



SAABE TIMES

A Publication of the San Antonio Association of Building Engineers

November, 2001

Mark Your Calendar —

“Roof Maintenance and Management Doesn't Cost, It Pays!”

Mr. David Gillian with Cram Roofing Company, Inc. will present a look at how roof maintenance and management really can pay off if approached correctly. Mr. Gillian has been active in the roofing business for 27 years. He has worked as a manufacturer's representative, a project manager and estimator for a roofing contractor and was a practicing partner in an engineering firm specializing in roof consulting.

Cram Roofing Company, Inc. is a 15 year old roofing company specializing in commercial roof replacement, management, maintenance and repair. Cram Roofing's roofing production department and roofing service department services many of San Antonio and South Texas largest building owners and managers.

Please join us on Wednesday, November 21 at the Old San Francisco Steak House for the next SAABE luncheon!

Luncheon Sponsors

We are in the process of setting up next year's luncheon programs, so if you'd like to sponsor a month please let Mike Alvarez know at 210-495-2600. Sponsors can either present their own informational program or sponsor an educational program to be presented by a municipal entity, etc.

Education Corner

by Kenny Aguilar

Classes being offered:

E.P.A Certification “Power Review” and “Speedscore”: Johnson Supply, 1050 Arion Parkway #106, San Antonio, TX 78216. November 15, 2002. Registration at 8:30 am. Power review 9-11am. Exam 11am to 1:30 pm. Test results at 3:30pm. Optional retest at 3:30pm. To prepay and guarantee reservations contact Johnson Supply at 210-495-9675, or register the morning of the exam. Seating limited to 25 participants.

Amcon Controls Inc. 2 day Boiler/Burner Training: Hilton San Antonio Airport, November 5th and 6th, 2001. 8am to 5pm. Presentation is designed around Honeywell Flame Safeguard (FSG) Controls. Cost of course is \$350.00 per person and class size is limited to 20 people. Cost includes all workbooks, textbooks, continental breakfast and lunch. To register call: 210-349-6161 or fax 210-341-0695, email sales@amcon.net

Entech Sales and Service Inc. Centrifugal Chiller Training (Carrier, Trane, York): Class 1 (Trane CVHE and PCV Series) Nov. 5-Nov. 9, 2001. Class 2 (Carrier 19 and 19D Series) Nov. 12-Nov. 16, 2001. 8am to 5pm. 1734 Highway 66, Suite 200, Garland, TX 75040-6723. To register call 972-485-1171 or 888-368-3241. Ask for Robin or Tami.



Employment Opportunity

QVC San Antonio Inc. is seeking a Maintenance Technician. Please send your resume to the Human Resources Dept. c/o Linda Bellah at QVC 9855 Westover Hills Blvd. San Antonio, TX 78251 or fax to (210) 522-4343. If you have any questions, please contact Roger Fraser at (210) 522-4332.

A Message from the President by Elena C. Castillo

Cold Weather – Just Around the Corner

The same natural forces that trigger cold-weather breaks up north can also cause pipes to burst in your own house or place of business down here in the South. Therefore, a plan of action needs to be implemented before cold weather hits. Protect property and equipment, safeguard your building against winter weather, and prevent partial or total business shutdown. Take a few moments to analyze your building's operation and avert costly shutdowns, which can save you time, money and aggravation.

A checklist consisting of plumbing, backup power and heating source information will prepare you and your business for the freezing winter temperatures we could encounter.

Plumbing:

- Water shutoff valves should be identified and tested regularly. If a pipe should freeze or break, any maintenance person or even a security person can locate the proper valve and turn it off before further damage can occur.
- Dry sprinkler systems normally located in parking garages, have low points in the piping, or drip legs, and need draining of accumulated condensation. Insulate these exposed pipes to prevent freezing.
- Concealed spaces and areas above suspended ceilings are also subject to adverse winter conditions, as cold air entering the building may cause sprinkler system freezeups. Check on ceiling heater settings.
- Add insulation or heat tracing to all exposed fire protection piping.
- Turn off and drain outdoor faucets and be sure to disconnect hoses.
- Winterize vacant spaces.
- Keep your thermostat set above 65 degrees when leaving your house or business for several days

If you think a pipe has already frozen:

- Thaw the pipe as soon as possible or call a plumber for help.
- Shut off the water or test the shut-off valve to make sure it works before making repairs.

