

# Mining Solutions

**Safer Operations. Higher Efficiency.  
Longer Lifespan.**



Mining drives progress beneath the surface. Titan delivers engineered geosynthetic solutions that enhance performance, extend lifespan, and improve reliability across critical mining infrastructure.

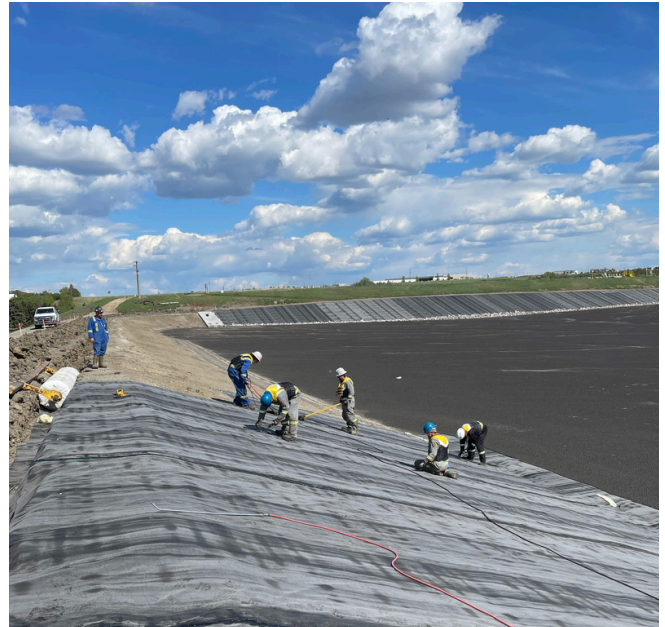
  
**TITAN**  
BUILD YOUR LEGEND

# Who We Are

## Experience you can count on — from concept to completion.

Titan is a leading supplier of innovative geosynthetic solutions designed to extend the lifecycle of critical mining infrastructure and improve operational efficiency. Our advanced product portfolio—including Mine-Shield Grid™, Swamp Grid®, Concrete Canvas®, and Bituminous Geomembrane (BGM liner)—is engineered to deliver high performance across a range of mining applications such as underground mine tunnels, heap leach pads, spillways and channels, vent walls, and haul roads.

Backed by extensive global project experience and a strong commitment to quality and safety, Titan provides reliable, field-proven solutions that help increase productivity, reduce maintenance demands, and enhance overall site performance—giving owners, engineers, and operators confidence in every stage of their mining operations.



## What We Do



### Design Assistance

Optimize performance and reduce costs through tailored design recommendations.



### Product Supply

We offer reliable material supply solutions across all Titan locations, ensuring consistent availability and support for your projects.



### Installation Support

Proven technical support backed by 300+ years of combined experience, assisting contractors to ensure proper system execution, performance, and longevity.

# Mining Solutions



## Tunnels

Underground tunnels are the backbone of mining operations, providing access to valuable resources deep below the surface. At Titan, we deliver precision-engineered solutions that ensure these critical pathways remain safe, reliable, and efficient, even in the most challenging conditions.

Structural Integrity



## Mine Haul Roads

Mine haul roads are the lifeline of mining operations, supporting heavy loads and constant traffic essential to productivity. Titan's engineered solutions enhance the durability, safety, and performance of these critical pathways, ensuring operations run efficiently even in the toughest conditions.

Load Performance



## Spillway Channels

Spillway channels are vital for managing water flow in mining operations, protecting both infrastructure and the surrounding environment. Through advanced geosynthetic solutions, Titan helps ensure these channels deliver reliable hydraulic performance, and long-term durability, even under extreme operating conditions.

Hydraulic Protection



## Tailings Ponds

Tailing ponds play a critical role in managing mining byproducts while protecting the surrounding environment. With advanced containment solutions, Titan helps mining operations achieve long-term durability, reliability, and environmental protection, even in the most demanding environments.

Containment

### Tunnels

Mining tunnels are more than just passageways—they are the foundation of safe, efficient operations. Ensuring their integrity is essential for safety, productivity, and long-term performance. With cutting-edge geosynthetic solutions,

Titan empowers mining projects to overcome the toughest underground challenges with confidence.

#### Featured Product Solution:

- Mine-Shield Grid™: High-strength geogrid for tunnel reinforcement.

