CompoTech
Carbon Composite Components

30 YEARS OF INNOVATION

ADVANCED WINDING TECHNOLOGY

Driving carbon composite technology forward →

30 YEARS OF

ADVANCED COMPOSITE ENGINEERING

For more than 30 years, CompoTech has been pushing the boundaries of what composite structures can do.

Our roots are in filament winding — a discipline we've mastered and then transformed through decades of development into something far more powerful. Today, our advanced multi-axis control and precise fibre placement technologies make possible composite structures that were once impractical or impossible.

Who We Are

CompoTech is an engineering company focused on advanced composite structures enabled by proprietary automated winding technologies. We design, develop, and manufacture composite structural components — and, uniquely, the manufacturing processes behind them. This combination of product and process expertise sets us apart.

What draws customers to CompoTech isn't only what we make, but how we think. We are engineers first. We question assumptions, follow the physics, and design manufacturing solutions that are innovative yet robust, working from prototype development to scalable production, and grounded in reality.

For organisations solving structural challenges where performance, repeatability, and innovation matter, CompoTech offers not just components, but capability — built on decades of engineering leadership.

CompoTech at a Glance

Founded in 1995 by engineers driven to improve carbon fibre performance, CompoTech has spent more than 30 years advancing filament winding beyond its traditional limits. From early lightweight sporting structures to today's load-bearing aerospace, hydrogen, and industrial systems, our focus has remained constant: fibre placement that follows physics, not convention.

Through continuous development of multi-axis winding, axial fibre placement, and processing of ultra-high-modulus fibres, CompoTech has evolved from a component manufacturer into a provider of advanced composite manufacturing capability.

Three decades of engineering.

Our Advanced Winding Technology

At the core of CompoTech is a proprietary approach to advanced fibre winding that exceeds established thinking of filament winding. Our technology enables precise control of fibre placement for high tolerance for complex prismatic and tapered structures — for both tube and non-cylindrical geometries as well as beams inclusive of internal support.

Through multi-axis motion control and advanced winding strategies, we place fibres in load-critical directions, including true zero degree (0°) axial alignment. This capability allows fibres to follow real load paths and offers capability to allow continuous closed loop connections — a process we call Integrated Loop Technology (ILT). This results in structures and connections with exceptional stiffness, strength, and efficiency.

Technical Note
Driving the process is our winding software SHNEG 2.0 which works alongside the robot cell. Developed in-house, it offers simple protocol editing and operator management using parametric inputs directly related to tooling dimensions and laminate schedule — meaning design calculation and winding protocol are taken from the same inputs.

Key Benefits

- True zero degrees axial fibre placement with consolidation
- Integrated Loop Technology (ILT) — CompoTech's proprietary technology for automated continuous fibre structural and articulated joint capability
- Multiple fibre cross-wound layers and fibre pattern options
- Supports carbon, glass, aramid, and ultra-high-modulus "pitch" fibres

C/Duro Bikes ILT Carbon Fibre Frame

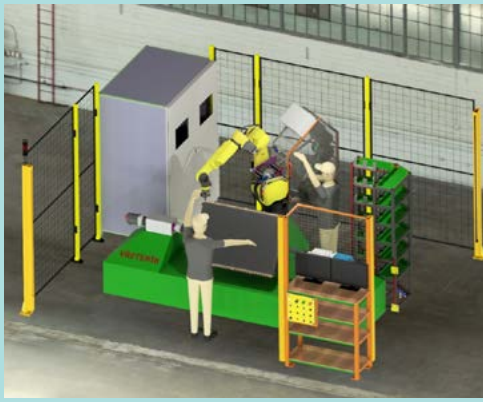
Partners: CompoTech & C/Duro Bikes

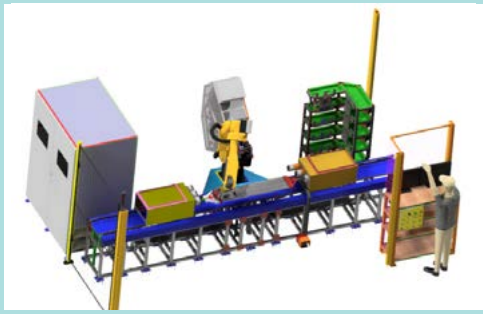
The Challenge: Create a high-performance mountain bike frame from carbon tubes with integrated joints, eliminating lugs or over-laminating, while maintaining ride quality and durability on demanding trails.

