Economy and Comfort

For Heating and Cooling

AIRTEx RADIANT-ACOUSTIC CEILINGS

with Energy Efficient Hydronic Systems
This expert belongs in your plans.

A Northwestern Bell Building Industry Consultant will help you preplan your communication facilities.

Northwestern Bell Building Industry Consultants are specialists who talk your language. They know construction procedures and they know communications techniques and procedures that will simplify your jobs and help keep your clients happy.

Modern buildings call for modern communications: telephone, data, teletypewriter, video. If these are planned for early -- well before the blueprint stage -- expensive alterations can often be avoided later on when the occupants' communications needs of today may be obsolete before it's finished.

No matter what kind of building you're planning - talk to a Northwestern Bell Building Industry Consultant first - the number is in your telephone book.

Best news of all: there's no extra charge for this service.
We’ve Moved →
TO GIVE YOU
Better Service!
See Us for All Your Reprographic Needs

now at 924 Grand Ave.
IN NEW MORE MODERN FACILITIES

Complete Photographic Reproduction Services

DIAZO PRINTING CAPACITY FOR GETTING YOUR
LARGEST JOB OUT IN THE SHORTEST SPAND OF TIME

Full Line of Architectural and Graphic
Arts Supplies. TELEDYNE POST

Dealerships:

K+E Keuffel & Esser Co.

SCOTT GRAPHICS • CHART-PAC • FORMAT

Crescent Cardboard

SERVICE PHOTOPRINT
924 Grand Ave. • Des Moines, Iowa
PHONE 515/288-1927

Full Service Zerox Capabilities with our

5400 FOR OFFICE USE WHICH WILL PRINT
ON BOTH SIDES OF THE SHEET IN WHITE OR
COLORS AND COLLATE SIZE 8¼ x 11 OR 8½ x 14 ALSO DO MAILING LABELS AND
ADHESIVE BACK MYLAR SERVICE

1860 Zerox ENGINEERING WILL ACCEPT
COPY UP TO 36" WIDE AND ½" THICK.
FINISHED PRODUCT MAXIMUM 18" WIDE
ON BOND OR VELLUM PAPER

We are as near as your phone!
Cover: This thermogram photo is similar to those which will be used to detect heat loss in communities throughout Iowa. In a thermogram photo, heat loss is illustrated in varying shades of grey. The arrow on the left points to a home (dark roof) which is well insulated while the arrow on the right shows a residence (light roof) which is wasting energy.
INTRODUCTION
A building designer could pay little attention to energy considerations if energy prices were low and if an ample energy supply were assured. However, the large increases in fuel costs of recent years and the disruptions in the energy distribution system (blackouts, brownouts, natural gas interruptions, etc.) have made energy system design extremely important to the building professional.

The greatest emphasis in the 1970's has, properly, been on energy conservation—designing buildings to decrease the outward thermal flow in winter and the inward heat flow in summer, and using more efficient equipment. Good insulation double or triple grazing, high EER air conditioners, and so forth--these are the best places to put the energy dollar.

No matter how much the building energy load is reduced, however, there remains a need for energy input. Usually this has been in the form of electricity, natural gas, or fuel oil; but there is growing interest in using solar energy for at least part of the thermal input.

To most people a solar energy system for a building means flat-pipe or concentrating collectors, pipes or ducts, valves, pumps or fans, water or rock storage, and so forth—a complicated, sophisticated, capital intensive system. Such “active” systems are becoming more common, more reliable, and more cost-effective, and are often an excellent choice for part of a building’s energy dollar.

Another type of solar energy system—the “passive” system—deserves a higher priority than most active systems. A passive system is one in which the thermal energy flow is by natural means. One example is a direct solar gain building in which sunlight is admitted into the interior through large south-facing glazing and stored in massive materials such as adobe, brick, or concrete. Another passive concept is the Trombe wall, a massive wall placed directly behind the south-facing glazing to serve as thermal storage.

Many passive solar energy buildings have been constructed in the past few years, largely in states like New Mexico and California, although a few exist in northern climates. The occupants of passive homes are always enthusiastic about them, because they have low requirements for auxiliary energy, are attractive and comfortable to live in, apparently work well in a variety of climates, can generally be built with standard construction materials at little additional expense, and have little or no maintenance requirements.

To date, passive design has largely been an art based on straightforward principles of physics. The first real scientific information about the performance of passive concepts has been developed in the past years. Most of this work has been carried out at Los Alamos Scientific Laboratory in New Mexico by J. Douglas Balcomb and his colleagues. The federal government began funding passive research only a couple of years ago and the program is now receiving about $4 million a year.

Interest in passive concepts is increasing rapidly. The first national passive conference in Albuquerque in May 1976 was attended by about 600 persons, while the second national conference this past March in Philadelphia drew 1800. As an incentive to use passive concepts, the federal government recently announced a Passive Solar Energy Design Competition and Demonstration.

Can passive principles be used in Iowa? Five passive heating concepts (direct gain, thermal storage wall, sunspace, roof pond, and thermosyphon) and six passive cooling concepts (radiant cooling to the night sky, evaporative cooling, dehumidification, conductive cooling through earth, natural cross ventilation, and natural induced ventilation) have been identified. We believe several of these concepts can be successfully applied in Iowa. In this article, we will concentrate on principles we feel are the most promising for Iowa’s climate and environment: the use of direct solar gain, thermal storage walls, and sunspaces for passive heating. We believe there is a virtue to considering active solar systems or active-passive hybrids, and will consider their role. We feel that the use of these concepts and principles offers designers great opportunities to design buildings that are aesthetic and bring their users in closer communion with Iowa’s “beautiful land.”

PASSIVE SOLAR CONCEPTS

DIRECT SOLAR GAIN

The simplest passive principle is that of direct solar gain: solar energy enters the building through a large expanse of south-facing glass (see diagram). Normally the glass is vertical and can be recessed or shaded by an overhang so that the high summer sun is excluded while the low winter sun can stream into the building.

For many buildings, the solar heat gain on a clear winter day can be excessive. It is thus necessary to have materials in the building that can absorb the excess heat. Massive materials such as concrete, masonry, or adobe are suitable for this purpose, as are large containers of water. The minimum amount of mass required...
has been estimated by Doug Balcomb of Los Alamos Scientific Laboratory to be 150 pounds of masonry or rock or 30 pounds of water per square foot of south-facing glazing if the storage is located in the direct sun, and about four times that amount if it is not in direct sun.

Direct solar gain systems have three possible drawbacks with which the designer should be concerned. The first is that they tend to have significant temperature swings over the course of a day—perhaps 10-15 degrees Fahrenheit or more. Adequate thermal mass will level out the variations since the mass soaks up heat during the day, which decreases the peak temperature, and it releases heat to the building at night, which decreases the drop in temperature. An auxiliary energy system can also smooth out the temperature fluctuations. The other two problems are those of glare from the sunlight streaming into the building and of accelerated fabric degradation due to increased ultraviolet radiation, factors which the designer needs to take into account.

The south-facing glazing can be a major heat loser. Double glazing is recommended even though it will decrease somewhat the radiation passing to the inside; and in Iowa, the use of nighttime insulation behind the window would significantly improve the performance of the solar system.