- Using a blow torch is not appropriate in thawing a frozen pipe, as heating it too fast will break it anyway.

Remember, unexpected freezing temperatures in southern climates often have much more of an impact on fire protection systems because the cold weather is not anticipated and buildings and fire protection equipment are not designed to withstand freezing in these areas.

Backup Power:

- Backup emergency generators will provide emergency lighting for your business, so perform startup tests. Check diesel engines, battery and battery charger, antifreeze level. Fill fuel tank with fresh fuel. Ensure that the block heater is also working properly. Remember, emergency generators should be ready for any emergency, so make sure they are serviced by factory trained technicians to insure proper operation.
- Power surge protection is especially necessary during cold weather, since severe weather can cause power loss and downed wires. Once electricity is restored to a disrupted power supply in your building, the sudden power surge can destroy modern, high-tech equipment such as computers, phone systems, etc. Therefore, turn it off and unplug it, or install surge protectors for protection.

Heating Sources:

A good winter fire protection precaution is to make sure boilers and other heating apparatus are in good working condition. In addition to building heat, make sure that any fire protection water tank heaters maintain a water temperature of at least 42°F. Check water temperature and tank heaters frequently during cold spells.

Keep your building and equipment warm. Heating systems are the lifeline of your business during cold conditions. If they fail, disaster could strike. Immediate action required:

1. **All piping must be insulated.** Install new and replace damaged insulation where necessary.
2. **Inspect all outside dampers** for proper operation.
3. **Clear and protect all outside vents** from ice and debris.
4. **Heat requires power.** If generators are unavailable, make arrangements to obtain non-electrical portable heating devices during outages.

Tio SAABE Asks...

Fire Protection in an Ever Changing World

Tio SAABE asks:

Should buildings make any changes to their life safety systems in response to the recent terrorist threats?

Vince Baker, of TYCO/Fire & Security/ SIMPLEXGRINNELL answers:

If there was ever a time to review your fire protection systems and its needs, it would be now. In light of all that is going on with terrorist attacks and the possibility of bio-chemical contaminations, we must reevaluate our building fire protection and evacuation systems. If your property was faced with a terrorist attack or fire, would you and your tenants know how to react? In the next few paragraphs I will explain the different aspects and what you can expect from your Fire Alarm System, Fire Sprinkler System, Fire Extinguishers, & Emergency Lighting.

Fire Alarm Systems are designed to be your first line of defense in detecting a fire and getting the occupants out of a dangerous situation as quickly as possible. There are two ways to achieve this; the first is automatically through smoke detectors, duct detectors, and heat detectors that detect a change in their environment, which will sound an alarm throughout the building. The second is through manual detection, which involves a person detecting a fire and manually pulling a pull station, which will also sound an alarm throughout the building. In both cases it is very important for the systems to be installed, tested, and maintained in accordance with NFPA pamphlet 72 and all adopted building codes. Your system may also include a voice evacuation system that is automatic or manually operated. This is a very important part of your fire alarm system, as it will help you in keeping your tenants informed in what to do in case of an emergency. You will need to keep designated people trained on what to do and have a specific message for each individual circumstance. This should be in writing and kept at the fire/evacuation panel. In accordance with NFPA, fire drills should be conducted every six months. This can be done during your fire protection systems inspections if coordinated with your fire protection provider. It will be somewhat of an inconvenience, but will be invaluable in the event of a real fire or emergency.



Fire Sprinkler Systems are your first line of defense in extinguishing a fire and protecting lives and property. A sprinkler system cannot replace the Fire Department, but it is the quickest way of extinguishing or containing a fire until the Fire Department arrives. It is very important for a sprinkler system to be installed in accordance with NFPA pamphlet 13. Sprinkler systems are custom designed for specific buildings. If a system is not designed properly then it cannot be expected to extinguish a fire in a space for which it was not designed. For example, if you design a system in a building for light hazard office use, you should not store plastic products on an encapsulated pallet without making modifications to the system — the sprinklers simply would not extinguish or contain the fire. It is also very important to inspect, test, and maintain the systems in accordance with NFPA pamphlet 25.

