UMOE

MANDAL

COMPANY PROFILE

Umoe Mandal

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Umoe Mandal offers expert engineering solutions, intelligent materials and bespoke production facilities for designing and building high-performance craft and advanced composite structures. These are used for a broad range of applications in marine, offshore, renewables, aquaculture and land-based industries worldwide.

STRONG performance. LIGHT materials.

Located on an island just outside the town of Mandal in southern Norway, we carry on the proud shipbuilding tradition of the region that stretches back several generations. We continue to master our craft, progressively crossing new technological frontiers.

OUR STORY

Since the Viking age, Norway's great reputation for building fast and agile wooden ships has been recognized worldwide. Praised for superb navigation in rough seas and in shallow waters, these versatile lightweight vessels safely carried the Norsemen to new and far away shores.

Our skilled naval architects and engineers at Umoe Mandal continue this tradition combining generations of Norwegian shipbuilding knowledge with the best of modern technology and use of intelligent fiber reinforced plastic (FRP) materials.

For the past 30 years Umoe Mandal has worked closely with clients and partners with exacting standards, including some of the most formidable navies in the world, reputable international academic institutions and research centers; to design, build and deliver truly ground-breaking naval vessels and advanced components in composite materials for some of the most demanding industries worldwide.

Today, we offer our WAVECRAFT™ high-performance, high-speed crew and passenger transfer vessels and advanced composite structures for a variety of applications in the marine, offshore, aquaculture, land-based and defense sectors.

Our teams are at the cutting edge of innovation using the latest proven technologies and R&D to design and build the vessels and advanced components of the future.

A FAMILY OF COMPANIES

Umoe Mandal is part of the Umoe Group, one of the largest privately-owned industrial investment companies in Norway, specializing in green energy and service sectors.

The Umoe Group was formed in 1984 initially as a shipping and oil service company. In 2000, it ceased its oil service operations to focus on the services sector and in recent years has expanded rapidly into renewable energy.

Today, Umoe Group has a strong international presence, operating in biofuels, advanced materials, forestry, merchant, offshore, renewables, naval sectors, consulting services, electronics, restaurant and real estate sectors. Umoe Group employs close to 5 500 professionals in Scandinavia, Canada and Brazil.

The Umoe Group seeks out high reward, high-risk opportunities, while developing companies through acquisitions, restructuring and organic growth. Umoe Group prides itself on contributing more than just capital, empowering its people and actively supporting its businesses in creating value.

Umoe Mandal is the main shareholder of Umoe Advanced Composites (UAC).

30 years of purpose and innovation.

OUR HERITAGE

Our shipbuilding history and specialized manufacturing of large composite structures in fiber reinforced plastic composites dates back to 1988, when we were founded as Kværner Båtservice, a purpose-built shipyard located just outside the town of Mandal in southern Norway.

Since then, we ventured to design and build nine Mine Countermeasure Vessels (MCMV's) of Oksøy and Alta Class and six of the fastest combat ships in the world of Skjold Class Corvette, for the Royal Norwegian Navy. These truly pioneering ships have since proven their powerful capabilities in national and international defense and peacekeeping missions.

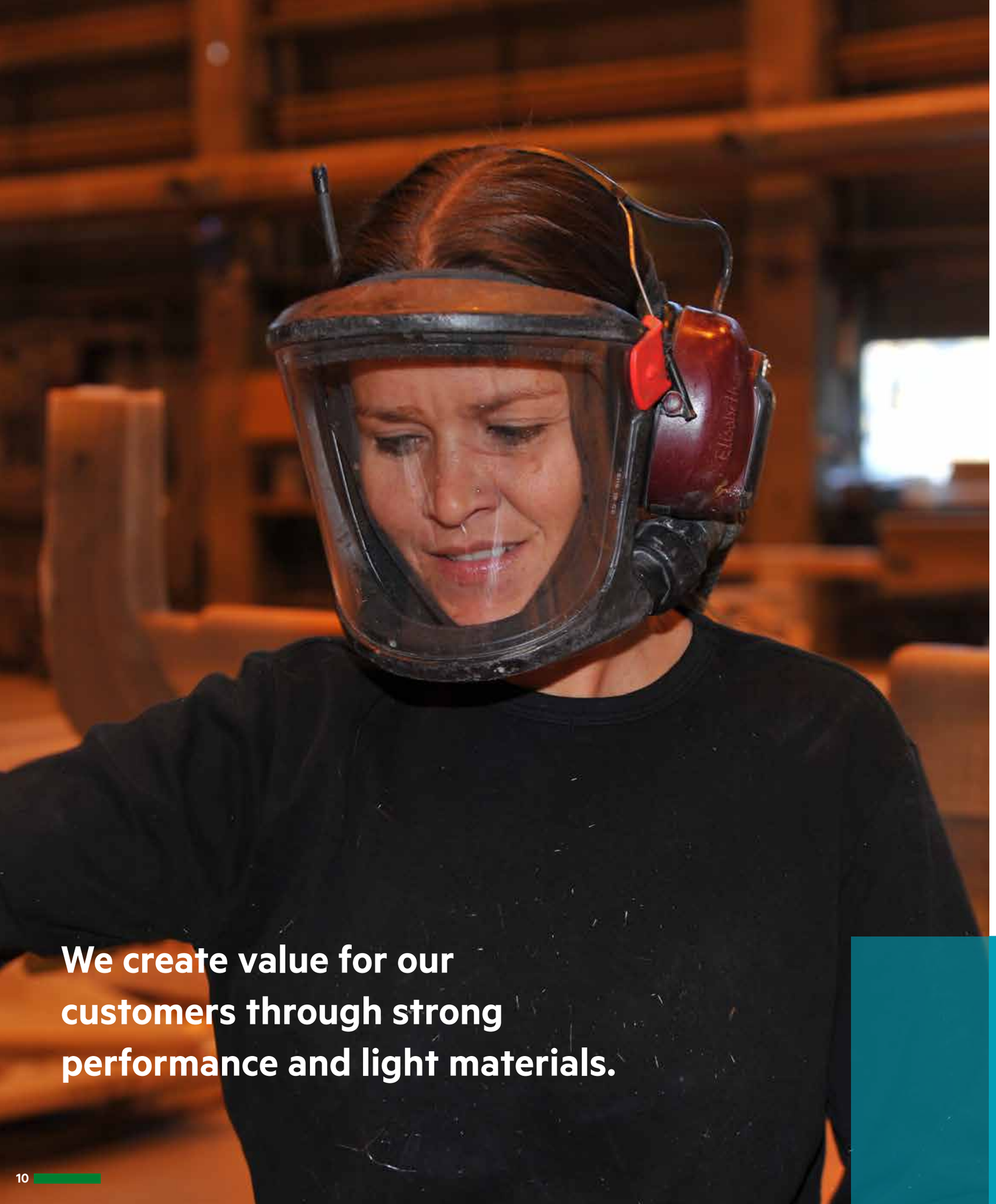
Over the years, we have delivered a number of vessels and daughter craft to naval and commercial sectors, including lifeboats, SAR (Search and Rescue) coast guard vessel, Whitbread Sail Racing Yacht and the new generation WAVECRAFT™ offshore crew transfer vessels.

