Volume 77

Year 2010

The Water Hauler's Bulletin

A production of Alberta Agriculture and Rural Development's Water Resources Branch

Travelling Water Screens to be Installed in BRID

Special points of interest:

- Completed reports available on-line
- Irrigation Technical Conference and Water Measurement Workshop presentations are available on-line

Deteriorated automated trash screens on the BRID's Lost Lake pump house intake are being replaced with large travelling water screens manufactured by Hydrolox Engineered Polymer Screens of the USA.

These screens are made from corrosion resistant polymer modules assembled in an interlocked, bricklayed pattern with full length hinge rods in virtually any width and length. Screens are light weight with built in strength and durability.

Pump house screens to be replaced

Travelling water screens to be installed

Inside this issue:

For more information contact Richard Phillips, Manager, BRID at 403-654-2111 or e-mail at richard@brid.ab.ca

BOW RIVER IRRIGATION DISTRICT www.brid.ab.ca

Aquatic Weed and Algae Filtration Systems

Throughout the irrigation districts, aquatic weeds and algae growth is a prevalent, ongoing problem in their open channel canal systems.

Clearing of weed accumulations at turnouts and pipeline inlets is increasing with one or more night time visits sometimes required by operations staff to unblock structures and maintain flows.

With the possibility of weed control methods currently practiced by most districts not being available in the near future, it is apparent that they may be facing a huge problem.

In view of this, the SMRID has developed some long term strategies for controlling aquatic weed and algae problems to ensure clean and adequate water delivery to their users. Three technologies are being implemented for testing at several locations throughout the district: (1) the gabion wall infiltration system – designed to exclude weeds from the canal turnout or pipeline inlet; (2) the infiltration gallery is permeable pipe within a gravel envelope connected perpendicularly to the inlet structure; (3) a floating net boom for pipeline settling ponds designed to intercept weeds and algae entering the pond.

Installation of these weed control alternatives is being undertaken in the spring of 2010 with some gabion walls already in place. Updates of installations and testing results will be provided in future articles as this information becomes available.

For more information, contact: Chris Gallagher, Design Engineer, SMRID, at 403-328-4401 or e-mail at cgallagher@smrid.ab.ca

Bell X Bell or Bell X Spigot for Reducer and Tee Fittings

What works for you?

Most of the time, a bell has to be cut off the next length of pipe to join it to a reducer or tee fitting.

Using a bell by spigot fitting in such cases would save time and money and reduce wasted pipe.

Bell by bell of course is still necessary, on some fittings, especially when needed to reverse the bell at the end of a pipe to insert a steel riser.

Bell by spigot fittings are easier to manufacture and thus, slightly cheaper than bell by bell.

For more information, contact: Rick Lorincz, CET, Technical Sales, IPEX Inc, Calgary at 403-236-8333 or e-mail at riclor@ipexinc.com

Unique BRID Pipe Inlet Structure

Lateral R in the South Hays area of the BRID parallels very closely along the west side of Highway 875 for several miles. Rehabilitation of sublaterals coming off Lateral R is with pvc pipeline systems requiring the installation of new inlet structures. All of the irrigated acres are east of 875, therefore, all pipelines must cross through the highway to serve irrigators. But, in areas where there is a lack of right-of-way between the lateral and pavement to install inlet structures, the district engineering staff designed a "backward" inlet structure coming off the opposite side of the lateral.

Instead of a drop inlet with gate and pipe directing flow through the embankment on the same side, the gate and pipe direct flow back under the bed of the channel through the opposite embankment and through the highway casing pipe.

Inlet precast panels are made by Precon Manufacturing Ltd.

