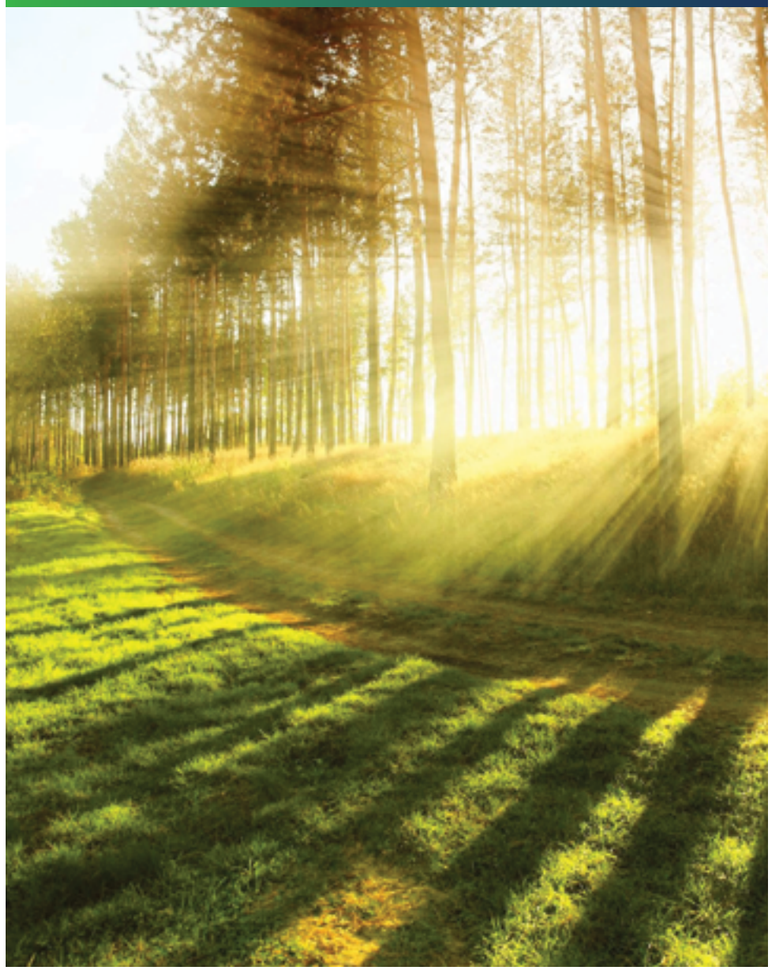
WESTERN EXCELSIOR CORPORATION

EROSION CONTROL • SEDIMENT CONTROL • TURF REINFORCEMENT

Flexible solutions for your erosion control needs.

Western Excelsior: Gaining ground, guaranteed.

Who is Western Excelsior?



In the beginning, Western Excelsior utilized timber harvested from logging initiatives aimed at reducing forest fires in the Rocky Mountains, manufacturing machine-produced excelsior since 1977. In the years since, Western Excelsior's product lines have expanded to include the use of a wide range of rapidly-renewable materials.

Western Excelsior produces a wide variety of Rolled Erosion Control Products (RECPs), High-Performance Turf Reinforcement Mats (HPTRMs), and sediment control products. All these materials provide engineered environmental stewardship with a product that is produced primarily of rapid-renewable and pre-consumer recycled materials. Using Western Excelsior products can aid in LEED certification while reducing pollution, and enhancing vegetation establishment. Western Excelsior provides the ultimate partnership between nature and technology, using natural resources engineered to preserve our natural landscapes.

By operating manufacturing plants and storage facilities in strategic locations across the country, Western Excelsior is positioned to provide economical erosion and sediment control solutions to any project. No matter the requirement, Western Excelsior is ready to meet the challenge.

Western Excelsior manufacturing facilities are located in Campbell, TX; Macon, GA; and Poseyville, IN, and the corporate offices are located in Evansville, Indiana. Additionally, Western Excelsior maintains an extensive network of distributors with offices from coast to coast.