In close cooperation with our customers, international academic and certification societies, we have mastered the science and craftsmanship of building complex systems and components in composite materials for a range of sophisticated applications in marine, offshore, renewables and defense industries. We have delivered essential components for wind turbines, offshore support vessels, rigs and naval craft.

From the beginning, we set out to utilize our expertise, channel our creativity and apply our spirit to deliver value to our customers, assure sustainable growth for our organization and bring about solutions that help preserve our environment. Every day, we continue to challenge ourselves and industries that we are a part of.

OUR MILESTONES

2017	Delivery of UMOE RAPID
2016	Delivery of UMOE FIRMUS
2014-2017	Development of WAVECRAFT™ VOYAGER series for the Oil & Gas sector
2013	Contract and production of three WAVECRAFT™ Commander series vessels
2011-2013	Development of new WAVECRAFT™ CTV series for Renewables sector
2011	WAVECRAFT™ awarded finalist place at Carbon Trust Offshore Wind Accelerator competition
2010	“Co-Patch” Consortium participant (Coordinated by NTUA and funded by the European Commission under the Framework-7)
2003-2013	Design, production and delivery of 5+1 Skjold Class FPB
2001-2008	Concept studies LCS, JMAC, T-Craft
2000	Acquired by Umoe Group and registered as Umoe Mandal AS
1999-2001	Trials and US deployment of HNoMS Skjold
1998-2004	Contract for upgrade of 14 Hauk Class FPBs
1997-1999	Design, production and delivery of prototype Skjold Class FPB
1991-1998	Design, production and delivery of 9 MCMVs
1991	Fully owned by Kværner with new facilities at Gismerøya in Mandal, Norway
1988	Founded as Kværner Båtservice – shipyard specializing in composite Fiber Reinforced Plastic materials



We create value for our customers through strong performance and light materials.

OUR SPIRIT

We are guided by respect and are empowered by the integrity of our principles in all of our relationships; with our colleagues, partners, clients and the environment.

Our vision is to be the preferred partner for advanced vessels and components in composite materials and we intend to achieve this by constantly reviewing and adapting what we do by challenging ourselves to create increasingly better solutions for our clients. Understanding our customers' current and future needs and expectations is pivotal to our strategy, and keeps us focused.

We have an all-inclusive culture empowering our people to take personal responsibility for their roles and embrace a collective responsibility to explore, apply and maintain best practices that we produce in synergy. By embracing the richness of our teams' differing skill sets, human experiences, characters and expertise, we can produce outstanding results even in the most demanding situations.

History shows that change is the only constant and that is reflected in our efforts to cultivate an agile organization with effective management and sound financial decision-making. We are proactive and forward-thinking in our day-to-day operations, which are devised to provide a sound platform for a sustainable long term growth.

Since the beginning 30 years ago, many changes have taken place at Umoe Mandal, in industries we operate in, and the environment that we are a part of. One element remains constant, our spirit. It is the core that defines our business: innovative solutions, value creation for our clients and sustainable development for our organization.

OUR RESPONSIBILITY

We are just as committed today, as we were when the company was founded, to continuously deliver products and services of exceptional quality and offer our colleagues a safe and empowering workplace while protecting the environment.

Our QHSE philosophy is rooted in the conviction that our employees are our most important asset. We encourage openness and honesty; together, we aim to cultivate a safe, satisfying and motivating work environment.

