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Above: The Birthday, Frank Welch and Associates, Dallas. Photograph by Ezra Stoller
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A Moment to Reflect

In June, the jury for the 43rd annual TSA Design Awards competition worked for two days to select 15 winning projects from among 164 entries. The results of their labors are presented in this issue, starting on page 51.

This was the fifth time in the six years I have worked at *Texas Architect* that I sat in on the deliberations. As always, I was impressed with the care the jury took in coming to their decision. (The jurors this year were Patricia Patkau of Patkau Architects, Vancouver, British Columbia; David Rinehart of Anshen + Allen, Los Angeles, Calif.; and Alejandro Diez of R. Kliment & Frances Halsband Architects, New York, N.Y.) Some jurors talk, some don't. This one did, at least on the second day, and as I listened, I was as fascinated now as I was six years ago by architects' ability to look at a plan and a few slides and understand something about how a building works or doesn't work. And listening to the jury's discussions reminded me of something that became clear to me during that first design-awards jury, three months after I started working for *TA*: Architecture is about much more than the way buildings look and architects do much more than just make buildings that look good.

The two projects the jurors selected to receive the 25-Year Award—the Kimbell Museum by Louis I. Kahn and the Birthday by Frank D. Welch, FAIA—do not, on the surface, have much in common: The Kimbell is a public monument, a shared pleasure. Birthday is inaccessible, an architect's pleasure. But as the jury recognized, almost without discussion, these are places that go straight to the heart of what architects can do: They can make buildings that transfix us with their absolute rightness, that force us to pause, just for a moment before we walk on in, to absorb the union of elements that have been assembled to create the whole.

Whether any of the other projects the jury selected to receive awards this year are remembered in 25 years is a question only time can answer. But for now we are pleased to honor them, their architects, the clients who made them possible, the entire design and construction team.

We thank the TSA Design Awards Committee and its chair, Nestor Infanzon of Dallas, for their hard work. Canan Yetmen, *TA*'s publisher, deserves special thanks for the time and energy she put into organizing the jury and making that part of the process run so smoothly.

*Texas Architect* 9/10 1997

**EDITORIAL NOTE**

**UPCOMING ISSUES**

We invite submission of projects to *Texas Architect* for the upcoming issue:

Jan/Feb '98 (deadline 29 September) “Texas Quarters: Houses and Housing”

If you have questions, or ideas for “News” or “Survey,” please call us at 512.478.7386, fax at 512.478.0528, or e-mail at williamson@sarch.com.
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Comments from the 1997 TSA Design Awards jury about the winning projects it selected

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Texas Architect 9/10 1997 11
UT alums to design memorial

OKLAHOMA CITY When the winner of the Oklahoma City Memorial Foundation design competition was unveiled on July 1, the city took one more step on its long path to healing. The winning team—project leaders Hans-Ekkehard Butzer and Torrey Butzer, based in Austin and Berlin and graduates of the University of Texas at Austin School of Architecture, with Sven Berg; Sasaki Associates, landscape and planning consultants, San Francisco; and The Benham Group, civil, structural, and electrical services, Oklahoma City—designed a place of quiet contemplation in the midst of downtown that honors both the victims and those left behind.

The fate of Oklahoma City took an unforeseen turn on April 19, 1995, when a bomb exploded in front of the nine-story Alfred P. Murrah Building, killing 168 adults and children. In July 1995, the mayor of Oklahoma City appointed a 350-member volunteer task force to develop a memorial to honor victims and survivors, and insure that everyone who wanted to could participate in the planning process, says Kari Ferguson, communications director for the foundation.

The task force gathered input from families, survivors, and the public about what experience a memorial should provide; from that, a mission statement was developed: We come here to remember those who were killed, those who survived and those changed forever. May all who leave here know the impact of violence. May this memorial offer comfort, strength, peace, hope and serenity. The task force, which has since transformed into the private, non-profit foundation, developed a three-pronged approach to fulfill those goals, says Ferguson. The first component was a symbolic memorial on a three-acre space, which includes the footprint of the Murrah Building, dedicated to victims and survivors. The other two components include a Memorial Center with a museum and visitors center, and the Oklahoma City Memorial Institute for the Prevention of Terrorism and Violence, a public/private research and assistance center.

The memorial competition received 624 submissions from all 50 states and 23 countries. A jury of design professionals narrowed the field to five: the Butzer submission and proposals by Hanno Weber, Kathleen Hess, and Michael Maher of Hanno Weber & Associates Architecture/Urban Design, Chicago; James Rossant and Richard Scherr, New York City; Brian Branstetter and J. Kyle Casper, Dallas; and Susan Herrington and Mark Stankard, Ames, Iowa. Each finalist submitted three 32-by-48-inch design boards and one model. A selection committee of 15, including eight family members and survivors, three local civic leaders, and four design professionals, unanimously chose the Butzer proposal.

For Hans, an Austin native, and Torrey, from Oklahoma, the competition was inviting for many reasons. “First was the call to design an outdoor room; it’s a challenge to design a space. And the theme of the memorial—to

Light rail steams ahead

DALLAS Will future generations of North Texas residents remember the summer of 1996? Last year, the Texas Rangers were chasing the pennant, construction on North Central Expressway continued, and modern electric light-rail trains started rolling in Dallas (see TA, July/August 1996, pp. 12-14). A year later, some things change, some things stay the same, and some things extend another three miles. Extending the Blue Line southward is how Dallas Area Rapid Transit (DART) celebrated the first birthday of the successful Light Rail Starter System. This event in May was preceded by two other transit system events in DART’s inaugural year: the Red Line extension northward along (and under) North Central Expressway to Park Lane and the opening of ten miles of the Trinity Railway Commuter Rail to South Irving Station.

Throughout the year, the public reception has been enthusiastic. DART reports that more than 33,000 patrons ride the train each weekday including many who are first-time mass-transit users. Parking lots at the North Central Station sites are filled as commuters opt to board the train and zip past the congested traffic on North Central Expressway. With ridership exceeding expectations, DART is making plans to expand station parking, maintenance facilities, and fleet size.

The response to the facilities has been as favorable as the response to the service. The station art program has created a linear museum with a $1-million art collection that has
help the community
get over a tragedy—
held tremendous ap-
peal for us," says
Hans Butzer.
The memorial
site is bounded on
the south by the
GSA Plaza and the
space where a wall
of the Murrah Build-
ing once stood, on
the north by the
Journal
Record Building,
on the west by
Harvey
Avenue, and on
the
east by Robinson
Avenue. The winning
proposal creates an
urban edge with two
"gates of time," one to
the east and one
to the
west, that interrupt
the city grid at Fifth

"UT alumni to design . . ." continued on page 14
received praise and
recognition. The fact
that the station art
reflects the character
and identity of the
neighborhood where
it is located has also
helped to keep van-
dalism at bay.

Preliminary de-
sign on two future
extensions were com-
pleted earlier this
year by the design
team of Carter &
Burgess, Inc., and
John S. Chase, FAIA,
Architects, Inc. These include the extension of

"Light rail steams ahead" continued on page 19

OF NOTE
Austin district added to National Register
In May, the Zilker Park Historic District, the cen-
terpiece of Austin's park system, was listed in
the National Register of Historic Places. The
district contains 28 historic resources, including
buildings, bridges, and landscape features,
making it the only public recreation facility in
Austin with National Register status. It was
ominated by the Texas Historical Commission
for its role in the development of Austin's pub-
lic parks during the early part of this century.
The Zilker Park Historic District was devel-
oped on 350 acres between 1917 and 1947 as
an urban park and recreation facility. When it
was created, it represented the latest trends in
park design and conservation. Notable features
are the 1928-29 Barton Springs Pool/Dam, the
1947 Bathhouse, and the 1934 Zilker Park Club-
house and Zilker Cabin.
The National Register of Historic Places in-
cludes over 2,200 listings in Texas. Listing af-
ords properties a measure of protection from
the possible impact of federally funded
projects, and access to technical expertise and
grant funds to preserve the property.

Houston's Sixth Ward teams with UH
Thanks to a $3,500 grant from the Greater
Houston Preservation Alliance and efforts by
University of Houston architecture students,
residents of Houston's Old Sixth Ward will now
have guidelines to restore and rehabilitate
buildings in the historic neighborhood. The
project will include historical research of the
area, with the publication of a detailed book of
written and graphic descriptions of architec-
tural styles and features from all historic
homes in the district west of downtown. In ad-
dition, schematic drawings will help owners
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name, or just check out the archived content
on an issue-by-issue basis. Articles and photos
are available from the May/June 1995 issue to
the present.

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1 Photo courtesy of
DART: aerial view of
DART Downtown Light
Rail Transit Mall and
West Transfer Bus
Station looking east
from West End
Street. Butzer describes the gates as a “preparatory space, which provides a transition from the bustle of the outdoor world.” On the east gate is inscribed “9:01,” representing the minute before the bomb exploded; on the west gate, facing the setting sun, is inscribed “9:03,” or the aftermath. In between is 9:02, the minute of the explosion. Although the existing site slopes from east to west, the space in between the gates would be leveled out for a reflecting pool.

The focus of the memorial’s design is 168 chairs, set in a grassy field on the ground where the Murrah Building once stood, one for each of the victims of the bomb blast. “The chairs are a personal approach to memorializing victims; their placement is an abstraction of the building,” says Butzer. The chairs, of varying sizes to represent either a child or an adult, would be built with a glass box base, each inscribed with the name of a victim, and a stone back and seat. During the day, says Butzer, the seat and back appear to float, “recalling the fleeting memories of the victims.” At night, the glass bases are lit, “standing as symbols of the victory of good,” says Butzer.

While the chairs are a direct reminder of the victims, several elements in the memorial are tributes to the survivors and “those changed forever.” To the north is the Survivor Tree, which was the only tree growing in the parking lot across from the Murrah Building before the blast; it managed to survive and is an enduring symbol of endurance and perseverance, says Butzer. The tree would be encircled with a stone wall inscribed with survivors’ names, and terraces cascading down to the reflecting pool. The proposal also calls for the survivors’ names to be inscribed in granite in a small freestanding wall near the east gate, the only real remnant of the Murrah Building and one that many of the survivors climbed over to safety, but Butzer said it is yet to be decided if the wall will be developed further.

The design also incorporates the future Memorial Center, which will be established in the first three floors of the Journal building. The submission guidelines required a proposal for the museum entrance, which establishes a visual connection with the rest of the memorial. Butzer says he “hopes the development of the museum will run parallel to the memorial,” and Kari Ferguson expects “the designers of the park will work with the designers of the museum closely.”

In addition, the Butzer proposal creates a space specifically for children, as a way to remember those who died and those who sent letters and cards from all over the world. Chalkboards in the ground in front of the museum entrance will allow children to continue to leave messages and feel involved in the memorial efforts, says Butzer. An orchard to the south of the children’s area will provide space for teachers to bring classes or groups to meet.

The foundation is currently working to raise the necessary funds to complete all three components, with construction of the memorial as a first step, says Ferguson. The capital campaign has raised $2.3 million of its $2.4 million goal, and at press time, the Senate voted to name the area a national memorial, placing it under the auspices of the National Park Service and giving it $5 million to be put in trust for perpetual care and maintenance. The Butzers, who in July relocated to Boston, expected to sign contracts with the foundation in mid-August and then present schematics to its board. Butzer hopes that the groundbreaking will take place in the spring or summer of 1998, with the dedication a year later.

Butzer feels that the community’s healing process relates directly to the competition process. “They coordinated the competition and goals as a way to confront what happened, visualize what the future should hold, and create a place where they could go to heal,” he says. The memorial recognizes that people may be at different stages in the grief process, and has different places—from a walkway with benches, to the chairs, to the orchard—for them to go. “This is a place for people to meet with lost ones,” says Butzer.

Ferguson feels that the overwhelmingly positive reaction to the memorial is due to the foundation’s involvement of the whole community, but in particular the survivors and the relatives of those killed. “The process has been unprecedented in the city. It was a community process that decided the competition, and from day one, they [the foundation] wanted community involvement. We involved people from all sectors so they have ownership of the memorial. This is a critical part of healing process … but it takes time, patience, and energy to get involved,” says Ferguson.

To “walk through” the memorial, view the site at www.oklahoman.net/connections/memorial. Contributions may be sent to the Oklahoma City Memorial Foundation, 420 N. Robinson Avenue, Oklahoma City, Okla. 73102.

Kelly Roberson
Fifteen honored by TSA

AUSTIN Ten individuals, one firm, and four programs will be recognized by the Texas Society of Architects (TSA) this fall with the Society's annual honor awards. Presentation of the awards will take place during TSA's annual meeting in Fort Worth, October 23-25. The recipient of the Llewelyn W. Pitts award for lifetime achievement, the highest honor TSA can bestow on a member, will also be announced during the meeting.

The recipients of this year's John G. Flowers Award, recognizing excellence in the promotion of architecture through the media, are Lee and Virginia McAlester of Dallas. The McAlesters have published numerous guides to historic and modern architecture, including *A Field Guide to American Houses and Discover Dallas Fort Worth*.

Richard B. Ferrier, FAIA, of Dallas is the 1997 Edward J. Romieniec Award winner, recognizing an individual architectural educator for outstanding contributions. Ferrier is a professor of architecture at the University of Texas at Arlington (UT-A), and was instrumental in the development of the UT-A School of Architecture. In addition, he served as associate dean at the school for 15 years, and was named to the Academy of Distinguished Teachers at the university.

Thomas Hayne Upchurch is the 1997 winner of the William W. Caudill Award, recognizing professional achievement in leadership development during the early years of AIA membership. In addition to numerous other activities, Upchurch was president of AIA Austin in 1996 and participated on the national AIA Committee on Design for nine years.

Receiving the Architecture Firm of the Year Award in 1997 is Hahnfeld Associates Architects/Planners. The firm, based in Fort Worth, was formed in 1963; during its history, it has developed an extensive background in educational, religious, and institutional facilities, and received numerous design awards for its work.

Six individuals will be recognized with TSA honorary membership. Sally Still Abbe will be honored for her efforts as a planner in the City of Lubbock Planning Department, including her work as staff liaison to the Urban Design and Historic Preservation Commission and in writing National Register of Historic Places nominations. Marty Craddock, former executive director of the Historic Preservation Council for Tarrant County, will receive honorary membership for her efforts to protect and restore structures of architectural and historic significance.

Alfred A. King, a private entrepreneur, investor, and philanthropist who will receive honorary membership, is founding chair of the Austin Lyric Opera, chair emeritus of Laguna Gloria Art Museum, and established the Alfred and Ellen King Lectureships in the UT College of Fine Arts and Natural Sciences. Newly elected honorary member Raymond Nasher, a longtime supporter of design and the arts, is founder and chair of The Nasher Company. He recently announced plans to build a public sculpture garden in a full city block adjacent to the Dallas Museum of Art.

Barbara Hesse Odum will receive a citation of honor for her leadership in efforts to save, restore, and maintain historic properties in San Angelo, including Fort Concho. Texas Parks and Wildlife will also be recognized with a citation of honor for its efforts to preserve Texas' history and pre-history resources. The Dallas Arboretum and Botanical Society will receive a citation of honor for its innovation and ongoing activities, especially the Ultimate Treehouses event, which provides the public insight into thinking about commonplace objects.

