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An Investigation Into the Potential Effects that the European Union EMF Directive 2013/25/EU May Have on the Energy Sector

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Background to EMF Directive: The Physical Agents Directives

- Vibration Directive 2002 - Control of Vibration at Work Regulations 2005
- Noise Directive 2003 – Control of Noise at Work Regulations 2005
- Optical Agents Directive 2006 – The Control of Optical Agents Regulations 2010
- EMF Directive (2004/40/EC) amended by 2008/46/EC delayed to April 2012, now due 31st October 2013.

Background to EMF Directive: The Physical Agents Directives

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- Part of Physical Agents Suite of Directives
- Original version of EMF Directive used the exposure limits by the ICNIRP International Commission on Non-Ionising Radiation Protection - ICNRP 1998 Limits originally due for implementation April 2008.
- Controversy over original EMF Directive Derogations required for MRI Scanners & Military - delaying Directive issued – April 2012.
- Further discussions ensued due to implications for industry across EU. Large debate and further Derogations debated.
- Revised EMF Directive Published in June 2013.

What is Happening?

- UK Compliance – Regulations must be transposed into UK law by June 2016.

- EU Commission sponsoring work on an EU Practical Guide – issued HSE attempting to influence the practical guide and review what is being done in the UK and across the EU.

Project Aims

- A review of the current knowledge with regard to magnetic fields to lead to a better understanding of the implications for the energy industry.
- Carry out evaluation of the types of systems that could result in exposures in excess of the proposed limits.
- Develop a standard methodology for measurement of potential magnetic fields using the recommended equipment types.
- Ensure that the Energy Industry complies with the requirements of the EMF Directive.

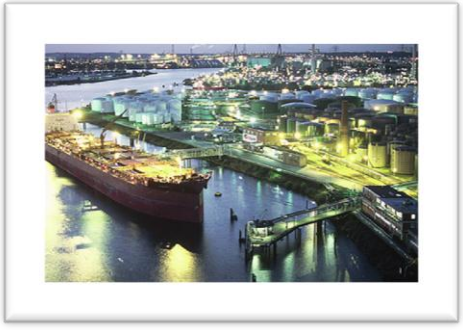
Key Deliverables

- Guidance on the health aspects of high magnetic field exposure (EI Publication).
- Guidance on specific methods for a quantifiable magnetic field risk assessment process for the energy industry (EI Publication).
- Clear identification of areas of specific risk within the energy industry and risk rate if possible (EI Publication).

Off-Shore

Oil Platforms, Gas Platforms, Accommodation Platforms

On-Shore



Fabrication/ Construction Facilities, Power Generation, Power Distribution, Pumping Stations, terminals, Refineries

Risk Assessments

Control Rooms

Welding Processes

Power Distribution

Measurements

- Data from over 300 spectra were accumulated in this preliminary survey across three offshore platforms and two onshore terminals.

- A further 4 spectra were acquired at the transformer and around the service entrance of a single 850kW wind turbine operating at 33% of its maximum output.

- The majority of measurements were made around transformers and switchboards and some measurements were made of power generation equipment, uninterruptible power supplies (UPSs), battery rooms and communication gear.

Transformers

- Transformers generally produced the largest magnetic field strengths
- The strongest fields were found at the low voltage side of the transformer units. (The power in an AC system is proportional to both the current and the voltage so the current will always be greater at the low voltage (LV) side of the transformer and thus the magnetic field will always be stronger at the LV side.)
- The highest reading observed in the entire survey was at the LV side of an 11kV to 415V transformer at one of the onshore terminals.

Wind Turbines

- The maximum magnetic field strength found around the wind turbine transformer was less than 5µT and the electric field strength was less than 1V/m.

Switchboards

Switchboards accounted for the large percentage of the measurements taken with the majority of these measurements gave spectra with magnetic field strengths below 10µT and electric field strengths below 1V/m.

Welding Equipment

It was not possible to obtain data for welding equipment as part of this survey but this is one of the few areas with relevant existing data.

Other Electrical Equipment

Various other pieces of electrical equipment were monitored during this survey, they were chosen based on what was running at the time. Some of these items produced larger fields than many other measurements but were still very low in comparison to the EU limits.

Recommendations

The notion of designated areas or zones is already used for other physical agents, e.g. ionising radiation or noise. Areas closer to the source of the hazard are often designated as such and access is restricted so that personnel must take certain actions in order to be permitted entry.

Area Category	Definition
Safe Area	Field strengths are below the ICNIRP reference levels for members of the public
Low Risk Area	Field strengths are at or above the ICNIRP reference levels for members of the public and below the EU low Action Levels. Additional Assessment for personnel fitted medical implants will be required.
Medium Risk Area	Field strengths are at or above the EU low Action Levels and below the EU high Action Levels.
High Risk Area	Field strengths are at or above the EU high Action Levels

Health Surveillance

- It is not necessary for any additional routine health surveillance for the majority of Off-shore and On-shore workers.

- However, if a worker is fitted with an electronic medical implant it should be highlighted as part of any ordinary medical examination and ELF EMFs must be taken into account in any subsequent risk assessments. (Individual assessment will be required).

Further Studies

- Drillships, drilling rigs and work-over rigs are of particular interest as they have a high power throughput during drilling and work-over operations.
- Medical Implants In terms of research the most pressing issue for the energy sector is the effects of ELF EMFs on electronic medical implants there is a conservative threshold in this report that could be restrictive for certain types of work (e.g. welding).
- Guidance regarding the mapping of ELF EMFs on sites and installations will need to be prepared for use by the industry and this guidance should be written with the assistance of electrical engineers with offshore and onshore site experience.
- The mapping of a site must take all areas into account including accommodation and offices where out-of-sight cables and equipment could generate higher field strengths than expected

Acknowledgements

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Any Questions ?