The largest passive building in the world, the Annexe of St. George’s School, Wallasey, England (near Liverpool), is a direct gain building designed and constructed in the early 1960’s by E.A. Morgan. It is located in a climate more temperate than Iowa’s (16° F warmer in mid-winter), but would appear to be in a poor location for solar energy because it is very far north at latitude 53° N (at winter solstice sunrise is at 8:30 a.m. and sunset at 3:30 p.m.), and the weather is very foggy and cloudy much of the time. However, the school has derived about two-thirds of its heat from direct solar gain and the rest from heat generated by lights and students. The auxiliary hot-water system was used only once in the first dozen years, during an electrical blackout.

THE NICHOLS HOUSE

Wayne Nichols of Communico, Inc., Santa Fe, N.M., designed and built this passive house. Behind the glazing of each of the wings of the house is a Trombe wall into which two windows have been placed. From the inside of the house, these walls appear to be rather ordinary walls with windows.

THERMAL STORAGE WALL

A thermal storage wall system differs from a direct gain system in the placement of the thermal mass, which is in the form of a wall located directly behind the south-facing glazing (see diagram.) The wall may be poured concrete, concrete block, adobe, or any other masonry construction, or it may consist of large containers filled with water.

The Trombe wall (named after Felix Trombe, who first used it in France in 1967) is a concrete wall about one foot thick, placed between the glazing and the interior of the building. The south side of the wall should be a dark color for good absorption of the solar radiation that falls on it. During the day, the south surface of the wall may heat up to about 150° F. The thermal energy diffuses through the wall and the building interior is heated by radiation and convection from the interior surface of the wall. The wall stores a great deal of heat to permit considerable nighttime release. The wall can also be built...
with ports at the bottom and top to provide a natural convection path during daytime; cold interior air is drawn through the bottom ports into the space between the wall and the glazing and returns, much warmer, through the ports at the top. To prevent nighttime heat losses by a reverse air flow, automatic backdraft dampers are needed; these may be as simple as light dampers of plastic film.

Careful tests of Trombe walls in small test buildings have been carried out by Doug Balcomb at Los Alamos. His measurements and computer simulations of the experimental results show that in any climate, a Trombe wall works best if it has a thickness of about 12 to 16 inches. The masonry should have a high density (100 pounds per cubic foot or more). The wall’s interior surface will then remain at a fairly uniform temperature of about 85°F and release heat into the room.

Another type of thermal storage wall is the water wall, such as tall fiberglass cylinders filled with water, or 55 gallon drums of water laid on end or on the sides. The performance of a water wall is usually a few percent better than that of a Trombe wall because the convective currents in the water transfer the thermal energy throughout the storage very quickly, reducing heat losses at the south surface. Water has a high heat capacity so only about 30 pounds of water are needed per square foot of south glazing, and the wall need be only eight or nine inches thick for optimum performance.

One major disadvantage of the thermal storage wall is it may block the view to the outside (in some circumstances, of course, that might be an advantage). This has sometimes been remedied by placing windows or other openings in the wall itself (see the Nichols house on the facing page). Another disadvantage is that the wall takes up space, reducing the usable depth of the interior by approximately 1½ feet. However, this type of passive system has excellent durability and freedom from maintenance.

Doug Balcomb has made calculations of the solar heating fraction obtainable from an 18 inch Trombe wall (perhaps a bit thicker than optimal) with vents having dampers to prevent reverse thermocirculation. For a building heating load of 12 Btu per degree-day per square foot glazing, the Trombe wall was calculated to meet about 42 percent of the heating needs in Madison, Wisconsin (7838 degree days, 1961-62 weather data) and 59 percent in Lincoln, Nebraska (5995 degree days, 1958-59 data).

A rough estimate is that a well-designed Trombe wall system in an energy-efficient house in Iowa could satisfy half of the heating needs of the residence.

**SUNSPACES**

A sunspace is a secondary space, isolated from the living areas of a building, which receives direct gain sunlight and stores it in massive materials (see diagram). It may be regarded as an intermediate concept between the Trombe wall system (in which the storage is adjacent to the south-facing glazing) and a direct gain room (in which the storage is distributed throughout the room).

An example of a sunspace is a greenhouse on the south side of a house. The back wall of the greenhouse separates it from the living space. The thermal storage may be this back wall, the floor of the greenhouse, or other massive materials in the greenhouse (such as rock beds, benches, or containers of water). The amount of storage should follow the rule of thumb given in the discussion of direct gain systems.

The sunspace need not be used as a greenhouse, but may serve as an atrium, a sunporch, a sunroom, or for some other purpose. The sunspace can be allowed to have large temperature fluctuations, particularly if it is unoccupied. If it is used as a greenhouse, the plants may be able to tolerate (or even thrive on) these temperature swings.

Some care must be exercised in the design of a sunspace to ensure that the thermal storage is adequate and that the transfer of heat into the living space occurs at a suitable rate. One solution is to have a massive wall with controllable openings (such as doors or windows) between the sunspace and the living areas.

Continued on page 11
Vertebra is an exceptional design achievement—as successful scientifically as it is accomplished aesthetically. Designed to behave with your spinal column, Vertebra is the only seating system which supports you automatically in any position your body may adopt at work.

Vertebra is the first seating system to provide seating that changes configurations automatically while continuing to support the body in any posture it may adopt. And Vertebra does so with simple, ingenious mechanisms that do not require manipulation of controls or levers.

OPEN ArK B.V. of the Netherlands is professionally and socially committed to the design and production of advanced furniture concepts, which make a contribution toward fulfilling the working person’s psychological, behavioral, functional, and aesthetic needs. Vertebra is the first of these innovative concepts offered by OPEN ArK in the USA.

Emilio Ambaz and Giancarlo Piretti of The Center for Design Research and Development, are designers of the Vertebra seating system and other outstanding products they have developed for OPEN ArK B.V.

all makes
office equipment co.

is helping designers and architects thrust the business environment into tomorrow!

401 Grand Avenue • Des Moines, Iowa 50309
515/282-2166
Insulated panels provide maximum energy savings.

**INSULATED PANELS**

<table>
<thead>
<tr>
<th>APPROX. THICKNESS</th>
<th>&quot;U&quot; FACTOR</th>
<th>R-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>.193</td>
<td>5.20</td>
</tr>
<tr>
<td>1¼&quot;</td>
<td>.153</td>
<td>6.56</td>
</tr>
<tr>
<td>1¾&quot;</td>
<td>.108</td>
<td>9.27</td>
</tr>
<tr>
<td>2¼&quot;</td>
<td>.084</td>
<td>11.97</td>
</tr>
<tr>
<td>3¼&quot;</td>
<td>.058</td>
<td>17.38</td>
</tr>
</tbody>
</table>

People are rightfully concerned about the energy shortage and MAPES Panels are at the 'top of the heap' not only compared to other products but also compared to other standard panels generally.

The U-value of a product is a measurement showing the BTU loss passing through a square foot of material per hour per each degree of temperature difference. The lower the U-value the more effective the material. R-value is another method of measuring insulation. The higher the R-value the more effective the product.

The following are approximate typical U-Values and R-Values for a variety of products.