CompoTech's Solution: CompoTech's ILT (Integrated Loop Technology) creates the C/Duro frame front triangle with a continuous fibre loop structure joining frame tubes. Key elements include:
- Integrated loop-based joints replace external lugs and manual lamination.
- Tailored laminate with True 0° axial fibre for stiffness and load transfer.
- Automated fibre winding with precisely engineered tooling for repeatable production.

Results & Impact
- Integrated joints reduce manual assembly steps and boost reliability and repeatability.
- Lightweight, stiff yet robust frames proven to be responsive and fast on the World Cup racing circuit.
- Positive industry recognition and a finalist in the JEC World Innovation Award in 2023.
- Scalable production via automated winding and ILT tooling.

Manufacturing Technology as a Deliverable





CompoTech does not only manufacture composite components — we deliver manufacturing capability.

Our proprietary winding technologies can be transferred to customers as complete turnkey, production-ready solutions. This includes process know-how, machine concepts, fibre placement strategies, control logic, and operational expertise developed through decades of real-world manufacturing and R&D.

We offer partnership to production, not only machine supply. Technology transfer projects may include custom machine development, process adaptation for specific components, operator training, commissioning support, and ongoing technical collaboration. This approach allows customers to internalise advanced composite manufacturing while reducing development risk and time to production.

For organisations seeking long-term capability rather than short-term supply, CompoTech acts as a technology partner, not just a supplier.

Technology Transfer for Meopta Precision Opto-Mechanical Systems

Client: Meopta – optika, s.r.o.

Industry: Precision optics, semiconductor metrology, life science

The Challenge: Conventional metallic and granite structures reaching limits in mass, stiffness, thermal stability, and dynamic performance for high-precision measurement devices.

CompoTech's Solution: Design and development of carbon machine frame structure.
- Ultra-high modulus fibres with "true zero-degree" placement.
- Low CTE structures minimising thermal deformation.
- Automated, repeatable production
- Joint development support — simulation, testing, prototyping.

This successful application led to customer looking for in-house composite production for their own products and development of custom AFL winding machine with comprehensive technology transfer package:

Results: Heavy stainless steel and granite frames replaced with lightweight carbon composite alternatives. Carbon fibre gantries developed for semiconductor clean room devices. Meopta now manufactures unique, high-performance composite parts in-house at higher volumes.

"We see carbon fibre technology as the future way for our company, opening up completely new design and application possibilities."
Jiří Vlk, Meopta R&D Director

Component and Process Development

Advanced composite structures demand that design and manufacturing are developed together. CompoTech specialises in the co-development of components and production processes, ensuring that performance targets are achieved without compromising manufacturability.

Working closely with customers, we support the full development cycle — from early concepts and structural design through process definition, tooling development, and manufacturing trials. Fibre architecture, material selection, and winding strategies are iteratively refined using simulation, prototyping, and physical testing.

This integrated approach enables novel structures, reduces technical risk, and ensures a smooth transition from prototype to production. The result is not only a validated component, but a robust and repeatable manufacturing process behind it.

