IN THE TRENCHES

EXECUTIVE

PRESIDENT
Jamie Turvey
(519) 535-4423
jamie.turvey@ads-pipe.com

PAST PRESIDENT
Matt Williams
(519) 291-0767
williamsdrainage@xplornet.com

VICE PRESIDENT
Jason Van Gorp
(519) 521-9086
jason.vangorp@gmail.com

DIRECTORS
Ken McCallum
(519) 440-7996
KenMccallum1187@gmail.com

Michael McCarthy
519-276-9292
mccarthyland@hotmail.com

Robert Hall
(519) 421-0036
robh@rwfbron.com

Secretary Treasurer
John R. Johnston
231 Dimson Ave, Guelph, ON
N1G 3C7
(519) 836-1386
jjohnston@gto.net

Convention Coordinator
Franklin Kains
(519) 775-0153
kains@golden.net

Environmental Advocate
Peter Johnson
(519) 318-2040
peter.johnson@bell.net

From the President's Desk

Greetings LICO Members,

After another long winter, we have finally had something close to a "normal" spring. The 2017 Survey of Agricultural Drainage tubing numbers have been released and to no one's surprise, the numbers were down by 24 million feet as compared with 2016 figures, coming in at a total of 150 million feet installed. I'm sure that we can all agree that the extremely wet spring last year was to blame for the downturn. Thankfully, this year seems to have the weather on our side and most contractors have more than enough to keep them busy until freeze up.

The next meeting of the LICO Executive will be held on June 12th, and our focus will be to review the Drainage Forum feedback. The end goal will be to provide a list of amendments/updates to the Drainage Guide, as well as possibly part of the Tile Drainage Installation Act and Regulations. If you were not at the convention in January or didn't have an opportunity to voice your concerns or suggestions, please feel free to do so by contacting one of the LICO Board Members prior to our next meeting. Your input is valuable and welcomed as we strive to improve and update.

Please remember to check out the new additions to our "In the Trenches" newsletter. We have added a free "Buy/Sell" section for members to list industry-related equipment that they are either looking to sell or needing to buy. Also, there is a new "Shots from the Field" section. Please send your pictures and advertisements to jjohnston@gto.net for the next addition of "In the Trenches."

Please also be reminded that the 2019 LICO convention dates are set for **January 22-24, 2019. You can book your rooms by calling 519-681-7151.**

Have a safe and prosperous summer!
Jamie Turvey

Drainage, Structures, and Erosion - Peter Johnson

February was a tough month in parts of Ontario, with record rainfall causing localized flash floods that even blew out some paved roads. The force of water, once the flow is concentrated, is unstoppable. Unfortunately, those same rainstorms took a huge toll on some farm fields, with gully erosion beyond what many growers have ever experienced.

One of the greatest concerns I have noted in my travels around Ontario this spring is the number of erosion control structures that did not hold up when an extreme rainstorm occurred. When the water diverts around the erosion control structure, it seems almost worse than having no erosion control structure at all. The water is concentrated, and that flow can create 6' gullies down through a field overnight. Erosion control structures are meant to prevent that from happening, our drains are supposed to get that water underground, so what is going wrong?

There are a number of factors coming together in most of these situations, but we need to work to prevent these. Often they are old erosion control structures, and almost always maintenance has been poor to non-existent. Tillage creates ridges and valleys that divert the water, and create new flow paths (darn that mouldboard plough!). In some cases sediments have built up and water retention is insufficient. But these are not the only factors. So many fencerows have been removed and ditches filled in, all of which increase water volumes dramatically! These are great from a field efficiency standpoint for the grower, but when that water flows, there is nothing to slow it down. And once it builds some volume and concentrates the flow, bad things happen fast.

Of course, it is not just all about the erosion control structure. Typically they are (and must be) designed, to handle the water that will come. There are many things that can contribute to failure of the structure, but tillage and maintenance are definitely the top two.

