Roofing Spec

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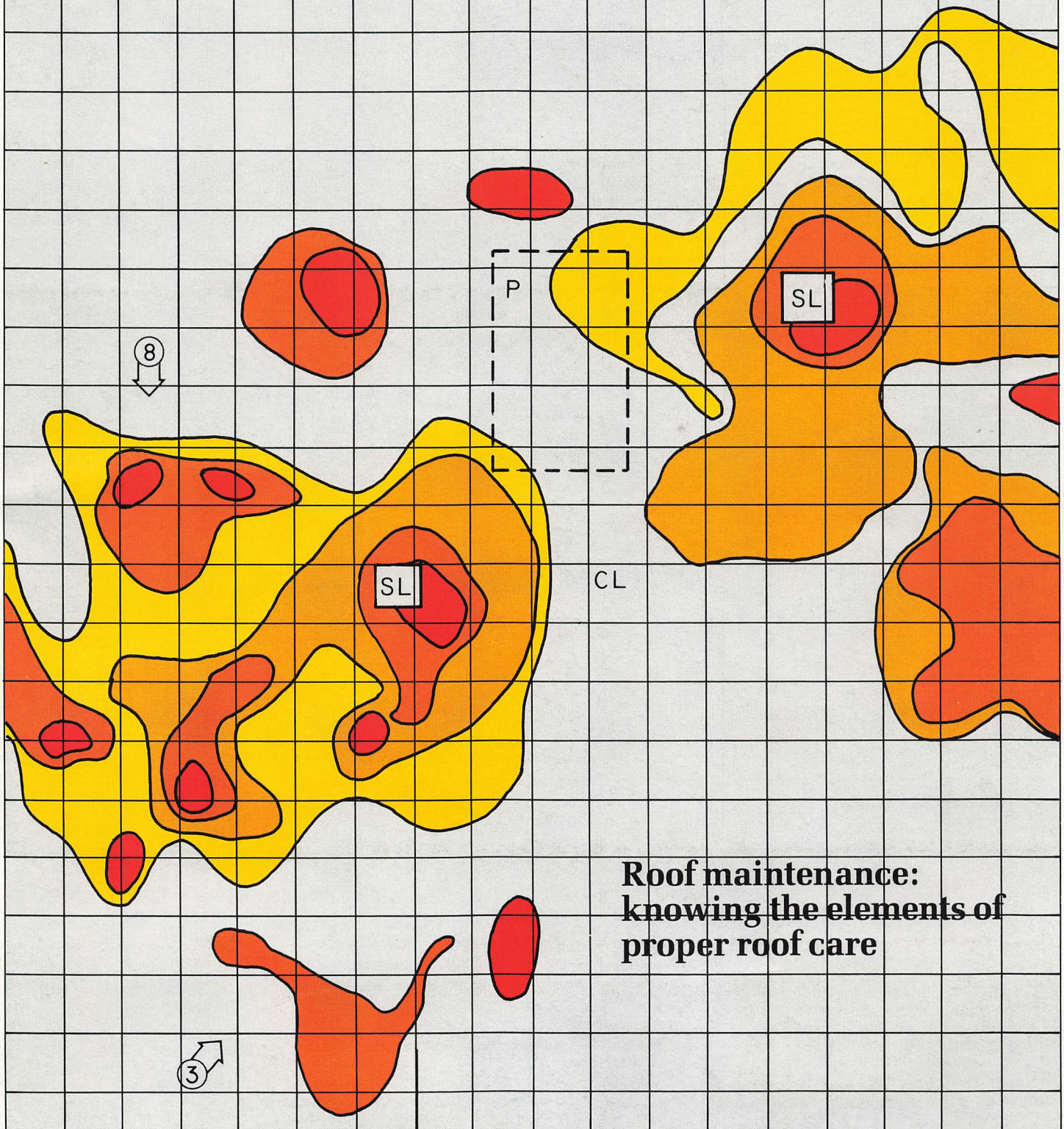
National Roofing Contractors Association

July 1984



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Roofing Spec

Vol. 12, No. 7
July 1984

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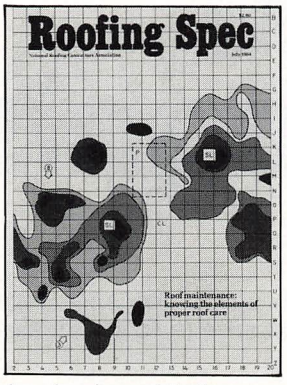

A roof-surface grid is the starting point for roof maintenance and long roof life.

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Departments

Features

Advertisers

Ideas, notes and random thoughts

The phones are ringing. June 1 marked the start-up date for the National Roofing Contractor referral service. Consumers can now dial 1-800/USA-ROOF and order a list of contractors in their cities. A computer list of local NRCA contractors is then mailed to the caller within a few days.

Building owners, architects, engineers and consumers: are you looking for reliable roofing contractors? NRCA's brochure, "Insist on a Roofing Professional," includes tips on what to look for in roofing contractors. A copy of the brochure will be sent to every member; additional copies are available at cost from NRCA headquarters.

NRCA's Convention Department named Vanya Bottorff to its new administrative assistant position. Her responsibilities include working with exhibitors and assisting the International Symposium and Centennial committees.

The cry, "watch out for the edge," could soon apply to more than just roof crews. A recent article in Working Woman discussed "roof playgrounds," possibly available on the tops of housing complexes. "Before World War II, many public schools in New York built open-air playgrounds on their roofs because they lacked sufficient ground-level play space. The same roof playgrounds, probably with newly invented improvements, could be created for two-career family housing." Mopball, or "ring-around-the-bitumen," anyone?

Foundation Update

The National Roofing Foundation wishes to thank the following for their support:

New Friend
Middle Tennessee Council of T.A.R.C., Nashville, Tenn.

Lifetime Friend
Roofing Contractors Group of Greater Louisville-Industry Fund, Louisville, Ky. ($1,000 donation).

Through the support of its Friends, The Foundation provides educational materials for the betterment of the roofing industry.

For more information, please contact NRF at 8600 Bryn Mawr Ave., Chicago, Ill. 60631; 312/693-0700.

NRCA welcomes two new staff members...Charlene Leo has been hired as secretary to Alan Grayson, Education Department, and Jody Zimmermann has joined the Communications staff as advertising sales manager.

"April was strong compared to March (for new housing), but I see no major upward trend," said Robert Genetski, chief economist for Harris Bank, Chicago. But this is good, he explains. "The economy is shifting gears from a rapid to a more subdued pace. People who overreacted to signs of strength before will now overreact to signs of weakness. But the recovery continues to show sustained growth, and that's what important," Genetski believes.

Are people losing confidence in the banking system? "I don't believe those concerns are justified," Genetski said. "It's still a closed banking system. If people are worried about one bank, they take their money out of that bank and put it in another. In order for people to shun the banking system entirely, they would have to turn *all* their funds into currency. If people do this, there will be a drain on the system. However, unlike the 1930s, the Federal Reserve Board will pump in replacement funds. In the 1930s, the Fed let the money supply drop."

"The problem with insight, sensitivity and intuition is that they tend to confirm our biases."

Naomi Weisstein

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April contracts up 1 percent

Contracts for new construction edged up a seasonally adjusted 1 percent in April, according to the F. W. Dodge division of McGraw-Hill Information Systems Co. Through the first four months of 1984, the value of all new construction started was $63.3 billion, a gain of 15 percent over the same period a year ago.

April's $17.4 billion of newly-started construction reflected modest gains in housing and commercial/industrial building, offset by a decline of public works construction. As a consequence, the seasonally adjusted Dodge Index advanced only one percentage point to 145 (1977 = 100).

The Dodge Index, which is the advance indicator of on-site requirements for building products and labor, has been drifting sideways in the 140 to 150 range for the past twelve months.

"In April, the construction market was again unable to break through the 150 ceiling which it reached a year ago, and rising interest rates will make it still tougher to do so in the future," commented George A. Christie, vice president and chief economist for F. W. Dodge.

"After a strong recovery, followed by a year of high level output concentrated heavily in the housing sector, the building industry is now depending on nonresidential markets to sustain volume as housing starts begin to fade," Christie said. "Prospects for a trade-off between housing and commercial/industrial building are good for the near future."

April contracts for nonresidential building totaled $5.4 billion, advancing 1 percent after adjustment for seasonality. Commercial and industrial building rose 12 percent in the latest month, largely on the strength of another surge of office projects. Meanwhile, institutional building fell sharply to its lowest rate in over a year.

According to Christie, "The office building boom, which reached its peak in 1981 as a Sun Belt phenomenon, is now being sustained in the more traditional commercial centers. Boston, New York and Chicago—each with a major new start in April—headed the latest month's list of projects."

Residential building, as tabulated by F. W. Dodge, remained at variance with the Commerce Department measure of housing activity. Dodge reported a seasonally adjusted rate of 1.79 million dwelling units in April versus Commerce's 1.96 million. Both sources indicate an average homebuilding level close to 1.8 million units during March and April, but Dodge data show building in both months at a steady level, while government statistics show a decline/rebound pattern. Most of the variance results from different methods of seasonal adjustment, it was explained.

The value of newly-started residential building, at $9.3 billion in April, was up a seasonally adjusted 3 percent from March. Multi-family building gained in the latest month, while one-family housing declined.

Contracting for hotels/motels rose sharply in April, due to the start of a $90 million project in St. Louis.

Contracting for nonbuilding construction, at $2.7 billion in April, declined 11 percent after seasonal adjustment. "Highway and bridge construction, the dominant category in this group of public works and utility projects, has been erratic in recent months owing to interruptions of federal funding," Christie said.

The regional distribution of April's construction contracts showed small gains in the Northeast and the West, no change in the South and a sizable decline in the Midwest.

MONTHLY SUMMARY OF CONSTRUCTION CONTRACT VALUE
Prepared by F. W. Dodge Division
McGraw-Hill Information Systems Company

	April, 1984 Construction Contract Value (000,000)	Seasonally Adjusted Percent Change From Previous Month
Nonresidential Building	$ 5,405.2	+ 1
Residential Building	9,329.8	+ 3
Nonbuilding Construction	2,689.9	- 11
Total Construction	$17,424.9	+ 1

	4 Mos. 1984 (000,000)	4 Mos. 1983 (000,000)	Cumulative Percent Change
Nonresidential Building	$20,852.2	$18,176.8	+15
Residential Building	31,839.6	25,827.5	+23
Nonbuilding Construction	10,565.5	11,139.8	- 5
Total Construction	$63,257.3	$55,144.1	+15

DODGE INDEX
(1977 = 100, SEASONALLY ADJUSTED)

February 1984	150
March 1984	144
April 1984	145

Open shops prevailing over unions

Open shops are now doing 70 percent of all building, *Nation's Business* reports. The magazine credits the higher productivity and efficiency of open shops for the rise in nonunion contracting.

Pat A. Alibrandi, president of the Associated Builders and Contractors, said, "As unions scramble to become more competitive, the truest measure of success will be not who builds more projects but who does more to improve the industry."

Open shops have been making inroads into union territory according to the magazine. Nonunion firms are winning more contracts in such union strongholds as Atlanta, Miami, Boston and Los Angeles.

Association cancels talk to calm union

To improve labor relations, a major trade association recently cancelled a seminar exploring nonunion operations.

The Mechanical Contractors Association of America, Inc. (MCAA) called off its seminar, "because of the adverse affect it was having at this time on national and local joint labor/management efforts to improve the competitive position of our membership," Association President John F. Dillon said.

Almost all of the Association's membership is union-employing and would like to stay that way, Dillon added.

According to Dillon, the Association and the union have made themselves more competitive recently by adjusting wages and working conditions. Association members believe the best way to do business is by training a pool of skilled workers and drawing from that pool when workers are needed.

The seminar, "Exploring Alternate Ways of Doing Business," was scheduled for May 20–21.

continued, page 11

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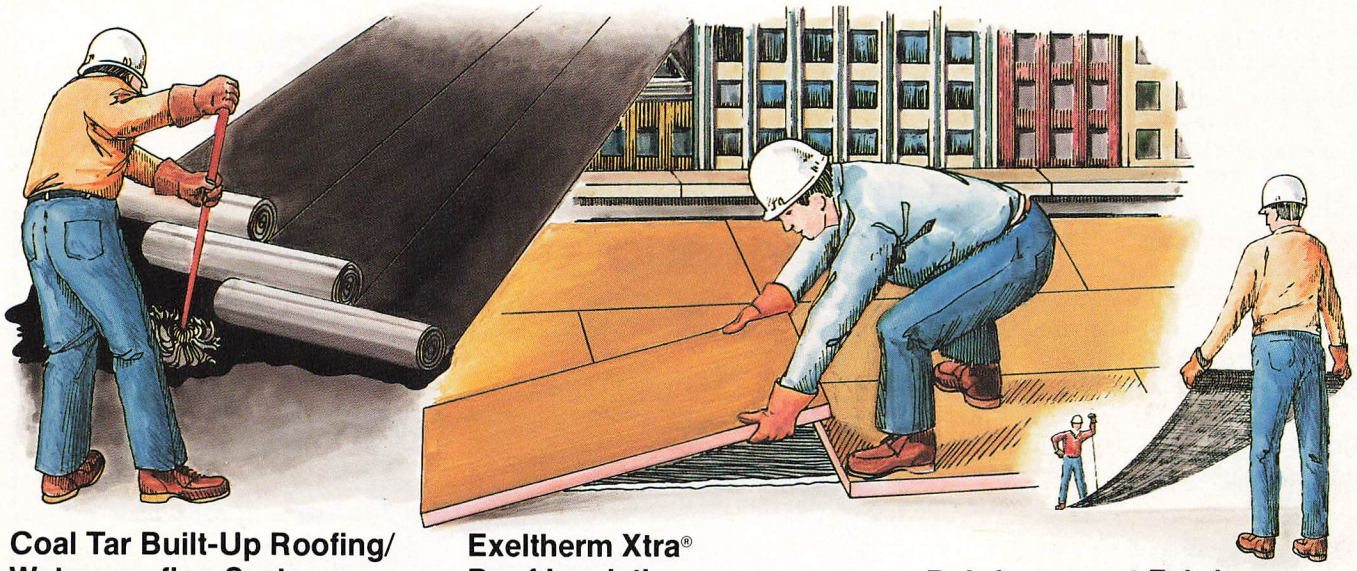
the experience and the products to satisfy all your roofing and waterproofing needs



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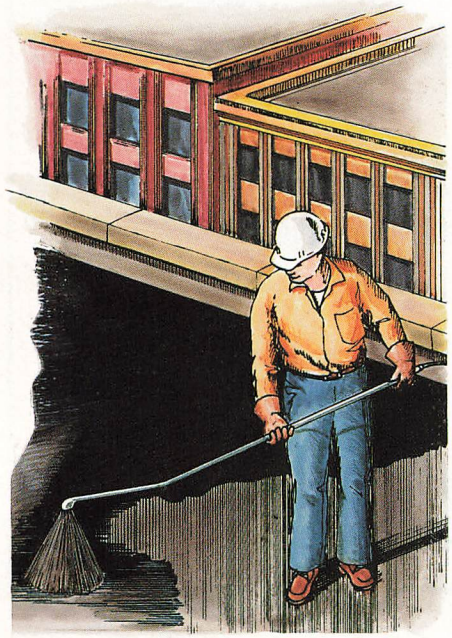

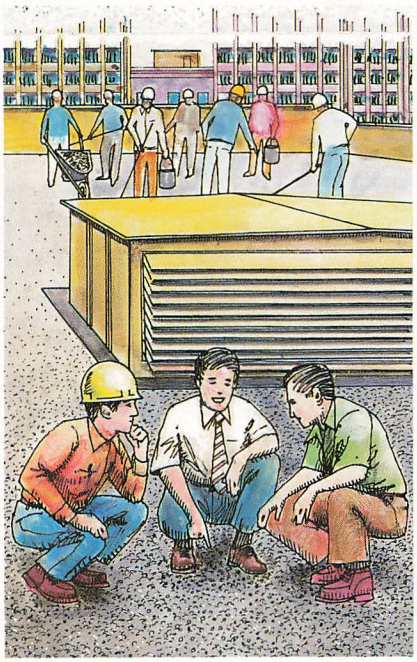

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continued from page 9

Tennessee schools urged to hire architects

The Legislative Committee of the Tennessee Association of Roofing Contractors (T. A. R. C.) is working to assure professional quality roofs on Tennessee schools.

The Committee is opposing an amendment to the Tennessee Code that would allow sparsely populated school districts to contract work without the supervision of an architect. "This would open the door to many so-called fly-by-night roofing contractors," a Committee report states. The Committee has agreed to support the Tennessee Society of Architect's position to defeat the amendment. A letter was sent to the Tennessee legislature voicing the Association's opposition to the amendment.