We continuously work to prevent accidents, injuries and any harm to individuals and the environment. Any deviation or accident are diligently investigated, and appropriate changes in procedures are implemented in a timely fashion.

We strive to continuously improve our processes and operations to ensure the sustainability of our products and services throughout their lifetime and concentrate our efforts to develop solutions that will reduce our environmental footprint.

All our employees must adhere to our code of business conduct and ethics, respect human rights and act in a socially responsible manner.

Key to our philosophy of sustainable growth is maintaining full compliance with latest industry standards and regulations, and upholding our own QHSE Management System at all levels of the organization.

Quality.
Health.
Safety.
Environment.

We encourage each other and our business partners to join us in our commitment to minimize any harm to mankind and the environment. Throughout all our activities and through entire value chain, we continuously strive to develop solutions and processes that will minimize our environmental footprint and that of our customers throughout the lifetime of our products.

Umoe Mandal AS is certified according to NS-EN ISO 9001:2015.

FINANCING SOLUTION

Umoe Mandal is supported by the Norwegian state-owned Export Credit Norway, which provides competitive long-term loan financing solutions to national and foreign companies looking to purchase goods and services from Norwegian exporters.

Export Credit Norway offers effective, stable long-term financing at competitive terms, handling the entire loan application process, including commitment, disbursement and monitoring of loans. The combined financing package includes a loan from Export Credit Norway, backed by guarantees from Export Credit agencies and banks, ensures a competitive and secure financing solution for the buyer.

Export Credit Norway offers loans with two different sets of interest terms: fixed-rate Commercial Interest Reference Rate (CIRR) loans and CIRR-qualified market loans with variable rates. Both types of loans may be disbursed in all OECD currencies, and both comply with the OECD Arrangement on Officially Supported Export Credits.

OUR EXPERTISE

R&D

30 years of experience and close partnerships with leading global academic institutions and industry experts have contributed to our increased capabilities and knowledge of highly specialized technology and productions methods.

We channel this insight into new projects, delivering more intelligent solutions to our customers, offering a more stimulating workplace for our people and ensuring sustainable growth for our company.

In close cooperation with the most formidable of customers and partners who challenge us to push the boundaries of vessel and advanced systems' specifications and operation, we have been researching, designing, building and delivering high-speed vessels and advanced components in all-composite Fiber-glass Reinforced Plastic (FRP) materials.

Our expertise spans across new warship designs, acoustic and magnetic properties, shock design, stealth technologies and weight / strength optimization.

We have also conducted extensive material research and test programs for composite materials and development of new commercial vessel designs, including high-performance, high-speed craft for crew and passenger transport.

We invest in continuous development and progress, and center our research and development activities and projects around fields that provide added value to our customers.

Cultivating value through innovation.

PAST AND CURRENT R&D PROJECTS

- European Defence Agency (EDA): Convince project
- National Technical University of Athens: Co-Patch project
- BAE MK: Engineering studies
- NATO: Norway, UK, Italy, Netherlands, France
- Royal Norwegian Navy:
  - Detail design, construction and testing of 5 minehunters of Oksøy class and 4 minesweepers of Alta class Mine Countermeasure Vessels
  - Detail design, construction, testing, evaluation and operations of 6 Skjold class Coastal Corvettes
- US Navy:
  - Concept design for Focused Mission Ship
  - Preliminary design of Littoral Combat Ship
  - Concept design of Joint Maritime Assault Connector (JMAC), the next generation LCAC
  - Composite hull design for Ship-to-Shore Connector (SSC) program
- Kværner: R & D program "Ship for the Future"
- US Office of Naval Research: Concept design and prototype development for Sea Base Connector Transformable Craft (T-Craft)
- Textron Marine & Land Systems (TM&LS): Composite components for Ship-to-Shore Connector (SSC)
- Research Council of Norway, Regional Research Fond, Statoil, Innovation Norway, Carbon Trust Offshore Wind Accelerator (OWA): WAVECRAFT™ high-speed CTVs

OUR EXPERTISE

MARINE & NAVAL ENGINEERING

We can offer complete ship design and build process for both naval and commercial vessels, as well as specialized components designs for a range of applications in commercial fishing, marine, offshore, land-based and defense sectors.

Our highly skilled engineering team of experts covers all relevant disciplines and has solid competence in Naval Architecture and Marine Engineering.

We offer our multi-disciplinary engineering services for any challenging design project in various industries with the focus on LEAN and efficient design methods and advanced design tools to reduce development time and costs.

From concept design through all levels of specifications, to detailed design, including new constructions or conversions, interior and exterior outfitting, for different types of vessels and advanced structures, we look for the most intelligent, efficient, practical, safe and environmentally responsible solution.

