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Interview: Huub den Rooijen
Head of Offshore Wind, Crown Estate

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Performance measurement and improvement: THE WAY FORWARD

Dr. John Hobson (Risktec Solutions Ltd.) discusses the importance and benefits of Health and Safety monitoring across RenewableUK, and the recent development of proposals for KPIs and effective incident reporting.

In Issue 19 of Real Power, Chris Streatfield (Director of Health & Safety, RenewableUK) wrote that in order 'to deliver a safe, competent and committed industry', we must 'continue to be vigilant and ensure that health and safety remains our number one priority'. A key part of achieving this is to implement a structured and systematic way of measuring and improving Health and Safety Performance.

In 2011, RenewableUK engaged Risktec Solutions to develop a way forward to achieve this, in line with the RenewableUK strategic health and safety commitment to 'a step change in the collation and sharing of industry key performance indicators (KPIs) and lessons learned outputs'. Risktec have extensive expertise in safety and risk management across many industries, and have specific experience in wind energy industry applications and safety performance measurement and improvement.

To ensure that proposals were tailored to the requirements of RenewableUK, its membership and key stakeholders, Risktec led a very extensive review and consultation process:

- Literature review of H&S performance measurement and improvement schemes, and their applicability to RenewableUK;
- Individual discussions with representative RenewableUK members and key stakeholders including the HSE, Crown Estate, MCA, DECC;
- Consultation open to all RenewableUK members;
- Three workshops;
- Establishment of private interactive project website;
- Online survey of membership.

The online membership survey confirmed the extent of support from RenewableUK members, and also the high level of established H&S management which will enable good quality health and safety reporting to RenewableUK. Specifically, 100 per cent of those surveyed supported RenewableUK's aim of identifying health and safety KPIs, and also the aim of improving the nature and extent of incident reporting across RenewableUK.

After interpreting and analysing the information obtained from the reviews and consultations, Risktec has produced proposals which have been accepted by RenewableUK. These aim to achieve a flexible and evolutionary approach for measuring and improving health and safety performance.

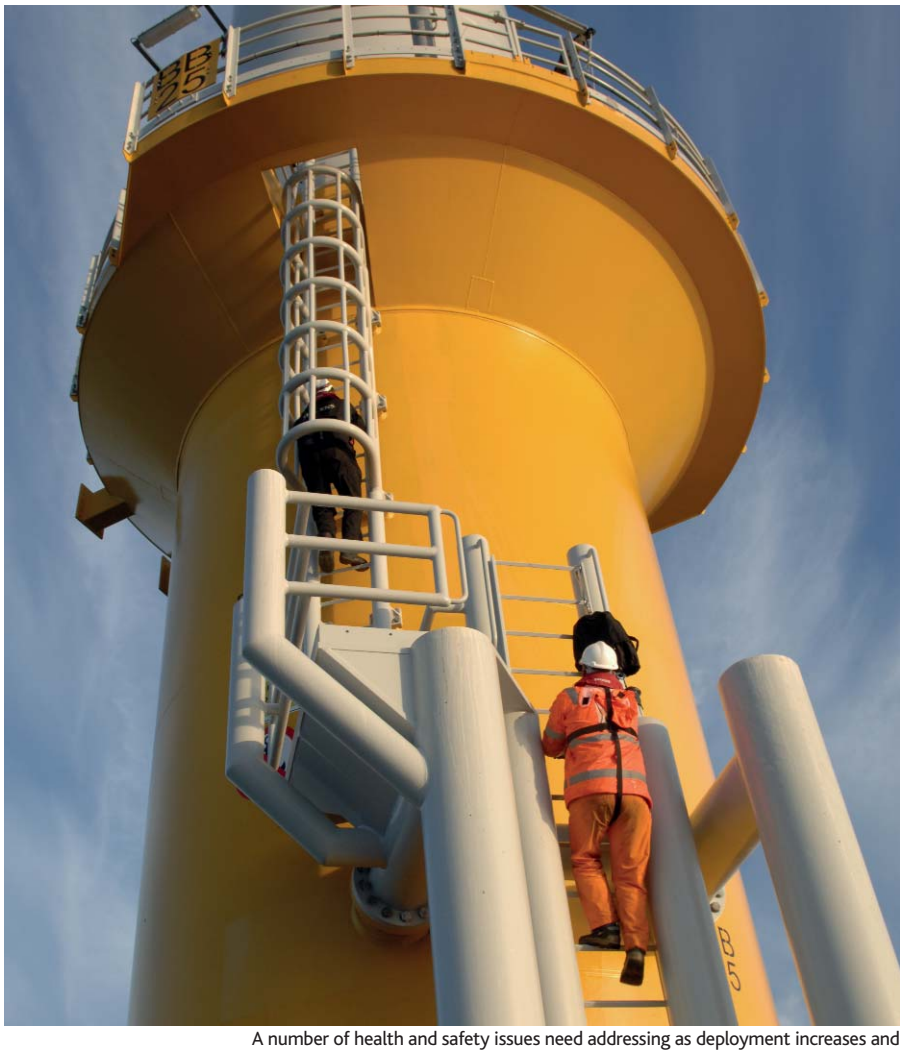
The development of proposals has been in line with the principles described in the RenewableUK Health and Safety Guidelines:

- Priority should be given to incidents that indicate the greatest risk.
- Both the immediate and the underlying causes of events need to be identified.
- Adequate analysis should be made of all collected data to identify common features or trends.
- Information should result in remedial action to improve health and safety.

