

MacArtney has produced a new active heave compensation winch design

WINCHES

New Generation Winches

As the offshore oil and gas industry gears itself for operations in increasingly greater water depths and harsher climatic environments, the technology requirements to overcome these challenges is also increasing. Providers of underwater technology systems and the offshore industry are commonly entering into partnerships to address the increased market demands. For many years MacArtney has been developing and supplying winch systems for the offshore market. Experience of more than 400 winch systems delivered, a

dedication to supplying smarter solutions and close collaboration with the ROV operator industry has formed the background for MacArtney's development of a latest generation of active heave compensation (AHC) winch systems.

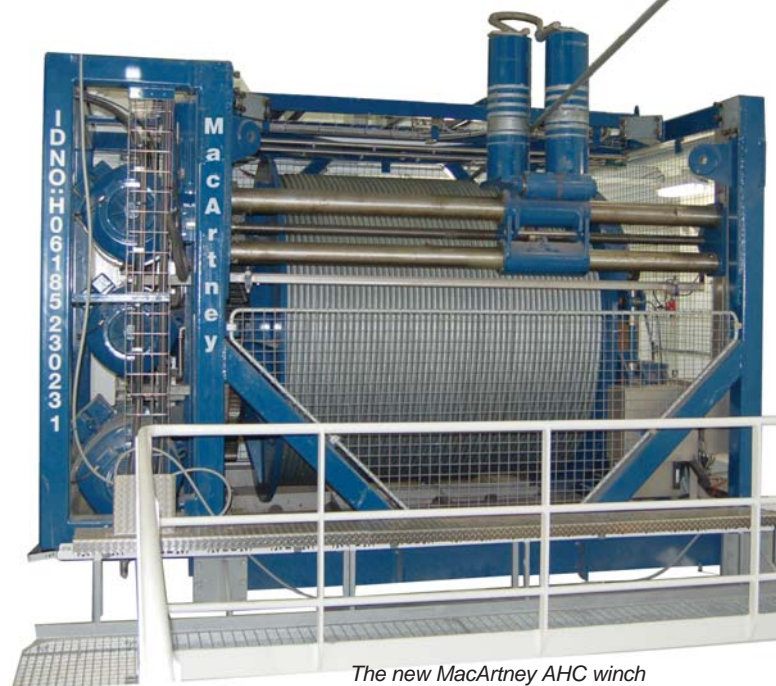


The Island Vanguard which houses the latest MacArtney AHC winch

The new MacArtney AHC winch has been met with a delivery of thirteen systems since

the introduction in the autumn 2006, and there are a number of systems in the order book. This was selected by Oceaneering for its existing and future ROV fleet. 'It is designed for 3400m 34mm diameter umbilical,' said a spokesman. 'It will be used in connection with Oceaneering's medium to large sized workclass ROV systems'.

The AHC winch for Oceaneering is the latest generation of super high speed AHC winch systems with safe working load of up to 12t at cable speeds up to 120m per min. The active



The new MacArtney AHC winch

heave compensation is based on input from a Kongberg MRU 5, which forms an integral part of the system. This feature allows for safe and controlled docking of the ROV into the tether management system. The time difference from input to output in the control system is extremely short, securing an operational mode without phase shift.

Three powerful electrical motors supply the more than 100kW power through planetary angled gears, while an overall ring gear drives the winch. All functions of the complete winch system, as well as the AHC functionality and a whole string of other control option, are made available through an advanced programmable logic control system.

'We have used some of the most advanced and complex control systems available on the market and the HMI (human machine interface) is a 10.4in operators panel with Ethernet connection working as a web server,' said a spokesman.

Design Philosophy

One of the design philosophies is to standardise the winch designs wherever possible, which has proven to be a strong marketing factor.

'It cuts costs, shortens delivery time, standardises spare parts and reduces documentation and certification time,' said a spokesman. 'However, it is equally important to understand customers often have special require-

ments for highly purpose built systems.

MacArtney manufacture subsea winches, traction systems with 10 000m cable for offshore pipe inspection requiring full ATEX certification and Norsok compliance. Most of its winches are electrically driven. This is a result of huge improvements to core technology of the frequency converters available on the market today and many years of

constant development work. Amongst the range of winches are

- Manually driven winches for deck storage
- Stainless steel electrical winches
- Oceanographic winches
- ROV winches
- Right angle winches
- Launch and recovery systems

'From here, all winch operations can be monitored from any computer with internet access and PLC-programs can be modified and monitored.'

The AHC winch incorporates separate drive of the level wind, synchronised with the drum through the use of encoders (rotating counters) and controlled by the PLC. The quality of spooling with such a system is unique. The rotation of the level wind trapeze spindle is divided into 4096 pulses. In contrast, a conventional diamond spindle has mechanical gear exchange from the drum, which generally involves compromises as the theoretical ratio is not possible in reality.

The separate drive also allows for change of cable diameter when needed (with the Oceaneering system, between 31–45mm), only requiring the operator to change the cable parameters in the software, and not replacing an expensive diamond spindle and gear train. Adjustable turning points for the level wind at the drum flanges compensates for changes in the cable's physical dimensions due to wear.

From the HMI operator panel or via any PC connected to the winch, basic parameters as load, speed, length of cable

out, remaining cable on the drum, actual layer, as well as cable characteristics and alarms and shutdowns are available on the screen. The screen layout can be altered to suit customer requirements. The HMI also allows for interface with other software systems communicating with the winch control system.

This feature is shared with the MacArtney FOCUS-2 and TRIAXUS towed vehicle systems, where cable length, load and cable speed are parameters used by the vehicles controls systems to control the flight characteristics of the underwater vehicle.

System options

System options to the AHC system includes wireless remote control, touch screen remote control station, control of winch by other customer signals ie, depth sensors etc. and constant tension with preset upper and lower values.

The MacArtney PLC control system may also, depending of the type of operation, include various operational modes as:

- Deck handling (decreased speed range on the joystick)
- Stop at pre programmed depth
- Emergency recovery
- Automatic stop eight turns of cable left on the drum



The drive system is based on three engines

The AHC winch systems for Oceaneering have been delivered according to DnV Rules for Certification of Lifting Appliances and The electrical installation and components have been delivered according to DnV Rules for Classification of Mobile Off-shore Units.

MacArtney

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