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>U-Value</th>
<th>R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼&quot; glass</td>
<td>.56 to .62</td>
<td>1.11</td>
</tr>
<tr>
<td>1&quot; insulated glass</td>
<td>1.25</td>
<td>.91</td>
</tr>
<tr>
<td>4&quot; brick</td>
<td>.90</td>
<td>.80</td>
</tr>
<tr>
<td>6&quot; pre-cast</td>
<td>.52</td>
<td>.79</td>
</tr>
<tr>
<td>8&quot; concrete block</td>
<td>.058</td>
<td>11.97</td>
</tr>
<tr>
<td>MAPES 1&quot; INSULATED PANELS</td>
<td>.193</td>
<td>5.20</td>
</tr>
<tr>
<td>MAPES 1¼&quot; INSULATED PANELS</td>
<td>.153</td>
<td>6.56</td>
</tr>
<tr>
<td>MAPES 1¾&quot; INSULATED PANELS</td>
<td>.108</td>
<td>9.27</td>
</tr>
<tr>
<td>MAPES 2¼&quot; INSULATED PANELS</td>
<td>.084</td>
<td>11.97</td>
</tr>
<tr>
<td>MAPES 3¼&quot; INSULATED PANELS</td>
<td>.058</td>
<td>17.38</td>
</tr>
<tr>
<td>MAPES 4¼&quot; INSULATED PANELS</td>
<td>.044</td>
<td>22.19</td>
</tr>
</tbody>
</table>

We feel that we have now more than just a permanent attractive panel to sell. We are also now selling a product that will help combat the energy crises both in terms of heat loss and air conditioning efficiency.

**MAPES & CO.**
P.O. BOX 80069
LINCOLN, NEBRASKA 68501
PHONE 402 466-1985
Continued from page 8

BALCOMB HOUSE
Doug Balcomb's house near Santa Fe, N.M., which was designed by Wayne and Susan Nichols, is an example of a sunspace (or greenhouse) passive system. The two-story 2300 ft adobe building wraps around a south-facing greenhouse. Heat is collected by direct gain into the greenhouse. Warm air rising to the top of the greenhouse is blown to two rock storage beds. The adobe walls also act as thermal storage. Cooling is by ventilation through windows, doors in the greenhouse, and high vents. Auxiliary heating is by electric baseboard heaters in each room. During a recent 6400 degree-day winter, the home used only 857 kilowatt-hours ($38) of auxiliary energy.

ACTIVE SOLAR COLLECTION
An active solar collection system uses a heat transfer medium (air or a liquid) to remove heat from the solar collector panels, and may use that heat to heat the building directly, to produce domestic hot water, or to build up thermal storage. The components of an active system are the collector, transfer loop, transfer medium, load (building), and remote storage. The recommended active collectors are flat plate collectors because they are considerably cheaper per Btu collected than alternatives (such as concentrating collectors) and they are better suited to the collection of the low temperature energy required by buildings. Active solar collectors must be used if low tolerances of temperature variance are desired and a high degree of control is required. The systems can be made to perform automatically with as high a level of comfort as a conventional furnace.

Office buildings, commercial installations, and some residences are the primary candidates for this type of solar system.

BOWLES RESIDENCE
The Bowles residence designed by author Dave Block is nearing completion in Indianola, Iowa. It is primarily an active solar system building although some passive principles are also employed. Incoming solar heat is transferred to a water storage tank. Domestic hot water is constantly preheated by the storage tank (to 140°F in the summer). The main storage tank is then utilized to heat the house. A hot water heating fireplace is also incorporated for additional heat production and back-up potential. The heat pump is primarily for summer cooling but could be used for winter heating during extended cold cloudy periods.

HYBRID SYSTEMS
Hybrid systems are those using two or more of the solar concepts described in this article. For example, a large expanse of passive glass could be used as the major space heating source, but if too much heat is coming in and the interior is overheating, the additional heat could be transferred to remote storage by fans; this would allow some bridging between sunny days. A common type of hybrid system is one in which both passive glazing and flat-plate collectors are used, perhaps the

continued on page 13
In Iowa

CONTRACTORS STEEL CORPORATION

is your local FENESTRA Distributor

Complete Inventory of FENESTRA STEEL DOORS, FRAMES and HARDWARE

Now contractors, architects and owners can buy Standard and custom door and frame products from a single source — FENESTRA/LOCKHART.

Fenestra, a leading producer of STANDARD products for more than 70 years, has acquired Lockhart Manufacturing Co., a 20 year old firm with a well-earned reputation for quality Custom Doors, Frames, and Flush Glazes Entrance Systems.

• FAST DELIVERY TO YOUR JOB SITE
• REMODELING DOOR & FRAME PACKAGE
  Easy to replace old wood or metal doors with Fenestra’s new Remodel Door & Frame Package

Sweeney & Assoc.
400 5th St. • West Des Moines, la. 50265

• PARKER Mirrors & Washroom Equipment
• HALSEY TAYLOR Water Coolers & Modular Wall Systems
• SLOAN Flush Valves
• STERN WILLIAMS Terrazzo Mop & Shower Receptors
• U.S. CHUTES CORP. Trash & Mail Chutes

• SYMMONS Non-Scald Pressure Balanced Shower Equipment
• HAUSMANN High Pressure Plastic Laminate Casework
• DAVIS Efficiency Kitchen Units
• SUPER SECUR Jail & Vandal Resistant Plumbing Fixtures

Phone: 515/274-2050
The actual amount of heat collected will, of course, be a function of the efficiency of the collector used. The similarity of the curves during the heating months suggests, however, that a choice of tilt based on aesthetic considerations would probably have only a minor effect on performance.

The curves show that tilt angles of $40^\circ$, $50^\circ$ and $60^\circ$ are all essentially equivalent during the major heating months of December, January and February, with $60^\circ$ having a slight edge. To determine the tilt that would provide the maximum annual solar contribution to the heating load of a building, the designer would need to carry out a careful calculation using detailed weather data and tested performance curves for the type of collector used. The Thompson residence (scheduled for Fall 1978 construction in Garden City) is an example of a hybrid system. The passive concept of direct gain is the major heating principle, with the necessary thermal mass on the interior of the building. Three hundred and twenty square feet of glass is employed for direct gain. On the sides are 100 square feet of active solar collector capable of bridging 1½ cloudy days. A fireplace will be used as back-up. Because of the low heat loss of the residence, additional components are not anticipated. Overhangs are designed for sun control so that no summer sun hits the passive glass to cause interior overheating.

**SOLAR COOLING**

We are saying little about solar cooling in this article. If the building is properly designed, the cooling loads in our climate can be greatly reduced and conventional cooling equipment (such as a heat pump) is attractive. Active solar cooling systems (such as absorption cooling systems) have high initial cost and short yearly time usage in Iowa, making their payback periods exceedingly long. Passive cooling techniques can be very helpful and should be considered by the designer; these may include windows that open for natural cross ventilation or ventilation induced by the solar heating of air near a high vent in the building.

**INSULATION DIAGRAM PRINCIPLES**

The solid curves on this graph show (For each month of the year) the average probable daily insulation (in BTU per square foot) on surfaces which face due south (zero azimuth) and are tilted at various angles to the horizontal. The data refer to surfaces located at $42^\circ$ N latitude (Ames, Iowa) and assume average cloud cover typical of Des Moines for that month. During December, the maximum clear day insulation for a vertical surface ($90^\circ$ tilt) averages 1573 Btu/ft., but the probable daily insulation taking cloud cover into account is only 1000 Btu/ft. as plotted. The actual amount of heat collected will, of course, be a function of the efficiency of the collector used.

Vertical south-facing glazing—often used in passive systems and occasionally encountered in active systems—is an excellent alternative, as shown by the curve labeled $90^\circ$. During November, December, and January— a period including two of the three major heating months—a given expanse of vertical glass receives about as much insulation (90 percent or more as much) as an equal area of glazing tilted $40^\circ$-$60^\circ$. During the summer the insulation on a vertical surface drops sharply—a very desirable situation that can be further improved by using an overhang for shading. (By contrast, collectors tilted $40^\circ$-$60^\circ$ are difficult to shade.)