Western Excelsior Timeline

1977	Western Excelsior is founded in Mancos, Colorado, focusing on manufacturing machine-produced Aspen excelsior fiber from superior quality, high-altitude Aspen trees.
1985	First fiber mat machines are brought to the US, and Excel excelsior fibered erosion control blankets are produced.
1985-1990	Product line expands with additional renewable fibered products including straw and coconut-based products.
2000	Western Excelsior Corporation is bought by a family-owned entity and business headquarters are created in Evansville, Indiana.
2007	A second manufacturing facility opens in Macon, Georgia, doubling the manufacturing capabilities of the company.
2017	Western Excelsior Corporation acquires North American Green gaining an additional production facility in Poseyville, Indiana. From the acquisition, WEC becomes the largest erosion control manufacturer.
May 2017	Facility fire at Mancos, Colorado indefinitely halts all aspen excelsior production.
2018	Campbell, Texas manufacturing facility opens, and final production closes at the original Mancos, Colorado site.

The Environmental Benefits of Erosion Control

Billions of dollars are spent each year to manage the effects of erosion. Slopes are washed away by storm water runoff, channels are filled with sediment, shorelines can be altered forever and topsoil can be lost to harvests. Additionally, chemical and biological pollutants attach to soil particles and are deposited into natural waterways along with the sediment load. In urban environments, the use of vegetated systems as long-term ground cover/protection reduces the runoff acceleration associated with development. As an added benefit, the long-term aesthetics and repair costs are typically far less than structural or rigid solutions.

"Accelerated global soil erosion decimates 12 to 15 million acres of land per year, and the costs to society are immeasurable."

Designers, specifiers and installers can prevent much of this destruction by using the latest developments in erosion control. Western Excelsior provides the products and expertise landowners, contractors and government agencies need to protect natural resources from land and soil loss. Western Excelsior solutions save many natural resources, save time and save money.

Quantifiable Performance, Field Proven Success

Although other manufacturers may provide a variety of products, Western Excelsior's dedication to quantifiable performance and field proven success yields a significant advantage for the customer, specifier, and the environment. Western Excelsior evaluates all its products via state-of-the-practice testing protocols including full-scale laboratory and field trials, leveraged by way of industry-leading documented performance.

Temporary

Excel SR-1™

[Single Net Straw Blanket]

Regular

Rapid Go

All Natural

Excel SS-2™

[Double Net Straw Blanket]

Regular

Rapid Go

All Natural

Speedy Green™

Fabricated from agricultural straw, Western Excelsior's **Excel SR-1** and **Excel SS-2** series temporary blankets offer an ideal solution for rainfall/rainsplash protection on shallow slopes and channel protection for low-risk, low-flow channels. These superior straw blankets incorporate Regular, Rapid-Go and All Natural nettings and are available in both single and double net varieties. Each blanket is manufactured to ensure a consistent thickness and distribution of fibers, allowing for excellent flexibility, moisture absorption and the ability to conform to the soil surface. Straw matrix temporary ECBs are used extensively for DOT applications on slopes, roadside ditches and swales.

Western Excelsior's SS-2 is also available with Speedy Green, a patent pending process that may be applied to any netting configuration. Speedy Green is a great option to bring a natural aesthetic to any project immediately upon installation.

Western Excelsior produces blankets available in custom widths and lengths covering 200, 500 and1000 square yards; providing savings in installation labor.

Nettings and Stitching

Regular
Synthetic, photodegradable

Rapid Go
UV accelerated synthetic, photodegradable, rapid degradable

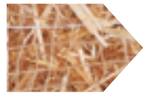
All Natural
Leno woven jute/scrim, 100% biodegradable

Extended-Term

Excel CS-3™

[Double Net Coconut/Straw Blanket]

Regular



All Natural

Nettings and Stitching

Regular
UV stabilized synthetic, photodegradable

All Natural
Leno woven jute/scrim, 100% biodegradable

"Extended-Term ECBs are ideal for projects requiring protection for longer than 12 months."

Excel CS-3 is an Extended-Term ECB comprised of a blended matrix of 70% agricultural straw and 30% clean coconut. The blended matrix is mechanically (stitch) bound on two inch centers to Regular or All Natural netting. Excel CS-3 offers extended 12-24 month longevity, compared to straw matrix ECBs, thus providing a longer lasting alternative for moderate gradient slopes and channels. The All Natural configuration provides a completely biodegradable option with leno-weave netting to minimize wildlife entrapment.

Long-Term

Excel CC-4™

[Double Net Coconut Blanket]

Regular

All Natural

Nettings and Stitching

Regular
UV stabilized synthetic, photodegradable

All Natural
Leno woven jute/scrim, 100% biodegradable

"Long-term ECBs are ideal for arid regions or projects requiring protection for longer than 24 months."