As a result of a Committee meeting with Tennessee's chief of fire protection, a letter was sent by the state office to all Tennessee school superintendents urging them to hire architects and reputable roofing contractors.

NLRB counsel's past concerns AFL-CIO

Rosemary M. Collyer has been appointed National Labor Relations Board General Counsel by the White House. Collyer is an attorney currently serving as chair of the Federal Mine Safety and Health Review Commission.

The AFL-CIO has not opposed Collyer's confirmation yet but is concerned about her former management associations. *Construction Labor Report*, a Bureau of National Affairs publication, quoted one labor leader as saying, "We are gravely concerned that Ms. Collyer—like NLRB Chairman Donald Dotson and member Patricia Diaz Dennis—is a former employer lawyer and that this nomination is another step in turning the NLRB over to management's agents lock, stock and barrel."

Another NLRB post, vacant since the departure of member Howard Jenkins last August, is yet to be filled by Reagan.

Execs might have to remit excess pay

The Internal Revenue Service gets concerned when it believes a shareholder-employee of a closely held company is receiving unreasonably high compensation, according to the Research Institute of America.

The agency treats the excess payment as dividend rather than earned income and it is not deductible by the company.

Some companies are protecting themselves with "hedge agreements" that obligate the executive to repay any amounts that might be disallowed. The executive gets a deduction on the amount repayed and the company does not have to declare the repayment as income.

The repayment arrangement can be a separate contract or a resolution recorded in the corporate minutes. Either way, the IRS will honor it only for payments made after the agreement's adoption, according to the Institute.

continued, page 13

DuPont Sontara®: newest way to cut labor costs on gravel reroofs.

Soft SONTARA Roofing Fabric conforms to gravel, speeds preparation and installation.

SONTARA is strong—yet so soft, it hugs every stone of gravel. That means faster preparation, because you don't have to clean off as much old gravel. Only loose material.

SONTARA spunbonded polyester absorbs cold asphalt faster than fiberglass. Asphalt soaks through SONTARA for better adherence to peaks and valleys. You get a tough membrane without the voids and bridges that are vulnerable to puncture.

And because SONTARA is 40% lighter than fiberglass, it's easier to get up to the roof.

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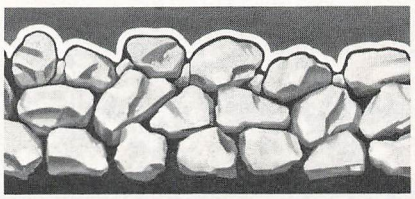

Unlike fiberglass, SONTARA conforms to peaks and voids created by gravel.

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NATIONAL NEWS

continued from page 11

Poll finds longer warranties

A survey conducted for Dow Chemical Co. by Ducker Research Co., Inc. has found the built-up roofing industry extending its warranties to compete with single-ply materials, according to the *Construction Specifier,* publication of the Construction Specifications Institute.

Ducker surveyed four built-up and 11 single-ply companies for its report which found 10- and 15-year materials warranties common in the industry. "Three years ago, 10-year warranties were the longest available," the report states.

The survey found two of the BUR manufacturers offering 20-year warranties while the other two offered 10-year warranties.

"For a time, built-up appeared to be trying to limit its warranties. Now it's coming back with stronger, more comprehensive warranties because of competition from single-ply," William H. Ducker, president of the independent market research and analysis firm said. Ducker predicts parity between BUR and single-ply manufacturers within five years.

Ducker also interviewed 42 contractors and found a trend toward contractors taking full labor responsibility for the first two years. The contractors preferred the longer warranties but believed there was too much emphasis on warranties at purchase time, the report noted.

PAS surveys wage differences

A survey conducted by Personnel Administration Services, Inc. (PAS) has found the average nonunion journeyman's wage to be $10.10 an hour plus 9.7 percent in fringe benefits, according to *Construction Labor Report.*

The all-craft weighted average for foremen was $12.03 an hour plus 9.7 percent fringe benefits, according to the survey.

PAS, an independent organization not subsidized by union or open shops, polled 248 open shops employing about 30,000 in 45 work classifications.

The survey data is broken down into several categories, including craft, geographic region, general and subcontractors, and size of project.

Workers on larger projects received higher wages, the survey found. On projects under $500,000, journeymen's wages average $8.70 an hour, while journeymen make $12.70 an hour on projects over $50 million. General contractors' journeymen also make more than their sub-contractor counterparts, according to the survey.

Copies of the study, "1984 Merit Shop Wage and Benefit Survey," may be purchased from Personnel Administration Services, Inc., 3000 Plymouth Road, Ann Arbor, Mich. 48105.

GenFlex prices increase again

GTR Building Products Co. has announced a second price increase for its single-ply roofing membranes.

The company, an operating unit of GenCorp, Inc., raised it prices on all GenFlex EPDM membranes and flashing materials by three cents per square foot. The increases have been in effect since July 1. It will not affect the price of accessory products.

GTR had already raised the price of its GenFlex products three cents per square foot April 1. The further increase was necessary because of higher labor and raw material costs, according to the company.

continued on following page

RIEI to prepare *Roofing Spec* articles

The Roofing Industry Educational Institute (RIEI) is preparing a comprehensive series of articles for *Roofing Spec*. Topics will include: roofing membranes, thermal insulations, roof decks and other elements of commercial roofing systems.

This series will update NRCA's pamphlets reprinted from past *Roofing Spec* articles. The pamphlets are: "The Roofing Membrane," "Roof Insulation," "The Roof Deck" and "The Single-Ply Roofing Membrane"

Industry experts will author the articles and a RIEI peer review panel will examine the manuscripts for technical accuracy. The articles will be published in *Roofing Spec* over the next several years. Bound reprints will also be available from NRCA.

RIEI also announced Dr. Frank M. Parrish as its new deputy director. Parrish will coordinate RIEI's administrative activities. His duties include fund raising, marketing and public relations.

UFCA forced to change management

In a surprise move, management of the Urethane Foam Contractors Association (UFCA) is now in the hands of Association and Society Management, Inc. of Austin, Texas. A bank foreclosure forced UFCA's previous management firm, Bell Publicom, out of business.

Bell's problems began with the death in a plane crash of its principal, Gerry Bell. Its management and financial woes worsened until its bank, Huntington Bank, was forced to foreclose. UFCA's Board of Directors had already begun searching for new management when the need for action became evident.

Meetings between UFCA directors, empolyees of both management firms and attorneys helped save electronic data and files in the nick of time. The day after the information was packed, the bank changed the locks on Bell's doors. UFCA President Hubert Coon, Jr. convinced the bank to release the packed cartons bearing his name.

Negotiations with Bell Publicom, Huntington Bank, the accounting firm and creditors worked out UFCA's financial status, leaving the Association in a secure position.

What makes the NRCA-sponsored Business Insurance Program a smart buy?

Local, professional services.

As a roofing contractor, one of the most important features a general business program can offer is local loss control service – service that can help you and your fellow members hold down losses.

And that's exactly what your NRCA-sponsored General Business Insurance Program gives you.

CNA's loss control specialists are experts in your industry and your individual needs. They will work with you to develop an individualized program aimed at optimizing safety in your employees' work environment and educating workers to safe and sensible methods of operation. Causes of accidents are analyzed and corrective steps recommended.

Another plus – when there are claims, they're also handled locally by experienced personnel who know the importance of resolving claims quickly and fairly.

Comprehensive coverage at economical rates. Your NRCA program provides property, liability, automobile and Workers' Compensation all in one economical package. Stability, too is important. And this protection is backed by the CNA Insurance Companies, an industry leader who has worked with roofing contractors for over 14 years and understands the roofing business.

It all adds up to one smart buy. Contact the NRCA Insurance Advisor today.

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The NRCA sponsored General Business Insurance Program is underwritten by Continental Casualty Company and Transportation Insurance Company, two of the CNA Insurance Companies.

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Associate News

Starling named G-P's Southeast V.P.

Georgia-Pacific Corp., Distribution Division, has named Robert A. Starling vice president of its Southeast region, succeeding Jack J. Castevens who retired.

Starling will direct the operation of 34 wholesale building products distribution centers located in 10 Southeastern states.

He joined G-P as Southeast hardboard sales representative in 1962. Starling was subsequently named Southeast merchandising representative and Atlanta sales manager. In 1966, he was promoted to Atlanta branch manager and was twice honored as a G-P President's Club award winner.

Second California plant for Celotex-Marley

Celotex-Marley opened a second production facility in Hollister, Calif., near San Jose on June 1.

The Hollister facility has the capability of producing the full line of Celotex-Marley concrete roof tile presently manufactured in the San Bernardino plant.

"The additional production capacity will greatly enhance our ability to deliver products to builders and distributors in California, Nevada, Utah and Arizona," said General Manager Clyde Black.

The facility is located at 1901 San Felipe Road.

W.R. Grace promotes Darragh

W.R. Grace & Co. appointed J. Michael Darragh as its western regional sales representative for Polycel sealants.

Darragh was previously a Polycel specialist in the firm's eastern region. He joined W.R. Grace in 1982 after three years as sales director for AC&R Insulation, Washington, D.C.

O-C expands Carolina plant

Owens-Corning Fiberglas Corp. is expanding its commercial roofing products manufacturing facility in Morehead City, N. C.

The existing facility will be renovated, adding production capacity for Derbigum modified bitumen products. The plant presently manufactures glass-fiber based built-up roofing materials.

Construction began in May. Owens-Corning hopes that production will be in full swing by the fourth quarter of 1984.

About 40 employees will be hired for the facility.

Personnel update at UC

UC Industries announced several new appointments to its sales and marketing department.

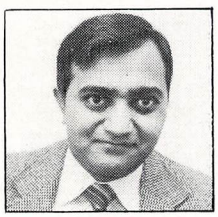
Michael L. Rew has been named industrial product manager. He is responsible for marketing UC's Foamular roofing insulation.

Rew was formerly with W.R. Grace & Co.

Russ Bodnyk and Jay Doherty were promoted from sales representatives to industrial account managers.

In addition, Terry Dobmeier and Kurt Ziemann advanced from market sales representatives to area sales managers.

Upjohn selects Parekh for new post



The Upjohn Co.'s Polymer Chemicals Division has appointed Kishore Parekh to the new position of international construction specialist.

Parekh will assist U.S. architects and contractors in engineering and specifications for polyurethane foams, related insulation products and other commercial, governmental and military projects.

He joined Upjohn as a technical service chemist in the Netherlands in 1973. Parekh then moved into polyurethane sales and service, with responsibility for the Middle East and Africa.

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Application of the Built-up Roof: Felts and Surfacings

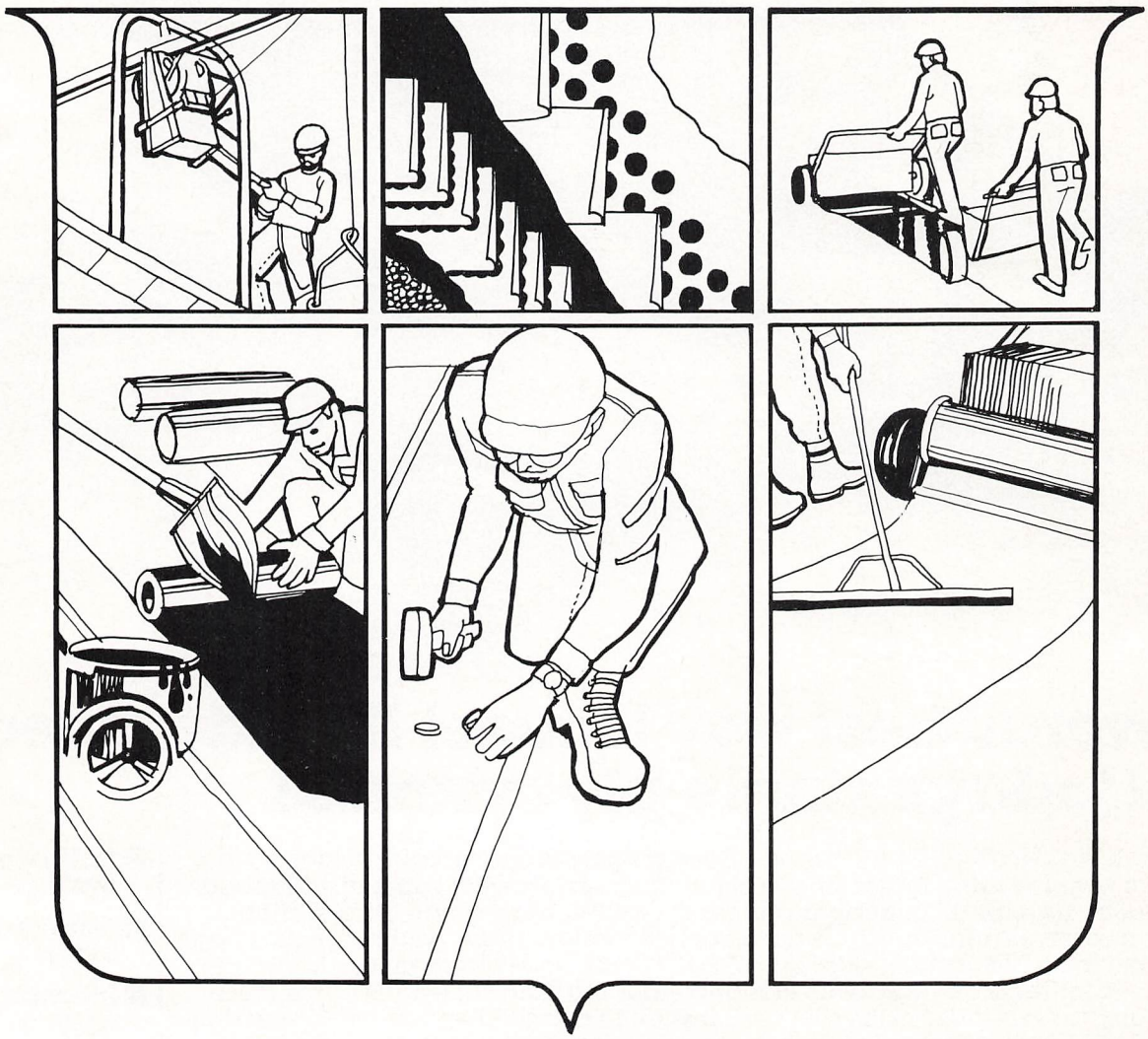
Now available from NRCA is the worker training program *Application of the Built-up Roof: Felts and Surfacings.* The training package consists of a narrated audiovisual presentation and companion workbook specifically designed for training workers through in-house sessions in the contractor's shop. It is intended to introduce the roof mechanic to the basic components of the hot built-up roof, fundamental BUR membrane design and specifications, and critical application considerations and procedures.

The audiovisual program, available in either slide/cassette or videotape format, consists of 600 slides and 74-minute narration. It provides clear, step-by-step instruction in the application of bitumen, felts, and surfacing material, including job set-up, equipment-handling, and safety considerations.

A comprehensive workbook contains a complete outline of the program plus quizzes, drills, and tests to gauge student progress and aid in instruction. A complete instruction guide is also available.

Up to nine hours of credit toward the requirements of the Academy of Roofing Contractors program can be earned using this program.

For more information on the program, contact Alan Grayson, NRCA Director of Education, 8600 Bryn Mawr Ave., Chicago, Ill. 60631.