During the months of February and March, when there are substantial heating requirements, a vertical collector receives significantly less insulation than a $40^\circ$-$60^\circ$ collector. However, the average heating requirement, shown by the dashed line and expressed in degree-days per day for Des Moines, follows a curve remarkably similar to that for $90^\circ$ tilt.
to keep on time, keep in touch.

The last thing you need in the design and construction phases of a building project is a problem securing natural gas or electrical service.

Iowa Power wants to help you keep your project on schedule. And we'll do everything possible to provide service when and where you want it.

But we need your help!

We need you to keep us informed of your plans, from the very beginning of a project. That way, we can help you avoid the kind of problems that can cause costly delays. By including us in the early stages of planning, you'll be giving us the lead time we need to establish working schedules of our own and secure the equipment and materials necessary to do the job.

Tell us what you need, before you need it, and you'll be helping us assure you of the availability of natural gas and electrical service for your project. Just keep in touch with your local Iowa Power office.
THE ENERGY SITUATION

by Maurie Van Nostrand
Chairman Iowa Energy Policy Council

INTRODUCTION

Each day now, the United States is taking 150,000 barrels of imported crude oil and dumping it back into pumped-out wells in our country. This is to be retained as a reserve to provide some protection should one or more foreign producers shut off the flow of oil to the United States.

But let me put this bit of good energy news in perspective. At that rate of flow into reserve--150,000 barrels each and every day--in a 30 day period we can accumulate enough oil to provide for this nation's needs for just six hours.

In 1977, 46 percent of all the oil we used was imported. That is a staggering fact--and an indisputable fact. But Americans seem to refuse to accept it and therefore certainly cannot be expected to accept its perilous implications.

Nothing demonstrates that better than a poll conducted recently. CBS and the New York Times asked people whether they thought the United States imported any oil. The results were depressing--but they make it easier to understand why our political system has not been able to respond to this incomparably serious problem.

That poll showed that 48 percent of those interviewed thought the United States did import some oil, 33 percent said no, we did not import any oil, and the balance--that good old 19 percent that is always "out of it"--didn't know or care.

Think about that for a moment. Less than half of our people think we import any oil. And I think you will agree it is likely that only a small percentage of our people is ready to acknowledge a widely published fact--that 8.7 million barrels of oil are brought into the United States from countries around the world everyday.

Okay, so we import a lot of oil everyday. What does that mean? It means, for example, that our foreign oil bill of 1977 was approximately $45 billion. The national economic implications of that bring a unanimous response from a professional group whose members seldom agree on anything. American economists--all the way from Walter Heller on the left to Milton Friedman on the right--agree that unemployment cannot be reduced to satisfactory levels as long as that volume of dollars--dollars that ought to be used in building productive and job-creating facilities--is being spent annually buying something that is consumed--figuratively, in a puff of smoke--almost immediately.

Let's compare America's 1977 foreign oil bill with something so we can better understand it. In 1970, just seven years ago, that foreign oil bill was $3 billion. We had a devastating 1400 percent increase in the outflow of dollars for oil since 1970. I believe it would be virtually impossible to find a measure of economic or social activity in America that has shown this kind of catastrophic deterioration since 1970.

An interesting exercise is to compare oil imports with agricultural exports. In 1970, when we spent $3 billion for foreign oil, we sold to foreign countries $7 billion worth of farm products. Our agricultural exports were more than twice our oil imports. But in 1977, our farm exports were slightly more than half our oil bill--about $24 billion.

It is obvious the U.S. cannot develop an independent foreign policy with the present dependence on other nations for oil. But making the situation more frightening is this nation's enormous and growing dependence on dictatorships for its oil.

Over 40 percent of the oil we import now comes from nations with little or no human rights, where elections are not held, where there is no judicial system, where there is no free press, where there are no checks and balances to provide political stability and protect the citizens against executive abuses.

The current danger is not that the members of OPEC (Organization of Petroleum Exporting Countries) will cut off oil shipment to the United States solely to see us in misery. The big danger is the Arab nations in OPEC will do as they have done four times before--cut off oil shipments to the United States to try to influence our stance regarding Israel. Let there be no doubt how closely the economic welfare of each American is tied to peace in the Middle East.

Today OPEC is setting the price, around the world, for liquid and gaseous energy. OPEC oil landed in the United States today costs about $14.20 per 42-gallon barrel. Regular gasoline refined from that oil alone, with state and federal taxes and local distribution costs added, would cost between 75 and 80 cents per gallon at the pumps in this city. But Oklahoma and Texas oil, under present federal regulations, sells for only $9 per barrel.

Why, for heaven's sake, should 100,000 Btu's of energy brought in from abroad be worth more than 100,00 Btu's of energy produced here? Even in ordinary times that doesn't make much sense. But now, with balance of payments deficits about to inundate us, and with the Arab nations in control of our foreign policy, anyone...
ought to see the wisdom of the principle that American produced energy is worth as least as much as energy brought from beyond our borders.

Prices paid by American consumers for energy must reflect cost or replacement cost. An energy policy built on that foundation will put us on the road quickly toward solution of this devastating problem.

Everytime a unit of energy is consumed, enough money must change hands so another unit of energy can be produced—from a reliable, secure source in a manner that will not wreck our nation. Continued deviation from that principle robs our children, deprives the poor of an opportunity for advancement, and guarantees our decline as an economic power.

I think the record is now clear that Americans will not conserve energy for energy's conservation's sake. They will conserve energy for one or both of two reasons—that the price of energy becomes a major item in their budgets and thereby causes them to look at possible options to huge and wasteful use—and that there is a visible enemy that can be beat back only by their dedicated action.

Moving prices of energy to their replacement cost—with a simultaneous plea by Congress for citizen help to loosen the Arab stranglehold on our nation, will, I'm confident, bring about energy conservation. And it will result in more domestic energy production. I disagree with the public statements of energy company officials that at some price all the oil and natural gas we want can be produced in and off-shore of these United States. I doubt, for example, that we could produce in the U.S., regardless of price, the 19 million barrels of oil we are consuming daily.

But we can make an oil-like substance from many things. And by providing American ingenuity an opportunity to work, by giving the American system an opportunity to function, I'm convinced we can move away from the current terrible dependence on other nations for one of our more important commodities.

Please help the folks in Congress. They say the people do not perceive energy to be a problem and that, therefore, any action taken to correct that problem will be unpopular. Tell them you think the energy problem is very serious and you want it given the attention it deserves.

Tell them you're more afraid of the foreign dictators than you are of the Americans who own our energy companies. Tell them you worry about spending $45 billion a year overseas for oil. And ask them who they'll blame for the certain disaster that will result if the Arabs cut off our oil again.

You can help—only if you understand that the Congress of the United States has both the authority and the duty to prevent or correct situations like the current energy problem. The American people are conducting themselves exactly as I'd expect them to do under these circumstances. It is the abysmal performance of the Congress I cannot understand.