With erosion control structures funded under the new Canadian Agricultural Partnership, there will hopefully be more put in place to minimize erosion. But along with these structures, growers and landowners need to be reminded about upslope management, and proper maintenance around the structure. As fields and farms continue to get bigger, these details cannot be lost in the rush. Gullies and tile blowouts are not fun for anyone, and certainly are not long term sustainable.

As an industry, we need to make sure that the people we work with (farmers) know how critical it is for them to add the other half of the equation to the erosion control structure answer: maintenance, tillage, crop rotation. Erosion won't give you a second chance, so lets get it right the first time!

DRAINAGE OF SOIL – Part 9 Recognizing a Drainage Problem - R.W. Irwin

Regular maintenance of a drainage system involving inspection of the surface of the drained areas will reduce drainage problems to a minimum. In the spring, look for dry streaks created by each drain and check for wet spots over each drain. Look for three things:

a) The field has remained wet longer than similar fields.

b) Wet spots that remain after the rest of the field has dried off.

c) Holes left in the field caused by soil washing into the drain.

Check the outlet. Clean any grass and debris that may have collected. Has the outlet eroded? Is there free discharge? Is the rodent guard in place? Are there signs of red iron or long stringy green organic waste? Is sand coming out of the drain? Should any of these signs be present, dig up the drain at critical points and locate the source of the problem. If there is a problem, call your LICO drainage contractor.

TYPE OF PROBLEMS

The failure of subsurface drains to perform as expected may be caused by:

1. Soil physical conditions not permitting drainage.
2. Not determining the source of the water before the drains were installed
3. Ochre clogging.
4. Grade reversals in construction.
5. Breakage or improper alignment of drain tile or damage to plastic tubing through careless backfilling.
6. Construction when soil is too wet.
7. Settlement of sections of drain because of an unstable foundation.
8. Excessive crack widths between drain tile, or excessively large slots in plastic tubing, or perforations improperly cut, which allow soil to enter the drain pipe.
9. Erosion of soil into the drain pipe because of loose backfill.
10. Improper envelope material or application, that is, poor placement, tearing of envelope material, sealing of envelope with soil or ochre.
11. Collapse of drain pipe because of excess surface load, weak pipe or improper backfilling methods.
12. Plugging of pipe by organic wastes, and/or roots.

Drain problems can be confirmed through simultaneously observing the drain discharge and the height of the watertable between existing lateral drains.

SEDIMENTATION

The effectiveness of a drainage system may rapidly be destroyed through soil entering the drain pipe. Some soils have a greater tendency towards sedimentation than others. Soils of uniform grain size are unable to form a natural soil filter.

Continued Pg. 4

DRAINAGE OF SOIL - Part 9 (Cont'd. from Pg. 3)

These soils have been identified as very fine sands, loamy fine sands, fine sands and silts as well as some organic soils. Such soils are unstable when saturated and will flow into the drain pipe or seal and block the entry of water into the pipe. All soils with structural instability create low soil permeability. The upward force of water entering a drain pipe may exceed the buoyant soil particle weight and result in instability and soil movement unless natural bridging occurs. Particles greater than 0.25 mm generally have enough mass to withstand the usual forces produced by soil water flow and tend to be stable.

Instability would be greater for fine silts and clays except these soils exhibit cohesive inter-particle forces which bind them together. The critical tractive force must be exceeded for a particle to move. Intermediate diameters move at lower values of tractive force. Fine-grained soils (diameters less than 0.05 mm) will not require an envelope and do not form long-term deposits in drain pipe. Indeed, these soils may clog an envelope material if one were used.

TESTS FOR ENVELOPE NEED

Soils with a high degree of non-uniformity are not subject to sedimentation. Fine-grained soils with a uniformity coefficient, U, of less than 5, are susceptible to sedimentation, which is, U = d60/d10 less than 5, where d60 is a fine or very fine sand. The d60 refers to the diameter of material in which 60% is finer from the grain size distribution curve. In the Unified Classification, soils requiring drain envelope materials are: SP, SM, ML, and MH. Another common criterion is that envelopes are required for soils where the plasticity index, PI, is less than 10. We may do another article to better describe these ratios but their determination is not practical in the field.

