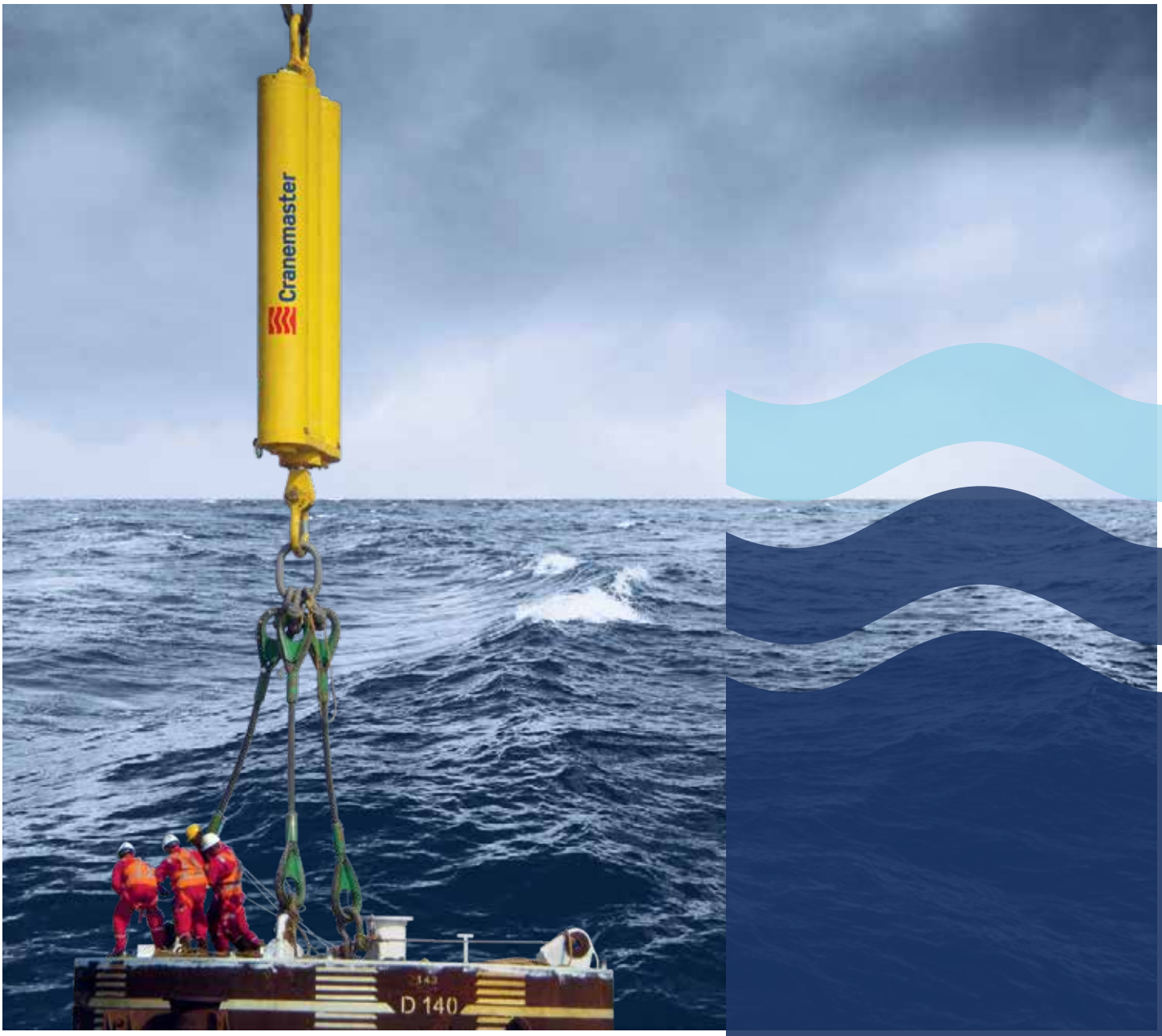
Cranemaster



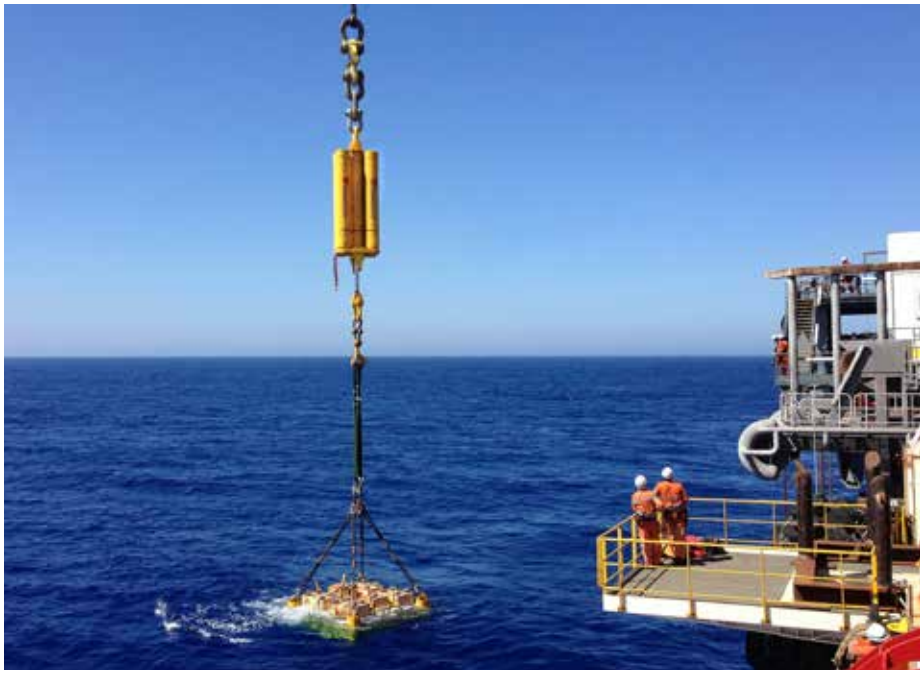
SECURING OFFSHORE LIFTING **OPERATIONS**

Pioneers in offshore lifting

Cranemaster is a privately owned company founded in 1983 by Ernst B. Johansen. In response to the increasing number of lifting incidents in the North Sea, he invented passive heave compensation for offshore lifts.

With hard work and dedication, he made the company a world leader in its field, and today Cranemaster works closely with most of the world's leading offshore contractors.

Cranemaster's headquarter is in Stathelle, Norway, with local representatives across the globe.



Expanding your capabilities

Mounted between the hook and the load, Cranemaster® shock absorbers and passive heave compensators expands your vessel capabilities while protecting your crane, lifted object and personnel. The result is improved operational weather window, reduced probability of snap loads and reduced heave motion.

OIL & GAS | From small in-air lifts of a few ton to subsea landing of the largest manifolds of more than 1000 ton, we have the right units to remove slack slings, shock loads and unwanted motion. We know dynamics challenges in all lifting phases and also how to reduce them!

RENEWABLES | Cranemaster has built up a strong track record in the offshore renewables market. Installation of monopiles, jacket foundations, templates, transition pieces and wave energy devices are some of the projects we have been involved in.

DECOMMISSIONING | We will be a positive contribution to your decommissioning activities in reducing cost and increasing weather window for lifting operations.

SALVAGE | Did you know our units were used in the Costa Concordia and Rena removal projects? With Cranemaster, you are ensured a safe and efficient salvage operation.

THE INVENTOR OF PASSIVE HEAVE COMPENSATION FOR OFFSHORE LIFTS

Application Areas

Lifts in air, splash zone crossing and subsea operations. Cranemaster ensures safe and effective operation, and together with our customers we continue to find new application areas.

SHOCK ABSORPTION

OPERATIONAL CHALLENGES

- Dynamic load on crane or load at lift-off for lifts in air.
- Limited operational weather window because of harsh weather conditions.
- Any operation where peak loads may arise, in air and subsea.
- Potential re-entry of load being lifted represents a significant risk.

