easy. And shorten design time.

By telling them about the larger bay areas possible with joist girders. And by talking about the fewer foundations and columns needed with joist girders than with I-beams.

Then came the subject of the advantages joist girders offer after they're erected.

And to explain that topic Vulcraft talked about the modified Warren truss configuration used in joist girders. And that it gave joist girders a high strength to weight ratio.

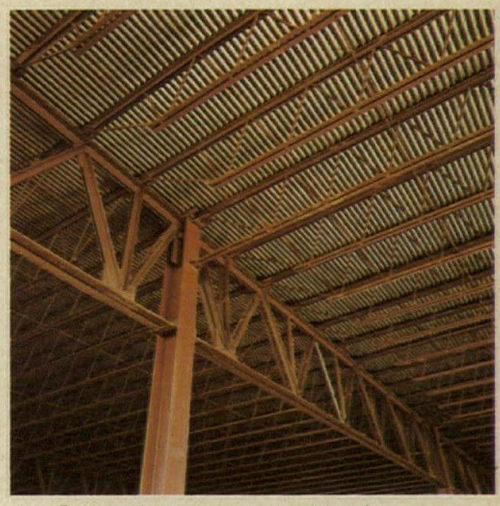


Joist girders have a modified Warren truss configuration using hot rolled double angle sections for top and bottom chords and single and double angle sections for web members. What that means is a high strength to weight ratio.

They mentioned further, that bar joist erection was faster. Because top chord panel points show joist location, eliminating a lot of measuring.

Finally, the matter of ducts, pipes and conduits came up. And Vulcraft explained how these things go right through a joist girder. Something no one can say about an I-beam.

What it all added up to for Berlin Steel was a change. A change from I-beams to another roof-framing system. A roof-framing system that was more economical and easier to erect



Joist girders have top chord panel points that show joist location. Which makes a lot of measuring unnecessary.

for anything over 10,000 square feet.

It wasn't surprising to Vulcraft, though. Because architects and engineers all over the country are discovering the advantages joist girders have over I-beams.

Joist girders already have spaces for pipes, conduits, and ducts to run through. So you don't have to cut them yourself.

If you'd like more information about how joist girders can work for you, send for Vulcraft's Joist Girder Specification Guide. Just contact your local Vulcraft sales office. Or write P.O. Box 17656, Charlotte, N.C. 28211. Or call (704) 366-7000. You'll find a few things even Berlin Steel didn't know. Until they asked.

VULCRAFT

Sage-Allen Department Store, West Hartford, Connecticut; Architect: Associated Architects, Farmington, Connecticut / General Contractor: Bartlett-Brainard & Eacott, Inc., Bloomfield, Connecticut / Consulting Engineer: Hallisey Engineering Associates, Inc., Hartford / Steel Fabricator: Berlin Steel Construction Company, Inc., Berlin, Connecticut. National Plastics and Plating Supply Co., Plymouth, Connecticut: Architect: Andrew C. Rossetti, Bristol, Connecticut / General Contractor: S. Carpenter Construction Co., Bristol / Consulting Engineer: Hallisey Engineering Associates, Inc. / Steel Fabricator: Berlin Steel Construction Co., Inc.

It's the law

Zoning changes

Bernard Tomson and Norman Coplan

Does zoning benefit individual interests or does it serve the community as a whole? The court's problem is to tell the difference as the case below illustrates.

Regulating the use of real property by enacting a zoning ordinance is exercising the "police power" of a municipality. The United States Supreme Court has repeatedly ruled that the exercise of such "police power" can only be constitutionally justified if the restriction upon private property rights serves the health, safety, or general welfare of the community (*Nectow* v. *City of Cambridge,* 277 U.S. 183). It is further a general rule of law that zoning regulations must serve the needs of the community as a whole, rather than the desires of an influential individual property owner, or the desires of a politically powerful majority. Zoning changes not consistent with a comprehensive plan reflecting a general developmental policy for the community as a whole will be rejected as "spot zoning" and an improper use of the legislative function. The major problem for the courts, however, has been to determine under the facts presented whether a particular zoning change does, in fact, conform with a comprehensive plan, or whether it falls within the definition of "spot zoning."

Illustrating this problem is the case (*Blumberg* v. *City of Yonkers,* 341 N.Y.S. 2d 977) involving the legality of the zoning of certain parcels of land, which property had been the subject of litigation over a period of 15 years. The property in question consisted of 13 lots which, in 1958, were partially located in a commercial zone and partially located in a residential zone. The owner of the property sought to build a supermarket on those lots which were commercially zoned and to use the remainder of the property as a parking lot. The Zoning Board of Appeals granted a variance for the accessory parking use of the residentially zoned property but upon appeal, the court annulled the variance on the ground that "one knowingly entering into a contract to purchase land for a prohibited use cannot thereafter have a variance in the use of the premises on the ground of unnecessary hardship." During the appeal period, no stay had been obtained and a substantial portion of the supermarket construction was finished before the work was halted following the court's decision.

The property was then sold and an application was made by the new owner for a change in the zoning classification so that all of the lots would be zoned commercially. The City Planning Board recommended that such application be denied on the ground that such rezoning would conflict with the city's guide plan and would depreciate the value of abutting improved parcels. The application was thus denied in 1960.

In 1962, a new owner made the same application and this time the city legislature chose to disregard the recommendation of the planning board and enacted an ordinance for the lots in question so as to permit an accessory use of the lots for parking purposes. This ordinance was challenged in court and was found to be an invalid exercise of the "police power," as it constituted spot zoning intended exclusively for the benefit of the owners of the property.

The property was once again sold and in 1965, the new owner sought a special exception use permit allowing accessory parking on the lots which were within the residential zone, contending that the zoning ordinance was unconstitutional as applied to his property because it was confiscatory. The special exception permit was granted to the property owner, but on appeal, the court, in 1967, held that such special exception permit had not been validly issued and that the zoning ordinance was constitutional.

In 1968, the city legislature enacted a new zoning ordinance which made numerous zoning changes in the city. It created new business and use districts and the whole of the subject property was placed in a district which permitted a supermarket and parking lot. The legislature, in adopting this ordinance, rejected the recommendation of its planning board, which included that the lots then in a residential district remain so zoned. Following the adoption of the new ordinance, the court declared it invalid on the ground that an appropriate hearing had not been had. However, the identical ordinance was properly reenacted in 1970 and the new ordinance was once again challenged in the courts. A final determination was rendered in 1973.

The plaintiffs contended that the 1970 ordinance, was antagonistic to the comprehensive zoning plan of the city and was enacted solely for the benefit of the property owner. The court, in concluding that the ordinance was valid and constitutional, stated:

"The 1970 ordinance represents an attempt to zone comprehensively for the entire City of Yonkers. Most of the zoning changes were the result of years of study by independent consultants and the planning board. Although those experts did not recommend the change in zone of the subject property, an examination of the map and the surrounding areas reveals that the change was not antagonistic to the comprehensive plan. The supermarket use is in harmony with the surrounding neighborhood. There is no proof that this use will impair the stability of the residential neighborhood. No feasible purpose is served by the split zoning theretofore existing. . . . So long as the validity of the ordinance is even 'fairly debatable' the legislative judgment must control."

Authors: Bernard Tomson is a County Court Judge, Nassau County, N.Y. Hon. AIA. Norman Coplan, Attorney, is Counsel to the New York State Association of Architects, Inc. AIA.

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The way to sharply reduce heat loss through masonry walls is to fill cores or cavities with ZONOLITE® Masonry Fill Insulation.

Insulation cost is frequently recovered in two or three years. Then owners enjoy lower heating and cooling costs over the entire life of the building. For example:

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Combined Heating/ Cooling Savings*	$6400	$3500	$8150	$6450	$5400
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*10-year savings from insulating walls; 8" lightweight block; 2-story office building, net exterior wall area 10,000 sq. ft.

ZONOLITE Masonry Fill Insulation is the most economical way to bring block walls into conformance with new FHA requirements—as low as 17¢/sq. ft. installed, for 8" block.

Don't pay for those wide-open spaces. Get the full savings-and-comfort story on ZONOLITE Masonry Fill Insulation. Contact your nearest ZONOLITE sales office for booklet MF-154B, or write Construction Products Division, W. R. Grace & Co., 62 Whittemore Avenue, Cambridge, Mass. 02410. In Canada: 66 Hymus Rd., Scarborough, Ontario.

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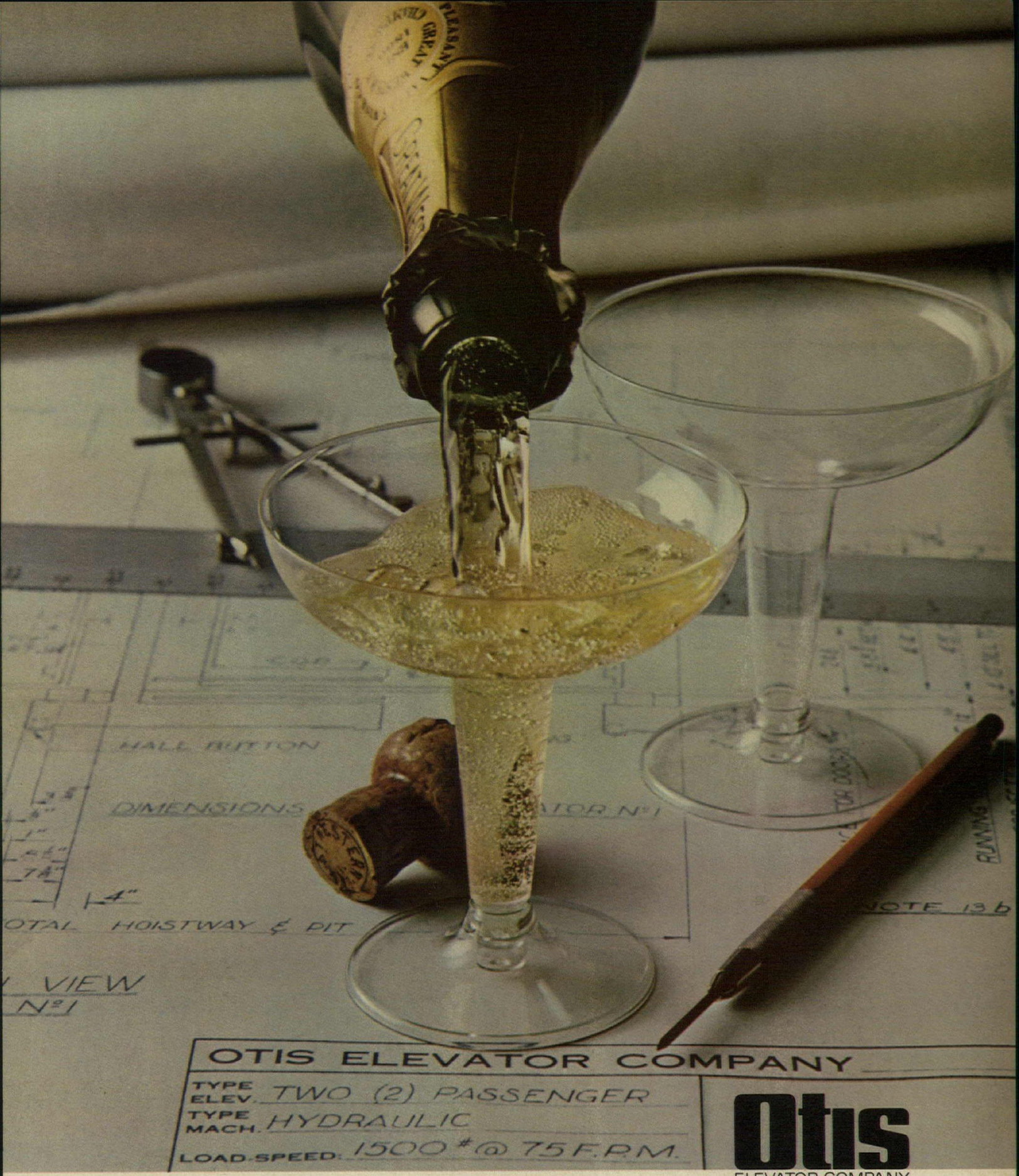


Otis
ELEVATOR COMPANY

Let's both celebrate. Otis now has seven, new, standard hydraulic elevators starting at less than $10,000* installed. It took a lot of work to engineer our kind of quality into that kind of price.

