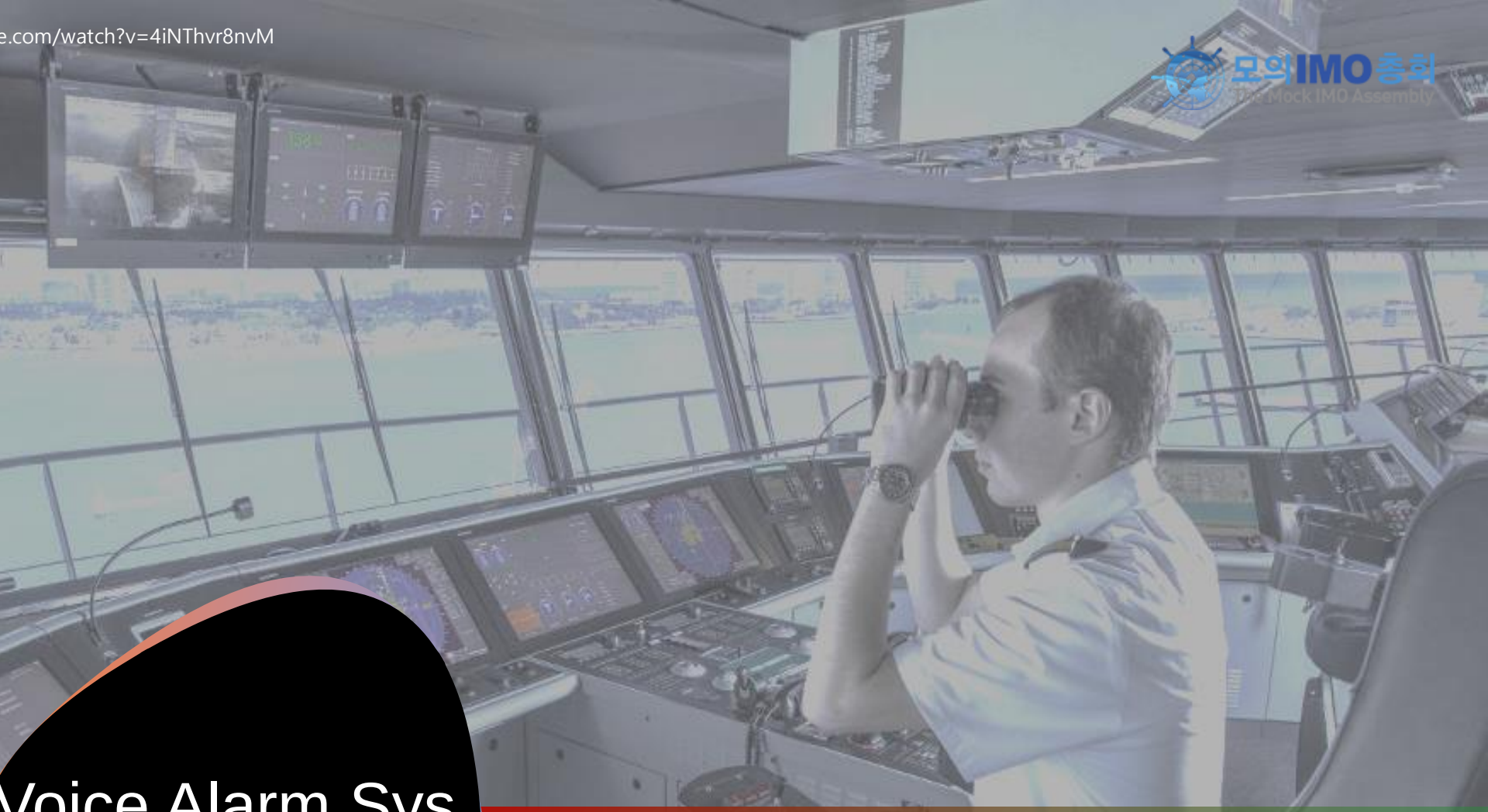
e.com/watch?v=4iNThvr8nvM



Voice Alarm Sys.

for ECDIS on bridge

1p | 31p

Agenda for introducing "Voice Alarm System" on bridge

Presented by "Swiss Cheese"

