

TITAN TIMES

2019 YEAR IN REVIEW



Rounding Off The Year...

Another year has come and gone and as usual we have had an eventful one! We are pleased to share our 2019 Titan Times Year in Review featuring:

- Project Highlights
- Company News
- Research and Development Activities
- Upcoming Events

We hope you enjoy the read!

PROJECT HIGHLIGHTS



Upstream section of completed channel.



Installation starting downstream of main spillway.



Completed installaion of main spillway.

01

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Eco-Friendly 'Concrete on a Roll' Technology at Yukon Mine Spillway

Technological advances bring to market many new, and often more environmentally friendly, construction materials that become alternates to conventional products. If you didn't think 'concrete on a roll' existed—guess again. It's called Concrete Canvas® (CC). But what is it exactly?

Concrete Canvas® (CC) is a revolutionary new-class construction material called Geosynthetic Cementitious Composite Mats (GCCMs). It consists of a three-dimensional geosynthetic fiber matrix filled with a high early strength cementitious powder mix that hardens on hydration to form a thin, durable, waterproof and low-carbon concrete layer. Essentially, it's concrete on a roll and allows concrete construction without the need for plant or mixing equipment.

Used for a wide range of erosion control applications Concrete Canvas® features numerous benefits that make it an attractive product. First, its low mass, low carbon technology uses up to 95% less material than conventional concrete for many applications. Cont'd.....

Secondly, CC's roll format makes it logistically easier to handle and easier to install than conventional concrete—you just unroll, place and add water. Third, it can be installed very rapidly. In fact, CC can be laid at a rate of 200m²/hour—up to 10 times faster than conventional concrete solutions. Perhaps most impressive is that once hydrated CC typically sets to 80% full-strength within 24 hours. Once at full-strength its climatic resistance and durability can provide in excess of 120 years of performance.



These combined benefits provide overall project cost efficiencies making Concrete Canvas® the ideal product for two spillway erosion control lining projects recently completed at Eagle Gold Mine, in the Yukon where there is seasonal temperature variance of + 20° C to -30° C.

These spillways were designed to convey any over topped mine heap leach-ate in extreme weather conditions. The main spillway is approximately 500 meters long with the emergency spillway approximately 140 meters in length.

The project was completed in May 2019. Titan supplied the Concrete Canvas® and JDS Energy and Mining Inc. completed the installation at a rate of 750 - 850m² per day .

See video [here](#).



02

Containment Lining at Manitoba Hydro's Largest Power Station

This fall we supplied and installed a multi-layer system lining system for a transistor containment cell at Manitoba Hydro's largest power station. This consisted of two geotextile layers sandwiching the oil containment liner. In order to secure the multi-layer system, Titan fastened the liner to the perimeter concrete walls and interior foundations using neoprene gasket, galvanized wedge anchor bolts, and galvanized batten bar. The project was completed quickly and Titan completed all quality control to the client's satisfaction.



Port Hope Radioactive Waste Cell Lining

Our field crews continued significant work this year at the site of a multi-phase, multi-year remediation project in Port Hope, Ontario as part of a federal-municipal initiative to clean-up and manage radioactive waste in the area. The larger project involves construction of a waste management facility and supporting infrastructure for long-term safe management of approximately 1.2 million cubic meters of historic low-level radioactive waste; cleanup and transportation of this waste from various sites within Port Hope to the waste management facility, and long-term maintenance and monitoring. This new facility includes a 16 x 25 m high waste containment mound, six buildings, paved roads/parking areas, a stormwater management pond and a water treatment plant. Titan's scope of work involves installing over 900,000m² of geosynthetics including; HDPE geomembrane, geotextile and Geosynthetic Clary Liner (GCL) to line three radioactive waste cells.

Work on the first cell began in 2018 and the majority of the work in 2019 was completed in the second cell, cell 2A, with installation of a seven-layer geosynthetic lining system.



04

Prefabricated Geotextile System for Lake Causeway in Rural Manitoba

Titan supplied and installed a prefabricated geotextile system covering an area of 9,500m² in a lake causeway bed in Portage la Prairie, Manitoba. This system worked to separate the lake bed and rock and included a total of three separate sections of geotextile panels that were pre-sewn off-site. Once on-site these three sections were joined together to form one large panel which was pulled into the body of water by hand and by boat. The final step involved weighing down the submerged panel with sandbags in preparation of the rock placement by the earthworks contractor.