#### Benefits:

- **Enhanced Safety:** Lightweight, blunt-profile materials reduce handling risks compared to steel mesh, while greater surface coverage improves ground control and anti-static properties add protection in underground environments.
- **Long-Term Durability:** Engineered to resist corrosion and degradation, these solutions do not rust like steel and can deliver up to a 120-year design life, ensuring reliable long-term performance in harsh mining conditions.
- **Cost Efficiency:** More cost-effective than traditional steel alternatives, with potential savings of approximately 25%, while faster installation reduces labor requirements and overall operating costs.
- **Ease of Installation:** Lightweight and flexible materials simplify transport and handling, enabling faster, more efficient installation and improved crew productivity.
- **Improved Performance:** Enhanced coverage and material performance help reduce maintenance requirements and support consistent, reliable operation of critical mining infrastructure.
- **Sustainability:** Reusable and long-lasting materials reduce waste and replacement frequency, supporting more sustainable and efficient mining operations.



#### Features:

- Flame-retardant and anti-static (FRAS) properties
- Corrosion, chemical, and biological resistance
- High tensile strength (up to 1000 × 1000 kN/m)
- Customizable sizes and aperture openings
- Flexible design conforms to ground conditions

### Mine Haul Roads

Mine haul roads are critical to maintaining efficient mining operations, bearing the weight of heavy machinery and constant traffic day in and day out. These critical pathways demand strength, stability, and resilience to keep operations running smoothly.

Titan's geosynthetic solutions are engineered to meet the rigorous demands of mine haul roads, offering unmatched performance and reliability:



#### Featured Product Solution:

- **Swamp Grid®** - Designed as an all-in-one solution, it provides soil reinforcement, filtration, separation, and drainage.

#### Benefits:

- **Cost Efficiency:** Reduces the need for aggregate, excavation, and backfilling—lowering overall construction costs.
- **Ground Stabilization:** Minimizes differential settlement and prevents subgrade movement, improving structural integrity.
- **Enhanced Performance:** Improves load distribution and overall system performance in weak or saturated soils.
- **Extended Service Life:** Increases the lifespan of infrastructure while reducing ongoing maintenance requirements.



#### A Swamp Grid™ for Every Project

There is a Swamp Grid™ for every project. Depending on the subgrade conditions and loading requirements of your site, Swamp Grid™ comes in various tensile strengths to be prescriptive for your project.

#### Features

- Geometry allows for strong mechanical interlock with soil particles and features high tensile stiffness at low strains to resist construction damage, environmental exposure.
- The attached non-woven geotextile effectively keeps expensive imported material from being contaminated by the migration of fines from the saturated subgrade soils.
- Engineered to be mechanically and chemically stable in aggressive soil environments and formulated to resist UV degradation.
- Not susceptible to hydrolysis, environmental stress cracking and micro-organism attack

### Spillway Channels

Designing reliable spillway channels is critical to maintaining structural integrity for mitigating risk and ensuring structural integrity in mining water management. High-velocity water flows and unpredictable subgrade conditions can quickly compromise traditional rock riprap and unreinforced concrete, exposing your site to potential failures.

To solve these complex challenges, we engineer advanced, customizable geosynthetic solutions that outcompete conventional methods and deliver proven field performance. Backed by rigorous testing data, our high-performance systems guarantee the long-term durability and regulatory compliance that your infrastructure demands.

#### Featured Product Solution:

- Concrete Canvas®: Geosynthetic Cementitious Composite Mat for lining and protection.

#### Benefits:

- **Rapid & Efficient Installation:** Can be installed up to 10× faster than traditional concrete, with minimal equipment and simplified logistics—reducing project timelines and labor costs.
- **Cost-Effective Solution:** Lower installation, transportation, and material requirements deliver significant overall cost savings compared to conventional concrete.
- **Lightweight & Low-Carbon:** Uses up to 95% less material, reducing environmental impact while minimizing waste and transportation demands.
- **Durable & Long-Lasting:** Provides up to 120 years of performance with superior resistance to abrasion, chemicals, weathering, and UV exposure.
- **High Strength Performance:** Achieves 50 MPa compressive strength with reinforced fiber matrix technology that resists cracking and absorbs impact.
- **Waterproof Protection:** Integrated PVC backing creates a durable, weather-resistant barrier for long-term infrastructure protection.
- **Flexible & Adaptable:** Easily conforms to ground profiles and existing structures, allowing for simple installation and on-site customization.