---

ADVERTISERS

Acoustical Specialties
Ahern-Pershing
All Makes Office Equip.
Allied Construction
B & W Landscaping Co.
David Bear, Inc.
Carriter-Waters
Commercial Office Supply
Contractors Steel
Des Moines Blueprint
Economy Forms
Gibbs-Cook
Hawkins Greenhouse
Hoskins Landscaping
Iowa Chapter Electrical Contractors
Iowa Paint
Iowa Power
Iowa Ready Mixed Concrete
Johnson Specialties
M. A. Knutsen Inc.
Koch Bros.
Lighting Associates of Iowa
Maier Tree Care & Landscaping
Mapes & Co.
Marquart Concrete
NDS Company
Northwestern Bell
O'Keefe Elevator Co.
Rosehill Nurseries
Service Photoprint
C. W. Shirley Co.
Stetson Building Products
L. J. Sweeney & Assoc.
United Brick & Tile Co.
Whitlam Nurseries

---

O'Keefe Elevator Company, Inc.

"A Dover Elevator Franchised Distributor"

We offer assistance to architects through:

- NEED AND DEMAND ANALYSIS
We can run a computer analysis which will provide you with the data of probable performance for any number of combinations of elevators with varying speeds, sizes and capacities. Also, based upon the specific design of your building, the computer will determine a range of probable demand to which the elevators will be subject.

- DIMENSIONAL AND REACTION INFORMATION
With the use of our architectural aid design book, immediate hoistway dimensions with proper code clearances as well as information on structural load reactions can be obtained.

- SPECIFICATION PREPARATION
At this stage all the various control systems will be discussed and applied to your specific building. Special options and features with cost estimates will be presented to you for possible incorporation into the specifications. Other divisions of the specifications such as electrical and interior design divisions will be coordinated.

In preparing your elevator specifications, this office will see that all national, state, and local codes are followed as well as compliance with any applicable federal agency.

- ACCESS TO A POOL OF EXPERIENCE
O'Keefe Elevator Company, Inc. has been in existence since 1883 and is the largest installation and service maintenance organization in the Nebraska-Iowa area. O'Keefe represents Dover Corporation of Memphis, Tennessee. Dover is the third largest elevator company in America and the oldest and largest manufacturer of hydraulic elevators.

In conclusion, we hope that we might assist you in designing and specifying traction cable or hydraulic elevators, escalators, dumbwaiters, staiclifts, and residential elevators in your various projects.

In Iowa: CEDAR RAPIDS • COUNCIL BLUFFS • DES MOINES • SIOUX CITY
In Nebraska: OMAHA • LINCOLN
Visit our new 4,000 sq. ft. furniture showroom located at 901 Locust St.

AHERN/PERSHING
Office Supplies & Equipment
905 Locust Street
Des Moines, Iowa 50309
Phone 515/244-0193

COAST TO COAST DELIVERY

WHITHAM NURSERIES, INC.
Specializing in Large Material You Are After

Exterior or Interior
For All Your Landscaping Needs See

• INTERIOR PLANTER
• PLANT ACCESSORIES
• ALL TYPES OR FOUNTAINS

"Over 47 Years of Experience in Landscaping"

Member of:
American Association of Nursery Men
Iowa State Nursery Men’s Association
Intl. Shade Tree Conf. Midwest Chapter

WE'D LIKE TO BID ON YOUR NEXT JOB
We are proud to have furnished the landscaping & plantings for:

Brenton Bank • 28th & Ingersoll
The Ruan Center • Downtown
• Valley Bank Regency Office
• Grand Avenue Parking Ramp

WHITHAM NURSERIES INCORPORATED
Write or Call
Phone: 515/937-5232 515/937-5233
AGENCY, IOWA 52530
LLOYD WHITHAM, PRESIDENT
Over 200 Acres of Stock Available for Immediate Delivery!
We hear a lot these days about the energy crisis. Some, perhaps too many, believe there is some kind of magic solution to our energy problems just around the corner.

What we must keep in mind is that there is a serious energy problem in this country and in the world. Political sniping of the oil companies for "rip-offs" does not change the basic fact that we are using up our energy resources at an alarming rate.

And still the demand continues to rise. The consumer is not yet totally convinced that certain resources are in short supply. However, he is learning very quickly that the continued heavy use of any of these resources has become costly. (See Chart A) Gone forever are the days of cheap fuels.

One utility industry expert has described the next 40 to 50 years as a transition period between fuel epochs." During this time our energy sources will shift overwhelming dependency from fossil and nuclear fission fuels to the inexhaustible energy from nuclear fusion and the sun itself.

These are the years during which we must buy time by making the best use of energy sources in comparatively abundant supply, as developing the technologies of every alternate source of energy.

Everyone can help. The most important thing we can do as individuals is to practice energy conservation in our homes. Iowa Power has long been committed to promoting insulation and the wise use of energy. This (1978) is the seventh year we have emphasized adequate home insulation through mass media advertising and work with insulation dealers and suppliers. The Company was one of the first utilities in the nation to recognize the advantages of energy conservation through insulation.

Dealers sales figures indicate that as many as 30,000 homeowners in the central and southwest Iowa area served by Iowa Power have reinsulated. In 1975 the Company introduced an insulation financing program which makes it possible for customers to finance up to $500 worth of insulation on their utility bill over a three year period at nine percent simple interest. Close to 2,500 customers have participated to the tune of more than $650,000.

The Operation Sky Scan program conducted throughout our service territory this year also brought forth some interesting results. In addition to bearing out our estimate of the number (30,000) of homeowners who have reinsulated, the aerial heat loss survey also supported our contention that the public is at last becoming interested in conservation.

In 1974 Iowa Power initiated a wise energy use program independent of the general insulation activity. It began with the Dr. Wise Use Energy Diet, a booklet outlining energy costs of appliances and challenging consumers to control their own energy use. The Energy Diet gained wide acceptance and was soon augmented by an energy efficient homes program featuring stringent guidelines for the energy conscious homeowner. To further these efforts, the Company has joined with utilities nationwide in support of the National Energy Watch (NEW). The first nationally organized consumer energy conservation program, NEW recognizes homeowners who conserve energy by improving the thermal integrity of their homes by installing energy efficient systems and appliances and by adopting better use habits.

The guidelines of the National Energy Watch have been set for maximum cost-effectiveness in this climate. If implemented, these standards will repay the individual homeowner for his investment in terms of added comfort, lower operating costs and increased property value. NEW also marks the home as an energy efficient structure, thereby increasing its marketability. The principles measures of these guidelines include:

**INSULATION**

The following R-values are recommended as minimum standards for all new homes:

- Ceilings: R-30
- Walls (frame): R-19
- Floors over vented crawl spaces: R-19
- Floors over unheated basements: R-11
- Walls between heated and unheated rooms: R-11
- Basement walls: R-4

**SLAB CONSTRUCTION**

The edges of concrete slabs on grade should be insulated 24 inches vertically and 24 inches horizontally. Thermal resistance values should be no less than R-6.

**DUCTWORK**

All ductwork should be located in conditioned space, or insulated to a minimum value of R-4.
If you can’t afford a power loss, you need

**Cat Standby Power**

For any operation that depends on an uninterrupted supply of electricity, a Caterpillar Standby Power System is a must. In hospitals, schools, office buildings, and computer operations, Cat Standby Power can be the only thing standing between you and severe economic loss — even loss of life. And, in addition to providing reliable power in emergencies, a Cat System can also supply economical supplementary power for seasonal or fluctuating requirements.

Cat Standby Power Systems are backed by Total Product Support from Gibbs/Cook, your Caterpillar dealer. Sales and Service facilities in Des Moines, Fort Dodge, Mason City and Postville.

_Good Prices — Closer To Home._

When you’re specifying contemporary furnishings, you can get good prices locally. In fact, the same as if you buy direct. M.A. Knutsen distributes a number of major lines at 40% off list — plus freight. So there’s no need to deal with people several states away.