PRECON

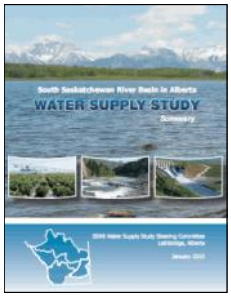
BOW RIVER IRRIGATION DISTRICT www.brid.ab.ca

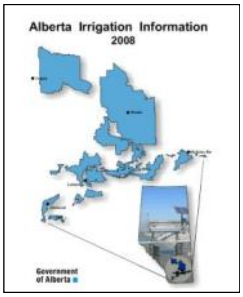
For more information contact Richard Phillips, Manager, BRID at 403-654-2111 or e-mail at richard@brid.ab.ca

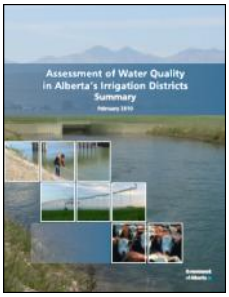
Completed Reports

Links to completed reports available on Alberta Agriculture's website Ropin' The Web.

- 2009 Alberta Irrigation Information Booklet
- Alberta Soil Phosphorus Limits Project
- Aquatic Weed and Algae Control in Irrigation Canals
- Assessment of Environmental Sustainability in Alberta's Agricultural Watersheds
- Assessment of Water Quality in Alberta's Irrigation Districts
- Crop Water Use and Requirements
- Crowfoot Creek Watershed Study
- Irrigating to Enhance Quality and Yield
- Irrigation Rehabilitation Program 2008/2009 Status Report
- Irrigation Rehabilitation Program 2006 to 2009 Status Reports
- South Saskatchewan River Basin (SSRB): Irrigation in the 21st Century
- South Saskatchewan River Basin in Alberta Water Supply Study







Combination Air/Vacuum Relief Valves

Some, if not most districts, have experienced early fall freezing that caused cracking of air relief valves on pipeline turnouts, particularly the cast iron valves.

Expensive to replace at $300+ and even more if thermally activated for frost resistance, these valves work well within certain tolerances but problems develop when temperatures drop below the operating range of the thermally activated valve.

In an effort to reduce replacement costs while retaining performance, the SMRID is testing three different types of combination air/vac valves for long term durability with good prospects for future availability.

Valves were installed on two separate pipeline systems; one in the Bow Island area, and one in the Lethbridge area of the district.

Results of the testing will influence the district's decision on future valve installations.

SMRID learned of experiences in a few districts, but SMRID would welcome further suggestions and any comments about the type of air/vacuum valves other districts are using that may help in their testing.

See page 10 for preliminary results.


Val Matic 201-C Air/Vac valve with frost plug


ARI D-040 P 2" Plastic Base


ARI D-040 B 2" Brass Base


Nelson ACV200P 2"Plastic Base

For more information, contact: Chris Gallagher, Design Engineer, SMRID, at 403-328-4401 or e-mail at cgallagher@smrid.ab.ca

EID Testing New Screen Cleaner

Aquatic weeds and other debris is a common problem in most open channel irrigation canals. To prevent clogging of closed pipeline systems coming off these canals, automatic screen cleaners are installed on pipeline inlets. Pipeline installation doesn't seem to be slowing down and the automated screen cleaners are not a cheap item.

In an effort to reduce the need to install a screen cleaner on every pipeline inlet along a canal, the EID is experimenting with a cleaner designed to screen the whole canal flow. The screen is a big hexagonal shaped drum made of perforated plate that is folded like an accordion to maximize the screen area. Attached to the downstream side of a structure, the drum rotates and picks up debris out of the water. A brush runs in both directions horizontally over the drum sweeping debris off both ends. The hope is that this screen will remove weeds/algae/debris from the canal and the water would be good for quite a distance before aquatics grow enough again to cause a problem. An update as to the effectiveness of this type of screening device will follow this fall after EID evaluation.

Alberta Water Screens of Brooks engineered and manufactured the screen for the EID and have designed and installed several other types of screens for the district in the past.