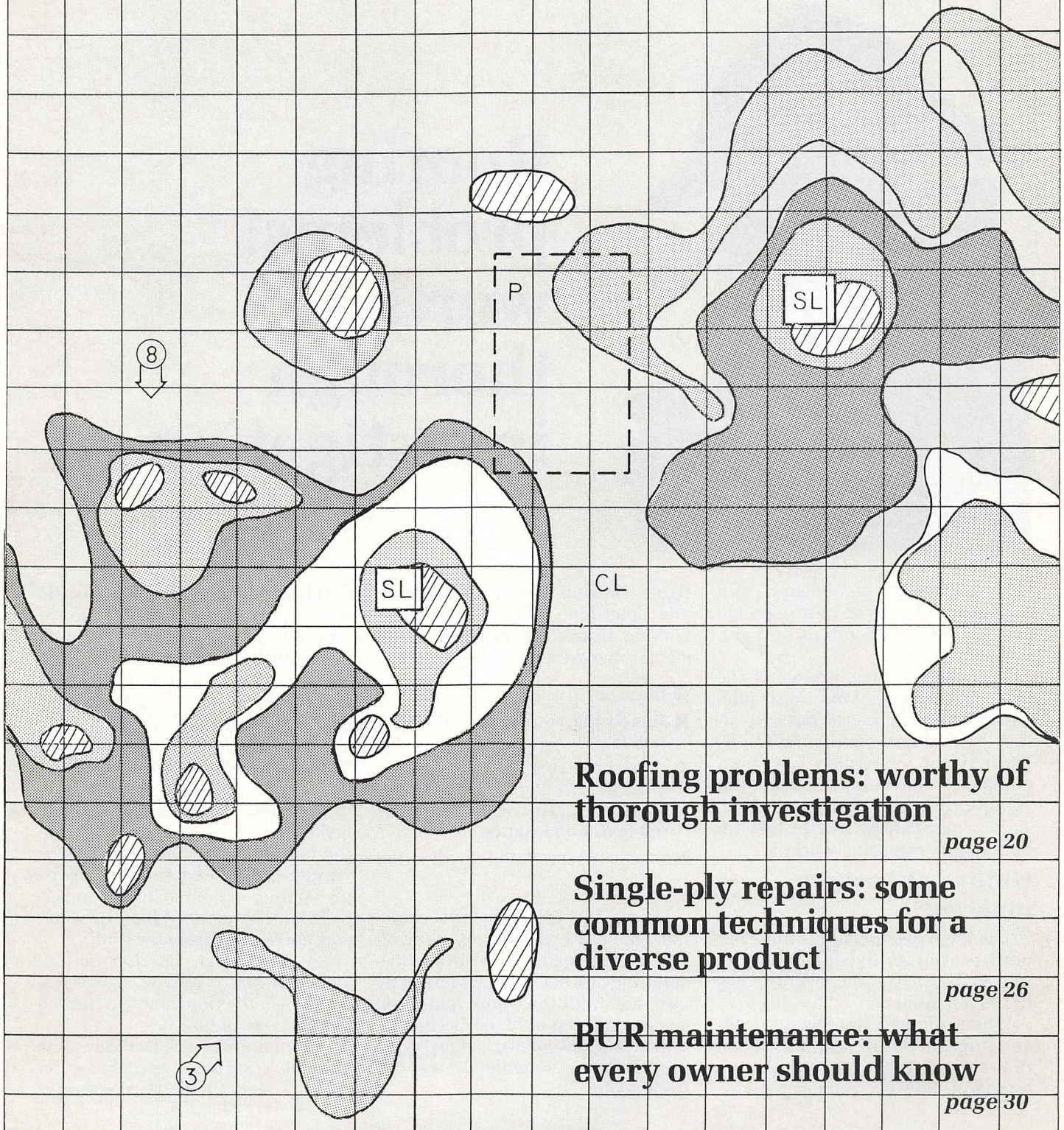


NATIONAL ROOFING CONTRACTORS ASSOCIATION

Check #788 on Reader Service Card

Roof Maintenance:

knowing the problems, products and procedures of proper roof repair



Roofing problems: worthy of thorough investigation

by Stanley Gerson, L. E. Schwartz & Sons, Inc.

Investigating a maintenance and repair problem can be an easy job or a hard job; it depends on how you go about it.

Just like all other phases of the roofing business, you must plan ahead, establish procedures and follow them. If not, your work will be hard, if not impossible, and your company could get blamed for things over which it has no control. This is particularly true in leak repair, new or reroofing work.

Guilty until proven innocent

The law says a person is innocent until proven guilty; not so in the roofing business. You are guilty until proven innocent.

When a client calls to report water entering his building, most of the time he feels it's the roofing contractor's fault. Now it's your job to investigate, find out what the problem is, and determine where the water is coming from. The problem could stem from several different causes:

- the roof.
- something your crew did or did not do.
- other problems with the roof, including mechanical equipment, skylights, drains, walls, windows or even condensation.
- problems unrelated to the roof area.

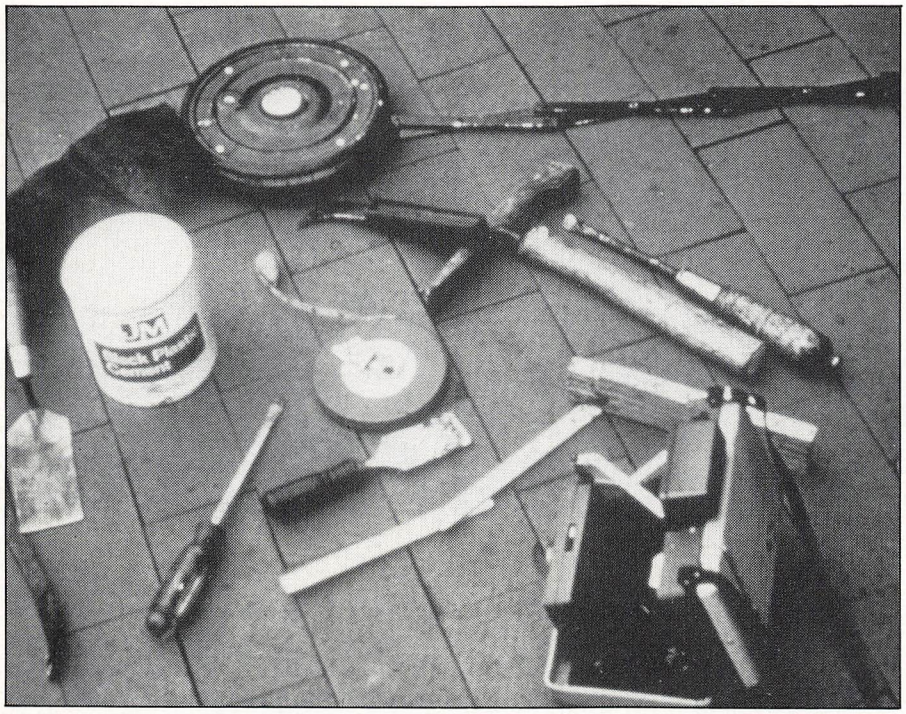
Let me give you a personal example. One day I was sitting in my office and received a call from an owner telling me that water was pouring into his building—and had been since rain had started the day before. This was a new job we had just completed, and I immediately went to the job-site.

I checked with the owner; he said he wanted to show me where the water was coming in. As we got to the elevator, instead of pushing the up button, he pushed the down button and we ended up in the basement. (This was a four-story building.)

We got off the elevator and took a right; there was water all over the basement floor. As we walked closer to the window, which was at grade level, you could see the water coming in from a bank right outside the window. I pointed this out to the owner and, of course, to his embarrassment, he realized that the water was not coming from the roof.

He apologized, but his parting statement was, "Well, there was water all over the floor, and we figured the roof was leaking."

It is an unfortunate fact that some basically good roofs are replaced, resulting in a tremendous waste of



Some of the roof investigator's tools.

time, money and resources, because the problem was not identified properly.

Check out what's below first

It is your job to investigate and determine which of the four factors is causing the problem. Then, if possible, fix it.

When you are called to investigate, it is always a good idea for an owner's representative to go with you, someone who might be more familiar with the roof and the building. An architect, an engineer or a consultant can also be a tremendous help.

To accurately investigate, you will need proper tools: a measuring device, a camera, cutting tools, material to repair core cuts and a flashlight. It is also good to develop a data sheet.

Before proceeding to the roof, develop a history of the system and its problems. Review the as-built plans and specifications if they are available. Note from the drawings the type of substrate, the structural surface, the direction and gauge of the steel deck or the thickness of the concrete or fill, the drain placement, slope of the roof, and the placement of expansion joints.

Encourage discussion with the person who is making the inspection or with the building janitor, plant engineer or owner. Find out if:

- the roof leaks during every rain or just during a hard, driving rain.
- the leak stops once the rain stops or continues for days.
- the structure was built all at once, or if it had additions; determine the owner's long-term plan for the structure.

Before inspecting the roof, examine the interior thoroughly. Make note of the space use, and whether it is heated, cooled or if humidity has developed. Has insulation been added at the ceiling? This could drastically alter what happens at the deck level. Maybe the space above the ceiling is a return air plenum for a mechanical system, or perhaps it is just a vented space.

In buildings where it is possible to see the structural roof framing and bottom of the deck, note the framing type and spacing. If the deck is metal, check for mechanically-fastened insulation. Note if the steel deck is changing directions; later verify the presence of an expansion joint at the deck level.

During the walkthrough, be sure to lift ceiling tile and use a flashlight—get the whole story.

While inside, spot the major leaks and measure to a reference point that can be located on the roof. Be sure to note any unusual conditions such as excessive vibration, chemical contamination, or high humidity.

Observe each exterior wall if possible, particularly in the area of the reported leaks.

Details, details and more details

On the way up to the roof, note the access hatch or ladder and the building's height; examine the walls for dampness, spalling brick, large cracks, effervescence or other unusual conditions. Be sure to note the type of building (masonry, wood, metal, tilt-up panels, etc.), look for stains, and note the effect of stress from the parapet footings.

Once on the roof, verify the dimensions from the earlier sketch, correcting where necessary. If no plan was available, take the time to make a sketch now and locate drains, mechanical equipment, penetrations, skylights and penthouses. The sketch should show the approximate location of all rooftop items.

It is important to use a checklist here; make your own or use the one in the NRCA maintenance manual. Check these points:

- What are the general conditions—is there debris on the roof? Debris will have to be removed whether the roof is repaired or replaced. Recommend that the owner do a better job of house-

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Investigating

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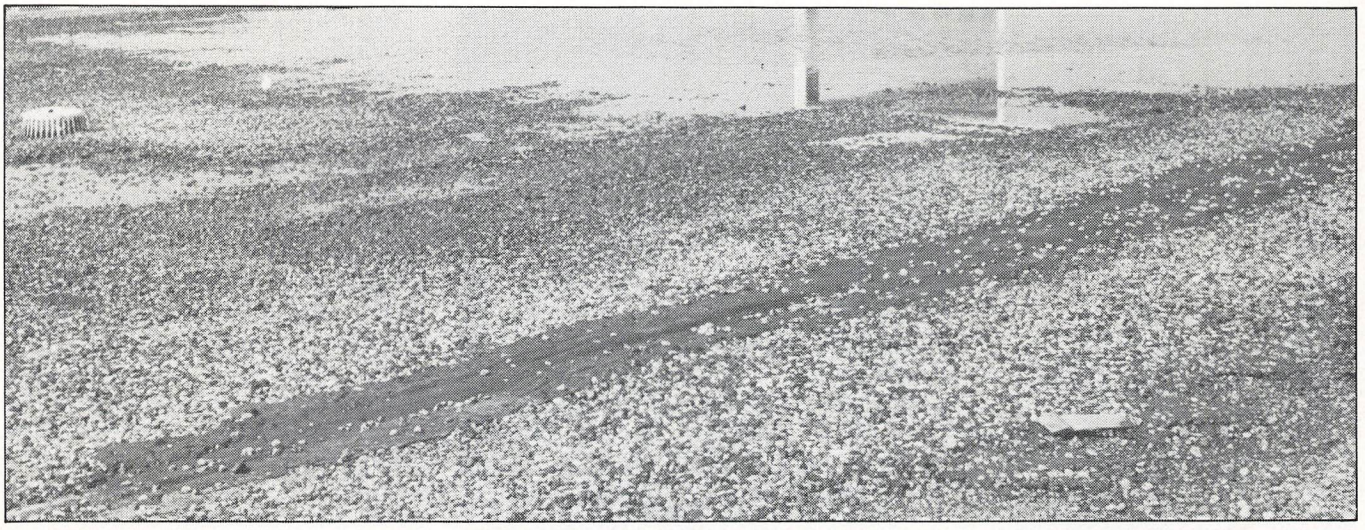

Ineffective drainage such as this may be the cause of a roof's problems.

keeping; debris could be the cause of the problem.

- What is the condition of the roof insulation? Just by walking across the roof, you can get an idea of how well the membrane adheres to the insulation and the insulation to the deck.
- How effective is the drainage? There should be no ponding water 48 hours after a rain. Are there duck ponds? Is drainage by gutter, scupper or internal drains? Are the drains at the high points? Might this be corrected with crickets, tapered insulation, or additional drains?

  Also note the level of water during a storm by the height of seeds or dirt around the drain domes. Examine the drain flashing for intact lead flashings and tight clamping bolts. If there is one single point that roofing experts of the world agree on, it is that all roofs should slope to drain if at all possible and practical.
- What is the membrane condition? Check for aggregate attachment and bare spots. If the felts are visible, is there evidence of curling, wrinkles, fishmouths or blisters?
- Are there blisters? The contractor may want to cut one to determine the nature of the blister. If the roof is very badly blistered, there may be only one solution: complete removal.
- Are there splits? While splits are very easy to pick out on smooth-surface roofs, they may be very difficult to find on a gravel-surface roof. Check for faint lines appearing in the gravel. Look for splits where there is a change of substrate or a change in the metal deck direction. If the insulation is attached poorly, stress may cause a split through the membrane.

Taking action

After determining where the leaks are coming from, decide which type of repair (emergency, temporary or permanent) will be best for the customer.

When arriving at the job-site, be courteous. Your attitude and the attitude of your employees can determine whether you will have a hard time or an easy time with your customer.

Communication is essential. Information must be passed from the contractor to the supervisor or project manager and the field workers so the job can be done as efficiently and economically as possible.

At L. E. Schwartz, we have a leak inspection report. When we receive a call reporting a leak, we fill out this form. The name and address of the company is put at the top. We also put the name of the caller and the name of the person we should contact at the job-site. If we don't have this information, then our job is going to be very difficult.

Also, during the initial phone call, we record where the leak is occurring if this information was given. If the owner suggests a cause for the leak, we will also note this—with a question mark, of course.

When we go to a job-site, we always check in with someone at the facility. If we can't see the contact person, we make sure we see someone else and make sure he knows who we are and why we are there.

If at all possible, get the person you see to sign the leak inspection report. A signature and a date will prove to the customer that you did make the inspection even though he did not witness the activity.

The number of workers we've sent to a job-site and the hours they've spent there are also recorded on the leak report sheet. Material used is also noted. This information must be turned into our company for invoicing the customer.

Do not take more workers to the project than are needed. Normally, a leak can be repaired by just two or three workers. Any more will cause

outrageous repair costs. You will have to have all the information possible to decide how many workers will be needed.

On the form there is a space for the foreman or superintendent to list the problem and the work performed. The owner should know exactly what was done. If the workmen are unable to make a permanent repair, the owner should know what type of work was performed and when the workmen will return to complete the job.

You will find clients working more closely with you and not getting upset if they know exactly what you are doing and why.

Upon investigation, if you find that the leak is not caused by the roof, tell the owner. If at all possible, show him where the water is coming from.

You will find clients working more closely with you if they know what you are doing.

Ready to give up

Many times after investigation, you still cannot determine the source of the water you can see entering the building. If this is the case, there are a few tricks that may solve the mystery.

A fairly simple procedure is running a water test on the area. Position someone inside the building so that they can tell you exactly when water starts to enter.

Start on the flat area of the roof, running water on one small area at a time. If no water enters the building, then run water on the base flashings or around other penetrations. If the leak is still not located, then run water on roof-mounted equipment or walls in the area.

In one instance, we found a very difficult leak with this technique.

From the first rain after a new job, water was entering the building. We returned to the project and checked the roof, inspecting the flashing and the counter flashing but could not find the leak's source.

Then we noticed that water was entering where an air handling unit was in place.

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Investigating

continued

We told the owner. He contacted the subcontractor who installed the unit. The subcontractor investigated and said it was impossible for water to enter through his equipment.

We went back and forth with the subcontractor for several months. The only thing the owner knew was that water came into his building every time it rained.

Then, one of our superintendents came up with an idea. He poured red food coloring on the flat roof around the unit, yellow food coloring on the base flashing, green food coloring on the top of the unit, and blue food coloring on the inside of the unit.

Early one morning, after the next rain, I went to the project and entered the leak area. On the floor was a large puddle of blue water, indicating a leak within the unit, not on the roof.

A little later the subcontractor who had installed this unit had to dismantle it. When he did, he discovered that the bottom pans had not been welded. Any time water entered the unit or condensation occurred, water immediately entered the building.

Another thing that you should look for inside the building is wet ceiling tile. Many times an owner won't replace the ceiling tile after a leak has been repaired. When it rains, the owner sees the spotted ceiling tiles and thinks he still has a leak.