Emergency Lighting is a very important part of the building's evacuation plan. Can you imagine trying to evacuate a building in total darkness? That's what happens in a stair well or in hallway that does not have working emergency lights. NFPA pamphlets 110 and 101 tell us how to install and maintain an emergency light system. They must be tested monthly for 30 seconds, and annually for 90 minutes under full battery power.

Fire Extinguishers are the primary line of defense in extinguishing fires in the first stage, and should be used only by trained personnel. OSHA regulation #1910.155 tells us that all personnel in buildings equipped with portable fire extinguishers must be properly trained annually in their use. People not properly trained can put themselves and others at great risk if they attempt to use a fire extinguisher and are not properly trained. NFPA pamphlet #10 covers the installation and inspection, testing, and maintenance of all portable fire extinguishers and should be closely followed.

The fire protection and evacuation systems installed at your properties are only as good as the inspection, testing, and maintenance programs that are in place to service them, and the people that are trained and responsible for them. So many times we hear that performing inspections and testing inconveniences tenants, but we need to keep in mind that the more informed they are, the more protected you are.

October Luncheon Summary

We really appreciated and enjoyed the October luncheon presentation by Bob Wright of Mechanical Maintenance on Direct Digital Controls (DDC). It's interesting to see how this technology is becoming the norm when it comes to HVAC control, but considering that it is 200-500% more accurate and easy to install than pneumatic systems, it is no secret as to why it is so popular! Thanks again, Bob, for your informative presentation.

Our clothing drive for Sam Rayburn Middle School went over pretty

well. Bob Harper of Industrial Systems, Inc. graciously delivered bags and bags of clothing to the school, where several teenagers removed the bags from the truck within seconds. It's funny how fast a teenager can work when you're taking a picture of them for a newsletter.



Thank you to all who contributed clothing and hygiene items at the luncheon! Thanks to Greg Graham of American Lighting and Robert Steele of Blackmon Mooring for their door prizes, too. See you all at the November meeting!

Bob Harper of Industrial Systems delivered our clothing donations to Sam Rayburn Middle School.

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From Noise to Silence...Hearing Loss

by Tom Lasater

Industrial noise can be hazardous to your hearing. In 1948 the court ruled that a person who developed a hearing loss as a result of his employment was entitled to compensation, even though there was no lost time or earnings from the hearing loss. After this many claims were submitted and in 1962 a court ruling resulted in establishing that hearing loss was compensable under the accidental injury provisions of the Workmen's Compensation law. The case involved a cumulative effect of a succession of injuries caused by each daily noise insult on the ears had caused an employee's hearing loss. By 1978, 46 of the 50 states had statutes that compensated for occupational hearing loss. Federal regulation of occupational noise began in 1969 and stated that noise must be reasonably controlled to minimize fatigue and industrial accidents. The 1970 passage of the Occupational Safety and Health Act (OSHA) set minimum standards for industrial hearing conservation programs. By 1974 a proposed noise regulation set limits for noise exposure and established requirements for audiometric testing.

Hearing loss, as a result of hazardous occupational noise by law, can and shall be compensated for by an employer. In 1981 the U.S. Department of Labor published 29 CFR Part 1910.95, an amendment to the noise standard that established an acceptable hearing conservation program which included monitoring of noise exposure, audiometric testing, record keeping, and employee education. This act is law and can be used to provide payment of compensation for occupational loss of hearing due to industrial noise problems. The following chart sets minimum standards for noise exposure Permissible Noise Exposures (per OSHA):

Duration per Day in hours	Noise Level in dBA
8 -----	90
6 -----	92
4 -----	95
3 -----	97
2 -----	100
1 ½ -----	102
1 -----	105
¾ -----	107
½ -----	110
¼ or less -----	115

For a better understanding of these values, a chain saw will register about 100 dB, a rock concert at 110 dB, and a jet plane engine at 130 dB. Diesel engines have been measured within the 100 to 110 dB range.

Hearing loss is difficult to detect because the loss is gradual. Some signs are hearing words but not understanding them, not hearing things with your back turned to them, hard

to understand conversation with background noises, not hear as well dripping faucets, ticking clocks, refrigerators running, talking louder than normal and ringing in the ears. Pain in the ears is felt with noise exposure over 120 dB but hearing loss can be produced at much lower levels. Our brains receive sounds from the ears and then process those sounds into words. As hearing loss progresses words are confused-like "frank" might sound like "sank" due to auditory distortion.

