Seismic

Tow Cables, Umbilicals, Straps and Ropes
Enhancing the Discovery
Continuous development in seismic data acquisition calls for innovation in umbilicals, tow cables, straps and ropes.

Traditional marine seismic recording spreads are rapidly increasing in size and data density and the emergence of new technologies like Life of Field, EM and Nodal have all pushed the demands on umbilicals, cables and their materials to keep pace.

Cortland is constantly evolving their products to meet the demands of these new technologies to ensure maximum operational efficiency and safety. Our experienced team of offshore seismic operation engineers have the knowledge and expertise to design and manufacture fibre ropes, armoured cables, electro mechanical cables and umbilicals for these high fatigue offshore applications.

As a key supplier to the seismic industry since the early 1990’s, Cortland has developed a unique and extensive portfolio of industry specific products including:

- All array ropes
- Bridle straps
- Armoured & synthetic tow cables
- Electro magnetic source cables
- Airgun umbilicals
- Deck cables
- Terminations
- Cable grips
- Tail buoy cables
- Fibre optical cables
- Ocean bottom component cables
- Permanent array cables
- Field support technicians
- Streamer strength members
- Streamer core cables
Safe deployment, equipment durability and transport of both energy and signal are all critical elements to successful seismic operations.

**Armoured Tow Cables** In 2001 Cortland was approached by a major seismic contractor to develop a next generation armoured tow cable with a significant reduction in diameter, yet retaining traditional tensile strength and fatigue performance. Working together with our suppliers we developed a specialized lubrication system that prevents corrosion and enhances fatigue for increased reliability and durability. The resulting cable has a 27% diameter reduction, while maintaining strength ductility and functionality. With hundreds of kilometers of this cable deployed, Cortland's Armoured Lead-in Cable sets the global standard for seismic tow cables.

Cortland also factory installs all types of common and specially developed fairings. Various cable termination configurations are offered for total mechanical, electrical and leak tight security including those performed in cooperation with Sercel, providing a second layer of quality control.

**Airgun Umbilicals** With increasing vessel speeds, wider spreads and challenging demands for source offsets, modern airgun umbilicals have a tough standard to meet. Cortland recently re-developed Airgun Umbilicals to meet these standards. These updated umbilicals have increased armoured performance and can include either standard 7/8”, 1” and 1-1/4” Aramid reinforced hoses or a selection of high collapse resistant hose variants.

**Ocean Bottom Cables** As a field goes from upstream to downstream reservoir monitoring, a key success factor is field optimization. This need drives the development of permanent and semi permanent data acquisition systems. Cortland has supplied many types of these Ocean Bottom Cables for both vertical and horizontal deployment.
Cortland Armoured Tow Cable

Key Advantages:
• Tensile > 2260N/mm²
• Proprietary cold drawn Armour process
• Pre forming of wires
• Steel tube, gel filled, for optics and signals

Did you know:
• Cortland was the first to develop, and patent, the hairy fairing on tow cables
• Cortland was the first to develop the “skinny” tow cable, achieving 27% reduction in cable diameter while maintaining strength ductility and functionality
Tow Cables and Umbilicals

Cortland has been involved in key technology breakthroughs which enable the deployment of today's arrays.

Nodal Technology Recent developments in ocean bottom data collection techniques have led to self-contained cable-less seismic monitoring “Node” stations that are deployed onto the ocean floor and then recovered to download collected data. Working with our partners, Cortland has developed a terminated deployment rope with the correct balance of: weight for fast deployment, tensile strength for heavy loads, precise length for correct nodal spacing, and quick connect/disconnect terminations for fast deployment and recovery. Hundreds of kilometers of our terminated Nodal Cables are currently being used worldwide.

Tail Buoy Cables By design tail buoys require towing which can induce unwanted noise and drag. As broadband seismic develops, longer tail buoy towing sections can amplify these negative effects. Cortland’s small diameter tail buoy cables utilize our proprietary Hi-Wire design allowing higher cable strains compared to more standard wire constructions. This provides reliable and quiet signal transfer with excellent stretch characteristics to help de-couple any tugging from the tail buoy.

Hairy Fairing Cortland was the first manufacturer to develop the Hairy Fairing Cable to reduce cable noise and drag without affecting winch or sheave performance. All our braided rope and cable products are offered with hairy fairing. A full selection of material blends and 1 to 4 take-outs around the circumference are available to achieve the best results for the intended application and environment.
Electro Magnetic Towed Power Cables The combination of conventional seismic and electro magnetic (EM) surveys has proven to increase accuracy of seismic interpretation. Cortland has manufactured EM power cables for both deep and shallow water towing from the very start of this technology.

Airgun Terminations Umbilicals can be fully terminated ensuring the successful transfer of the tow loads while offering protection to the electrical, optical and pneumatic interfaces. Termination options include subsea waterproof canister units, molded or spring bend stiffeners or segmented bend restrictors, bulkhead interface plates and topside tubed take-offs. Cortland's trained field engineers provide services and commissioning to the global seismic fleet for all our customers.

Deck Cables Cortland offers robust and reliable instrument room-to-reel signal cables. Jacket protection and splash-proof connectors are all designed to keep a clean and reliable signal as debris and time accumulate during the vessel's lifetime.