For more information, contact: Ivan Friesen EID RET, at 403-362-1423 or cell at 403-363-5612 or email at ifriesen@eidnet.org or Craig Hopf, Alberta Water Screens Co. at 403-501-0190 or email at chopf@hotmail.com

Joint Restraint Device for PVC Pressure Fittings

The Raymond Irrigation District is trying a faster more economical method of restraining pvc pressure fittings in certain situations.

Joining a new pipeline to an existing pipeline required a 1.4 meter "Z" drop. Normally, a steel "Z" drop would be fabricated and installed requiring thrust blocks to prevent movement. This means leaving the trench open while waiting for the concrete truck to arrive, sometimes building forms, then leaving the trench open for the concrete to cure, then returning with equipment to backfill the trench.

Joint restraints keep the job moving, plus, if for any reason the "Z" drop needs replacing, it can be done easily and parts salvaged for reuse. No large blocks of concrete to remove and dispose of.

Joint restraints can be designed to fit all sizes of pvc pipe fittings and require only a wrench to assemble.

RID

For more information, contact: Mark Jensen, Superintendent, RID, at 403-752-3511 or e-mail at markwjensen@hotmail.com

Geocomposite Geotextile Canal Liner

Recently, a short reach of the demo canal at the CACDI Irrigation Development Center in Lethbridge was lined with a geocomposite geotextile that consists of two polyester non-woven material bonded one on each side to 20 mils of an EVA geomembrane.

The liner, named Canal³ 8208, made by Huesker Inc of North Carolina, is designed for use as an impervious barrier.

As a research section at the demo farm, the top 1/3 inside slope of the liner was covered with armour, the middle 1/3 will be covered with shotcrete, and the bottom 1/3 and bed will be left uncovered.

Site preparations and liner installation was provided by the St Mary River Irrigation District under the direction of the Huesker representative.

For more information, contact: Lloyd Healy, Irrigation Water Management Engineer, Agriculture and Rural Development at 403-382-4407 or email Lloyd.Healy@gov.ab.ca or, Greg Wright, Midwest Sales Manager, Huesker Inc, at 605-342-8318 or email gwright@hueskerinc.com

Combination Air Valves Testing Preliminary Results

Initial testing of plastic combination air valves has been completed by the SMRID over the 20I0 irrigation season and carried into the post-season for frost performance.

The valves tested included the following:

1. Val-Matic 201-C - cast iron body (approx. $330) c/w Therm-Omega-Tech, Inc. Thermally Activate Valve (approx. $200)
2. Nelson ACV200P 2" - reinforced (glass-filled) nylon body and reinforced (glassfilled) polypropylene base; polypropylene float; SS reinforced EPDM seal (approx. $100)
3. Netafim (ARI) 0-040 P 2" - reinforced nylon body and base; foamed polypropylene float; EPDM rolling seal c/w reinforced nylon plug (approx. $150)
4. Netafim (ARI) 0-040 B 2" - reinforced nylon body and brass base; foamed polypropylene float; EPDM rolling seal c/w reinforced nylon plug (approx. $250)

The testing sites included:

1. Main Canal Lateral 4 located approximately 6 km southeast of Lethbridge (7 newer Val-Matic 201-C; 5 Nelson ACV200P; 4 ARI D-040 P; 5 ARI D-040 B)
2. Bow Island LateralI0H-l located approximately 10 km southwest of Bow Island (1 Val-Matic 201-C; 3 Nelson ACV200P; 4 ARI D-040 P; 4 ARI D-040 B)

FILLING / DRAINING / SEATING

Air valves were checked during filling to ensure air was being released. Turnout valves were checked following filling of the line and periodically during the season to assess complete and ongoing evacuation of air. All plastic valves operated satisfactorily during filling and draining of the pipelines, seating fully even under low head conditions. The Val-Matic 201-C did not seat well under low head conditions and in some cases a plug had been inserted by the farmer or Water Coordinator to stop leaking or the ball valve (if affixed) was closed. On two occasions the seat had rusted closed and did not open during draining of the pipeline.