So you say that's very informative, but what is that to me? As Building Engineers we are subject to noises daily: power washers with gasoline engines, diesel engines on generators and fire pumps that we test for at least 30 minutes on a regular basis, cooling towers noises from water and fans, and chiller noise. Our health and safety and that of our employees should be of primary concern to us since we are the ones responsible. One of OSHA's requirements in 1910.95 Occupational noise exposure is audiometric testing of any employee whose exposure is equal to or above the 8 hour level of 85dBA. At 100 dBA the time is 2 hours and at 110dBA the time is reduced to ½ hour: so if a diesel engine noise level is at the 110dBA reading, and your employee observes the operation for ½ hour, the test is required.

In order to determine if these levels are present, it is necessary to have a company test your workplace with sound meters by a qualified audiologist with equipment meeting and calibrated to OSHA standards. Komet Hearing Solutions has a van with equipment and technicians to perform this testing at your site. As an initial test, Radio Shack has a sound meter for about \$40.00 with both A & C weighting and slow – fast response. The meter is positioned at about ear level with the employee in a normal position in relation to the noise source. The A weighted scale is less sensitive to low frequencies as is the human ear and the slow position gives a more average reading – "A" & slow comply with OSHA standards. Most audiologists and hearing aid companies listed in the yellow pages give the first audiogram to personnel without charge. This can be used as baseline audiogram to which 6-month and 1-year tests can be compared.

Part two next month will cover additional OSHA requirements including personnel protection (ear plugs & ear muffs). Our thanks and appreciation to the following sources for information provided to develop this article : "Handbook of Clinical Audiology 3rd Edition edited by Jack Katz: Rebecca Best, M. S., CCC-A with the AVADA Hearing Care Centers 341-1414: Mark Johnston, M. S., CCC-A 616-0315 with Komet Hearing Solutions: and SETON Identification Products at <http://www.setonresourcecenter.com>.



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The Straight Dope® by Cecil Adams®

Q: What's the difference between a street, a road, an avenue, a boulevard, etc.? There seems to be no rhyme or reason as to how the names of public ways are suffixed. Does it depend on width, length, importance, or (more likely) the builder's whim?

A: Whimsy? Lesser minds might describe it as whimsy. I see it as evidence of the same confusion that got us involved in a war in the Balkans.

Whatever scarcities we may have in this world, a shortage of street-name suffixes isn't one of them. The possibilities include but are not limited to alley, avenue, boulevard, circle, court, cove, crescent, crossing, dale, drive, estate, extension, gardens, gate, heights, highway, lake, landing, lane, loop, park, parkway, path, place, plaza, point, promenade, ridge, road, roadway, square, street, terrace, trace, trail, village, or way, to say nothing of commonly used foreign words such as camino, calle, etc.

Confronted with this plethora of terms, you'll probably have one of the following reactions:

(1) We need some kind of system here.

(2) We don't need no stinking system, we need some minimal restrictions to protect the public interest.

(3) Whatever, I don't care. Go away.

Reaction #3, I venture to say, has historically predominated among the public officials nominally in charge of these things, but reaction #1 has occurred often enough to convince people there's some underlying plan when in fact there isn't. The most famous sorta-system is Manhattan's grid of north-south avenues and east-west streets. Here's another from the Tri-County Regional Planning Commission of Lansing, Michigan (my assistant Jane lives there, that's why):

- Cul-de-sacs should be named circle, court, way, or place
- Meandering streets—drive, lane, path, trail
- North-south streets—avenue, highway
- Streets with planted medians boulevard, parkway.

Guilford County, North Carolina, prefers:

- North-south streets—street; east west—avenue (take that, Manhattan)
- Diagonal—road

- Dead-end streets—terrace, point, cove, dale, way
- Cul-de-sacs—court
- Short curved roads with ingress and egress from the same thoroughfare—circle.