Edinburg 2020 Vision—Design of the City will receive a citation of honor for its planning efforts which resulted in the first Architectural Design Review Ordinance in Texas, created to preserve and promote the city's heritage, character, and traditions. A citation of honor will also go to the Lubbock Heritage Society for its efforts to promote, maintain, and preserve the history, cultural heritage, and architecture of Lubbock and the surrounding area, including renovation of the city's oldest existing public building.

Barbara Hesse Odum

Thomas Taylor, also receiving honorary membership, is president of Datum Engineers, Inc., a fellow of the American Society of Civil Engineers, and an honorary member of the Dallas Chapter of the AIA. William Wright will receive honorary membership for his commitment to the humanities, arts, and photography, including his work on the National Committee on the Humanities and as president of the Texas Committee on the Humanities.
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TSA architect, intern, and associate members will receive information in July; if you'd like to learn more about attending or exhibiting, call 512/478-7386. Join us in Fort Worth—you won't want to miss it.

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“Light rail steams ahead” continued from page 13

the North Central Line from Park Lane to LBJ Freeway, through Richardson’s Telecom Corridor (in 2002), and on into Plano by 2003. The northeast extension serving Garland opens in 2002. DART has initiated final design for these extensions with the general engineering consultant team, consisting of program managers LAN/STV and section designers Greiner, Inc., for the northeast extension and Chian, Patel & Yerby, Inc., for the North Central extensions. While prototype station designs from the starter system will continue to be used, the architects will also develop new aerial stations for use near locations where the light-rail guideway will travel overhead to avoid grade-level crossings at major streets.

DART’s successful year has coincided with a year of good economic news for downtown Dallas. The relocation of Blockbuster Entertainment Group’s headquarters to downtown was accompanied by several other major deals: Union Pacific, Continental Insurance, and Amresco’s relocation to downtown; and Transamerica Insurance Company’s lease and NationsBank’s ten-year lease renewal. The Dallas Business Journal has identified DART’s growing light-rail system as one of the factors driving downtown’s “renaissance.” A recent newspaper article announcing plans for the Adam’s Mark Hotel renovation notes the proximity to DART’s light-rail line as “a major factor in the decision to buy and renovate.” There are also indications of development activity along the north and south light-rail corridors beyond downtown.

Bolstered by favorable decisions from voters in five member cities who reconsidered participation in the transit system, DART’s plan for light-rail system expansion has started to gain momentum. Future anniversaries of the 1996 opening of the Light Rail Starter System will continue to coincide with ribbon cuttings and rail extensions. If development follows infrastructure, then DART rail expansion will create expectations of economic activity. And why not? As with the Rangers, opening days are always accompanied by great expectations. David Ehrlieber

David Ehrlieber is deputy program manager for architecture with LAN/STV and is currently assigned to the DART light-rail extension project.
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Drawn from one of the largest and most distinguished collections of surrealist art in the world, The Menil Collection has assembled a group of works by American artist Joseph Cornell (1903-1972). The exhibition is composed of 50 collages and boxes created by Cornell that contain small toys, momentos, and unusual objects preserving his personal reflections. The Menil Collection, Houston (713)525-9404, SEPTEMBER 19 THROUGH JANUARY 4, 1998

Life and Design
In celebration of its centennial, the Cooperative Hewitt will explore the central role design plays in our lives in Design For Life: A Centennial Celebration. The exhibition features 200 works from the permanent collection challenging the notion that design is a modern phenomenon by exploring its presence throughout history. Cooperative Hewitt, National Design Museum, Smithsonian Institution, New York City, N.Y. (212)860-6894, SEPTEMBER 30 THROUGH JANUARY 11, 1998

Quilts for the Ages
Peaceworks: Textiles about a Community is an exhibition fashioned from the result of the Museum of Fine Arts’ ongoing community art education effort "A Place for All People." Nine quilts were constructed by students ages 9 to 18 in Houston’s Near Northwest neighborhood following a free quilt-making workshop offered by the museum in the summer of 1996. Modeled after the Baltimore Album Quilt in the museum’s permanent collection, the quilts reflect the spirit of community life, family histories, and nurturing environments. The quilts will also be on exhibit in community centers, schools, and public venues in the Near Northwest neighborhood. Museum of Fine Arts, Houston (713)639-7300, NOVEMBER 2 THROUGH 24

"Hidden Treasures from Tervuren"
In their first trip outside their home in Brussels, 125 treasures from the Royal Museum for Central Africa will be exhibited at the Kimbell Art Museum. A majority of the objects in the exhibition, taken from the richest collection of central African art in the world at the Tervuren Museum, come from what is now Zaire. They include masks, weapons, headrests, statues, and ritualistic figurines, and give a balanced overview of central Africa’s most culturally important ethnic groups. Kimbell Art Museum, Fort Worth (817)332-8451, NOVEMBER 9 THROUGH JANUARY 25, 1998

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A Roofing Alternative

A ROOF SUBSTRATE that is commonly utilized, both in existing and new construction, in the southern and southwestern regions of the United States, is lightweight-insulating concrete. This article provides ideas and general information regarding material options, application methods, testing procedures, system-construction sequencing, and constructibility options that can be used during installation of new lightweight-insulating concrete or roof-replacement activities over existing lightweight-insulating concrete fill substrates.

General Information

LIGHTWEIGHT-INSULATING CONCRETE has been used in the construction of roof decks since the late 1930s. It consists of Portland cement (ASTM C 150, Types I, II, and III), water, and either a lightweight aggregate or an air entraining agent. There are two basic types: 1) aggregate lightweight-insulating concrete, or 2) cellular lightweight-insulating concrete.

The aggregate type of lightweight concrete has been used since the late 1930s. Two predominant aggregates have been utilized: vermiculite or perlite. Both are naturally occurring minerals that are mined. The aggregate that is used in the concrete is formed by taking the mined ore and heating it at elevated temperatures (1800 degrees Fahrenheit), causing the mineral to expand many times (4 to 20 times) its original size and volume. Consequently, the resulting “expanded” particle occupies a larger volume at a lower weight.

These “lightweight” aggregates are incorporated into the concrete mixture (Portland cement and water) in lieu of sand and gravel (typically used in traditional structural concrete), in order to create the lightweight-insulating concrete while providing some level of insulating value. These aggregates, when used in lightweight-insulating concrete, should conform to ASTM C 332, “Lightweight Aggregates for Insulating Concrete” Group 1 designation (aggregates prepared by expanding products such as perlite or vermiculite).

W.R. Grace was the predominant supplier of vermiculite-based lightweight-insulating concrete for many years. In 1995, Siplast purchased the rights from Grace to the lightweight-insulating concrete business and is the current predominant supplier of the vermiculite-fill material. Siplast markets their products under the previous names used by Grace, which are Zonolight Insulating Concrete (ZIC) and NVS (Non-venting substrate) Insulating Concrete. The perlite-based material is generally provided by regionally located deck applicators rather than one particular manufacturer. The Perlite Institute has published guidelines and standards for perlite-aggregate-based lightweight-insulating concrete.

The cellular or “foam” lightweight concrete has been used since the 1960s. Cellular concrete utilizes a pre-generated foam (“detergent”) that is introduced into the cement and water mixture. The foam creates tiny air bubbles within the concrete mixture during the batching process. The control of the density of the fill is achieved by substituting macroscopic air cells for all or a portion of the fine aggregate. After placement and during the curing process, the foam dissolves, creating a network of open air cells throughout the concrete mixture, thus creating the lightweight characteristic and, in addition, providing some level of insulating value.

The use of the foam creates a “slickness” characteristic that allows for ease of use during the placement of the concrete. Consequently, less water is necessary with cellular concrete because the addition of the foam concentrate makes the concrete more workable. The foam concentrate should comply with the standard specifications as established by ASTM C 869, “Specification for Foaming Agents Used in Making Pre-formed Foam for Cellular Concrete,” when tested in accordance with ASTM C 796, “Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Pre-formed Foam.” At this time, several manufacturers provide the cellular type of lightweight-insulating concrete, including Elastizell Corporation of America (Elastizell Cellular Concrete), Celcore, Inc. (Celcore Cellular Concrete), Cellufom Concrete Systems (Ultra-Lite), Mearl Corporation (Mearlcrete), Lite-Crete, Inc. (Lite-Crete Cellular Concrete), and Siplast (Insucel.)

Other elements can and have been substituted for the aggregate to achieve alternative lightweight mixtures. One is expanded polystyrene (EPS) beads. Combinations of the lightweight aggregates, EPS beads, and/or foam have also been used to achieve a desired formulation by various manufacturers. One manufacturer, Siplast, currently provides a hybrid mixture of both aggregate (vermiculite) and foam which is called Zonoceil.

Common properties of the two variations of lightweight insulating concretes

<table>
<thead>
<tr>
<th>Property</th>
<th>Aggregate</th>
<th>Cellular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement:Aggregate Ratio</td>
<td>1:3.5-1:6 1:3</td>
<td>6 sacks/cubic yd</td>
</tr>
<tr>
<td>Cement Content</td>
<td>4-5 sacks/cubic yd</td>
<td>0.5-0.6</td>
</tr>
<tr>
<td>Water:Cement Ratio</td>
<td>1:2.5-1:6</td>
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<tr>
<td>“Wet” Density</td>
<td>35-60 pcf</td>
<td>20-40 pcf</td>
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<tr>
<td>“Dry” Density</td>
<td>20-40 pcf</td>
<td>120-200 psi</td>
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<tr>
<td>Compressive Strength</td>
<td>130-300 psi</td>
<td></td>
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</tbody>
</table>

If you are a registered architect and an AIA member, reading this regular feature in Texas Architect can help you accumulate valuable learning units. After reading “TA Specifier,” complete the questions on page 48 and check your answers on page 87 for two learning units.

Learning Objectives

After reading this article and completing the exercises, you will be able to:
1. understand the material qualities of lightweight concrete;
2. understand the advantages and disadvantages of lightweight concrete;
3. realize the implications for its applications and installation.
The typical R-value of lightweight concrete ranges from approximately 1.1–1.5 per inch, depending upon the added element (aggregate versus foam). The R-value of the lightweight-concrete system can be increased significantly with the inclusion of EPS board. EPS board has a typical R-value of approximately 4.15 per inch based on a minimum density of 1 pcf. The R-value is determined by independent testing of materials in accordance with ASTM C 177 “Standard Test Method for Steady State Heat Flux Measurement and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus.”

Advantages of Lightweight-insulating Concrete

The advantages of lightweight-insulating concrete are as follows:

- Provides one-hour to two-hour fire-rated roof assemblies without the addition of thermal barriers or the application of fire-proothing on the underside of the metal deck.
- The insulating concrete is attached to the structural deck without the use of mechanical fasteners.
- The insulating concrete provides a smooth monolithic substrate without joints or surface irregularities for application of the new roof.
- Provides excellent resistance to wind uplift since the lightweight concrete provides a monolithic substrate that prevents air infiltration occurring below the roof assembly.
- Provides a relatively dense substrate for attachment of the roof assembly that reduces thermal fluctuations and/or thermal stresses incurred by the roof membrane.
- The lightweight concrete can be considered a permanent part of the structure or a “recyclable” insulation.
- The insulating concrete typically remains in place during roof replacement activities, unlike rigid board insulations, which are commonly discarded.
- Lightweight-insulating concrete can provide a substrate with a relatively high compressive strength (minimum 125 pounds per square inch) compared to 10–30 psi for common rigid board insulations.
- Lightweight-insulating concrete is inert and will not rot or decay and remains dimensionally stable under variable climatic conditions.
- Provides a positive slope that can be created for any building configuration.

Batching

The lightweight-insulating concrete is batched on-site to the desired proportions, pumped to the desired location, deposited, and screeded to the desired thickness. The elements of the lightweight mixture are batched in a mobile mixer and pumping machine. The Portland cement (Type I, II, or III, ASTM C 150), water (potable), and either the aggregate or the foam are all stored adjacent to the machine. The aggregate is commonly retained in a typical storage trailer adjacent to the batching machine and supplied in 100 pound paper or cloth bags. The foaming agent is supplied by the manufacturer in either 55-gallon drums or five-gallon pails. The foam is then mixed by the deck appi­cator (typically 40 parts water to 1 part foam) and stored in plastic storage/dispensing tanks mounted on a trailer. The trailer is then positioned in adjacent to the batching equipment.

The Portland cement is typically stored adjacent to the batching machine in what is commonly referred to as a “bulker” or a container trailer with bulk storage and self-discharging capacity. The water can be obtained from either a source at the subject building, public facilities (i.e., fire hydrant), or a mobile-storage tanker. The entire set-up can be considered an on-site mini-batch plant.

Strong Manufacturing Company is the predominant manufacturer of the type of equipment currently utilized for the batching/placement of the lightweight-insulating concrete. Approximately 90 percent of the lightweight-insulating concrete fill for roofing is mixed and placed using the “DeckMate” mobile insulating-concrete mixer and pump manufactured by Strong.

The cement and water are supplied to the batching machine via measured mechanical methods utilizing spring-tension or platform scales. The aggregate is typically removed from the bags manually and placed in a holding device until the desired proportion (determined by weight) is reached, whereupon it is introduced into the batching machine by mechanical methods. The foaming agent is introduced into the mix via a hose that is attached to the source. The operator adds the foam to the mix by activating a manually triggered apparatus on the hose until the desired quantity is achieved. The technician can determine the foam output of the apparatus by...
filling a container of known volume with the foam and timing this process. The ASTM suggested ratio of water to foaming agent is 40 parts water to 1 part agent, by volume.

Several factors can arise during the batching process that could impact the physical characteristics of the final product.  

1. The type of Portland cement selected can have an effect on the proportioning of the components. Most mix designs are based on Type I cement. However, using Types II or III, which have a finer cement particle size, will require a higher water/cement ratio to achieve the same product workability.

2. It has been estimated that the compressive strength of the lightweight-insulating concrete can be reduced 5 to 10 pounds per square inch (psi) for every one percent increase in the water/cement ratio.

3. An increase in the water/cement ratio can result in an increase in occurrence and/or concentration of dry shrinkage cracks in the lightweight concrete during the curing process.

4. The compressive strength may decrease 5 to 10 psi for every one percent increase in the foam volume.

5. Proper dispersion of the cement particles throughout the mix is important in maintaining the physical characteristics of the specified product. The compressive strength can be reduced if proper cement dispersion is not achieved. Some common characteristics of improperly dispersed cement are lumps, clots, and pellet-size balls of cement.

Placement

After obtaining the desired mixture, the material is transported (pumped from the hopper) utilizing conventional concrete-pumping equipment. A two-inch diameter flexible hose is typically used with common pumping capabilities of 15 to 35 cubic yards/hour at maximum distances of 1,000 feet horizontally or 200 to 300 feet vertically. The material is placed on the substrate with a typical minimum thickness of one to two inches, depending on the type of lightweight-insulating concrete utilized. Wood nailing or blocking are commonly used at low points and perimeters to provide a stop and thickness guide for the lightweight concrete.

After placement, the lightweight concrete is screeded and finished utilizing the conventional techniques and tools used with traditional concrete placement. Fill boards, matching the desired thickness of the lightweight-insulating concrete, and/or string lines are often used during the placement to maintain proper slopes and/or thicknesses during the screeding process.

When the thickness of the lightweight concrete is anticipated to exceed the minimum-required thickness (typically two inches), an expanded polystyrene (EPS) board is commonly used as a "filler" board. The EPS board provides several functions when incorporated into the lightweight-insulating concrete: It reduces the overall weight of the lightweight concrete, reduces total material costs, and increases the insulating value of lightweight-insulating concrete. The thickness of the EPS board can range from 1 to 16 inches, depending on the capacity of the manufacturer's equipment. When the desired insulation-board thickness exceeds the maximum thickness of the available insulation board, two or more boards typically have to be laminated together to achieve the desired thickness.