The latter bullet is crucial – H&S performance measurement and learning lessons form the basis for prioritising and driving improvement, with KPIs being used to demonstrate success in improving health and safety across RenewableUK.

The key elements of the proposed H&S monitoring and improvement process are:

- A modified incident reporting structure, based on developing the existing successful scheme.
- A simple KPI scheme based on three groupings of KPIs, which together provide a balance of 'lagging' and 'leading' indicators.
- 'mandatory reporting' KPIs – which collate mandatory H&S reporting statistics across RenewableUK (e.g. from RIDDOR, MAIB etc.)
- 'Incident database' KPIs – which reflect the priority themes and issues across RenewableUK arising from incident reports submitted by members.
- 'Organisational' KPIs – which assess the robustness of the health and safety management systems across RenewableUK, and the strength of the supporting organisational H&S cultures.



A number of health and safety issues need addressing as deployment increases and wind farms move further from shore into deeper water. Photo: Dong Energy

- The ability to perform intra- and inter-industry benchmarking of health and safety performance KPIs, as well as monitoring KPI variations with time and the impact of improvement measures taken across RenewableUK.
- Identification of key 'lessons learned' most relevant to RenewableUK, through a structured review and prioritisation of reported incidents (and near-incidents) based on a broad characterisation of their areas of application (e.g. onshore, offshore, cross-industry etc.), their risks and their causes.

In developing the proposals, simplicity and confidentiality were identified as being critically important for obtaining buy-in and participation by the RenewableUK membership. The importance of these were repeatedly emphasised during the consultation process.

It is vital to achieve a balance between 'value' and 'simplicity' – it is clear that both incident reporting and performance measurement can be very simple by seeking very little information, but it is essential that sufficient information is required if the analysis and review is to add significant value (e.g. in benchmarking, learning lessons, targeting improvement and deriving key safety performance indicators). It is also essential to minimise duplication of data being submitted to different systems as far as possible, although it is recognised that individual organisations will have different interests and requirements, making a single universal reporting system impractical.

"In developing the proposals, simplicity and confidentiality were identified as being critically important."

Assured confidentiality of information being supplied by members is also fundamentally important, and the existing 'lessons learned' scheme has been scrupulous in this regard. Members will only be able to see their own submitted incident information and KPIs in detail, but will also be able to access aggregated information across RenewableUK with which to compare their own performance.

Progress in implementing the agreed H&S measurement and improvement process is as follows:

- A set of ten initial specific KPIs have been identified, based on historic reported incidents and priority H&S areas (these will be subject to ongoing review).
- A preliminary incident reporting structure has been produced.
- Requirements and functionality of a supporting web-based IT platform for incident reporting and KPI monitoring have been defined (the implementation of this is subject of a separate project to be started shortly).
- A recommended forward strategy and implementation plan to maintain and develop the proposed approach has been produced in outline, to be reviewed when the incident reporting platform is in place.
- Agreement in principle has been reached with Crown Estate that the RenewableUK process will meet their requirements, and so will eliminate the need for separate reporting.

The implementation of this process by RenewableUK through the active and committed involvement of the membership will demonstrate commitment to health and safety assurance and improvement, as well as making a substantial contribution to increasing the credibility and reputation of the industry.

Risktec Solutions Ltd (www.risktec.co.uk) is an established, independent and specialist risk management consulting and training company, and is wholly owned by its employees. They assist clients in major hazard industries as well as commercial and public sectors to manage health, safety, security, environmental and business risk.

WORLD'S LARGEST WIND TURBINE BEARING TEST RIG NOW OPERATIONAL

After less than two years, the Schaeffler Group has successfully completed the design and build of the world's largest, most powerful test rig for large-size bearings.

The *'Astraios'* test rig – named after the Titan in Greek mythology who fathered the four wind gods – enables large-size bearings weighing up to 15 tonnes with outside diameters up to 3.5m, to be fully tested in realistic conditions using a comprehensive simulation programme. It is particularly suited to those bearings used in wind power applications.

At a cost of around seven million euros, *Astraios* is a significant investment. However, it will enable Schaeffler to help reduce wind turbine development times for customers, as well as improving the reliability, safety and cost effectiveness of future wind turbine designs.

Astraios will be primarily used to test rotor bearings for multi-megawatt wind turbines and will help to further improve the understanding of wind turbine systems, influencing factors and the interrelationship between drive train components. The tests will also provide useful insights into wind turbine operation and maintenance, as well as information on how to optimise the design of any adjacent constructions.

SET-UP AND FUNCTION OF ASTRAIOS

The test rig will perform realistic simulations of static and dynamic loads that act on the rotor bearings and slewing rings. All rotor bearing concepts for wind turbines with an output of up to 6MW can be tested on *Astraios*. Functional tests will provide insights into rolling bearing kinematics, temperature and friction behaviour, loads and deformation. The data required for these tests will be provided by more than 300 different sensors, mounted on the test rig and in the bearings.

The loading frame is the most important part of the test rig. Four radial and four axial hydraulic cylinders are fixed to this frame, which generate the real loads and moment forces that occur in a wind turbine. The radial cylinders simulate the weight of a rotor hub with rotor blades, while the axial cylinders generate the wind loads.

Schaeffler Group's new 'Astraios' test rig for wind turbine bearings

For more information visit: www.schaeffler.co.uk