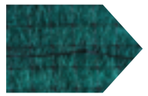
Excel CC-4 is a Long-Term ECB comprised of a 100% clean coconut matrix mechanically (stitch) bound on two inch centers between two long lasting nets. The properties of the coconut matrix provide long-lasting erosion protection and the highest level of performance protecting slope installations from rainfall and rainsplash.

Coconut fibers are utilized as matrix materials, providing erosion protection and mulching for a period greater than 24 and up to 36 months. Heavy duty, UV stabilized netting is exclusively utilized for regular, long-term products. Coconut blankets are also available with All Natural netting.

Permanent

Excel PP5-8/10/12™

[Double Net, Stitch bonded, Fiber filled TRM]



Regular

Nettings and Stitching

Regular
UV stabilized synthetic, nondegradable

Excel PP5 permanent Turf Reinforcement Mats (TRMs) are comprised of 100% synthetic components. A matrix of green or tan polypropylene fibers is mechanically (stitch) bound between two UV stabilized heavy-duty synthetic nets. Each is a permanent rolled erosion control product that provides short-term erosion protection and long-term turf reinforcement for greater than 36 months.

The PP5 line of stitch bonded TRMs provide significant resistance to hydraulic forces and have been tested in full-scale laboratory environments as well as challenging field conditions. PP5-8, PP5-10 and PP5-12 provide increasing levels of unvegetated performance, giving designers options to make economical use of material while satisfying project needs. Once partially and/or fully vegetated, each material provides a high level of performance in resisting the forces of flowing water and rainfall.

HPTRM Systems

Advancing High-Performance Turf Reinforcement Mat Technology

Utilizing a new, advanced production process, Western Excelsior has produced woven HPTRMs that offer extended capabilities when compared to competitive products. The PP5 line of woven HPTRMs have a continuous and homogeneous 3-D structure, providing superior resistance to hydraulic stresses and environmental degradation (ideal for long life in any climate). Western Excelsior's next generation materials offer greater strength at low strain, which means mobilizing the HPTRM strength faster, maintaining dimension and stability under the most extreme conditions and loads. The PP5 HPTRMs provide the highest level of resistance to hydraulic stresses, wheel loads or debris/ice and provide the highest factor of safety and durability. This technology provides a sensible choice for a cost-effective, technically proven, permanent, environmentally sensitive, reinforced vegetative solution to traditional hard armor alternatives.

PP5-Pro™

Capitalizing on Western Excelsior's groundbreaking woven technology, PP5-Pro™ provides greater strength, durability and performance compared to stitch-bonded TRMs. Classified as a medium loading/survivability material, PP5-Pro™ affords designers a cost-effective solution and offers these benefits:

- Increased design life and strength.
- Single-layer homogeneous woven structure.
- Superior aesthetics and reduced potential for entanglement with wildlife, foot traffic or mowers.

PP5-Xtreme™

Strength sets PP5-Xtreme™ apart from any other materials. Real, practical working strength is provided by the material as full strength is achieved at low strain. PP5-Xtreme™ is unmatched in strength as it shows an instant and significant resistance to loading, minimizing displacement under load. This strength is what enables PP5-Xtreme™ to be more durable when exposed to debris and hydraulic stresses. PP5-Xtreme™ is classified as a high survivability material, and offers these additional benefits:

- Balanced properties yield excellent performance with respect to vegetation establishment.
- Provides geotechnical reinforcement to resist shallow plane failures.
- Highest resistance to flow induced shear and USACE overtopping flow qualified.

PP5-Pro™
PP5-Xtreme™
PP5-Ultimate™

These high-performance, turf reinforcement mats are all available in these 3 configurations.

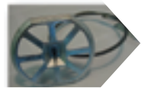
PP5-Ultimate™

PP5-Ulitimate is just that, Ultimate. Highest yield strength with the same real, practical working strength of PP5-Xtreme. Specializing in slope stability, shore lining and other applications where high-end strength or longevity are of singular importance, PP5-Ultimate is the top of the line.

- Longest design life.
- Highest yield strength.
- Slope stability standout.