Kenai Peninsula Borough, Alaska, is even more precise:

- North-south cul-de-sac—circle.
- East-west cul-de-sac—court.
- Northwest-southeast street—drive
- Northeast-southwest street—lane (doesn't the Kenai planning department have anything better to do?)
- Begins and ends at same thoroughfare—loop
- Meandering—road.

You get the picture. Lacking a detailed national standard (where are the French when we need them?), we're left with a muddle. One may hazard the generalization that long streets typically are called avenue, street, highway, road, etc., while short ones get terrace, court, place, and the like. But there are many exceptions even to this simple rule.

Don't despair. The U.S. Postal Service, exhibiting rare common sense, has decided suffixes aren't worth worrying about. It merely requests that street names be unique without regard to suffix, lest mail carriers be confused if the suffix is left off. (A notorious violator of this principle is Chicago, which has numerous instances of streets with names like 21st Place running parallel to 21st Street.) The agency adds a few other reasonable guidelines, e.g., street names should sound dissimilar to one another to avert mix-ups. These rules appear to have been widely adopted by local officials. In short we have a collective bureaucratic judgment that the power of the state ought to be exercised economically, a conclusion that might be applied to many aspects of public life.

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Pumps and Fans! (Part Two of Two)

Fans are very similar to pumps except for the obvious difference of moving air rather than a liquid. Like a pump, a fan's parts consist of a housing, an impeller, and a motor. Centrifugal fans are commonly found in HVAC applications, since this type of fan can move large or small quantities of air over a wide range of pressure conditions. Centrifugal fans are similar to centrifugal pumps, with the fan inlet located perpendicular to the outlet. Axial fans are also used in HVAC applications. They are in-line, with airflow moving over the fan in a straight line, but are not capable of overcoming as much pressure as centrifugal fans. Fans can be either direct motor drive or belt-driven; the best selection depends on the application. Belt-driven fans have the distinct advantage of providing greater flexibility by allowing different belt and pulley sizes. These units should be inspected regularly, since belts slip and wear out. It is not uncommon for roof exhaust fans to appear to be operating when in fact; the fan may be freewheeling because of wind velocity generated by positive static building pressure, when the belt breaks. The fan may be exhausting air under this condition, but it will be much less than the required exhaust flow rate.

There are many different applications for fans. While most fans have inlet and outlet ductwork, some applications only have ductwork on the inlet or outlet side, while others do not use any ductwork. Sidewall exhaust fans, or propeller style fans, may include a motorized or barometric damper, as well as an outside louver, and are mounted in wall openings. These fans can be installed without ductwork and are commonly used to remove heat buildup in industrial facilities. These fans can also have inlet ductwork that terminates just above floor level, as seen in fans that remove fumes from automobile garages and chiller rooms where refrigerant R-123 is used.

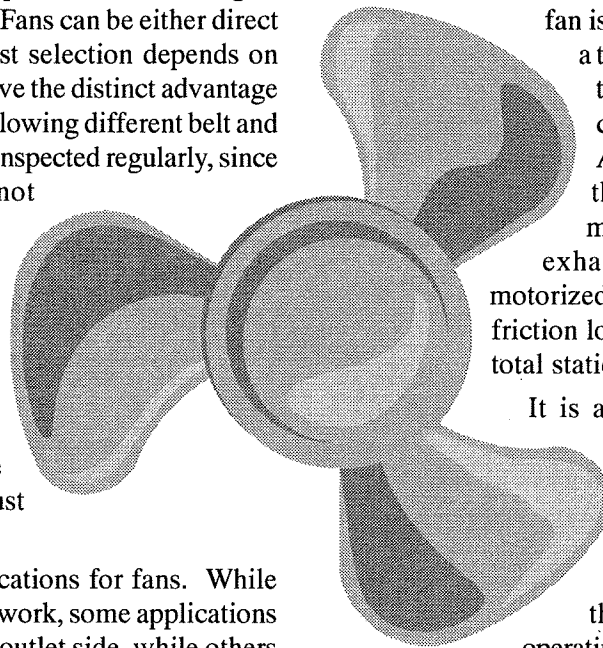
With the tremendous diversity in fan applications, it is difficult to generalize what type of fan to use. Typically, for the fan to operate properly it must be able to overcome the system friction, just as a pump must overcome its system pressure.