*For a 2-stop, 10-passenger elevator, including 3 months' maintenance. Varies with elevator constructors' local rates and expenses, cylinder well drilling cost and local taxes.

Outside, one of 11 colors available in our low maintenance, acrylic coated aluminum exterior.

Pella Clad Wood Windows overcome, beautifully, two common objections to weather-shielded wood windows. Lack of color choice. And lack of design freedom. In a Pella Clad window, all exterior wood surfaces are covered with an acrylic coated aluminum skin. A well-known and well-respected outside finish. Available in three standard (a) and eight special colors. On our Contemporary and Traditional Double-Hung, Casement, Awning, Fixed and Trapezoidal Windows. And Pella Sliding Glass Doors.

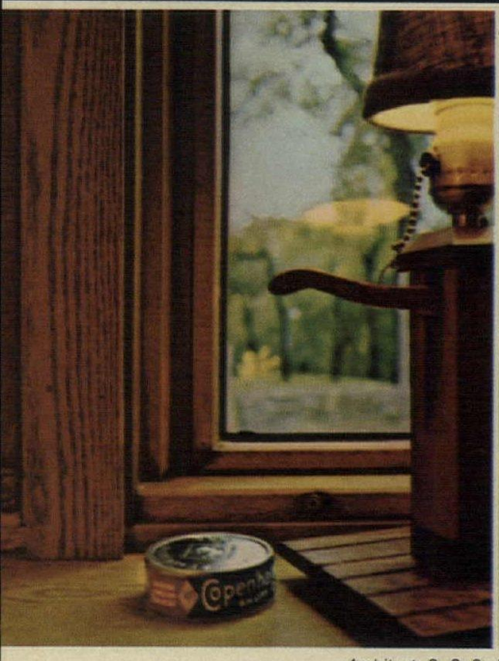
(a)

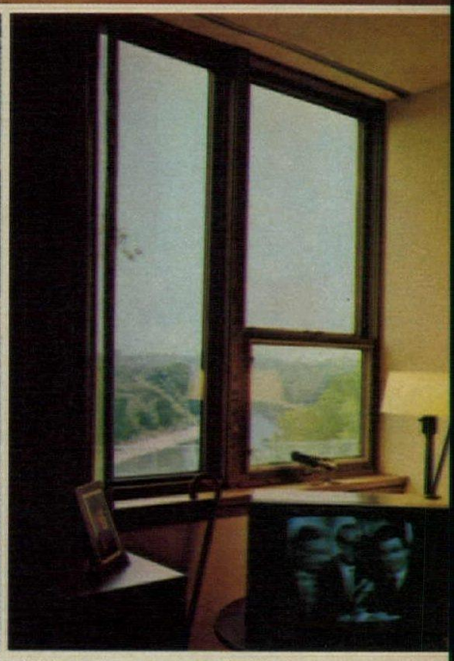
Inside, the unspoiled beauty of a carefully-crafted wood window.

Wood windows are known for their warmth. Visually. And because of their natural insulating value. And in designing the Pella Clad Wood Window, we left both of those properties unchanged. The exterior aluminum skin does not penetrate the frame or sash (b). Nor is it visible anywhere on the inside of the window. We recognized the need for a weather-resistant, low maintenance window. But seeing no reason to compromise the natural warmth of a wood window, we very carefully avoided doing just that.

(b)

At the Minnesota Veterans Home, this Pella Clad window system adds a warm touch, inside and out.





Architect: S. C. Smiley & Associates *Builder: Arkay Construction Company* *Windows: Pella Clad Fixed Units and Contemporary Double-Hung*

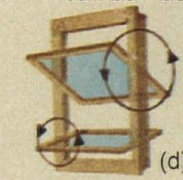
In between, the built-in flexibility of Pella's exclusive Double Glazing System.

The removable inside storm panel gives you any number of interesting options. Like using our unique Slimshade® (c) to control sunlight, privacy and solar heat gain and loss. Housed between the panes, this fully adjustable blind remains virtually dust-free. The system also accommodates our snap-in wood muntins, and the selective use of privacy panels. But flexibility is not the system's only strong point. The 13/16″ air space between the panes does a better job of insulating than welded insulating glass.

(c)

Afterward, the ease of washing a counterbalanced, pivoting sash double-hung window.

Window cleaning is another maintenance factor that must be considered. And here again, Pella design makes an easy job of it. Our Double-Hung Window has a spring-loaded, vinyl jamb liner which allows the sash to pivot. So the outside surfaces can be washed from inside the building. And because each sash pivots at its center point (d), the weight of the sash is counterbalanced. Which makes the whole job just that much easier. Reglazing can also be accomplished from inside, along with sash removal.



(d)

Pella®

For more detailed information, send for your free copy of our 24-page, full-color brochure on Pella Clad Windows & Sliding Glass Doors. See us in Sweet's Architectural File. Or look in the Yellow Pages, under "windows", for the phone number of your Pella Distributor.

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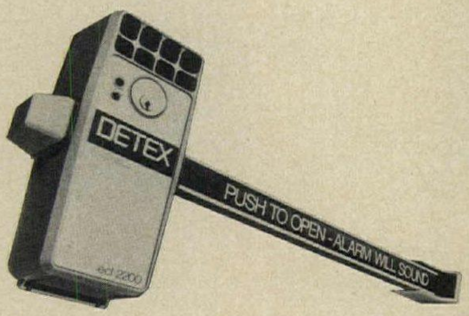
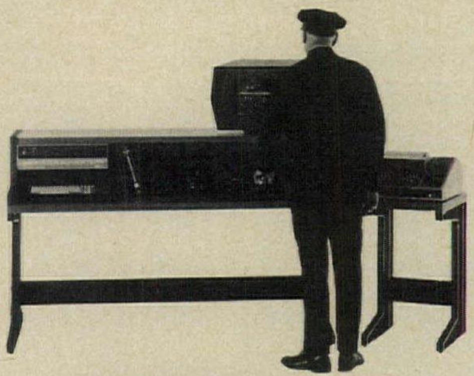
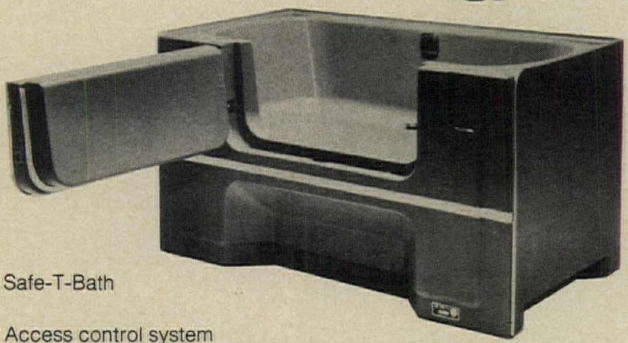
Products and literature



Door alarm



Econ VI



Safe-T-Bath

Access control system

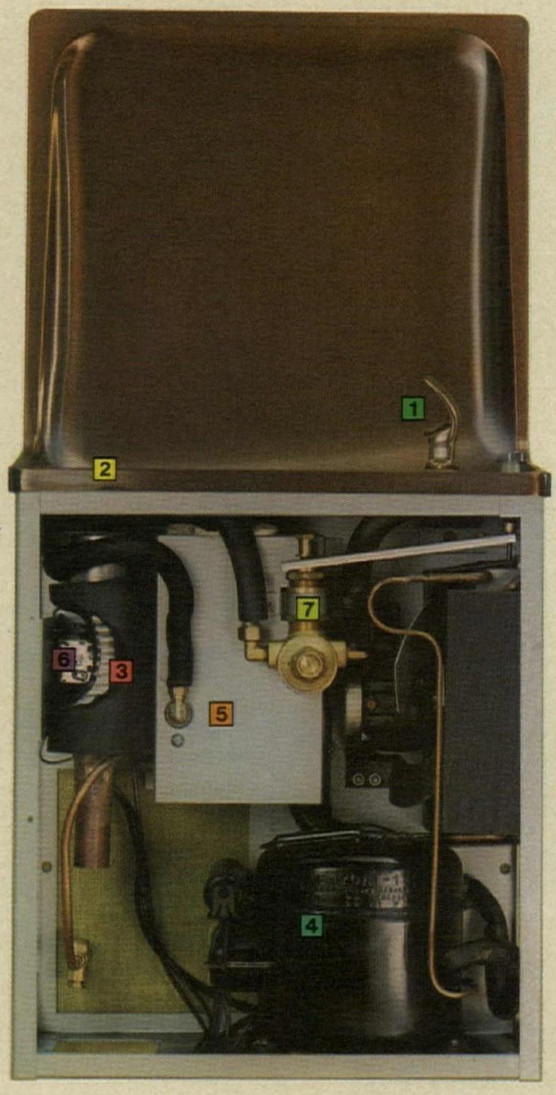
Door alarm and lock unit. Designed to monitor emergency exits against unauthorized use and to ensure immediate egress in case of an emergency in commercial and industrial buildings, hospitals, apartment buildings, and other public areas. Four separate convenience security modes are offered from a key requirement for all exiting or entry (alarm sounds during no-key exits) to free entry and exit with no key or alarm involvement. It will fit wood, aluminum, and steel doors, is easily installed on out-swinging doors. Circuitry is all solid-state, pre-wired and powered by a 6 v battery. Only 4 lbs of pressure on any spot on the solid, extruded aluminum panic bar releases the latch and unlocks the door. Detex Corp.
Circle 100 on reader service card

Econ VI monitors entire building's fire detection and alarm network continuously, employs flame and smoke detectors, thermal fire detectors, firestats, and sprinkler alarms, reports and alerts personnel to any abnormal condition immediately, pinpoints location of problem. Programmed procedures can be automatically activated. Used in building surveillance, systems can employ infrared and microwave intrusion detectors, perimeter protection devices, door and entry detection, ID card readers, parking lot capacity control etc., according to maker. Barber Colman Company.
Circle 101 on reader service card

Safe-T-Bath. A regular-size, 5-ft bathtub with a door which allows paraplegics to enter and exit on their own. Tub is raised 18 in. off the floor and its watertight door measures 30 in., with opening swing of 180 degrees. Floor of the tub is exact level required for a patient to slide from wheelchair to tub. Steel frame unit is covered with fiberglass. According to maker, surface is chip- and mar-resistant and is easily cleaned. Safe-T-Bath, Inc.
Circle 102 on reader service card

Access control system. In addition to other checks provided by the system, it adds a visual comparison of the card user, either direct or via CCTV. In operation an individual inserts his invisibly coded card in the reader at an authorized entrance. The reader automatically selects the correct 35 mm. photo from the photo ID bank and displays it in large format and full color, visible only to guard personnel, on a screen at the entrance, or at the central control station. Visual comparison of the photo and the individual allows or denies access. Rusco Electronics Systems.
Circle 103 on reader service card
[continued on page 112]

Patina bronze-tone stainless outside...