CRANEMASTER ADVANTAGES

- Increased weather window for your lifting operations.
- Protection of crane and lifted payload at lift-off and landing.
- Immediate response to potential dangerous peak loads.

TENSION CONTROL

OPERATIONAL CHALLENGES

- Rapid heeling of vessel during installation of heavy objects.
- Instability between touch-down and fastening.
- Suction forces combined with vessel movements creating large dynamic forces in crane and wire.
- Keeping tension during sawing and cutting.

CRANEMASTER ADVANTAGES

- Constant tension despite vessel movements.
- Fail safe constant tension functionality.
- Works as a constant tension system, but with added dampening preventing abrupt movements.
- Overload protection.

SPLASH ZONE CROSSING

OPERATIONAL CHALLENGES

- Limited operational weather window due to dynamic loads.
- Large forces on structures during crossing, especially complex structures and structures with large horizontal surfaces (e.g. manifolds).
- Crossing of structures with large variation between weight in water and air.

CRANEMASTER ADVANTAGES

- Reduction of dynamic forces in structure and lifting points during splash zone crossing.
- Reduction of dynamic load on the crane tip and the hoisting system.
- Reduction of probability of slack wire situations.

SUBSEA LANDING

OPERATIONAL CHALLENGES

- Limited operational weather window to reach required vertical landing speed.
- Structures with landing speed limitations. Exceeding these might cause overstress within the structures.
- Landing of structures with tight angular tolerance.
- Rapid heeling of vessel during landing of heavy loads.

CRANEMASTER ADVANTAGES

- Reduction of landing speed.
- Possibility to maintain tension in wire during landing phase.
- Reduction of peak loads in case of re-lifting.
- Prevention of rapid heeling of vessel during landing of heavy loads.

35 YEARS OF EXPERIENCE WITH A WELL PROVEN TRACK RECORD

LOAD CHART IMPROVEMENT

OPERATIONAL CHALLENGES

- Reduced lifting capacity at increasing wave heights.
- Potential damage to rig crane and load due to dynamic forces at high sea states.

CRANEMASTER ADVANTAGES

- Increased weather window for your lifting operations.
- Lifting capacity maintained despite increasing wave heights.
- Increased rig utilization by minimizing rig downtime.
- Protection of crane, rigging and load at lift-off.

PILE RUN PROTECTION

OPERATIONAL CHALLENGES

- Sudden free fall of the piles during pile hammering due to layering in the soil.
- The snap loads following pile runs can be very high, exposing both personnel and equipment to high risk.

CRANEMASTER ADVANTAGES

- Pile run snap loads reduced to acceptable levels.
- Elimination of ringing effects.
- Expensive interruptions in the piling process can be avoided.

SUBSEA RETRIEVAL

OPERATIONAL CHALLENGES

- Retrieval of objects from the sea floor may cause large forces in the crane and wire due to a combination of vessel movement and suction forces.

CRANEMASTER ADVANTAGES

- Absorption of forces in crane and wire, preventing direct coupling between load and boom-tip movement.
- Constant tensioning system, but with added dampening once object is loose from the sea floor.
- Overload protection.

RESONANCE AVOIDANCE

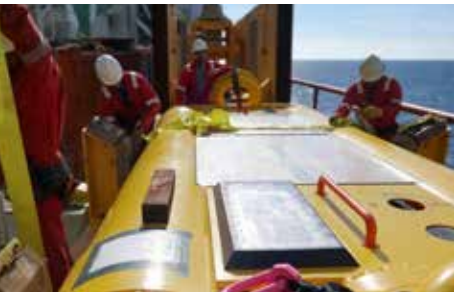
OPERATIONAL CHALLENGES

- When the wave period of the surface waves, and thus the frequency of the heave, generate boom tip movements which correspond to the system frequency of the load and wire.
- The heave creates resonance movements in the subsea load and wire with destructive energy.

CRANEMASTER ADVANTAGES

- Uncontrolled dynamic forces and escalating movements of load during deep water operations avoided.
- System resonance period increased.

