

NEW WORK ITEM PROPOSAL (NP)

PROPOSER: United States of America	DATE OF PROPOSAL: 2023-04-13
DATE OF CIRCULATION: 2023-04-21	CLOSING DATE FOR VOTING: 2023-07-14

IEC TC 88: WIND ENERGY GENERATION SYSTEMS	
SECRETARIAT: Denmark	SECRETARY: Mrs Christine Weibøl Bertelsen
NEED FOR IEC COORDINATION:	PROPOSED HORIZONTAL STANDARD ☐ Other TC/SCs are requested to indicate their interest, if any, in this NP to the TC/SC secretary
FUNCTIONS CONCERNED: ☐ EMC ☒ ENVIRONMENT ☒ QUALITY ASSURANCE ☒ SAFETY	

TITLE OF PROPOSAL: Wind energy generation systems – Part 32: Operations and maintenance of blades

☒ STANDARD	☐ TECHNICAL SPECIFICATION
PROPOSED PROJECT NUMBER: 61400-32	

SCOPE (AS DEFINED IN ISO/IEC DIRECTIVES, PART 2, 14): An international standard to provide general requirements and guidelines for the operation and maintenance (O&M) of wind turbine rotor blades from the time of departure from the blade factory through end of life. The scope of this standard is not proposed to include requirements for original equipment manufacturers (OEMs) related to defining blade O&M requirements as may be defined as part of the original design of the blade, a subject already addressed in the IEC 61400-5 standard (Chapter 8).

PURPOSE AND JUSTIFICATION INCLUDING THE MARKET RELEVANCE AND WHETHER IT IS PROPOSED TO BE A HORIZONTAL STANDARD. MARKET RELEVANCE SHOULD BE ADDRESSED BY INDICATING THE NEED FOR THE CORRESPONDING STANDARDS WORK AND ITS GLOBAL RELEVANCE (SEE ISO/IEC DIRECTIVES, PART 1 ANNEX C) IF PROPOSED AS A HORIZONTAL STANDARD, IDENTIFY AS POSSIBLE, THE CORRESPONDING APPLICABLE GUIDE(S) AND ASSOCIATED ADVISORY COMMITTEE(S) (SEE GUIDE 108).
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PT 61400-101 proposed several years ago the creation of 61400 standards related to the operations and maintenance of wind turbines, wind farms, and components. To date, no such proposals have been produced. The present proposal would be the first such wind turbine O&M standard.

According to many sources, rotor blades now constitute the turbine component accounting for the largest share of O&M expenses. Owners/operators are experiencing high rates of damage formation and premature failures of blades. The industry is presently operating with a patchwork of common practices related to critical aspects of blade maintenance, including blade worker training and classification, and the performance and reporting of inspections and repairs,

While standards, guidelines, or white papers have been published by a few organizations (e.g., GWO, DNV, EPRI) related to a few narrow aspects of blade O&M (e.g., classification of damage, training of personnel), no national or internationally accepted standards have been created to date that encompass the full scope of blade maintenance. This has created a number of challenges for owners/operators and service providers:

- The lack of standardization of methods of damage classification where damage severity is based on the structural criticality or urgency of repair and the methods of classification are validated has produced a situation where operators are frequently investing too much of their O&M resources in repairing misclassified non-critical damage while misclassified critical damage goes unrepaired.
- The lack of widely accepted normative standards regarding the classification of worker credentials and training levels and requirements regarding the experience level of workers to perform certain types of repairs has led to a widespread problem of under-qualified workers performing structurally critical repairs.
- The lack of normative requirements related to the performance of root cause analyses and validation of repairs of structurally significant damage has resulted in a situation in which unqualified workers are frequently making the determination while performing repairs as to how structurally critical repairs should be performed, using largely unvalidated “rules of thumb” that have too long been common in the industry.
- This has led to a problem of recurring structurally critical damage when previous repairs fail.

As a result, many owners/operators are experiencing O&M costs that are excessive and reducing the ROI on their investments in wind to an untenable level.

The proposed blade O&M standard is expected to reduce the cost of ownership and increase the ROI for wind power investments by creating a framework in which owners can more efficiently prioritize critical repairs and be ensured that repairs are performed properly and that they will not fail prematurely once repaired. The standard should also streamline procurement of blade O&M services by standardizing classification of worker credentials and requirements for repair validation.