The lone seating issue found with the plastic valves was a Nelson ACV200P on an unused domestic turnout that was found slowly dripping late in the season. Algae were found to be growing on the drainage elbow. After flushing the domestic turnout line and successive draining and refilling of the valve using the draining ball valve installed below, the valve stopped dripping.

DYNAMIC PERFORMANCE

Air valves were not deliberately tested for dynamic performance due to the potential risk to pipelines. On one occasion however, a farmer-owned flex-hose suddenly disconnected from Turnout No. 28 while the tester was standing directly beside Turnout Nos. 30&31 less than Yz mile downstream. A sudden sucking sound was heard from both air valves (1 Nelson ACV200P and 1 ARI D-040 P), followed approximately 1-2 seconds later by spitting of water as both valves re-seated. No further evidence of valve action was heard, including after the farmer's pump supplier shut the SMRID butterfly valve approximately 1 minute later. A performance comparison between the Nelson and ARI valve could not be made as although the ARI valve sounded as if it took in and evacuated more air, it was located just upstream of the Nelson valve. Both valves participated in protection of the pipeline due to the sudden loss of pressure.

FROST PERFORMANCE

Both the Main Canal Lateral 4 and Bow Island Lateral 10H-l pipelines were kept charged until freezing conditions were observed sufficient to test the valves for frost performance.

The first cold snap occurred in mid-October, with overnight temperatures dropping to -7C south of Lethbridge and -6C south of Bow Island. The thermally activated valves (TAV's) on the Val-Matic 201-C's were all running and there were no signs of problems with the functioning valves. One Nelson ACV200P located on Domestic Turnout No.4 of Main Canal Lateral 4 was found broken on the morning of October 17th(see attached Photos No. 1 & 2). The base was cracked parallel to the female-threaded base, just above the flare where the a-ring is seated. This valve was replaced with a new Nelson ACV200P. No other failures were noted. In most cases the freezing conditions were not sustained so as to completely freeze the water in the valves as most ball valves were able to drain to some degree when closed.

The second cold snap occurred in late October, with sustained freezing temperatures from the evening of the 26th (-6C) through the day of the 27th (-2C to OC) and overnight of the 27th (-7C to -8C) for a total of approximately 30-36 hours. Again, all TAV's were operating except where the hydraulic grade line had dropped due to some ponds being filled from the Main Canal Lateral 4 pipeline. No Val-Matic 201-C's experienced complete freezing and no bodies were observed to have any damage. The new Nelson ACV200P was found to have cracked in the same location and pattern. No damage was found on any of the ARI valves. The valves were checked again during thawing with no damage observed.

A further observation on the draining of valves using the ball valves is that the ARI valves were found to be the last to stop allowing draining during the freeze-up stage and the first to start allowing draining during thaw.

Testing was discontinued following the second cold snap, with the lines drained during mild conditions beginning October 28th.

Combination Air Valves Testing Preliminary Results (continued)

EVALUATION OF POTENTIAL PROBLEMS

As the Val-Matic 201-C has a history of failure due to seizing of parts and leaking of seats and was observed with these problems during the test, this valve receives the lowest performance rating.

The leaking of the Nelson ACV200P due to algae buildup may be an exception for the site, but does indicate a potential for future problems. The ability to quickly flush and reseat (where a draining ball valve is affixed) is an advantage over the Val-Matic 201-C. The cracking of the base during frost at the same location and with the same pattern on two occasions indicates a limited ability to handle freezing conditions. This vulnerability of the base may be due to the smaller volume of the body, the incompressible float (ARI's is foamed polypropylene) and/or the thin polypropylene base (ARI's is thicker and made of nylon). The failure rate of 2/9 or approximately 20% is high. The reduced operability during frost conditions compared to the ARI valves may be a characteristic of the size/shape of the valve (ARI is larger), the materials, the internal geometry and/or the seal characteristics. Regardless of the mechanism, this provides an indication of the ability to continue to operate during partial frozen conditions while the Nelson valves are already/still frozen.