Customized solutions that meet the **toughest** demands and **expectations**



The Cranemaster team consists of highly skilled, committed and QHSE focused employees. Our unparalleled experience and expertise makes us a reliable project partner. Rapid response and comprehensive support is one of Cranemaster's main strenghts according to our customers.

LIFT ANALYSIS

Our competent engineering team is eager to solve any challenge you may have related to dynamics or motions, using our existing technology or through development of tailor made solutions.

Typically this includes force analysis in crane/wire/load during lifts in air or through the splash zone, operational weather window calculations, subsea landing speed analysis or review of the above based on analysis received from the customer.

OFFSHORE ASSISTANCE

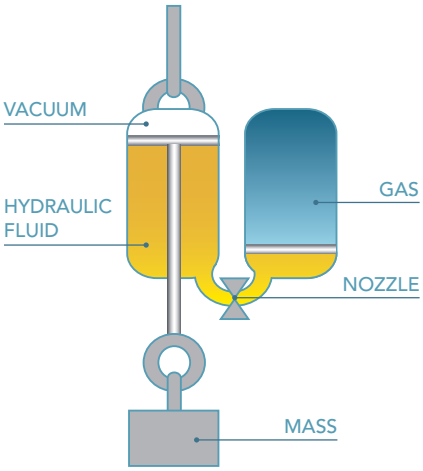
If you need assistance, our service technicians, all with offshore experience and certificates, can assist you. Typical examples of services are help with mobilization prior to departure, training of on-board technicians and assistance during operation at sea. The larger Cranemaster® units are equipped with up/down-ending frames to ease the deck handling process.

TRUSTED PARTNER FOR THE WORLD'S LEADING OFFSHORE CONTRACTORS

WORKING PRINCIPLE

A Cranemaster® unit is a passive heave compensator system with a double acting hydraulic load absorber.

It is a rugged self-contained hydraulic/pneumatic unit based on gas pressure and hydraulic fluid.



PASSIVE DEPTH COMPENSATION FOR ULTRA DEEP WATERS

- Robust mechanical depth compensation units for ultra deep waters.
- Automatic and simple, no need for control system.
- Exclusive patent right.

From compact **shock absorbers** to advanced **passive heave compensation** systems

ROBUST TECHNOLOGY & STATE OF THE ART PRODUCTION IN NORWAY

STANDARD SHOCK ABSORBERS AND PASSIVE HEAVE COMPENSATORS

Rugged units protecting crane, rigging and payload from shock loads, motion and excessive forces. We have the world's largest fleet of rental units ready for immediate mobilization.

- **Load range:** 0,5 T - 1400 T.
- **Stroke range:** 0,5 m - 5,0 m.
- **Maximum water depth:** 3000 m.
- Designed and tested for harsh offshore environments.
- Adjustable spring and dampening characteristics.
- Self contained – no external connections of hoses or wire required.
- Can be connected in parallel for increased load and series for increased stroke.
- For rental or purchase.
- Special units designed on request.
- Produced in Norway using high quality material and components.

UNITS WITH ADVANCED FEATURES FOR ENHANCED PERFORMANCE AND CONTROL

Innovation and continous product development is at the heart of our philosophy, and for demanding operations we have developed units with high performance functionality.

- **Cranemaster® Adaptive Control |** Optimized performance through automatic change of settings for the various phases during lifting operation.
- **Depth Compensation |** For deep water operations, stroke will remain constant independent of depth.
- **CAST |** Superior performance for splash zone crossing of demanding payloads.
- **Lock & Release |** Reduction of rigging height through piston locking.
- **Quick Lift |** Enables a load to be quickly lifted off the deck of a vessel to prevent re-contact of load with deck due to vessel heaving.
- Automatic stroke adjustments for temperature, weight and buoyancy correction.
- Monitoring and logging.

SECURING OFFSHORE LIFTING **OPERATIONS**

Worldwide coverage

Local stock, service and solution engineers through trusted partners.

Cranemaster

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QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

Achilles JQS empowered by Achilles Qualified