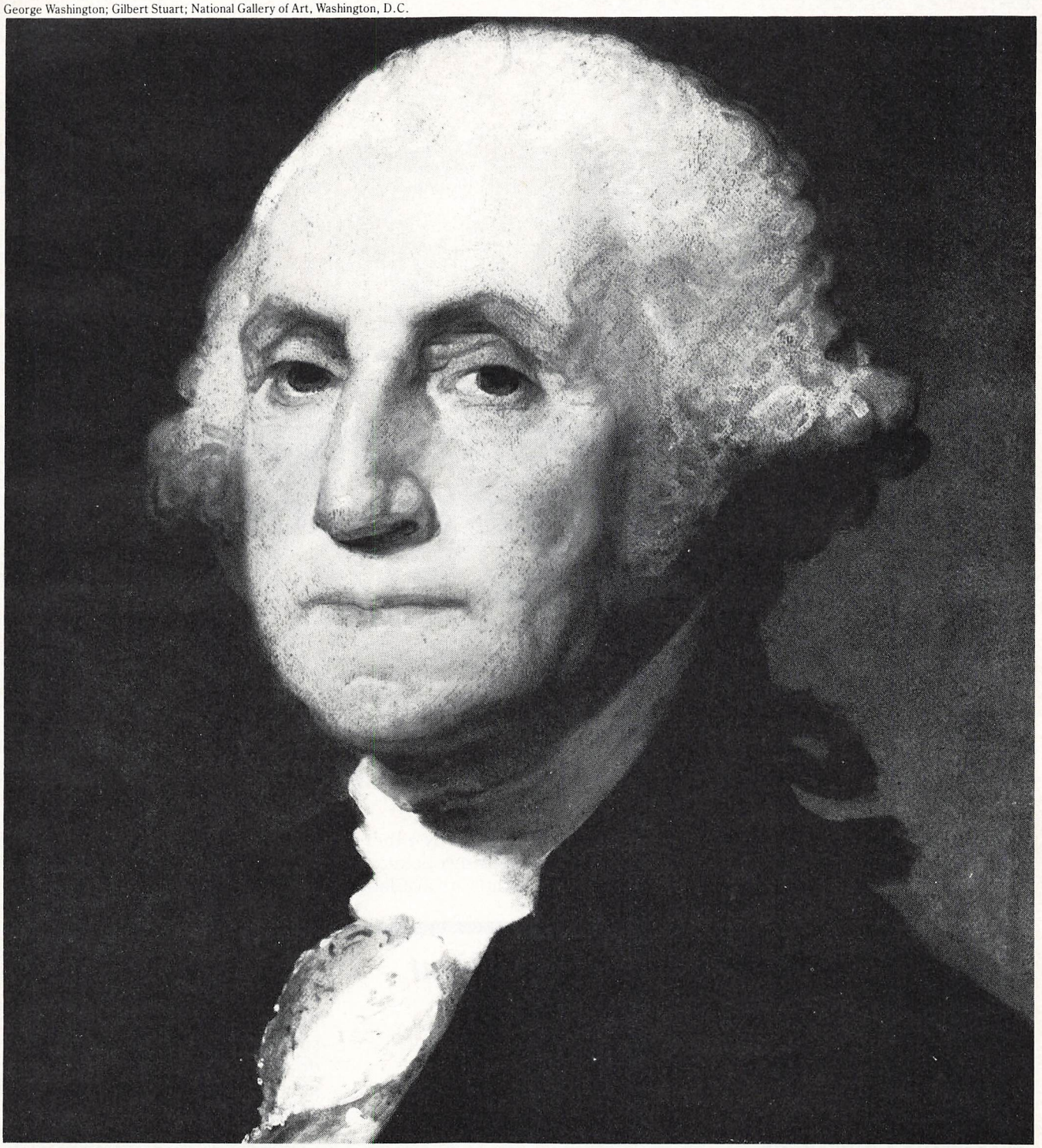
You can tell whether these are fresh leaks by the the color of the rings. Older stains tend to darken.

On the floor was a puddle of blue water, indicating a leak within the unit, not on the roof.

All in a day's work

Investigating a roofing problem is not easy, but it is a part of your job. Having a proper plan for these investigations will help you work smarter, not harder.

George Washington; Gilbert Stuart; National Gallery of Art, Washington, D.C.



Would the winter he spent at Valley Forge have cost him a promotion in your company?

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Single-ply repairs: some common techniques for a diverse product

by R. J. Wallace, Daniel Construction Co.

Repairing a single-ply roofing system requires extensive product knowledge. Currently, there are about 90 single-ply manufacturers, with most manufacturers having more than one product and each product having more than one method of installation. As a result, about 400 single-ply systems are presently available. And, many manufacturers have changed their products or their installation procedures within the last few years.

Single-ply categories

Single-ply roofing systems are generally divided into three categories: thermoplastic, thermoset and modified bitumen. These categories are subdivided by chemical composition.

Thermoplastic materials are generally available in sheets, either with or without reinforcement. The materials are formed from these chemical compositions: polyvinyl chloride (PVC), chlorinated polyethylene (CPE) and ethylene-copolymerbitumen (ECB).

Field seams are formed by either a solvent or a heat-welding operation.

Thermoset materials are available in both sheet and liquid form. The sheet materials are formed from these chemical compositions: butyl; chlorosulfonated polyethylene (Hypalon); ethylene propylene diene monomer (EPDM); polychloroprene (Neoprene); polyisobutylene (PIB); and polyvinyl fluoride (Tedlar).

There are about 90 single-ply manufacturers having more than one product and method of installation.

The liquid-applied thermoset materials are classified as either permeable or impermeable. The permeable materials allow more gas vapor migration than the impermeable. The liquid materials are formed from these chemical compositions: silicone, urethane, acrylic, butyl, polychloroprene (Neoprene), chlorosulfonated polyethylene (Hypalon) or a combination. Field seams are generally formed with a moisture-curing adhesive.

A modified bitumen is a blend of asphalt and rubber molecules. The modified bitumen roofing sheets are available both as carrying sheets and reinforced sheets. The sheets are installed with asphalt or by torch.

Now or later

Three types of general repairs are: emergency, temporary and permanent repairs. Emergency repairs relieve an immediate problem. These repairs are made without concern for what is right or wrong or for how long the repairs will be effective. An

emergency repair has only one purpose: to stop the water entering the building at the time the repair is made.

Temporary repairs extend the life of a roofing system for a few years. Such repairs are made when time is needed to either request funds for permanent repairs or roofing system replacement, or to decide on appropriate corrective action.

Permanent repairs are intended to remain effective for the roofing system's expected life. The repair techniques discussed later will be permanent repairs.

Before making permanent membrane repairs, determine whether the cost of the repairs can be justified. Questions to be considered are:

- **How old is the roofing system?** If the roofing system has nearly reached its expected life, money would probably be better spent in replacing it. If the roofing system has been in place for a short time, the benefits derived from repair expenditures should be realized over the roof's remaining life. At this time, the expected lives of single-ply roofs are, for the most part, unknown. With continued use, however, a better understanding of single-plies' life expectancy will develop.

- **Is the membrane in good condition?** If the membrane has been neglected by maintenance personnel, severely damaged by traffic, exposed to solvent spills, or severely damaged by environmental or weather conditions, then permanent, point-of-leakage repairs will help.

- **Is the insulation dry?** If a leak has existed for a long time and the roofing has a vapor barrier or a monolithic concrete substrate, a great deal of water has probably accumulated in a large portion of the roofing system. It is probably better to remove and replace the roofing system to prevent roofing insulation deterioration and energy money loss.

Before making permanent repairs, determine whether the cost of the repairs can be justified.

- **How many leaks are there, and how much water has entered the roofing system?** If the number of leaks and the amount of water entry is small, permanent repairs will probably be a cost benefit. Wet insulation should be removed and replaced with new insulation to provide energy savings and to prevent substrate deterioration.

- **Is the structural substrate deteriorated?** Caution is required in evaluating steel deck deterioration caused by roof leaks. Because the deck rusts down from the top surface, the deck can look good from below but, in fact, have no reserve strength. If the substrate is seriously deteriorated, roofing repairs without substrate replacement are pointless and dangerous.

Repairing only the symptom could result in further roof leaks.

Answering these questions helps determine whether permanent repairs are the best course of action. If permanent repairs are not justified, less costly temporary repairs may provide owners with a short respite from leakage while they evaluate alternative solutions to their problems and request funds for roofing replacement.

Preparation

Once it is determined that permanent repairs are required, it is necessary to identify the cause of the leaks, the type and manufacturer of the roofing components, and possible contingency actions.

In determining the cause of leakage problems, do not mistake a symptom for the actual cause. Repairing only the symptom could result in further roof leaks. Finding answers to the following questions can help determine the cause:

- How old is the roofing system?
- Has the roofing system been properly installed?
- When did the leakage begin?
- How many leaks are there?
- Is the number of leaks increasing?
- What is the path of water entry?
- What is at the source of water entry?
- Is the roofing system maintained?
- Have remedial repair attempts been made and have they been effective?
- Is leakage dependent upon storm direction?

In order to select the proper repair materials and repair procedures, know both the type of materials and their manufacturers. Contract specifications and drawings, construction correspondence and guarantees can provide this information. If such documentation is not available, laboratory analysis may determine the material.

Once the material and manufacturer are identified, the manufacturer can be contacted for recommended remedial materials and procedures.

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Single-ply repairs

continued

Because the contractor conducting the remedial action is putting the company's reputation on the line, he or she should be more conservative than the manufacturer's recommendations.

With remedial work, be prepared for the unexpected. Plan contingency action for everything that might be found wrong. Answering the following questions can help establish such actions:

- Is a vapor retarder in place?
- Is the deck deteriorated?
- What type of insulation is installed?
- Is there more than one water entry source contributing to a single entry point into the building?

Remedial repair can be implemented after collecting this information: the source of leakage, the leak's cause, and the required remedial materials. Establish conservative repair procedures and expect the unexpected.

Ballasted PVC repairs

These repair techniques are guidelines. Membrane manufacturers should be contacted for specific repair procedures. Before discussing specific repair methods, two points need emphasis:

- Use extreme caution in removing ballast from the repair area. Careless ballast removal can cause more leaks. The use of a stiff bristle broom to remove ballast is the safest method, although the most difficult.
- If the membrane is older than five to seven years, patches can be more effectively installed on the bottom surface of the membrane.

The following procedure is recommended for repairing punctures in a ballasted PVC membrane:

1. Remove ballast from area around the puncture.
2. Remove a circular section of the membrane from around the puncture.
3. Prepare both the membrane surface receiving the patch and the patch surface contacting the membrane as follows:
   a. solvent-wash surfaces to be mated.

With remedial work, be prepared for the unexpected. Plan contingency actions for everything that might be found wrong.

   b. apply a full and uniform application of primer to both surfaces; let dry.
   c. apply a full and uniform application of adhesive to both surfaces.
4. Immediately install patch, bringing the mating surfaces into intimate contact with pressure from a steel roller. The patch should lap the membrane 6 inches, minimum.
5. Install an edge sealant along the patch perimeter.
6. Re-install ballast.

The following procedure is recommended for repairing bond failure between a PVC membrane and a factory-coated metal:

1. Remove ballast from area.
2. Inspect the metal for either damaged factory coating or deteriorated metal. If either is found, remove the sheet metal and replace with new factory-coated metal.
3. Remove and discard the membrane over and along the metal.
4. Round all membrane corner cuts.
5. Install new membrane as earlier described.
6. Re-install ballast.

PVC most frequently hardens or cracks when installed over a coal tar pitch roof or when exposed to chemicals, causing plasticizer migration. The following procedure is recommended for repairing hardened and cracked PVC:

If the affected area is along a break in the vapor seal over a coal tar pitch roof:

1. Remove ballast from area.
2. Remove deteriorated membrane and round all corner cuts.
3. Patch vapor seal using appropriate vapor seal barrier and adhesive.
4. Install a patch as described for puncture repairs.
5. Re-install ballast.

At an area exposed to chemical spills:

1. Remove ballast.
2. Remove deteriorated membrane and round all corner cuts.
3. Install a patch as described for puncture repairs.
4. Re-install ballast.

Ballasted EPDM techniques

These repair techniques are guidelines. The manufacturer of a specific system or material should be contacted for specific repair procedures.

The ballast should be carefully removed from the repair area so that more leaks will not be made than were contracted to repair.

The following procedure is recommended for repairing ballasted-EPDM membrane punctures:

1. Remove ballast from area around puncture.
2. Remove a circular section of the membrane from around puncture.
3. Wash matching surfaces of both the membrane and the patch with white gas or manufacturer's cleaning agent.
4. Prime washed surfaces.

5. Apply lap adhesive in a full and uniform application to mating surfaces.
6. When the adhesive has dried (it won't stick to a clean, dry finger), install the patch. The patch should lap the membrane 6 inches, minimum. Bring the surfaces into intimate contact with pressure from a steel roller.
7. Apply an edge sealant along the perimeter of the patch.
8. Re-install ballast.

The following procedure is recommended in repairing lap failures in ballasted EPDM membranes:

1. Remove ballast from the length of the lap failure.
2. Remove areas of formerly bonded surfaces, both upper and lower sheets. Round all corner cuts.
3. Repeat puncture patch steps.
4. Re-install ballast.

As single-ply use increases, more technical information will become available.

Oil can reduce the life of an EPDM membrane. Areas of the membrane exposed to oil should be removed (rounding corner cuts) and patched as described earlier for punctures.

Constants

Presently, there is little information regarding single-ply membrane performance criteria, design criteria or repair techniques. As single-ply system use increases, more technical information will become available.

Although the advent of new technical information may change design, installation and repair practices, the repair basics probably will not change dramatically.

In order to permanently repair a single-ply membrane, the basic suggestions I have outlined will always be valid.

BUR maintenance: what every owner should know

by B. Jack Williams, Twin City Roofing, Inc.

The starting point in any maintenance or repair procedure is understanding the problem. Thousands of hours and millions of dollars are wasted each year because of failure to recognize this.

Roofs are coated that don't need recoating; flashings are replaced right alongside the hidden roof split that is the real problem; and roofs are replaced when windows are the actual source of the leaks.

Repair or replace?

To find the actual leak source, a roofing contractor should examine the entire building. Three questions need to be answered:

- What is the problem?
- What caused the problem?
- What is the solution to the problem?

This process is greatly simplified when the roofing contractor has access to building plans, specifications and building inspection logs, allowing him to trace the history of the building and the roof. Once the contractor has answered the three questions, he should have solutions to the roofing problems that make good economic sense.

Maintenance repairs are those required by performing roof systems for prolonged life. Some roofs require replacement and any attempt to prolong life is probably economically disastrous. The cost of maintenance repairs should always be weighed against the cost of replacement, the anticipated added life and risk factors.

The economic factors can be weighed by comparing the cost of repairs and the expected life of the repaired system to the cost of replacement and the expected life of the new system.

If the owner spends $2,000 for repairs that will add five years to the roof's life, the cost per year is $400. If he replaces the roof for $10,000 and gets a 20-year guarantee on the new membrane, the cost per year is $500. It may make sense to repair this roof, but is saving $100 per year worth the risk factor?

Owners should always be aware that the replacement cost generally includes upgrading the roof system—adding insulation, for example. These costs as well as interest costs, which can be factored, should be a part of the total economic picture.

What the owner can do

Repairs generally require the services of a professional roofing contractor. While owners can perform these procedures, they must be knowledgeable or they may make the problems worse.

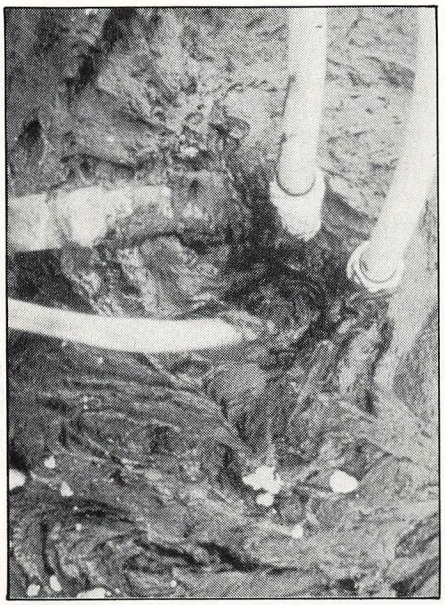
Maintenance procedures, on the other hand, can and should be performed by owners. These procedures involve periodic inspection and housekeeping such as roof drain cleaning and debris removal. Personnel should be told that heavy foot traffic may damage the roof. A good starting point for a program is a tour of the roof with the contractor who can point out vulnerable areas and items needing attention.

Drain bells (strainers) should be removed and cleaned during each inspection. Debris from the strainers should be taken off the roof. If the owner leaves bell debris on the roof, it will be swept back into the drains during the next rain.

All drains should have bells intact and in place. Obstructions such as tennis balls can find their way to the roof automatically, eventually plugging a drain without a strainer. Plugged drains can lead to back-up leakage and possible building collapse.

The weight-bearing capacity of a roof should be considered in heavy snowfall areas. Before removing snow, the owner should know the design loading numbers for the areas and record them in a roof log.