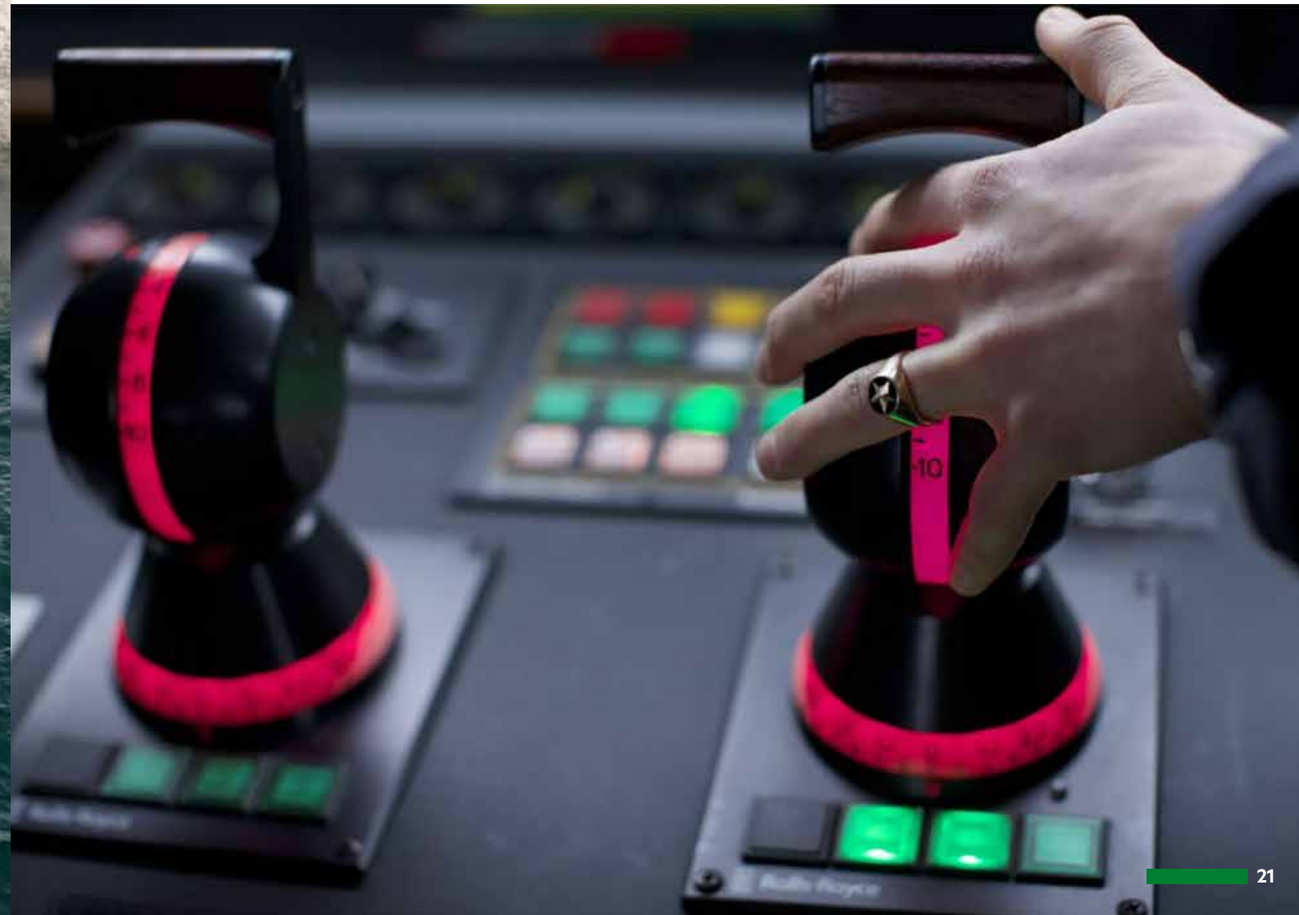
We emphasize quality of analysis, calculations and testing, and deliver projects in compliance with applicable local and international classifications and regulations. Many of our sophisticated designs and building techniques are based on state-of-the-art practices in the aircraft and automobile industries.

Close cooperation between our expert teams of naval architects, engineers, project- and production teams ensures accurate, compliant and cost efficient process.

Solutions grounded in our experience.

Proven technology. Specialized expertise.

- SES and high-speed craft technology
- Air-cushion catamaran design
- Composite materials (design and production)
- Weight / strength optimization
- Ship systems engineering
- Hull structures
- Propulsion systems
- Auxiliary and special systems
- Electrical systems
- Cargo handling systems
- Crew and passenger facilities
- Navigation and ship control systems
- MCMV technology
- Stability and survivability
- Shock protection methods
- Fire, nuclear, chemical and biological protection
- Magnetic, IR and optical signatures
- Stealth technology
- EMC/EMI measures, tempest and security
- Combat systems integration



OUR EXPERTISE

COMPOSITE MATERIALS

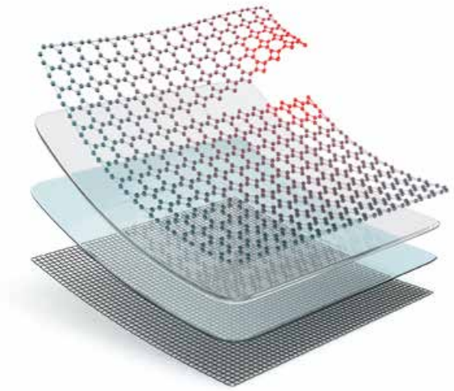
Intelligent materials. Tailored performance.

We specialize in the design and manufacture of vessels and components in all-composite materials. These deliver high-strength, very low structural weight vessels and large structures for a variety of advanced applications in marine, offshore, aquaculture, land-based and defense industries.

For three decades, we have been perfecting the design and production of vessels and large advanced structures in composite sandwich materials. We have delivered components and vessels built in a variety of Fiber-Reinforced Polymer composites (FRP), such as resins (polyesters, vinyl ester, epoxy, phenolic), fibers (glass, aramid, carbon), roving (uni- and multi-axial fabrics, woven roving, etc.) with core materials of PVC and PMI foam, balsa and honeycombs.