Once the grain size distribution has been determined, graphs are available for establishing the effectiveness of an envelope for a particular soil. At the same time, the "Atterberg Limits" for the soil must also be determined in order to make a proper classification to assess the appropriateness of an envelope.

The School of Engineering, using the above criteria, developed a simple field test for the need for some form of filter protection. Many contractors use it but it is worthwhile to repeat.

A simple test to check on the need for a filter for a particular soil can be done as follows:

1. Cut the top and bottom out of two coffee cans.
2. Solder the cans together so you have an open-cylinder about 280 mm long.
3. Cut the center from the plastic lid and fit a piece of copper window screen to it.
4. Place on the can.
5. Moisten (not too wet) the soil to be tested and pack about a 25 cm depth on the screen.
6. Very carefully pour water into the top without washing the soil.
7. If you can fill the can to a depth of about 185 mm without the water and soil washing out the bottom, the soil does **not** require the pipe to be encased in an envelope. Be patient, wait at least three minutes.

Continued Pg. 5

DRAINAGE OF SOIL - Part 9 (Cont'd. from Pg. 4)

SOLUTION

Construction

Deposition of soil particles in a drain pipe usually takes place immediately after construction when the soil or backfill is still loose and any preexisting soil structure has been destroyed. In many instances, the material found in the drain pipe may be coarser than the parent material because of fines being washed away.

Minimum grades for full pipe flow are recommended in the Ontario Ministry of Agriculture and Food Publication 29 *Drainage Guide for Ontario*, but these grades do not make allowances for the condition of the sediment, nor make any prediction of the amount of sediment that can be carried.

Turbulence reduces flow but may cause sediment to move. Self-cleaning grades are not feasible with unstable soils; however, there is some merit in designing the pipe system for the maximum grade available and in the use of larger diameter pipe, to minimize inlet velocities. Drains will not flush out naturally when the depth of sediment deposits exceeds 20 mm.

It is essential that construction in these problem soils take place during dry periods, otherwise problems are certain to occur. Initial installation is a very critical period.

Envelopes

When labour was available and inexpensive, drain pipes were blinded with sod which created an effective filter envelope by placing water stable particles near the drain pipe. It also increased the effective pipe diameter and reduced the velocity of inflow.

The types of envelope material now available in Ontario provide protection for most problem soils provided the soils do not contain a large portion of fines. Failures of envelopes may occur through sealing by fine silt and clay particles and by iron and manganese oxides and sulfates. They also fail by mechanical tearing and abrasion.

Dietrich Engineering is celebrating it's 15th Anniversary!

Effective May 28th their address is now:

Dietrich Engineering
10 Alpine Court
Kitchener Ontario
N2E 2M7

CALENDAR OF EVENTS

January 21 - 24, 2019
LICO Conference
Best Western Lamplighter Inn
591 Wellington Rd,
London, Ontario N6C 4R3

Perform Rotary Ditching with Ditch Doctor

The Ditch Doctor rotary attachment is used to create, restore and maintain efficient ditches and is gentle on the environment. The attachment is used with a hydraulic excavator as a faster and more cost effective alternative to the conventional ditching method of bucket and excavator. One of the major benefits of the Ditch Doctor method is that the spoil is self-leveling so there is no need for any additional handling of the spoil. It produces an immediately viable ditch, requiring less maintenance once established and significantly reduces the impact on the local environment. The vegetation on the slope of the ditch is not disturbed, preventing erosion of the evenly distributed spoil back into the ditch. The Ditch Doctor method can also create a two stage ditch and work in up to three feet of water. For more information, visit ditchdoctor.ca