Anchor Reinforced Vegetated Systems

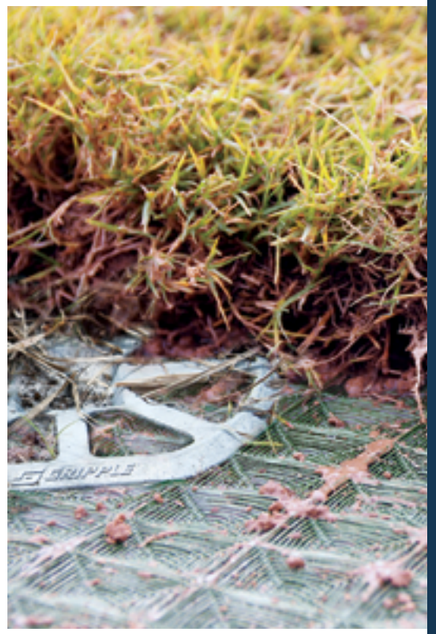
Introducing Xtreme Armor System™



The Xtreme Armor System (XAS) is an Anchor Reinforced Vegetated System (ARVS), combining woven High-Performance Turf Reinforcement Mats (HPTRMs) with Gripple® Percussion Driven Anchors (PDAs) to create an armoring system that is mechanically secured to the ground surface. The durability of the woven HPTRM provides confidence to install in high loading/high survivability applications. PDAs are deep-seated anchors that are embedded under a potential failure plane, harnessing the strength of the fabric to hold saturated, surficial soil. XAS provides a high performance, reliable and cost-effective means to replace or provide slope stability in many applications. The system is available in a suite of standard configurations to address a typical range of projects. Custom configurations can be designed to optimize performance and value to site-specific challenges.

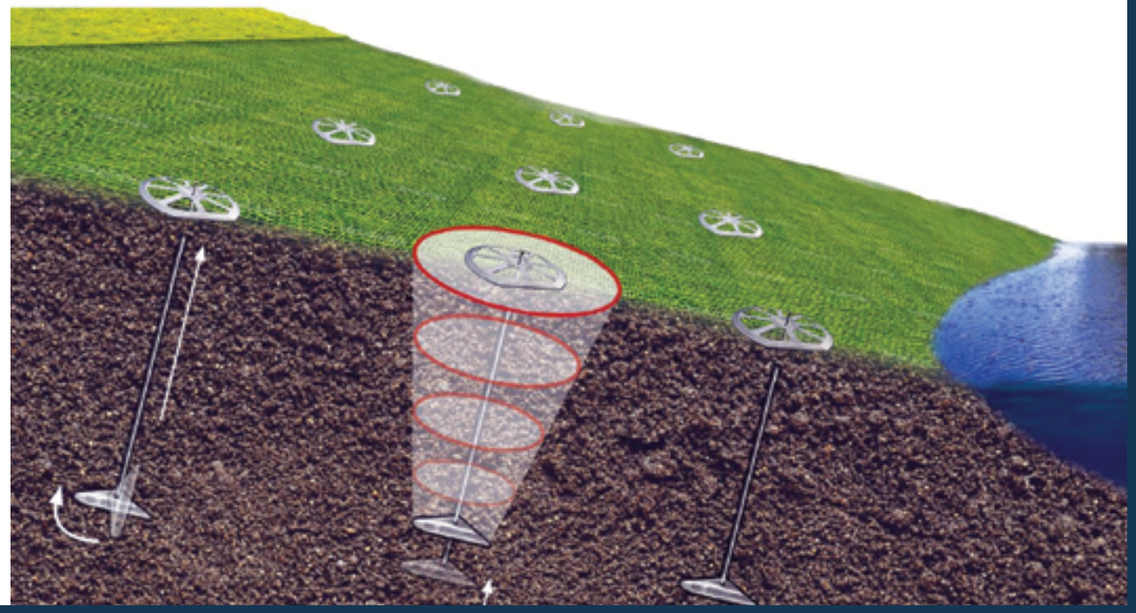
ARVS installations are used to protect ground from erosion and add stability to the soil base. Slope stability, channel lining, shoreline and public grounds projects are often well suited for ARVS consideration. The outstanding performance and flexibility of XAS make the system a well-respected and widely used solution. After nearly ten years, XAS has become a clear market leader in value and performance.