Roof assemblies incorporating lightweight-insulating concrete that are published in the Underwriters Laboratory (UL) Directory have a maximum thickness of eight inches for the EPS board. UL limits the thickness based on structural and heat transfer issues. The thickness is also limited due to manufacturing equipment that cannot produce boards of a greater thickness. The size of the board is typically two-feet-by-four-feet. Boards four-feet-by-eight-feet can also be made.

As outlined by Underwriters Laboratory, the polystyrene-foamed plastic insulation board should have a density of 1.0 +/- 0.1 pcf. Other criteria for the EPS board as outlined by UL include the following: 1) The EPS board should have a hole or a hole/slot configuration constructed into the board; 2) the holes should be a nominal three inches in diameter spaced approximately twelve inches on-center per row or three holes in a row (across the width of the board); 3) the rows should be spaced approximately 16 inches on-center longitudinally or lengthwise along the board; and 4) the holes should equal approximately three percent of the gross surface area of the board. One manufacturer, Siplast, provides a polystyrene board that has the designated holes together with slots or a hole/slot combination that are also incorporated into the board.

The holes and/or slots in the EPS board provide two functions: 1) they allow the board to become "keyed" into the lightweight concrete "tieing" together the lightweight concrete located below and above the board, and 2) they provide an avenue for outward moisture migration during the curing process for the newly placed lightweight concrete ("slurry coat") below the EPS board.

Underwriters Laboratories classifies the polystyrene board for surface-burning characteristics (Classification BRYX) and for wind-uplift characteristics (UL Construction No. 110 and No. 115—Class 90: Roof Deck Construction TGKY). If the foamed-plastic board is designated to be used in a roof deck construction with a UL "P" design number, it means that the polystyrene board bearing the UL mark under category BRYX or CCOV (category of Foamed Plastic in the UL Fire Resistance Directory) may be used in the construction of UL Fire Resistance Designs (BXUV). The EPS board should meet the requirements established by ASTM C 578 "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation,” Type 1.

The lightweight concrete is initially placed either in the flutes of the steel deck (filling
Roofing warranties: A liability trap?

Most architects know of the risks of implied warranties with strict liability as the measure of professional performance. For an unfortunate few, the lesson has been a painful trip through a legal system clouded by the White Budd case (24, March/April 1993). For others, it has been through confrontation with an onerous architect/owner agreement like that promulgated by the National Construction Law Center (Architecture, February 1997). For almost all architects involved in public work, it has been evident in the attitude that an architect's job is to somehow protect the bureaucracy from any responsibility for building ownership. Some roofing cases provide an example of how that works.

Case in Point

In the early days of built-up roofing, manufacturers controlled the entire process. After World War II, the nationwide building boom and new competitive forces made that system increasingly impractical, so the manufacturers began establishing networks of approved roofers. To control quality and protect their ability to warrant their product, they established standards for field practices and inspections. To provide financial substance to their warranties, they offered performance bonds for roofs meeting those standards.

These bonds were backed by a surley and typically cost around 10 percent of the financial exposure, which was limited in several ways and usually capped by a dollar amount. The bond offered no coverage to repair structures or finishes that might have been damaged by leaks. It excluded coverage of accessory items like insulation and metal flashing. It was voided by "unusual" use of the roof such as heavy traffic or by alterations or repairs not approved by the manufacturer. It was also limited to the normal life expectancy of the system—usually 15 years for three-ply roofs and 20 for four- or five-ply systems. Hence the term "bondable roof" entered the lexicon of the trade and architects began referring to a "15-year bondable roof" as a shorthand way to describe the underlying technical requirements, whether or not a bond was actually specified.

Then, in the late '80s, several Texas school districts with large, built-up roofs ranging from 5 to 15 years old that leaked were advised by attorneys that the term "20-year bondable roof" in the 1970s specifications or project correspondence constituted an implied warranty by the architect that the roof would not leak for 20 years. Although the school district had not purchased the manufacturer's bond, this was actually far better. It covered damages to finishes, prior repairs, and all accessories. School districts are not bound by the three-year statute of limitations on claims of negligence or breach of contract, so they could claim entitlement to a whole new roof up to 10 years into the life of the old one. Best of all, it was free. All they had to do was hire the attorney on a contingency fee and sue. Faced with a trial in which the jury would be taxpayers from the district and with defending an architect who had not inspected and tested the roof to the extent required by the manufacturer if they had warranted it, the architect's liability carrier capitulated. They, along with the contractor, (if still solvent), bought the district a new roof.

Avoiding the Trap

Although roofing bonds are a thing of the past, major manufacturers still advertise extended warranties with similar costs and limitations. One company, for instance, offers, for $15 per square (about 10 percent of the initial roof cost), their 20-year "classic" warranty, which covers repairs to both roof and insulation. They also offer a "standard" warranty at $8 per square for the roof alone. Both exclude collateral damage and both are voidable by misuse or unauthorized repair.

Whether or not either is economical depends on project-specific factors. Warranties vary for stable, long-term owner occupancy than for buildings where frequent additions or alterations or a quick turnover are expected. Most roofing problems appear in the first two or three years of a building's life, when still covered by the contractor's warranty, so the money might be better invested in a higher-quality roof or a specialized consultant to oversee the installation.

The architect should help the owner make an informed decision. If a manufacturer's warranty is purchased, advise the owner of requirements for maintenance and inspection. Make sure the warranty is delivered prior to closeout and that the small print conforms to the terms specified. If an explicit warranty is not purchased, architects can avoid creating an implied one by accurately documenting their advice throughout and by knowledgeable use of both the technology and the language of roofing.

John McGinty, FAIA

John McGinty, FAIA, of Houston, is managing principal of American Construction Investigations, a forensic consulting firm.

The flutes completely) or on top of a solid substrate (i.e. structural concrete, secondary roof, etc.) to provide a slurry coat approximately 1/8-inch-thick (measured from top flange of deck rib or top of substrate). The EPS board should be placed within approximately 30 to 60 minutes after the slurry coat is applied. The EPS board should be placed or embedded into the slurry coat so that the bottom of the board comes in full contact with the slurry coat and the slurry coat enters the keying holes. The board should be installed with the long dimension of the board parallel to the flue direction of the steel form deck, where applicable. The transverse joints (joints at the ends of the boards) should be staggered and all joints should be butted snugly. The board should also be held back from the roof edge approximately three inches. The EPS boards are placed in a stair step configuration to achieve the desired slope. A maximum differential of one inch should be maintained for adjacent stair-stepped boards.

Once the EPS board is installed, the underlying lightweight concrete should be placed within one to four hours into the holes and over the board to reach the desired thickness. It is possible that the EPS board, particularly the boards with thickness greater than two inches, can "float" in the lightweight concrete if a proper slurry coat is not initially applied and the EPS board is not properly embedded into the slurry coat. If this occurs, it is advised that the EPS board and affected lightweight concrete be removed and replaced.

If during the placement process and the following 24 hours, the ambient air temperature is expected to be 40 degrees Fahrenheit or lower, then installation of the lightweight concrete should be delayed until warmer temperatures will prevail. However, if installation must proceed during cold weather, certain precautions, such as using warm water during the batching process, should be followed. If proper precautions are not implemented, freezing of the concrete can occur and jeopardize the quality.

Prior to the installation of the new roof assembly, the adequacy of the slope created by the newly placed lightweight-insulating concrete substrate can be verified via water testing. By conducting water testing, potential areas of inadequate drainage (i.e. bird baths)
can be identified. If these areas are identified, the low-profile lightweight can be leveled to match the surrounding substrate. A "rich" mixture (1:3:1.4 cement to water ratio) can be hand-troweled onto the substrate to fill in the low areas. Prior to applying the trowelable mixture, the existing lightweight concrete should be removed to a depth of approximately 1/2-inch within the subject area. Then the subject area should be well wetted (visible surface moisture) just prior to the application of the rich mixture. Wetting of the existing surface prevents the underlying dry substrate from drawing moisture out of the repair mixture, which would cause rapid curing. The rapid curing would result in embrittlement of the repair mixture and subsequent cracking. Feathering the edges of lightweight concrete in a repair area should be avoided, as the thin lightweight-insulating concrete will have a tendency to crack and become disbanded.

For lightweight concrete with perlite aggregate, control joints are required at roof perimeters and penetrations. These control joints should be typically one inch wide and should extend down through the full depth of the concrete. A compressible-fill insulation, typically fiberglass insulation, is installed at the control joint location and the lightweight concrete is placed up against the insulation. These joints are required because the perlite-based concretes can experience expansion after placement due to the expansive nature of perlite.

After placement, lightweight concrete (like traditional concrete) requires time for curing and hydration of the Portland cement. As with traditional concrete, the 18-day curing time frame also applies to lightweight-insulating concrete in order to achieve the maximum physical characteristics and properties. However, roof application can and should occur prior to the 28-day cure time. A cure time of five to seven days is normally required for aggregate lightweight-insulating concrete prior to roof insulation. For cellular lightweight concrete, 48 to 72 hours is a typical cure time allowance prior to installing the new roof. Actual cure time will depend on the

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climate and weather during the placement and curing process. A common rule of thumb used in the industry states: If foot traffic upon the lightweight concrete does not result in depressions in the surface of the lightweight concrete, then the concrete is suitable to receive the new roof.

Current typical industry practice involves placement of the lightweight concrete over a corrugated-metal form deck. Other possible substrates that have been utilized in the past, and to some extent continue to be used today, include structural and/or precast concrete, cementitious wood-fiber panels, fibrous form boards over bulb Tee's, gypsum form boards over bar joists, reinforced kraft paper/wire mesh over bulb Tee's, wood, and existing roof membranes.

The steel deck should be coated with either G60 or G90 hot dipped galvanized zinc coating. A G60 galvanized coating results in a zinc coating applied at a rate of approximately 0.6 ounces per square foot to both sides of the sheet. The G90 coating results in a zinc coating applied at a rate of approximately 0.9 ounces per square foot. Both of these coating weights conform to ASTM A 525. Neither bare metal nor painted metal decking is acceptable to be used as a form deck for lightweight-insulating concrete. Steel decking with the G60 coating is acceptable for use with lightweight concrete. However, in higher moisture/humidity exposure conditions, the G90 coating may be more appropriate.

The steel decking should have uniformly distributed slots located on either the bottom or the sides of the flutes. Common available slotted steel decks are manufactured with 0.75- to 1.5-percent net free area venting. The amount of bottom venting required will depend upon the local exterior climatic conditions, the quantity of water used in the mix, and the interior temperature and humidity conditions. The steel used in manufacturing decking conforms to either ASTM A 611 or A 446 having a minimum yield strength of 33 ksi. Some typical manufacturers that provide steel decks for lightweight-insulating concrete substrates include, but are not limited to, Wheeling and Vulcanraft.

If cellular concrete is used, the metal form deck should not have bottom side venting. Cellular concrete or other non-venting types of lightweight concrete should be installed over a "non-venting" substrate. If cellular concrete is placed over a venting substrate, accelerated curing can occur possibly resulting in shrinkage cracks and decreased physical properties.

The installation of the steel deck, if used, should conform to those requirements outlined by Factory Mutual 1-28. The typical installation criteria includes lapping ends of deck panels a minimum of two inches. The end lap should occur over the structural members. The sides of adjacent deck panels should be lapped a minimum of one-half of a rib. Once laid in place, the deck panels should be secured to the support members with either 1/2-inch (13 mm) diameter (Exposure 1) or 5/8-inch diameter (Exposure 2) puddle welds installed with weld washers or approved mechanical fasteners. Weld washers are typically required with metal decks that are 24-gauge or less. When weld washers are utilized, they should be minimum 16-gauge metal with a 3/8-inch diameter hole. Whichever attachment method is used, the maximum spacing should be 12 inches on-center in the field and six inches on-center in the corners and perimeters. There are four options for attaching side laps: stitch screws, button punched, top-seam welded, or side-seam welded. For metal decks of 22 gauge or less, stitch screws are recommended for side-lap attachment. Side laps should be secured three feet on-center (Exposure 1 and 2) and 30 inches on-center (Exposure 3). The spacing should be reduced 50 percent in the corners and perimeters. The dimensions of the area to increase the rate of attachment is determined by the smaller number of 0.1 times the lesser plan dimension, 0.4 times the cove height or a minimum of four feet.

The bonding capacity of lightweight concrete to galvanized steel deck produces excellent uplift resistance to meet UL Class #10 Wind Uplift Resistance Classification (Published in UL Director, Construction No. 110).

Lightweight concrete also forms an interfacial bond with polystyrene board when utilized in construction to achieve the necessary uplift resistance.

Steel reinforcement can also be incorporated into the lightweight-insulating concrete matrix. Steel reinforcement is typically required for a two-hour fire-rated assembly. The steel reinforcement is typically a woven mesh consisting of 19-gauge galvanized wire twisted in a two-inch hexagonal configuration with an additional 16-gauge longitudinal reinforcement wire spaced approximately three inches on-center across the width. The steel reinforcement should have a minimum cross-sectional area of 0.026 square inches per linear foot and meet the tensile, bending, and coating requirements outlined in ASTM A 82. A common product that is used and complies with these requirements is Keydeck 2160-2-1619 as manufactured by Keystone Steel & Wire. The wire mesh should be placed in the middle of the desired top pour thickness (measured from top of steel deck, substrate, or EPS board) of the lightweight concrete. The wire mesh should be lapped a minimum of six inches at ends and butted or spaced no more than four inches apart at sides. The wire mesh should be placed with the longitudinal wires at right angles or perpendicular to the structural supports and cut at openings/penetrations in the deck.

One common problem experienced with lightweight-insulating concrete, particularly the cellular version, is the occurrence of shrinkage cracks during the initial curing process. Since the mix is composed of only cement, water, and fine aggregate and/or
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foam, movement in the substrate or just the natural curing process can result in cracks within the concrete. One option to reduce this cracking condition involves the inclusion of either steel wire mesh and/or inorganic fibers dispersed within the mix. The reinforcing mesh or fibers as well as aggregate allows the forces and stresses created by the curing process to be transferred to the matrix. The transfer of these forces allows the concrete matrix to resist these forces and consequently reduce the chance of cracking. The fibers can be either polyester, fiberglass, or polypropylene in nature and are added to the mix prior to the inclusion of the foam at a rate of approximately one to two pounds per cubic yard. One manufacturer of cellular concrete, Elastizell, provides a polyester fiber called Zellerete Fibers. Fiber Mesh is a common manufacturer of polypropylene fibers, commonly used as an additive fiber to structural concrete.

Another practice that can be implemented during the placement process, particularly in hot and arid climates, to minimize or reduce the occurrence of cracks, is to apply water, via spray misting, to the newly placed concrete. If cracks do occur within the cured concrete, repairs can be performed to the affected areas. The lightweight concrete can be routed out along the crack, typically in a "V" shape to a depth of approximately 1/2 to 3/4-in. Loose debris should be removed from within the crack, the surface of the concrete wetted, and a rich mixture should be troweled into the routed "V", striking flush with the adjacent surfaces.