Composite materials produce a light environmental footprint as they are recyclable and non-toxic to the surrounding environment. They are ultra-light, strong yet malleable, and contribute to a product's lifespan, sustainability and lifetime economy with low maintenance and lower overall lifecycle cost due to their constitutional properties, such as resistance to chemicals and corrosion, even in harsh marine environments.

An advanced manufacturing process allows for the unique combination of various core materials and different skin alternatives to meet custom requirements. We combine the intelligent adaptability of the materials and our expertise to offer products, which are the best match for specific operational requirements and regulatory standards.



OUR EXPERTISE

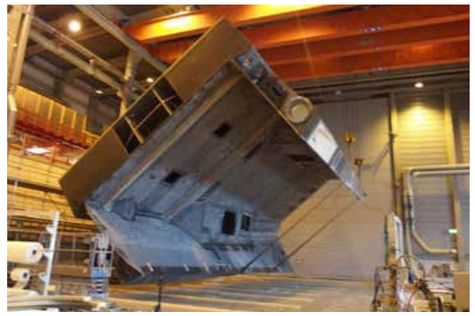
PRODUCTION CAPABILITIES

Our facilities are purpose-built and equipped for optimized production flow of larger military vessels and civilian passenger and crew transfer vessels, as well as, composite components, or production of smaller boats in larger series in combination with other large and advanced products.

Our bespoke facilities accommodate design, production, testing and servicing of large structures and vessels in Fiber Reinforced Plastic (FRP) sandwich material, and are equipped to ensure high volume, quality-manufacturing process.

We evaluate the processing needs of the materials at the initial stage of every project, and customize the best solution as part of a lifecycle analysis, depending upon the intended function of the component or structure.

We utilize a number of tools and techniques when designing, manufacturing and testing composite structures and vessels. Typically, all large components are vacuum infused, while high-temperature RTM is used for smaller, aero-dynamic components.



PURPOSE-BUILT FACILITIES

- Total area: 41.000 m2
- Indoor floor area: 16.000 m2 including offices, production hall, outfit hall, workshops and warehouse
- Efficient sandwich composite prefabrication of large panels
- Indoor hall can concurrently accommodate 4 ships with approximate dimensions of 60m x 16,5 m
- Max. capacity ship lift and transport system: 400 t
- Traverse cranes
- 4 x 15 MT SWL in production hall
- 1 x 12,5 MT SWL in the outfit hall
- Systems for ventilation, heating and humidity designed specifically for FRP production
- Deep-water quay: 6 m depth

SPECIALIZED EQUIPMENT

- Distributed vacuum system
- Distributed pressurized air system
- Automatic temperature and humidity control system
- Large tables for vacuum infusion with carriages for fabric rolls
- Transportable heat-curing oven
- Crane and vacuum system for lifting and turning large panels
- Laser projection system for laying up laminates and panels
- CNC controlled cutting machine for large panels
- Portable 3D laser scanner for 3D measurements of physical objects
- Laser for downlight reinforces and contour
- Fiber cutter
- Easily customizable aluminum bed for building of sections and modules

CALCULATION METHODS

- Computational Fluid Dynamics for aerodynamic performance predictions and load calculations
- FEM analysis (ANSYS) for load calculations
- Polyworx for flow simulation and complex vacuum infusion processes
- Scaled model testing

MANUFACTURING PROCESS

- Resin Transfer Molding (RTM)
- Vacuum Assisted Resin Transfer Molding (VARTM)
- Hand layup – Open Molding Process
- Filament winding
- “Pre-preg” and “Wet-preg”

OUR BUSINESS AREAS

AT A GLANCE

BUSINESS AREAS	RENEWABLES	OIL & GAS	PASSENGER	DEFENSE	AQUACULTURE	ENGINEERING SERVICES
Shipbuilding	Commander 27 Sprinter 26	Voyager 32 Voyager 38 T Voyager 38 X	Commuter 32	Defender SOI Defender MCMV Drone		R&D Engineering Production
Composite structures	Lift fans Blades for wind turbines Pressure vessels Wire and rope sheaves	Lift fans Paravane Air-control skid Pressure vessels Wire and rope sheaves	Lift fans	Lift fans Paravane SSC components Gun cupolas Masts	Paravane Structures for commercial fish-farming	R&D Engineering Production
Lifecycle support	On site of your operations, at ports or at our purpose-built yard facilities.					

Crossing new technological frontiers.

OUR BUSINESS AREAS

SHIPBUILDING

Our experience in delivering pioneering naval vessels has set the ground-work for expanding into high-performance commercial craft. The WAVECRAFT™ series of new generation crew and passenger transfer vessels is our contribution to the Renewables, Oil & Gas, Passenger and Naval sectors.

All WAVECRAFT™ vessels are based on proven Surface Effect Ship and air-cushion catamaran design. We build all our high-performance navy and commercial vessels in composite sandwich materials, where their constitutional properties and low structural weight and present several benefits, including unrivaled speed, high payload fraction and reduced displacement.

Advantages of the air-cushion catamaran technology vs. monohull design allow for 50% less required engine capacity, 50-70% less fuel consumption at high speed and a range of up to 700 nm, resulting in lower emissions and cost efficiencies.