There were no seating, performance or frost resistance issues identified for either the ARI D-040 P (plastic base) or D-040 B (brass base). The only disadvantage of the ARI valves (and Nelson ACV200P) would be the loss of operation compared to the Val-Matic 201-C during sustained freezing temperatures. As this situation would be quite rare and that it would be very unlikely that irrigation would be happening at this time minimize this downside. The other problems noted with the Val-Matic 201-C, including farmer override on leaking valves, seizing, etc. are more of a concern than this temporary loss of function. Based on the current testing there is no apparent advantage to using the brass base so long as a reasonable level of care is taken in handling, threading and tightening the valve. At this time the anticipated potential difference in long-term failure rate due to the selection of base materials (say 1%-5%) does not justify the increased cost (67% or approximately $100/valve).

Availability of all of the above valves was considered prior to testing. All valves are anticipated to be available for purchase for the foreseeable future.

RECOMMENDATIONS

It is recommended that SMRID proceed to full scale testing. The Netafim (ARI) D-040 P 2" (plastic base) air valve is recommended for all new and replacement sites. Ongoing monitoring to establish a long-term failure rate is required to continue to justify the plastic base, particularly following significant freeze events.

It is further recommended that SMRID review the placement of CAV's to improve performance. Placement at the high point of the turnout (top of the elbow) should be considered to improve the release of air during filling, reduce the response time during vacuum events and to improve the heat transfer from the large turnout body to the air valve.

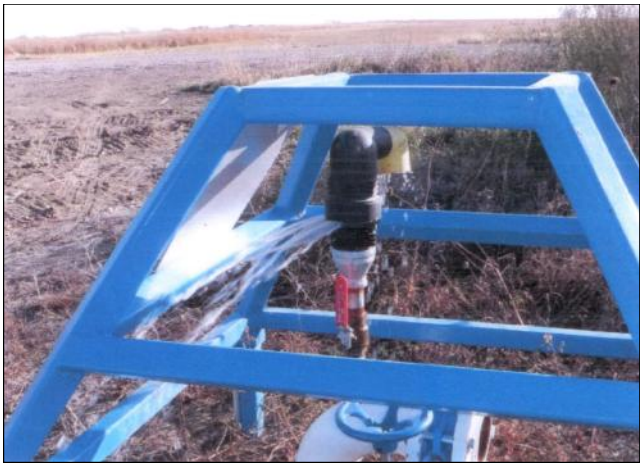


Photo No. 1

Photo No. 2

For more information, contact: Chris Gallagher, Design Engineer, SMRID, at 403-328-4401 or e-mail at cgallagher@smrid.ab.ca

Events

Irrigation Technical Conference took place on June 2 at the Lethbridge Lodge.

Topics included: alternate weed control methods, Magnacide H issues, end of pipeline spill provisions, Wheolite installation, dam safety and wasteways, Travers rehabilitation, irrigation water quality, alternate parcel agreements, and new IRP engineering standards.

Presentations are available on the CACDI website.

Contact Lloyd Healy at 403-382-4407 or email lloyd.healy@gov.ab.ca

Water Measurement Workshop took place on July 14 and 15 at the CACDI Flow Measurement and Testing Facility in Lethbridge.

Presentations are available on the CACDI website.

Contact Lawrence Schinkel at 403-381-5855 or email lawrence.schinkel@gov.ab.ca

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Visit us on the web

www.demofarm.ca/water_haulers.htm

This bulletin is intended to provide Alberta's irrigation industry with items of interest in irrigation. If you would like to submit articles or provide us with input, feel free to contact Don Gross by phone in Lethbridge at (403) 381-5872 or E-mail don.gross@gov.ab.ca.

Current and archive copies can be viewed on the Canada-Alberta Crop Development Initiative (CACDI) web page at www.demofarm.ca/water_haulers.htm.

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