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Meeting the Challenges of Safety Management in Wind Energy Industry

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Abstract: ***Countries promoting renewable energies encounter a variety of phenomena that can challenge the implementation of further onshore wind energy development. Those challenges can be observed in many multi-level governance systems, as exhibited in the U.S., Germany, and Mexico, where various regulatory and institutional levels must agree on goals and responsibilities. (1) Political and market phenomena, (2) siting issues, (3) the green vs. green dilemma, and (4) social acceptance are selected challenges within the different levels of decision-making processes in wind energy implementation. In this paper these challenges can enhance outlooks in policy and planning, posing solutions to wind energy challenges even in sensitive environments and triggering innovations such as adaptive management.***
Keywords: Governance, Renewable Energies, Wind Energy, Triggering.4

I. INTRODUCTION

Wind energy workers can be exposed to hazards that can result in fatalities and serious injuries during the various phases of a wind farm project. Many aspects of siting, erecting, maintaining, servicing and possibly dismantling wind turbines are unique, and even if most of the job hazards that these workers will face are not, the working environments and combinations in which they are found create unique challenges.

The objective of this report is to provide an in-depth and comprehensive overview and analysis of the OSH challenges in the wind energy sector in order to raise awareness and thereby support good OSH, so that the jobs in this sector are jobs that provide safe and healthy working conditions.

II. LITERATURE SURVEY

The lack of an industry standard in practical wind energy training is seen as one of the major factors attributing to this skills gap. According to Renewable, although there are generic (not specific to wind energy) onshore and offshore health and safety standards available, outside of this it is left to each individual wind energy company to interpret what is an adequate standard. Small and medium-sized companies are not able to afford to offer training to potential workers, which makes it difficult for them to have skilled workers.

Even larger companies, which can afford to provide such training, could benefit from a common training standard, and the time and money they invest in bringing new recruits up to standard could be used to expand other parts of the business.

III. GENERAL OSH CHALLENGES IN THE WIND ENERGY SECTOR

The G9 is looking to steer the development and publication of technical andoperational guidance to be implemented in the offshore wind industry to mitigate the risk of working at height. The guidance will provide a high-level overview of current working at height operations, and will reference operational guidance that has been developed for the offshore oil and gas sector. Guidance will be provided for a number of high-risk working at height operations.

1) Personnel working day/night rotating shifts were more likely to report sleep disturbance and gastric problems than those working only day shifts.
2) Injuries that occur during the night shift tend to be more severe.
3) Day/night shift workers were more likely to visit the installation sick bay than day workers. They were also more likely to visit the sick bay because of an accident.
4) Fixed shift patterns are less likely to cause problems with sleep, alertness and performance than rollover patterns.
5) Working long hours both onshore and offshore adversely affects mood and performance, but the offshore environment tends to intensify the issue.

IV. OSH ISSUES ACROSS THE LIFE CYCLE OF A WIND TURBINE

Construction is seen as the most complicated and possibly the most dangerous stage in a wind turbine's life cycle, as it involves the installation of major components, among them the foundation and transition piece and the assembly of the wind turbine. It includes most of the heavy lifting of turbine components together with the completion of multiple tasks in quick succession, and this presents a number of safety issues. Although the number of workers involved in the installation phase will depend on the size of the wind farm, this is the most personnel-intensive phase in its development and operation. Finally, it is important to remember that construction activities take place in windy areas and that turbine heights are designed to position the blades where the wind blows most strongly. The safety implications of working at height and the exposure to these high wind conditions need to be carefully considered throughout the construction phase (Figures 7.1).Portable tower cranes set up near installations onshore pose risks such as overloading, unintentional movement of the boom or vehicle towards other workers, risks to workers in the tower cranes' blind zones, inadequate access to the cab and power line contact. Many crane incidents are due to inadequate bearing surfaces, (Figures 7.1). so bearing pressures and ground surface capabilities should be determined with each activity, whether it is hoisting a load or walking the crane. During all major component lifts, crane mats should be placed on top of the crane pad. Wind tower components with the higher failure rates will require more maintenance interventions. Extreme weather conditions such as snow, strong wind and rain can all result in temperatures that range from the very low to the very high, and these harsh conditions, together with dirt, dust and lightning, also contributes to the blades having to be repaired or cleaned regularly.