Structural design of our vessels presents low wake wash characteristics, enabling safer, high-speed operation in shallow and confined areas, while benefiting atmospheric and marine environments.

All WAVECRAFT™ vessels are equipped with a sophisticated heave compensation system, which counteracts for vertical wave motion, offering comfortable transit and safe access to other vessels and installations in high sea states.

Whether intended for commercial passenger commute or rapid offshore crew transfer, WAVECRAFT™ fleet is optimized with noise and vibration insulation technology, suspension- and reclining seating options, entertainment systems, and other modern amenities for the comfort of passengers and crew.

Our vessels guarantee rapid transit time, safety, excellent seakeeping and passenger comfort, superior fuel economy and reduced environmental footprint.

WAVECRAFT™ vessels are delivered in accordance with all major classification societies, including USCG EPA TIER 4 standard (for Voyager 38X series).

WAVE CRAFT™ BY UMOE MANDAL

DOCUMENTED BENEFITS

- Unrivalled speed
- Shallow draft
- Enhanced safety
- Excellent seakeeping
- Comfort and reduced seasickness
- Transfer and boatlanding in high sea states
- Low wake wash
- Unique fuel efficiency
- Improved environmental footprint

The power of air on water.

A combination of lift, air-cushion and catamaran hull shape make this an ideal design that offers our vessels high speed, stability and exceptional seakeeping. An added advantage is the very low weight of all-composite hull materials.

Surface-Effect Ship (SES) technology combines the best features of hovercraft and catamaran hull design. Unlike a hovercraft, SES vessel does not depend on speed to rise in the water. Even at a complete standstill, large fans create a cushion of air inside the enclosure formed between the twin hulls by flexible skirts fore and aft. Rubber finger-type seals in the bow, and a bag seal in the stern maintain an air-tight pocket.

The SES concept is famous for its high vessel speed, but most of all, it is the combination of high speed and excellent seakeeping that offers its unique capabilities. Unlike a hoovercraft, these vessels offer low noise levels.

Air-cushion catamaran design and SES technology offer low wave resistance, hence, high speeds and considerably decreased fuel consumption, compared to monohulled vessels, resulting in improved environmental footprint and higher efficiencies.

Smooth comfort at all speeds.

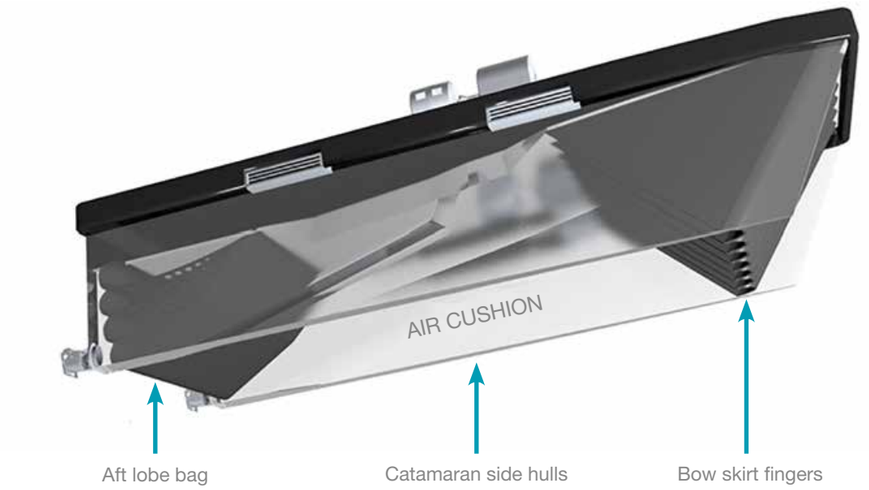
We have developed a sophisticated vertical motion heave compensating system, which consists of two fully automatic submodes: Ride Control System (RCS) and Boarding Control System (BCS™). Unique benefits offered by this system, combined with SES and air-cushion catamaran design result in excellent seakeeping, passenger comfort, substantially reduced seasickness and improved safety.

WAVE CRAFT™ BY UMOE MANDAL

Early SES designs experienced problems with the “cobblestone” effect, which produced high vertical accelerations in low sea states at high speed. The “cobblestone” phenomenon is a resonance effect due to the compressibility of air in the air cushion. Activation of RCS substantially reduces “cobblestone” effect, offering a much smoother transit for passengers, with documented reduction in seasickness. This in turn, results in more efficient operations of service technicians.

Once a vessel approaches a wind turbine, another vessel or offshore installation, BCS™ is engaged. As a result, air cushion pressure is actively controlled by ventilation valves to counteract wave forces. When buoyancy of the hulls is increased, the air is ventilated from the cushion and thus the air pressure is reduced. When buoyancy of the hulls is decreased in a wave through air pressure is increased to compensate for lost buoyancy assuring a safe and simple ‘step-off’ to an offshore structure.

The two modes are easily switched between on the operator interface touchscreen according to required operating mode, either Transit or Boarding.



Implementing intelligent design and state-of-the-art technology to offer new standard for offshore crew transfer and passenger seafaring.

WAVE CRAFT™
BY UMOE MANDAL

< RENEWABLES

Sprinter 26 and Commander 27 series are designed for fast-speed medium to long-range transportation of personnel to offshore wind farms. These vessels offer excellent seakeeping, maneuverability and safe access to offshore installations. Rapid transit, reduced seasickness and improved wellbeing of transported O&M personnel offers more uptime and cost efficiencies for the operator, maximizing the availability of wind turbines for minimal costs.