Thayer Coggin residential and institutional furniture, Claud Bunyard Windsor chairs, FCA’s Cesca chair, Koch + Lowy lighting and Forms & Surfaces nylon hardware — all available to you at 40% off list — plus freight. Next time, stay closer to home. Call 279-9075.

_B&W Landscaping Co._

**Complete Landscaping Contractors**

Planting • Seeding • Retaining Walls

Commercial—Residential

Sales and Service
Planned to Fit Your Budget
Let Us Bid Your Next Job

Join our growing list of satisfied customers

We are willing to work on your Landscaping Problems!

Call 515/287-4299

5010 Southwest 9th, Des Moines, Iowa 50315
WINDOWS AND DOORS

Double glazed windows and insulated doors with R-values of three, or storm doors should be incorporated in all buildings. Triple glazing is recommended for additional thermal efficiency.

Air infiltration should be minimized by the effective use of weather stripping, caulking and sill sealing.

COMFORT CONDITIONING

Heat pumps with COP of 1.6 or greater should be carefully considered for all homes. When a gas-fueled system is chosen, the furnace should feature electronic ignition. In addition, installation of an automatic flue damper is suggested.

Central systems incorporating air conditioning should have a minimum energy efficient ratio of 7.5.

Solar assist equipment should be incorporated wherever economically feasible.

Appropriate controls, including set-back thermostats, should be installed to minimize energy consumption.

Non-centralizing heating or cooling systems should incorporate room to room controls.

(Guidelines for certain other areas and for some major appliances are also spelled out in the NEW program.)

These guidelines have been designed to promote optimum energy efficiency. Short of building a home underground, today's technology has probably brought us to the saturation point in terms of reducing heat loss. Energy efficient standards of the 1950's probably reduced heat loss to about 105 Btu/square foot. By 1960 this figure had been lowered to approximately 52 Btu/square foot and as 1970 rolled around heat loss had fallen to approximately 56 Btu/square foot. Today's energy efficient standards have lowered heat loss still further, to less than 40 Btu/square foot.

Energy consumption figures for our residential customers point out an interesting paradox. While annual use of natural gas declines, continuing a trend which began in 1973, the annual consumption of electricity has climbed significantly during the past 10 years.

In 1972 the annual consumption for the average residential natural gas customer was 1,804 Ccf. During 1977 this figure had slipped to 1,484 Ccf. (See Chart B). Obviously the heating season customer has begun to take energy conservation seriously.

But what about electric use? Ten years ago the annual consumption of electricity by the average residential customer totalled 5,285 Kwh. Since then this figure has climbed at a steady rate, peaking in 1977 at 7,400 Kwh yearly. (See Chart B)

Thus, with the increasing demand for more electricity we are compelled to provide additional generation. The
trend (of increasing demand) which has established itself through the years is expected to continue. Energy experts predict electric demand to continue to rise at the historical figure of five to six percent annually.

Will we be able to keep up with this demand? Starting as early as next year, sections of our country may begin experiencing severe power shortages—brownouts as well as blackouts, according to the National Electric Reliability Council (NERC). Here in the Midwest, NERC warns of potential shortages by 1983. Such impending shortages may not last for only a few hours; they could go on for days, weeks, even months.

Can we avoid these shortages? We can if we are able to build sufficient generating and transmission facilities to supply the increasing demand for energy. This is the goal of Iowa Power and utilities throughout the nation.

We’re working to avoid energy shortages. But we can’t do it without your support. We need to implement all of the guidelines and proven technologies available to reduce energy waste, and we must build new generating plants and transmission facilities, utilizing the best available sources of energy, including coal and nuclear fuel.

With your continued support, there won’t be brownouts in your future.

---

**ELECTRICAL PROGRESS**

Through Joint Apprenticeship And Training

When you design, build, remodel or rewire, use an electrical contractor that’s qualified for the job. Use a member of the Iowa Chapter-National Electrical Contractors Association (NECA) employing skilled International Brotherhood of Electrical Workers (IBEW) journeyman wiremen and trained electrical apprentices. Their various Joint Apprenticeship and Training Programs provide them with the advanced management and technical skills necessary to save you both time and money on residential and commercial electrical construction.

For more information call: (515) 278-2445.

SPONSORED BY:

Iowa Chapter - National Electrical Contractors Association

and

Local Unions of The International Brotherhood of Electrical Workers
WE HAVE THE SOLUTION!

Iowa Paint

In following our policy of offering the very best in paints and coatings now offer

Sealants by Pecora Corporation
Elastomeric Expansion Joint System

...a total system for expansion joints subjected to the demands of foot and vehicular traffic...Pecora TJ-200 Non-Sag or Self Leveling Sealant and Pecora EP-400 Epoxy Edging Compound...

Advanced Planning System

Restoration System

Complete descriptive literature and Installation Procedures are available upon request for both systems.

Iowa Paint
Manufacturing Company, Incorporated
P.O. Box 1417 Des Moines, Iowa 50305
Phone 515-283-1501
When Strayer-Wood Has Standing Room Only... Marquart Provides the Room to Stand.

Both the exterior and interior walls of the beautiful Strayer-Wood Theatre are made of Marquart split-face block. Marquart Concrete Block Company provides durable building materials of the highest quality. So, when the house comes down at Strayer-Wood, Marquart block will be keeping it up.

We Build a Better Block

MARQUART
CONCRETE BLOCK COMPANY

110 Dunham Place, P. O. Box 990
Waterloo, IA 50704
(319) 233-8421
the custom approach in creating individual kitchens for residences of distinction

Convenience Appearance Durability Strength
Also Distributors of DWYER KITCHENS

NDS Company
Negley Design & Sales Co
3829 Merle Hay Road  Des Moines  515/276-5500

lighting associates of iowa
Arne Oja John P. Higgins Mel Lambert

Got Problems... We'll bear The Solutions
david bear inc.
construction components
DES MOINES, IOWA
515-262-8251
IN IOWA 800/362-2786

HAYDITE
LIGHTWEIGHT AGGREGATE
REDUCES DEADLOAD ... CUTS COSTS

"The savings effected in the foundation system, due to reduced deadloads, was more than enough to offset the cost of using lightweight concrete in the floor slabs and roof."

The above statement, by Robert G. Wade, of the engineering firm of Stevson-Hall & Wade, Inc., expresses one of the principal reasons why lightweight Haydite concrete is so often specified for high-rise construction ... weight reduction without sacrificing strength ... and at a savings in cost. Other reasons include superior fire rating, improved thermal and acoustical insulation, and more.

For detailed information, see your local supplier, or contact us direct.

CARTER WATERS
CONSTRUCTION MATERIALS

PROJECT
MOBERLY TOWERS
MOBERLY, MO.
ARCHITECT
KURT & WOLFE, AIA
KANSAS CITY, MO.
ENGINEER
SHEFFIELD & MENG, INC.
KANSAS CITY, MO.
CONTRACTOR
B. B. ANDERSON CONSTRUCTION CO.
EUPORA, KANSAS
READ M. WATTS CONCRETE & MATERIALS CO.
MOBERLY, MO.
2440 WEST PENNWAY  •  POST OFFICE BOX 19676
KANSAS CITY, MISSOURI 64141  •  PHONE: 816-471-2570
similar to the insulation on a vertical collector. A vertical collector would produce a solar heating fraction that is very high in the fall (note the ratio of the solid to the dashed curve), drops to a minimum in December (when, it should be noted, it does nearly as well as a 40°-60° collector), and increases through the rest of the heating season.