Incomparable workmanship inside

Here's a case where "or equal" isn't equal.

Halsey Taylor has a pretty good name. But it's not because we make the best-looking water coolers in the world. It's because we put a lot more quality workmanship on the inside of our coolers—where hardly anyone ever looks, or needs to.

We honestly don't believe Halsey Taylor water coolers have an equal.

Do us a small favor. Look carefully at the inner workings of this simulated semi-recessed cooler. Compare its craftsmanship, technical ingenuity and performance with any other brand of water cooler.

We work too hard at building the best to accept the idea that anyone else's product is just as good.

1 **Exclusive 2-stream bubbler.** Builds a large, drinkable mound of water. Anti-squirt and vandal resistant. One piece chrome-plated brass forging prevents contamination.

2 **Cooler top.** Patina stainless steel or satin finish stainless steel, polished and buffed for beauty and ease of cleaning. Separate drain strainer removable for easy cleaning without removing cooler top.

3 **Pre-cooler (cutaway).** Incoming water line coiled around and tin-bonded to cold water drain. Boosts cooling capacity by 60%.

4 **Condensing unit assembly.** Hermetically sealed, lubricated for life. Automatic re-set overload protector prevents overheating. Capacitor insures compressor startup. All components designed and coordinated for top efficiency and long life.

5 **Cooling storage tank.** All copper, hot-dipped pure tin lining. Incoming coil is tin-bonded to refrigerant coil to cool water before it enters tank.

6 **Dual temperature controls.** Two thermostats, primary and secondary, provide double protection against freeze-up.

7 **Automatic regulating/operating valve.** Maintains constant stream height under line pressures varying from 20 p.s.i. to 90 p.s.i. Easy to service. Tamper-proof. Large orifices resist deposits and clogging. All parts are corrosion-resistant.

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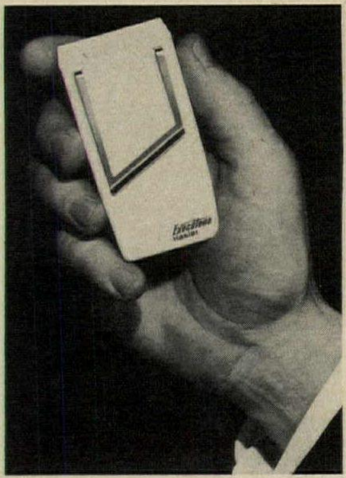
Products and literature continued from page 110

Pocket page system can alert selected personnel whenever locked doors, safes, windows, cabinets are opened without authorization; can also be tied in with pressure valves, thermostats, fire alarms, sprinkler systems, and similar equipment to alert maintenance men and others in case of emergency. A coded tone signal from receiver worn in a guard's shirt or jacket pocket lets him know when a forced entry is taking place. Any number of guards can be alerted simultaneously. Executone Inc.
Circle 104 on reader service card

Smoke detector, alarm/control panel. A fire-alarm system that spots an incipient fire, flashes a signal, to alarm control panel, which automatically turns on emergency signal, has been designed especially for hospitals, schools and colleges, commercial and industrial use. Panels can also monitor separate security and surveillance systems. Users can order degree of protection needed, can expand system. Honeywell.
Circle 105 on reader service card

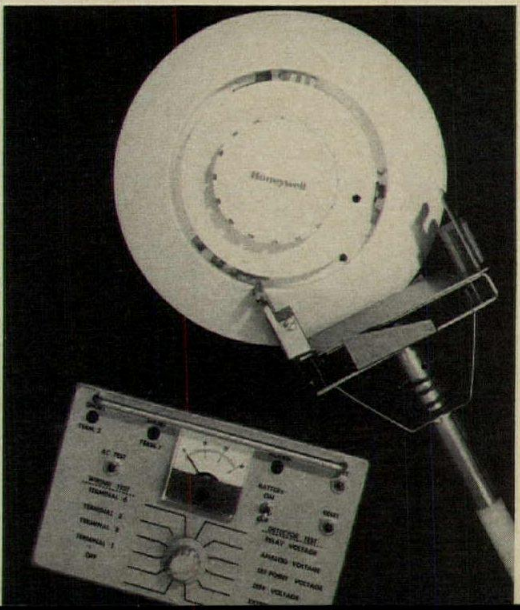
Hinges. Spring type are self-closing devices for room doors off corridors in hotels, motels, or apartments which must be self-closing. Concealed circuit electric hinges and concealed switch electric hinges serve as components in electronic security system, conducting electricity to door to operate locks, or activating alarms or monitoring devices when door opens or closes. All are tamperproof, states maker. Stanley Hardware.
Circle 106 on reader service card

[continued on page 114]



Pocket page

Smoke detector



Bally Walk-Ins belong where food must be right and ready for the daily pupil parade

Bally Walk-In Coolers and Freezers belong everywhere mass feeding takes place. They can be assembled in any size for indoor or outdoor use from standard panels insulated with four inches of foamed-in-place urethane, UL 25 low flame spread rated and Factory Mutual research approved. Choice of stainless steel, aluminum or galvanized. Easy to enlarge . . . easy to relocate. Refrigeration systems from 35°F. cooling to minus 40°F. freezing. Subject to fast depreciation and investment tax credit. (Ask your accountant.) Write for 28-page book and urethane sample.

Bally Case & Cooler, Inc., Bally, Penna. 19503.

Bally®

Address all correspondence to Dept. PA-4.

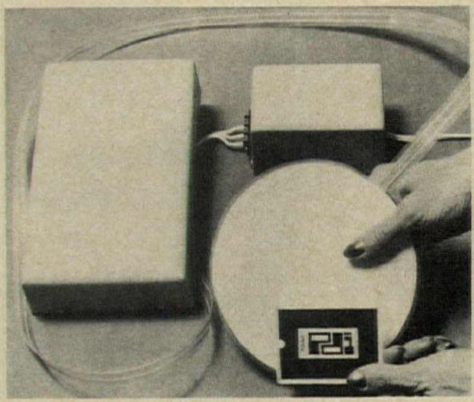
Circle No. 330, on Reader Service Card

Products and literature continued from page 112

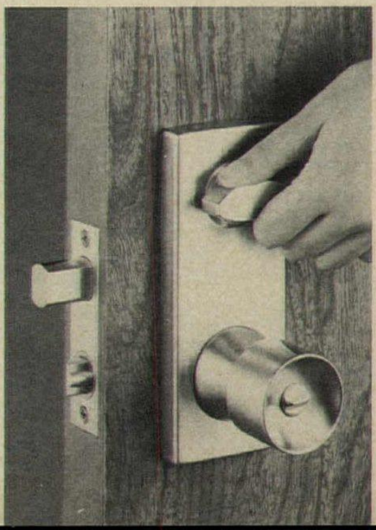
Proximity device. A remote sensing electronic security system that reacts by unlocking doors, opening gates, and sending off alarm signals. Each door operated by the system has a sensor in or near the door but not externally visible. Only the holder of the PDI key (similar to a credit card), knowing the whereabouts of the sensor, can gain entry. If card is incorrect, an alarm circuit will be activated. It is tamperproof, states maker. Proximity Devices, Inc.
Circle 107 on reader service card

Double-locking security. Lock instantly retracts locking mechanisms. To exit, twist knob or thumbturn for simultaneous release of both the deadbolt and deadlatch; from the outside, the two locking mechanisms are retracted with a turn of the key, a one-hand operation. It features combinations of a half-inch throw deadlatch with a one-inch throw deadbolt. Cylinder unit is recessed, mechanism protected by an armor plate. Schlage Lock Company.
Circle 108 on reader service card

Combination door holder-release and hydraulic closer, with integral smoke detector is mounted on the door frame to detect smoke from any direction. Unit holds fire and smoke barrier doors open to facilitate building egress. The first trace of smoke passing through the door opening activates smoke detector and doors automatically close to confine smoke to the area of fire origin. Unit offers multipoint hold-open and automatically adjusts to wall conditions to achieve maximum hold-open. It meets all model building code requirements for smoke detection and automatic closing doors and may be used for independent door control or incorporated into any listed compatible fire alarm system. Rixson-Firemark, Inc.
Circle 109 on reader service card
[continued on page 116]



Proximity device



Double lock

Architect: Alan Liddle, FAIA

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Olympic Stain is just about the most beautiful thing you can do for wood. It brings out the grain and subtle beauty of wood, yet penetrates for real protection. And because it allows the wood to breathe, Olympic Stain will never crack, peel or blister. (The solid colors are also excellent for re-do over old paint on rough wood siding, shingles or shakes.)

Free color samples: Write Olympic Stain, 1148 N.W. Leary Way, Seattle, Wa. 98107. Olympic Stain, A division of COMERCO, INC.

Products and literature continued from page 114

Sentronic door closer/holder is a fail-safe safety device that closes smoke barrier doors when electric current is interrupted and can be used in conjunction with all types of new and existing detection systems. Meets major building and life safety codes. It is available in two surface and one concealed model for mounting on the hinge face, stop face, or fully concealed in the door. Hold-open options range from 85 to 130 degrees. LCN Closers.
Circle 110 on reader service card

JMC-AV-COM self-contained plug-in audiovisual communications unit requires no projection booth, no screen set-up, no complex wiring, no training or special knowledge to operate, according to manufacturer. The 33-in.-deep module can be recessed, placed on a shelf or installed in other ways. Built-in, nonglare rear projection screen large enough to accommodate viewers up to 32 ft away, makes it adaptable to conference rooms, libraries, classrooms. Jerome Menell Co.
Circle 111 on reader service card

Life safety fire sprinkler system is designed for use in compartmentalized spaces and is intended to react quickly and effectively enough to suppress and contain fire in the compartment of origin, thereby preventing the fire's spread. According to the maker, system uses water efficiently and can be installed easily and economically. In addition to attacking the fire, the system will also summon the fire department. Components are copper or copper alloy. Total system includes water supply, piping, and electronic equipment for monitoring the system. Copper Development Association, Inc.
Circle 112 on reader service card

Duct sealer is designed for sealing joints in industrial high-pressure ductwork and carries the UL label. According to the manufacturer, sealer has high solid content with consistency that prevents flowing once it is put. Tests indicate sealer will be effective without having to solvent clean the duct and fitting prior to application. United Sheet Metal.
Circle 113 on reader service card

Emergency/general fluorescent lighting. It is said to provide widespread glare-free lighting for 90 min in emergencies and normal-task illumination level when building power is present. Lensafe II's two lamps are lighted when normal ac power is present but unit instantaneously switches to one-lamp battery-powered operation whenever an outage occurs and automatically switches back to normal power when it is restored. Holophane Company, Inc.
Circle 114 on reader service card

Multi-Cable Transit, a device used in making firetight penetrations with electrical cable, conduit, or pipe, stops the passage of fire from one room (or floor) to the next and contains water and poisonous gases as well. Transit frames are available in a variety of types for many penetration requirements. They permit the addition or elimination of cable at any time. Nelson Electric.
Circle 115 on reader service card
[continued on page 118]

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The Glass Company thinks safety should mean freedom of choice.