Testing

Several testing procedures can be implemented during and/or after the placement of lightweight concrete for evaluation. Some of the common testing determines wet density, fastener pull-out resistance, compressive strength, and dry density. The first test, determination of wet density, is performed during the initial placement of the lightweight-insulating concrete. The wet density should be determined at various times during the day as the lightweight-insulating concrete is being batched and placed. The wet density should be obtained at both the hopper and the point of placement. It can be determined simply by placing the batched mixture in a container of known volume and weighing the

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The text is a combination of product promotion and technical presentation. It highlights the capabilities of the company in the metal building component industry and provides details on the materials and methods used in construction projects, particularly focusing on the use of lightweight concrete and the techniques to minimize cracking. The text also includes information on testing procedures for evaluating the performance of the concrete.
filled container. If the measured wet density is found to be within ±5 percent of the specified wet density, then the batching and placement process would be considered to be functioning properly. If the wet density is found to be out of tolerance of the specified range, then the following events may be present: water/cement ratio is out of tolerance, batching equipment is not functioning properly, pumping system is deficient, placement hose is kinked or has loose connections, or the diameter of the hose is too large. The sample of the lightweight-insulating concrete that is to be used for testing purposes should be considered representative and not be collected at the beginning or ending of the placement operation.

The remaining tests are performed after the placement of the lightweight-insulating concrete. As stated earlier, a common rule of thumb used by field personnel is: If foot traffic does not leave an impression (i.e., footprints) in the lightweight-insulating concrete, then the concrete is suitable to receive the new roof. However, there are other more scientific testing methods to evaluate the suitability of the concrete.

The fastener pull-out resistance is a relatively quick test to determine if the concrete has reached an adequate "age" to allow installation of the new roof. The fastener proposed for use in the new roof assembly should be used and tested in several random locations throughout the subject area (approximately one test per 100 squares). The minimum pull-out resistance that is commonly required by manufacturers for the split shank fastener is 40 pounds per fastener. Care should be taken if evaluation of the lightweight concrete is determined only by performing pull-out resistance tests on fasteners. The concerns are twofold: 1) the concrete may not have reached the 28-day strength, and 2) galvanized steel fasteners reportedly can gain additional pull-out resistance as a bond develops between the lightweight concrete and the steel fastener as the concrete cures.

The pull-out resistance test can be performed using a sheet metal holding clamp that could be attached to a spring scale. The scale should have a range of 0 to 100 pounds with one-pound increments. Another pull-out tester than can be utilized is a hydraulic device with a twisting crank and dial gauge, commonly utilized for testing screw-type fasteners.

Another easily performed test to verify the density of the cured concrete implements a hand-held penetrometer, designed for performing field and laboratory evaluations of initial set of concrete mortars. This testing apparatus is comprised of a hand-held cylindrical tool (7 inches long by 3/4-inch diameter) with a circular probe/shaft with a 1/20th square inch of surface area. It is manufactured by ELE International and classified as a Concrete Mortar Penetrometer. The test involves pushing the shaft of the penetrometer into the lightweight-insulating concrete. The tool has a direct read scale on a range of 0 to 700 psi. The reading that is obtained from forcing the shaft into the concrete at a constant rate to a known depth provides an individual relative indication of the compressive strength/density of the concrete. However, this test does not provide sufficient repeatable data nor the precision to use as a single source of evaluation.

Testing of the compressive strength of newly installed lightweight concrete is performed in accordance with ASTM C 495, "Standard Test Method for Compressive Strength of Lightweight-Insulating Concrete." This method covers the preparation and testing of molded cylinders (three inches diameter by six inches long) for lightweight concretes with oven-dry weights not exceeding 50 pcf. The test specimens are molded from a sample of the lightweight-concrete mixture obtained from the batching equipment prior to placement. The mixture is placed in molds, stored, and specifically cured. The molding process consists of placing the wet mixture in two approximate equal layers. After each layer is placed in the mold, the sides of the mold should be tapped until the top surface of the respective layer has subsided to a plane.

The ASTM procedure has specific procedures for curing, which generally involves initial moist curing followed by oven dry curing. It is critical that the samples are dried prior to testing. The most practical procedure is to moist cure (70 degrees Fahrenheit, +/−10 degrees) in the mold for the first seven days, strip the mold and cure in the appropriate environment (70 degrees Fahrenheit, +/−10 degrees) for the following 18 days, and then oven dried (140 degrees Fahrenheit, +/−five degrees) for three days. The sample should then be allowed to air cool until dry prior to testing.

Several factors can affect the results of the testing of molded cylinders: 1) The accuracy of the testing machine is a critical issue. The maximum load required to break the sample of lightweight-insulating concrete should not be less than 10 percent of the maximum load range of the testing equipment being used.
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The testing equipment that is commonly used for testing compressive strength of structural concrete has a typical load range of 10,000 pounds. Ten percent of this load range equals 1,000 pounds, which exceeds the typical maximum compressive strength of lightweight-insulating concrete range of 200 to 400 psi; 2) The actual cross-sectional area of the cylinder can also have an impact on the test results. Even though the cylinder mold is commonly three inches in diameter, the actual diameter of the hardened concrete cylinder should be measured to the nearest 0.01 inch (0.3 mm). The recorded diameter should be determined by an average of two diameters measured at right angles to each other at mid-height of the sample. The difference of 1/10th of an inch less than the nominal three-inch diameter will result in a smaller bearing surface which can reflect a lower compressive strength reading of approximately 6±1/2 percent. The actual recorded height of the sample should also be measured to the nearest 0.01-inch (0.3 mm); 3) Preparation of the specimen can also have an effect on the sample. The concrete should be placed in the mold in two to three lifts. After each lift is placed in the mold, the mold should be tapped, or raised, and dropped approximately one inch to allow the lift/layer to settle. The concrete should not be rodded as is typically performed during the molding of cylinders for structural concrete. After the cylinder is molded, it should be left undisturbed for 16 hours and kept in the mold a minimum of seven days.

Testing the physical properties of existing lightweight concrete can be performed in accordance with ASTM C-513, "Obtaining and Testing Specimens of Hardened Lightweight Insulating concrete for Compressive Strength." This method covers obtaining and preparation of in-place lightweight concrete (minimum 14 days old). In general, the procedure consists of obtaining a bulk sample of the existing (cured) lightweight-insulating concrete and shaving/shaping the sample down to the desired size and number of cubes. The bulk sample obtained shall not include any cracks, spalls, or otherwise be damaged. The size of the shaped cubes shall be two inches by two inches (minimum), or four inches by four inches (maximum). The size of the cube is typically determined by the maximum thickness of the lightweight-insulating concrete. Four cubes (three for compressive strength, one for density) should be obtained for the appropriate testing. Since the samples are manually produced, the actual measurements of the cube shall be achieved to determine the true size and bearing surface. The specimens shall be oven-dried (140 degrees Fahrenheit, ±/five degrees) for three days prior to performing the tests.

To obtain the dry density of the lightweight-insulating concrete, the oven dry weight should be determined initially using cylinders, similar to those prepared for the compressive strength testing, molded and cured the same as the compressive strength specimens. However, after 28 days, the specimens should be placed in an oven at 230±18
Self-Test Questions

1. What process makes the aggregate lightweight?
2. What two materials are used in lightweight aggregate?
3. Why is less water needed in cellular concrete?
4. True or False: Cellular concrete is slightly more difficult to cast than typical structural concrete.
5. What provides the insulating value in cellular concrete?
6. What has higher potential compressive strength: aggregate or cellular concrete?
7. True or False: Because of the air pockets in concrete, a fire resistant material needs to be added to the concrete for a one-hour fire rating.
8. If Type II cement is used, how will the water/cement ratio have to be altered to provide the same workability as Type I?
9. True or False: Conventional finishing tools and techniques cannot be used for lightweight concrete.
10. To pour an eight-inch-thick slab, what material is added to the lightweight concrete? Name two advantages of using this material instead of solid concrete.
11. True or False: Lightweight concrete typically cures faster than structural concrete.
12. What material can be used to help avoid shrinkage cracks in lightweight concrete?
13. Name two ways lightweight concrete is tested.
degrees Fahrenheit (110 + 10 degrees Celsius) and weighed at 24-hour intervals until the loss of weight does not exceed 1 percent. Upon determining the oven dry weight and measuring the specimen, the dry density can then be calculated.

Summary

In summary, lightweight-insulating concrete fills can provide challenging circumstances to those individuals involved in roof installation activities. However, with proper pre-planning, design, material selection, and installation, lightweight-insulating concrete will serve as a sound suitable substrate in which to install the new roof system and provide the desired features expected from the project personnel.

Karl Schaeck

Karl Schaeck, P.E., is the branch manager of Price Consulting, Inc., of Houston.

See page 87 for answers to the self test.

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1997 TSA Design Awards

Presented on these pages are the winners of the 43rd annual TSA Design Awards competition. The 15 projects include 13 Design Award winners and two winners of the TSA 25-Year Award. They were selected in June from among 164 entries by jurors Patricia Patkau of Vancouver; David Rinehart of Los Angeles; and Alejandro Diez of New York (see page 5 for more on the jury).

The winning projects show the range and diversity of architectural practice in the state: from an enormous office complex in Canada to a house on the prairie in South Texas, from townhouses in Houston to the Texas State Cemetery. Enjoy.
1. living room looking toward stairs coming down from glazed bridge.

2. dining room, looking toward entry.

3. An outside bridge leads to the main entry; beyond it a glazed bridge connects the house's two sections.

4. From the rear of the house, the master bedroom, at left, cantilevers out over the living room below.

5. The architects fabricated a light fixture of dacron, fir, and birch plywood for the dining room, seen here through window at entry.
House in Two Parts

by Susan Williamson

The Latorre House by Cunningham Architects of Dallas, a 1997 TSA Design Award winner, is a house of several faces: at once public and private, outward-looking and inward-focused. The 3,500-square-foot house was designed for a single man with a variety of interests and requirements, the architects say. The hunter and fisherman wanted a lodge, the gourmet cook and entertainer wanted a kitchen, and the conservative businessman wanted a house that would fit into the neighborhood. The result is a house of various parts and of varied moods. The parts are contained in two separate volumes connected with a glazed bridge.

The more public part of the house includes an open kitchen and dining room on the first level with guest bedrooms above. These rooms sit behind one of two rubble walls built from limestone salvaged when a previous house on the lot was demolished. The inward-curving wall anchors one edge of the dining room and provides a sense of enclosure that is further enhanced by a pavilion-like structure of exposed columns, beams, and cross members. A bank of windows opens onto the back of the site and the warm-toned materials—glue-laminated beams and columns, cork floors, and a tongue-and-groove wood ceiling—glow in the natural light. The galley kitchen is screened from the dining room by a divider of steel and frosted and textured glass fabricated by the architects.

Across the bridge and downstairs—stairs whose railing is an intricate assembly of wrought iron created by artist David Sines—is the much more private living room. North and south window walls connect the room to the heavily wooded site. The second limestone wall, curving outward this time, provides a backdrop for a wood-burning stove. Upstairs from the dining room and across the bridge is the master-bedroom suite: sitting room, a wonderful set of built-in wardrobes, bathroom, and bedroom, connected again to the woods through banks of windows.

The house, with its hints of a 1930s sensibility, its richly textured and varied materials, and its openness to and relationship with the site, provides almost an overload of images and moods. It is a collage in the best possible sense: an assembly of diverse pieces where the whole is more than the sum of the parts.

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PROJECT Latorre House, Dallas
CLIENT Robert Latorre, Dallas
ARCHITECT Cunningham Architects, Dallas
CONTRACTOR Charles Hoback Construction
CONSULTANTS MEP Inc. (mechanical, electrical, plumbing); James Smith (structural); Phil McEwin (structure); Cunningham Architects (landscape)
PHOTOGRAPHER James F. Wilson

RESOURCES
Structure: Featherlite; wall surfacing: Featherlite, USG; doors: Simpson Mastermark, John Fitzgerald Millwork (custom pivot maple plywood); floor surfacing: Dodge (cork), Bentley (carpet); roofing: GAF; insulation: Owens Corning; kitchen appliances: Viking range, Subzero refrigerator, Bosch dishwasher; custom steel handrails and steel pot rack: David Sines; lighting: Flos, Lightolier; plumbing and sanitary: Kohler, American Standard, Speakman, Elkay; heating and air conditioning systems: Trane; environmental control system: Trane; carpets/rugs: Bentley, Daphne Perry, Architect; lamps/portable lighting: Artemide, Cassina; furniture: ICF, Max Aalto, John Fitzgerald Millwork, Knoll, ICF, Herman Miller; blinds: 9 & B Italia

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Wide Open Place

By Canan Yetmen

Bringing an office tower originally designed in the late 1970s into the late 1990s was the task of the renovation undertaken by Ziegler Cooper Architects of Houston. The result, the transformed 35-story, 875,000-square-foot Louisiana Place (see TA, May/June 1997, p. 14), is winner of a 1997 TSA Design Award. The building, sited prominently on the Louisiana Street corridor in Houston’s central business district, needed updating in all public areas—lobbies, corridors, and restrooms—as well as the creation of retail space at the tunnel level and replacement of the exterior at the base of the building.

The renovation focused on redesigning the first two floors by connecting the two lobbies to create a large open volume and prominent entrances. The interiors, including the tunnel level, were completely gutted, with large portions of floor removed to open the space and accommodate new escalators. A structural clear glass curtainwall system two stories high gives a view into the lobby from the outside, and accentuates the feeling of openness. The predominantly cool blue and silver palette of the public spaces is warmed by the figured anigre wood veneer of the elevator lobbies and security consoles. An exterior vocabulary of silver-painted aluminum cladding, thermal-finish luna pearl stone with black accents, and stainless steel was chosen to complement the existing tower of glass and aluminum. “The success of this project, in our view, is the connection we were able to create between the tunnel and street,” says Kurt Hull, principal of Ziegler Cooper. “We are pleased with the fact that we were able to redevelop an existing office building by responding to the context of the structure, and create an open and inviting feel to the building.”

1. One of two new escalators in the Louisiana Place project leads from the street level to the first-floor lobby.
2. The new two-story clear glass curtainwall reveals the life of the lobby inside.
3. Two corners of the existing building were carved out to create prominent entrances that enhance the streetscape.
4. Stainless steel plates connect the two-foot-six-inch interior structural “fins” that control wind-loading conditions.
5. The exterior of the 35-story building in downtown Houston is detailed with entrance canopies and sunscreen elements.
6. Interior canopies over elevator lobbies recall the exterior.
RESOURCES
Completed in the fall of 1995, the Great Northwest Branch Library is a 12,000-square-foot addition to San Antonio’s public library system. Needs included simple, functional work areas, ample lighting, and ease of visual surveillance. The building (see TA, July/August 1996, pp. 52-55) is another in a growing list of design-award winning projects from San Antonio-based Lake/Flato Architects, ranging from residential and commercial structures to community projects.

The architects predicated the design of Great Northwest upon simplicity and order. The geometry of the building creates a datum, wherein stacks and rooms occur in the low spaces while reading areas occupy the taller spaces between—identified by their metal, shed-like roofs that provide clerestory light. From the outside, the limestone walls delineate the perimeter of the library and define the rectangular interiors. Lake/Flato’s use of clear and logical forms, a simplified mechanical system, and a limited materials palette were in part due to budgetary constraints, but these elements also create an elegantly simple and useful “warehouse”—in the words of the architects—for books.
1 Industrial forms rise above the limestone walls to demarcate the reading spaces between the stacks.

