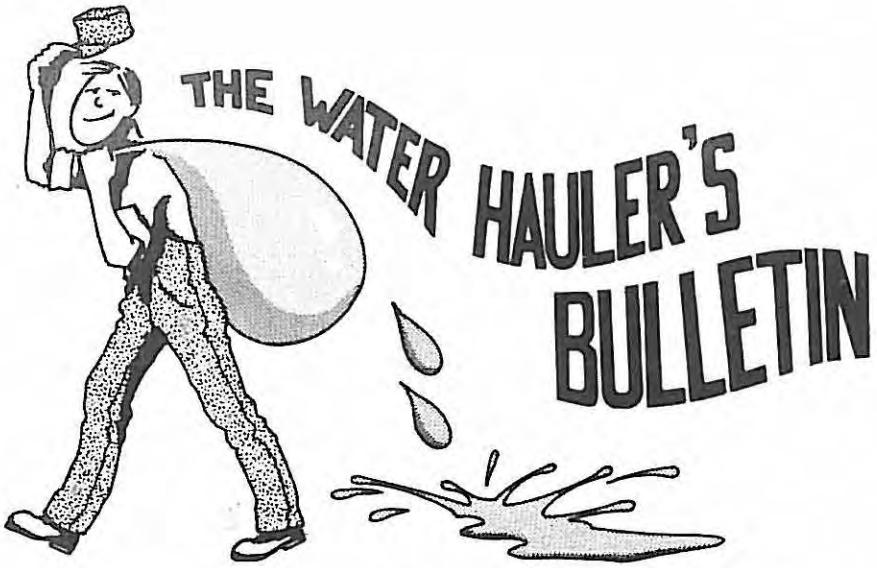

VOLUME 15, SPRING 1984

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PROTECTION - THE NAME OF THE GAME

In order to avoid unnecessary and costly repairs to buried water pipelines and canal liners, some irrigation districts are installing warning signs. In the case of buried water pipelines, the signs are placed on each side of the road right of way where the pipeline crosses any county road. The canal liner warning signs are usually placed where the liner starts and also at the end with the arrow pointing in the direction of the liner. If the liner is relatively long, then a sign may be placed in the middle with arrows pointing both directions. The signs are made up of either aluminum, galvanized sheet metal, or fibreglass measuring approximately 250 mm x 350 mm in size. Thickness of the material is 3 to 4 mm.

The lettering may be either painted on or silk screened. In the case of the fibreglass sign the lettering is covered with a thin coat of resin for protection against weather. The signs used by the districts thus far have been the metal type, but the Lethbridge Northern Irrigation District is experimenting with the fibreglass type. The notation on the sign reads "Warning" or "Caution" at the top followed by water pipeline or buried canal liner, with the district's name and telephone number at the bottom. Posts used are either the steel fence type or standard highway traffic sign posts which are available from Alberta Traffic Supplies. The cost per sign including cost of the post is approximately $15.00 each. This is money well spent - no need to say any more.

To coin a well known phrase - "Look before you dig".

* * *

ACROLEIN: DESERVES YOUR RESPECT

It has been reported in the Bureau of Reclamation's Operation and Maintenance Bulletin that a district employee in a U.S. Irrigation District lost an eye from exposure to acrolein. As many of you know, acrolein is often the active ingredient in aquatic plant herbicides used in our district canals to control submerged and floating weeds. The employee accidentally hooked and unlocked a valve on the top of the acrolein cylinder with his shirt sleeve, activating it sufficiently for a small amount of liquid chemical to squirt against his arm and ricochet into his left eye. Repeated washings upstream in the canal did not relieve the irritation of the eye. When medical attention was obtained, the employee did not have any acrolein label or literature with treatment information to provide his doctor. In spite of continued proper medical treatments, the employee lost sight in the eye.

It must be emphasized to employees that acrolein is flammable, chemically reactive, toxic and a lachrymator (eye irritator).

Important precautions that should be taken when acrolein is being handled or incorporated are: wear goggles and a face shield; have an approved gas mask available and know how to use it; if spilled on the skin, remove all contaminated clothing and wash skin thoroughly with water; if acrolein gets in the eyes, flush with water at least 15 minutes, and seek medical aid. Never have less than two people (one a certified applicator) working together around acrolein, so that assistance or help can be rendered in case of emergencies. Keep a water container close by so that in the event of an accident the victim does not have to jump into the canal and risk drowning.

One of our own irrigation district employees had a very close call, let's make 1984 chemically accident free.