Hardi International

Client: Hardi International (Agricultural Technology)

Application: Composite crop sprayer boom

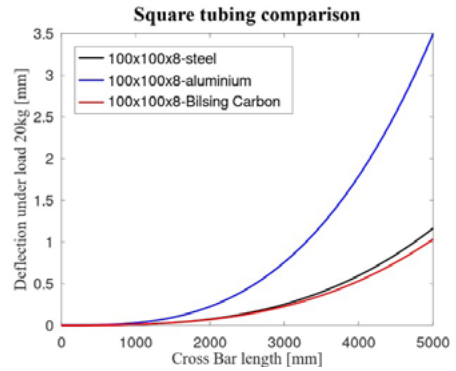
CompoTech and Hardi International developed composite outer and tip sections for a crop spray arm. The composite replacement is 1.5 m longer than the welded aluminium version, whilst offering a lighter structure allowing higher capacity fluid for the same payload.

Using advanced winding techniques integrating tube and wound truss structures, prototyping was achieved with temporary tooling for fast, economic testing. The composite design uses both high-strength carbon and ultra-high modulus graphite fibres, extending total boom length to 39 m while fitting the same propulsion unit with identical load footprint.

Benefits: Better corrosion and fatigue behaviour, field-repairable with designated repair kit.

Materials & Structural Performance

Our advanced winding and automated fibre laying technology allows true 0° axial fibre alignment, placing continuous carbon and ultra-high modulus (UHM) fibres precisely where primary loads act. This control delivers significant improvements in stiffness, strength, and dynamic behaviour compared with conventional wound composites.



Traditional filament winding typically lays fibres at angles that compromise bending performance because fibres are not aligned with the principal load direction. CompoTech's axial placement technology overcomes this by orienting high-modulus carbon fibres straight along the beam axis, maximising contribution to bending resistance. The result: 10–15% higher axial stiffness and up to 50% greater bending strength than conventional wound composites of equivalent size.

By combining continuous PAN carbon with delicate UHM pitch fibres, automated axial winding produces beams and tubes that can achieve axial stiffness levels on par with — or exceeding — metallic alternatives at a fraction of the weight.

Bilsing Automation EOAT

Partner: Bilsing Automation

Application: Composite beams for press-line end-of-arm tooling.

CompoTech collaborates with Bilsing to deliver an all-composite End Of Arm Technology (EOAT) for robotic pic and place of automitive press shop automation. Replacing a aluminium fixture design with PAN and UHM carbon fibres placed axially where bending loads are highest, the new design enabled:

- Increased Natural Frequency due to lighter stiffer structures.
- Up to 75% faster stroke rates
- Stronger load capacity with minimal deformation (<5 mm deflection under load).
- Simplified tooling interchangeability and reduced maintenance costs.

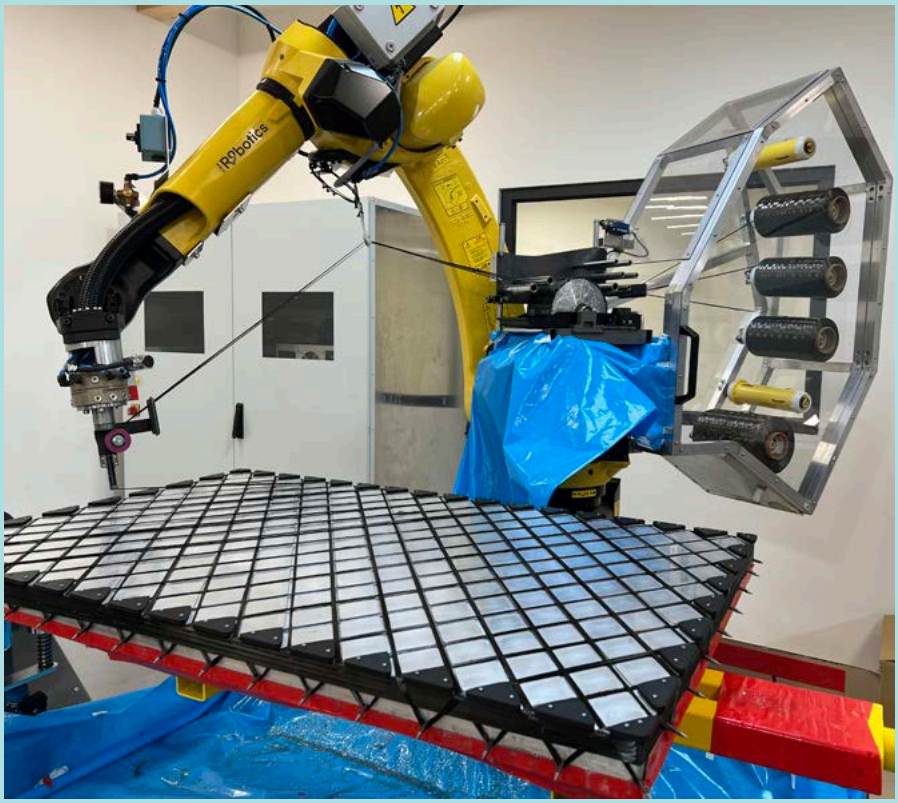
Dynamic tests confirmed that axial fibre placement unlocks performance unattainable with conventional composites or metals in high-speed automation systems.