Western Excelsior is an exclusive supplier of Gripple® anchoring solutions for the erosion control market. The Gripple Terra-Lock System of anchors is an innovative method of geotechnical engineering for heavy erosion and slope stability, delivering significant time and labor savings, immediate security and aiding vegetation growth. Additionally, we carry a full-line of Gripple Twist Anchors and Anchoring accessories. To learn more, visit our website www.westernexcelsior.com/products/gripple



Final Assembly

The unique and powerful feature of Anchor Reinforced Vegetated Systems (ARVS), is the combination of components. Utilizing deep-seated, high-strength anchors in conjunction with high-strength, low-deformation fabric yields a system that uniquely provides high performance at an economy that cannot be matched. Matching the anchor/fabric combination with a site-specific frequency and depth design can optimize a system to provide an even greater cost-benefit ratio. If economical top-end performance isn't enough, the flexibility, aesthetics, durability, and repairability of the WEC systems are compelling on their own merit.



Product Overview Chart

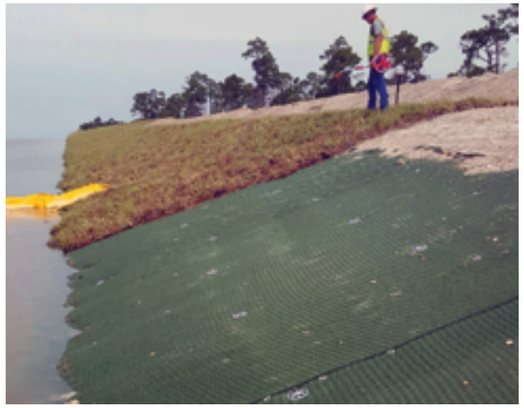
Western Excelsior manufactures a full line of erosion and sediment control products including short-term, extended-term, long-term, and permanent Rolled Erosion Control Products (RECPs) each designed to meet different project site needs.

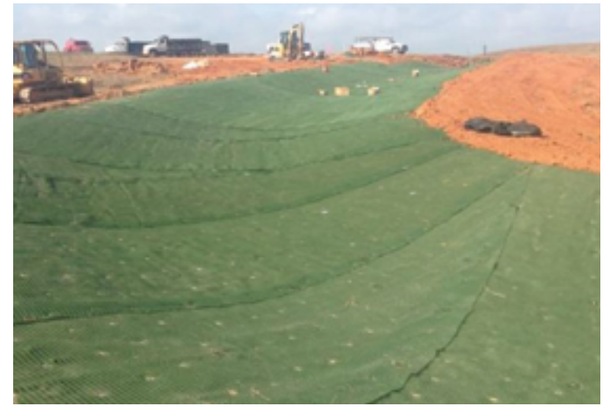
Successful projects start with evaluating the erosion potential, then selecting the proper product based on those parameters. Reference the product selection chart below to find the right solution for your next project. Need more help? Try our design software Excel Erosion Design (EED) or contact us directly for design guidance.

Visit westernexcelsior.com to get started.

Rolled Erosion Control Product Selection Chart

	Product	Net Description	Matrix Materials	Longevity (months)	Typical Slope Applications (H:V)	Channel Application Thresholds
Short-term Temporary ECBs	SR-1	Lightweight photodegradable, synthetic top net	Straw	≤ 12	3:1	≤ 1.6 psf /5.0 fps
	SR-1 Rapid Go	Lightweight accelerated photodegradable, synthetic top net	Straw	≤ 3	3:1	≤ 1.6 psf /5.0 fps
	SR-1 All Natural	Woven biodegradable jute top net	Straw	≤ 12	3:1	≤ 1.6 psf /5.0 fps
	SS-2	Lightweight photodegradable, synthetic top and bottom net	Straw	≤ 12	2.5:1	≤ 1.8 psf /6.0 fps
	SS-2 Rapid Go	Lightweight accelerated photodegradable, synthetic top and bottom net	Straw	≤ 3	2.5:1	≤ 1.8 psf /6.0 fps
	SS-2 All Natural	Woven biodegradable jute top and bottom net	Straw	≤ 12	2.5:1	≤ 1.8 psf /6.0 fps
Extended-term Temporary ECBs	CS-3	UV-extended synthetic photodegradable top net, lightweight photodegradable synthetic bottom net.	Coconut/Straw	≤ 24	2:1	≤ 2.0 psf /7.0 fps
	CS-3 All Natural	Woven biodegradable jute top and bottom net	Coconut/Straw	≤ 24	2:1	≤ 2.0 psf /7.0 fps
	CC-4	UV-extended synthetic photodegradable top and bottom net	Coconut	≤ 36	1:1	≤ 2.3 psf /8.0 fps
	CC-4 All Natural	Woven biodegradable jute top and bottom net	Coconut	≤ 36	1:1	≤ 2.8 psf /9.0 fps
Permanent TRMs	PP5 - 8 oz.	UV-stable permanent synthetic top and bottom net	UV-stable Synthetic fiber	≥ 36	1:1	≤ 8 psf/12 fps
	PP5 - 10 oz.	UV-stable permanent synthetic top and bottom net	UV-stable Synthetic fiber	≥ 36	1:1	≤ 12 psf/15 fps
	PP5 - 12 oz.	UV-stable permanent synthetic top and bottom net	UV-stable Synthetic fiber	≥ 36	1:1	≤ 12 psf/15 fps
	PP5-Heavy Duty™	TRM with UV-stable, woven synthetic construction	N/A	Permanent	1:1 and greater	≤ 12 psf/20 fps