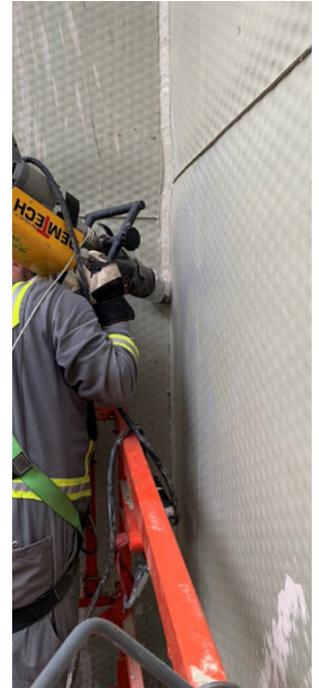
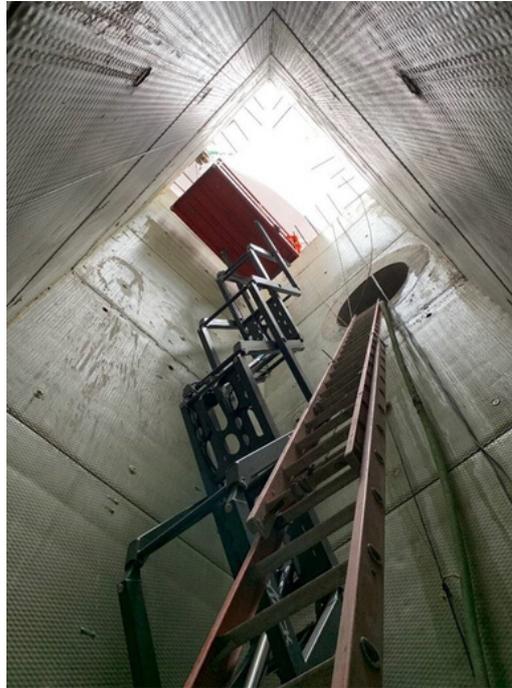
It took four days to complete the installation, which would have taken double the time without prefabrication, therefore this option provided the client with significant cost savings.



05

Sewer Tunnel Lining in Sarnia

Titan was involved in installing a combination of force main and gravity sewers to carry sewage from a pumping station to a Water Pollution Control Centre. When that was complete, two older pumping stations were decommissioned and replaced with a new pumping station. The purpose of this new sewer system is to increase capacity so new developments can be built. The quantity of liner supplied on this project is 315m², split between a 46' deep Vortex Chamber and a 15' deep Drop Chamber. The purpose of the concrete protection liner for the Vortex and Drop Chamber is to protect the concrete from gases that are bound to corrode it. Once the concrete was cast, Titan went on site to weld together any gaps between panels of liner, and to seal it to pipes coming into the chambers.



06

Environmental Drainage Solutions in Saskatchewan

We are doing our part for the environment with environmentally sound solutions including recycled materials like galvanized steel corrugated pipe and high density polyethylene plastic pipe (HDPE). Both steel and HDPE pipe offer a range of features and benefits which are suited to specific job site conditions and or requirements. Whether you require a steel CSP pipe arch culvert to reduce flow speed, which is required for some fish species to successfully swim upstream or, if you just need the flow capacity while dealing with a low terrain elevation the steel pipe arch culvert is a great option. The HDPE plastic dual wall pipe with smooth wall interior is very easy to handle making it very safe to use, it's light weight, strong, durable and offers increased flow rates. We have seen an increase of the use of HDPE plastic culverts in various projects throughout Saskatchewan, with a majority of projects still using steel CSP culverts. Great drainage solutions while being environmentally aware. Steel is the most recycled material on earth and the steel recycled in Canada every year saves enough energy to power approximately 2.7 million homes. Over 500 million pounds of plastic has been removed from our landfills and has been re-used in making HDPE drainage products. Titan is proud to have been a part of many plastic HDPE culvert drainage projects and steel CSP culvert drainage projects in Saskatchewan this year.



COMPANY HIGHLIGHTS

07

Award Winning 'Adopt-a-Highway' Clean Up Initiative



Titan's Peter McDougall (second left) accepts award on behalf of Titan.

Chamber award winners and dignitaries featured L to R: Ritchot Mayor Chris Ewan, Peter McDougall, Titan Environmental Containment; Ben Plett, Cobblestone Homes, Marty Ritchot, Maxx Pro Builders; Chamber President Marc Palud; and event emcee Derek Roth, Adventure Power Products.

In an effort to do our part for the environment, this spring, our Manitoba office adopted a 24 km stretch of highway (north and south of head office) under the Province's 'Adopt-a-Highway' program. For three weeks our staff teamed-up and worked tirelessly to clean up the ditches that had become heavily polluted from garbage trucks traveling to Winnipeg. Though not a glamorous job, we found some interesting items along the way, and it was extremely gratifying to see the remarkable difference this was making. We are very proud to have also won the Ritchot Chamber of Commerce 2018 Corporate Volunteerism of the Year Award in recognition of this initiative and other support that Titan provides to the local community.



08

First Titan Talk Seminar Series a Success!

This year marked the first Titan Talk Spring Seminar Series held in Winnipeg, Regina and Edmonton with an outstanding turn-out of 200 participants!