From Prototype to Industrial Production

CompoTech's technologies are designed to scale. What begins as a prototype or demonstrator is developed with serial production in mind from the outset.

We support customers through all stages of industrialisation, including production tooling, quality control strategies, and process stabilisation. Our experience spans one-off demonstrators, low-rate aerospace production, and higher-volume industrial applications.

By maintaining tight control over fibre placement, process parameters, and automation, we ensure repeatability, consistency, and long-term production reliability. Advanced does not mean experimental — our focus is always on deployable, industrial solutions.



PalletX CF Epoxy Pallets

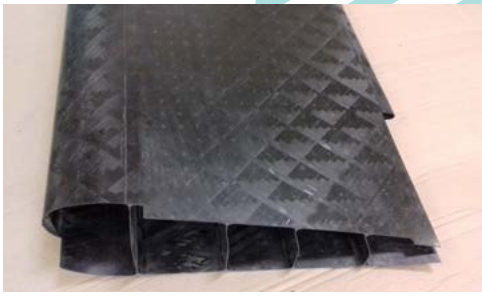
Client: PalletX

Application: Lightweight carbon fibre transport pallets.

Our AFL machine has been programmed to manufacture a new type of carbon fibre epoxy composite pallet. Commissioned within a wider sustainability initiative, the new pallets are lightweight, supremely high strength, and replace existing, much heavier metal pallets to significantly reduce transportation costs and carbon footprint.

The design includes CompoTech's proprietary Advanced winding technology was used to create a fibre placed lattice structure, combined with producing fixture-free ILT joints for a robust, industrial-grade logistics solution.

Aerospace & Space



Aerospace is where structural efficiency, reliability, and repeatability are non-negotiable. CompoTech supplies advanced composite structures for aircraft and space-related applications where fibres must be placed to follow real load paths rather than simplified geometries.

Our advanced winding technologies enable load-bearing components, integrated structures, and multifunctional parts that combine stiffness, strength, and weight efficiency. From development demonstrators to flight-ready structures, we support both component supply and long-term manufacturing capability for aerospace programmes.

L-39NG "Sky Fox" Aileron

Client: Aero Vodochody

Application: Filament-wound aileron for next-generation trainer jet.

Recognition: JEC Innovation Award — Aerospace Category Winner (2019)
Aero Vodochody's L-39NG trainer jet features a revolutionary aileron developed with CompoTech. The innovative design replaces traditional aerostructure bulkheads bonded to outer skin that had problems with trailing edge delamination. The solution created composite longitudinal ribs connected by a final wound outer skin layer — forming a monolithic, one-piece structure cured in one step with no secondary bonding required.

Innovative Structural Design
- Composite Longitudinal Ribs: Replacing traditional bulkheads with a main spar, CompoTech engineered composite longitudinal ribs that provide superior strength and stiffness-to-weight ratio.
- Integrated Structure: The ribs are connected by a final outer skin layer, forming a monolithic, one-piece structure with excellent fatigue properties and no secondary bonding required.