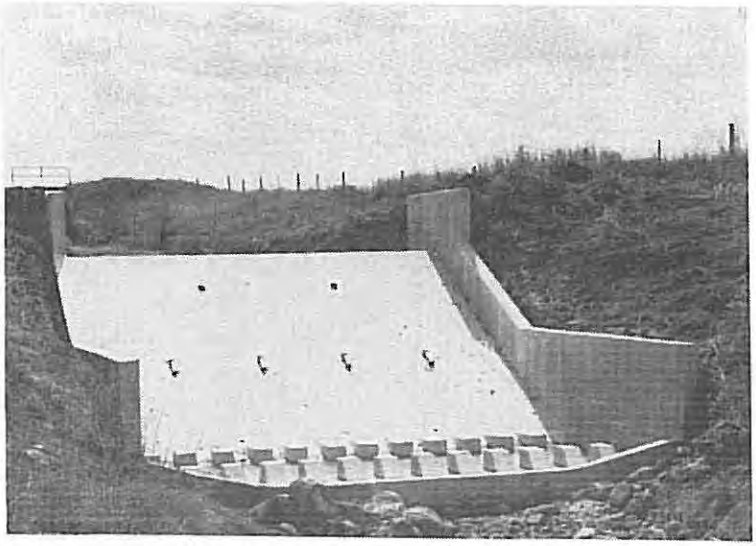
* * *

STRUCTURE REHABILITATION

In Volume 4, Water Hauler's Bulletin, Summer 1981, we reported on some major repairs done to refurbish three (3) drop structures on Lateral B, Enchant in Bow River Irrigation District. Sika Top was used to rebuild and patch the stilling basin blocks and floors. Epoxy was used to seal cracks and concrete grout used for major reconstruction of walls.

These structures are faring well after several irrigation seasons except for one problem. All three (3) structures developed a hairline transverse crack across the chute and the transition walls. Recent inspection indicates no serious widening of the chute cracks but the wall cracks appear much wider. We believe that the cracks are due to frost heave of saturated soil because the structures do not have adequate underslab drainage. It is possible that weep holes with adequate filters will solve the problem by draining out the water before freeze up. The savings by rehabilitating these structures rather than replacing them are quite high. It was estimated that the cost for replacing one of these structures would be over $70,000.00. The repairs and refurbishing was about $12,000.00. All indications are that the district made a wise decision.

Since that time the B.R.I.D. has gone ahead and rehabilitated three (3) more drop structures on Lateral B, Enchant and nineteen (19) drop structures on Lateral D5 (Vauxhall). In the near future the district will rehabilitate thirty one (31) similar drop structures on Lateral J (Vauxhall). The works on the fifty (50) structures on Laterals 5D and J include extending the stilling basin floors and provide new cutoffs, replacing rotten concrete with either Sika Top or concrete grout, replacing badly corroded rebars or increase rebars where possible, sealing cracks with epoxy, providing steel struts to the side walls and applying a Sika Top protective coating. Specialty work such as epoxy injection, patching and repairing is done by Jasan Engineering. Extension of floors and provision of new floors with stilling blocks, installation of struts, backfill and riprap placement is carried out by the district staff.



Like Hockey's Rocket Richard this old structure not only looks great but is in great shape after rehabilitation.

There are probably instances in other districts where the hydraulic structures are sound and capacity is not a problem. These structures may be rehabilitated for considerably less than the cost of a replacement and probably last as long. Some of the hydraulic structures constructed within the last ten years may show signs of trouble. We believe these structures should be repaired now before the problem becomes too serious. We know of such an instance in Lethbridge Northern Irrigation District where Jasan Engineering was called to repair a drop structure.

Epoxy injection requires specialists with special equipment but general concrete repairs can be done by district staff. The Portland Cement Association will provide advice to districts at no charge.

