Input paper: [[1]](#footnote-1) ARM14-3.2.8

Input paper for the following Committee(s): Purpose of paper:

**X** ARM **□** ENG **□** PAP **□** Input

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Agenda item [[2]](#footnote-2) Task 3.2

Technical Domain / Task Number 2 …………………………………

Author(s) / Submitter(s) Korea Institute of Aids to Navigation / TK Park

Proposal of Additional Marking on Fixed Bridge

# Summary

According to economic growth and regional development, the number of bridges installed at bays, islands, and rivers is increasing significantly. In line with this, the number of ships navigating under the bridge increases, it increases the risk of maritime accidents. Even though IALA recommends diverse of manners indicating safe waterway under bridge to prevent accident through R0133(The marking of fixed bridges and other structures over navigable waters), as the application of exterior lighting of bridges has recently expanded in order to promote the region and help attract tourists, the total number of accidents is increasing and the perception rate on route mark has decreased due to the expansion of background lighting.

For instance, approximately 42% of maritime bridges are equipped with exterior lighting in Republic of Korea.

In accordance with IALA Navguide, Excessive background lighting, from street lights, neon signs etc., frequently makes a Marine Aid to navigation light less effective and, in some cases, it becomes completely lost in the general background clutter, such a light can be made more conspicuous by increasing its intensity, changing its colour or by varying its rhythm. However, these methods can further reduce the recognition rate on the relatively dark pier or its foundation, thereby increasing the risk of collision with the ship.

## Purpose of the document

To reflect additional criteria about a marking on fixed bridge over navigable water, if necessary, this paper might be used as reference for discussion.

## Related documents

R0113(O-113) The Marking of Fixed Bridges and Other Structures over Navigable Waters.

IALA Recommendation R-0139 on Marking of Man-made Offshore Structures

# Background

R0113(O-113) Edition2.1/Sep. 2020.

Currently out of work programme for 2018-2022.

# Discussion \_ issue regarding marking on bridge in korea

In October 2020, a fishing boat collided with a pier of Wonsan Anmyeon Bridge (Taean, Republic of Korea), causing 22 casualties. The accident occurred when a craft relying on radar collided with a pier during the night time when it was difficult to secure visibility. Refer to the figure.1

Site survey was carried out to set measures to prevent additional accidents.

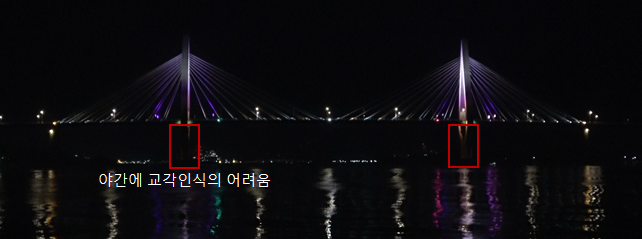
Figure 1. Collision point on fender of piers of Wonsan Ahn Myun Bridge, Republic of Korea

The investigator determined that the accident occurred due to watch keeping failure mainly, However, he expressed regret that there was no lighting mark for the dark pier foundation exposed over water surface to help prevent accident.

The investigator judged that the accident occurred due to the lack of awareness of navigable passage mark under the span and dark piers contrast to bright exterior lighting of bridge.

it was difficult to recognize the pier as following figure.2, In spite of IALA's recommendation, floodlights illuminating a part of piers are applied, but the recognition rate to the protrusion was relatively low.

Figure 2. Sailor’s Vision to Wonsan Ahn Myun Bridge (Night), Republic of Korea



Difficult to recognise

As a matter of result from site investigation, competent AtoN authority confirmed the necessity further improvement of visual recognition on limitation of navigable water under bridge at night and amended the domestic decree. (2021. Jan.)

## Additional Criteria for Marking on Fixed Bridge piers

Existing Criteria has not included mark indicating foundation of piers so far. It is necessary to add the criteria such as following sentence accordingly;

In case of bridge piers foundation exposure over the water surface, It is possible to consider installing special mark or side boundary mark facility indicating the edge of the foundation to prevent collision with craft at night. Refer to the Figure.3.

Figure.4 is a sample showing that the the bridge applied with side boundary lighting mark indicating the edge of the foundation to prevent collision with craft at night.

Figure 3. Foundation of bridge pier exposured over water surface



Figure 4. A bridge applied with side boundary lighting mark on pier of Seo Hae Bridge (Night) Republic of Korea

## Status of Bridge in Republic of Korea

In Korean waters, over 190 bridges are deployed with exterior light as follows;

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Location  No. | Total | Busan | Incheon | Yeosu | Masan | Ulsan | East sea | Gunsan | Mokpo | Jindo | pohang | Pyengtaek | Daesan |
|  | 192 | 24 | 53 | 31 | 25 | 2 | 4 | 6 | 18 | 15 | 4 | 2 | 8 |

# References

1. Regulations for Function and Specification of Aids to Navigation of Republic of Korea
2. ..........

# Action requested of the Committee

The Committee is requested to:

1. Review on this input paper.
2. Open the opportunity for discussion, In order to consider this paper when revise O-113.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)