In summary, a vertical collector is a good choice for Iowa, and has several significant advantages over collectors tilted at conventional angles. This fact is extremely relevant in passive design.

**SOLAR ENERGY PRINCIPLES**

Many factors influence the decision to incorporate solar concepts and equipment in buildings. These features include the designer's opinion concerning the future of energy prices and supply; and the availability, cost, and long term reliability of solar equipment.

Solar energy is appealing to many people because they want to be as energy self-sufficient as possible, because they want to reduce the depletion of non-renewable natural resources, and because they favor environmentally benign technologies. Nevertheless, we believe most people are interested in solar energy as an economic alternative to other forms of energy, whose prices are rising and whose availability is often uncertain.

Since it is our intent to make solar energy economical as well as functional and attractive, we believe that solar equipment payback, solar building type usage, and solar opportunities for aesthetic architecture should be stressed.

The following ten principles summarize our views on solar energy usage.

**PRINCIPLE 1.** THE DECISION TO USE SOLAR CONCEPTS REQUIRES A COMPREHENSIVE DESIGN APPROACH TO THE BUILDING AND A THOROUGH ANALYSIS OF THE OCCUPANT'S ENERGY REQUIREMENTS. For example, a house is occupied 24 hours a day whereas a commercial building may be used only 8 hours a day, and sizeable downward temperature swings at night may be better tolerated in the latter. Seasonal building usage is also important. Thus the type and amount of solar equipment and the control mechanisms employed may vary greatly.

**PRINCIPLE 2.** SOLAR ENERGY BUILDINGS USUALLY COST MORE INITIALLY THAN NON-SOLAR BUILDINGS, BUT SHOULD COST MUCH LESS OVER THE LONG TERM. OWNERS MUST BE WILLING TO MAKE AN INVESTMENT IN THE FUTURE. For example, the amount of glass needed for both passive and active solar buildings normally costs more than the wall or roof it replaces. But the utility bill savings over the first few years can recoup this initial investment plus interest costs, and substantial utility bill savings continue thereafter. In many cases, the extra mortgage payments resulting from the solar investment are more than offset by the lower utility bills. This is particularly true of housing and lower cost structures, but may not be true for office and commercial buildings.

**PRINCIPLE 3.** ON A PRIORITY BASIS, THE FIRST DOLLAR IN ENERGY MANAGEMENT SHOULD BE PLACED IN ENERGY CONSERVATION. Studies at Iowa State University, Argonne National Laboratory, and some done for private clients indicate that heat loss in winter can be reduced as much as 60 percent through employment of a combination of earth berming, low-aspect ratio (length/width), increased insulation, wind diverters, and glass placement. A slightly lower decrease in heat gain reduction occurs in the summer. Placing first priority on energy conservation is suggested by the very short payback period, the relative ease of inclusion, and the actual decrease in maintenance.

**PRINCIPLE 4.** THE SECOND DOLLAR IN ENERGY MANAGEMENT SHOULD BE PLACED IN A LIQUID COLLECTOR TO PRODUCE DOMESTIC HOT WATER. The large advantage of solar hot water heaters stem from the fact that this equipment is utilized year round. For example, a small collector can produce 100 percent of the hot water required for a residence for nine of the twelve months and up to 60 percent for the remaining three months. Because hot water usage normally increases in summer as does solar availability, the mating of solar to this demand is most fortunate. Payback periods as short as five years can be expected on some domestic solar applications with substantial savings anticipated from that point on.

**PRINCIPLE 5.** THE THIRD DOLLAR IN ENERGY MANAGEMENT SHOULD BE PLACED IN SPACE HEATING. IN MOST INSTANCES, ECONOMIC ANALYSIS WILL INDICATE THE USE OF PASSIVE SOLAR CONCEPTS. The primary advantage of passive solar concepts is lower initial cost than active systems. Also, there is no anticipated increase in maintenance because there are no moving parts. Disadvantages are a reduction in interior temperature control relative to a conventional furnace and the absence of heated storage beyond approximately 12-16 hours. Payback periods of 7-10 years are anticipated with these concepts.

**PRINCIPLE 6.** THE FOURTH DOLLAR IN ENERGY MANAGEMENT SHOULD BE PLACED IN AN ACTIVE SOLAR COLLECTION SYSTEM FOR SPACE HEATING. The major advantages of an active solar system are its temperature control capabilities and its potential for longer-term storage (2-3 days). It can also be incorporated with a domestic solar hot water heating system. Thus cloudy days can be bridged, something passive systems may not do as well. The disadvantages lie in higher initial costs and higher anticipated maintenance in the future. Payback periods of 10-15 years are anticipated on some active systems recently installed in Iowa. These are good quality but inexpensive systems. Extremely sophisticated active solar systems may never pay back and their use should be discouraged.

**PRINCIPLE 7.** THE USE OF HYBRID SYSTEMS (COMBINATIONS OF ENERGY CONSERVATION, SOLAR HOT WATER HEATING, AND PASSIVE AND ACTIVE CONCEPTS) OFFER THE GREATEST OPPORTUNITIES
HAWKINS INTERIOR PLANTINGS
"Complete Plant Service"

- Design-Selection-Specification
- Installation
- Maintenance

A few of the
Places we maintain now
- Rusty Scupper Restaurants
- Henry A. Wallace Bldg.
- Meredith Corporation
- Adventureland Inn
- Merle Hay Mall
- Pioneer Hi-Bred International
- Interstate Assurance

You see our
work everywhere
“It Thrives”

DICK VOLKAMER A.A.F.
HAWKINS INTERIOR PLANTINGS
HAWKINS GREENHOUSE
4270 6TH AVE • DES MOINES, IOWA 50313
515-288-4831

The Businessman’s
Department Store

- NEW AND USED OFFICE FURNITURE
- COMPLETE LINES OF OFFICE SUPPLIES
- FAST DELIVERY IN DES MOINES

288-6751

COMMERCIAL
OFFICE
SUPPLY
COMPANY

WM. “BILL” PHILLIPS
PRESIDENT

329 EAST FIFTH STREET • OPEN WEEKDAYS 8-5
VISIT OUR DISPLAY ROOM

You Build it Better...and
Faster...With Concrete!

FIVE PROVEN STRUCTURAL SYSTEMS THAT CAN
WORK FOR YOU WHEN YOU WORK WITH CONCRETE

SITE PRE-CAST CONCRETE
CONSTRUCTION CUTS COSTS
Cast-In-Place Concrete Floors
Speed Construction-Reduce
Story Height

All kinds of commercial build-
ings—apartments, offices, hospitals,
etc.—take less time to complete when
cast-in-place concrete floors are used.
And since floors can be thinner,
buildings can be "shorter." Or more
stories can be "squeezed" into a given
height.

Simple, Sensible Flat Plate Floors
CONCRETE: THE BEST BUY

What more can we say about concrete?
All this: it conserves energy, it serves as an
excellent sound barrier, it won’t rust or rot
and concrete structural systems don’t need
expensive fire proofing.
Perhaps most important of all, concrete
is beautiful...in the hands of an imaginative
engineer or architect.

For More Information Contact Your Local Concrete
Dealer, or
Iowa Ready Mixed Concrete Assn.
1200 35th St. • West Des Moines, IA. 50265 (515-225-3535)
Got Problems... We'll bear The Solutions

New Interior Construction or Remodeling In Your Future Plans? We Can Help!