* * *

CONSOLIDATED CONCRETE PIPE - PRESSURE TESTED

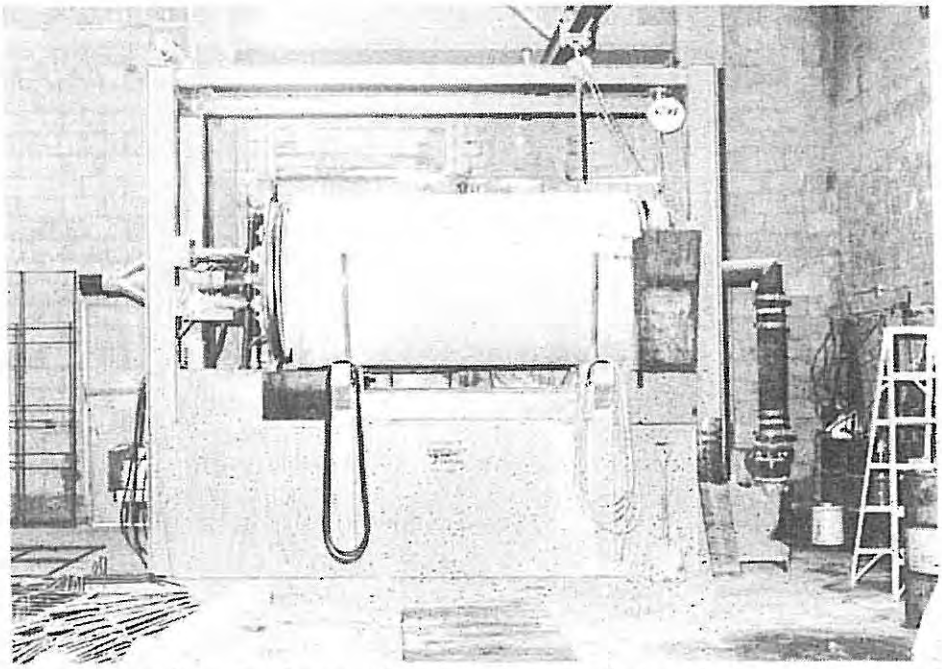
Consolidated Concrete Lethbridge has now developed two methods for pressure testing their concrete pipe built to A.S.T.M. C-361 Specifications. Leaks are a common problem both in the irrigation and sewer industries and are not often found until the pipeline is put in service.

Consolidated has far exceeded the specifications for testing by subjecting every pipe to a water pressure test using a specially designed hydrostatic tester. The tester creates a "working condition" by quickly introducing water to create the required design pressure. The pipe is joined to the machine using equivalent bell and spigot ends, the same as it would be done in the field.

They also have field joint air testers available that are designed to test the joint during installation for final assurance that everything is in readiness to do the job.

As a locally situated business, they extend an invitation to any interested person to drop by and inspect the plant products produced and their innovative testing procedures.

Further information may be obtained by phoning 327-7027 and asking for Graham, Ed or Doug.



It only takes 5 short minutes to complete the pipe pressure test with this custom built hydrostatic tester.

* * *

HOW WELL DO YOU KNOW YOUR CHAINS?

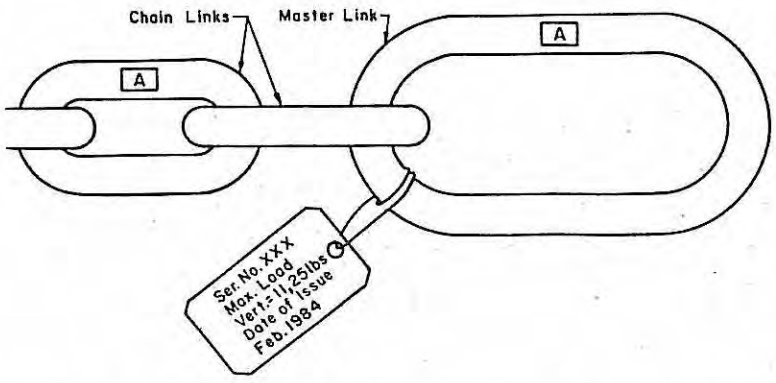
Did you realize that there is a difference between a lifting chain and an ordinary logging chain? There are many different grades of chain which are designed for specific types of applications. Choosing the right chain for a particular job is very important, especially when human lives are involved, eg. situations such as overhead hoisting. An ordinary logging or decking chain should never be used for overhead lifting. All too often an ordinary logging chain will not withstand the tension load produced by lifting heavy concrete structures such as precast panels and you know the rest of the story.

Every chain has a designated "working load limit". The "working load limit" is defined as the maximum load in kilograms or pounds which should ever be applied to a chain, when the chain is new or "in as new condition", and when the load is uniformly applied in direct tension to a straight length of chain. This may sound like a lot of words, but is well worth noting.

Only alloy chain, grade 8 or 80, should ever be used for overhead lifting applications. A grade 8 or 80 chain is identifiable by the letter A and number 8 or 80 stamped on each link or alternating links. Identification tags are used by some chain manufacturers and are attached to a link on the chain. The tag will have the manufacturer's serial number, maximum load limit, and date of issue on it.

The old saying that a chain is only as strong as its weakest link stands for its components as well. Chain component such as hooks, connecting links, swivels and any other fittings should have a rated "working load limit" at least equal to the chain.

