Yesteryear was a much simpler time. Energy was cheap and for many decades the designers’ choice for fluid control was the use of pressure dependent manual balance valves. Loads were considered to be static, controls were unsophisticated and constant volume pumping systems were the norm. Three-way valves were employed to ensure constant volume for either hot or chiller water systems. Proportional balance was the mantra and systems were designed to perform best at full load conditions. Excess flow was re-circulated via primary-secondary piping to protect the hot or cold water source and flows of 125 to 150% of design were common. Everyone was warm or cool as needed. Energy was cheap. Times were simple.

This month we hope to tell a different story. We are happy this month to have Kenneth R. Luther visit Tri-County to present on the inner workings and the benefits of installing pressure independent control valves in the hydronic systems that we design. Mr. Luther comes to us from Griswold Controls and is a friend to long-time Tri-County member David Hernandez of Dawson Company. This promises to be a great presentation chock full of lots of juicy engineering information. You won’t want to miss out this month!

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Coming attractions

What’s in store for you for the next few months at Tri-County ASHRAE?

Check it out!

March 17th
STATE OF THE ECONOMY IN THE INLAND EMPIRE.

April 15th
STUDENT NIGHT!

May 15th
INSTALLATION DINNER.

upcoming events

Don’t miss out on the exciting events coming up in the meetings to come!
Bring a buddy and enjoy the time with your friends and colleagues, and network within your industry!
As the cost of energy exploded, concern mounted about the cost and performance of hydronic systems. Designers quickly realized that energy savings could be realized by designing variable volume systems by utilizing 2-way control valves and riding the constant speed pump curve. Pressure dependent manual balance valves were still the norm. Variable volume systems were definitely an improvement but much more could still be done. Control systems continued to improve and the designer was soon given a new energy saving tool, the adjustable frequency drive (AFD). The designer could now use both variable volume and variable speed to match the load and realize even more savings. No longer were we chained to the concept of full load design. Appropriately, the piping systems became more complex to address the difficulty of getting the water to where it was needed without over-pumping and wasting energy. The flow to load relationship between the load, coil and the 2-way valves became the designers challenge.

Unfortunately, AFDs gave the pumps a mind of their own. Even when loads were reduced, excessive head produced by pumps in lightly loaded zones resulted in overflow, and low system differential temperatures (ΔT).

While pressure dependent manual balance valves continued to rule the market, a new technology emerged that could subside the over pumping and low ΔT issues plant operators were experiencing. The invention and application of pressure dependent flow limiting valves were employed to take excessive over-pumping out of the equation. No matter what the pump tried to do, the maximum any coil could be pumped was design flow. Two way valve piped systems began to do what there were designed to do...save pumping, chiller and cooling tower energy. Typical central plant energy savings approached 50% over 3-way valve controlled systems. Unfortunately, increasing energy costs never subsided. In addition, poor operation techniques, lack of maintenance, inadequate designs, and load profile and design changes, added to the escalating cost of operating systems. Although systems were drastically improved, manual balancing and flow limiting valves were still "pressure dependent", which meant not only did the room thermostat influence the flow through the coil, but so did all of the adjacent 2-way control valves and variable speed pumps. The fluid flow through the coil was still not 100% influenced by the only control that directly monitored the load, the room thermostat. A better way of controlling flow was needed.

Enter the third generation of flow control... the Pressure Independent Control Valve or the “PICV”. The PICV, pictured on page 1, is two valves in one...a characterized temperature control valve (TCV) providing linear flow output proportional with valve stem position and a pressure regulator maintaining a constant differential pressure (ΔP) independent of the ball valve opening, providing infinitely variable C_v. At all positions of the TCV, the PIC-V will limit the flow to that value, no matter how the pump or other valves in the system are modulating. As long as the system pressure remains with the design criteria a constant flow within ±5% is maintained. Constant flow is maintained as well as maximizing the discharge temperature off the coil. Over-pumping is eliminated, additional chillers are not turned on, and additional cooling towers are also avoided... energy savings blossom. An additional 25–50% in central energy plant operating costs can be expected over traditional two-way valve variable volume variable speed designed systems.

Now designers have the best of all worlds available...an accurate control valve that can provide the desired linear flow to load relationship at the coil and the ability to maintain a constant temperature output regardless of external pressure influences...pressure independence!
Tri-County’s Jim Toda and Yung Lin Attend Cal Poly Pomona ASHRAE Meeting

On February 9, Yung Lin and I met with the Cal Poly Pomona Student Branch. Faculty Branch advisor Professor Henry Xue also attended the meeting and spoke to the Branch members. The Branch is made up of nine members so far.

The Student Branch members are excited to participate in ASHRAE activities and events. They look forward to forming a team for the ASHRAE Student Design Competition next year. Cal Poly Pomona gives students credit for their Senior Project, when they participate in a Design Competition entry.

The Tri-County chapter sponsored the Student Branch meeting lunch, which was appreciated by the students. Tri-County members will be able to meet Student Branch members, at our annual Student Night in April.
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