Polymers revolutionizing offshore applications

The offshore energy sector demands innovative solutions to improve efficiency, safety and environmental sustainability. Traditional metallic Hang-Off Clamps (HOCs) face challenges such as corrosion, heavy weight and complex installation requirements. Advanced polymer technology is transforming these applications, offering lightweight, corrosion resistant alternatives that enhance performance and reduce maintenance.

Nylacast Engineered Products leads the way in polymer manufacturing and development, drawing on over 50 years of expertise to deliver high performance alternatives across a wide range of industries, including automotive, offshore oil & gas, mining, construction, and aerospace.

With an advanced manufacturing facility, the company has made significant investments to establish an engineered solutions division, offering unparalleled polymer manufacturing and machining capabilities. Industry leading cellular polymer manufacturing divisions, comprehensive multi-axis CNC machining, in-house testing and assembly, and a dedicated training academy ensure that every opportunity is maximized. This commitment fosters expertise that drives continuous innovation, meeting the industry's evolving needs year after year.

The Nylacast engineering department comprises dedicated project and production teams, each focused on meeting exact customer requirements through design and development, analysis, project management, and front-end engineering support.

As a provider of complex engineered solutions, it offers a full turnkey package tailored to industry applications with bespoke and specialized capabilities. With a strong focus on the offshore energy and renewable sectors, the company delivers innovative solutions that enhance design, efficiency, cost-effectiveness, and environmental impact, helping customers optimize their existing applications.

Materials

Engineered polymers have been a driving force behind innovative technologies for years. Polymer developments and the science behind the process have seen material developments progress over recent years, enabling industrial polymers to become a cost-effective and performance enhancing alternative to metallics and engineered alloys.

Meeting critical performance and capability standards, many of the products and the material science behind them have been able to meet and exceed stringent and demanding quality standards, ensuring products satisfy all material qualification criteria whilst offering environmental advantages unachievable with traditional metallic offerings.

The company's material portfolio continues to grow, delivering solutions through advanced polymer science. With a diverse customer base that includes competitors and suppliers, it can provide innovative solutions that are not available through existing and alternative routes.

Our engineering teams responded swiftly, taking the product from concept to market ready in less than 12 months.

Nyla-Hang-Off Clamps (Nyla-HOC)

Hang-Off Clamps (HOC) have seen many iterations over the years. While the principle of cable clamping is a relatively simple process, aspects of clamp manufacture and design have improved to offer advantages with assembly and sealing especially for the environment, with resin-free designs now widely becoming the option of choice.

Having been approached by existing customers and analyzing current HOC designs, installation procedures, and performance expectations, Nylacast has identified specific areas for improvement. Medium and high voltage applications and cable support structures need compliant, safety critical products.

The HOC assembly is manufactured from high-performance industrial CF 110 Nylon, a material that offers robust mechanical properties while being 50% lighter than steel alternatives. It is electrically neutral and therefore does not require earthing spurs or grounding cables.

The elimination of the requirement for external coatings, along with the reduced need for their management, cost, and maintenance, provides a significant overall advantage.

From an environmental perspective, the material composition is a groundbreaking innovation for HOC applications. CF 110 Nylon is a corrosion resistant, non-degenerative material that eliminates the need for chemically complex coatings. Unlike traditional materials, it does not experience coating delamination over time, which, along with pollutive material oxidation, can negatively impact the environment throughout the product lifecycle. CF 110 Nylon is a superior alternative to metallics.

The Nyla-HOC has undergone rigorous testing to ensure product integrity under load, ensuring the performance requirements with cable clamping are adhered to for the duration of the product design life. Slippage and pressure testing, including batch testing requirements on varying opportunities and cable configurations, are performed and managed internally.

CF 110 Nylon is already an existing solution for a multitude of products and applications, with substantial historical track records, in both the subsea and offshore sectors. It is a proven and highly effective material for these harsh environments meeting performance characteristics greater than conventional materials.