And we support that opinion with glasses like Pinstripe® wired glass, shown here. A unique combination of style and protection, manufactured and patented exclusively by ASG, and part of a complete line of safety glazing products in a variety of colors, patterns and finishes. Including Nuweld® wired glass, which qualifies as both safety and fire retardant glazing. Tru-Temp® tempered glass, produced with a special heat treatment that makes it four to five times stronger than regular annealed glass. Supratest® laminated glass to reduce the potential hazards of flying glass in case of breakage. And, now, Polyflow® and Acryflow®—new plastic safety glazing materials that are amazingly strong, light in weight and transparent. All quality products from ASG, where safety glazing means the beginning of great things—not the end. Write us for complete information.

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Sound system supervisor monitors every component in voice evacuation system. The malfunction of a speaker, speaker line, amplifier, or any other component is indicated by illuminating general and specific-area annunciator lamps plus sounding an alert signal. If time permits, maintenance staff can correct the failure before an emergency arises; if not, the annunciator will let the fire marshall or other emergency personnel know that a substitute means must be found to communicate with the area affected by the equipment failure. Dukane Corporation.
Circle 116 on reader service card

Literature

Lightning protection. Catalog contains information on origin of lightning, protection equipment, systems, and codes. Approved Lightning Protection Co., Inc.
Circle 200 on reader service card

Building Security into Building Plans is the title of booklet describing Electronic Control of Openings (ECO) security system. It lists facts about major components, installation, and optional security equipment, provides architects and builders with information concerning benefits of designing security into original building plans. ECO system provides buildings with total monitoring and control by sensitizing openings, states maker. Components are wired directly to a central control panel. Hager Hinge Company.
Circle 201 on reader service card

UL-listed panelboards suitable for use in class 1, group D, div. 1 and 2 hazardous areas are approved for use on single phase, 3 wire, 120/240 VAC systems, or 3 phase, 4 wire, 120/208 VAC systems and are equipped with a solid neutral bus. Used for control and protection of lighting circuits in either hazardous locations or locations requiring watertight enclosures. Brochure contains outline dimensions and shows standard and optional features. Nelson Electric.
Circle 202 on reader service card

Surface-mounted exit alarm. Unit is designed for use where fire-safety regulations prohibit ac line voltage directly at the door. It contains a nickel cadmium battery which is maintained at full power by an automatic trickle charger, permitting continuous alarm surveillance even if the ac power fails. If a monitored door is opened by an unauthorized person, alarm sounds on-site, at a remote panel, or both. Battery power is sufficient to keep alarm operable for 10 hrs, states maker. Literature is available. Detex Corporation.
Circle 203 on reader service card

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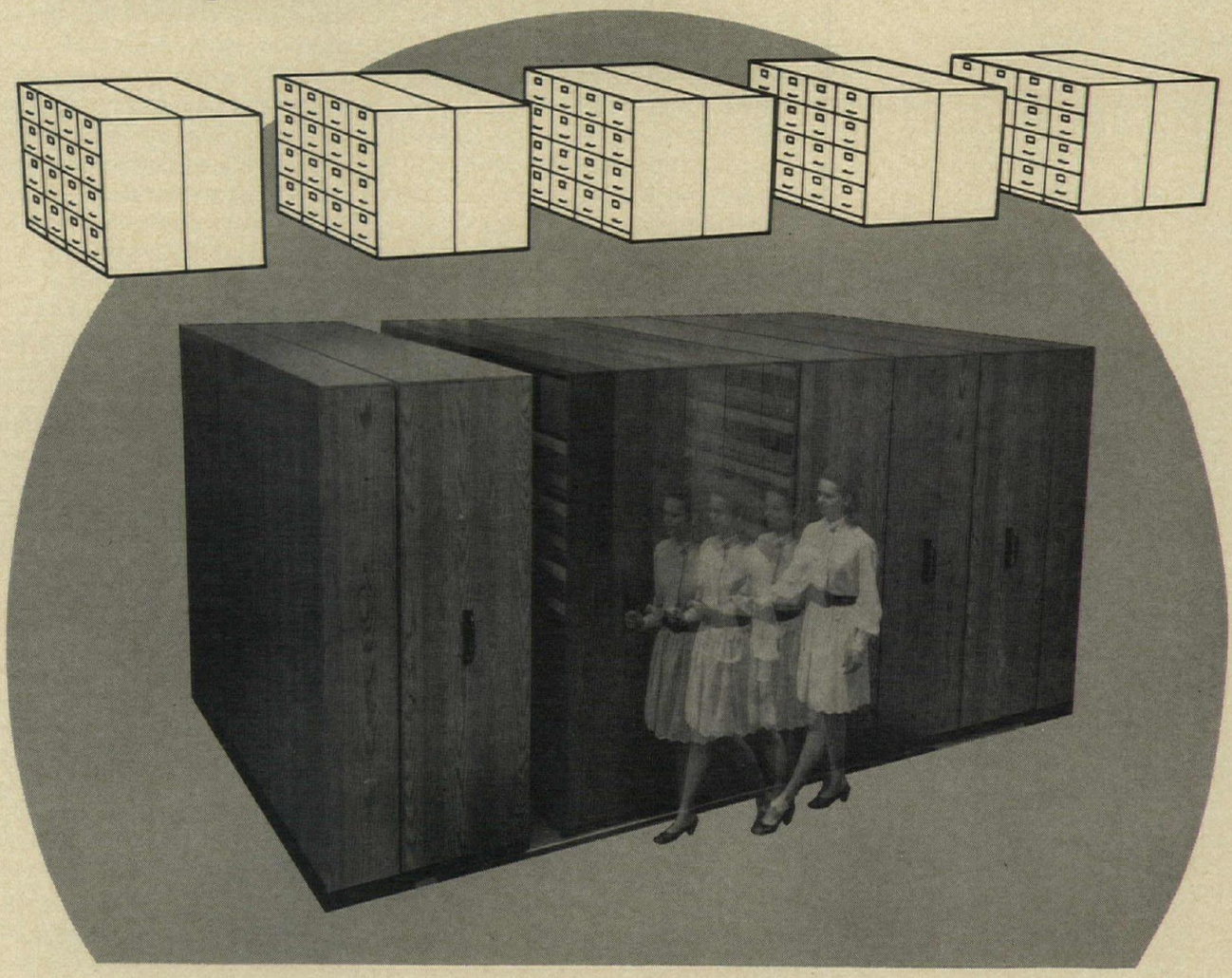

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Prepare-for-the-worst bookshelf

Fire Safety in Buildings: *Principles and Practice by G. J. Langdon-Thomas. New York; St. Martin's Press, 1973, 296 pp., $20.*

Because most of the pertinent research on the subject of building fire safety is only to be found in reports and papers, the author of this text has consolidated much of the material in one book. The comprehensive text, written in clear language by the senior architect of Britain's Fire Research Station, provides concise guidance for understanding the science of fire technology to architects, engineers, and others concerned with the building products industry.

America Burning: The Report of the National Commission on Fire Prevention and Control. *Washington, D. C.; U. S. Government Printing Office, 1973, 188 pp., $2.35.*

Over $11 billion of our resources are wasted by destructive fires each year. 12,000 people are killed each year and tens of thousands more are physically and emotionally scarred by fire. If implemented, the recommendations presented in this report would significantly reduce this great toll. The report emphasizes the prevention of fire through implementation of local programs. One of the longest chapters of the report covers Fire and the Built Environment, which details the hazards created through building materials and design, and also discusses codes and standards.

Designing to Survive Disaster. Proceedings of the conference held in Chicago on 6, 7, and 8 November, 1973. *Chicago; Illinois Institute of Technology Research Institute, 1973, 284 pp., ringbound, paperback, $15.*

The 29 papers—many with extensive and invaluable bibliographies—presented at the Chicago conference make up one of the most thorough documents yet assembled on the problem of design as it relates to survival. Some of the presentations that would be of special importance to architects are: Disaster Response Planning, Earthquake Effects on Tall Buildings, Designing Critical Facilities for Extreme Wind Conditions, Wind Effects on Tall Buildings, Structural Design—Integrated Load (Hazard) Conditions, Common Causes of Building Failure, Tall Building Protection From Physical Disasters, Fires in Tall Buildings, and Influence of Fire-Resistant Design on Survival.

A Design Guide for Home Safety. *Washington, D. C.; U. S. Government Printing Office, 1972, 151 pp., paperback, $1.50.*

This survey, prepared for HUD's office of research and technology by Teledyne Brown Engineering, was made after it was learned that statistics for developing reliable and effective accident-reduction design had not been previously accumulated by any organization. Invaluable for architects, engineers, planners, builder-developers and housing manufacturers, this concise and clear guide includes statistical data on the causes of home accidents, comprehensive, well-illustrated design guidelines and recommendations for the provision of safer home environments, and a series of safety checklists pertinent to [continued on page 122]

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Books continued from page 120

each major design consideration. Individual chapters discuss stairs, bathrooms, windows, doors, kitchens, floors, electrical, exterior environs, and some additional considerations, which include garages, roofs, heating, and air conditioning.

Earthquake Engineering *compiled by Robert L. Wiegel, coordinating editor. Englewood Cliffs; Prentice-Hall, Inc., 1970, 518 pp., $26.95.*

This collection of articles by outstanding authorities summarizes all that is known about earthquakes and resistant-design of structures to provide the designer and engineer with a complete coverage of this geological problem. The final section is devoted to modern design of earthquake-resistant structures, including high-rise structures (reinforced concrete, steel frame, pre-stressed and pre-cast concrete towers), with emphasis on the ductility requirements of these structures.

Introduction to Earthquake Engineering *by Shunzo Okamoto. New York; Halsted Press, John Wiley & Sons, 1973, 571 pp., $36.*

This reliable and comprehensive study covers the design of earthquake-resistant buildings as well as civil structures. In 18 chapters, the study provides a brief outline on geophysics related to earthquakes, seismicity, recent earthquakes (with particular attention to those of Japan), and the resulting damage. It also covers the relationship between the ground and earthquake motion, earthquake-resistant design in general, seismic problems of soil structures, and the resistance of buildings and other structures.

Building Failure: Case Studies in Construction and Design *by Thomas H. McKaig. New York; McGraw Hill Book Co., 1962, 261 pp., $12.50.*

This now standard and classic text in its field, directed specifically to the architect,

[continued on page 125]

Polysulfide sealants stick to your job year after year

Years ahead of competing materials, LP® polysulfide polymer base sealants continue to ensure waterproof and airtight construction joints in structures all over the world. For more than 25 years, polysulfide base sealants have been at work in buildings—keeping a tight bond, and preventing moisture and air penetration while expanding and contracting year after year with seasonal temperature changes.

