

Water Stories

Duke Waters talks about check valves with a kiss.

It was a bright morning, and being the semi-retired, free-lance engineer that I am, I anchored my Mississippi houseboat at St Louis Heights to pay a visit to an old friend. I found Bruce, the Water Superintendent of St Louis Heights, hard at work as usual

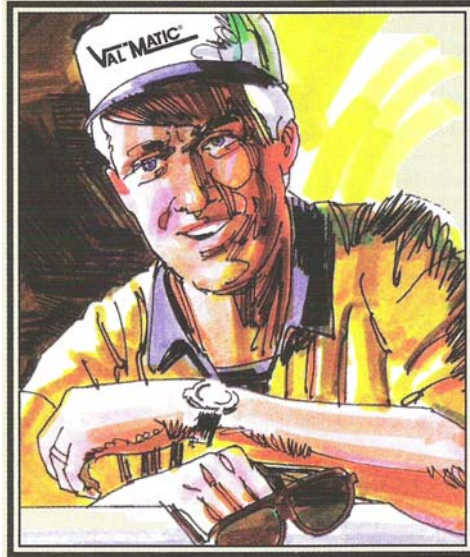
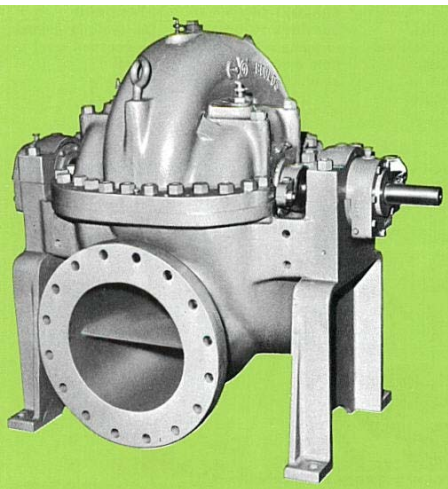


behind a pile of paperwork with four post-it notes in his fingers. Bruce waived me over to his conference

room where I found an ancient copy of Golf Digest to read. Before I could get half way through the article I wrote in '01 on swing planes, Bruce rushed in and said, "Hey Duke, great to see you! Let's take a drive." What Bruce didn't tell me was that there was a warning light on the number two pump down at the river booster station. In less than a minute we were racing down the windy road to the booster station at the bottom of the bluff.

I immediately knew something was up when we saw steam rising out one of the windows of the pump station. Bruce went in first. Right behind him, I heard a pump screaming and saw steam blowing out of one of the pump discharge flanges. With my face burning from the heat, I heard Bruce describe the situation with a string of four-letter words. I scrambled over to the main pump power panel and pulled the breaker. In a few heart-pounding seconds the pumps wound down and for the first time we could hear ourselves think. Jim said "it looks like the number two pump has been running against a closed check valve for an entire shift" and then added another string of four-letter words.

He was right. With no flow against the closed check valve, the pump generated enough heat to boil the water in the pump, blow out the pipe gaskets, and in turn destroy



a \$150K pump.

Bruce turned to me and said "How can this happen?" I could hear no reverse flow through the check valve so it must be closed. It was a 10 in. traditional pilot-operated globe-style pump control valve. I took a look at the Motor Control Console and saw that the valve "OPEN" light was lit, but the valve was indeed closed. I then looked at the valve and saw that the closed limit switch trip arm was not tripped. Looking further I saw that the vertical indicator stem had come unconnected from the valve disc preventing the limit switch from tripping the pump. I showed Bruce that the cause of this \$150K loss appeared to be this little quarter inch diameter limit switch rod.

He asked, "I know these pump control valves are difficult to maintain, but how do I keep this from happening again? Last week the water pilots were clogged."

I explained to Bruce that there is an old design principle called KISS that would help here which stands for "Keep It Simple. Stupid. Since the pump must run while a control type check valve slowly closes (or the pump will backspin), the check valve limit switch is wired into the pump control circuit to trip out the pump motor starter when the valve is closed. So if the valve doesn't close, or in this case, the limit switch contact doesn't open, the pump will continue to run. And it did! The pump motor overloads must also have failed to trip, but when Murphy's Law is in motion, look out!

I suggested that he consider a simpler check valve solution, a Tilted-Disc Check Valve from Val-Matic. The Tilted-Disc not only operates independently of the pump

control circuit, but it also has about one eighth the headloss as the control valve and will likely pay for itself in a couple of years. Val-Matic publishes an Application Engineering Guide AEG-301 that explains the use of Tilted-Disc Check Valves along with their bottom and top mounted oil dashpots. There are also energy calculations that show how the valve can pay for itself in a few years. I took a look at the pump nameplate, and based on the its 1750 gpm and 25% usage time, the savings over 40 years would be \$12,800.



Tilted-Disc Check Valve

I explained "Because your discharge line is about a mile long, a top-mounted oil dashpot would be used here. The top mounted oil dashpot is directly connected to the disc and provides adjustable opening and closing times between 5 and 30 seconds. Best of all, the Tilted-Disc Check Valve needs no wiring to the pump and no external power source." Bruce said, "Ok, I'm sold. Now let me go buy you lunch so you can tell me again about your double-eagle at Doral."

Bruce called me the following spring and said the new Tilted-Disc Check Valves were working great so I invited him to tell me all about it on the boat on our way down to Mardi Gras.

VAL-MATIC

Val-Matic, 905 Riverside Dr.,
Elmhurst, IL 60126
www.valmatic.com