

## Updated Methods for PVB Testing.

Accurate results when testing any type of backflow prevention assembly are essential. The Foundation Engineering Staff has made some discoveries regarding the use of certain gauges. Gauges are not all constructed in the same manner, therefore, certain gauges have different characteristics than others. Because of this, it is necessary to modify testing procedures slightly to assure the most accurate readings possible.

The Midwest Model 830 differential gauge is constructed with an

elastomer diaphragm separating the high side of the gauge from the low side of the gauge. This elastomer diaphragm fully flexes when only one side of the gauge is pressurized. This is an important fact in testing the pressure vacuum breaker (PVB), as only one side of the gauge is used. While testing the PVB, the 7th edition of the *Manual of Cross-Connection Control* states that, "... the differential pressure gauge must be held at the same level as the assembly being tested. Be sure that the hoses not

*(continued on page 4)*

## The Foundation Short Course Comes to Your Area.

Many Members are not aware of the fact that the Short Course offered by the Foundation may be held at any location. Many times a "Hosting Agency" will ask the Foundation to bring our 5-day Short Course for the Training of Backflow Prevention Assembly Testers to their area. The Foundation does this several times each year.

There are several advantages to hosting a Short Course in your area. The Foundation charges the hosting agency a flat fee plus expenses. A hosting agency will normally fill a portion of the class with its own personnel. The rest of the class will be opened to those parties in the area which may be interested in the course. These "other parties" are charged a fee by the hosting agency which is sufficient to cover the entire cost of the course! In this way the

hosting agency gets their own personnel trained without any net cost.

There are also advantages for the Foundation as "away" Short Courses do not necessitate the closure of the Foundation Laboratory.

*... the hosting agency gets their own personnel trained without any net cost.*

The courses held in Los Angeles are held at the Laboratory, therefore, hindering the normal operation of the Laboratory. If you would like some more information regarding hosting the USC Short Course in your area, please call the Foundation office at (213) 743-2032. Ask for the "Information Packet on Hosting the Short Course."

## Roy Van Meter Donates Material.

Roy O. Van Meter has donated his personal library of cross-connection control information to the Foundation. Mr. Van Meter has been involved in cross-connection control since the earliest programs were set up in the western United States. He attended the University of Southern California and after serving four years in the Navy, Mr. Van Meter joined the Los Angeles Department of Water and Power in 1925. After working with the Department for 39 years he retired, only to take on a full time consulting position with the Hersey-Sparling Company, which he held for several years. Mr. Van Meter also served on the original "Specifications and Manual of Cross-Connection Control Practice Committee," which prepared the first edition of the *Manual of Cross-Connection Control*. Mr. Van Meter has also been the recipient of many varied awards and honors.

The Foundation is very grateful for the gift to the Foundation of Mr.

*(continued on page 4)*

### Highlights

- Updated testing methods for the PVB
- Hosting a USC Short Course
- Membership growth continues
- The Foundation Engineering Staff
- Calendar of events

## Foundation Membership Continues to Grow.

Membership in the Foundation has continued to grow consistently over the past year. There are several contributing factors which have helped the expansion of the Membership Program. In California, the new Title 17 has caused a major awareness of responsibility to implement and maintain a cross-connection control program. The result of this is that more agencies are interested in the benefits derived from Membership in the Foundation. Because of the increased Membership, it is possible for the Foundation to provide it's Membership with more services and information without an increase in cost to the Members.

Below are listed the most recent recipients of the benefits of the Foundation's Membership Program. The agencies, departments, and companies listed below joined the Foundation's Membership Program in the fourth quarter of 1987. Welcome to the Membership Program!

Allan T. Mitchell & Son, Inc., CA  
 Apollo Rooter and Plumbing, NV  
 Backflow Pros, Inc., LA  
 City of Bishop, Public Services Dept., CA  
 Bodega Bay Public Utility District, CA  
 Capistrano Valley Water District, CA  
 Centennial Water and Sanitation District, CO  
 Claremont-Colleges, CA  
 Clearlake Oaks County Water District, CA  
 City of Colusa, CA  
 El Toro Water District, CA  
 Forest Lakes Mutual Water Company, CA  
 Groveland Community Services District, CA  
 City of Healdsburg, CA  
 Hillview Water Co., CA  
 City of Huntington Park, CA  
 Idyllwild Water District, CA  
 Kruppa and Associates, Inc., CA  
 Lake Arrowhead Community Services District, CA  
 City of Lebanon, TN  
 Linden County Water District, CA  
 Littlerock Creek Irrigation District, CA