2 As a nod to the library's community, the entrance faces the neighborhood and not the adjacent arterial street.

3 Reading spaces between the stacks benefit from a taller space and more natural light.

4 Clerestories bring softened, indirect light into building interiors.

5 The library combines rectangular stone walls and shed-like steel forms.
Little House on the Prairie

By Kelly Roberson

DESIGNED AS A WEEKEND RETREAT for 70-year-old Milton Butcher, a photographer, wood boat builder, and art collector, the Butcher Ranch Residence was only the second project Michael Imber of San Antonio completed after starting his own firm, and marks the firm’s first TSA Design Award. Located on 700 acres of prairie in Gonzales County, the 1,960-square-foot house forms a courtyard with an existing barn, several full-grown oak trees, and a 100-year-old grapevine. The house, oriented to the southeast to capture breezes and maximize views, was designed as a sculptural object in the landscape, says Imber, and acts as a screen through which you must pass for a full view of the prairie. For Imber, the house “almost reads like a ship.” The chimney anchors one end and the interior stair anchors the other, acting as a bulkhead to separate public from private.

The aesthetics came from Butcher’s acute eye and minimalist approach, says Imber, as well as a sensitivity to landscape and client needs. Materials, such as the exterior painted plaster, recall the German immigrant vernacular of Butcher’s heritage and reflect the history of the region. A redwood sleeping porch, with two beds tucked away into closets, and a kitchen “shed” are utilitarian and add a personal touch and scale. For economy of space, wardrobes in the bedroom and entry, which screen the high wood ceilings of the living room and wrap into the kitchen, provide the only storage space, and the bathrooms are tucked under the stair. The windows are small, and most placed high, to allow room for the art collection and to let light drift across the walls from above. The hand-carved fireplace evokes the property’s grapevine in a continuous effort to relate the details back to the site, says Imber.
Details in the living room include a hand-carved limestone fireplace lintel, Colorado sandstone floors, custom iron chandeliers, and a long-leaf pine ceiling.

The screened porch at the rear of the house looks out onto the prairie beyond.

From the front, looking at the redwood kitchen shed.

The stair acts as a separation between public (kitchen, living room) and private (bedroom).

The sculptured plaster forms of the house took their cue from vernacular elements used by German immigrants.

The screened porch fills the length of the house; a stair to the side leads directly to the guest bedroom upstairs for added privacy.
Not Your Standard Fare

By Kelly Roberson

In a slice of a residential neighborhood facing Memorial Park, on the western edge of central Houston, are the Haskell Street Townhouses, designed by Natalye Appel Architects of Houston and recipient of a 1997 TSA Design Award. For Appel, the project was a chance to design for a client—a landscape architect—who gave her freedom and encouragement, who “knew they [the townhouses] would sell if it was good design,” she says.

The floor plan of the side-by-side, 3,000-square-foot, split-level townhouses maximizes park views across the depth of the space, while preserving the character of the site, says Appel. Designed mainly for professionals with a need for a flexible arrangement, the townhouses lift up the living room over a ground floor bedroom/office. The dining room and kitchen are one-half level up from the living room, over the garage and mechanical at the rear, affording views through the entry and 15-foot-high front space. The curve of the courtyard window wall pulls the eye towards a view of the park. The interiors are simple and clean, with white walls, clear finish cabinets, lightly finished wood floors, and slate as accent around the fireplace and in the bathrooms and bar. Spaces that didn’t need as much light—stairwells, bathrooms, pantry, and laundry—were tucked in around the party wall.

For Appel, the outside spaces, and the residents’ connection to them, were just as important as the interiors: Each floor has a terrace overlooking the park, and a 600-square-foot roof terrace is located over the living room, a place Appel calls a “a space up in the trees.” The relationship with the park is further emphasized with a front garden, landscaped by the client, that enables residents to be a part of a public area while maintaining a semi-private space and feeling.
1. The front of the Haskell Street Townhouses

2. The kitchen and service areas are in the back of the townhouses, overlooking the alley access.

3. The roof terrace, above the living room, looks over Memorial Park.

4. Front windows open up the townhouses to the park.

5. The curved wall looks out over the entry and garden toward the park.

6. Bounded by the party wall, the entry court looks up onto two terraces.

RESOURCES
Wall surfacing: Atlantic Partners, Eagle Concrete Products; windows: Champion Windows; skylights: Gulf & Babco; doors: Lonestar Plywood & Door; floor surfacing: Keystone Concrete, Houston Hardwood Floors; ceiling surfacing/system: Kuri Drywall; cabinets: Mecanux, Francois W. Desruisseaux.
The congregation at St. Pius X Catholic Church in San Antonio had no idea that their new fellowship hall, designed by Kell Muñoz Wigodsky Architects/Jerry Theis & Associates Joint Venture of San Antonio, could be completed under budget and at the same time exceed their expectations. But this 1997 TSA Design Award winner proved to do just that: It is an example of beautifully executed design reflecting both forethought and spirituality.

Faced with the challenge of linking an existing church built in 1977 and a school built in 1959, the architects focused their attention on a courtyard shared by both of the buildings. The courtyard proved to be the main design inspiration, serving as a natural tie between the divinity of nature and the divinity of religion. Architect Dan Wigodsky wanted the lobby and hall interior to echo this connection, creating what he calls a “symbolic orchard.”

The architects achieved this by creating a long lobby, with tall windows that not only offer a view of the courtyard but also allow an easy transition from the garden without to the garden within. Daylight spilling in through the windows creates shadows on a rich purple wall in the lobby; the constantly changing shadows provide both a visual accent and a connection to the natural world.

Stained glass in the lobby doors is etched with plant motifs, each representing a different religious symbol. The lobby ceiling is constructed of overlapping panels of wood of different colors. In the main hall, wood paneling is used again on the ceiling, as well as on the walls; however, the geometry of the ceiling installation there suggests a transition from the emphasis on symbol in the lobby to an emphasis on form in the hall. Also in the hall, circular lights hung at different heights simulate stars in the night sky.

Symbolic Orchard

by Jenna Colley

1 St. Pius X Fellowship Hall, looking through the lobby and into the hall from the courtyard
2 The tall lobby wall, which faces the courtyard, is detailed with sunshades and louvers.
The hall is connected to the school on the east and the church on the west, allowing for functional movement and activity between the two. Several meeting and activity rooms border the main hall.

If a religious structure is to serve those who worship there, it must be part of the experience, the architects say. The St. Pius X Fellowship Hall does that by combining the spiritual with the natural.

Three sets of double doors open the fellowship hall lobby to the courtyard, allowing an easy flow between outdoors and indoors.

The warm materials used on the interior of the hall provide an inviting atmosphere for its users.

The architects wanted to create a connection between the well-used outdoor plaza at St. Pius X and the new fellowship hall.

**RESOURCES**

Structure: Vulcraft; wall surfacing: Acme; windows: Kawneer; doors: Kawneer, Weyerhauser, Won Door Corp.; floor surfacing: Alamo Concrete Products, Prince Street, Venic Art Terrazzo Co.; ceiling surfacing/system: Armstrong; roofing: Allied Signal; insulation: Owens Corning; paint and stain: ICI Paints (Devco); hardware: Schläger; elevators: Dover; lighting: Lithonia; plumbing and lavatory: Kohler, Bradley; air-conditioning system: York, Magic Air.

**PROJECT: St. Pius X Fellowship Hall, San Antonio**

**CLIENT:** The Catholic Archdiocese of San Antonio

**ARCHITECT:** Kelly Mooney Architects/Jerry Theis & Associates Joint Venture, San Antonio

**CONTRACTOR:** The Keller-Martin Organization

**CONSULTANTS:** Project Control of Texas (project manager); Danysh Lindy & Associates, Inc. (structural); HMG & Associates, Inc. (mechanical, electrical, plumbing); Boner & Associates, Inc. (acoustical)

**PHOTOGRAPHER:** R. Greg Hursley
1. The massive presence of the visitors center anchors the western edge of the site.

2. Natural light enters the visitors center gallery through small floor-level openings.

3. The Plaza de los Recuerdos is composed of a circle of large stones centered on a Texas flag.

4. The formal entry to the cemetery is modeled on a gate at the Texas State Capitol.

5. The long visitors center is organized as two sections connected by a central dogtrot-like opening.
A Place of Pride

by Jonathan Hagood

After three years of hard work, the Texas State Cemetery in Austin opened the doors in March 1997 to a new visitors center, a fresh landscape, and restored monuments and landmarks. Lake/Flato Architects of San Antonio spearheaded the award-winning project, including design of the visitors center (see TA, May/June 1997, pp. 12-13). The work was begun at the behest of Lt. Gov. Bob Bullock who wanted people to feel "reverence, respect, dignity, and honor for those buried here and the people of Texas."

The cemetery, which was established by the Texas Legislature in 1851, had by the 1980s fallen into a state of general disrepair. A master plan developed by Lake/Flato called for a reorganization of the grounds, including construction of the new visitors center. The building, stretching along the western edge of the site, now provides a focal point for the restored cemetery. The center houses administrative offices and a gallery containing exhibits designed by Douglas/Gallagher of Houston (see TA, July/August 1997, pp. 48-49). The building is a massive, low-slung limestone presence, punctuated on the street side only by a central opening through which the cemetery grounds can be seen and on the cemetery side by small floor-level windows.

The formal entry to the grounds is through the Rose Gate, a replica of the gates on the Texas State Capitol grounds, flanked by a 265-foot-long columbarium. Also newly constructed was the Plaza de los Recuerdos—a circle of roughly cut standing stones dedicated to important Texans who are not buried in the cemetery. A series of ponds and replanted native grasses, wildflowers, and trees cover much of the grounds, and winding paths provide an opportunity for visitors to walk through history.

TA

RESOURCES
Structure: Dryden Stone; windows: Marvin Windows; floor surfacing: Dryden Stone; paint and stain: ICI Paints (Devoe); hardware: Dorma, Hager, Adams Rite; special equipment: G.E. Electric; furniture: Taylor, Kimball
1 Skylights were inserted above circulation paths to add light and provide visual identification of the circulation zones.

2 Interior hallways feature bright colors and street signs.

3 Interior of the new entry area

4 An undulating glass wall, placed over the original facade, marks the entry to the new headquarters building.
Neighborhood Office

by Jonathan Hagood

Northern Telecom's new global corporate headquarters in Brampton, Ontario, is a small city complete with piazzas, street signs, and neighborhood coffee shops. The award-winning design by Hellmuth, Obata & Kassabaum of Houston is a conversion of 470,000 square feet of high-bay manufacturing space—the equivalent of a 25-story office tower spread over a single floor—and a renovation of 346,000 square feet of existing office space into the telecommunications company's new combined headquarters. The facility houses operations such as the senior executive staff, corporate communications, finance, human resources, information systems, and legal and marketing, and replaced previously separate Nortel facilities in the Toronto area.

The development of a pedestrian streetscape and circulation system reduced the scale of the project and gave a sense of order to the office complex. The 3,000 employees at Brampton Centre are organized into what the architects call neighborhoods made up of work groups that need to communicate and interact with each other. Implementation of the concept meant including street signs, different floor and overhead treatments for the circulation paths, and frequent streetside benches. Also, piazzas with trees, open eating areas, and "public" buildings—facilities such as cafés, retail stores, and banking kiosks—occur at street intersections and building entrances.

This cityscape lies within the former manufacturing building. HOK altered the envelope to provide views to and from the outdoors and to bring in more of the weak, northern-latitude light. For similar reasons, the renovation inserted skylights over the streets, which also helped visually identify the circulation paths. The architects redesigned the public entry—the signature piece of the building—as an undulating glass wall fronting portions of the original industrial facade. Internal streets, trees, and offices are visible through the new transparent facade.

While bright, upbeat colors and the repeated small-scale structures break up the immense space, these design elements also create a sense of unity throughout, like parts of a city that have a similar character yet a different feel depending upon the neighborhood or street on which you find yourself.

PROJECT NORTEL Brampton Centre, Brampton, Ontario, Canada
CLIENT Northern Telecom Canada, Ltd., Real Estate
ARCHITECT Hellmuth, Obata & Kassabaum, Inc., Houston
ASSOCIATE ARCHITECT Bregman + Hamann Architects, Toronto, Canada
CONTRACTOR The Jackson-Lewis Company
CONSULTANTS Caruthers & Wallace Limited (structural); Smith & Anderson Consulting (engineering (mechanical & plumbing); Mueley & Banani International, Inc. (electrical); Marshall Mackin Monaghan (civil); Herman Miller Canada, Inc. & Steckler Canada Limited (furniture).
PHOTOGRAPHER Gary Quesad, Hedrich Blessing Photographer

RESOURCES
Wall surfacing: Sota Glazing; skylights: Sota Glazing; doors: Sota Glazing, Toronto Door & Hardware; floor surfacing: Gordon T. Sands, Toronto Marble & Terrazzo; partitions: Herman Miller; hardware: Best Lock; signage: WSI, carpets/rugs: Gordon T. Sands; furniture: Herman Miller; elevators: Dover; plumbing and sanitary: American Standard

existing conditions in the high-bay space
Public spaces, such as this dining area, are placed at street intersections and help break down the scale of the immense building.

first-floor plan
On the River

by Susan Williamson

A Cotulla Ranch House by Lake/Flato Architects of San Antonio includes many of the elements that have come to be expected from the firm’s award-winning houses. However, with this project, winner of a 1997 TSA Design Award, the firm pushes the boundaries of its past work, refining some elements and recombining others to create a whole that stands on its own.

The 4,424-square-foot house, located between San Antonio and Laredo on the banks of the Nueces River, looks to both the river and to the surrounding arid flatlands for its inspiration. Two screened rooms open the house to the outdoors. At the river end, an elliptical structure composed of heavy stone buttresses and panels of screen ties the house to the river bank. The depth of the buttresses was necessary, says architect Ted Flato, to allow space for the swing of glass shutters used to seal the room during cold weather. Screened rooms are always the most-used areas of the houses the firm designs, Flato says, so in this case they made one that could be used year round. A dramatic light monitor tops the metal-roofed main room. At the opposite end of the house, a more conventional screened room bows outward toward adjacent pastures.

The rest of the house is composed of four L-shaped stucco sheds organized around a large courtyard anchored at each corner with a small cistern-like pool where rainwater runoff is deposited. An even larger pool—the architects call it a stock pond—is located directly across the courtyard from the main entrance, providing a break in the courtyard’s enclosure, necessary to keep out deer and other wildlife. At the entry, a large-scale arbor—Flato describes it, in what he calls ranch vernacular, as a “truck” arbor—will provide shade for parked vehicles when recently planted vines grow to cover it.
RESOURCES

Modernist Makeover

By Canan Yetmen

Richter Associates Architects’ renovation of a 1970s modernist shingle-style house in Corpus Christi is the winner of a 1997 TSA Design Award. The project included construction of a new carport and studio, designed to define an entry space for the existing courtyard. Extensive modifications were performed on the interior of the house, including renovation of bedrooms, kitchen, and dining areas, as well as new landscaping and paving of the courtyard.

The exterior of the L-shaped house was originally clad entirely with wood shingles, making the building appear flat and too homogenous. To visually support the composition of the house, Richter Associates added new texture and color by highlighting design elements with pre-weathered copper cladding. Board-formed concrete pilasters anchor the structure and contrast the lightness of the other two materials. The copper cladding, its blue-green patina echoing the nearby ocean, was chosen for its ability to stand up to the constant humidity and pounding winds of the coastal bend.