The material's distinctive features provide substantial improvements over existing metallic designs, offering enhanced performance, durability, and efficiency. Several key advantages and value differentiators further elevate its capabilities.

One of its standout features is the resin free environmental seal, which ensures protection up to 2 bar. Additionally, installation time is significantly improved, with a split design option reducing the process to just 40 minutes. The material's lightweight nature also contributes to easier handling, lowering installation and logistics costs while meeting weight limits for on-deck storage.

Comprehensive in-house testing, including batch pressure testing, ensures the highest quality and reliability. Unlike traditional metallic alternatives, the material requires no earthing due to its polymer composition. It also eliminates the need for costly coatings or third party coating approvals, making it a more cost-effective and streamlined solution. Furthermore, installation damage has no impact on product integrity, and the material is entirely corrosion free, requiring minimal maintenance throughout its lifespan.

The design allows independent operation of both temporary and permanent hang-off clamps. Additionally, it supports full turnkey manufacturing, complete with in-house testing and certification. Standard off-the-shelf items are readily available for quick turnaround needs, while bespoke options can be developed through in-house design and engineering expertise.

This material is fully environmentally compliant, offering substantial health and safety benefits along with pollution-free characteristics. The Nyla-HOC is guaranteed to last for 40 years and is made from a fully recyclable material, reinforcing its sustainability and long-term value.

The Nyla-HOC is a structurally advanced, polymer-engineered, performance improvement product. It can provide all the performance and longevity requirements for cable clamping on medium and high voltage cable applications.

Andrew Hey, Renewables Sales Manager at Nylacast, has been integral to the development of this innovative application, contributing from the early stages of concept discussions and in-house testing to the final delivery and market launch. Andrew is proud of the team's work, and confident that the application will deliver significant benefits while addressing key needs for the offshore wind sector.

Installation and assembly

The design of the Nyla-HOC has been carefully developed to offer benefits and options for cable clamping with inter-array and export cables on top of a foundation or cable deck on monopiles, jackets, or rigs. The use of an electrically neutral material offers significant safety benefits for both temporary and permanent cable clamping in medium to high voltage environments. With no need for earthing spurs or grounding cables, assembly times are reduced, and reliance on specialist engineering support is minimized.

Being significantly lighter than its metallic alternatives, the product enhances handling and assembly safety. Through direct interaction with installers and operators, Nylacast have identified that a key factor in installation performance and efficiency is the ability to transport and install HOCs without requiring additional lifting or handling equipment. The Nyla-HOC minimizes on-deck storage requirements and weight restrictions, making transportation more efficient and cost-effective.

The assembly of the Temporary Hang-off Clamp takes approximately 40 minutes and does not require specialist knowledge. A key feature of the design is the easy release of the temporary clamp once the cable is secured with the permanent clamp. Unlike traditional designs, the solution does not require the removal of the temporary clamp; however, if needed, it can be quickly and easily detached.

Recent testing of the permanent cable clamping process on cable armor wires, combined with the introduction of grip coatings, has demonstrated a higher clamping coefficient than steel-to-steel, significantly reducing the risk of cable slippage. Cable load testing results exceeded 20 tonnes, further proving the system's reliability.

Additionally, core wire trimming after permanent clamping often damages the clamping edges. In conventional steel applications, this requires coating repairs or 'touch ups.' However, Nyla-HOC eliminates this issue, as its coating free material ensures product integrity and maintains corrosion resistance without the need for additional maintenance.

Nyla-Hang-Off Clamps polymer composition and associated benefits are having a substantial impact on HOC applications for the energy sector, driving the need for alternative, innovative, progressive, high-performance, environmentally compliant, and advanced material solutions.

Dean Sanders, Energy Director at Nylacast Engineered Products, states, 'Our close relationships with customers made us aware of the need for change. Our engineering teams responded swiftly, taking the product from concept to market ready in less than 12 months. The management team at Nylacast has always championed innovation, and this achievement exemplifies the proactive approach we take in our daily operations.'

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