INDEX

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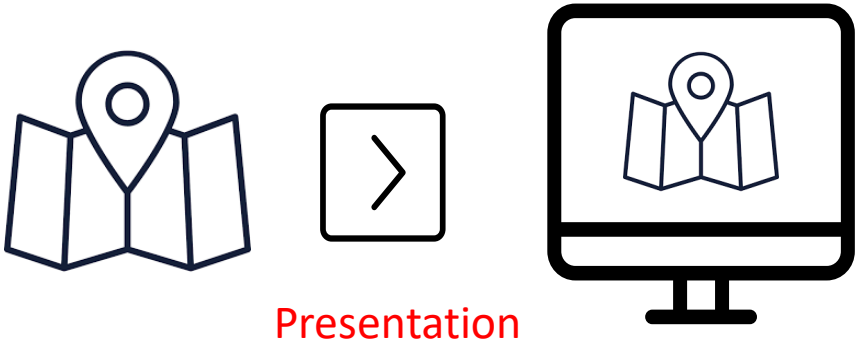
The Mock IMO Assembly

PL 4.0 and ECDIS

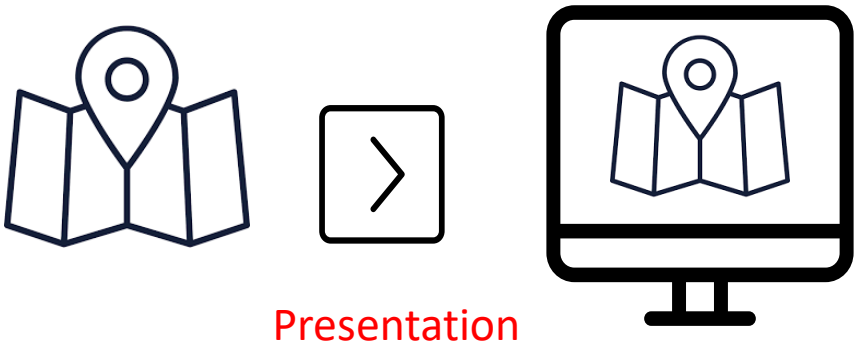
- The new edition, Presentation Library 4.0, was developed in Sep. 2014 by IHO
- ECDIS should be operated with PL 4.0 from Sep. 1st 2017

? What is **Presentation Library**?



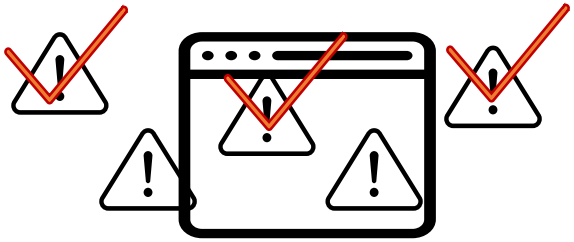
Source : https:/ www.gnsworldwide.com/gns-seall-announce-strategic-partnership-deliver-next-generation-integrated-ecdis-navigation-software-solutions/

? What is PL4.0?



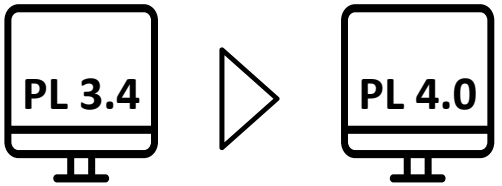
P.L 4.0 is the new edition of performance standards for indicating ENC on ECDIS

What is the big difference compared with the previous one?



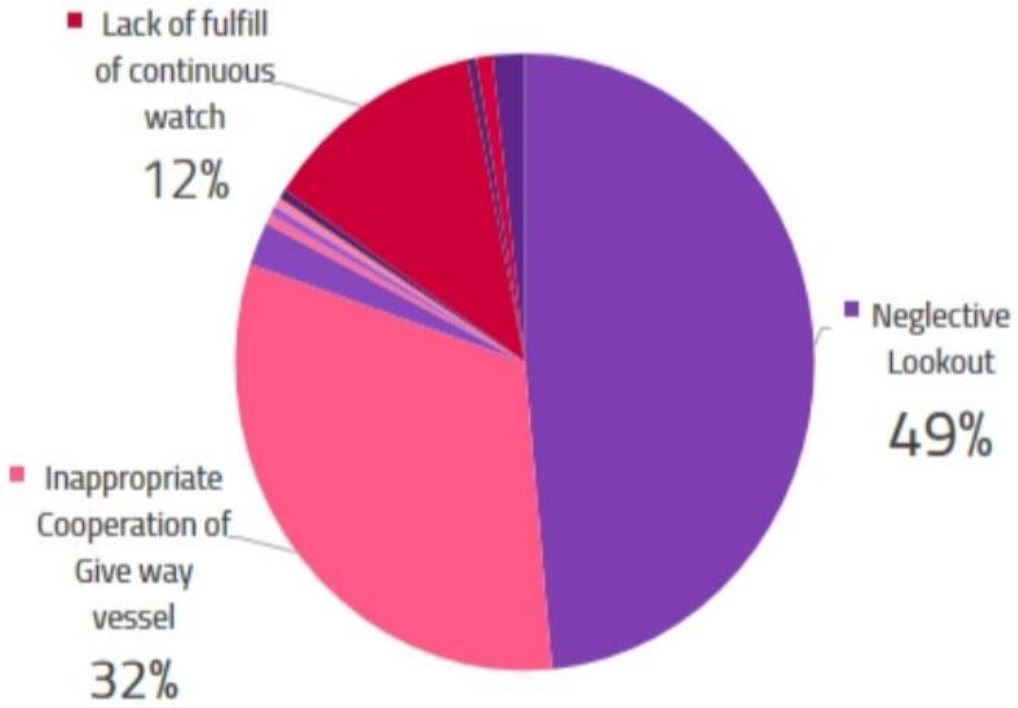
To compare with the PL3.4, one of the biggest differences is that it is available to set **alarms** to be indicated selectively by mariners