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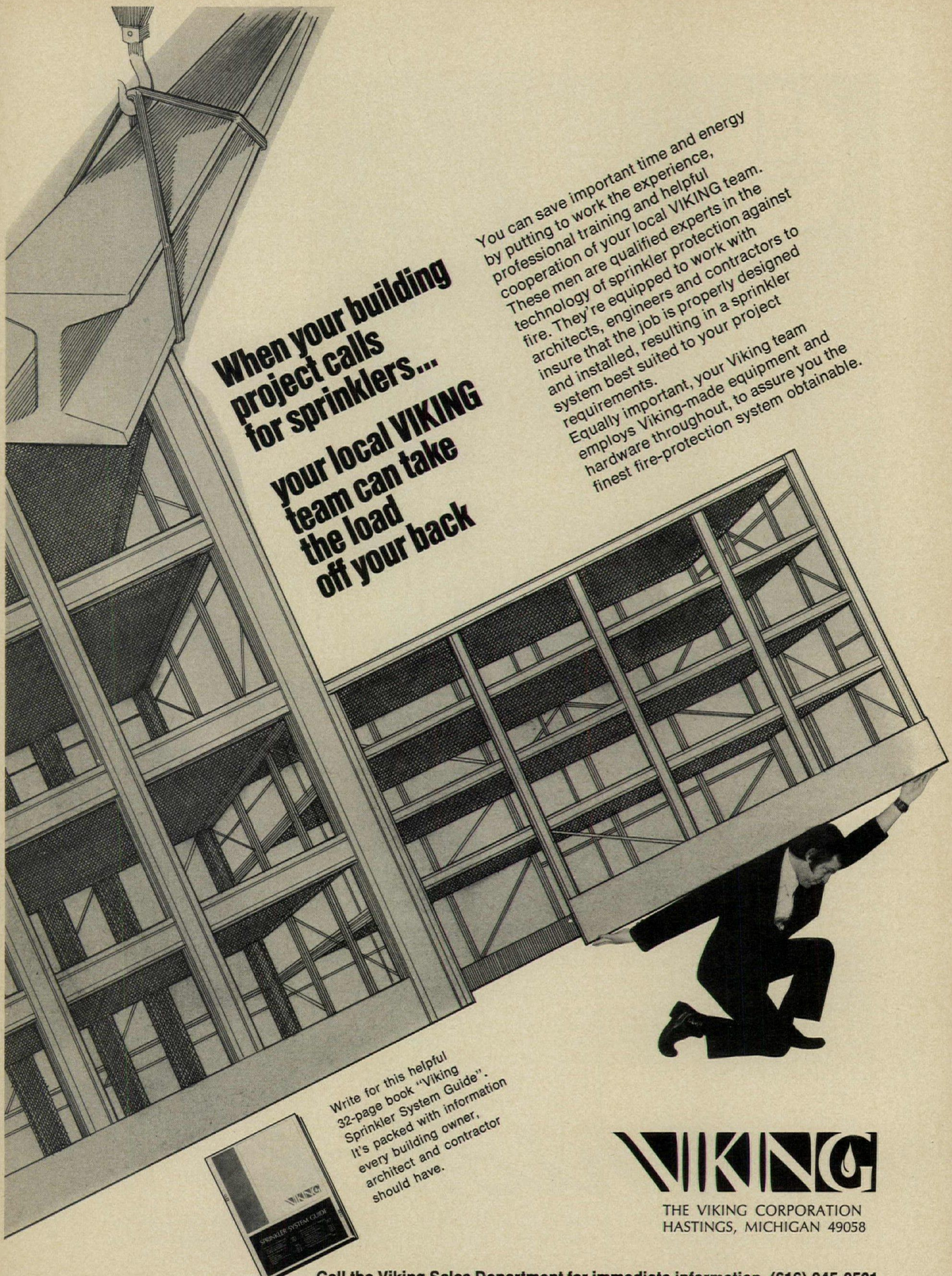

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Books continued from page 122

builder, and structural engineer, takes the position that the most interesting and instructive building is often the one that falls down. From a study of the causes of building failures, it points out, the art of building progresses; new structural principles and materials are developed, and men learn to build more safely. The comprehensive book provides building professionals with over 200 case studies of the most noteworthy failures of recent years, all systematically assembled and annotated for easy reference. Covering almost every type of building failure, individual chapters detail failures in reinforced concrete and steel frame buildings, and failures that occur as a result of alteration operations, of wind, fire and explosion.

Documents
[*The documents listed below are available from the associations and agencies cited. Requests for such documents should be directed accordingly.*]

National Fire Codes, 1973-1974 Edition. *National Fire Protection Association, 470 Atlantic Ave., Boston, Mass., 02210. 10 volumes, 225 standards, 9,516 pp., $5.75 per volume, $46 the complete set.*

Among the 10 volumes of the new edition of the National Fire Codes, 3 would be of particular interest to architects. They are: Volume 4, Building Construction and Facilities; Volume 7, Alarm and Special Extinguishing Systems; Volume 9, Occupancy Standards and Process Hazards.

Four Papers on Fire Protection for Buildings in Chicago, presented at the 1972 Chicago Conference on Fire Protection. *Gage-Babcock and Associates, Box 270, Westchester, Ill., $2 the set.*

The four papers included are: "Some Comments on the Fire Problem in Buildings" by R. A. Hechtman, "The Fire Experience in High-rise Buildings" by R.H. Jensen, "The Effect of Structural Materials on Fire Insurance Rates" by W. L. Sands, and "The Hazard and Control of Materials for Building Interiors" by C. H. Yuill.

Standard on Construction and Protection of Airport Terminal Buildings. *National Fire Protection Assn. 1973, 16 pp., $1.*

In this updated text, mandatory provisions have been separated from recommendations and the entire standard has been revised on the basis of recent fire loss experience.

[continued on page 128]

Circle No. 390, on Reader Service Card →

P/A in May

Education environments from day care through college will make up a major portion of P/A's May issue.

A day care center and, more importantly, a prototypical solution to the activities that go on there, represents the young end of the spectrum. The concept, by architects Stanley Thomasson and Raymond Abraham, turns the interior of an existing building into an exciting and responsive learning environment with almost infinite adaptability.

The next step up the education ladder, two schools by Caudill Rowlett Scott also demonstrate versatility in different levels of learning. Fodrea Elementary School in Columbus, Indiana and the latest technical school for Bell & Howell in Chicago express their different curriculum requirements with great skill and attention to detail.

With a structural system as an exterior statement, architects Dagit/Saylor have designed a new college physical education building (with multiuse capabilities) that has a clear ceiling and equally clear design convictions.

The logical chronology in education is summed up in the new Kresge College facilities in Santa Cruz, California by MLTW/ Moore Turnbull Architects. Incorporating many different activities (such as living quarters) into the education environment, Kresge brings a new quality to its student living, while showing an enormous respect for scale and siting.

Instead of a conventional presentation of a single-family house, P/A will show a new house by Peter Eisenman along with the architect's comments and the owner's appraisal of how it works.

The May issue will also include an article on how and when to use escalators, a valuable reference for anyone with vertical transportation in mind.

Then in June

P/A will turn its attention to Environmental Impact, exploring the many ways our profession is designing for relevant issues.

A profile of Wallace McHarg Roberts & Todd will show how that firm has made a true profession out of planning, making distinctions in their work that were previously unheard of.

Architect Robert Geddes of Geddes, Brecher, Qualls & Cunningham will discuss the impact of his Institute for Advanced Studies at Princeton on its surroundings and his rationale in designing the facility.

Landscape architect Ed Bye will point out for architects the potential of siting and placement in features or topographical events to create moods or feelings. He will discuss relationships of such elements as pathways and foliage to buildings that will combine structural and natural surroundings more sensitively. In addition a house for Mr. Bye by John Hejduk will be covered as a separate feature.

California architect Beverly Willis has a developed computerized technique for land use planning termed "environmental mapping." The technique attempts to identify thresholds through social, economic and ecological inputs and assesses the impact of a project in these terms both for a given piece of land and its surrounds.

Fire contained to one room of 175 apartment complex...Thanks to Spancrete®

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Needless to say, an incident such as this points out the tremendous advantage of fire-safe construction and why we will continue to build with precast-prestressed concrete in our future apartment endeavors."

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The fire gained fast headway because one tenant "...admitted she tried to extinguish the fire herself and finally realized that she wasn't making any headway, then decided to call the Fire Department."

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Signed: Rocco Paolini, Chief

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Books continued from page 125

The Role of Magnesium Oxychloride Cements in Fire Loss Protection *by John Montle. Fireproofing Products Division, Carboline Company, 350 Hanley Industrial Court, St. Louis, Mo., 63144. free*

This paper presents a new method of fire protection, showing that magnesium oxychloride plaster will provide more effective fireproofing than other newly important materials such as intumescent or subliming mastics, as well as more conventional materials such as concrete, gunite and haydite/concrete encasement.

Standards for Acceptance Testing of Electrical Distribution Apparatus. *National Electrical Testing Association, 16055 W. Ryerson Road, New Berlin, Wisconsin 53151. An 88 pp. volume to be updated free to subscribers; $75.*

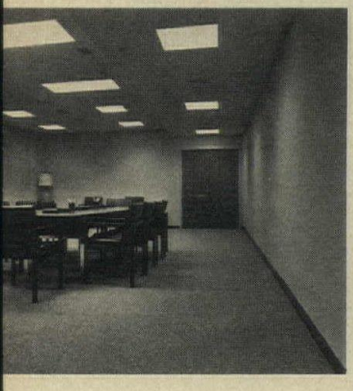
Being offered to architects, registered professional engineers, building design and construction firms, this volume includes thorough acceptance testing standards for all types of electrical system components, conductors, rotating machinery, insulation, etc.

Digest on Fire-Resistive Assemblies, Technical Digest No. 4. *The Steel Joist Institute, 2001 Jefferson Davis Highway, Suite 707, Arlington, Va. 22202. 42 pp., $1.*

This capsule review includes information on the design of fire-resistive assemblies with steel joists, and procedures for determining the most economical floor or roof assembly for ratings from one to four hours; and a series of eight rules for achieving required fire endurance through various combinations of materials, joist modifications, and substitutions, and mechanical fastening systems.

Standard for the Installation of Standpipe and Hose Systems. *National Fire Protection Association. 1973, 24 pp. $1.*

Recognition of the special needs in providing fire protection for high-rise buildings has led to major revisions in this new edition, which contains a new section on combined standpipe and automatic sprinkler systems, a new provision permitting an increase of standpipe zone heights under certain circumstances, and a requirement for roof outlets for facilities with combustible roofs or with combustible structures or contents on roofs.



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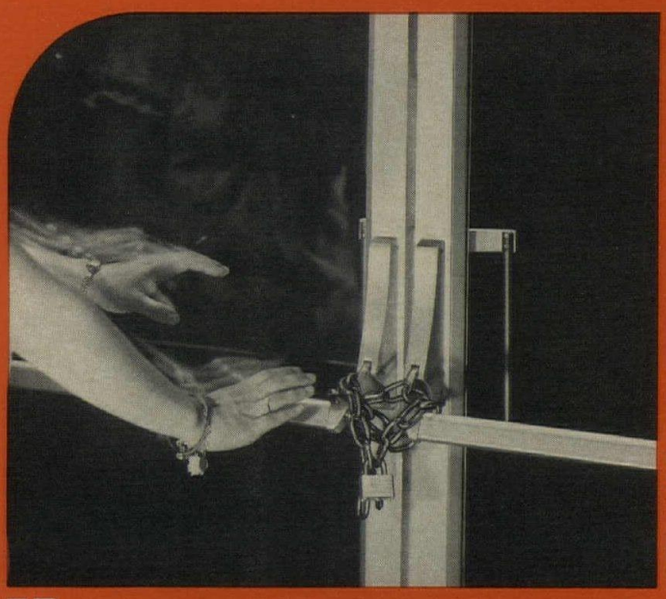

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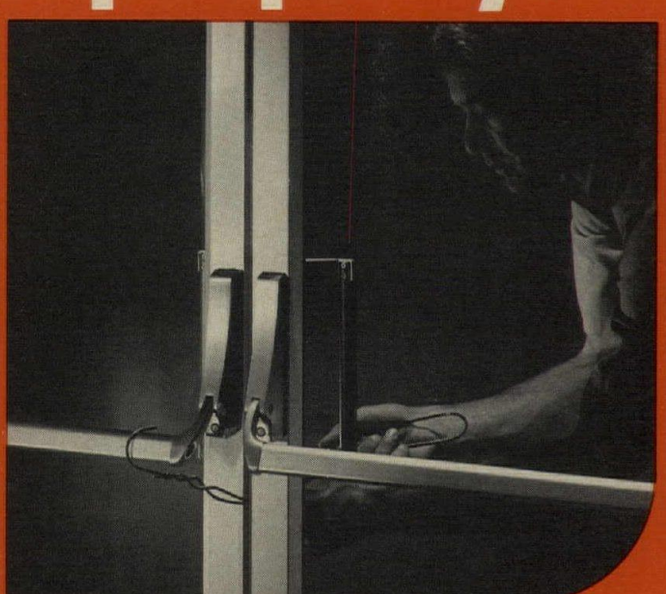