Owners can estimate the snow's



Poor penetration flashing can be a major cause of leaks.

weight by removing and weighing a portion. With this knowledge they can gauge the depth at which the snow load becomes dangerous.

Snow removal always presents a possibility of roof damage by shovels or workcrews because the roof will be cold and brittle. The owner should remove snow only when necessary; snow provides insulation and reduces thermal shock.

If the owner must remove snow, he shouldn't clean all the snow from the surface. Approximately 3 to 6 inches should remain to cushion the membrane.

The owner should log all trips to the roof. One of the keys to roof longevity is the key to the roof hatch padlock! By knowing who has been on the roof, the owner will have some idea of who is responsible for roof problems.

Television installers love to screw their little antenna standoffs through the roof. With wind, these wiggle and jiggle until they open up a hole that lets water in. If there is a vapor retarder, the leakage may not show up until huge areas of insulation have been ruined.

Use test results cautiously

If an owner is using infrared or nuclear scans to monitor roof performance, he should log the test results. The first scan should be done shortly after the roof is installed to provide a data base. Consequent scans, performed every two years, can provide a track record of roof performance, pinpoint problems as they occur and eliminate major repair expense.

An owner should not rely on aerial infrared to compare his building to his neighbor's. The density of one roof insulation may be different; the denser the system, the longer the heat retention. A concrete deck system, for example, will retain heat longer than a steel deck. A fly-over infrared reading might lead the owner to believe his building's insulation is not performing as well as the building's next door, when in fact, his system is retaining heat and giving false information.

Generally, the better the insulation/deck system, the longer heat will be retained. Thus, a "better" system might show up worse in aerial infrared, since solar heat build-up is retained longer.

In my opinion, infrared or nuclear non-destructive testing does not replace a trained observer and visual inspection. I have observed enormous discrepancies between an infrared scan and visual inspection. I noted a 50-foot split with water oozing from the gap; infrared missed it.

Nuclear readings are subject to misinterpretation, too. A nuclear scan is done on grids. The further apart the grids are, the more area that can be missed.

While both scanning systems are great tools, these devices need a knowledgeable observer, looking at the roof in the light of day, to be effective. And, the more knowledgeable the observer, the less need there is for the devices.

Nevertheless, nuclear and infrared tests can provide data and remove subjective factors in the inspection.

Just the facts, please

The owner should report leaks to the roofing contractor immediately and observe the weather conditions during the leak and note these circumstances:

- Was the wind blowing? This might help trace a wall or window leak where rain moves sideways.
- How soon after the rain started did the leak occur? Immediate leakage (without a vapor retarder) might indicate a split, puncture or flashing problem. A leak that takes a long time to develop might indicate a vapor retarder or drainage problem.
- How long after the rain stopped did the leak stop? If it stops immediately, it's probably a flashing problem. If it drips for days, it's a split or puncture and will only stop when the water dries up.

This information will help the repair crew trace the problem to its source quickly and reduce repair costs. Leakage, of course, should be recorded in the roof logs for future reference and comparisons between scans or visual inspections.

One of the keys to roof longevity is the key to the roof hatch padlock.

My advice to owners regarding maintenance procedures is to know their system:

- What's up there?
- What's the deck type?
- Is there a vapor retarder?

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- What are the insulation and R-factors?
- What's the membrane?
- What types of felt and bitumen were used?
- How many plies?

Return on your investment

Knowing the answers to these questions puts the owner three lengths ahead when decisions must be made. But it means the owner must get serious about his roof and realize that he has quite an investment up there. (It's always out of sight and out of mind.)

This investment requires that the owner set up a roof log, record the original installation specifications and plans, monitor roof performance, know who is going up on the roof, and record each inspection and maintenance procedure.

Roofs should be monitored the way owners monitor their checkbooks.

There is an old roofer's tale about a man who bought a $15,000 Cadillac with a 90-day guarantee. He put the car in a garage with a roof that cost him $500 with a 20-year guarantee.

Guess which one he paid more attention to?

Today when roofs cost as much as the Cadillac, they should be monitored the way owners monitor their checkbooks. This provides a tremendous return on their investments.

Owners shouldn't rely on the guarantee! Roofs generally die slowly. If the contractor or manufacturer is legitimate, he's given the owner a guarantee he can live with (risk factor). The roof should last far beyond that guarantee. (Some guarantees run out when the rain runs in!)

Next month in Part II, Williams will discuss actual built-up roof problems, diagnoses and repair techniques.

Bradford, Blue, Van Wagoner on maintenance programs: worth the risk if you know what you're doing

Preventive maintenance programs can be risky business. "There's money to be made—and lost—in such a program," says John Van Wagoner of Prospect Industries, Inc. in McLean, Va. "But after all, the definition of a roofing contractor is a gambler who never gets to shuffle, cut or deal," he adds.

Gaylord Blue, Blue's Roofing Co., San Jose, Calif., John Bradford, Bradford Roofing & Insulation Co., Billings, Mont. and Van Wagoner offer preventive maintenance programs as part of their roofing contracting businesses. These contractors think that a "PM" program, if carefully organized and administered, can be rewarding from both a financial and a public relations standpoint.

"Preventive maintenance is regularly-scheduled inspections and timely corrective actions on problems discovered," Bradford explains. "We're talking about how to manage roofs, rather than be victimized by them."

"You can't start a program and figure it's going to be a sideline," Blue cautions. "If it works, it's going to be very demanding and time-consuming."

Supporting documents

All three contractors emphasize the need for careful recordkeeping.

Bradford offers the following initial questions that need to be answered for developing historical documents for a building: Who was the architect? Who was the general contractor? Who was the roofing contractor? When was construction completed? Where are the original plans and specifications located? What was the design load of the roof structure? What was the specification of the original roof system? What is the specification of the current roof system? What type of roof deck was used? What kind of roof insulation was used and what is the thermal value? Is there a current guarantee on the roof system? What is the history of repairs and reroofing? What is the access to the roof?

"This information is critical to how long your preventive maintenance program will be and what it will cost," Van Wagoner agrees. His preventive maintenance contracts range from one to five years, depending on some of these factors.

Other maintenance program paperwork includes a small-scale roof plan, inspection forms, a calendar of inspection dates, a work order system, surveys, contracts and promotional brochures.

"Probably the most used document in each master file is the small-scale roof plan," Bradford comments. "It's used to indicate the

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location of problems, and is included in reroofing specifications. The drawings should be of a size that can be reproduced on a standard office copying machine."

"You should set up a tickler file of your contracts," Blue advises. "Index each job by month of inspection, and by owner and job name. These files should show the scope of the work and the pre-agreed charges."

Bradford's records are computerized. "We have a program that allows us to identify the point at which additional maintenance is not economically feasible," he reports. At that point, Bradford will recommend reroofing.

Van Wagoner favors inspection and repairs for total control.

Passing inspection

Bradford emphasizes the importance of regular inspections. "You choose the intervals, but your program fails if you miss those dates," he says firmly.

"Most preventive maintenance programs can be classified as annual or biannual," Van Wagoner says. "We have an annual program. But you make this decision based on several factors: type of roof system, environment, number of penetrations, amount of abuse."

Van Wagoner reports that some programs offer inspection service only; the building owner receives a written report that includes the repairs needed, but they are performed by another party. Other contractors

Periodic inspections insure performance

Roof maintenance programs are considered a plus from the insurance standpoint. It makes sense to periodically check roof systems after installation and take preventive steps to correct any circumstances that may lead to roof failure.

Another trade may have worked on the roof to install, relocate or service internal environmental systems; a communications antenna may have required new roof openings; unusually severe storms may have weakened single-ply membrane integrity. These and other factors contribute to failure conditions, an unhappy owner or possibly, a claim for damages.

By correcting defects before additional damage occurs, the overall cost is controlled and your reputation as a professional remains untarnished in the owner's eyes. Even as a purely defensive measure, then, periodic inspection has merit.

Any insurance company will want more than a dollar for every dollar of routine, noncatastrophic loss it investigates, defends and pays for such damage claims. The cost of unusual, unexpectedly large claims will be borne by everyone. The premium cost of the normal, "business-type" loss, which is more or less predictable, will be largely passed on to the installing contractor.

Actually, it is to the contractor's advantage to treat routine losses as business overhead rather than insurance claims. If an insurance company is unable to investigate fault or argue the extent of claimed damages and ultimately does nothing more than draw a settlement check, you are probably better off treating the cost of such a circumstance as overhead.

Before submitting a questionable claim, consult with your own insurance representative. Only he knows the specific circumstances of your insurance protection and the effect of claims on your premium/loss record.

Educating the building owner is another part of the maintenance process. He may think that once the roof is installed, it no longer needs attention. The owner feels secure with the long-term warranty in his hand. Closer warranty examination usually reveals a list of practical, necessary limitations.

Every owner realizes that when he buys a car, he must take certain steps at stated intervals to keep his warranty valid. That thought process can be logically applied to a new roof, considering weather's ravages. It is very much to the owner's advantage to learn of roof problems early.

Also, early detection makes repair and maintenance possible in a noncritical time frame. You can avoid the risk of opening up a roof under less-than-ideal weather conditions and reduce the chances of water damage to the building or its contents.

Levelling out the workload also keeps your work force safer. Your installers are statistically more likely to be hurt when working under rushed conditions—unusually long hours or marginal weather conditions.

Contractors who are most successful in avoiding injuries a) show real commitment to safety at the chief executive officer level, b) assign ongoing responsibility for the program to single subordinates who report directly to top management, c) allocate costs by project and d) calculate the effects of such injuries.

A confusing subject becomes much clearer when conveyed in terms readily understood—the number of laid squares needed to produce enough profit to cover the cost of a single notable accident. That never fails to get attention, regardless of the numbers involved.

Contractors who undertake roof maintenance programming should be certain their insurance underwriters know about it, because regularly-scheduled inspection of completed work inherently reduces the opportunity for fortuitous loss.

offer repair-only agreements and develop relationships with inspectors so that they are recommended for jobs.

Van Wagoner favors the program that encompasses both inspection and repairs, because the contractor has total control of the situation.

Blue agrees, adding, "The more comprehensive your preventive maintenance program is, the easier it is to sell."

Marketing maintenance

"Give the customer something extra for his money," Blue advises. "We have a roof survey system. We offer the building owner something other people don't—an aerial photo of his building."

"You need a brochure that justifies the need for the program to the owner," Van Wagoner says. "It should explain what your program will and will not cover. It should be mailed to a selective market with which you wish to deal. You don't develop such a program and do a broad-scale mailing to everyone. These programs cost money; they have to be selectively handled."

Bradford brings preventive maintenance down to dollars and sense. "Consider a 40,000-sq.-ft. area that originally cost $2.50 per square foot. The total cost was $100,000. If the roof lasts as long as the architect, the material manufacturer, and the roofing contractor designed it to last—a nominal 20 years—the cost per year would be $5,000.

"However, if no one looked at it for 10 years, then it failed and had to be replaced, the per-year cost would be $10,000. To put it another way, there would be a net loss of use of $50,000 if the roof lasts only one-half as long as it was designed for," he says.

"Preventive maintenance of roofs just has to be the most cost-effective program a building owner can have," he summarizes.

A great potential

"I'm on a hospital board," Bradford says thoughtfully, "and it seems to me that preventive maintenance is the emergency room of roofing contracting. It's the toughest place to make a profit, but you need it for entry into the other areas of the business.

"Most contractors would like to forget maintenance. They would rather reroof. But during the economic downturn, they started looking for any type of client. And really, roofing contractors with maintenance programs are not doing anything more than packaging what they've been doing all along in a different way.

"If you're interested in building an image," Bradford concludes, "this is the way to do it."

Evaluating the evaluators: they're good but not foolproof

by Richard Baxter, Carolina Roofing Service, Inc.

Non-destructive evaluations (NDE) have become sophisticated enough to be effective diagnostic tools. They can evaluate existing roof assemblies or new assemblies immediately following installation and help find moisture infiltration points. Contractors can use non-destructive tests to support roof restoration recommendations to customers, and customers may use the tests to evaluate a contractor's work after completion.

Non-destructive evaluation is here to stay, and roofing contractors should understand its methods. A knowledgeable contractor can effectively use NDEs to his advantage or defend himself against allegations made after non-destructive evaluation of his work.

The most important thing to recognize about any non-destructive test is that it is an indirect indication of roof moisture. None of the available methods directly detects water. Infrared devices measure differences in temperature; nuclear devices measure discharged neutron reflection and capacitance devices measure electrical resistance. The only way to detect water is by destructive testing, either core sample removal or a resistance meter probe. These direct testing methods are the key to verifying non-destructive test results.

As an example, heavy accumulations of surfacing bitumen and aggregate look the same as moisture-damaged insulation to an infrared camera unless roof surface temperatures have been allowed to stabilize over an exceptionally long time. The camera only senses the heat retained by the bitumen or conducted by the insulation. Without destructive verification there is no way to determine which condition is being detected.

Direct testing methods are the key to verifying non-destructive test results.

Infrared cameras are sensitive enough to pick up heat from fluorescent light ballasts attached to the underside of the roof deck or heat transfer from the interior of the facility. Wet insulation, high interior temperatures and ballasted light fixtures will show "hot" on the infrared screen.

In the summer, infrared devices may detect only heat remaining after direct sun load disappears. When using an infrared moisture detector in the warm months, timing is everything. The evaluation must be made before the roof loses its heat to the atmosphere. Dark-surfaced roofs radiate heat faster than light-surfaced roofs, and there may not be enough time in one evening for effective evaluation of a large, dark-colored roof. If the equipment operator is not well-trained, test results may be in error.

Nuclear devices can also misinterpret readings from excessive asphalt and aggregate accumulations. The devices discharge neutrons, which

are reflected by the roof assembly. Meter readings indicate how long it takes for the discharged neutrons to return to the machine.

Normally, in moist roofing the neutron bounces back quickly, giving a high meter reading. The neutron will also return rapidly through excessive accumulations of surfacing bitumen. A destructive test is the only way to verify that moisture is causing the high meter readings.

Capacitance-type moisture detectors may locate moisture trapped in lightweight or poured-in-place concrete decks, held in surface tension on surfacing aggregate or trapped in the roof insulation.

Whatever the capacitance meter manufacturers' sensitivity claims, we have discovered that it is almost impossible to differentiate between moisture indications in decks (or in some cases even the steel deck conductance), surface water beneath surfacing aggregate, and water trapped in the roof insulation.

Usually, if two types of moisture detectors are used in a roof inspection they will back up each other, allowing a much better "guess" of the actual roof insulation condition. Even with two types of detectors, it is still necessary for an inspector to physically verify the detectors' readings.

It should also be recognized that most NDE methods are ineffective on ballasted, uninsulated or protected sheet membrane roofs. Test readings from protected membranes or uninsulated assemblies over lightweight concrete decks will be very difficult to interpret. (NDEs are virtually useless on lightweight assemblies containing EPS when the roofing membrane is attached directly to the lightweight concrete deck.)

The test methods are only marginally effective with polystyrene and foamed glass roof insulations, which take on very little water. The readings will be difficult to evaluate because any moisture present is generally trapped beneath the insulation or at insulation joints.

Even with two types of detectors, it is necessary to physically verify the readings.

Obviously, NDE is not for all roofing assemblies and some methods may be incompatible with certain roofing assemblies. Capacitance meters, for instance, will not provide accurate readings over EPDM membranes. The carbon black in EPDM is conductive enough to produce high meter readings without the presence of moisture.

Most contractors can afford nondestructive test equipment. Except for the infrared camera, the devices are relatively inexpensive. The sales-oriented contractor should be able to establish credibility with cus-

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tomers by putting at least one of these devices to work.

Non-destructive test methods also help the contractor locate water infiltration. This makes the search-and-destroy mission of leak repair on aggregate surfaced built-up roofs much less of a shot in the dark. NDE devices communicate reasonably valid information concerning moisture infiltration to an owner. This helps him evaluate the means and extent of repairs needed. Good information improves a contractor's credibility and makes a sale more likely.

Many owners are now evaluating newly installed roofing assemblies with NDE. Some owners have even specified non-destructive evaluations two to five years after roof completion. If moisture is detected then, the roofing contractor is responsible for correcting the system—including replacement of moisture damaged insulation.

Any contractor who works under these criteria won't be much of a long-term factor in the local roofing market. A contractor can't control everything that can happen to a roof in two to five years. Too many of those things will allow water into the roofing assembly.

Most roofing contractors will agree to a competently conducted moisture survey immediately after roof completion. It can provide him with a clean bill of health or allow him to make spot assembly corrections in the roofing assembly should they be required. For contractors, the key is the competence of the test device operator and his familiarity with roofing assemblies.