Passengers:	12-24
Speed:	up to 45 kn
Boatlanding:	up to 2,5 m Hs
Fuel consumption:	21 l/nm

OIL & GAS >

Voyager 32, Voyager 38T and Voyager 38X series are the new-generation service vessels optimized for safe, high speed transfer of crew for the Oil & Gas sector. They offer substantial transit time reduction, expanded operational window, excellent fuel economy, reduced emissions and an improved environmental footprint. Voyager vessels can be delivered with a gangway and a SeaSpyder personnel transfer system. These high-performance craft challenge every operational level and offer a long-range, economical, commercially – feasible and safe alternative to helicopters.

Passengers:	60-150
Speed:	up to 58 kn
Boatlanding:	up to 2,5 m Hs
Fuel consumption:	23 -30 l/nm

< PASSENGER

Passenger safety, exceptional comfort, time-saving, superior maneuverability in congested waterways and excellent environmental performance are the essence of Commuter 32 series. Vessel's efficient layout is designed to minimize noise ingress to the main cabin and offers comfortable and comprehensive amenities for the modern traveler. Commuter 32 fast ferry series is constructed for reliable and efficient logistics, designed for an exclusive travel experience.

Passengers:	200
Speed:	up to 40 kn
Fuel consumption:	21 l/nm

< NAVAL

Speed, stealth and combat power are the essence of Defender SOI (Special Operations Interceptor) Defender MCMV Drone series, designed to guarantee top performance. High-speed, in combination with superior seakeeping, stability and maneuverability in heavy seas and exceptional stealth capabilities, offer the required flexibility to carry out a variety of sophisticated operations, while providing a platform for safe and rapid deployment in combat and peacekeeping missions. These new-generation combat craft are modeled on our power warships of Skjøld-class corvettes and Oksøy and Alta-class MCMVs.

Custom solutions
for unique projects.

OUR BUSINESS AREAS

COMPOSITE STRUCTURES

We combine our long expertise in designing advanced components and vessels in all-composite materials with our unique know-how of specialized manufacturing methods and production capabilities to deliver purpose-built solutions for our customers' unique projects.

We manufacture composite structures in custom-made molds that conform to advanced and precise geometry detail and are designed to accommodate a product's stringent specifications for precision and finish and critical requirements in regard to strength and geometry.

As a result, we can offer competitive production of "one-off" or a smaller series of products, since our manufacturing methods would require less costly customized molds. This also means that we can progressively make adjustments and implement design modifications from product to product.

Composite materials are extremely easy to repair and can also be modified to "as new" quality in case of need for revision even later in the production process of a specific project.

Composite structures may be designed to meet specific operational requirements, including strength and stiffness specifications, high temperature properties and integrated sensor and stealth technologies. Composite materials add to structural strength and endurance, and offer light environmental footprint.

Sustainability is the underlying principle of our production processes, materials that we use and one of the intended benefits of the final product that we offer. No matter the challenge, our technology will offer a non-toxic, non-corrosive, lightweight, yet very robust solution that will contribute to reduction of environmental footprint, as well as to efficiency of operations and decrease of lifecycle costs.

LIGHT AND ROBUST

- High strength/weight and stiffness/weight ratios
- 2/3 the weight of aluminum and ¼ the weight of steel
- Resist fatigue and impact
- Offer dimensional stability

INTELLIGENT

- Malleable, easy to embed sensor and stealth technology
- Low-signature
- Non-conductive with high dielectric capability
- Thermal and conductive properties
- Insulate against heat and frost

SUSTAINABLE

- Non-toxic
- Resistant to chemicals
- Non-corrosive
- Can be recycled into concrete
- Lighter vessels – less CO2 emissions

COST-EFFICIENT

- Less consumption, less maintenance, less replacement

< DEFENSE

We deliver complex composite structures for a variety of advanced applications, tailored to meet particular requirements including strength and stiffness specifications and high temperature properties.

Low weight, robustness, malleability and non-corrosive qualities of our all-composite components will contribute to reliability and maintainability of a complex structure or a combat craft, meeting requirements of increased payload, speed, availability, fuel efficiency and integrated low signature sensor and stealth technologies.

RENEWABLES >

We manufacture blades for windmill turbines in glass and epoxy composites, which are produced using a specialized method of vacuum injection into electrically heated moulds.

Using optimized materials composition and high-end production methods, we can supply large blades with high stiffness, low density, higher mechanical properties and good fatigue performance for reduced deflection, better efficiencies and an increased, low-maintenance lifespan.

We can deliver a range of specialized solutions for vessels, installations and lifting systems serving the renewable energy sector.

< AQUACULTURE AND COMMERCIAL FISH-FARMING

We can manufacture very large and complex structures for enclosed fish-farming that will ensure clean, sustainable and efficient breeding conditions. Building these systems in composite materials will safeguard the health of the fish and quality of marine environment.

While our solutions can solve typical challenges, such as fish escape, lice and waste management, composite materials will produce non-corrosive, non-toxic, yet extremely robust structures to withstand even rough sea conditions.