Streamlined Production Process
- Automated Fibre Laying (AFL): CompoTech's proprietary AFL technology enables automated, precise fibre placement, reducing manual labour and increasing repeatability.
- One-Cure Process: The entire composite structure is cured in a single step, eliminating the need for secondary bonding and simplifying the production process.

Awards and Recognition
- JEC Innovation Award (2019): Recognised for innovative design as the Aerospace category winner, highlighting its potential to transform aerospace manufacturing.

This aileron design opens doors to further composite applications: wing structures, control surfaces, and primary aircraft structures enabled by autoclave processing and automation.

Hydrogen, Pressure Vessels & Energy Systems

CompoTech develops advanced composite pressure vessels and energy-related structures for hydrogen and other gaseous media, including non-cylindrical and load-bearing designs that conventional winding technologies cannot produce.

Our proprietary winding processes enable precise fibre placement for permeability control, pressure resistance, and structural integration. These capabilities allow pressure vessels to become part of the primary structure rather than passive containers — reducing mass, increasing system efficiency, and enabling new architectures for hydrogen-powered systems.

Structural Hydrogen Fuel Tank for Aircraft Wing

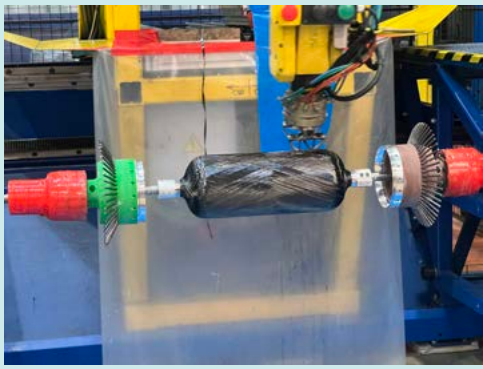
Partners: : CTU Prague, CompoTech PLUS, Distar CZ.

The Challenge: Develop a non-cylindrical, load-bearing hydrogen tank integrated into an aircraft wing — safely storing compressed gaseous hydrogen while contributing to primary structure.

CompoTech's Solution: CompoTech developed a flat, airfoil-like composite hydrogen tank manufactured using Robot Assisted Fibre Laying (RAFL) technology. Each cavity is wound on its own mandrel, then assembled and overwound to form a unified, multi-wall structure. The result is a Type 4 and test made for linerless Type 5 composite pressure vessel optimised for minimum mass and maximum safety.

Testing & Validation:
- Hydrogen permeation testing at 350 bar.
- Hydrostatic pressure testing targeting 800 bar burst.
- Bending and torsional tests validating structural integration.

Why It Matters:
This project demonstrates how advanced composite manufacturing transforms hydrogen storage into an integrated, load-bearing structure — opening doors for aviation, UAVs, and weight-critical applications.



Defence & Security

Defence applications demand structures that perform under extreme loading, fatigue, and environmental conditions while maintaining tight control over quality and repeatability.

CompoTech works with defence partners to develop advanced composite structures, protective components, and load-carrying elements where fibre architecture and manufacturing control are critical.

Our ability to transfer manufacturing technology and processes is particularly valuable in defence programmes requiring secure, sovereign production capabilities.

Composite Telescopic Aerial for Border Patrol

Client: Czech Republic Border Police

Solution Provider: CompoTech PLUS / Compolift.

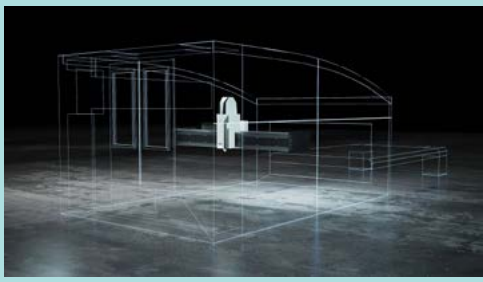
Application: Mobile surveillance and border security.