There are many testing firms in the United States that will provide non-destructive roof assembly tests. Sometimes, a technician is sent to the job to obtain raw data. In some cases it may be recorded on videotape, but more commonly, the raw data is assembled later. This is sent to the owner with little or no physical verification performed during or after the tests. This formal presentation of erroneous information may result in very trying conditions for all parties concerned. Unfortunately, in many cases NDE is presented to an owner as fool-proof. This simply is not true.

Most roofing contractors will agree to a competently conducted moisture survey.

So what can the prudent contractor do to insure a fair non-destructive evaluation? The answer is involvement. A contractor should request that a representative of his firm be present during test verification.

The contractor should know what equipment will be used and become familiar with its capabilities and limitations. With this knowledge he can evaluate the tests himself. The contractor should have the right to request physical verification by a method acceptable to him of all testing anomalies or areas of alleged moisture infiltration.

Yes, it takes time. But it's time well spent given the situation's potential for liability and defamation of character. The contractor's representative should question any unlikely results and call attention to questionable decisions.

The owner's testing requirements immediately after completion of work should not be a threat to a competent contractor. Rather, they should be a way to prove to the owner that the contractor has provided a watertight assembly. If the roofing assembly is accepted only after moisture infiltration is not detected, the favorable NDE allows a strong defense in future litigation.

The favorable non-destructive evaluation allows a strong defense in future litigation.

The clean bill of health supported by tests conducted immediately after roof completion will go a long way to prove that the roofing contractor has performed competently. The contractor should not be embarrassed if minor areas of infiltration are detected. Prompt correction will only reinforce the contractor's integrity and demonstrate that he is willing to stand behind his work.

Many owners have discovered, and many more will discover, that non-destructive testing is not a foolproof method. But, as owners become more adept at judging results, we can expect non-destructive evaluation to become more common. NDE is here to stay and every contractor whose work is tested must become familiar with the equipment and procedures used. Contractor involvement during testing, and more important, during the physical verification of the tests, is the key to fair evaluations and accurate results.

Non-destructive test equipment is valuable to the contractor who sells reroofing work. So long as NDE is considered a tool and another means of making a best guess, non-destructive evaluations can benefit the professional roofing contractor.

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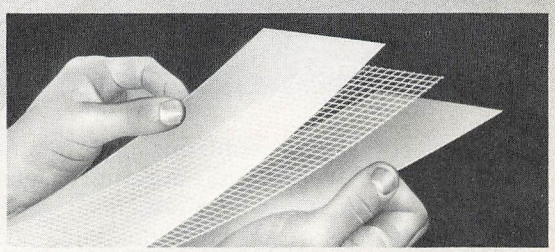

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Consultants examine industry

The way it stacks up: building owners unhappy with contractors' workmanship

A recent survey confirms contractors' worst fears—building owners are having roof problems, and contractors are getting blamed.

The survey was conducted on behalf of Wagner-Hohn-Inglis, Inc. (W-H-I), an international consulting firm in La Crescenta, Calif. Michael Callahan, the company vice president who supervised the survey, said W-H-I, as a consulting firm, is most often involved in building problems. The company commissioned the survey to gain a better perspective of the construction industry. "No one's going to call us up if the job is easy," Callahan said.

According to the vice president, his company was concerned about the management of projects, the designer's ability to design and the reduced significance of the American construction industry abroad. "We were interested in how many things go wrong," he said.

One section of the survey concerned construction problems; leaky roofs were the most common listed by the owners. Over half the respondents said they have had at least some roof problems, and one-fifth said they have had many leaky roofs.

Faulty heating and cooling systems were almost as common, according to the survey, but 20 percent or fewer of the owners experienced any other problems.

According to 42 percent of the owners with leaky roofs, the contractor's poor workmanship caused the problem. Only 20 percent find fault with the roof design and 9 percent blame the materials.

In contrast, 16 percent of the owners with HVAC problems blame the workmanship while 56 percent blame the design.

The survey also revealed a pattern of litigation among owners. Those with roofing problems are most likely to go to court, with owners who know what's causing the leak going to court slightly less than owners in the dark.

"There is no question that owners are upset over their buildings—with the way they are put together, the way they hold together or the time and cost the buildings require," H. Murray Hohns, president of W-H-I said.

Unfortunately, this is not the opinion of an unimportant minority, the survey states. The polling company, the Opinion Research Division of Fleishman-Hillard, Inc., talked to a representative sample of 448 owners culled from *Building Design and Construction* magazine and *Construction News and Report*. Callahan said the company went back five years in the publications and saw who was building repeatedly. Almost two-thirds of the respondents built six or more buildings in the last five years and most had contracted for work worth at least $10 million.

Owners chosen were sent an introductory letter and then polled by phone. A transcript of the interview was sent to the respondents so they could check their answers. According to the survey, the findings reflect with an accuracy of plus or minus 5 percent the opinions of all owners who have had major projects built in the last three years.

Almost 90 percent of the owners first contacted by mail were interviewed. This high response is an indication of owner concern, according to Callahan. "I have heard that owners were interested in responding and interested in participating because they haven't had their views sought, and they're the ultimate consumers," he said.

W-H-I may not be ready to take the owner's opinions as gospel, however. "On some of the findings, the owners were just wrong," Callahan said. Most notably, Hohns and Callahan believe that poor workmanship among roofing contractors isn't as widespread as the owners think. "It has been our experience that the real problems are with the design team and the construction management rather than with the labor or the quality of the materials," said Hohns, a former roofing contractor.

Callahan believes the owner's opinions may reflect what they hear from the designers. The owners tend to trust the designer's word because of their close working relationship, he said. The contractor is an unknown who just does the job and leaves, making him an easy scapegoat.

Owner involvement may be the answer to this unfair situation. "The owner who cares will ask the designer 'Why did you pick that system for me?'" Callahan said. Concerned owners will also go and examine the selected roofing in use on other buildings to see if it is a familiar and workable system, he added.

Roofing contractors should be involved at the early stages as well, according to Callahan. It's important for the roofing contractor to negotiate directly with the owner, convincing him the roofing contractor shouldn't be just a low bid in the GC's proposal.

Other questions on the survey concerned the owners' opinions of architects and contractors. Two thirds of the owners use competitive low bids to select contractors, according to the survey. Three-quarters of the owners do not believe accepting the lowest bid results in inferior work.

W-H-I is sharing its survey results so that the U.S. construction industry will better understand owners' feelings. Survey results and articles about the survey have appeared in *Construction Specifier*, the *Washington Post* and *Chicago Tribune* as well as other publications. A general news release was also prepared and distrubuted by Fleishman-Hillard.

By sharing the information, W-H-I is also receiving valuable feedback from contractors, architects and owners. The company is finding out new questions to ask and better ways to ask current survey questions.

W-H-I is planning a follow-up survey with questions added and some questions revised. The new survey will not only fine-tune the survey results but also gauge the change in owners' opinions, Callahan said.

"It is unfortunate that more owners don't enter a construction project anticipating problems with their buildings," Hohns said, summing up the survey. "The owner sets the whole tone of the project. It's up to the owner to demand and find a professional design team and to insist on modern project management and scheduling techniques."

"Do you have problems with:"

	Many	Some	Few
Leaky roofs in your building?	21%	38	38
Heating or cooling systems?	14%	43	40
Elevators?	6%	21	70
Poured concrete?	2%	22	73
Electrical work?	2%	19	77
Plumbing?	1%	17	79
Masonry?	1%	15	80
Lighting systems?	1%	10	85
Structural steel work?	0%	4	93

"Are the problems generally related to the quality of workmanship, materials used, or the design of the building?"*

	Quality of Workmanship	Materials Used	Design of Building	Don't Know
Leaky roofs	42%	9	20	29
Heating or cooling systems	16%	9	56	19
Elevators	36%	29	14	20
Poured concrete	60%	15	11	14
Electrical work	35%	14	35	15
Plumbing	51%	11	26	11
Masonry	54%	12	18	16

**Asked only of owners with many or some problems with each specific area.*

It's up to the owner to demand and find a professional design team.

Developing a roof maintenance program: legal and practical considerations

by Sidney R. Barrett, Jr.

This article was prepared for *Roofing Spec* by the law firm of Hendrick, Spanos & Phillips in Atlanta, Ga. It presents information and legal matters of general concern to contractors. The text is necessarily generalized, and you are advised to consult legal counsel before taking any action.

Given the expense of new roofing and reroofing, building owners are turning to regularly scheduled maintenance programs to protect their investments, extend roof life and avoid potentially costly leaks. As a result, roofing contractors have developed and marketed a new service—the roof maintenance program.

The roof maintenance program is usually a contract between the roofing contractor and the owner. The precise program terms will govern the contractor's and owner's rights and obligations. It is important that the roof maintenance program be carefully designed to provide practical limits on the contractor's legal liability, while fulfilling its function of providing a valuable service to the owner.

What is a roof maintenance program?

There is no standard format for a roof maintenance program. It should be drafted to balance the owner's objectives and the roofing contractor's services and risks. The more extensive and open-ended the roof maintenance program is, the greater the risk the contractor assumes. A properly drafted roof maintenance program can be a source of security to the owner, a profitable enterprise for the contractor and an effective marketing tool.

It is important that the program provide limits on the contractor's liability, while providing a service to the owner.

The roofing contractor's duties and obligations in a roof maintenance contract may be similar to obligations commonly included in roofing guarantees (e.g., repairing leaks resulting from defective installation). Or, they may be more extensive than those found in a typical guarantee (e.g., cleaning debris from drains and gutters, periodic inspections, flashing repairs).

While the terms and conditions included in roof maintenance programs can vary considerably, they generally have some common characteristics:

- The roof maintenance program is a service contract between the contractor and the owner for a specified period.
- The contract price may be paid in a lump sum or through installments but is typically budgeted for a particular roof after inspection by the contractor.
- The contractor will conduct periodic roof inspections and perform the certain repairs and routine maintenance that may be necessary during the contract period. The contractor may also prepare estimates or specifications for work not within the scope of the program.
- The owner must promptly notify the contractor of any roof leaks or alterations.

A contractor's decision to offer a roof maintenance program on a particular roof should be made only after a thorough inspection; a review of the owner's construction, maintenance and repair records; and a conference with the prospective client to evaluate his needs. After inspecting the roof, the contractor may need to compile a list of corrections or repairs that must be performed before the roof maintenance program's effective date.

One feature that sets the roof maintenance program apart from the typical roof guarantee is that it may be available for a roof installed by another contractor. The contractor who offers his roof maintenance program for such roofs lacks the detailed knowledge of the roof and its possible defects. However, some contractors believe that the benefits in attracting new clients are worth the added risk.

Designing the roof maintenance program

The key feature of a roof maintenance program, and perhaps its most attractive asset, is that it can be custom-made for each roof and each customer. The contractor can tailor his program to suit the customer's individual desires, the type of roof system, the environment and the contractor's own practices.

Designing an individual roof maintenance program is similar to underwriting an insurance policy. By agreeing to perform certain repairs or maintenance, the contractor is assuming the risk that repair expenses will turn out to be less than the contract price.

The contractor is assuming that repair expenses will be less than the contract price.

His ability to turn the roof maintenance program into a profit-making venture will depend on the weather, type of roof system, installation quality and other factors that can affect roof performance during the contract period.

Like other contracts, the roofing contractor's potential liability will be determined by the obligations in the contract, the prescribed conditions that trigger an obligation to perform work, the degree of skill and care exhibited in performing the work and any limitations on liability included in the contract.

Selecting the roof

One of the most important liability decisions the contractor will make will be on the kinds of roofs eligible for the roof maintenance program. The danger here is, of course, that the contractor will accept a roof that has or will develop serious problems, requiring extensive repairs. The contractor may be obligated to perform the repairs at his own expense under the program's terms.

For example, based upon a visual inspection performed relatively early in the roof's life, the roof's membrane may appear sound, but its underlying substrate has been affected by cracks, movement or moisture retention. Such a roof may develop severe leaks. The repairs needed to correct the leaks could result in substantial expenditures for the contractor who provided an extensive maintenance program on that roof, unless the contract excluded underlying conditions not apparent on visual inspection.

The best solution to the problem is to avoid issuing a roof maintenance contract on such a roof.

The contractor should develop a procedure to weed out roofs that pose a poor risk under the roof maintenance program. He may elect to offer his roof maintenance program only for roofs he has installed. In this case, the contractor will have a great deal more information about the roof and a much better idea of its potential for trouble.

Roofing contractors who offer their maintenance programs for systems installed by others are at a comparative disadvantage; they lack the detailed knowledge of the roof's original application.

This problem might be countered by requiring a thorough inspection, at the owner's expense, prior to deciding whether to offer a roof maintenance program. The contractor would then identify the repairs that should be made before the effective date of the roof maintenance program.

Such an arrangement could require that the owner perform, at his expense, the necessary repairs before the roof maintenance program goes into effect.

In addition, a contractor should obtain from the owner information on the roof and deck design, the original roofing specifications, the date the original roof was installed and by whom, and the history of the roof (e.g., leaks, repairs and maintenance). This information may prove invaluable in spotting the problem roof at the outset.

There comes a time when replacement, rather than continued repair, is needed.

Defining the scope of the contractor's obligations

The heart of the roof maintenance program and its value to the owner lies in the owner paying a set fee to the contractor and then calling on the contractor to perform the work prescribed in the contract at no additional cost. A prudent contractor will, of course, not agree to make all repairs regardless of cause. Also, at some point in every roof's life there comes a time when replacement, rather than continued repair, is needed. The roofing contractor must choose the repair obligations that he will and will not assume and clearly define these obligations in the agreement.

The scope of the roof maintenance program can be quite limited. For example, the contractor can agree to make only periodic inspections of the roof, advise the owner on repairs

continued on following page

and submit estimates for performing them. Or, the program can be quite extensive. The contractor may agree to maintain the building in a watertight condition for an extended period without excluding any conditions that could cause leaks.

The key is to strike the right balance so that the contractor has a satisfied customer and a profitable enterprise. A contractor could cover the same points typically excluded in conventional roofing guarantees (e.g., leaks due to vandalism, acts of God, defective design or subsequent roof alterations without notice). Repairs due to these causes might be covered by the owner's own insurance policies.

Because it may be to the owner's advantage to have the roofing contractor make repairs caused by these excluded conditions as well, the roof maintenance contract could state that the contractor would make these repairs at his cost plus a fixed percentage for overhead and profit.

From a practical standpoint, remember that a roof maintenance program that contains many broad exclusions provides less protection for the owner; it will be less attractive and will probably command a lower price in the market.

Where certain repairs have been excluded from the roof maintenance program, the contractor may find it profitable to provide estimates for such work as extras under the contract.

This type of service is particularly valuable to the owner when emergency work is needed, such as repairing damage resulting from unusual weather. Of course, if the contractor does not wish to obligate himself to perform this work, he should make it clear that the estimates are not binding without both parties' express agreement.

Other legal considerations

The roofing contractor who markets a roof maintenance program has promised to perform certain maintenance and repair work for the owner. The contractor may, of course, be liable for damages sustained by the owner resulting from the contractor's failure to honor his contractual obligations.

For example, if the roof maintenance program requires the contractor to make emergency repairs within 48 hours of receiving notice from the owner, failure to respond within that time would be a breach of contract. In this situation, the owner may be entitled to recover the costs of hiring another roofing contractor to repair the leak, together with any damage to the building, its interior furnishings and contents resulting from the delay.

The contractor may be willing and able to assume the risk of incidental or consequential damages. Generally, roof guarantees offered by contractors and manufacturers contain provisions excluding consequential and incidental damage liablity.

The contractor may be willing to assume incidental damages.

Incidental or consequential damages resulting from a leak in the roof over an ice skating rink are one thing. Damage from a roof leak over a computer facility could be a more serious problem.

If the contractor is unwilling to accept such a risk, then he should consider disclaiming his liability for incidental and consequential damages in the contract.

Another potential problem in drafting the contract is a major roof failure, requiring substantial repairs or total replacement. Most roof maintenance programs include a relatively limited obligation to make repairs and are not meant to be an insurance policy requiring the contractor to replace a roof that fails during the program. It is important that the roof maintenance contract makes it clear that reroofing is not contemplated.

There are several ways the contractor can guard against liability for a major roof failure. One way is to exercise great care in selecting the roof for which a roof maintenance program will be offered.

Another method might be to make a roof maintenance program renewable on a periodic basis, such as one or two years, at the contractor's option. This method allows the contractor to inspect the roof and estimate the repair work needed during the next contract period and re-adjust the contract price accordingly.

If the roof appears to be deteriorating rapidly, the contractor can simply not renew the roof maintenance program.