< OIL & GAS

We supply a range of products and components for integration onboard offshore support vessels, platforms, drillships and offshore lifting systems. Strength and low weight of composite components optimize capacity and stability for both a lifting system and vessel, and offer energy savings for operators.

The robustness and non-corrosive nature of composite materials lend themselves favorably to the lifecycle of a product in harsh marine and offshore environments, considerably increasing its usage duration, and reducing maintenance cost.

OUR BUSINESS AREAS

LIFECYCLE SUPPORT

We understand the importance of operational availability and employ our specialist skills to ensure the lifetime performance, reliability, safety and cost-efficiency of our products.

We strive to be a long-term partner for our clients and preserve a sense of enduring loyalty that extends far beyond the launch of a new vessel or delivery of a new product.

We have brought together an expert service and aftermarket team to meet all of your needs and to offer the best aftercare for our world-class craft and advanced components.

We offer a range of comprehensive service agreement packages, specifically developed to support the repair, maintenance and upgrade of composite vessels and components. We offer our services on site of your operations, at ports or at our purpose-built yard facilities.

OUR SERVICE PORTFOLIO INCLUDES:

- Planning and scheduling
- Periodic and preventive maintenance
- Overhaul and planned maintenance of complete vessels
- Modification, mid-life updates and retrofits
- Configuration management and control
- Repair of structure, sub-systems and equipment
- Integrated logistics support with 24/7 online maintenance system updates
- Training for crew
- Warranty support
- Spare parts

STRONG performance. LIGHT materials.

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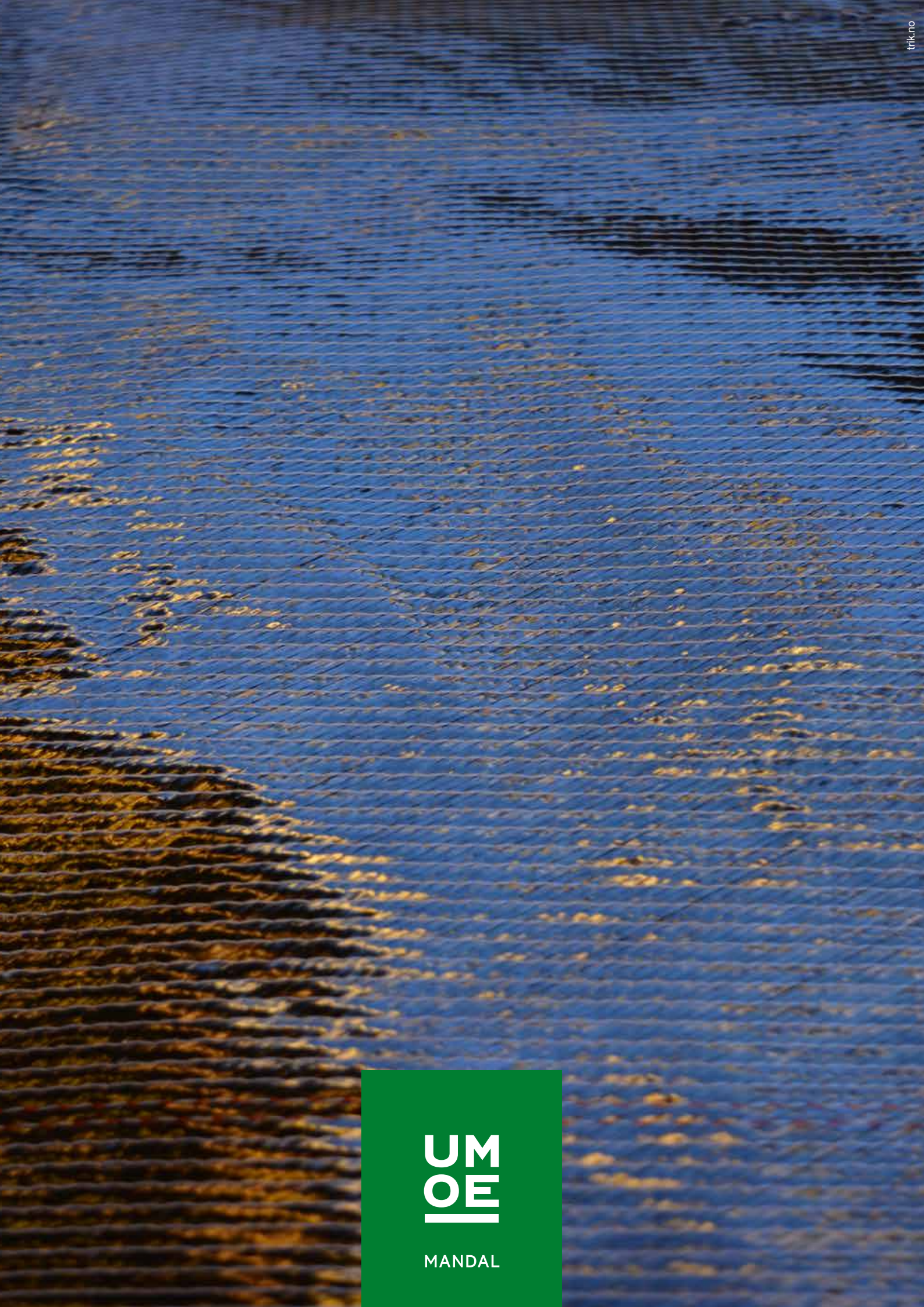

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