Cable Grips Used to grip many types of cables, from large hydraulic umbilicals to small fibre optic cables, Cable Grips are designed to minimize any external damage with non-metallic content. They can be used as a “quick fit” temporary attachment, or as a permanent attachment, and can be retrofitted without the need to gain access to the end of the cable.

Connector reliability is important in adverse conditions and limited access applications
The technological use of blended synthetic fibres produces tow rope and straps with optimal characteristics for seismic exploration.

Cortland offers a selection of purpose engineered tow ropes and straps for the seismic industry. Our numerous manufacturing partners also allow us to select the fibre best suited for your application. HMWPE (High Molecular Weight Polyethylene), Aramid, LCP (Liquid Crystal Polymer) and Polyamid families of fibres are all available. Cortland can even blend these materials to accomplish optimal characteristics for the intended purpose.

**Ropes** With unlimited length capacity and rope sizes up to 200mm, Cortland is one of the most advanced rope manufacturers in the world. Our patented 12x12 rope design and BOB® (Bend Optimized Braid) construction are perfectly suited for super wide tow ropes and other front end applications.

Cortland also offers the strongest rope fibre currently available. Our Plasma® rope strands are created from Spectra® HMWPE fibre and enhanced using a patented process that draws the fibre at the strand level to optimize load distribution of individual filaments within the rope. Unlike many heat set processes, Plasma® rope maintains a workable softness.

**Straps** As seismic spreads are increasing, so are the required forces to achieve the separation. Position accuracy and long-term deployment exposure mean deflector straps need to be purpose designed and built. Cortland offers a full line of deflector straps specifically designed for seismic front-end requirements. Using our extensive experience, we carefully select a strap's fibre blend to maintain strength and resist both fatigue and creep. Cortland straps are encapsulated in a double armoured PVC fairing that offers cut protection and reduces strumming and oscillation during operation, and can include specified hardware as well as full traceability and material certification.
Deflector Straps

Cortland Key Benefits:
- Integrated PVC fairing
- Low friction material in eye pads to protect against wear and ensure movement on spools
- Blend of HMWPE and Aramid load bearing
- Length tolerance: +/- 5mm
- Overbraided jacket to remove "slamming" and reduce abrasion

Options:
- Improved cut resistance 5-10x by additional synthetic armouring
- Integrated backup strap
- Set of straps with stiffness optimized design for reduced fatigue exposure on deflector
- Fully proof load tested and certified, with "as built" length verification
Straps and Ropes

Super Wide Tow Rope  Probably the most critical rope within the seismic array, super wide tow ropes need to cope with high levels of tension-tension and cyclic bend fatigue.

Two major elements to consider when choosing a super wide tow rope:

Rope Construction  This has to be a balance between efficient fiber use, flexibility, spliceability and total structural rope integrity. These factors are especially critical as ropes get larger to cope with the new types of paravanes coming onto the market. Cortland’s patented 12x12 rope construction offers an excellent balance of these factors.

Cortland offers a variety of rope constructions and designs, either with or without jacketed and faired sections, created to suit specific configurations.

Rope Material  Cortland engineers its products with both high performance and standard fibers to offer customers the proper solutions. High performance fibers are generally limited to three major types, HMPE, liquid crystal polymer (LCP) and Aramids. HMPE has excellent fatigue and robustness properties; however it suffers from low heat tolerance. LCP provides good fatigue properties with excellent creep resistance. Aramids have excellent heat and creep resistance properties but do not perform as well in abrasion resistance, tension-tension and bend fatigue.

Cortland has utilized the advantages of both HMPE and LCP to develop BOB® (Braid Optimized for Bending) rope. This rope leads the way in deep water lifting applications where serious fatigue is induced by AHC (active heave compensation) units.
Every Cortland solution is unique and developed in close partnership with our customer.

**Front End Ropes** Whether it’s separation ropes, spur lines, dilt float ropes, deflector lifting ropes or 3-eye splices, Cortland ropes are ready for deployment upon delivery. Braided or foiled fairings are also available and we can even create specialty ropes that achieve a combination of stretch and low elongation.

**Deflector Straps** As deflector doors get larger, accurate positioning and durability become more critical for deflector straps. Cortland straps can be specifically designed to the load and position needs of the deflector itself. Our well-proven blend of Aramid and HMWPE fibres are created to last 12 months in sea before verification, and have a high resistance to creep, abrasion and temperature. For increased safety, options like backup ropes and cut resistant synthetic layers are also available.

**Dilt Float Depth Ropes** As the selection of streamer depths increases, it requires accurate and reliable depth tow ropes for the front end. By using dilt float straps from the Cortland family of products, the handling is very light, reliable, and efficient.

Cortland continues to use advances in technology to provide innovative solutions to the seismic industry. Please email cortland@cortlandcompany.com for an initial discussion, or visit us online at cortlandcompany.com.
Cortland is driven by innovative thinking, use of high technology materials and attention to detail. Our in-depth understanding of demanding operational environments means we can deliver trusted, proven solutions to our customers worldwide.

Today, Cortland provides innovative, efficient and lightweight rope, slings, cables and umbilicals; along with mooring design, analysis and installation services to the oil and gas, heavy marine, subsea, ROV, seismic, defense, aerostat and medical markets. Cortland is a part of Actuant Corporation (NYSE: ATU), a diversified industrial company with operations in more than 30 countries. cortlandcompany.com