In specifying fans, the variables are expressed as cubic feet of air per minute (cfm) and inches of static pressure.

Airflow exerts three different pressures: velocity pressure caused only by the air flow, static pressure exerted at right angles to the air flow, and the total pressure of velocity and static pressure. Unlike with water, air density can vary, which affects the fan's performance. Therefore, in selecting fans from manufacturers data, air quantities must be adjusted to cfm standard of air. Care also must be taken to use static pressure, not total pressure, for fan selection. Fan selection requires a determination of the proper airflow and an estimate of the system static pressure that the fan is likely to experience. For instance, if a toilet room requires 200 cfm of exhaust, the designer will select a fan with that capacity. But at what static pressure? All the restrictions and pressure drops that the exhaust fan needs to overcome must be considered, including the ceiling exhaust grille, ductwork friction loss, motorized damper, and outdoor louver. These friction losses are added together to obtain the total static pressure for the fan.

It is also common for manufacturers to include noise data with airflow and static pressure information on their data sheets. Some do this by including specific noise data at each condition. Others shade portions of the data table to indicate less desirable operating conditions. Since airborne noise can be an irritating distraction, fan noise should be carefully evaluated when selecting fans that are to be located in or near occupied spaces. Fans are selected based on an estimate of flow and anticipated pressure drops. Over design is more common than under design, since an under designed system will not operate properly. An over designed system may not be optimized for energy efficiency, but it will provide the required flow rate so that the system operates as expected.

Once the proper size fan has been selected, the way it is controlled determines the energy that it will use. Therefore, it is important that each fan is operated only as long as necessary. Fan's, especially belt-driven units, should be inspected regularly to ensure proper operation. Once a system is built, the fan system needs to be balanced so that the proper airflow is being supplied.



continued on page 9

Tech Talk

continued from page 8

There are several standard relationships between the basic parameters for pumps and fans. The affinity laws are used for pumps and the fan laws are used for fans:

1. The flow rate (Q, in gpm or cfm) varies directly to the speed (rpm), so that $Q^2 = (\text{rpm}^2 / \text{rpm}^1) \times Q^1$.
2. The pressure (H¹, in feet of head or total pressure) varies directly as the square of the speed (rpm), so that $H^2 = (\text{rpm}^2 / \text{rpm}^1)^2 \times H^1$.
3. The horsepower (hp) varies directly as the cube of the speed (rpm), so that $\text{hp}^2 = (\text{rpm}^2 / \text{rpm}^1)^3 \times \text{hp}^1$.

From these laws it is easy to see that a 50% increase in speed would cause a similar increase in flow rate ($\text{rpm}^2 / \text{rpm}^1 = 1.5$). However, the pressure would be 225% of the speed (150%² equals 225%), and the horsepower would be 337.7 percent of the speed. These laws can be used to determine the performance of a particular pump or fan when one set of conditions is known.

Troubleshooting

If problems develop in pump or fan systems, the design parameters should be examined first to ensure that a mistake has not been made.

Second, the system should be inspected to ensure that it does not have any leaks. Duct leaks can result in a significant loss, with the delivered airflow substantially below design requirements.

Flow and pressure drop measurements should be taken at the pump or fan. If these values appear appropriate, the piping or ductwork should be examined for closed valves or dampers, or obstructions.

The pump or fan wiring should also be examined to ensure that three-phase motors are turning in the right direction. If a problem still exists, the pump or fan manufacturer should be consulted to ensure that the proper motor and impeller sizes were supplied.

Next Month: Improving HVAC System Performance

CHARLIE'S LAW: The definition of Deja Moo: The feeling that you have heard this bull before!

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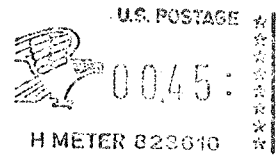
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SAABE TIMES November Issue

Final Thought —

“Spirit, the will to win, and the will to excel are the things that endure. These qualities are so much more important than the events that occur.”

— Vince Lombardi

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Membership Luncheon November 21, 2001

Time: 11:30 a.m.

Location: Old San Francisco Steakhouse

Topic: Roof Maintenance & Management

Speaker: David Gillian

Sponsor: Cram Roofing

Upcoming Luncheon:

December 19, 2001
Christmas Party



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