#### Features

- Innovative geosynthetic materials
- Waterproof and durable design
- Rapid installation
- Reinforced for longevity
- Environmentally conscious
- Versatile applications

### Tailings pond, Dams, and Caps

Tailings ponds, dams, and caps are essential components of mining operations, ensuring safe containment of byproducts, environmental protection, and operational efficiency. However, challenges like seepage, erosion, and structural instability demand innovative solutions. Titan's advanced geosynthetic systems are engineered to meet these challenges head-on, delivering unmatched performance and reliability.



#### Featured Product Solution:

- Bituminous Geomembrane (BGM)

#### Benefits:

- **High Puncture Resistance:** Engineered to withstand demanding site conditions, providing robust protection against damage without the need for additional protective layers.
- **Versatile Compatibility:** Suitable for use with all subgrades and cover materials, ensuring reliable performance across a wide range of applications.
- **Cost-Effective Installation:** Can be installed directly over prepared mineral sealing layers, eliminating the need for additional components and reducing overall project costs.
- **All-Weather Exposure:** Designed to remain exposed to environmental conditions without compromising performance or integrity.
- **Cold Weather Performance:** Can be installed in extreme temperatures down to  $-40^{\circ}\text{C}$ , enabling year-round construction in challenging climates.
- **Efficient Installation:** Fast installation process with reduced sensitivity to weather conditions helps extend construction seasons and improve project timelines.
- **Long-Term Durability:** Offers excellent resistance to aging, maintaining performance over extended service life.
- **Chemical & Environmental Resistance:** Performs reliably in aggressive environments without requiring additional anti-puncture geotextiles.
- **Dimensional Stability & Flexibility:** Maintains close contact with the subgrade, ensuring consistent performance and long-term sealing integrity.



#### Additional Geomembrane Solutions for Mining:

Titan also offers a range of proven geomembranes to suit varying project conditions, design requirements, and performance priorities:

- **HDPE Geomembrane:** High-density polyethylene liners offer excellent chemical resistance and durability, making them ideal for containment applications such as heap leach pads, tailings facilities, and water management systems.
- **LLDPE Geomembrane:** Linear low-density polyethylene provides enhanced flexibility and elongation, allowing for better performance in applications requiring adaptability to subgrade movement or complex geometries.
- **PVC Geomembrane:** Highly flexible and easy to install, well-suited for applications requiring close conformity to irregular surfaces or complex shapes.

# How We Deliver

## A clear path from plan to hand-off

With Titan's extensive mining experience and integrated supply capabilities, we support complex projects with reliable product availability, coordinated planning, and responsive execution that helps keep critical timelines on track.

You benefit from a single, accountable partner aligning materials, prefabrication, equipment, and documentation—ensuring consistency across the project, minimizing risk, and giving owners, engineers, and operators confidence from design through delivery.

## What that means for your project:

- **Design Assistance:** Technical guidance and engineering support to optimize material selection, system design, and constructability for mining applications
- **Integrated Project Assurance:** Coordinated planning and resource alignment to support complex mining schedules and reduce risk
- **Reliable Supply Chain:** Regional network and strong inventory position to ensure consistent material availability and minimize delays
- **Dedicated Project Oversight:** Single point of accountability with clear communication and proactive issue management



**Titan Environmental supplies proven geosynthetics and specialty civil engineering construction solutions designed to extend the life of vital infrastructure while protecting precious natural resources.**

We push limits with creative solutions. Our product lines include geomembranes, geotextiles, geogrids, primary & secondary containment systems, stormwater management solutions, drainage solutions, MSE wall & slope systems, and erosion & sediment control products. We service the road construction, agricultural, waste management, water resources, mining, oil and gas, and hydroelectric industries that support essential infrastructure worldwide. By providing engineers with a resilient foundation for building better, we've become North America's fastest-growing-end-to-end geosynthetics supplier, fabricator and installer.

We do more than help manage environmental impact—we improve how that's done. With a team of audacious innovators and agile problem-solvers, we're trusted to adapt to change, respond quickly, and support you at every stage. When you build with Titan, you strive for your very best.

**Titan Environmental Containment**

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