Figure.1. OSH risks associated with the construction of wind turbines
(Unloading of Tower cells)

Figure.2.Erection of Tower cells & Blades

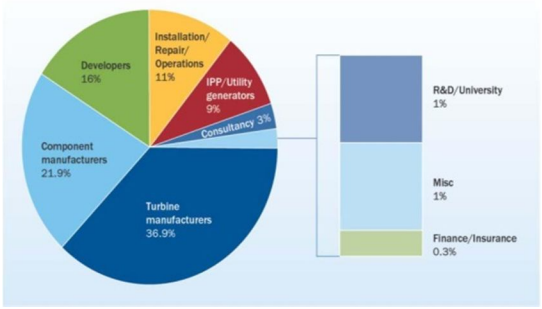


Figure.3Designed and Produced

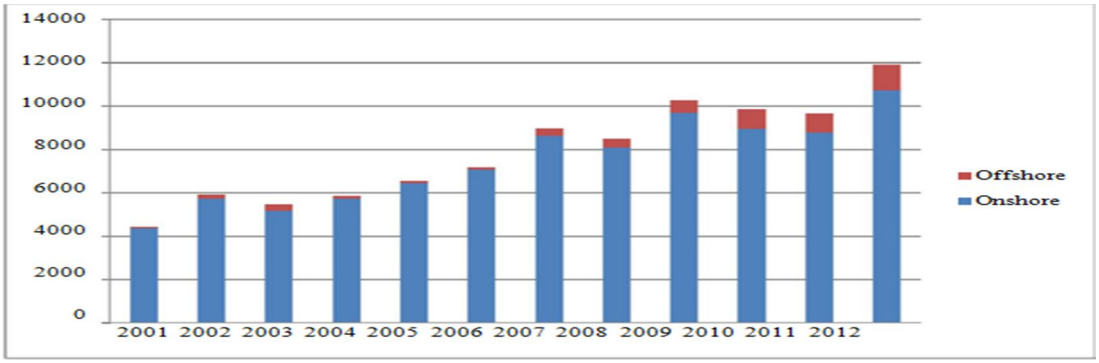


Figure.4. Annual onshore and offshore installations (MW)

Table 1: Breakdown of the wind standards by category and number

Category	Total	Performance	Product	Pre-Installation	Installation	Testing, Sampling & Analysis	Cross Cutting
Wind	39	2	14	7	2	11	3