It must be recognized that certain factors in the usage of chain and attachments can be abusive and lessen the load that the chain or attachments can withstand. Some examples are twisting of the chain; disfigurement; deterioration by straining, usage, weathering and corrosion; rapid application of load or jerking; and applying excessive loads. Things to look for are: cracks, gouges, wear, twists, bends and distortion.



NOTE: A Seminar on chains and lifting devices is being planned for sometime in the winter of 1985.

Just like any other piece of equipment, chains require regular inspection and maintenance. Chains judged defective should not be used until they are repaired or replaced.

It is advised that anyone buying chains, for lifting or otherwise, check with the manufacturer as to the working limits of a chain and stay within these recommendations.

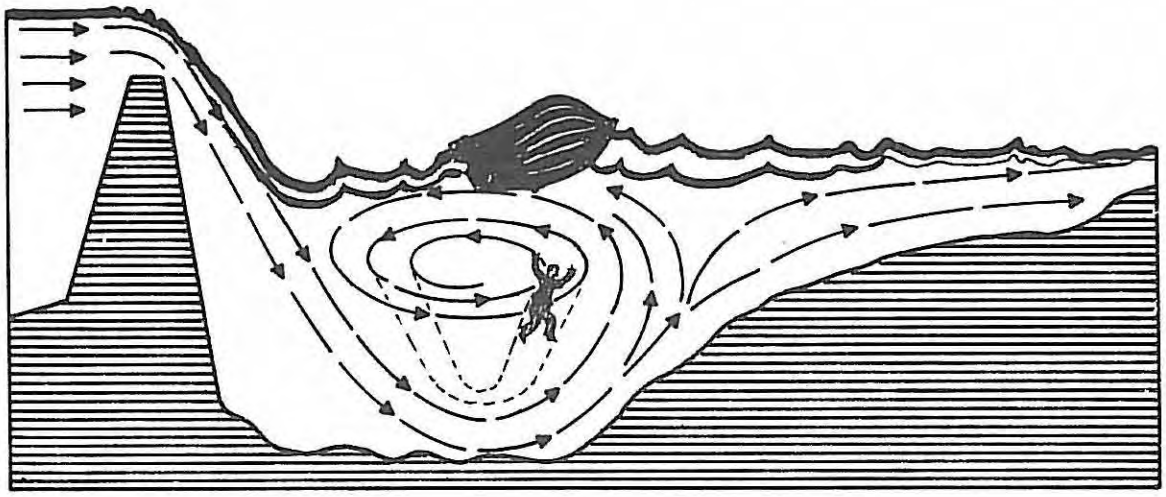
* * *

THE DROWNING MACHINE

Deceptively calm, yet deadly dangerous: that's the drowning machine - Weirs. Unlike the fearsome rolling and boiling taking place in the stilling basins of drop structures the weirs are deceptively harmless looking. Yet once in their grasp, the hydraulic forces below the weir soon pull even a large boat with motor running full throttle, back against the face of the weir, capsizing and flipping it. The best made life jackets will not save the occupants from being sucked under. Rescue is always a high risk operation, even when attempted by trained personnel using the proper methods and equipment.

The Project Planning Branch in Lethbridge has purchased the film entitled the "Drowning Machine", which explains the dangers of weirs and has actual film footage of boats being capsized with both the boaters and their unexperienced rescuers drowning. The film really drives the point home!

Any district or organization wanting to see this film can book it through Bev McIlroy by calling her at 329-5164. There is no charge for the usage of the film.



Arrows indicate direction of flow. However, a body may be in the "boil" for hours or days before finally being "kicked out" or retrieved.

* * *

DEFLECTOMETER IMPROVES PIPELINE INSPECTION

A new inside diameter pipe deflectometer has been developed jointly by the Project Planning Branch and Emku Engineering Ltd. of Edmonton. As many of our readers know, a deflection in a pipeline is one of the reasons for reduced flow capacity in an irrigation pipeline. The deflectometer currently being tested will provide a continuous reading of pipe deflections in irrigation pipe having diameters from 250 mm to 900 mm. The maximum length of pipe between manholes that can be inspected is 1000 m.

The video inspection program (now in third year) was initiated after concern was raised by an irrigation district that no means was available to know why flow capacities were reduced in pipelines. However, this type of inspection had some drawbacks. The deflections could be detected only at pipe joints and when the camera was submerged in water, no deflection evaluation could be done. The new deflectometer is designed to give a continuous reading of deflections even under submerged conditions.