What is the benefit of changes of PL4.0?



It will **ease the issue of alarm fatigue** for the officers and also maintaining safety at sea.

Human Factors and Marine Accidents

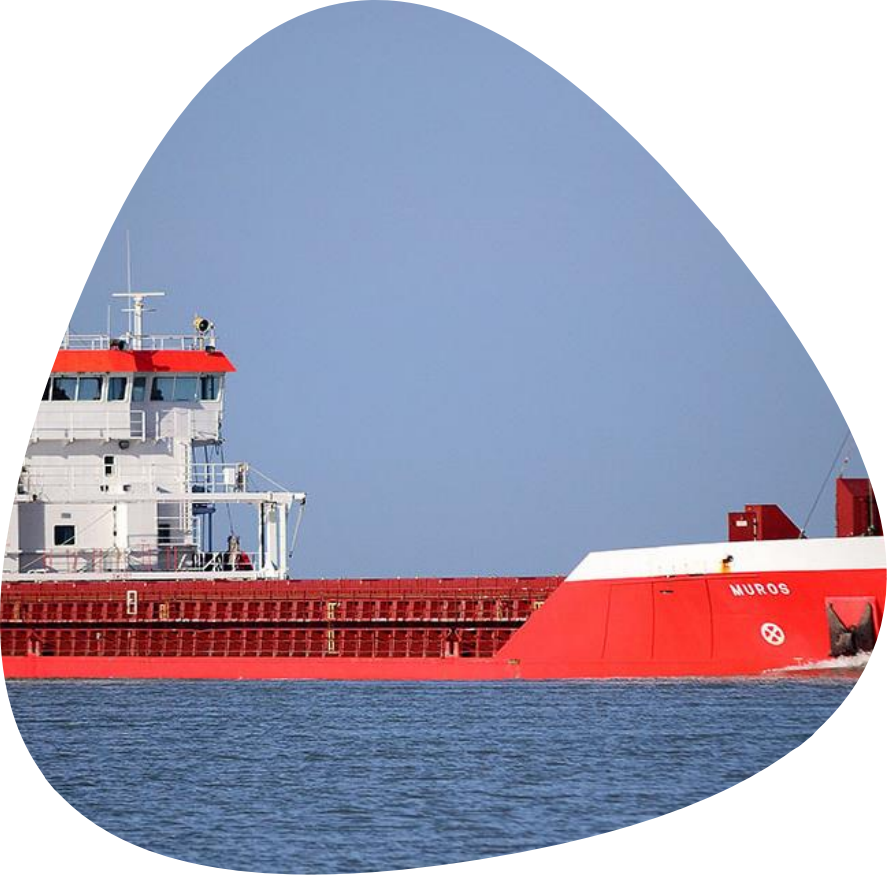


Considering a fact that most of the marine accidents are caused by human error,

Which factors make human error that leads to marine accidents?

The results are as follows;

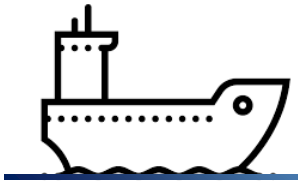
Reference: Dae Sik Kim. analysis of causes of collisions caused by human error of captain and OOW in ship collision accidents
http://dx.doi.org/10.5143/JESK.2018.37.1.1



M/V MUROS Grounding Accident

? Why did the ship run aground?

- In the early hours of 3 December 2016, bulk carrier Muros ran aground on Haisborough Sand.



- What made M/V MUROS ran aground was not a technical problem but human error which made the accident.