The original design of house, courtyard, and greenhouse lacked a fourth element to enclose the space and provide a well-defined entry. The gatehouse creates covered parking spaces, a parking court for guests, a new guest room or study, and provides a spatial anchor for the courtyard. The study is oriented inward, its largest window looking back over the house and courtyard. Shingles on the gatehouse exterior echo the original material of the house, and copper inlays supporting the trellis inject the patina of the renovation, visually tying old and new together.
RESOURCES

Above and Beyond

By Jenna Colley

Architect Max Levy understands that architecture, even in its most elegant and calculated form, must still pay homage to the uncontrollable elements of nature. It is this understanding that made his project, House with a Sky View, a winner of a 1997 TSA Design Award.

Nestled among the shallow pastures of Parker, north of Dallas, the house is anchored by low walls that form a small parking court. This forecourt is open-ended to the north and contains gridded clusters of crepe myrtle trees, paving blocks, grasses, and low growing ground cover. Great care was taken to secure the view of the drive from the kitchen window and dining room. Levy's use of the Texas sky resonates throughout the entire project. "One of architecture's most elementary acts is the framing of a view . . . and that's about all this house is about," says Levy.

Gray-green slate paves the breezeway of the house, while a screened porch projects above the roof line. Bright light forms curving shadows on the interior of the oculus, enhancing the intensity of the blue sky by contrasting with the lighter stucco finish. A wide glass entry door located off the breezeway pivots open to a small vestibule included within the single volume of the interior of the house. Continuous ceiling and floor planes extend from the entrance to the bedroom, opening to three enormous skylights suggested by the rooftop solids. The skylights modulate the light, creating a space that is both dynamic and vibrant. Contrast plays a fundamental role in the interior of the house. Finished in gray basecoat plaster, the texture of the fireplace contrasts with the smooth surface of the painted walls.
1 A triangular skylight floods the bedroom with natural light.

2 The gardens at the back of the house are divided by long, low walls of varying lengths.

3 An exterior stair leads to the roof deck.

4 Light through the skylights is controlled with sliding panels of wood-framed sail cloth.
The construction of a building for the display of the Menil Foundation's restored 13th-century frescoes required a space that was both reliquary and chapel, and resulted in a structure with a similar duality of volume. Architect Francois de Menil's award-winning design (see TA, July/August 1997, pp. 44-47) is a double envelope of space: a curving chapel formed by light within a dark cube of steel and concrete. Instead of a traditional—and secular—museum or a literal reconstruction of a church, Menil interpreted the space, volume, and emotion of a small Byzantine chapel.

The exterior of the building, an arrangement of concrete-clad platonic forms, has a neutral presence that belies its light-filled interior and religious content. Inside are illuminated, 1-1/2-inch-thick glass panels and a black space frame braced to the structure of the building, forming the complex chapel volume. The effect is striking: The matte-black background and luminous glass panels place the focus dramatically upon the frescoes and create a space for both display and spiritual contemplation.
RESOURCES


1 early concept sketch
2 axonometric of final design interior
3 north transept wall
4 model of final design
5 outdoor garden that separates the chapel from the entry
6 section facing east (above) and section facing north (below)
7 typical space frame and glass panel connection
Off the Beaten Path

By Kelly Roberson

The highways and byways of our landscape are not often honored with awards for design. But recognition this year went to the North Central Expressway Urban Design project (see TA, March/April 1993, p. 9), recipient of a TSA Design Award, and its key players: Hellmuth, Obata + Kassabaum (HOK) of Dallas and the Texas Department of Transportation (TXDOT).

Central Expressway was built in the late 1940s; almost as soon as it was finished, says Donal Simpson, principal-in-charge at HOK, there were rumblings of an upgrade. An elevated expressway proposal in the 1970s met with community opposition, sending TXDOT back to the drawing board. The result was a compromise to rebuild Central, depressing six miles of the ten-mile project 26 feet below grade. Included was an amenities package to ensure, says Simpson, that it was “depressed, not depressing.” The design, says Simpson, had two primary goals: to maintain architectural continuity in the main lanes and to reflect the character of neighborhoods in the frontage roads. HOK designed all the visible elements, including retaining walls, bridges, lighting, landscape, noise walls, signage, and special features on some bridges.

Central represents one of the rare times TXDOT has hired an architecture firm, and HOK worked to convince TXDOT to adopt new standards for some items used in construction, including the retaining walls and light fixtures. In addition, the city of Dallas agreed to pay half of the total $10.7 million cost of the amenities package, which was only a small portion of the total project cost of $500 million.

Over the course of ten years spent working on the project, Simpson has seen a change in TXDOT’s attitude. “We hoped it would have an impact on TXDOT. High-
ways have such a big impact on cities, and aesthetics are so important. TXDOT has started to recognize that you need to make the freeways an asset to the city, which is a paradigm shift for them, outside the old parameters of engineering practice. TXDOT deserves kudos; it will be several years before they realize all that they've done," says Simpson.

PROJECT North Central Expressway Urban Design, Dallas
CLIENT Texas Department of Transportation
ARCHITECT Hellmuth, Obata + Kassabaum, Inc., Dallas
CONTRACTOR Granite Construction Co., HB Zachry, Taylor Brothers
CONSULTANTS Lockwood, Andrews, and Newnam (engineering);
Carre, Lynde, Hark, and Sandell (urban design); The Slaney
Shuntana Group (landscape); Terry J. Little, ASLA (irrigation)
PHOTOGRAPHER Craig Blackmon, Black Ink

RESOURCES
Structure: Texas Industries, North Texas Cement Co., Structural
Metals Inc., Sheffield Steel Corp., Auburn Steel Co., Inc., Gifford
Hill Inc., Red River Sand + Gravel, Latimore Industries, Inc., Bexar
Concrete Works, Inc.; wall surfacing: H.B. Zachry Co., Trico
Precast, Inc.; floor surfacing: Pavestone, Koch Materials; paint
and stain: Industrial Coating Specialists; traffic signage:
Interstate Highway Sign Co.; lighting: General Electric

1 a watercolor of the plan for the 10-mile stretch of
Central Expressway
2 HOK persuaded TXDOT to accept the new retaining
walls they designed as a standard.
3 Three parts of the five

part project are finished; the
official schedule forecasts a completion date in
1999.
4 Working out the
geometry of the landscape,
says Simpson, was a real
challenge.
5 A sketch of a frontage
road/landscaped section
Condensed Poetry

by Frank D. Welch, FAIA

Fort Worth's Kimbell Museum would have been a cultural fixture in that city regardless of who its architect was. Yet the building designed by Louis Kahn in 1966 and completed in 1972, and winner of a 1997 TSA 25-Year Award, became an international landmark and destination for visitors from around the world.

Kay Kimbell, a Fort Worth businessman with a collection of 18th-century paintings, provided in his will for a museum to hold his art, much as Amon Carter had done in the late 1950s when he stipulated that his western art collection be housed in a museum as his memorial. Philip Johnson designed that project and its success provided a momentum for art and architecture in the city known as Cowtown that has never let up. The Kimbell was the penultimate manifestation of Fort Worth's remarkable civic impetus and one of the 20th century's architectural triumphs. Yet to come is Tadao Ando's Modern Art Museum.

The Kimbell's first director, Richard Fargo Brown, led a committee that selected Kahn to design the building. Kahn was a sort of holy man among architects, given to sometimes obtuse statements of his philosophy. The clarity of his message was in the buildings: strongly graphic and expressive of their use and construction in a condensed poetry unknown to his peers. The Kimbell is one of his strongest statements.

Kahn's design for the Kimbell did not spring from his head and heart all at once but evolved through several stages. His first schematics show a large, low symmetrical "industrial" building of top-lighted parallel roof forms, punctuated with random openings in the roof. The first sketched sections were of triangular roof volumes, like a large-scale folded plate. The vault concept came soon after, and initially proposed lighting and mechanical services suspended below a center slit in the vault. Rick Brown shepherded Kahn through the shoals of full development of the museum as we know it today.

The finished building was received with warmth and praise by public and professionals. The low palazzo scale and the repeating, cycloid-vaulted profile struck an emotional chord with laymen (whose favorite architectural form is undoubtedly the arch), and the articulated materiality of concrete, marble, glass, and sheet metal in a sublime concert of proportion and the luminous, spatial magic of the interior enthralled architects. A huge cry from the architectural community went up in the late 1980s when plans to enlarge the building by extending its vaulted extrusions were revealed (and later abandoned).

From Kahn, apropos of the building: "My mind is full of Roman greatness and the vault so etched itself in my mind that... it's there always ready. And the vault seems to be the best. And I realize that the light must come from the high point where the light is best in its zenith. The vault, rising not high, not in an august manner, but somehow appropriate to the size of the individual."

May the integrity of Fort Worth's treasure be preserved.

Frank Welch, FAIA, is an architect practicing in Dallas.

PROJECT Kimbell Museum, Fort Worth
CLIENT Kimbell Foundation, Fort Worth
ARCHITECT Louis I. Kahn, Philadelphia, Penn.
ASSOCIATE ARCHITECT Preston M. Geren & Associates, Fort Worth
CONTRACTOR Thomas S. Byrne, Inc., Fort Worth
CONSULTANTS August E. Komendant (structural); Cowan Love and Jackson (mechanical, electrical, and plumbing); Richard Kelley (lighting); George Patton (landscape)
Time and Place

By W. Mark Gunderson

That which lasts longest in time lies closest to the truth.—American Indian saying

The act of crossing has ancient origins in establishing place. An intersection of stone and wood in plan, this small shelter/retreat, designed by Frank Welch, FAIA, and completed in 1965, sits on a rock bluff in the obdurate landscape described so succinctly in Cormac McCarthy's All the Pretty Horses. Standing as simply and assuredly as the mnemonic Mexican masonry shrines after which it was named, in its 32 years Birthday has endured a lightning hit, hail, and a tornado. In West Texas "new" was always synonymous with "green," not mature. In this sense perhaps Birthday is just now "broken in" and useful.

The terse pragmatism suggested by such a landscape is real enough in this part of Sterling County, and it is easy to imagine this world, sans telephone lines and highway, as unchanged since the conquistadors and the ancient inhabitants before them. The surrounding ranches date only to the 1880s and 1890s and life is, in many respects, as demanding now as then.

The structure proper consists of a single enclosed room with fireplace that lies along the slope of the bluff, "crossed" by opposing wood decks (see T4, January/February 1996, p. 76). An entry deck with a prefacing stone step acts as threshold to the room, and an overlook deck terminated by a wood bench serves as destination and edge. Both become outdoor rooms by implication. Two sliding exterior wall panels between them allow flexibility in use and configuration with the interior space. The material vocabulary—stacked limestone, oil rig timber from an abandoned lumber yard in Midland, untreated cedar sid-
ing, concrete core samples as counterweights, and steel—establishes an immediate rapport with the landscape and contributes to its undeniably strong sense of “appropriateness” to its lithic site. It is Kenneth Frampton’s “critical regionalism” manifest.

Frank Welch was 38 years old and a sole practitioner in Midland when this project for John and B. Lee Dorn, clients since 1959, was constructed. He believes in hindsight that possible subconscious influences may have included Peter Blake’s 1954 Pinwheel House (a summer beach house) in Water Mill, Long Island, which is elevated in Miesian manner and utilizes sliding walls in a similar way. Birthday, however, belongs without question to Welch and West Texas.

It has incorrectly been called a house, which it is not. The Dorns requested a place to “stay overnight” and it is a place to repair in the archaic sense, to take refuge in shade, to contemplate. An adjacent windmill/water well provides water.

It is an interesting consequence of severe utility that it produces a kind of poetry born of restriction, and becomes more open and flexible, functions become abstract and universal. Birthday is imbued with dualities that coexist conceptually—open and closed, local and universal, stone and wood, un courant and timeless—and if the strength of architecture lies in the end in its encompassing breadth of concerns, then this small construction, winner of a 1997 TSA 25-Year Award, is of great consequence.

W. Mark Gunderson is an architect in Fort Worth.
Long Time Coming

ARCHITECTURE The Chapel of St. Basil at the University of St. Thomas in Houston was dedicated in June. It was 40 years a-horning and worth the wait.

Shortly after their international-style house on San Felipe Road was completed in 1950, Dominique and Jean de Menil agreed to pay Philip Johnson, their New York architect, for a master plan for the University of St. Thomas's new campus in the Montrose area. Dominique de Menil had made friends with some of the Basilian fathers at the small Catholic university and she and her husband had taken a philanthropic interest in it. Their initiative as architectural patrons of the small school set in motion a series of events that affected the architectural culture of Houston, indeed the state of Texas, in historic ways.

Johnson's New York career was first as a museum curator and scholarly observer of buildings who didn't start studies to become a maker of buildings until he entered Harvard's Graduate School of Design at age 34. Johnson went on to become an architectural celebrity and Texas' favorite "out-of-town" architect during the 1960s, '70s, and '80s, designing over 20 high-profile projects throughout the state that changed the public's expectation of our buildings (see T, January/February and July/August 1993).

The master plan for St. Thomas was inspired by Thomas Jefferson's University of Virginia "academical village" of separate buildings arranged on a long open space, connected by an arcade and focused axially on a primary building: the Rotunda library in the case of UVA, the school's chapel at St. Thomas. Johnson's building language was an explicit form of the genre found in Mies van der Rohe's Illinois Institute of Technology in Chicago. His first design for the chapel was a monumental cube of steel-framed brick masonry in a strict Miesian manner. He revised the chapel schematically over and over for the fathers and the Menils and finally bowed out in the '60s, leaving it to Howard Barnstone and Eugene Aubry to complete a Menil chapel near the campus. That became the Rothko Chapel.

In 1990, Johnson was called again to design a chapel for his original 1957 location. Architecture had been through a lot since the 1950s and Johnson, ever sensitive to the zeitgeist, produced a building congruent with the times. He finally got his cube and St. Thomas got a prominent head for its long mall-like lawn.

The futurism of painter Kasimir Malevich seems to have inspired the building's plan and form with a respectful nod toward SITE and Le Corbusier. The chalk-white chapel measures 64-by-64-by-50 feet and is surmounted by a 20-foot gold-leafed dome and embraced on one side with an arm of the university's double gallery. A free-standing, polished black granite wall, taller than the chapel, cleaves completely through building and dome on the diagonal, opening the dome into arched clerestories and...
All artificial lighting is on the outside of the building with concealed fixtures in the light wells and recessed ground lights for perimeter wall washing. The artworks, including the altar table, are by David Cargill and are generally successful, particularly the flesh-toned intaglio stations of the cross under the great cross in the west wall. However, the altar furnishings, especially the large floor candelabra, are overscaled and visually crowd that limited area, distracting from the serenity of the whole.

When Johnson, who is 91 and convalescing from surgery, heard recently that the building was a great success with the public, that music in the space was “splendid,” and that university officials were “thrilled” with the building, he was warmed with the pleasure architects feel when hearing praise. He has waited a long time for this building. But when he was reminded that this chapel is much better than the one he might have designed 40 years ago, he quickly said, “But I’m a better architect than I was then."

Frank D. Welch, FAIA

Frank D. Welch, FAIA, practices in Dallas; he is completing a book on Philip Johnson to be published by the University of Texas Press.

