Paper for Consideration by ENCWG

Suggestion on Encoding for vertical clearance of

offshore wind turbine blades

Submitted by:	CHINA Maritime Safety Administration
Executive Summary:	This paper proposes to encode for vertical clearance of offshore wind turbine blades
Related Documents:	S-57 Use of the Object Catalogue for ENC

Introduction / Background

Offshore windmotor composed of tower, blade, generator and other components. Blade is one of the important components of wind turbine to convert wind energy into electric energy. The condition of blade directly affects the performance and power generation efficiency of the whole machine. In recent years, China's coastal wind farms often have blade damage accidents due to construction ship collision, which not only causes serious loss of power generation, but also brings expensive blade maintenance costs. Therefore, it is necessary for data producers to provide data users with vertical clearance of wind turbine blades.

Analysis/Discussion

According to S-57 UOC(Edition 4.2.0) §11.7.4

If it is required to encode an offshore wind farm, it should be done using an OSPARE object, with attribute CATPRA=9(wind farm).General information about the wind farm such as blade diameter and blade vertical clearance should be

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encoded, if required, using the attributes INFORM or TXTDSC. if it is required to encode individual offshore wind turbines, it should be done using a LNDMRK object of type point(see clause 4.8.15),with attribute CATLMK=19(windmotor).Where a LNDMRK is encoded, an ECDIS Base Display object(for example PILPNT,LNDARE) must also be encoded coincident to ensure the feature is always displayed on the ECDIS. Where fitted, lights should be encoded as described in clause 12.8,with the LNDMRK being used as the structure object for the LIGHTS equipment object(s) (see clause 12.1.1).The extent and nature of any restricted area related to the wind turbine should be encoded using a RESARE object(see clause 11.1).

According to §11.7.4, the coding of blade vertical clearance is to assign values in the attribute INFORM or TXTDSC of object OSPARE. This method does not consider the difference of blade vertical clearance among offshore windmotors in the same wind farm, and the vertical clearance cannot be visually displayed visually in ECDIS.

Conclusions

1. The difference of blade vertical clearance among offshore windmotors in the same offshore wind farm should be considered.

2. The difference of convenience for obtaining blade vertical clearance information in ECDIS due to different coding methods should be fully considered.

Recommendations

In order to better protect the blades of offshore windmotors. The recommendation of this paper is to amend UOC §4.8.15 and add attribute VERCLR(the vertical distance from the mean high water springs to the lowest point of the object) to LNDMRK object.

The changes proposed to the UOC § 4.8.15 are as follows.

Amend the first paragraph of clause 4.8.15 as follows:

Added text is marked in red.

Geo object: Landmark   LNDMRK   (P,L,A)

Attributes: CATLMK COLOUR CLOPAT CONDTN CONRAD CONVIS ELEVAT HEIGHT NATCON NOBJNM OBJNAM STATUS FUNCTN ~~VERACC~~ VERCLR ~~VERDAT~~ INFORM NINFOM

Justification and Impacts

The data producer can encode the VERCLR attribute on the premise of collecting the vertical clearance information of the blade. The data user can obtain the VERCLR information in ECDIS visually and sail or operate with reference to the VERCLR to avoid damaging the blades of windmotors, thus reducing the losses of the construction ship and the wind farm.

Action Required of ENCWG

The ENCWG is invited to endorse the recommendations of this paper.

References

IHO S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC, Ed. 4.2.0, International Hydrographic Organization, 2020.4.