Thank you to all participants and our group of quality presenters from Advanced Drainage Systems, Inc. Geoproducts LLC, Concrete Canvas®, GeoSolutions and Seaman Corporation for making this event a big success.



09

Exclusive Sales Partnership with Concrete Canvas®

One of this year's biggest highlights was the launch of a new partnership with UK based Concrete Canvas®, granting Titan exclusive distribution rights for Concrete Canvas® geosynthetic cementitious composite mat (GCCM) in Canada. This partnership brings to market an innovative product with many core applications such as channel lining, bund lining, slope protection, weed suppression and remediation of existing concrete infrastructure. To support this venture Titan has opened a new 4,200 sq. ft. location in Squamish, British Columbia, complete with office and shop space; and has added two team members dedicated to Concrete Canvas® sales. The product is available from all Titan locations across Canada, and from newly established sub-distribution partners servicing Ontario, Québec and Atlantic Canada.



Shown L to R: Kelly Sitarz, President (Titan); Ron Drewry, Concrete Canvas Product Specialist (Titan); Phil Greer, UK & North America Business Development Manager (Concrete Canvas Ltd.); Brett Burkard, CEO (Titan); Juice Lambert, VP of Sales (Titan); Derek Bishop, CFO (Titan).

10

Becoming an ESOP Company

Looking towards the future, Titan is proud to have joined many influential and industry-leading companies with the official launch of a company-wide Employee Share Ownership Plan (ESOP) in early 2018. This plan makes it possible for employees to participate in the long-term value growth of the business through the purchase of an ownership interest. "Employee ownership has been part of Titan's culture since the start of our Company in 2006. And after many years of evolution and some hurdles along the way, I am thrilled that we are finally able to offer our staff the opportunity to own company stocks and share in our overall success", says Brett Burkard, CEO.

"My business partners and I recognize that what is good for the us, as principal owners of the business, is also good for employees who give their best to the company's continuous operation. We believe that both investment ownership and work contribution make a company successful and that's why we decided to implement this plan." The company has invested considerable time and resources to bring the ESOP to fruition and sees the investment as the foundation for long-term success.



R & D Activities

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Queen's University - Kingston ON - NSERC

Our collaborative research and development grant project with Queen's University continued, focusing on evaluating the performance of bituminous geomembrane in three important areas of study. One being the physical performance of BGM's to study the gravel puncture and leakage in mining applications, the other study focuses on examining the creep rupture behavior of BGM seams under different tensile shear loads the 3rd study examines the chemical durability of BGM's in a high pH range of 13.5 and impact of high temperature and the effect of the exposure of edges of the geotextile component to the high pH solutions. Very useful results were found so far from these studies and the technical papers are in progress.

University of Ottawa - Ottawa ON (NSERC - EGP)

We are pleased to have worked with the University of Ottawa for the Development of a Geosynthetic Mechanical Stabilization Technique for Road Sub-grade in Warming Cold Regions. This is a novel research study first of its kind in Canada and an innovative, unique and promising research that may bring about a significant technological advance that may contribute to significantly enhance the performance of roads in Canada in light of global warming and impact of freeze thaw cycles. Titan has developed an innovative geogrid composite for this application.

University of Saskatchewan - Saskatoon, SK (NSERC-CRD)

NSERC has approved another CRD research project for the study of 'Durability and Performance of BGM's; and this study will focus upon using the recycled aggregate materials like TDA' Tire derived aggregates which are widely used in Western Canada and also aim towards sustainable geosynthetic solutions and recycling.

McGill University - Montreal QC (Mitacs Accelerated Program)

Titan is actively involved in the Investigation of Low Ductility Geogrid - Based Reinforcement for the Ground Supported Concrete Structures using its innovative TE-SCR150 Con-force Geogrid.

Titan had successfully developed its innovative TE-SCR150 Con-force grid and installed it in 2017 in the concrete sidewalks for City of Calgary projects. The visual inspection after two years was similar to the first year with no visible distresses or cracking. Accelerated aging tests demonstrated that the material outperforms steel reinforcement in the long term with more corrosion resistant and bonding characteristics.

This year Titan engaged in the Mitacs approved research program with McGill University Montreal. A series In-situ tests will be performed using the TE-SCR150 Con-Force Grid. A computer program will also be created to model the structural behavior of the geogrid-reinforced concrete elements. Results are expected to provide new insights into the potential of using Con-Force Grid - reinforced for applications (sidewalks, concrete pavement, foundations, posts, etc.) in Northern Canada.