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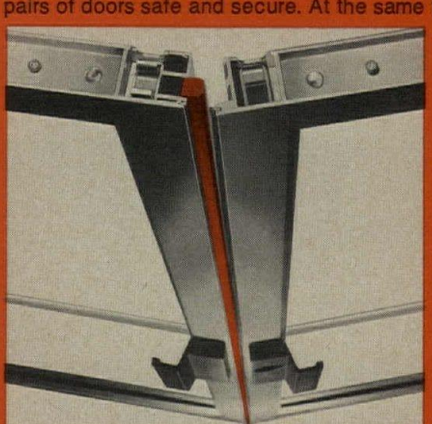

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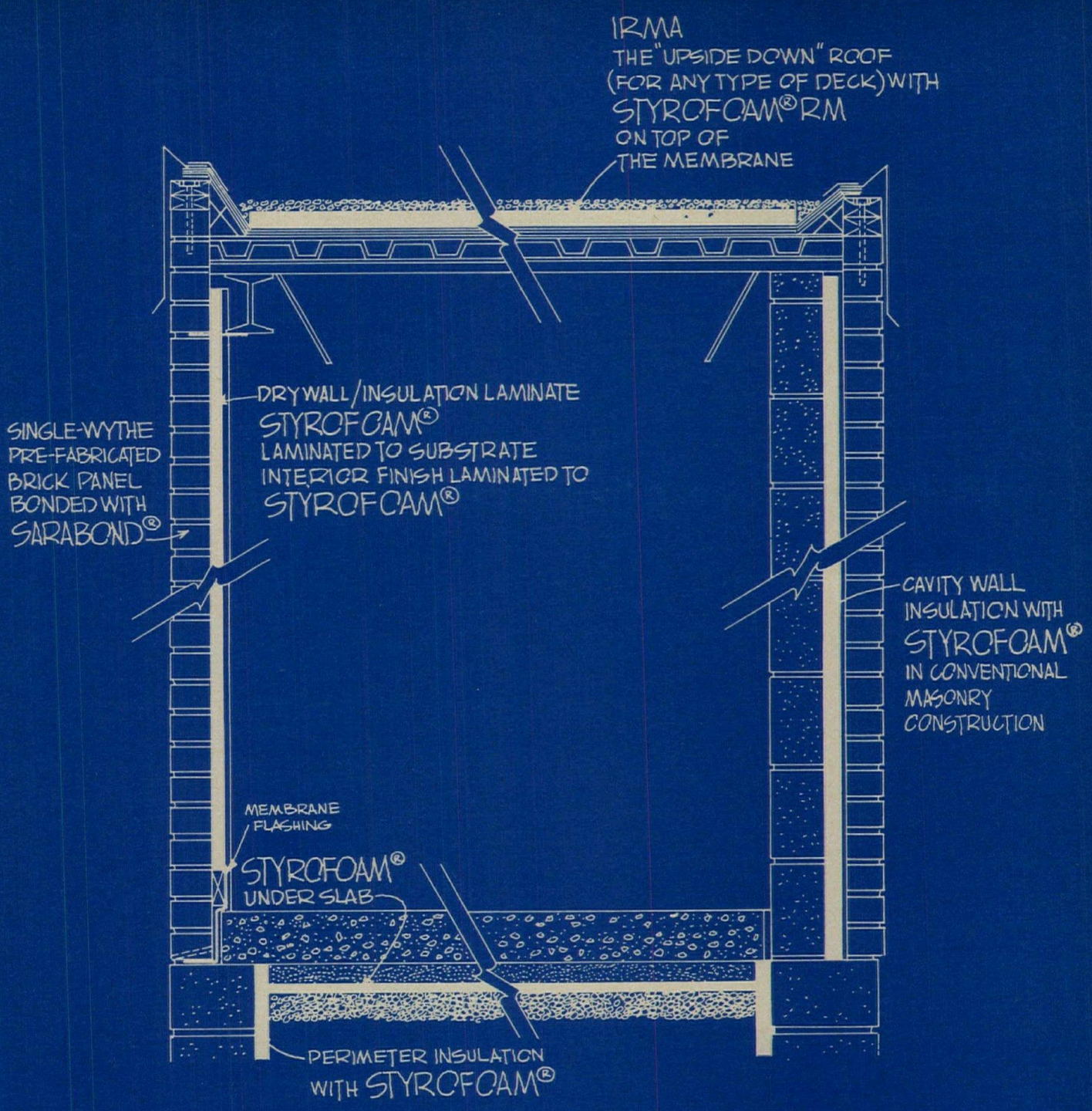

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SUPERIOR INSULATION APPLICATIONS WITH STYROFOAM* BRAND PLASTIC FOAM: CAVITY WALL, PERIMETER, AND DRYWALL LAMINATION.

STYROFOAM brand plastic foam is high performance insulation, with a record of proven performance over 25 years in all parts of the country. STYROFOAM finds extensive use in a variety of systems: drywall lamination (STYROFOAM brand plastic foam applied with STYROFOAM mastic No. 11 directly to a masonry substrate; drywall applied to the foam with the same mastic); the IRMA roofing system, a better roof possible only because of the properties of STYROFOAM RM; perimeter insulation; cavity wall insulation; and sidewall insulation over metal or wood stud frames. While STYROFOAM contains an effective fire retardant compound, it is combustible and should be installed according to recommendations. When covered with a non-combustible finish such as gypsum drywall, STYROFOAM presents no fire or safety hazard. STYROFOAM meets all major code requirements.

STYROFOAM is one of the best insulations; it provides permanent insulation in the buildings you design. And compared with many other insulation materials, *STYROFOAM is in ample supply.*

You need no "or equal"; STYROFOAM has none.

PRE-FABRICATED MASONRY WALLS WITH SARABOND* BRAND MORTAR ADDITIVE

SARABOND brand mortar additive greatly improves the bond strength of portland cement mortar. It enables prefabrication of single wythe load-bearing walls and curtain walls on-site or in a plant. Pre-fabrication under controlled conditions means better quality control and continuous production even in the coldest weather. In curtain wall applications, single wythe brick panels are hoisted into place and bolted or welded to the structure with no need for backup block. With thinner walls there is less building weight and more usable floor space. And prefabricated brick panels can speed construction time for fast occupancy.

THE PATENTED IRMA ROOFING SYSTEM PROTECTS THE BUILT-UP ROOF MEMBRANE AS WELL AS INSULATING THE BUILDING.**

IRMA . . . Insulated Roof Membrane Assembly . . . does two things, at one time, that no other roofing system can do. With STYROFOAM RM brand foam insulation on top of the membrane, IRMA protects the membrane from the abuses of nature and man which can cause failure in conventional roof systems. And it insulates the building, conserving valued energy and helping the building's heating plant work more efficiently. IRMA, which can be applied to all decks, has been around for a long time; testing and installation of the "upside down roof" began more than 20 years ago, and we know of no IRMA failures.

IRMA is the only insulated roofing system ever to qualify for all the ratings of consequence: Fire Acceptable and Class 60 Wind Uplift classifications (UL Roof Deck Construction No. 58) from Underwriters' Laboratories Inc.; and Factory Mutual approval for Class I construction.

IRMA is an engineered roof, designed to prevent problems from happening in the first place . . . not to correct one shortcoming while creating another.

I'm interested in the following Amspec systems to help me in my building designs.

- ☐ IRMA roofing system
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Notices

Appointments

Gary L. Williamson, AIA has joined Albert C. Martin & Associates, Los Angeles, as principal planner.

Frederic C. Weckel was named vice president, business development, of Welton Becket & Associates, New York City.

Victor Barr, Charles Harker and **Dominic Marziani** have been named officers of Richard E. Martin, AIA & Associates, Philadelphia.

The following have been appointed senior associates of Albert Kahn Associates, Inc., Detroit: **Arthur F. Bassett, Harry S. King, Michael W. Waskul, Ross S. Taylor, Robert H. Baum.**

Paul A. Fisher and **James N. Lewis** are new associates of Fisher Friedman Associates, AIA, San Francisco.

David C. Nichols and **Joel A. Coccia** have been named associates of Faragher & Macomber, Rochester, N.Y.

Alec Osachoff and **George Carlson, AIA** have been named associates of Danielian Moon Sampieri & Ilg, Newport Beach, Calif.

David B. Linstrum, ASLA was named senior landscape architect of Reynolds, Smith & Hills, Jacksonville, Fla.

Arthur F. Ward has been named an associate of LeMessurier Associates/SCI, Cambridge, Mass.

Joseph Roher is now managing director of Gruzen & Partners, New York City and Newark, N.J. **Charles Silverman, AIA, Robert A. Genchek, AIA, David Eng, AIA,** were named senior associates. **Hortensia Mateos** and **Franklin G. Brehmer Jr.** are new associates. **Allan R. Johnson, AIA** was appointed senior associate and director of the Newark office and **Edward N. Rothe, AIA** was promoted to director of design and planning.

Don L. Gugliuzza, Richard H. Hynes, Norman R. Pedersen and **James E. Truitt** have been elected general partners of Larson & Darby, Inc., Rockford, Ill.

Russell Christianson has been named vice president and **Sam Cardella** has been named to the interior consulting staff of Jeanne Hartnett & Associates, Inc., Chicago.

Williard C. Pistler, Jr., AIA has rejoined Dalton Dalton Little Newport, Cleveland, as vice president of architecture services.

Paul N. Schneider has joined the Fort Lauderdale office of Perkins & Will Architects.

Ron Jolivette has been named a vice president of Frank L. Hope & Associates, San Diego, Calif.

New addresses

Robert B. Alpern Associates Inc., 700 Maple East, Birmingham, Mich. 48011.

Ware Malcomb Garner, 16722 Hale Ave., Irvine, Calif. 92664.

The Ritchie Organization, 236 Goodwin Crest, Birmingham, Ala. 35243.

Perkins & Will, 488 Madison Ave., New York City 10022.

Kajima Associates, 299 Park Ave., New York City 10017.

Larson & Darby, Inc., 1322 East State St., Rockford, Ill. 61108.

New firms

Eugene Lew & Associates, 1844 Union St., San Francisco 94123.

Don Knorr & Associates, 950 Battery St., San Francisco 94111.

Newport Collaborative, Inc., 444-A N. Newport Blvd., Newport Beach, Calif. 92660.

Safe Steel Pipe Fights Fires...

It doesn't feed them

Fire Chief Allen Hulett, Elk Grove Village, Ill.: "Steel pipe is the kind of safe, strong piping material I'd like to see in all of our buildings—especially industrial and commercial buildings. And in Elk Grove Village we have plenty of them—more than 900 industries are located here next to O'Hare Airport. We have the nation's fastest growing industrial park.

"In fire situations, steel pipe sprinkler systems will stay intact longer than any other material—to extinguish the fire or contain it until we arrive. Steel doesn't disintegrate in fire. And steel pipe doesn't pose a threat to my 70 officers and fire-fighters. It doesn't add to the combustibles and, most important, it doesn't give off toxic gases.