City of Livermore, CA  
 City of Madera Water/Sewer Division, CA  
 Marina County Water District, CA  
 Maywood Mutual Water Company #1, CA  
 Maywood Mutual Water Company #2, CA  
 McGee Plumbing and Heating, CA  
 Mid-West Instrument, MI  
 Millview County Water District, CA  
 Mil Potrero Mutual Water Company, CA  
 Montebello Land & Water Company, CA  
 City of Needles, Public Works Dept., CA  
 North Gualala Water Company, CA  
 City of Norwalk, CA  
 Oakwood Lake, Inc., CA  
 Oildale Mutual Water Co., CA  
 Parkcon, Inc., CO  
 Plumbing and Pipe Fitting Industry Apprenticeship Committee, CA  
 Rockwell International, CA  
 Rosamond Community Services Districts, CA  
 Rudy's Plumbing and Heating, Inc. CA

## 1987 Annual Report

The Annual Report of the Foundation for 1987 has been published. The report contains fiscal information about the Foundation, as well as highlighting the work of the Foundation in 1987. Each Member of the Foundation should have received a copy of the Annual Report. If not, or if an additional copy is needed, please give the Foundation office a call.

Fiscal information is included in the 1987 Annual Report for previous years. Because of the heavy workload of the Foundation, it had not been possible to publish an annual report.

San Bernardino Waterworks District #8, CA  
 City of Santa Clara, CA  
 Santa Monica Water Division, CA  
 City of Santa Rosa, CA  
 Santiago County Water District, CA  
 Scripps Clinic and Research Foundation, CA  
 Soquel Creek County Water District, CA  
 Southern California Water Company, CA  
 Sunny Slope Water Company, CA  
 Thermalito Irrigation District, CA  
 Tuolumne Regional Water District, CA  
 City of Upland, CA  
 Utilities Maintenance Districts, CA  
 Village of Westmont, Water Department, CA  
 West Kern Water District, CA  
 Willow Creek Community Services District, CA  
 W. J. Hanna & Son, CA  
 City of Yuba City, CA

*Cross Talk* is published by the University of Southern California's Foundation for Cross-Connection Control and Hydraulic Research for its Members. Additional copies of *Cross Talk* are available to Members upon request.

(213) 743-2032

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# Foundation News

Some Members may be wondering if any changes have occurred at the Foundation which have caused so many changes in appearance over the past year. There have been no administrative or major policy changes in the Foundation. The only changes which have taken place over the last year or so is that of an increase in the workload of the Foundation in general. Because of this increased workload, it was necessary to hire another full-time engineer. With the workforce a bit stronger the Foundation was in a position to put more effort into increasing the quantity and quality of work which is produced. One area which was extremely important was that of strengthening ties with the Members. There was also the concerted effort to make more agencies aware of the Membership Program and include them. A result of this effort has been a substantial increase in the Membership program of the Foundation. Because so many water agencies, health departments, private companies, etc. have joined the Membership of the Foundation, it has been possible to improve our communication with the Members. This is why *Cross Talk* was re-instated last

year. For this same reason it seemed necessary to increase the amount of information being sent to the Members in 1988. Hence, the newer expanded version of *Cross Talk*. Since the Membership Program has seen such an increase, it is possible to augment the services to the Members without an increase in cost to the Members. It is our desire to continue to increase the quantity and quality of service to the Members of the Foundation as Membership continues to grow.

The Work of the Foundation Laboratory has continued to grow each and every quarter. The Engineering Staff has always been very detailed in the evaluation process. This is a time consuming process, but it is necessary to assure the quality of backflow prevention assemblies being approved. With the workload in the Laboratory and in the field remaining extremely high, there are plans to upgrade some of the Laboratory equipment, which should expedite some of the evaluation process.

Training courses continue to occupy much of the Foundation Engi-

neering Staff's time. Several courses are scheduled each year both in Los Angeles, and at different locations across the nation, as hosting agencies request. The Training Course for Backflow Prevention Assembly Testers, is very popular with many requests coming in from around the nation for courses. Next quarter the Foundation will offer a course for a "Cross-Connection Control Program Specialist". This course is specifically designed to train an individual to administer a cross-connection control program. The next issue of *Cross Talk* will contain the official announcement for the Short Course and will give the exact dates.

All in all the Foundation has not had any major policy or administrative changes. The Foundation plans on providing the expertise in cross-connection control that it always has to the Members. The Foundation staff is striving to increase this expertise. Should the Foundation Members have any comments, suggestions, or questions, the Foundation's Engineering Staff may always be contacted at (213) 743-2032.

## Air Gap?

An air gap is a very common means of backflow protection. However, it should be noted that not all air gaps are sufficient to protect against backsiphonage. A proper air gap must be installed with the inlet pipe or fixture at least two pipe diameters above the overflow rim of the receiving vessel. In no case should the air gap be less than one inch. The Photo to the right shows what might happen if the proper air gap is not maintained.