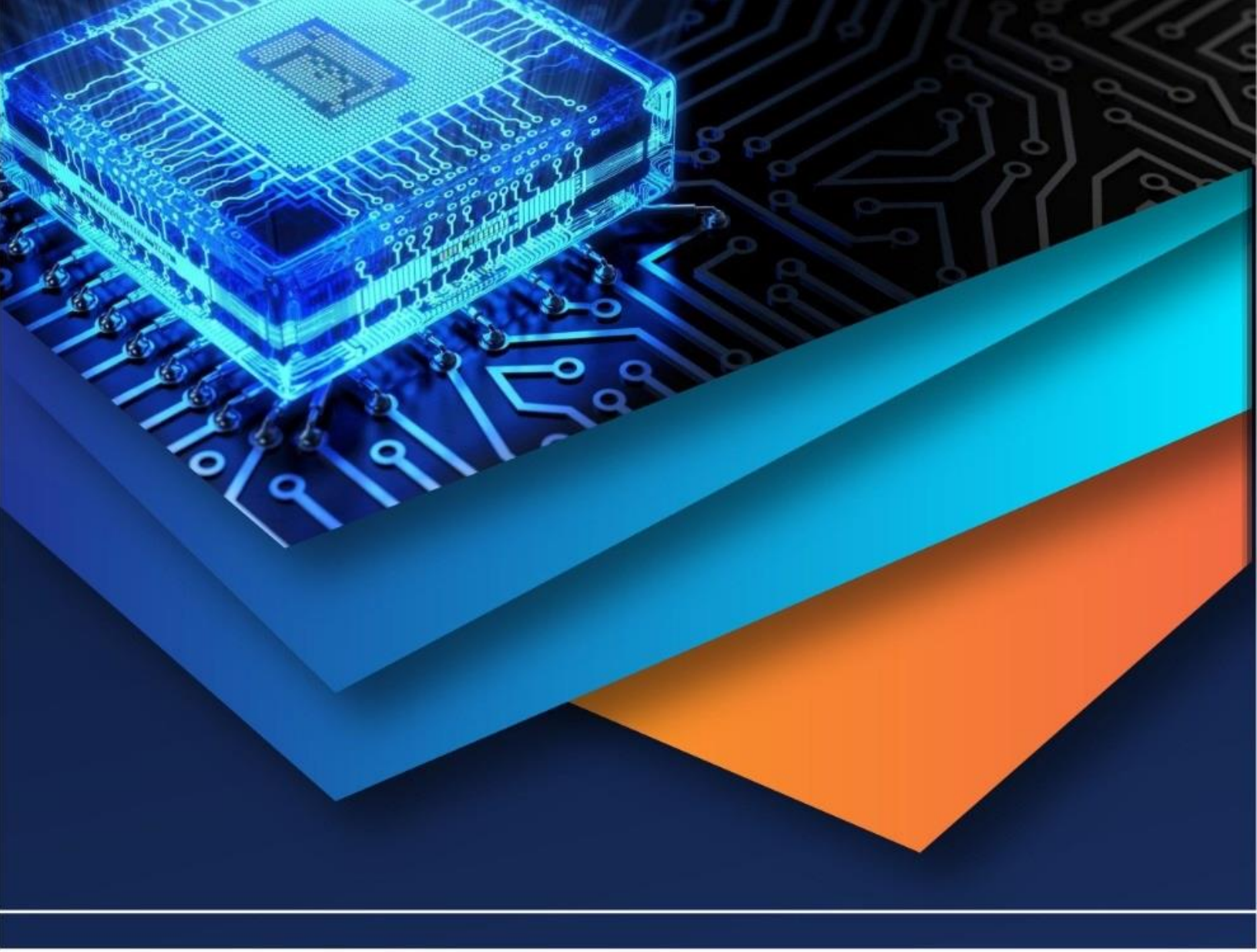
V. CONCLUSION

Europe's ambitious programmer to increase wind energy capacity so that it represents 25 % of EU electricity consumption by 2030 (EWEA, 2010) will require further efforts to consolidate and further improve OSH within the industry. Many of the OSH risks faced by the industry are not new as such, but are found in new, different situations or combinations that bring along new, different challenges.

1) Lack of osh data and information
2) Skills shortage and training
3) Osh through the life cycle of a wind turbine
4) Design and development
5) Construction — control of contractors
6) Operation and maintenance
7) Repowering and decommissioning

REFERENCES

[1] Albrechtsen, E., 'Occupational safety management in the offshore wind industry — status and challenges', Energy Procedia, Vol. 24, 2012, pp. 313–321.
[2] American Wind Energy Association and Canadian Wind Energy Association, Wind turbine sound andhealth effects. An expert panel review, 2009. Available at:(accessed 15 November 2013).
[3] Bundesverband WindEnergies, 'GWEC: wind energy powers ahead despite economic turmoil', 2012. Available at:(accessed 22 May 2012).
[4] Byon, Y. D, 'Season-dependent condition based maintenance for a wind turbine using a partially observed markover decision process', IEEE Transactions on Power Systems, Vol. 25, No 4, 2010, pp. 1823–1834.
[5] Casey, Z., 'No link between wind turbine and adverse health effects', 2013, EWEA blog. Available at:
[6] Chief Medical Officer of Health (CMOH), The potential health impact of wind turbines, CMOH, Ontario, Canada, May 2010.
[7] Clarke, P., Health & safety on wind farms — the PowerGen approach, PowerGen, pp. 25–31.
[8] Department of Health and Human Sciences (National Institute for Occupational Safety and Health), Summary of the Making Green Jobs Safe workshop, 14–16 December 2009, Mandarin Hotel, Washington, DC., 2011, publication number 2011-201, NIOSH.
[9] European Commission, 'Wind energy generation, Strategic Energy Technologies Information System', 2012. Available at: (accessed 15 November 2013).
[10] European Energy Research Alliance, 'The EERA joint programmer on wind energy', 2010, Available at: (accessed 18 June 2012).
[11] European Environment Agency, 'Europe's onshore and offshore wind energy potential. An assessment of environmental and economic constraints', EEA Technical report No 6/2009, 2009.
[12] EWEA (European Wind Energy Association), Arti. S.gonge,D.S.Ingole , PSO algorithm for line balancing. International Journal of Innovative and emerging Research in engineering 2; 26-29,2015.
[13] EWEA (European Wind Energy Association), European Wind Energy Platform, wind energytechnology roadmap implementation plan 2010—2012. 2010.



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