"In 20 years of fire fighting, and the burning of more than a thousand buildings for research and training, I've learned a lot about the effects of fire on building materials. In my opinion steel pipe is the safest material available."

Committee of Steel Pipe Producers
American Iron and Steel Institute
150 E. 42nd Street, New York, N.Y. 10017

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Situations open

Architect: Position available with A/E firm in Black Hills area of western South Dakota. B.A. architecture, at least one year's experience in an architect's office or similar summer employment. Salary commensurate with ability and experience. Equal opportunity employer. Send experience record and salary requirements. Reply to Box #1361-636, *Progressive Architecture.*

Architect: Young university graduate with design and sketching ability for expanding firm in Florida. Please enclose freehand sketches of past work with application. Excellent potential for future associateship for the right person. Reply to Box #1361-637, *Progressive Architecture.*

Architect: Small, design oriented, high performance firm with diversified and well-financed clientele is searching for one graduate architect with three years experience. This is a permanent position in our South Florida office. Our employees know of this ad. Reply to Box #1361-655, *Progressive Architecture.*

Architect: An established consulting engineering office in northern Ohio desires a full-service architectural-engineering office. This open position is for the right person who is interested in assuming the development of this service with securement of staff, client contact, project design and supervision and office management. Salary, fringe benefits, profit sharing, partnership options, etc. are open. Equal opportunity employer. Write to Lester H. Poggemeyer, P.E., Inc., 121 East Wooster Street, Bowling Green, Ohio 43402.

Architects: For group leader positions with experience on working drawings for schools, shopping centers and medical projects. Key positions open in 200 man office. Daverman Associates, Inc., 200 Monroe, N.W., Grand Rapids, Michigan 49502. An equal opportunity employer.

Architects for Peace Corps/Vista-Action: Volunteer overseas and U. S. Low income housing projects, design of schools, hospitals, community centers, etc. Most openings —singles; some couples. Information: Bruce Mazzie, Action, OCP Box A-2, Washington, D.C. 20525.

Architectural Designer: Midwest firm with national projects has position for creative designer with experience in site planning, building design, and client presentations. Outstanding opportunity for accomplishment of significant buildings and advancement as key member of interdisciplinary design team for major educational, institutional, and industrial projects. Send confidential resume of qualifications and experience. Reply to Box #1361-639, *Progressive Architecture.*

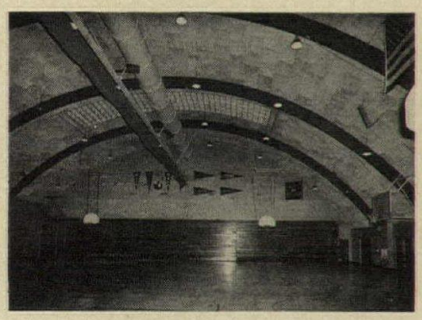
Architectural Designer and Delineator: For progressive office in Montreal with international business. Excellent possibility for advancement with young design oriented firm. Relocation expenses paid. Please include samples of work with application. Reply to Box #1361-640, *Progressive Architecture.*

Architectural Faculty: Rapidly developing architectural program at Tuskegee Institute seeks qualified professionals to teach architectural graphics, design fundamentals, environmental systems, architectural design. Opportunity for research, community work. Salary and ranking commensurate with experience, education, talent. Send vitae to: Charles Hight, Head, Department of Architecture, Tuskegee Institute, Tuskegee Institute, Alabama 36088.

Construction Management: Position open to architects or engineers experienced in CPM scheduling, systems design, estimating, contracting and other CM programs. Opportunity to join expanding department at Daverman Associates, Inc., 200 Monroe, N.W., Grand Rapids, Michigan 49502. An equal opportunity employer.

Designer: Continued growth into a nationwide practice of our Southwest based A & E firm has made it possible to offer experienced persons an outstanding compensation package while working on a variety of projects. Candidates will have three to five years in preparing working drawings, coordination and checking of all phases for a complete document package. Write today in complete [continued on page 138]

We're celebrating our 20th reunion at Burlington-Edison High School.

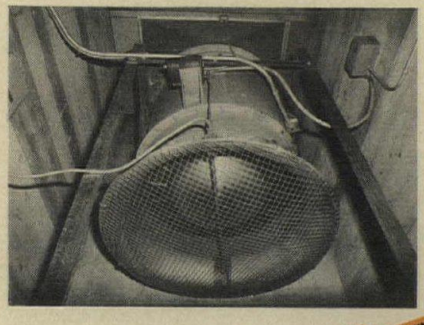


In 1953, a Joy controllable pitch Axivane® fan was installed in the Burlington-Edison High School, Burlington, Washington, to quietly heat and ventilate the gymnasium building. The engineer selected a controllable pitch fan because it was the most efficient way to satisfy variable ventilation loads created by 50 to 2000 shouting spectators.

After twenty years, the Joy controllable pitch Axivane fan equipped VAV system is still in school, with no danger of becoming a dropout. Power requirements are low. Fan maintenance has been practically zero. Operating costs are minimal. Quiet operation was assured by incorporating an engineer selected sound cell.

To meet the air requirements of VAV systems, the Joy controllable pitch fan precisely adjusts the pitch of its blades. And maximum energy savings are realized at partial loads . . . a very important consideration these days. At Burlington-Edison, the fan blade angle is adjusted in response to a wall rheostat calibrated to crowd capacity.

Take advantage of our 20 years of experience and inventiveness in designing and building Joy controllable pitch fans . . . write for information and engineering recommendations. Joy Manufacturing Company, Air Moving Products, New Philadelphia, Ohio 44663. In Canada: Joy Manufacturing Company Ltd., Alpha Fan Division, Winnipeg, Manitoba.



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Offices and plants throughout the world

NEW PHILADELPHIA DIVISION

JOY

Job mart continued from page 136

confidence. An equal opportunity employer M/F. Reply to Box #1361-613, *Progressive Architecture.*

Director of Design: Minneapolis A-E firm of 75, with diverse, regional/national practice, seeks imaginative, aggressive architect for position of Director of Design. Must have degree, registration, and extensive experience as a senior architectural designer. Primary responsibility is for all visual design office-wide. Director is design consultant for all projects, and chief critic and spokesman for architectural designers. Send confidential resume and salary history to William Scott, Setter, Leach & Lindstrom, Inc., 133 Foshay Tower, Minneapolis, Minnesota 55402.

General Manager: For architectural firm in upper midwest. Registered architect plus five years management experience. Mature individual required. Record of leadership and accomplishment in professional and organizational activities. Will work closely with senior management and must have ability to direct and control all operational and administrative functions. Salary range: $30,000. Reply to C. Van R. Bogert, Jr., AIA, Weld-Coxe Associates, 1900 Chestnut Street, Philadelphia, Pa. 19103.

Landscape Architect: Expanding multi-displined A/E/P firm has opening for landscape architect. Registered or qualified to be registered in Ohio. Upon proven performance, position can lead to department head status. Send complete resume and technical references to: Samborn, Steketee, Otis and Evans, Inc., 600 LOF Building, Toledo, Ohio 43624. (419-248-6271) An equal opportunity M/F employer.

Manager. Professionally oriented individual with ability in marketing services and client contact sought to head up business development efforts of large general architectural practice in Central Pennsylvania on full time basis; must be able to initiate market research, communicate effectively the firm's capabilities, perceive project requirements, and secure commissions; background in architectural or related design professions desirable. Forward detailed resume tracing professional growth and salary history to P. O. Box 1144, Harrisburg, Pa. 17108.

Project Architect: Registered architect with at least 5 years medical facilities design and planning experience needed as project architect, responsible for overall direction and completion of a large variety of medical projects working with a seasoned staff of professionals. Increased work load makes opening available. Excellent opportunity for professional advancement. Outstanding benefits include profit sharing, bonus, regular salary reviews, as well as health, life, disability and accident insurances. Qualified professionals. Please send resume in complete confidence to: Cliff Schroeder, Ellerbe, Inc. (Architects/Engineers/Planners), One Appletree Square, Minneapolis, Minn. 55420. Equal Opportunity Employer.

Registered Architect: Established, medium size, architectural firm, which has received over 35 local, state and national design awards, and maintains a growing and diversified practice, in Metropolitan Detroit, seeks an experienced registered architect as an associate level office administrator. Responsibilities include management of personnel, finance, facilities, contract negotiations, professional services, public relations and project involvement. Send resume and references to: P. O. Box #8788, Detroit, Mich. 48224.

Registered Architect: Sophisticated architectural practice in small southern New Mexico town is interested in registered architect for association. Position primarily is in-office controlled production. Send resume and samples of work to Alley Associates, P. O. Box 2106, Roswell, New Mexico 88201.

Teaching Position: Architectural engineer or architect with some civil engineering background. Must have minimum of three years professional experience and some teaching experience desired. Registration not required, but desirable. Position open for full-time faculty in two-year community college in vicinity of Washington, D.C. starting August, 1974. Send resume to Prof. Cecil Van Allen, Chairman, Engineering and Engineering Technology Department, Montgomery College, Rockville, Maryland 20850.

[continued on page 140]

In your town, what do fire alarms sound like?

Bells or buzzer? Chimes, gongs, horns or sirens? A fire alarm *must* sound like a fire alarm; the same in schools as in offices and public buildings. The same sound in Sheboygan as in Chicago. There *must* be a sole, easily-recognized national fire alarm alerting signal.

DirecTone™ horns reproduce a loud, penetrating and distinctive "slow whoop" fire alarm alerting signal. These same horns reproduce voice-command evacuation management orders to occupants and firemen. Secondary emergency tones can be provided. UL-listed. Meets NFPA standards.

In your area, how do your Fire Fighters communicate with each other during a fire?

By shouting? Walkie-talkie? There *must* be a separate, closed-circuit, 2-way telephone system between the central control station and all elevators, elevator lobbies, corridors, stairways and safe refuge compartments.

Firemen communicate current information direct to Autocall's Fire Command Center using dedicated telephone system.

In your high rise, how do you evacuate all occupants in case of fire?

You don't! You direct fire-affected occupants to areas of safe refuge. For increased life-safety, there *must* be a voice-command capability which fire fighters can use to tell occupants what to do, where to go.

Occupants are directed to safety and fire fighters are issued orders from Autocall's Fire Command Center. DirecTone Systems may be zoned by floors or refuge compartments. Alarm-tones and voice-commands can be directed to selected zones. Entire system electrically supervised. UL-listed. Meets NFPA standards.

Operators shown wearing Federal fire helmet

INCREASE LIFE SAFETY WITH THIS EVACUATION MANAGEMENT SYSTEM

This evacuation management system meets recent building code changes.

To increase life-safety, Autocall urges national adoption of the "slow whoop" as the standard fire alarm alerting signal.

Building codes must be updated locally, state-wide and federally:

- to adopt voice-command communications as the approved evacuation management standard;
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Autocall's Evacuation Management Systems are available now. To fit any building configuration, old or new. To save lives. To save property. To meet recent building code changes.

Building code officials, architects, electrical consultants, fire chiefs, fire marshals, contractors and building owners: write today for your free Evacuation Management Infopak . . . including a sound recording of the unique DirecTone "slow whoop." Autocall Division, Federal Sign & Signal Corporation; Shelby, Ohio 44875. Or phone 419/342-3015.