It is also possible to include a termination clause permitting the contractor to end the contract if the roof system requires replacement.

Any of these means, alone or in combination, could be used to prevent the contractor from assuming responsibility for a major failure if that responsibility is not within the intended scope of his obligations.

In promising to maintain and protect the owner's investment in his roof system, the contractor must be careful not to assume unreasonable risks for insuring the future performance of the roof and must tailor the roof maintenance program contract accordingly.

When thoughtfully designed and adapted to meet the needs of each customer, a roof maintenance program can be a valuable service to a building owner. The maintenance program can also help the contractor attract new clients and strengthen relationships with existing customers.

COMMENT

Some people believe that the strength of an association lies in the homogeneity of the group. Members have the same backgrounds, the same businesses, the same interests and goals. These people also believe they have existed in previous centuries as various forms of plant life.

The real strength of an association lies in the diversity of member attitudes. This diversity provides a check-and-balance system for some of the more innovative association programs.

The NRCA's public relations/centennial program is a case in point. On the eve of the Association's 100th birthday, members have been asked to cough up $340 each to fund an image-building campaign that will tell home and building owners to "Insist on a professional roofing contractor." Many members wholeheartedly support this effort, but legitimate questions such as these have been raised by those who are uncertain about what such a promotional campaign would accomplish.

This program is telling people roofing contractors are professionals. I know some members who aren't. Why should I encourage the public to deal with these contractors?

The "Insist on a professional" program does not encourage home and building owners to deal with NRCA members. It encourages them to look for and work with reputable roofing contractors. The program's intent is to increase the public's awareness of what makes a good roofing contractor.

The pros in this field should be delighted; they are the ones who are going to shine under such close scrutiny. Those contractors with more questionable operations may have to clean up their acts to withstand the astute consumer's examination. As my father always said, you can lead a horse to water, but he won't drink it if it's covered with scum.

How is the public supposed to know what a "professional roofing contractor" is, anyway?

NRCA has developed materials for home and building owners that describe the professional roofing contractor's attributes in detail, such as commitments to safety, education, quality materials, fair guarantees and service after the sale.

You're asking us to pay for this, but the non-members get the same benefits from a national public relations campaign. Why shouldn't I just put this money into my advertising budget, instead of giving my competitors a leg up?

There is no way to reserve the positive results of such a campaign for members only. Roofing contractors are certainly familiar with the old tarred-with-the-same-brush phenomenon; this is the more desirable alternative. It is our hope that those non-member contractors who enjoy these benefits will think again about joining an association that offers such services. You should also be aware that non-members will pay more for the materials and services that accompany this program. And, try asking an advertising agency what it can give you for $340. They'll look at you like you're two logs short of a cord.

Well, what can you give me for $340?

We can give you results of a market research study that tells you what home and building owners think about roofing contractors, and how they choose one. We can give you a 100-page marketing manual specifically written for the roofing contractor. We can give you camera-ready artwork for billboards, posters, magazine and newspaper ads, and decals. We can give you a cassette tape with original music for radio spots. We can give you outdoor and airport billboards and a *Wall Street Journal* ad that say "Insist on a professional roofing contractor." We can put your name on a referral list that's sent to people in your area who have called us on a toll-free line, looking for roofing contractors. We can send you brochures to give to your clients that explain what a professional roofing contractor is, and why they should work with one. We can place the NRCA president on national and local radio stations to talk about the importance of a commercial or residential roofing pro and answer phoned-in questions from listeners.

And that's just what we've done so far.

So, hit us with your best shot. If we can't answer your questions, we don't deserve your money. Kinda like the roofing business.

Chris Taylor

Coming Events

July 19–21
Annual Meeting
Alabama Roofing, S/M, Heating & A/C Contractors Association
Calloway Gardens, Ga.

August 2–4
Eighth Annual Convention
Mississippi Roofing Contractors Association
Gatlinburg, Tenn.

August 21–24
Infra-Red Scanning Course
The Infraspection Institute
Burlington, Vt.

August 23–24
Roof Inspection, Diagnosis & Repair
Roofing Industry Educational Institute
Lebanon, N.H.

August 23–26
Summer Convention
SMARCA of Minnesota, Inc.
Brainerd, Minn.

August 23–26
Annual Summer Meeting
New York State S/M, Roofing & A/C Contractors Association
Alexandria Bay, N.Y.

August 27
Design & Specification of Roofing Systems
Roofing Industry Educational Institute
Lebanon, N.H.

August 29–September 1
Convention
Roofing Industry Promotion Fund
Bellaire, Mich.

(For inclusion of events, address all correspondence to:
Roofing Spec "Coming Events"
8600 Bryn Mawr Ave.,
Chicago, Ill. 60631).

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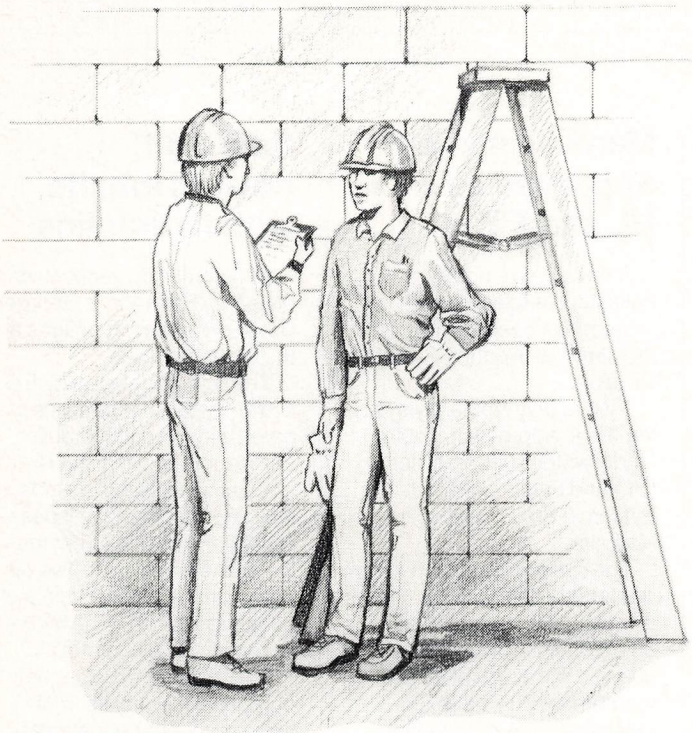
SAFE & SOUND

Sound advice on roofing safety by the members of the National Roofing Contractors Association (NRCA).



Safety Inspectors

At each new work-site, we appoint a roofing mechanic as safety inspector for the job's duration. Every morning before work begins, the inspector checks each crew member for proper clothing, shoes and tools. All equipment is also checked, and the roof is cleared of debris. The inspector records the information in a daily log. Citations are issued for safety violations. With three citations, the crew member has to donate one hour of his or her time to the W.J. Grinder shop, cleaning kettles and working in the yard. Safety inspectors are rewarded with a W.J. Grinder jacket. Because we change inspectors with each job, everyone has an opportunity to earn a jacket.

Jack Jones
W.J. Grinder Roofing Co., Inc.
Rochester, N.Y.

NRCA and the author(s) do not represent or warrant that these safety tips fully comply with the law, insurance company requirements or recommendations or the legal duties owed by employers to their employees and to the public. The NRCA and the author(s) disclaim any responsibility for any injuries to persons or property, or for any violation of applicable laws or regulations which may result in use of, or reliance upon, the information and recommendations contained herein.

New Products, Ideas, & Publications

Digital handbook helps companies pick computers

A free handbook from Digital Equipment Corp. helps choose the right computer for your business.

The *Rainbow™ Handbook* is a 275-page paperback. It outlines the hardware, options and over 700 programs available for Digital's Rainbow 100 and Rainbow 100 + computers. The book also includes a guide to business computer use and information on getting help with your computer selection and purchase.

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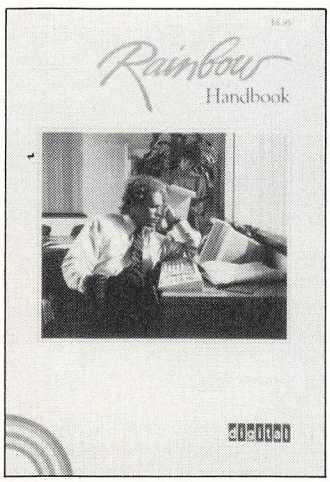


Video shows installation of Otto® system

A 14-minute video has been prepared by OTTO® Fabric, Inc. to explain the OTTO Single-Ply Silicone® Roofing System.

The film covers an installation of the fully-adhered system and features seaming, flashing and parapet wall details.

The OTTO system combines weather-resistant silicone rubber with fiber glass to form an inorganic membrane. The product carries a Class A/B fire rating. The white membrane is adhered with a spray-applied silicone rubber adhesive.

Contact the company to arrange a viewing of the video presentation.

Check #183 on Reader Service Card

Manville system approved by UL and FM

A new fire-retardant, non-ballasted, single-ply roofing system has been introduced by Manville's Roofing Systems Division.

It is the only single-ply system to be approved by both Underwriter's Laboratories (UL) and Factory Mutual System (FM), according to Manville.

The system features two new products, UltraGard SP™, an isocyanurate foam insulation board, and SPM 60 FR™, a 60-mil, fire-retardant EPDM membrane. The self-extinguishing EPDM formulation makes it flame resistant without additional coatings or surfacings.

The system is approved by UL for mechanically-attached or totally-adhered Class A systems applied over noncombustible roof decks. It is also approved by FM for Class 1 service with an I-60 wind-uplift rating for totally-adhered systems and I-60 and I-90 ratings for mechanically-attached systems.

A complete line of roofing cements, sealants and accessories is also available for the system.

More information is available from Manville.

Check #184 on Reader Service Card

R&G unit powers jobsite with hydraulics

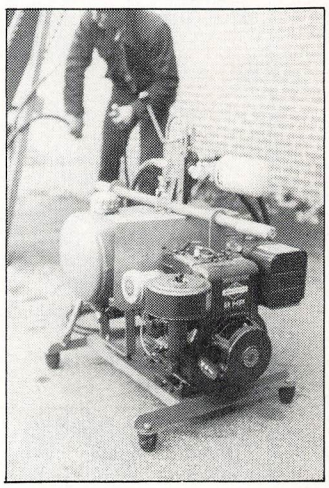
A hydraulic power pack produced by Reimann & Georger Co. serves many functions at the roofing job-site.

The unit, developed by F. C. Brown Research, consists of a gas engine and a hydraulic pump mounted in a steel frame. The unit weighs 110 pounds. Its size and weight make it possible to carry the unit from the job-site to avoid theft. Two oil lines fitted with quick-release couplings transmit the hydraulic power to roofing tools.

The unit can drive asphalt pumps, ladder hoists, roof hoists and other equipment. Brown has produced conversion kits to drive existing equipment hydraulically wherever possible.

More information on the unit and its accessories may be obtained from Reimann & Georger.

Check #185 on Reader Service Card



Novaglass bonds to roof surface without adhesives

Novaglass, a plasticized bituminous roofing product, has been introduced in America by the Guaina Corp.

Novaglass consists of a polyester core impregnated and covered on both sides by modified asphalt and special petrochemicals. The membrane is also available with a fiber glass core.

The product bonds to surfaces without special adhesives or sealants. It can be installed over existing roofs that are clean, dry and free of ballast and debris.

Novaglass rolls are available in six colors as well as an aluminum finish.

Guaina is also distributing a datryl synthetic rubber and plastic scupper designed to go through standard parapet walls. The scupper can be used with most roofing materials and fits a standard cant strip. A datryl rubber strainer for the scupper is also available.

More information, including color brochures describing these products, is available from the manufacturer.

Check #186 on Reader Service Card

Telescopic boom from Sellick handles big jobs

The Maxi-Reach telescopic boom handler introduced by Sellick Equipment complements the company's smaller Teleporter reach machine series. The new machine features a Perkins 4.236 diesel engine, Funk powershift transmission and Rockwell planetary axis.

The Maxi-Reach has a lift capacity of 8,000 pounds, a lift height of 34 feet and a maximum forward reach of 18.6 feet. Frame levelling, self-levelling, mechanical 4-wheel drive and triple-steer mode are standard equipment. Self-lubricating wear pads are incorporated into the boom design.

Contact Sellick Equipment for more information.

Check #187 on Reader Service Card

Goss introduces Ready-Flame single-ply fuser

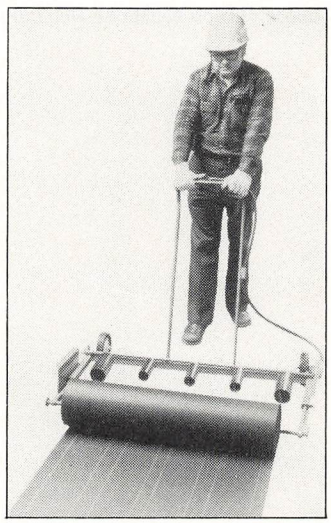
The Ready-Flame Fuser was developed by Goss, Inc. for fast-fusing modified, single-ply membranes.

The five-flame unit with handle controls may be operated by one person. The outer two adjustable burners are larger diameter for improved seam fusing. Windshields on the side of the fuser guard against flame deviation.

The unit uses about 2-1/2 pounds of vapor LP gas per roll of roofing. It weighs 30 pounds and is made of welded steel.

For more information contact Goss.

Check #188 on Reader Service Card



Temple-Eastex details insulation in new bulletin

A new product bulletin describes TemPro SP Roof Insulation, manufactured by Temple-Eastex, Inc.

TemPro SP is a lightweight insulation consisting of a polyisocyanurate foam core bonded between glass-reinforced aluminum foil facers. The product meets all applicable Factory Mutual System (FM) requirements.

The bulletin lists physical properties, uses, advantages, acceptances, storage recommendations and other product data.

A copy of the bulletin may be obtained from Temple-Eastex.

Check #189 on Reader Service Card

Book describes and illustrates roof inspections

A new book by Clarence Heuttenrauch outlines problems commonly found on roof inspections.

The book, "Preparation for a Roof Inspection Report," explains the problems, probable causes and repair procedures. The information is illustrated with 114 photographs.

Also included in the publication are sample inspection reports, membrane and sheet metal specifications, and roofing details.

The book is available from the author in hard cover or loose-leaf binder.

Check #190 on Reader Service Card

Ruftac system is self-adhering and self-sealing

Ruftac®, a modified bitumen roofing system, has been introduced by Phillips Fibers Corp.

The material contains a puncture-resistant surface web of nonwoven polypropylene bonded to a mat of adhesive rubberized asphalt. The system has a 70 percent recovery rate from a 30 percent elongation, according to tests.

Its self-adhering and self-sealing features eliminate the need for torching or hot adhesives. A two-person work crew can install Ruftac two to three times faster than many other systems, according to the manufacturer.

More information on the system is available from Phillips.

Check #191 on Reader Service Card

Gardner offers coatings for mobile homes

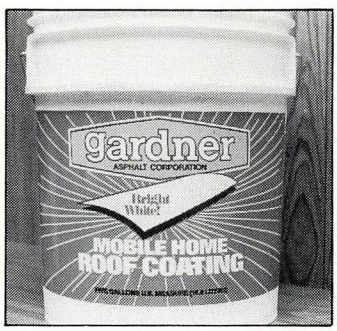
Bright White Mobile Home Roof Coating is a new product introduced by the Gardner Asphalt Corp. Its high reflectance and insulating ability help keep mobile home roofs cool.

The coating is 100 percent acrylic and can be applied on black and galvanized steel, aluminum, asphaltic aluminum coatings, asbestos shingles, stucco and polystyrene panels.

One gallon of the product covers approximately 200 to 300 square feet. It can be applied with a brush, roller or sprayer.

Contact Gardner for more information.

Check #192 on Reader Service Card



BUR promoted in ARMA programs

Two new audio/visual training programs are being offered by the Asphalt Roofing Manufacturers Association (ARMA).

"Built-up Roofing, A System Above the Rest" leads the viewer through the components of the modern built-up system. It highlights research, improvements and new installation techniques and covers new construction, reroofing and maintenance.

"How to Roof With Asphalt Shingles" outlines state-of-the-art techniques for asphalt shingle application. Key topics covered include: deck preparation, drip edges and flashings, and fastener recommendations for nails and pneumatically-driven staples.

The built-up roofing program is available on 77 slides with a written and recorded script. The shingle program is available in either a synchronized sound-slide or a LaBelle Commpak 16 mm format.

Cost and ordering information is available from ARMA.

Check #193 on Reader Service Card

PDL to market thermal barriers

Polymer Development Laboratories, Inc. (PDL) has entered into agreement with Stahl Industries, Inc. to manufacture and market Staytex Thermal Barrier products.