CEILINGS:
- CONWEB
- U.S.G. SOUND CONTROL CEILINGS WALLS-PARTITIONS
- GLEN O'BRIEN MFG.
- CONWEB CONCEPT II

DEMOUNTABLE WALLS AND PARTITIONS
FREE-STANDING PORTABLE PARTITIONS FOR MODULAR WORK CENTERS

Reach your energy conservation goals with Double "T" Energy Saver Walls by Shirey

These precast-prestressed double T walls can be sandwiched with rigid thermal insulation in any thickness to meet your R-factor requirements.

This is the new wall in Iowa construction. We have "Energy Saver" walls enveloping over 3 million square feet of floor space in Iowa.

Energy Savings plus Flexibility and Variety!
- Ideal for single and multi story construction
- Practical for load bearing or curtain walls
- All the advantages of fast track construction
- Complete door and window location flexibility
- Exterior finishes include; form finished concrete, color stained, and exposed aggregates
- For schools, warehouses, office structures, retail facilities, etc.

Let Shirey help you reach your energy conservation goals, tell us your "R" factor requirements and we'll help you meet them. Write or Phone:

C.W. Shirey Company
P. O. Box 840 • 1845 LaPorte Road
WATERLOO, IOWA 50704
PHONE 319-291-5345
FOR IOWA AND THE MIDDLE WEST. The hybrid systems offer a balance of initial cost control, temperature control, and maintenance, allowing a good fit between solar equipment and occupant demands. In addition, owner manipulation of controls and equipment used can result in an infinite number of options.

**PRINCIPLE 8.** SOLAR CONCEPTUAL DESIGN AND EQUIPMENT DETAILING SHOULD BE DONE BY A COMPETENT ARCHITECT AND/OR ENGINEER. Although solar concepts are relatively easy to master, the technical pitfalls are numerous and must be solved in total on the drawing board. The national success rate of this approach is nearly perfect, while the failure rate of the do-it-yourselfer is very high, with a corresponding level of frustration.

**PRINCIPLE 9.** THE PAYBACK PERIOD OF SOLAR EQUIPMENT IS DEPENDENT ON MANY FACTORS AND SHOULD BE INCLUDED IN ALL SOLAR CONSIDERATIONS. Payback occurs when initial capital investment of the solar equipment equals the cumulative utility bill savings (properly discounted). Government tax incentives and owner income tax rates also enter into the decision to utilize solar concepts.

**PRINCIPLE 10.** SOLAR DESIGN OFFERS OPPORTUNITIES FOR AESTHETIC ARCHITECTURE AND FORMS THAT MAKE BUILDINGS MORE RESPONSIVE TO THE OCCUPANTS NEEDS AND MORE IN HARMONY WITH THE CLIMATE AND THE ENVIRONMENT, THESE PRINCIPLES SHOULD BE AN EXPRESSED AND INTEGRAL PART OF THE BUILDING FORM. Some opportunities for exterior as well as interior forms have been discussed in the accompanying explanations and illustrations. We anticipate that solar architecture will increase rather than decrease the quality of life style, and that in the near future, every new building will incorporate a significant contribution from solar energy.

**SOLAR DESIGN COMPETITION AND DEMONSTRATION NATIONAL**

The U.S. Department of Housing and Urban Development (HUD), in cooperation with the U.S. Department of Energy (DOE), recently announced a Passive Solar Residential Competition and Demonstration open to architects, engineers, builders, and other single family project designers.

Both new and existing homes are eligible. New home projects can be for private owners or for builders who plan to sell the homes on the open market, and must be planned for construction (conceptual designs for imaginary projects are not eligible). Existing home projects must be based on an existing house but may be planned for construction or may be conceptual. Project construction cannot have begun before March 17, 1978.

Design awards will be $5000 for new passive solar homes and $2000 for existing homes.

Winning new home designs for homes to be sold on the open market are eligible for an additional construction award, which will be $7000 for the first home and $2000 each for the second through fifth homes built from a design at the same time.

HUD'S award budget is $2 million, at least 10 percent of which will be allocated for designs applicable to existing homes.

Applications are due in early August and awards will be made by late October or early November. The grant application is available from: RFGA/Passive Competition, Solar Demonstration Program, Room 8158 Department of HUD, Washington, D.C. 20410.

**STATE**

The State of Iowa, through the Iowa Energy Policy Council, is also sponsoring a solar residential demonstration program for active, passive, or hybrid systems. Grants of up to $3500, not to exceed 50 percent of the cost of the solar system, will be made to award winners. All Iowa residents are eligible. Applications are available from the Iowa Energy Policy Council, 215 East Seventh St., Des Moines, Iowa 50319. Applications are due August 31, 1978.

**AUTHORS**

Dave Block (left) is an architect-planner from Ames. He is Assistant Professor of Architecture at Iowa State University and is solar energy researcher with the Engineering Research Institute. He has designed and constructed several residences and commercial buildings incorporating active and passive principles. Laurent Hodges (right) is Professor of Physics at Iowa State University and a solar energy researcher with the Ames Laboratory (DOE). He has served as Research Director of the Iowa Energy Policy Council and as an energy consultant to the U.S. House of Representatives and to Rep. Tom Harkin. He is the author of the textbook, Environmental Pollution.

Both authors are currently designing their own solar homes incorporating both passive and active systems.

**REFERENCE MATERIALS**

A. Available From the National Solar Heating and Cooling Information Center, P.O. Box 1607, Rockville, MD 20850 (or call toll-free 1-800-523-2929):

2. Regional Guidelines for Passive Energy Conserving Architecture
4. Bibliography on Underground Houses
5. Solar Greenhouse Bibliography and List of Plans
6. Passive Design Tools
7. Architects and Designers Familiar With Passive Solar Design (list)

B. Available from DOE Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830:

1. Passive Solar Bibliography
2. Survey of Instrumented Passive Solar Systems


D. Available from National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161:

Passive Solar Buildings: A Compilation of Data and Results. $5.25. SAND 77-1204.
Koch Brothers
325 Grand Avenue
Des Moines, Iowa 50308
(515) 283-2451

Consider the possibilities
Consider the Watrous Vari-Purpose Module System

Johnson Specialty Sales
P.O. Box 2691
Des Moines, Iowa 50315
Phone 515/285-2483

Write for your New 1978 Catalogue
PetriCal/Urethane is a new insulated roof deck or wall panel developed by the Cornell Corporation which dramatically lowers a building's energy requirements—to a U factor as low as 0.066, with a single panel & built up roofing.

PetriCal/Urethane has a foam core of the highest quality which eliminates the problems of on-site foam application saving costly man-hours.

PetriCal/Urethane is a composite board of PetriCal® structural cement fiber integrally bonded to urethane foam, with a top layer of asphalt-saturated 15-lb. roofing felt.

Write or call for new PetriCal/Urethane brochure.
The EFCO Space Generator Building System has been developed to bring that profit picture into line and keep it there. The system does this by providing the most economical method for producing load bearing walls and flat slab superstructures. The Space Generator features factory-like production which results in dependable schedules, low labor costs and predictable projects.

If you would like your project to pencil out, call EFCO and pencil profit in.

SEND FOR FREE BROCHURE

<table>
<thead>
<tr>
<th>Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>Zip</td>
</tr>
<tr>
<td>Phone</td>
<td></td>
</tr>
</tbody>
</table>

Economy Forms Corporation
Box D55, East 14th St. Station Des Moines, Iowa 50316  Ph. 515/266–1141 Telex U.S.A. 478-374