Xtreme Armor System Selection Chart

STEP 1. Select HPTRM

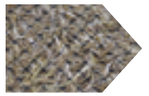
Product	Mass/Area (oz/yd2)	Product Description	Channel Application Thresholds	Tensile Strength
PP5 - Pro™	7.5	Basic HPTRM with UV-stable, woven synthetic construction	12 psf/20fps	3,200 lb/ft x 3,000 lb/ft MD x TD
PP5 - Xtreme™	9.2	Optimized HPTRM for channels and slopes, UV-stable, high strength woven synthetic construction	17psf/25fps	4,000 lb/ft x 3,000 lb/ft MD x TD
PP5 - Ultimate™	12.5	Specialized HPTRM for slope stability and pond linings. UV-stable, ultimate strength woven synthetic construction	17psf/25fps	5,000 lb/ft x 5,000 lb/ft MD x TD

STEP 2. Select Anchor

Product	Anchor Description	Anchor Size	Typical Working Load	Typical Application
Twist Anchor	Stainless steel twisted anchor. Available in TL-TA1 for compacted soils and TL-TA2 for soft soils	8"	50-180 lbs	Anchoring for moderate loading/survivability.
		12"	100-230 lbs	
Gripple® TLA2	Gravity Die Cast Percussion Driven Earth Anchor (PDEA). Available in Zinc Aluminum Alloy or Stainless Steel	3 in^2 anchor area, 3mm, 3 ft Tendon (typ.)	500 lbs	Surficial Slope and High loading capabilities under hydraulic stresses
Gripple® TLA3	Gravity Die Cast Percussion Driven Earth Anchor (PDEA). Available in Zinc Aluminum Alloy or Stainless Steel	6 in^2 anchor area, 3-4 mm, 3-6 ft Tendon (typ.)	1000 lbs	Handles high to extreme loading to greater subsurface depths.
Gripple® TLA4	Gravity Die Cast Percussion Driven Earth Anchor (PDEA). Available in Zinc Aluminum Alloy or Stainless Steel	13 in^2 anchor area, 4-6 mm, 6-9 ft Tendon (typ.)	2000 lbs	Ultimate loading and strength for structural support

Sediment Control

Excel Straw Logs - Straw Fiber Sediment Control Logs



Excel Straw Logs

Excel Straw Bio Logs

Excel Straw Logs consist of a 100% straw matrix confined by a tubular synthetic net. Excel Straw Logs function well as low-flow inlet filters and roadside filters, as they allow minimal flow and sediment to pass through. The logs are flexible, conform to the soil surface, and are secured by staking.

Available in a variety of standard diameters- 9, 12 and 20 inch and lengths, Excel Straw Logs can also be ordered in custom lengths to meet specific job conditions.

Project Design Support

All Successful Projects Initiate the Same Way, Rooted in Solid Design

Excel Erosion Design

All projects benefit from good planning. Understanding product thresholds is a good start, however, erosion control product performance is affected by site-specific conditions. For site-specific product selection, consult Excel Erosion Design (EED), the state-of-the-art design program developed by Western Excelsior. EED utilizes the most proven design methods to optimize the use of the unique properties and advantages of each product. Both slope/rainfall and channel projects may be evaluated. Additionally, vegetated and unvegetated conditions can be considered. EED is easy and free to use, but also complete in execution and output.