It is necessary to realize that a proper airgap is to be measured from the supply line to the overflow rim of the receiving vessel. The overflow rim is not the same as a drain line. The overflow rim is the point at which water will overflow onto the surrounding floorspace under flooding conditions.



## PVB Testing.

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being used are also kept at this level." In the past it had been "acceptable" to have the gauge at a lower elevation than that of the assembly being tested as long as the low side hose was filled with water and kept at the same level as the assembly (to which the high side of the hose was connected). See *Cross Talk*, Volume 5, Number 2, July 1987. However, because of the large amount of flexing in the Model 830 diaphragm, this is not a valid procedure.

With the high side hose attached to the PVB and the low side hose open to atmosphere, the volume on the high side of the diaphragm is expanded to its maximum (as shown to the right). Although the low side hose is full of water and at the same level as the assembly being tested, this is only temporary. As the pressure in the body of the PVB is slowly dropped to determine either the opening point of the air inlet valve or the opening point of the check valve (depending upon which part of the test is being conducted), the pressure in the high side of the gauge also drops. As the pressure in the high side of the gauge drops the volume in the high side of the gauge is reduced due to the deflection of the diaphragm. This, in turn, causes the volume on the low side of the diaphragm to increase, filling with the water which was in the low side hose, thus draining the low side hose. In experiments run at the Foundation Laboratory, it was found that as much as 60 inches of water could be drained from the low side hose to fill the volume on the low side of the gauge. Even though one may think that the low pressure hose is filled with water (to compensate for the difference in height between the gauge and the assembly being tested) this hose may actually be empty. This could result in an error in the gauge reading as much as 2.1 psi. The gauge is reading the difference in pressure between the high side of the gauge and the low side of the gauge. The high side could simply be the height of water in the high

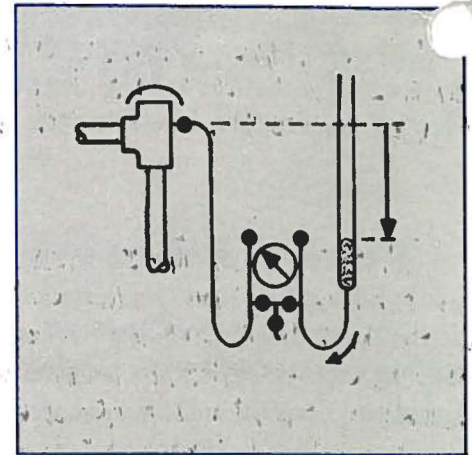
side hose (e.g. 60" Water = 2.1 psi), while the low side may have no water at all in the hose. Thus, the gauge is reading as much as 2.1 psi higher than the actual differential between the pressure in the chamber of the assembly and atmosphere. Since both the air inlet valve and the check valve of the PVB must have opening points above 1.0 psi, this error could be "life threatening".

With this new information, it is essential that the gauge be held at the same level as the PVB being tested in order to obtain accurate readings. This holds true for the Midwest Model 830 differential gauge and other gauges which have an elastomer diaphragm. The ITT Barton differential gauge uses a metal bellows and does not demonstrate this effect to the extent that would jeopardize the accuracy of the test results (although a slight error of approximately 0.1 psi is possible if the gauge is not held at the same level.)

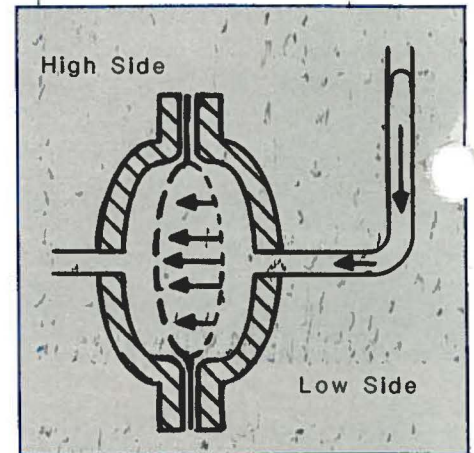
The information regarding the gauges above does not imply the preference of one gauge over another. It is only provided so that the tester may be aware of the idiosyncrasies of his or her particular gauge.

## Manual Update

The 8th edition of the *Manual of Cross-Connection Control* is its last phases before printing. The Manual will contain items which will be important to all of those involved in cross-connection control. The price of the 8th edition will be determined once the bids come in from the printers. The price should not be substantially more than that of the 7th edition. The Members of the Foundation will receive a complimentary copy of the as a benefit of Membership. Additional copies will be available to the Members at a 25% discount.



As the pressure on the high side of the gauge drops, the tube drains to fill the increased volume on the low side.



The elastomer diaphragm of the gauge flexes increasing the volume on the low side.