Staytex 4119A was developed for use over rigid polyurethane foam and other materials such as polystyrene, wood or paper products.

The product has model-building-code listing and will protect urethane foam insulation and prevent fire growth during 15 minutes' exposure to a full-scale fire.

The thermal barrier is supplied in 55-gallon drums. Applied at a thickness of 1/16-inch, it is lightweight, hard and washable. It can be applied by any trained, experienced urethane foam contractor.

Further use and application information can be obtained from PDL.

Check #194 on Reader Service Card

Rawl adds longer lengths to fastener line

Rawl has added several longer-length expansion anchors to its line of Rawl-Drive concrete fasteners. The 3/16-inch size starts at a 1-inch length and goes to 4 inches in 1/2-inch increments. Quarter-inch anchors are available from 1-1/2 inches to 8 inches.

The flat-head, one-piece expansion anchors will accommodate greater insulation thicknesses. When driven into the hole, the two halves of the Rawl-Drive are compressed, exerting a force which keeps the anchor in place. The smooth contours of the fastener keep insulation out of the hole when setting the anchor.

Contact Rawl for the name of the nearest stocking distributor.

Check #195 on Reader Service Card

KSI offers one-piece roofs for bay windows

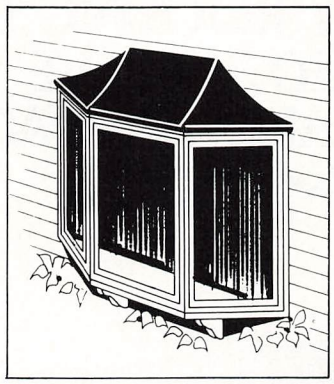
KSI Building Products, Inc. has introduced a line of one-piece molded roofs for a selected group of Andersen® Perma Shield® bay and bow windows. Roofs are not included with the windows or available from Andersen.

The one-piece roofs are made of molded polymer and are designed to allow ample room for insulation. A five-year warranty is offered by the manufacturer.

The roof is particularly useful where there is no overhanging roof protection or where a fascia board-to-soffit overhang is not wanted, according to the manufacturer.

Additional information about the roofs is available from KSI.

Check #196 on Reader Service Card



Polylite foam creates seamless roof systems

Polylite® urethane foam is a field-sprayed resin roofing product manufactured by Reichhold Chemicals, Inc. When covered with a fluid applied membrane (supplied by other manufacturers), it creates a seamless, self-flashing roof system.

Technical information, performance characteristics and flashing details for the product are outlined in a booklet being offered by Reichhold. Suggested specifications for roof systems incorporating Polylite are also included.

Check #197 on Reader Service Card

Classified Ads

Place a classified ad in *Roofing Spec* for 50 cents per word. There is a minimum charge of $20. Boxed or display advertisements are available in the classified section for $40 per inch (one inch minimum). Ads using blind boxes available at no additional charge to NRCA members; non-members add $10 to total order. Send ad copy and payment to: Advertising Manager, *Roofing Spec,* 8600 Bryn Mawr Ave., Chicago, Ill., 60631.

ROOF CORE

Roof Core Sampler "C.R.R.E.L." type 1⅞-in. core. Hardened steel jaws, compact weight less than 6 pounds $135 plus $8 shipping and handling. For details contact Autrey Steel & Machine, P. O. Box 40304, Tucson, Ariz. 85717. Phone 602/623-3444.

ROOFING SUPERINTENDENT

Roofing superintendent for architectural and roofing consulting firm. Minimum 10 years field and technical experience. Ex-rep or retired contractor considered. C.B. Goldsmith & Associates, 13303 U.S. Highway 19 S., Clearwater, Fla. 33546, 813/536-0456.

ROOFING SALESMAN

Southern California Roofing Company, located in Los Angeles County, established 1926, is in need of a roofing salesman thoroughly experienced and successful in commercial, industrial and public works reroofing sales. Only energetic self-starters who are interested in a profitable and successful future through hard work should apply. Please send resume to: Harold R. Provin, C.E.O., Southern California Roofing Co., 9623 Imperial Highway, P. O. Box 158, Downey, Calif. 90241, 213/803-5583.

FOR SALE

Roofing company, booming Houston, Texas. Reputation second to none in the industry. Best personnel and equipment available. Over 20-year flawless track record in all types roofing installation. Specializing in BUR systems. Gross in excess of $2 million with little or no sales effort. Growth potential unlimited. Professional only please reply. Minimum $.5 million to invest will buy lock, stock and barrel. Balance negotiable. Box 5B, Roofing Spec, 8600 W. Bryn Mawr Ave., Chicago, Ill. 60631.

RESIDENTIAL SALESPERSON WANTED

Wish to hire top sales personnel for residential reroofing. Must have experience and willingness to relocate to sunny Arizona. Top compensation plus auto and company benefits provided. Send resumes or call Universal Roofers, P. O. Box 20627, Phoenix, Ariz. 85036.

ROOFING MANAGER

Successful roofing contractor wants to communicate only with the best in the business. Candidates must have a very successful experience in industrial and commercial reroofing sales. Opportunities available on West Coast that are unique and lucrative. Send work history and objectives to Speranza Management Consultants Co., 12 Johns Canyon Road, Rolling Hills, Calif. 90274.

BRANCH MANAGER WANTED

Wish to hire individual as branch manager for large Arizona contractor. Must have roofing and strong business or marketing experience. Applicant must be willing to relocate to sunny Tucson, Ariz. Good salary, incentive comp plan, auto and company benefits. Send resume or call Universal Roofers, P. O. Box 20627, Phoenix, Ariz. 85036.

COMMERCIAL/INDUSTRIAL SALESPERSON WANTED

Wish to hire experienced commercial/industrial reroofing salesman. Applicants must be willing to relocate to sunny Arizona. Good salary, auto and company benefits furnished. Send resumes or call Universal Roofers, P. O. Box 20627, Phoenix, Ariz. 85036.

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HOURLY DAILY WEEKLY MONTHLY RENTALS

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Hydraulic cranes, Aerial bucket trucks, digger derricks—large inventory of used units in stock.

RUNNION EQUIPMENT COMPANY
7950 W. 47th St., Lyons (Chicago), Ill. 60534.
Collect calls accepted: 312/447-3169.

ROOFING CONTRACTORS

Distributor for Duro Last Single Ply Roofing System is seeking experienced roofing contractors throughout the state of Pennsylvania to install an exciting new product. Duro Last is a mechanically-fastened, sheet roofing system that is Factory Mutual-approved and carries a 20-year factory warranty. Unique opportunity to enter into the single-ply market. Robert Roy, R.D. #2, Dushore, Pa. 18614, 717/928-8819.

ROOF VACUUM HOSE FOR SALE

Flexible, lightweight hoses for roof vacuum applications. Hoses are a proven success in the removal of pea gravel from the roof. Hose for vacuum machine to the roof is available in 4-in., 5-in. and 6-in. I.D. x 100-ft. lengths. Styles 180AR, 220RS and 110CL. Whip Hoses 4-in. I.D. x 100-ft. lengths. Styles 180BL or 155Gray. Hose is in stock for immediate delivery. We ship anywhere. For more information and pricing call 414/272-2141. Milwaukee Rubber Products, Inc., 1117 N. Water St., P.O. Box 92896, Milwaukee, Wis. 53202.

ROOF INSULATION

Life cycle economic analysis of thickness based on 26 variables, $400
HP-86/87/9816/9836 or IBM PC
Loyd E. Winer, P.E.
2140 Rolling Hill Drive S.E.
Grand Rapids, Mich. 49506
616/949-5831 or 949-8889

FOR SALE

Seaman Nuclear Roof Moisture Meter—Model R-75. Purchased new 3-16-79. Hardly used. New condition. $2,500 or best offer. Ph: 309/556-3066 or write to: Illinois Wesleyan Univ., Attn: Millard C. Jorgenson, director of Physical Plant, POB. #2900, Bloomington, Ill. 61701.

OPPORTUNITY FOR ROOFING SUPERINTENDENT

Experienced roofing superintendent who is company-minded and able to coordinate and supervise people. Must be able to handle crews and equipment. Requiring 10 years experience with references. Send resume to KLINE ASSOCIATED ROOFING CONTRACTORS, INC., 350 E. First St., Hagerstown, Md. 21740, 301/791-2828.

EXPERIENCED PERSONNEL WANTED

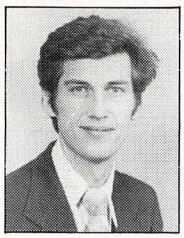
Roofing and waterproofing salesmen/estimators, management positions (previous business owners preferred) and superintendents wanted for growing Florida and Texas commercial roofing and waterproofing company seeking experienced personnel in all phases of commercial and industrial reroofing (hot- and cold-process and single-ply needed). Excellent opportunities for self-motivated individuals. Please send resume and salary requirements to: Mr. Scott, 4420 N.W. 79th Ave., Miami, Fla. 33166.

BUSINESS OPPORTUNITIES

An expanding South Texas roofing company is taking applications for roofing superintendent. Must have successful experience in all types of commercial, residential roofing and reroofing. Send resume, objectives and salary requirements to: P.O. Box 9393, Corpus Christi, Texas 78469.

COMPANIES WANTED

We have cash to buy roofing and sheet metal companies. They would have sales of $1 million and some profit. Will tailor buyout to suit seller. All responses kept confidential. Send replies to Box 7A, Roofing Spec, 8600 W. Bryn Mawr Ave., Chicago, Ill. 60631.



TECH TALK

by Bob LaCosse, CAE, director of Technical Services
and Jeff Lowinski, manager of Technical Services

Members ask about roof maintenance

You asked for it

In keeping with our maintenance theme for this month's *Roofing Spec*, Bob LaCosse and Jeff Lowinski answer some questions frequently asked by our members.

Where can I get information on maintenance, including samples of work orders, inspection sheets and other forms?

The *Manual of Roof Maintenance and Roof Repair*, published by NRCA and the Asphalt Roofing Manufacturers Association (ARMA), contains maintenance information that may help you. An inspection form is included in the *Manual*. It is available through NRCA's service center in the headquarters office. NRCA also has files of individual contractors' forms, which the Association will send out on request.

The NBS study indicates that a resaturant will not save a badly deteriorated roof.

What factual results and experience has the NRCA had with the use of resaturants as an extender of roof life? Is it cost-effective?

The NRCA's Cold-Applied Liquid Systems Committee is now drafting guidelines for cold-applied systems; these guidelines will include the use of resaturants.

The National Bureau of Standards has produced a document on resaturants, based on a study of 14- to 26-year-old roofs. The NBS study indicates that a resaturant will not save a badly deteriorated roof. It may slow down the aging process a little, but the resaturant will not rejuvenate a damaged roof.

Can NRCA develop and publish a comprehensive, sample maintenance program with sample forms and contract documents?

Pat Appelhans, director of Member Services and an attorney, says it is not NRCA's role to draft contract documents for its members to use. NRCA's proper role as a trade association is to give advice and educate members. Contract documents should be prepared by individual members based on the desires, needs and wants of their customers.

Technical activities update

UL: NRCA's Technical Operating Committee and several officers met with Underwriters Laboratories' top brass on April 30. Among the subjects discussed was reformatting UL's building materials and fire resistance directories. The directories will be easier to use in the future, and roofing information will be more accessible. There is even some talk of producing a separate UL directory on roofing assemblies only. UL will have a booth at the 1985 NRCA Convention and has submitted a proposal for a program there on fire performance test methods.

BOCA: NRCA representatives met with the deputy executive director and the technical director of the Building Officials and Code Administrators (BOCA) in April. As a result of the discussion, BOCA and NRCA are cooperating on developing revisions to the Basic National Building Code. NRCA's Building Code Committee will provide input.

Coal tar overruns: The Technical Operating Committee coordinated field tests on coal tar bitumen and coal tar pitch applications in May, addressing the numerous complaints about overruns with these substances. LaCosse reports that the materials were applied by hand-mopping; the Committee may do a second series using spreaders. The Committee will report on its findings.

EPS: The final draft of a report on expanded polystyrene (EPS) roof insulation was circulated to the EPS Steering Committee in May. The Committee is composed of representatives from NRCA, the Midwest Roofing Contractors Association (MRCA) and the Society of the Plastics Industry, Inc. (SPI). The draft still needed some revision; an SPI press conference will be held when the report is ready for release.

How're you gonna keep 'em down on the farm: LaCosse left for Paris the last week in May to attend a meeting sponsored by the International Joint Committee on Single-Layer Roofing. The first such meeting was held in 1983 at NBS in Gaithersburg, Md. In Paris, representatives from 22 countries were scheduled to talk about the possibility of international roofing standards.

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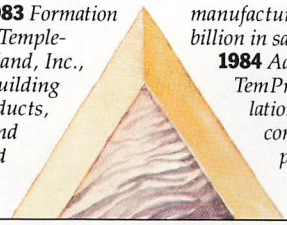
1893 *Formation of the original company by T.L.L. Temple as a forest products supplier in East Texas.*

1958 *Expansion into the manufacturing of fiberboard products after 60 years of steady growth.*

1980 *Opening of Temple-Eastex rigid foam insulation plant in Diboll, Texas.*

1983 *Formation of Temple-Inland, Inc., a building products, pulp and paper, and container manufacturer with $1.2 billion in sales.*



1984 *Addition of TemPro roof insulation to the company's product line.*

ONE LEAK AND YOUR PROFITS COULD GO DOWN THE DRAIN.

If you're called back to repair a roof you installed, you might as well say good-bye to your profits and your customer goodwill. Callbacks are expensive. That's why Firestone makes sure its licensed installers receive all of the materials and expert support they need to assure a profitable, water-tight, long-lasting installation every time. A Firestone roof starts with our own EPDM single-ply membrane, carefully checked throughout the manufacturing process to assure high quality. We provide the training and technical support you need for even the most difficult installations. And once the roof is down, a Firestone Field Technical Representative will inspect the roof to make sure your crew did the job right...so callbacks are minimized.

With membranes as wide as 50 feet, Firestone EPDM roofing goes down fast. It's easy to handle and install, whether it's adhered, ballasted, mechanically anchored or installed with our exclusive FasTrac™ system. Fast installation means more roofing jobs in less time. The bottom line is a lower installed cost for greater profitability on every job.

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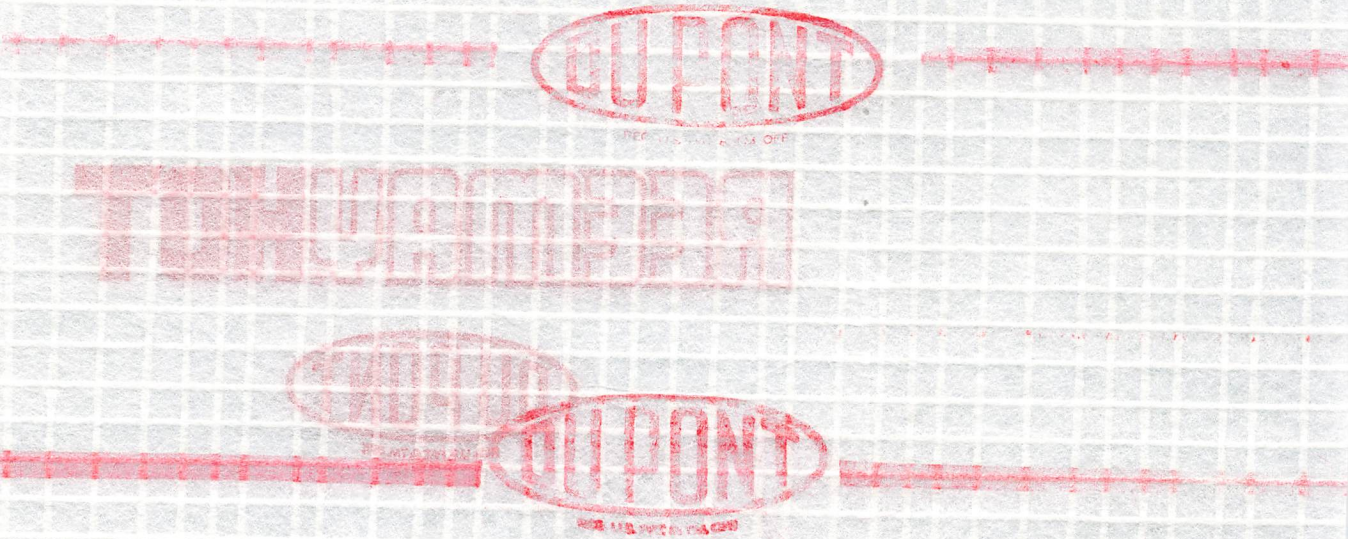
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