

Overview of IEC 61400-31 Standard Wind Turbine Siting Risk Assessment

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Wind turbine siting risks

Rationale:

1. Free space for turbine siting near load centers / populated areas gets rare
2. Renewable energy is wanted however remote from homes and dwellings
 - > More pressure on development of remaining sites.
3. Significant amount of time and energy spent by OEMs and developers meeting local risk requirements based on different assumptions / methods
4. Unclear requirements in many jurisdictions and lack of general accepted calculations methods contributing to complex liability question

Wind turbine siting risks

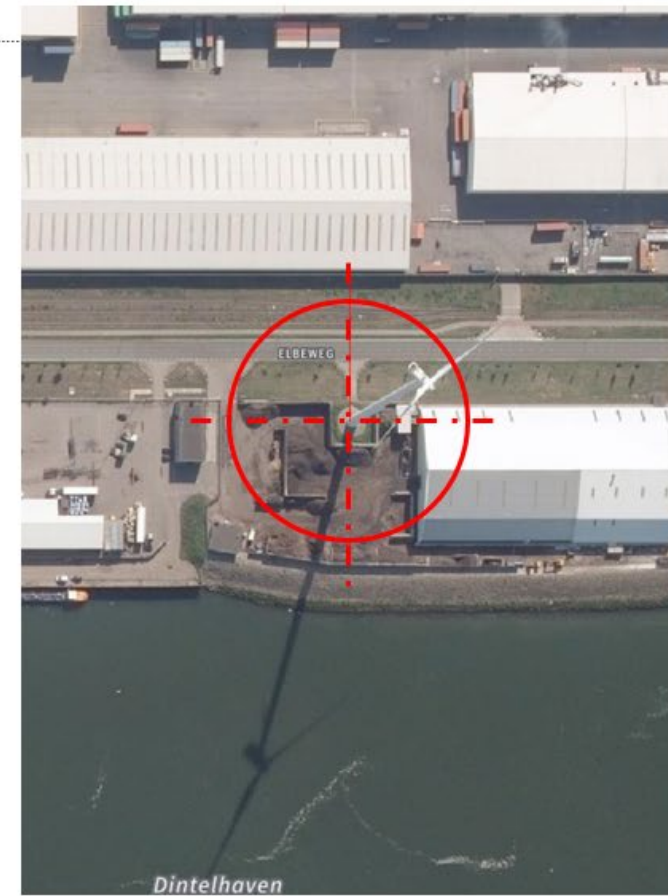
Rationale:

- The lack of a dedicated wind turbine siting risk assessment Technical Specification leads to
 - Unidentified, unquantified and unassessed risks
 - Potentially overly conservative risk assessments in comparison to other risks, that prevent projects to be executed.
 - Differences in risk assessments for the same sites

Siting Risks – an example Hartelkanaal, Rotterdam, NL



Circles drawn 1 x Rotor Diameter only!



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Preliminary chapters

- Foreword
- Introduction
- Scope of application
- Normative references
- Terms and definitions
- Assumptions
- Harm to people and objects
- Hazards identification

Risk analysis
Tolerable risk criteria
Risk evaluation
Risk reduction
Risk management through life
Non-normative references
Annex
Bibliography

Current Scope

Scope elements	Proposed in scope	Proposed out of scope	Where does out of scope get covered?
What			
Type of machinery	Horizontal axis wind turbines and wind parks without the substation	Substation of the park	-
Onshore/Offshore	Onshore only	Near- and Offshore	Potentially International Standard Perhaps Offshore demands a 61400-31-2
Aspect	Safety risks due to the presence of wind turbines	Environmental and long-term health	A separate NP for environmental hazards
Root cause	At least but not limited to: fire (and spreading), technical failure, turbine icing, extreme wind conditions, lightning strikes, earth quakes, adverse human operator or technician actions, flooding, land slides	War, terrorism, riots and vandalism	Comparable to insurance exclusion clauses Cybercrime demands are covered by IEC 62351
Transmission	Tower collapses, falling or throwing parts and ice, shadow flicker distraction leading to immediate accidents e.g. road traffic	Noise, shadow flicker long term effects, e.g. nuisance to residents	
Affected by harm	People in public, not linked to the operation & maintenance of the turbine. Objects limited to have a consequential impact on people, e.g. but not limited to gas pipelines, nuclear facilities, dykes, rail infrastructure, roads. Potentially by a checklist, to be used by the one using the standard - no claim on completeness.	Occupational safety, livestock Sewage systems Damage and its financial consequences	Harm to objects to be covered in a Edition 2 or the standard. Most current laws regard livestock as property, changing.

Current Scope

Scope elements	Proposed in scope	Proposed out of scope	Where does out of scope get covered?
Incubation time to harm	Immediate	Non-immediate	
Cascading	Direct to people and objects with indirect harm to people	Objects for their own sake	
Physical / Mental	Physical	Mental	to the scope: it may be mentioned that there can be
Extend of harm	Potentially lethal. The acceptable risk will be given by risk of death, that way covering also any non-lethal harm.	Non-lethal and near-misses are excluded initially as they are harder to quantify.	in sync with See DIN EN 50126-1:2018-10 Railway Applications – The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS). Non-lethal and near misses should be considered in an Edition 2
Life cycle	Operation incl. during maintenance, idling and standstill Note, 61400-28 section 6 <i>Risk management process</i> indicates that failure rates may increase over life.	Civil works, crane operation, assembly, maintenance, repair and decommissioning.	Civil works excluded, similar to ISO 12100. IEC 61400-28-1
Size of turbines	covered by 61400-1 (>200 m ²)	All turbines under 61400-2	

U.S. Technical Experts on PT31

- Lindsay Wetzel- Wetzel Wind
- Mark Bastasch- Jacobs Engineering

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Anticipated Schedule

- NP September 2020
- First Meeting – January 2021
 - Jaco Neis (GE, Germany) – Convenor
- Meetings Roughly Monthly
- CD – August 2021
- TS – 2022