## Van Meter

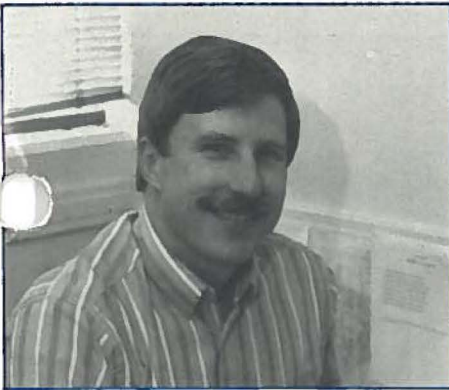
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Van Meter's papers and documents. The collection contains some of the earliest papers ever presented on cross-connection control and back-flow protection. Most of the papers are those which Mr. Van Meter presented himself years ago when he was introducing the fundamentals of cross-connection control to different agencies across the nation. This information will serve to enhance the archives of the Foundation, making more information available to pass on to the Membership.

## The Foundation's Engineering Staff...

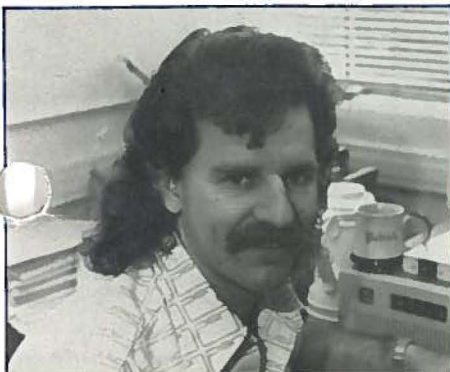
*Shown below is each member of the Foundation's Engineering Staff. Because of the increased activity of the Foundation and the increased communication with the Membership, it is nice to know a little more about the engineers that you may be speaking with.*

**Prof. J.J. Lee** is the Director of the Foundation. Prof. Lee is also a full time professor of Civil and Environmental Engineering at the University. He earned his Ph.D. in Civil Engineering at the California Institute of Technology. Prof. Lee is a registered Professional Engineer in the State of California. Prof. Lee directs the entire operation of the Foundation. Aside from his activities at the Foundation he is also a noted expert in Coastal Engineering and one of the student's favorite professors at USC's School of Engineering.



**Paul H. Schwartz** is the Chief Engineer of the Foundation. He earned his B.S. in Mechanical Engineering at the University of Southern California. He is a registered Professional Engineer in the State of California. Paul oversees the Engineering staff in all aspects of the Foundation's Programs and functions. He is also very much involved in the revision of the Manual, and he instructs for the Foundation's Training Courses. Aside from all of this, Paul is quite often representing the Foundation at seminars and training courses.

**Henry W. Chang** is a Mechanical Engineer. He earned his B. S. in Mechanical Engineering at the University of Southern California. Henry is also actively pursuing his Masters in Mechanical Engineering at USC. Henry devotes most of his time to the Evaluation Program of the Foundation. He is involved with the scheduling of the laboratory and also the placement of back-flow preventers in the field for the field evaluation phase of the Approval Program. Henry is also an instructor for the Foundation Training Courses.



**Patrick A. Sylvester** is a Mechanical Engineer. He earned his B. S. in Mechanical Engineering at the University of Southern California. He is also pursuing a Masters of Business Administration at USC. Patrick is mostly involved in Membership services. This includes publishing *Cross Talk*, Annual Reports, and various promotional material which the Foundation publishes. Patrick is also an instructor for the Foundation Training Courses.

# Calendar of Events

*This Calendar lists the activities which the Foundation has participated in over the past few months. The Calendar also lists those activities which the Foundation plans on participating in through the end of April 1988.*

## October 1987

28th-29th American Water Works Association  
CA/NV Section Fall Conference, Palm Springs, CA

## November 1987

9th-13th USC Tester Course, Tempe, AZ

21st Trojan Football, USC-17 UCLA-13

## December 1987

10th Western States Symposium Association meet-  
ing, San Diego, CA

## January 1988

11th-15th USC Tester Course, Los Angeles, CA

25th-29th USC Tester Course, Los Angeles, CA

## February 1988

19th American Water Works Association CA/NV  
Section Recertification, Las Vegas, NV

24th Western States Symposium Association meet-  
ing, Ventura, CA

27th American Backflow Prevention Association  
update seminar, Los Angeles, CA

## March 1988

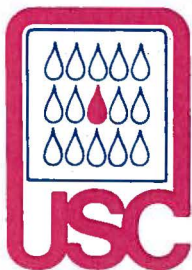
7th-11th USC Tester Course, Pasadena, CA  
21st-25th USC Tester Course, San Diego, CA

## April 1988

12th American Water Works Association CA/NV  
Section Recertification, Concord, CA

13th-15th American Water Works Association  
CA/NV Section Spring Conference, Concord, CA

25th-28th American Backflow Prevention Associa-  
tion National Conference, Orlando FL



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