PROJECT Chapel of St. Basil, Houston
CLIENT University of St. Thomas, Houston
DESIGN ARCHITECT Philip Johnson Ritchie & Fiore Architects, New York, N.Y. (Philip Johnson)
ARCHITECT OF RECORD Merriman Holt Architects, Inc., Houston
CONTRACTOR Linbeck Construction Corporation
CONSULTANTS CHP & Associates (mechanical, electrical, and plumbing); Cagley Conti & Jumper, Inc. (structural); McDonough Engineering Corp. (civil); Hoover & Keith Inc. (acoustical); Engle Associate Lighting Design (lighting); David Cargill (artist); Michael Dobbins (furniture)
PHOTOGRAPHER Richard Payne, FAIA

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A New Home

ARCHITECTURE In 1996 the Texas Society of Architects decided that it needed more than the 4,500 square feet that was available in the historic Norwood Tower in downtown Austin, its home since 1981. In November 1996 the Society moved into new offices in the recently refurbished Frost Bank Tower at the corner of Ninth Street and Congress Avenue.

The finish-out of the 6,400-square-foot shell space was completed largely with donated materials and services. Benson Hlavity Paret Architects of Dallas, which designed the new space, donated its architectural services. According to principal-in-charge Sandra Paret, the TSA offices offered an opportunity to showcase the benefits of using an architect to create a functional and aesthetically appealing office interior. "In addition, we wanted to show that interior architecture is an important part of the profession these days," Paret says. The project was challenging because of the nature of working with donated materials, she says. "It was like working with a kit of parts where we didn't get to pick the kit."

The offices include an expansive entry area, featuring a curved wall and reception desk, that opens onto a conference room with a view of the Capitol. Staff offices are arranged along the outside wall, with support areas placed on the interior. According to Paret, Texas materials were used when possible, including the limestone and granite in the reception area.

Susan Williamson

The Texas Society of Architects would like to thank the following businesses and suppliers for their donations of materials and services to the TSA office project:

Vinyl tile: Armstrong; paint: Benjamin Moore; architectural services: Benson Hlavity Paret Architects, Dallas; curved-wall paint, decorative pulls: Bollen Resources; construction, entry lighting: Capitol Area Contractors; ceiling tile: Celotex; conference tabletop: Cold Spring Granite; conference wallcovering: Design Tex; graphics: Douglas/Gallagher; public corridor sconces: E.C. Dickens; entry limestone floor: Featherlite; furniture delivery, installation:

Furniture Marketing Group; furniture discount: Haworth; entry granite floor: IGM; interior signage: Intex United, Inc.; front-house base: Johnsonite; interior core paint: Kenmark; accent wall textile: Knoll; reception dome and conference room pendants: Lightolier; back-house base: Longhorn Distributors; conference room accent cable: MCS; office accent paint: MDC Wallcovering; reception and hallway pendant: Reid Cooper; conference display rack: Schenck-Sanford; carpet: Shaw Contract; wood floor, accent metal, and laminate: Wilsonart; granite and limestone installation: York Marble & Granite
Modernism in Mexico

Modernism in Mexico
Edited by Edward R. Burian
The University of Texas Press (Austin, 1997)
220 pages, $40 hardcover, $19.95 paperback

BOOKS To comprehend modernism is to understand progress and the need many countries felt for its implied prosperity and economic success. Mexico’s nearly obsessive drive towards modernity made it almost a single-issue country throughout much of the 20th century. In architecture as well as politics, Mexico embraced modernism as the key to progress and national unity; acceptance into the First World proved irresistible if not necessary to a nation torn apart by revolution and bloodshed.

International modernism—European modernism—emerged from the ruins of the First World War with the promise of an ideal man—a concept that would transcend all borders and nations, eliminate war, and unite humanity everywhere. Mexico saw in modernism a solution to its need to create an ideal Mexican man, a man who could unite all of Mexico’s contradictions and disparities. The irony of this co-option—the use of international modernism to achieve a nationalist end—is critical to an understanding of both 20th-century Mexico and its architecture.

To be a “Mexican” is a relatively new concept, beginning with Porfirian technocrats in the late 19th century and becoming a major tenet of post-revolutionary Mexican government in the 1920s. The nation, torn apart by regional, cultural, and economic differences, desperately needed the common identity modernism could provide. To make a Mexican was to combine all aspects of Indian, mestizo, and Spanish history, because for everyone to invest in Mexico’s future required the ability of everyone to claim Mexico’s past.

After a period in which architects have critiqued, discredited, and even despised modernism, the profession is coming to terms with the ideology that shaped the 20th century. Critical to the discussion is an understanding of the reasoning behind the architecture: the goals of the governments and architects who furthered the modern ideal.

Modernism and the Architecture of Mexico, a collection of essays covering ideologies and specific works, was published as an introduction to both Mexican architecture and the modern movement. The topic’s pertinence lies in Mexico’s geographic and cultural proximity and in the fact that Mexican modernism became so closely intertwined with government, public, and private development that in many respects it is still practiced today. Modernity is a survey of the roots of the movement and its ideologies, and presents a primer to some of its historically unsung heroes.

An interview with architectural historian Alberto Pérez-Gómez sets the stage and, combined with Antonio E. Méndez-Vigá’s excellent essay “Politics and Architectural Language,” provides a background for the narrower topics of the essays that follow. The immensely significant design and construction of the Ciudad Universitaria in Mexico City is discussed, and the ideas and works of architects Enrique del Moral, Juan O’Gorman, Carlos Obregón Santacilia, Juan Segura, and Mario Pani each receive an in-depth analysis.

Reading Modernity is only a starting point to a critical discussion of modernism. In Mexico as elsewhere, the movement’s ideals are still with us today in spirit and as part of the built environment. Understanding how contemporary architecture reacts to modernism requires a thorough analysis of the movement itself and a critical understanding of why and how modernism became so important to a people preoccupied with progress and national unity. This collection is self-consciously incomplete and implores the reader to think critically about the issues and explore further the meaning and history of modernism, for to think critically of our immediate past is to understand our immediate future.

Jonathan Hagood

Coming next issue . . .

The November/December issue of Texas Architect will feature a wide range of public buildings: The Armed Forces Guard/Reserve Center in Lubbock by Rike Ogden Figueroa Dickson Wells and the E.B. Cape Center for Public Works Excellence in Houston by Willis Bricker & Cannady. In addition, architect Willis Winters of Dallas will present a survey of recent municipal projects in the Dallas/Fort Worth area, including a fire station by Phillips Swagger Associates, an arts center by Milton Powell & Partners, a library by Good Fulton & Farrell, a maintenance building by CamargoCopeland, and a city hall by Ron Hobbs

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See ya'll in Fort Worth

Visit the Texas Architect booth at the TSA Trade Show for some good information on how to get your projects noticed and published. We'll also show you what's in store for 1998 and beyond, and how you can use TA as your own personal marketing kit.

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So come by and see how TA can help your firm. And if you have any gripes, let us hear 'em.

We want to know how we can do better.

Don't be shy. Come on by and sit a spell. We'll be waiting!

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Answers to Self-Test

I have read the article "A Roofing Alternative," and I have taken the self-test. I will receive one learning unit at quality level two for a total of two learning units.

Name ____________________________
Firm ______________________________
Address ____________________________
City, State, Zip _______________________
AIA Member number ___________________
Signature ____________________________

Note: You MUST include your AIA member number and your signature to qualify for credit.

Please return the completed form to: TA Continuing Education • TEXAS ARCHITECT • 816 Congress Ave., Suite 970 • Austin, TX 78701
DO NOT SUBMIT THIS FORM DIRECTLY TO AIA.
TEXAS ARCHITECT must forward your form on your behalf.

Products and Information

The companies listed in "Products and Information" are exhibitors in the 58th Annual TSA Design Products & Ideas Exposition in Fort Worth, October 23-25.

Acme Brick Company, booth 306
2821 W. 7th St., Fort Worth, TX 76107
817/332-4101, fax 817/390-2404
Circle 1 on reader inquiry card

Advantage Buildings & Exteriors, booth 625
9741 E. 56th St. N., Tulsa, OK 74117
918/272-1101, fax 918/272-2517
Advantage Buildings & Exteriors provides commercial wall panels for architectural buildings. They are composite steel stud framed, prefabricated, including final exterior finishes of 1/2-inch clay-fired brick, glazed tile, synthetic stucco, exposed natural stone, or specialty panels of polymer-reinforced concrete. Custom wall units can incorporate combinations of these finishes.
Circle 2 on reader inquiry card

AIA Trust Business Insurance Group, booth 627
4001 Kennett Pike #318, Greenville, DE 19807
888/242-2420, fax 302/658-2389
Circle 3 on reader inquiry card

Alenco Commercial Div., Redman Building Products, Inc., booth 411
1800 Shiloh, Bryan, TX 77803
800/444-1444, fax 409/263-1065
For new installations or replacements, Alenco offers nearly a half century of technological improvements and service leadership in aluminum window manufacturing; windows and window wall systems made entirely at our Bryan plant; aluminum extrusion, insulated glass manufacturing, assembly, and painting are smooth steps in a tightly controlled process.
Circle 4 on reader inquiry card

All Texas Decks, Inc., aka Sundek, booth 515
805 Avenue H #509, Arlington, TX 76011
817/355-2406, fax 817/949-7178
Circle 5 on reader inquiry card

American Tile Supply, booth 308
1839 Merrell Rd., Dallas, TX 75229
972/243-2377
Distributor of all kinds of ceramic tile, marble, stone, and related products with 12 convenient locations in Texas.
Circle 6 on reader inquiry card

Ameristar Fence Products, booth 621
POB 4180, Tulsa, OK 74158-1000
918/835-0898, fax 918/835-0899
Ameristar Fence Products, with its unique Permacote color coating system, produces the finest ornamental iron and color chain link framework in the world today. Permacote consists of a double layer of powder coating protection. The zinc rich epoxy base coat is top coated with a "no mar" polyester coat. The result is a quality, long lasting, fantastic-looking fence you will be proud to specify or own.
Circle 7 on reader inquiry card
Amex Cost Consultants, Inc., booth 605
201 Billings St. #150, Arlington, TX 76010
817/649-3080, fax 817/649-1366
Circle 21 on reader inquiry card

Ampco Products, Inc., booth 613
201 Railroad Ave., Sanger, TX 76266
817/398-7401, fax 817/398-5307
Circle 22 on reader inquiry card

Anchor Fence/Monumental Iron Works, booth 319
6500 Eastern Ave., Baltimore, MD 21224
800/229-5613, fax 800/230-1263
Vinyl coated chain link fence and gate systems. Ornamental picket fence and gate systems. Gate operators and access control systems. Metal (privacy) fencing and gate systems.
Circle 23 on reader inquiry card

APCO Graphics, Inc., booth 321
1150 Copeland Rd. #710, Arlington, TX 76011
817/836-1085, fax 817/834-1534
APCO's ADA Process 1 feature, available on its IM System of modular sign components, provides the tactile and tactile characters required by ADA; includes a broad range of components, from personnel signs to space identification and directional modules.
Circle 24 on reader inquiry card

Architectural Building Components, Inc., booth 317
11625 N. Houston Rosedale Rd., Houston, TX 77086
281/931-3986, fax 281/931-1398
Manufacturer of nine (concealed fastener) roofing panels; material is 24 gauge Galvalume, available in 16 standard Kynar 500 colors; products include panels with structural and solid deck applications; systems are integral male-female snap-together, straight leg mechanically scanned, snap-on batten, curved roof panel, and flush soffit panels.
Circle 25 on reader inquiry card

ASI Sign Systems, booth 102
8601 Jameel Dr., Houston, TX 77040
713/462-7222, fax 713/895-7516
Circle 26 on reader inquiry card

Associated Masonry Contractors of Texas, booth 408
314 Highland Mall Blvd. #510, Austin, TX 78752
512/374-9022, fax 512/375-9556
Circle 27 on reader inquiry card

Billy Cooper Stone Co., Inc., dba Cooper Stone Co., booth 309
3788 West FM 487, Jarrell, TX 76537
512/736-2210, fax 512/736-2270
Limestone from the Austin area for use in both commercial and residential projects.
Circle 28 on reader inquiry card

Boral Bricks, booth 112
1400 N. Broadway, Carrollton, TX 75006
972/245-1542, fax 972/242-8172
As the largest manufacturer of brick in the U.S., Boral Bricks is committed to providing quality brick to the architectural and residential markets. In conjunction with Boral manufacturing plants across the nation, we offer a wide array of products and services. Our combination of colors, shapes, and textures offers the architectural community unlimited design opportunities.
Circle 42 on reader inquiry card

Cadmion Inc., booth 310
1950 Stemmons Fwy. #501, Dallas, TX 75207
214/741-2432, fax 214/741-2407
Circle 34 on reader inquiry card

CADWorks, Inc., an Avatech Solutions Company, booth 208
4322 N. Beltline #B-110, Irving, TX 75038
972/370-0007, fax 972/370-7505
CADWorks has been providing CAD Solutions to CAD professionals since 1983. With industry experience and a full suite of AEC products, CADWorks is positioned to offer the highest quality service and products with software from Autocad, Softdesk, Virrus, and others.
Circle 35 on reader inquiry card

Carlisle Syntec Inc., booth 109
390 Midway Rd., Carrollton, TX 75006
972/248-0366, fax 972/248-0933
Circle 36 on reader inquiry card

Carrollton Harvey Roofing Inc., booth 623
827 Avenue H East #211, Arlington, TX 76011
817/695-7055, fax 817/695-7050
Proven around the world for over 40 years, DECRA Roofing Systems by Carrollton Harvey Roofing Inc., are the original stone coated steel roofing systems. Available in tile, slate, and shake profiles, these lightweight, high-performance systems carry a 30-year limited warranty that includes hail and 1200-mph wind resistance.
Circle 37 on reader inquiry card

Celotex Corporation, booth 114
13800 Montfort Dr. #350, Dallas, TX 75240
972/661-1406, fax 972/686-1053
Celotex is a leader in the manufacture of residential and commercial ceiling systems, roofing, and rigid insulations. Working in conjunction with architects to specify foams and roofing with emphasis on EIFS and other foam systems as well as higher-end aesthetically pleasing roofing products.
Circle 41 on reader inquiry card

Ceramic Tile International, booth 415, 514
2333 S. Jupiter Rd., Garland, TX 75041
214/501-5490, fax 214/501-5489
Ceramic Tile International offers one of the largest selections of floor and wall tile products in the Southwest with several innovative designer showrooms conveniently located throughout Texas and Georgia, as well as a fully staffed, professional team of architectural sales representatives to assist with all commercial tile requirements.
Circle 42 on reader inquiry card

Certainteed Corporation, booth 651
POB 506, Shakopee, MN 55379
612/445-6450
Circle 43 on reader inquiry card

Chas. F. Williams Company, booth 508
POB 1724, Fort Worth, TX 76101
817/332-6575, fax 817/320-9320
Circle 44 on reader inquiry card

Chempood Technology, Inc., booth 607
2805 Industrial Lane, Garland, TX 75041
972/321-5551, fax 972/321-5553
Manufacturer of above-grade water repellents and stains for concrete, masonry, stucco, and precast industries, including conformed stain, Prime A Pell 100, and new water-based Prime A Pell H:O. Call our toll free number or contact us at www.chempro.com.
Circle 45 on reader inquiry card

Chicago Metallic Corporation, booth 596
4849 S. Austin Ave., Chicago, IL 60648
800/323-7164, fax 708/563-4552
Circle 47 on reader inquiry card

Citiadl Architectural Products, booth 518
3131-A N. Franklin Rd., Indianapolis, IN 46226
317/894-9341, fax 317/894-8333
Laminated composite panels for exterior use on buildings in softs, facias, window infills, and exterior panel system.
Circle 48 on reader inquiry card