AUTOCALL®

Job mart continued from page 138

Situations wanted

Architect: NCARB, with proven capabilities in design with award-winning firms plus related experience in project and office management. Programming, planning and design experience in educational, governmental, commercial, religious and multi-family housing projects. Recently sold my interest in Chicago based firm which I founded in 1969. 38 years old, single (again) and looking for a new challenge in any location. Reply to Box #1361-676, *Progressive Architecture.*

Landscape Architect and Horticulturist: Graduating in May with a double Degree of B.S. in each from Iowa State University. Previous experience has been with a small Chicago design nursery. Would like to specialize in plant material design. Seeking versatile opportunity with innovative design oriented firm. Resume and references on request. Paul D. Mawicke, 6228 Knapp Hall, Iowa State University, Ames, Iowa 50010.

Project Architect: M. Arch., B. Arch., age 33, project architect with multidisciplinary firm engaged in a wide variety of projects. Extensive background in criminal justice planning on national level for courts, correctional, and law enforcement facilities. Formally associated with U. S. Dept. of Justice/LEAA. Resume upon request. Reply to Box #1361-678, *Progressive Architecture.*

Registered Architect: NACRB plus 9 eastern state registrations, with excellent completely equipped downtown Washington, D.C. office facilities, wishes to affiliate with reputable architectural firm seeking branch office in Washington. Twenty-eight years as principal architect in commercial, institutional, industrial and governmental projects. B.S. degree in Architectural Engineering and excellent track record with federal agencies. Reply to Box #1361-675, *Progressive Architecture.*

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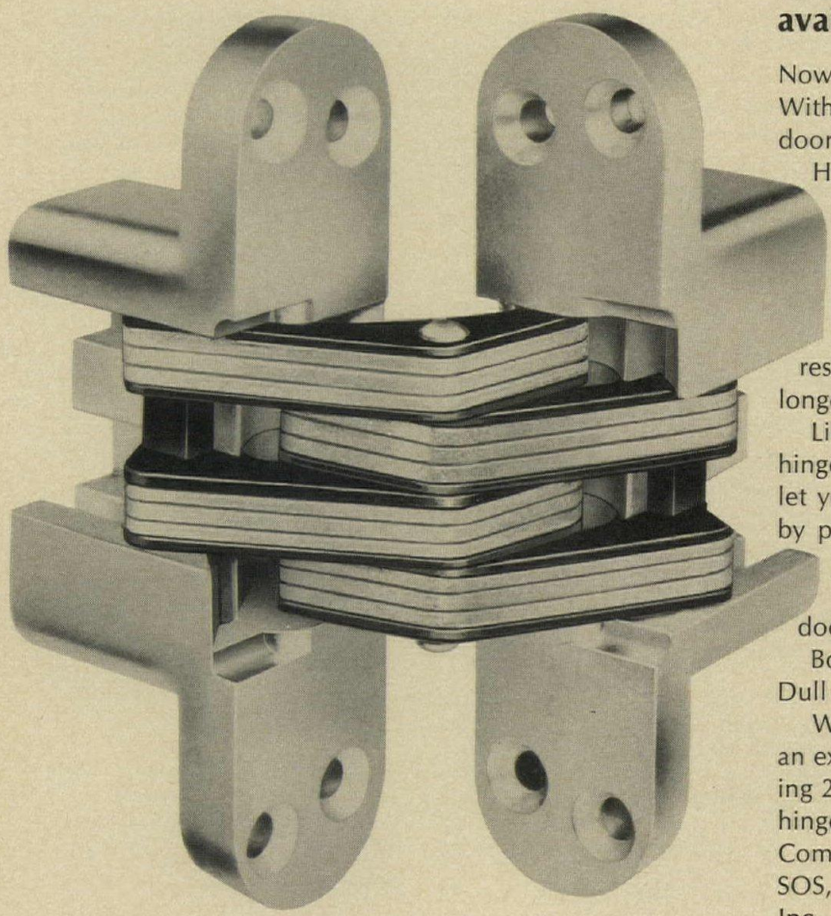
Edwards & Shepard Agency: We are a national design and architectural placement service in business to serve these professions. Bill Shepard, a Pratt graduate, is equipped to effectively evaluate the experience and qualifications of Architectural and Interior Designers, Urban Planners, Systems and Space Planners, Construction Specialists, Exhibit, Lighting and Environmental Designers. Mr. Shepard conducts confidential interviews, by appointment, for recent graduates to adminstrators. He has access to the best prospects and can be invaluable timewise in a job search. Phone (212) 725-1280 or write: 1170 Broadway, New York, N.Y. 10001.

Libraries Purchased: Cash promptly paid for 19th Century photographically illustrated-architectural books, loose prints, construction reports, public works reports, general photographically illustrated books and albums and cameras. Janet C. Lehr, 45 East 85th St., N.Y.C. 10028. (212) BU8-6234.

Rendering/Illustration: Established studio (15 years) with experience and virtuosity of staff to accept any commission. Opaque tempera color unless other treatment preferred. Hand lettered or Pres-Type titles (by request). Display quality color or black and white photo reproduction service available. Lydia Welch: Ralph Johnson Associates, Box 17543, Raleigh, N.C., 27609, (919) 782-2033.

RitaSue Siegel Agency: Ms. Woody Gibson introduces people with superior skills in architecture, interior, landscape, urban design, planning, programming and management to our consultant and corporate clients seeking genuine problem solvers throughout the U. S. A. RitaSue Siegel identifies and evaluates industrial and graphic designers. You are invited to submit resumes in confidence. Our clients pay all fees. 60 W 55th St., N. Y. C. 10019, (212) 586-4750.

NEW! Hinges that hide... a lot longer



Extended-life invisible hinges now available for high frequency doors

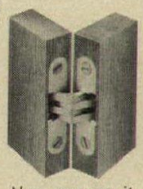
Now you can expand your hinge hiding horizons. With two new, extended-life, large commercial door hinges from the invisible hinge company.

Hinge Models 218 and 220 now have nylon links and bushings at all wear points (Patent Pending). The molybdenum disulfide-reinforced nylon is visible in the black areas in the open hinge shown at left. But when the hinge is closed, the nylon results in just one more invisible feature: longer life.

Like every Soss Invisible, these rugged new hinges are completely hidden when closed. They let you create clean architectural lines unbroken by protruding hinges. And their longer life lets you add this invisible beauty on high frequency doors and on doors with automatic closing mechanisms.

Both hinges are available in Dull Brass US 4, Dull Bronze US 10, and Dull Chrome US 26D.

Write for all the details. We'll also include an extra copy of our catalog in Sweet's, featuring 20 styles and models of the tamper-proof hinges that hide. All from Soss Manufacturing Company, Division of SOS, Consolidated Inc., P.O. Box 8200, Detroit, Michigan 48031.



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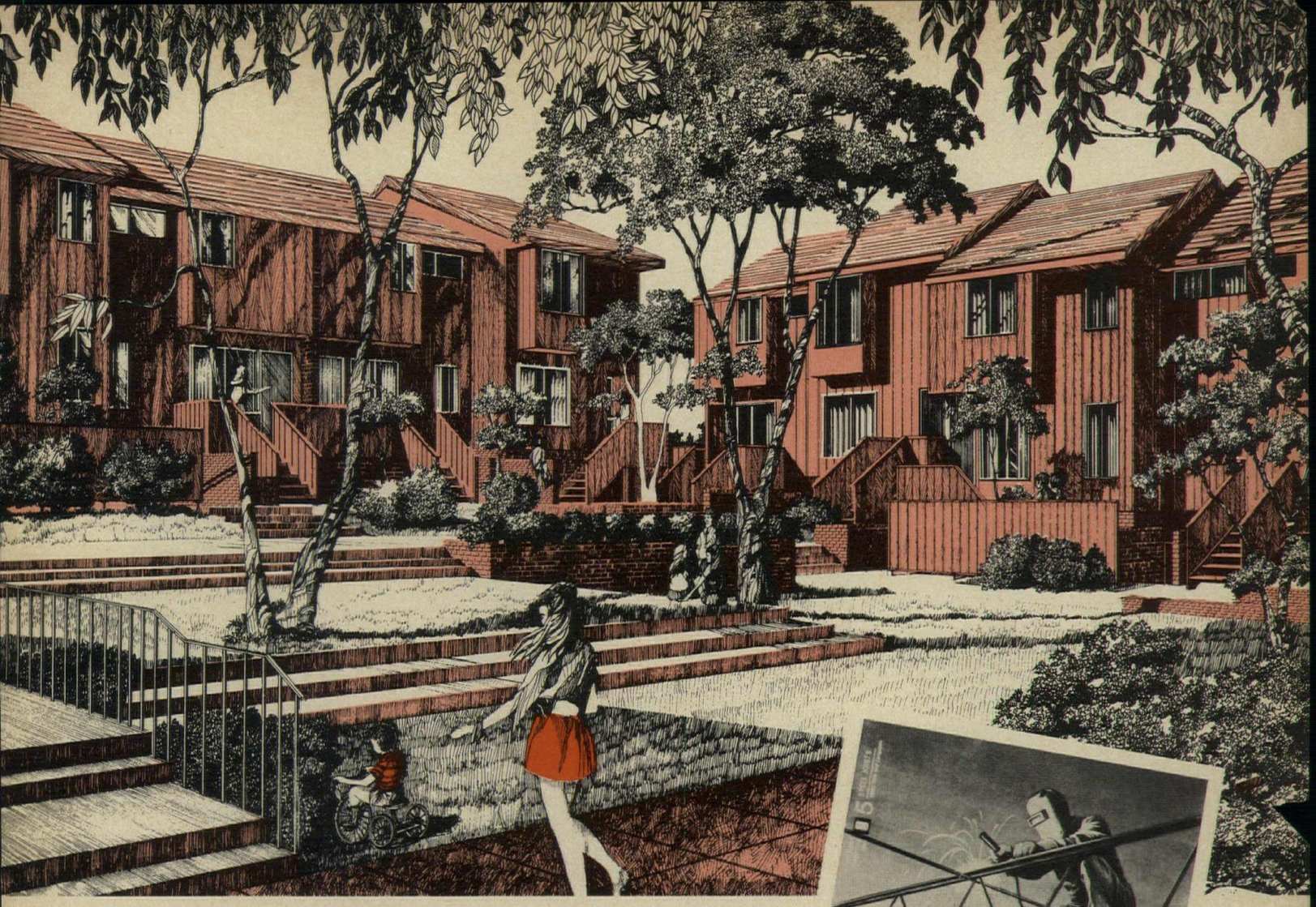

Why steel joists were the right answer to this building need

"THE WESTERLIES": STEEL JOISTS HELPED KEEP THE PRICE DOWN BUT THE LUXURY UP

Located in the highly affluent McLean, Va. area outside Washington, D.C., this 67-unit condominium complex with three condominiums per unit, offers residents the utmost in gracious living at moderate cost. The key to economy was total planning and judicious use of design, construction and material selection . . . including versatile, cost-cutting steel joists.

First floor construction includes open web steel joists, J-series, 12″ deep, space at 24″ centers with horizontal bridging. Drywall ceiling is attached to the bottom chords, and 3″ batts of fiber glass insulation are installed over the ceiling and between the joists.

"We chose this type of floor construction," stated Richard Collins of architects-engineers Collins and Kronstadt, "to provide 2-hour fire resistance rating and reduce sound transmission. We also used the open webs for easy passage and concealment of pipes, wiring, ducts and conduits within the floor depth, for installation economy."

Want to learn more about open web steel joists and their value to modern construction? Write for new edition of Specifications and Load Tables for Open Web Steel Joists and Longspan Steel Joists. Mail coupon for your free copy.

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