Outstanding features of the program include:

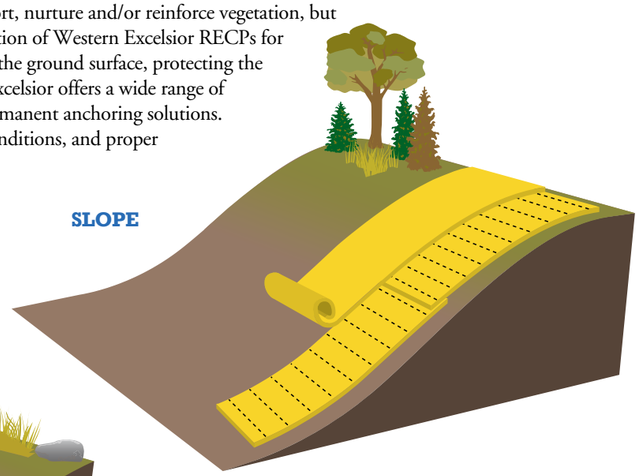
- Work in English or Metric Units Seamlessly
- Utilize State of the Practice Design Techniques
- Engineer Preferred Output
- Easy Web Based Interface
- Always Free and Available
- Multiple Product Options with Corresponding Factor of Safety

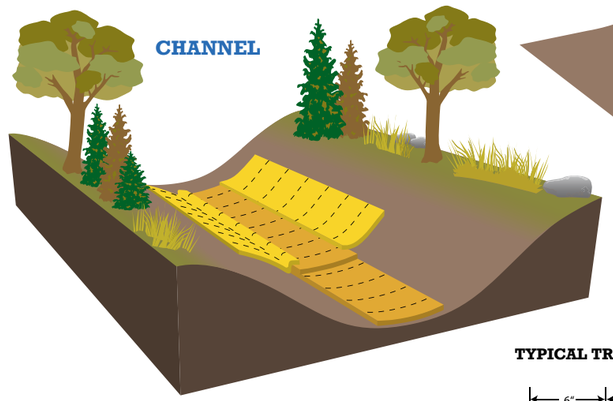
Log on to www.westernexcelsior.com to access the program.

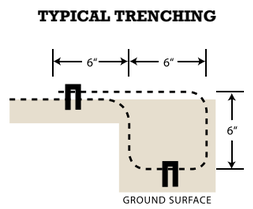
Basics of Installation

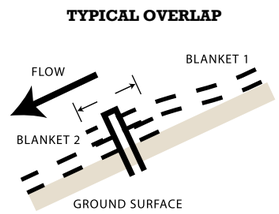
Rolled Erosion Control Product (RECP)

All Western Excelsior RECP products are designed to support, nurture and/or reinforce vegetation, but proper installation is the key to a successful project. Application of Western Excelsior RECPs for slope and channel projects requires securing the material to the ground surface, protecting the terminal edges, and overlapping pins and seams. Western Excelsior offers a wide range of fastener types from wire staples to eco-friendly stakes, to permanent anchoring solutions. Selection of fasteners will vary depending on soil and site conditions, and proper fastening patterns must be used to achieve optimal results.