Operational Need: Mobile, rapidly deployable surveillance providing elevated observation from standard vehicles, operating reliably in exposed environments while carrying sensitive electro-optical equipment with minimal vibration.

CompoTech's Solution: A carbon-epoxy, self-extending telescopic mast system featuring:
- High stiffness-to-weight ratio and corrosion resistance.
- Self-extending design for fast, controlled deployment.
- 7 m extension height.
- Rigid platform supporting up to 160 kg surveillance payload.

Outcome: Stable imaging performance, minimal vehicle impact, compact stowed footprint. Success catalysed launch of Compolift — extending telescopic composite expertise into defence, marine, and mobility markets with developments including tactical drone warfare applications.

Machine Tool Structures & Automation



EAGLE LASER CUTTER CARBON TRAVERSE

In Machine tools & Automation, composites are increasingly selected not for weight alone, but for stiffness, natural frequency, fatigue resistance, and dimensional stability.

CompoTech produces structural composite components for automation systems, industrial machinery, and robotic applications where dynamic loads, vibration control, thermal stability and precision are essential. Advanced winding allows fibres to be placed exactly where stiffness and durability are needed, enabling lighter, more responsive systems with long service life.

This sector benefits strongly from our component and process co-development approach, ensuring designs are optimised for both performance and manufacturability.

Applications include: High speed precision gantry beams, Z and Y axis structures. Hybrid milling tools, Hybird Spindle and thermal compensation tools.

Hybrid Carbon Metal Milling Cutter — 78% Faster Machining

Partners: CompoTech PLUS spol. s r.o. & HOFMEISTER s.r.o.

Application: High productivity four-disc milling tool for chain manufacturing.

The Challenge: A leading European chain manufacturer sought to boost milling output and cut production costs. The existing steel two-disc cutter was constrained by its 25 kg maximum tool weight, making a four-disc upgrade unfeasible with metal alone.

CompoTech's Solution: CompoTech and HOFMEISTER created a hybrid carbon fibre and steel four-disc milling cutter using CompoTech's advanced winding technology. This replaced the steel disc body with a lightweight, UHM carbon composite. Having 16 cutting inserts compared to the original 12 per disc also allows for higher cutting speed and feed rate on the same machine.

Key Performance Gains:
- 78% faster machining than the standard steel two disc cutter.
- Lower inertia for reduced energy consumption.
- Superior vibration damping for improved slot hole accuracy and surface finish.
- Tool durability almost five times greater than the conventional cutter.

Results & Impact:
- Dramatically increased output rates on existing equipment with no machine upgrade.
- Higher surface quality and machining accuracy from improved damping behaviour.
- Significantly extended tool life reducing changeover downtime and tooling costs.
- Validated the use of hybrid composite metal construction for demanding rotary cutting tools.

Marine and Mobility

For marine and lightweight transport applications, structural efficiency directly translates into performance, range, and energy savings.

CompoTech's winding technologies support masts, spars, beams, and structural elements that must withstand cyclic loading, torsion, and environmental exposure. With America's Cup Heritage, we deliver durable, high-performance structures suitable for demanding operational environments.

WISAMO Telescopic Composite Mast

Client: Michelin / WISAMO (Wing Sail Mobility)

Application: Telescopic carbon epoxy mast for wind assisted ships.

Snapshot: Seven stage, self extending mast for the WISAMO wing sail. 4.5 m stowed, 21 m extended, ~200 kg total, supporting 60–100 m² sail. Fully automated deployment with high stiffness to weight, corrosion resistance, and BV SMS classification.

The Challenge: Create a tall, lightweight, fully deployable mast capable of carrying a large inflatable wing sail on commercial and patrol vessels, while withstanding harsh marine conditions and enabling rapid, crew free operation.