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City Of Winnipeg - R&D Testing with TE-FGP11-EPM

Titan's TE-FGP11-EPM range of fiberglass grids are specifically designed fiberglass grids ideal for asphalt reinforcement. These grids are polymer coated and bonded to an engineered polymeric membrane (EPM) one side. The EPM is designed to facilitate a stronger adhesion to the asphalt layers and the grid is placed with the EMP side on the top to be paved. A light track-coat is required over an old surface before installing this product. The polymer coating further optimizes the chemical compatibility between the fiber glass reinforcement and the pavement overlay.

TE-FGP11-EPM Fiberglass grid was field tested in the summer for Pavement rehabilitation projects and the EPM layer fully melted upon paving with HMA, thus strongly increasing the bonding strength of the Fiberglass grid within the asphalt layers. The testing was done on Main Street in the City of Winnipeg. The installation went very successful and now the cores of the installed section are being tested in the 3rd party laboratory to determine the increase in the bonding strength of the grid reinforcement in the asphalt layers.



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2019 Technical Papers

We are please to have published and presented the following technical papers as a result of our previous research and development activities:

- **'Pilot Case Study of Geogrid Reinforcement in Concrete' at Geo-Environmental Engineering 2019**

Concordia University, Montreal, Canada, May 30-31, 2019
 Sam Bhat 1*, Jimmy Thomas¹, and Venkat Lakkavailli²,
 Titan Environmental Containment Ltd. Ile des Chenes, MB Canada
Apleona Inc., Toronto, ON Canada

- **Use of Non-Woven Geotextiles for improving water quality of a eutrophic lake : An In-situ Study**

CSCE Annual Conference
 Growing with youth - Croitre avec les jeunes
 Laval (Greater Montreal), June 12 - 15, 2019

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2 Titan Environmental Containment Ltd., Canada

UPCOMING EVENTS

Look for us here in 2020!

January 2020

- MB Ag Days (Brandon, MB)
- AME Roundup (Vancouver, BC)

February 2020

- IECA Environmental Connection 2020 (Raleigh, NC)

March 2020

- Geosynthetics Conference (Charleston, SC)
- Tri-Party/Consulting Engineers of Alberta (Red Deer, AB)
- PDAC (Toronto, ON)
- Nunavut Mining Symposium (Nunavut)

April 2020

- Minerals North (Quesnel, BC)
- SIMSA SK Mining Supply Chain Forum (Saskatoon, SK)

May 2020

- Trenchless Technology Road Show (Edmonton, AB)
- Canadian Mining Expo (Timmins, ON)
- CIM (Vancouver, BC)

September 2020

- BC Road Builders Association (Kelowna, BC)
- GeoCalgary 2020 (Calgary, AB)
- SWIFT Conference (Winnipeg, MB)
- TAC 2020 Conference (Vancouver, BC)

October 2020

- Canadian Dam Association (Winnipeg, MB)
- TAC – Tunneling Association of Canada (Toronto, ON)
- Sask Pork Industry Symposium (Saskatoon, SK)

November 2020

- SARM Midterm Convention (Saskatoon, SK)
- ARHCA Annual Convention & Expo (Banff, AB)
- SHCA Fall Convention (Regina, SK)
- SCDA Show
- Erosion and Sediment Control Association Conference (Coquitlam, BC)
- ALIDP (Calgary, AB)
- MCDA Trade Show (Brandon, MB)





GEOMEMBRANE FABRICATION



TITAN TRAP
DRIVE-ON SPILL CONTAINMENT BERMS

Titan is now pleased to offer fabrication of geomembrane panels at our new Canadian fabrication facility. Using the latest in heat fusion technology our highly trained, IAGI certified staff produce the highest quality fabricated panels meeting ASTM D-443 standards. All of our fabricated geomembrane panels are destructive seam tested in our quality assurance lab. We fabricate many types of geomembranes to meet the most simple to the most complex design specifications for applications, including; oil and gas, secondary containment, frac tanks and waste and contaminated soil containment. Our **Titan Trap** drive-on spill berms provide protection of soil contamination from oil and gas spills on job sites. Featuring a truly tough geomembrane panels, our **Titan Trap** is designed to withstand the rugged terrain and the hearty Canadian climate



BENEFITS:

- Lead time is 1 - 3 days depending on qty.
- High flexibility, can withstand direct folding and compound bending without damaging its integrity and performance.
- Outstanding resistance to low temperature and ultraviolet exposure .
- Low replacement cost. If needed, only the floor is to be replaced, saving approx. 50%.
- Fully portable and collapsible, making storage and transport easy.

FEATURES:

- Custom made to fit specific sizes.
- Textured SKRIM reinforced material (LLDPE) - to help prevent slips.
- Durable and high puncture resistance.
- We provide various underlay options to help extend the life of the berm.
- Oil and water resistance memory foam walls.



HAPPY NEW YEAR!

YOU'VE MADE A GREAT IMPACT ON
THE YEAR. WE ARE GRATEFUL FOR
YOUR BUSINESS!

-THE TEAM AT TITAN-

