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COMMUNICATION HUB FOR THE WIND ENERGY INDUSTRY

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## Marine Coordination

# Global Offshore Wind 2016 Preview

Subsea Umbilicals  
& Seals

**WORKBOATS**

# Evolution in Torque Control **TAKE TWO**

In 2010 Norbar research revealed that traditional electric torque tools were giving vastly different results depending on the joint type. The torque delivered to a hard joint could be more than double the torque that the same tool, with the same settings, would deliver to a soft joint with great potential to leave bolts under or over tightened and potentially therefore dangerous.

## INNOVATIVE LAUNCH

As a result, Norbar launched EvoTorque, and now EvoTorque2, which uses the very latest in joint sensing technology, a patent pending motor design and market leading control software to emit exactly the right amount of torque required to tighten a specific joint. The required torque can be easily programmed with the touch of a few buttons and the EvoTorque indicates, using a clear display screen, when the correct output has been achieved.

This revolutionary tool underwent rigorous evaluation including drop tests, water and dust resistance ingress, and power cable stress tests. Coupled with a third party verified sound power of 72.3 dB (A) and vibration level of 0.304 m/s<sup>2</sup> the EvoTorque is leading the way in accuracy, efficiency and safety – now that's what we're torquing about!



## TORQUEING WIND TURBINES

When it comes to large wind turbines; both on and offshore, the greatest cost consideration is usually the turbine itself and the installation process. While maintenance programmes are a necessity, in some circumstances the tools and processes involved could be doing more damage than good.

Juan Carlos Casas, Sales Engineer at Norbar explains...

Torque, in this context, is essentially the measurement of rotational force applied to a threaded fastener. Where the torque is either under or over the manufacturer's specification, it can cause considerable damage to the turbine structure. One of the key technical implications of over or under torque is the potential for vibrations in the turbine, which presents a real risk

of catastrophic failure. The relaxation of joints as a result of bolts becoming loose, premature wear on a number of components, damage to the steel or concrete structure or even fire are all possible consequences.

## IN REALITY

To put this into context, in many windfarm locations maintenance operatives are required to use a variety of tools to get the job done. For example, in the turbine tower; an operative would require one tool to run down the bolts and then a hydraulic wrench to achieve final torque. The reality of using these two tools could present a number of complications, particularly with regard to ease of operation and manoeuvrability. Health and safety is therefore a key concern.



Furthermore, when triggering electric multipliers on bolts that have already been tightened, a dangerous overtorque can be achieved due to the slow response time of controllers, high motor start currents and high motor inertias. In some cases, this overtorque can be in the region of 100 per cent. When triggered multiple times, in this type of condition, there is an extreme danger that the application may fail due to the overstress of the joint.

## SOLUTION

The solution therefore is the Norbar EvoTorque2 which is capable of incredible control in tough conditions - producing results within  $\pm 5$  per cent of set torque, when re-applied to a bolt that is already tightened. However, in scenarios where bolts have not previously been tightened EvoTorque will deliver torque values with an accuracy of  $\pm 3\%$ . When performing a re-tightening test, the EvoTorque also demonstrated a clear advantage which, when triggered 18 consecutive times on an already tightened bolt, it achieved total accumulated overtorque of around 15-20 per cent of the set torque; depending on the hardness of the joint. This number of consecutive applications using traditional electric tools would almost certainly result in failure of either the tool or bolt.

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## BENEFITS

The benefits of the EvoTorque2 are therefore considerable, offering far more reliable torque results than conventional tools and, more importantly, no need for final torquing with a hydraulic wrench.

Furthermore, in independent tests and calibrations conducted across a number of Spanish windfarm sites; EvoTorque achieved the OK/PAA/APPROVAL standard; making it the first and only electric multiplier permitted to perform final torque on a number of windfarm sites.



The range is available in both 110V and 230V versions and crucially is weather sealed to IP44 and equipped with a maintenance free motor. The EvoTorque range covers requirements from 200 N·m to 6,000 N·m.

## ADDITIONAL OPERATING CONCERN

Another major concern regarding the use of electric tools on windfarm sites is the quality of the power supply. Power is usually provided by small generators together with long cable runs. The implication of which is, that most electric tools will either not run or their torque output becomes erratic. The EvoTorque is largely immune from the effects of voltage fluctuation due to the technology used in the motor controller.

## SPECIFICATION

EvoTorque2 adds Bluetooth connectivity, a 3,000 reading memory and Torque, Torque & Angle, and Torque Audit modes to its capabilities. Torque data can be sent via the tool or a PC, either wirelessly via Bluetooth Smart, or wired using the USB cable supplied. The reading memory will store 3,000 readings, each date and time stamped. These features provide comprehensive joint traceability for operators and their clients.

**Norbar Torque Tools Ltd**

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