The Solution: CompoTech engineered a seven stage carbon epoxy telescopic mast using advanced winding. Key features include:

- True 0° axial placement for maximum bending stiffness and minimal deflection.
- High fibre volume fractions in critical sections for peak rigidity at low weight.
- Precision nesting geometry and integrated interfaces for reliable seven stage extension.
- Corrosion resistant carbon composite with no painting or anti fouling required.
- Fully automated extend/retract operation and full process traceability.
- BV Marine SMS recognised manufacturing process for class confidence.

Result: Demonstrated capability to integrate advanced wind propulsion systems into real world maritime operations and pave the way for broader adoption to larger maritime vesels.

Industrial Machinery and Agricultural Techology

Modern agricultural and specialised machinery increasingly relies on lightweight, stiff, and fatigue-resistant structures to improve efficiency, precision, and reliability.

CompoTech supplies composite beams, arms, rollers, and structural components for advanced machinery and agricultural technology, where long spans, repetitive loading, and durability are critical. Automated winding ensures consistent quality at scale while enabling tailored fibre architectures that outperform traditional metallic solutions.

Composite Mobile Crane — Carbon Epoxy Telescopic Boom

Client: TRIO project (Czech Republic)

Partners: CompoTech PLUS spol. s r.o., RTI (University of West Bohemia), Pilsen.

Application: Lightweight, welded free crane for mobile and marine use.

The Challenge: Traditional mobile cranes rely on welded steel, which is heavy, corrosion prone, and limits transportability and efficiency. The goal was a fully composite solution that matches or exceeds steel performance while eliminating welding and reducing maintenance.

The Solution: CompoTech designed a complete carbon epoxy crane system consisting of:

- A two part composite mast and a three section octagonal telescopic boom.
- Advanced (AFL) and Integrated Loop Technology (ILT) for automated continuous fibre connections.
- True 0° axial fibre placement for maximum bending and buckling resistance.
- No welding or heat treatment; corrosion free construction.

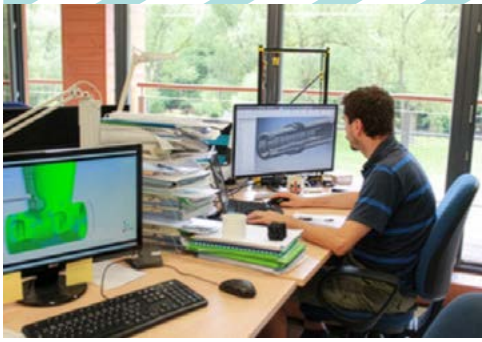
Results & Impact:

- 50–70% stiffer structures at a fraction of the weight vs. steel equivalents.
- Weight reduction enables greater mobility, payload efficiency, and easier transport.
- No welding, no corrosion maintenance, and a streamlined, repeatable manufacturing process
- Demonstrated fatigue performance and reliable deployment in mobile/marine contexts.
- A scalable platform for future composite crane, davit, and lifting applications.

Engineering & Manufacturing Support

CompoTech offers complete design-to-production assistance including:

- Load analysis and FEA validation.
- Prototype and serial manufacturing.
- Structural and fatigue testing with third-party testing institutes.
- Lifecycle analysis and sustainability documentation.



Quality & Certification

CompoTech maintains a rigorous quality framework to ensure every component meets the highest standards of performance and reliability.

Certifications & Compliance:
- ISO 9001:2015 Certified — quality management system covering design, production, and testing.
- DNV Guidelines Compliance — selected products verified for marine and offshore classification.
- Bureau Veritas (BV) Certification — composite telescopic structures.

Quality Assurance:
- Full Traceability — all materials, processes, and testing records documented from fibre batch to finished component.
- Process Control & Auditing — continuous monitoring with regular internal and external audits.
- Continuous Improvement — feedback-driven development enhancing reliability, efficiency, and sustainability.

Let's Engineer Your Next Composite Solution

Whether you need advanced composite components, manufacturing capability, or a development partner to solve structural challenges — CompoTech brings 30 years of engineering expertise to your project.

CompoTech
Carbon Composite Components

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