Cold Spring Granite Company, booth 516
202 S. Third Ave., Cold Spring, MN 56320
320/685-8413, fax 320/685-8490
Full service supplier of domestically quarried granite for building facing (interior and exterior), paving, landscape areas, and industrial uses. Product line includes slabs and thin tile.
Circle 49 on reader inquiry card

Collins & Aikman Flooringcoverings, booth 504
1316-B Hyn Line Dr., Dallas, TX 75207
214/730-0663, fax 214/730-6632
Collins & Aikman Flooringcoverings, Inc., is a manufacturer and recycler of high performance vinyl soft surface floors in both six-foot roll goods and modular tiles. Please ask about our revolutionary wet-adhesive-free system known as Powerbond RS, available on all floorcoverings.
Circle 50 on reader inquiry card

Construction Market Data Group, booth 509
4126 Pleasantdale Rd. A-8, Atlanta, GA 30340
770/442-0650, fax 770/442-0432
Circle 51 on reader inquiry card

Dal-Tile, booth 507
7834 Hawn Fwy., Dallas, TX 75217
214/436-1441, fax 214/436-8384
Dal-Tile is ... possibilities, color, fashion, texture, and inspiration; longtime suppliers of high-quality tile; ADA.
Circle 53 on reader inquiry card
Modernfold Distributors of Texas, booth 330
14611 Sommersmeyer, Houston, TX 77041
713/690-3348, fax 713/690-4911
Casodix is a flexible wall system that, with the touch of a button, vertically divides a room and offers a functional, yet aesthetically pleasing glass panel design. Casodix offers commercial customers a flexible space division product that is attractive, functional, simple to operate, and inconspicuous when not in use.
Circle 110 on reader inquiry card

Monarch Paint Company, booth 219
3212 Oak Ridge Dr., Duncanville, TX 75116
972/566-6600, fax 972/566-5080
Circle 111 on reader inquiry card

Monier Inc., booth 511
3900 Riverview Dr., San Bernardino, CA 92408
800/734-1100, fax 909/769-1258
Circle 112 on reader inquiry card

Moulding Associates, Inc., booth 657
293 N. Kirby, Garland, TX 75042
972/487-6680, fax 972/487-6584
Circle 113 on reader inquiry card

Nevamar Decorative Surfaces, booth 333
8339 Telegraph Rd., Odenton, MD 21113-1397
800/638-3430, fax 410/931-0341
Circle 114 on reader inquiry card

North American Tile & Stone/Stone Marketing
International, booth 620
2095 Altton, Houston, TX 77055
713/682-1300, fax 713/656-4808
Circle 115 on reader inquiry card

Pavestone Company, booth 202, 204
POB 1868, Grapevine, TX 76099
817/481-1802, fax 817/329-5216
Circle 116 on reader inquiry card

PyroTherm/TXJ, booth 405
7353 Harlem Rd., Clodine, TX 77469
713/277-3202, fax 713/277-1475
High performance concrete masonry units conforming to the specifications of Pyrotherm are available at authorized producers in Texas and Louisiana. Masonry wall systems with HPCMUs provide reduced construction costs, energy savings, and high performing fire walls. Specify a CMU with predictable weight, texture, and strength.
"Half the Weight and all the Strength of a Heavy-weight." Select from "Color Sensations" group as well as Natural Gray and Silverstone. Custom colors are also available.
Circle 119 on reader inquiry card

R.H. Tamlin & Sons, Inc., booth 609
10406 Cash Rd., Stafford, TX 77477
972/334-1676, fax 817/499-8948
High wind mitigation products including hurricane clips, straps, and holdown anchors; masonry products including wall ties, triangles, and veneer anchors; vinyl accessories for fiber-cement including snap vent and ex vent continuous soffit vents, vinyl H mold Z bar, J mold, inside and outside corners, adjustable reveal/shadow line, starter.
Circle 120 on reader inquiry card

Racit Altura, booth 215
2000 Siller Rd., Houston, TX 77055
713/682-6100, fax 713/682-2079
Circle 120 on reader inquiry card

RAM Hurricane Protection System, booth 111
2203 Wells Port Cove, Austin, TX 78728
512/322-1478, fax 512/899-1387
Circle 121 on reader inquiry card
RAM Hurricane Protection System consists of 0.5-inch steel rods that are threaded at each end. Bottom end is screwed onto an anchor bolt that is cast in concrete slab, and top end uses a nut/washer to attach to the top plate. System reinforces the walls and roof of building structures.

Rheinzink Canada Ltd., booth 335
4500 Dawson Street, Vancouver, BC V5C 4C1
604/317-8711, fax 604/391-1343
Architecture with zinc. Rheinzink is titanium zinc, a natural material developed for architectural roofing and wall cladding. Available in pre-weathered and bright rolled finishes, Rheinzink weathers to a natural blue-gray color. This self-healing patina makes Rheinzink extremely durable, corrosion resistant and low maintenance. If you are thinking quality, longevity, and environmentally, then you are thinking Rheinzink.
Circle 122 on reader inquiry card

Rogers-O'Brien Construction Company, booth 122
11145 Morrison Ln., Dallas, TX 75229
972/433-1335, fax 972/484-6311
Founded in 1969 with combined construction experience of over 17 years, project experience includes corporate headquarters facilities, office building, banking/investment facilities, manufacturing plants, industrial warehouses, healthcare facilities, retail and commercial outlets, and recreational buildings; as general contractor offers building construction, construction management, refurbishing and remodeling, interior finish work, and design/build, proven track record on many methods of project delivery: phased, fast track, design/build, guaranteed maximum price, construction management, and conventional design/build/construction.
Circle 123 on reader inquiry card

RTC, Inc., booth 318
1420 Century Dr. #1000, Carrollton, TX 75006
972/466-2211, fax 972/466-1522
Circle 124 on reader inquiry card

Schirmer Engineering Corporation, booth 326
1701 N. Collins Blvd. #315, Richardson, TX 75080
972/234-1617, fax 972/234-2753
Schirmer Engineering is a full-service fire protection and life safety engineering firm. Services include: building, fire and accessibility code analysis; fire detection and suppression system design; fire and security alarm system design; computer based fire modeling studies. Offices in Dallas, Chicago, Los Angeles, San Diego, San Francisco and Washington, DC.
Circle 125 on reader inquiry card

Semaphore Inc., booth 221
3 E 28th 11th Fl., New York, NY 10016
800/345-7434, fax 212/345-7433
Semaphore software features real-time processing of accounting/financial data. The Windows-based program is available with remote Time/Expense, payroll, 254/255, and other optional modules; report and invoice formats are fully customizable. Semaphore operates with other Windows applications, spreadsheets, and word processors.
Circle 126 on reader inquiry card

Simpson Strong-Tie Company, booth 324
1710 Couch Dr., McKinney, TX 75069
972/542-0136, fax 972/548-0924
Founded in 1914, manufacturer of wood-to-wood and wood-to-concrete connectors since 1950; manufacturing facilities located in McKinney, Texas; San Leandro, Calif.; Brea, Calif.; and Columbus, Ohio; field representatives throughout the U.S. will be available to answer product application questions and participate in seminars dealing with structural-constructor requirements in wood-to-wood and wood-to-concrete construction.
Circle 127 on reader inquiry card

Sound Reinforcements, Inc., booth 108
410 N.E. Wilshire, Burleson, TX 76028
817/205-9903, fax 817/295-0239
Circle 128 on reader inquiry card

Southwest Terrazzo Association, booth 351
309 Gold St., Garland, TX 75042
972/272-8894, fax 972/276-4736
Association of terrazzo contractors and suppliers whose specialty is the installation of poured-in-place terrazzo.
Circle 130 on reader inquiry card

Sport Court of Texas, booth 214
10208 Hwy. 620 N., Austin, TX 78716
512/315-9779, fax 512/315-9770
Suspended synthetic gymnasium and sports flooring.
Circle 132 on reader inquiry card

Sto Finish Systems, booth 210
10076 Navajo, Quinlan, TX 75474
903/356-0284, fax 903/356-0273
Circle 134 on reader inquiry card
Stone Panels, Inc., booth 417
1725 Sandy Lake Rd., Carrollton, TX 75006
972/446-1776, fax 972/445-3749
Circle 135 on reader inquiry card

Terracon Consultants, Inc., booth 619
1845 Woodall Rodgers Frwy. #1200, Dallas, TX 75201
214/905-8029, fax 214/905-8027
Circle 136 on reader inquiry card

Tubelite Inc., booth 104
4878 Mackinaw Trail, Reed City, MI 49677
800/866-2227, fax 616/832-2611
Tubelite Inc., is a national manufacturer, fabricator, and distributor of extruded aluminum storefronts, entrances, and curtain wall products for the glass and glazing industry. Company distribution centers are owned and operated in Dallas and Chicago. Tubelite's corporate office and main plant have been located in Reed City, Mich., since 1945.
Circle 143 on reader inquiry card

TX Dept. of Health-Toxic Substance Control Div., booth 505
1100 W. 40th St., Austin, TX 78704
512/834-6610, fax 512/834-6644
Circle 144 on reader inquiry card

Tyvek Housewrap Distributors, booth 527
1619 Lombardy Ln., Dallas, TX 75220
800/288-0835, fax 214/351-0811
DuPont introduces a new Tyvek Weatherization System. The new system features a series of new Tyvek protective building wraps and Tyvek Tape. DuPont now manufactures Tyvek building wrap tailored to specific construction applications. The first new Tyvek Weatherization System product introduced in 1997 is all new Tyvek HomeWrap. Comparing new HomeWrap with original Tyvek housewrap, HomeWrap is 50 percent better at stopping bulk water and two times better at reducing air infiltration for improved energy efficiency. Tyvek HomeWrap is still "breathable" at 58 perms. DuPont will introduce Tyvek CommercialWrap for the first time at the TSA show.
Circle 145 on reader inquiry card

US Brick, booth 419
8851 Hwy. 80 W., Fort Worth, TX 76116
817/244-9191, fax 817/244-8866
US Brick presents innovative products that simulate the look of natural stone. These new cultured limestone brick named "River Rock" and "Austin Stone" have several advantages. The brick can simply be laid in the wall by a mason which can result up to 60 percent savings in labor and material costs. Designing with the aesthetics of stone has become more affordable for architects.
Circle 146 on reader inquiry card

W.P. Hickman Systems, Inc., booth 217
30700 Solon Industrial Pkwy., Solon, OH 44139
216/248-7665, fax 216/248-6524
Provide diverse, high-quality roofing products and services; on-site roof inspections include nondestructive analysis, roof core sampling, and roof condition analysis information obtained is vital to making proper design decisions for effective roof system selection, repair, or replacement; assists in preparation of project specifications and detailed drawing; can provide full- or part-time inspection services; charter AIA/CES provider member offering courses to educate and assist with risk management.
Circle 147 on reader inquiry card

Wilsonart International, booth 216
500 E. Ridge Dr., Temple, TX 76502
817/778-2322, fax 817/778-3864
Introducing Wilsonart Solid Surfacing; Veneer, a repairable, non-porous, and stain-resistant material with many of the same characteristics as thicker solid surfacing materials; similar to laminate; the 1/8-inch-thick material can be bonded to conventional substrates; offering the elegant look of solid surfacing at moderate price points.
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Circle 147 on reader inquiry card

Weather Shield Mfg., Inc., booth 125, 127, 224, 226
One Weather Shield Plz., Medford, WI 54451
715/748-2100, fax 715/748-0169
Circle 148 on reader inquiry card

Texas Architect 9/10 1997 91
Wrightson, Johnson, Haddon & Williams, Inc.

Bill Haddon
Chris Williams

13714 Gamma Road, Suite 110
Dallas, Texas 75274
972 934-3700
FAX 972 934-3720

Circle 11 on the reader inquiry card

The Carriage Support Systems Inc. product line was developed in response to customers wanting an affordable support system that is flexible enough to handle any condition, new or retrofitted, found on a roof.

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281/872-0159

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A Road Less Traveled

TRAVEL. Fort Worth is known for Philip Johnson’s Amon Carter Museum, an always alert scout looking east to warn us of approaching trouble, and Louis Kahn’s Kimbell Museum, that temple dedicated to light. Soon we will have Tadao Ando’s Modern Art Museum, which we expect to be a spiritual space dedicated to art. In addition to those famous museums, our central city contains Paul Rudolph and David Schwarz buildings seated among blocks of sensitively restored historic structures, a mix created with the philosophy of providing users with a safe but active street scene.

But before the museums were built or the downtown revitalized, Fort Worth was a place of water and natural wilderness. Lake Worth is the oldest of Fort Worth’s water reservoirs, built early in this century and surrounded by many Civilian Conservation Corp-built park facilities. The shoreline is owned by the City of Fort Worth, which early on leased shore lots for summer lake cottages. Needless to say, through time, these properties turned into year-round residences of all description. Among this varied lot of buildings are two unusual structures, both notable for their eccentric character. The first is the Hip Pocket Outdoor Theater at 1620 North Las Vegas Trail and the other is a house known as the Lake Worth Castle at 1121 Heron Drive.

The Hip Pocket Theater sits well back from Las Vegas Trail behind a local beer and barbeque joint. Its design—or lack of design—is reminiscent of the “Drop City” era of found materials architecture—a reference to the unincorporated towns of the hip generation in New Mexico, where everything was homemade and homemade was everything. The theater was built in 1977-78 by Hip Pocket’s director Johnny Simon, his wife, the production and business manager, and cast. It is open to the sky with a multi-level, free-form stage. Seating varies from church pews to home built. There is also a sprinkling of tin-can lighting. Not only is the building fun to look at, the theater company it houses presents a great series of summer musicals on the stage.

Inverness—known locally as the Lake Worth Castle—was built from 1928 to 1938 by the Samuel Whitting family. Mrs. Whitting designed and personally supervised the construction of the house, which is built around a three-room stone farm house that was itself reputedly built in 1860 by D.P. Terrell. Construction continued over a decade because the materials used were largely found and recycled. These found objects included such things as Victorian doors and trim, stained glass from the Masonic Temple at Mosque Point, and a three-dimensional wall sculpture composed of pieces of miscellaneous statues, cherubs and knights in armor.

The castle sits across Heron Drive from the lake, with a view and the remains of a pier at which a ferry once landed and transported cars to the “casino,” a lakeside swimming and dancing park. Slightly to the west of the pier remains are five guest cottages built by the Whittings. These are now being restored to their original salvaged material origins; the restored structures will house the Lake Worth Sailing Center.

So you’ll know: Someone famous slept at Inverness. Jimmy Stewart called the castle home while he was filming Strategic Air Command at nearby Carswell Air Force Base. It is also alleged that the Lake Worth Monster resided under the pier, and still comes out on occasion to star in the musical of the same name.

Directions: To Hip Pocket—Go west on I-30. Take the Loop 820 (North) exit on your right. Drive north on Loop 820, exiting at the Las Vegas Trail-Heron exit (if you go over the lake bridge you missed your exit). Continue down the access road to Las Vegas Trail and turn left. Go under Loop 820, past the Baptist church to the Oak Acres BBQ. The road to the Hip Pocket is between Oak Acres and the church (it’s hard to see so go slow). To Inverness—Keep driving down the now-winding Las Vegas Trail about one-half mile to Heron. Take a left on Heron and drive several miles along the lake shore; you will see Inverness on your left with a large yard, a wood fence, and stone pillared iron gates.

Paul Koepp is an architect living in Fort Worth.
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