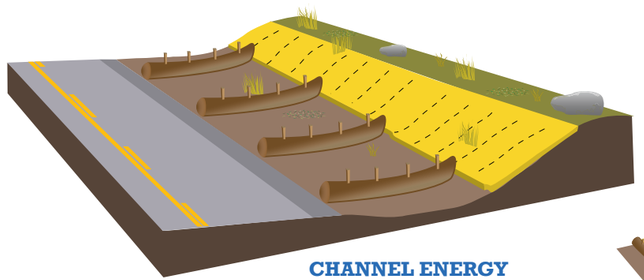


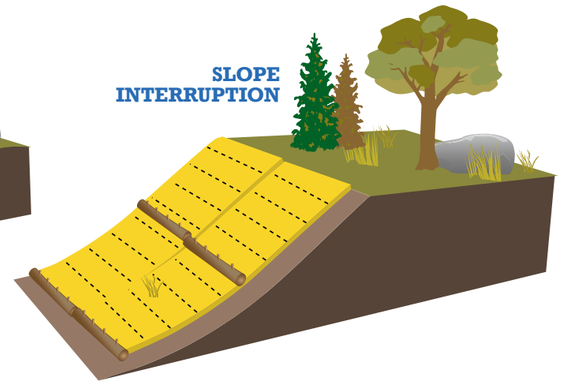




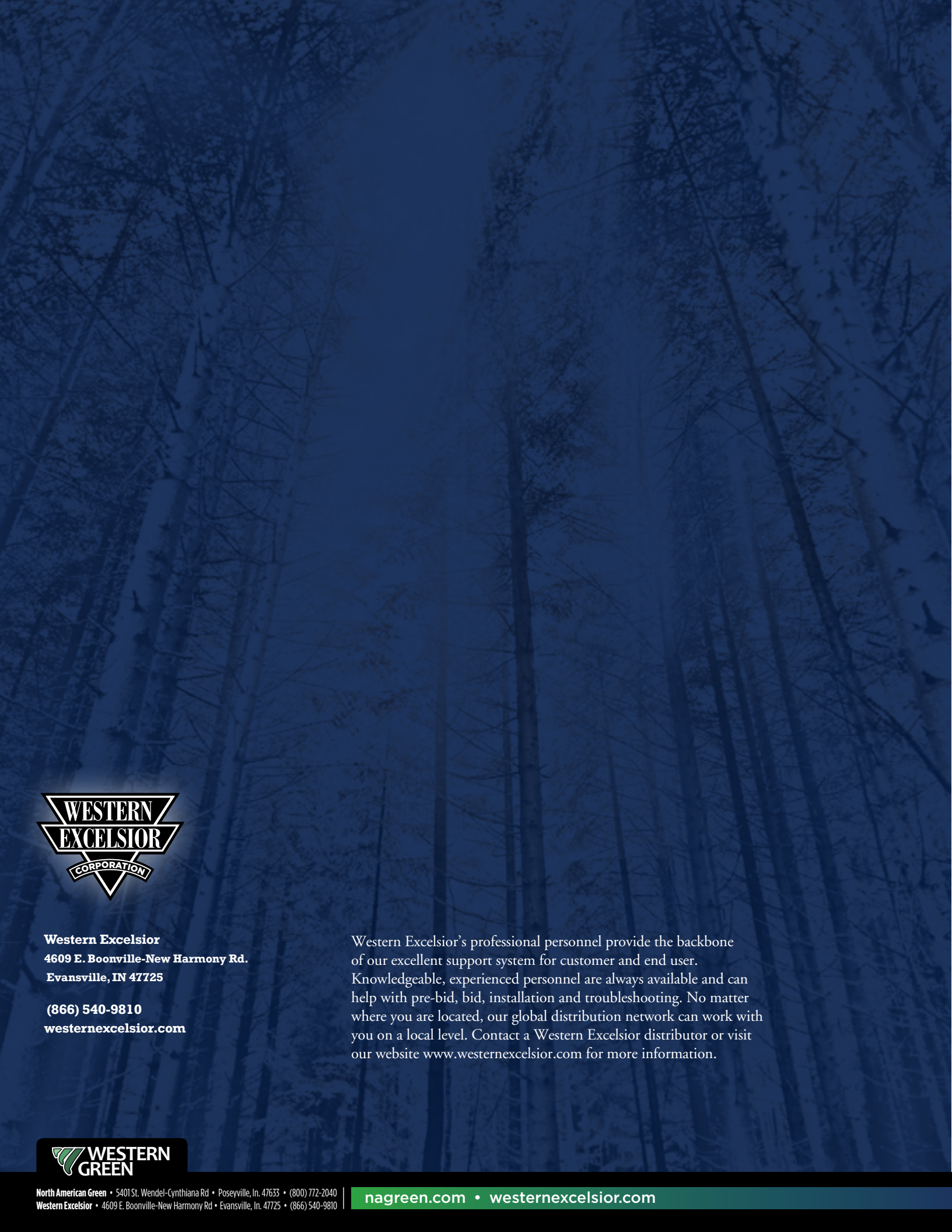
Sediment Retention Fiber Roll (SRFR)

SRFRs reduce energy, spread and dissipate flow, and filter sediment in four main applications: perimeter sediment control, channel energy dissipation, inlet filtration and slope interruption. Proper selection and installation of SRFRs will ensure project success. Installed with staking or lashing, alone or in conjunction with RECPs, a SRFR can offer temporary sediment control for up to 2 years.





For full installation details, drawings, stapling patterns and more, visit westernexcelsior.com for downloadable guides in both PDF and DWG format.



Western Excelsior
4609 E. Boonville-New Harmony Rd.
Evansville, IN 47725

(866) 540-9810
westernexcelsior.com

Western Excelsior's professional personnel provide the backbone of our excellent support system for customer and end user. Knowledgeable, experienced personnel are always available and can help with pre-bid, bid, installation and troubleshooting. No matter where you are located, our global distribution network can work with you on a local level. Contact a Western Excelsior distributor or visit our website www.westernexcelsior.com for more information.