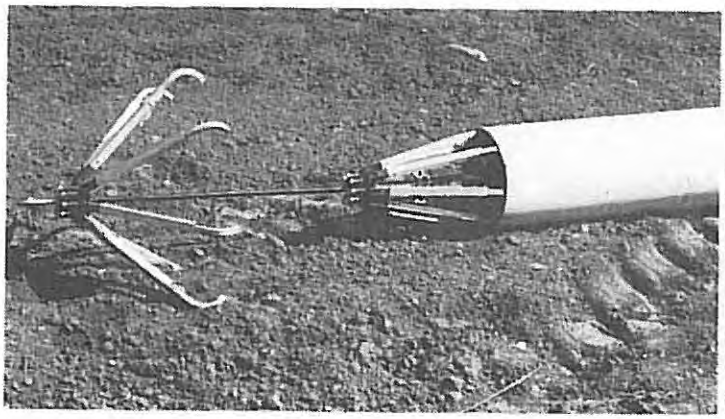
The deflectometer pictured below is constructed with two sets of eight flexible arms which are adjusted according to the pipeline diameter. The first set of arms aligns the deflectometer as it travels through the pipeline while the rear set of arms take the actual measurements. The diameter of the pipeline is measured in four different axis. Deflections can be measured to 175 mm in diameter.

A rope is strung through the pipeline and connected to the deflectometer before towing it with a 4 X 4 vehicle. As the deflectometer is towed, deflections are transmitted through a signal cable to a strip chart recorder to graphically monitor information as received.

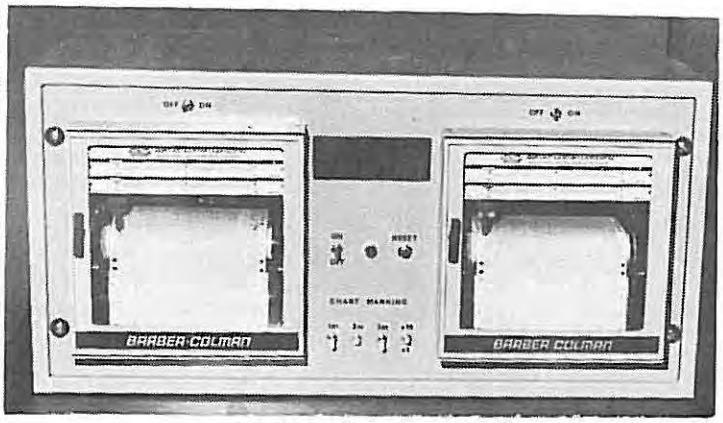
The deflectometer is currently under field testing in the St. Mary River Irrigation District and Mountain View Irrigation District.

Planned for the very near future is a research program involving the deflectometer whereby low pressure polyethylene and PVC pipelines will be studied to determine the extent of deflections in our irrigation pipelines and to monitor any changes taking place over time.

For more information please contact Svat Jonas at 329-5164.



Deflectometer emerging from pipeline.



Strip chart recorder.

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DRYLAND SALINE SEEPAGE CONTROL AND INVESTIGATIONS

In Alberta, approximately 500,000 acres of dryland are severely affected by saline seepage, costing farmers $40 million annually in lost revenue. The key to controlling dryland saline seepage is the appropriate management of water; either encouraging maximum use of water by plants in the recharge area or by draining subsurface water in the discharge area.

Preventing the phenomena in the recharge area before it becomes a problem is the preferred control. Alfalfa is most effective in drying out the subsoil and lowering the water table of the recharge area and consequently that of the saline seep. Alfalfa has a deeper rooting system (eg. 6 metres) and uses more moisture per foot than any other forage or cereal crop. It will produce best and be most effective in the parts of the field that have high water tables and are main recharge areas.

At the request of the Dryland Salinity Control Association, a farmers group, the Alberta Departments of Agriculture and Environment, and PFRA have provided soil and groundwater investigation teams and equipment. For a fee of $50 per affected quarter section a detailed investigation is carried out in order to locate the high water table and main recharge areas. Presently 109 farmers in southern Alberta have applied for 266 quarter sections, of which 7% is salt affected and 165 quarter sections have been investigated. Applications can be obtained from the local district agriculturist.

Subsurface drainage is an excellent control of dryland saline seepage, but only in selected instances. Research, funded by Farming For the Future, is being carried out to determine depth and spacing standards for subsurface drainage of dryland saline seeps. Preliminary data indicates that tile interceptor drainage should be installed deeper than on irrigated land, and preferably in a saturated, permeable layer.

For more information please contact Hank Vander Pluym at 329-5126.

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THE WATER HAULER'S BULLETIN

Designed to provide the operation and management personnel of Irrigation Districts with items of interest in their line of work. Comments are welcome. Please contact Duncan Lloyd at 329-5164, Lethbridge.

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