PLEASE SELECT ANY UN SUSTAINABLE DEVELOPMENT GOALS (SDGs) THAT THIS DOCUMENT WILL SUPPORT. FOR MORE INFORMATION ON SDGs, PLEASE VISIT OUR WEBSITE AT [HTTPS://WWW.IEC.CH/SDG/](https://www.iec.ch/sdg/)

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| ☐ GOAL 1: No Poverty | ☐ GOAL 10: Reduced Inequalities |
| ☐ GOAL 2: Zero Hunger | ☐ GOAL 11: Sustainable Cities and Communities |
| ☐ GOAL 3: Good Health and Well-being | ☐ GOAL 12: Responsible Consumption and Production |
| ☐ GOAL 4: Quality Education | ☒ GOAL 13: Climate Action |
| ☐ GOAL 5: Gender Equality | ☐ GOAL 14: Life Below Water |
| ☐ GOAL 6: Clean Water and Sanitation | ☐ GOAL 15: Life on Land |
| ☒ GOAL 7: Affordable and Clean Energy | ☐ GOAL 16: Peace, Justice and Strong Institutions |
| ☐ GOAL 8: Decent Work and Economic Growth | ☐ GOAL 17: Partnerships for the Goals |
| ☒ GOAL 9: Industry, Innovation and Infrastructure | |

TARGET DATE(S)	FOR FIRST CD: 2025-05-01	FOR IS: 2026-09-01
ESTIMATED NUMBER OF MEETINGS: 14	FREQUENCY OF MEETINGS: 6 per year	DATE OF FIRST MEETING: Fall 2023 – TBD
		PLACE OF FIRST MEETING: Online

RELEVANT DOCUMENTS TO BE CONSIDERED:

- IEC Standard 61400-5:2020. It is expected that the MT 61400-5 will soon begin work on a second edition of the blade design and manufacturing standard. It is proposed that PT 61400-32 and MT 61400-5 coordinate to ensure that requirements imposed by the two standards regarding operation and maintenance of blades as addressed by OEMs at the design stage and post-installation operation and maintenance are consistent between the two standards.
- DNV Standard ST-0376 contains a short chapter related to operations and maintenance of blades, the contents of which have become widely used during the past few years. The presently proposed standard could borrow and build from the contents of this chapter, with permission of DNV.
- IEC Standard 61400-23:2014. MT 61400-23 is currently working on revisions to that standard, and those revisions may include requirements for validation through testing of blade repairs performed during operation. This NP might include similar requirements for validation of some repairs via testing governed by the 61400-23 IS. Coordination is required to ensure consistency.
- IEC Standard 61400-24:2019 contains requirements related to the lightning protection system in blades.
- Global Wind Organization “Blade Repair Training Standard”, Ver. 3, 2022-04-01. This document contains requirements for training of blade repair personnel that have been adopted by some operators and OEMs in recent years. The presently proposed standard could borrow and build from the contents of this document, with permission from GWO.
- EPRI, A White Paper on Wind Turbine Blade Defect and Damage Categorization: Current State of the Industry, 2020-10-30. This document reflects an early attempt to create guidelines governing classification of damage severity that could serve as a foundation for creating normative requirements in the presently proposed standard.
- The proposal relates to the work of the PT 61400-9 standard on probabilistic design, the 61400-26-4 technical specification related to reliability, and the 61400-28-1 technical specification related to through

life management, and coordination with the activities of these working groups and project teams are advisable. In particular this relates to considerations with respect to continuous improvement of blade O&M practices and blade reliability, including consideration of reliability-based approaches to design and operation.

National Committees are also invited as part of their voting and comments on this NP to submit recommendations for additional documents to be considered by the PT.

RELATIONSHIP OF PROJECT TO ACTIVITIES OF OTHER INTERNATIONAL BODIES:

IEA Wind TCP Task 46 is presently investigating the subject of blade leading edge erosion and may relate to requirements or guidelines to be incorporated into 61400-32.

The proposal relates to activities of the IECRE. Creation of O&M standards could be accompanied by the creation of a framework within IECRE for certifying O&M service providers in accordance with the TC88 standards.

LIAISONS WITH INTERNATIONAL BODIES:

NEED FOR ISO COORDINATION:

DOCUMENT MATURITY:

☐ A DRAFT IS ATTACHED FOR COMMENT*

☒ AN OUTLINE IS ATTACHED

* Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

CONCERNS KNOWN PATENTED ITEMS (SEE ISO/IEC DIRECTIVES, PART 1)

☐ YES

☒ NO

PATENT DESCRIPTION:

WE NOMINATE A PROJECT LEADER IN ACCORDANCE WITH ISO/IEC DIRECTIVES, PART 1

LAST NAME:

FIRST NAME:

E-MAIL:

COUNTRY:

Wetzel

Kyle

kyle.wetzel@wetzelwind.com

United States of America

COMMENTS AND RECOMMENDATIONS FROM TC/SC OFFICERS:

WORK ALLOCATION:

☒ NEW PROJECT TEAM

☐ NEW WORKING GROUP

☐ EXISTING WORKING GROUP:

IF APPROVED, THE NEXT STAGE SHOULD BE:

☒ CD

☐ CDV

REMARKS FROM TC/SC OFFICERS:

IEC national committees with P-membership status wishing to participate in the development of this new project are invited to appoint experts.

APPROVAL CRITERIA

- Approval of the new work item proposal by a 2/3 majority of the P-members voting;
- At least 4 P-members in the case of a committee with 16 or fewer P-members, or at least 5 P-members in the case of committees with more than 17 P-members, have nominated or confirmed the name of an expert and approved the new work item proposal.