Source : https://gcaptain.com/maib-ecdis-safeguards-overlooked-disabled-or-ignored-in-grounding-of-cargo-ship-off-england/

M/V MUROS Grounding Accident

? Why did the ship run aground?

- **Passage plan without considering depth in the water**
- **Neglective lookout**
- **Insufficient ECDIS monitoring**

M/V MUROS was grounded by “Human errors”

Sufficient monitoring of ECDIS could save the ship

↳ So, more practical system is needed

Source : https://en.wikipedia.org/wiki/Haisborough_Sands

Mission of IMO

Mission of IMO

- To promote safe, secure, environmentally sound, efficient and sustainable shipping through cooperation

How to be accomplished?

- By adopting the highest practicable standards
- By considering related legal matters and effective implementations

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SYSTEM OVERVIEW

The "**Safe Layer**" that will block "Axis of accident".

- Swiss Cheese Model
- Comparison between aircraft & ship
- Main features & Overview
- Utilization of the system

Swiss Cheese Model

There are always “latent defects”
that can make accidents like holes of
a Swiss cheese, and accidents occur
when those defects come out simultaneously.

James Reason’s “Swiss Cheese Model”

ALARM SYS. ON COCKPIT

Alarm systems on aircraft cockpit consist of;

-Audible Warning Sound

-Audible Warning Voice

ALARM SYS. ON BRIDGE

Alarm systems on ship's bridge consist of;

-Audible Warning Sound

-Visual Indication

What is the difference?

-Voice Alarm is the difference. Aircraft has it, but Ship has not.

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MAIN FEATURES

Voice Alarm System on bridge supports more time for OOW.

1 **Phase 1**

5 MANDATORY ALARMS IN VOICE FORM

Five mandatory alarms could not be edited by operators.

2 **Phase 2**

EXTRA ALARMS OF ECDIS IN VOICE FORM

Extra alarms including 5 mandatory alarms should be given in voice for safety.

3 **Phase 3**

RADAR ALARMS IN VOICE FORM

Supporting radar alarm in voice shall give OOW flexibility.

LOOKOUT SUPPORT

The Sys. will report the critical info. to OOW.

01

MORE TIME TO OOW FOR DECISION

The Sys. will reduce time to noticing the current situation.

NOTICING SOURCE OF THE ALARMS

Noticing the source of alarm shall give more time to decide.

02

PREVENTING IMMINENT DANGER OF ACCIDENT

Those Two factors will make more time for OOW, and this will make OOW to make better decision.

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Voice Alarm Sys. Usage Examples

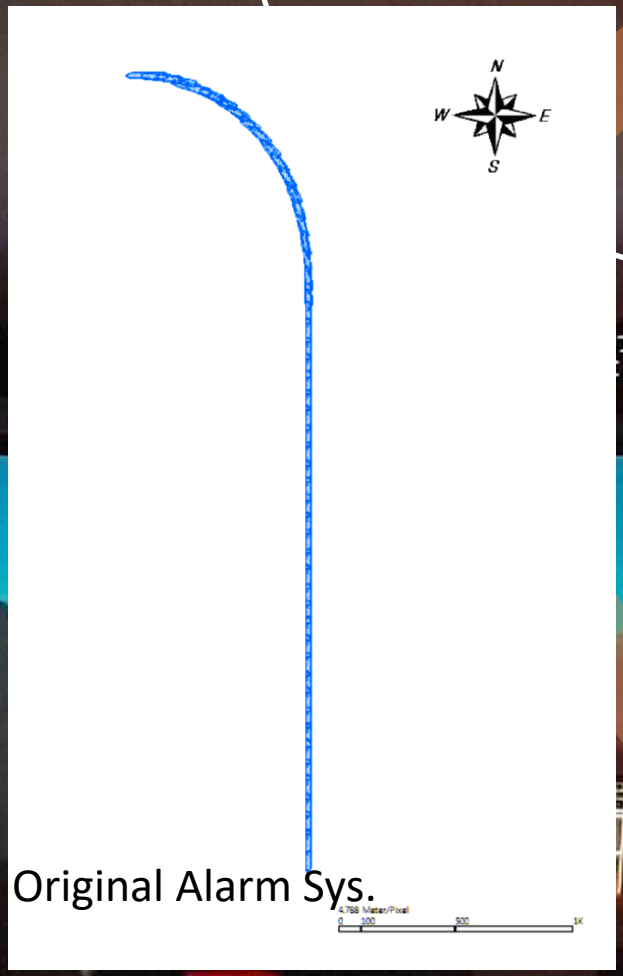
Comparing two bridges

- Bridge with original alarm system
- Bridge with Voice alarm system

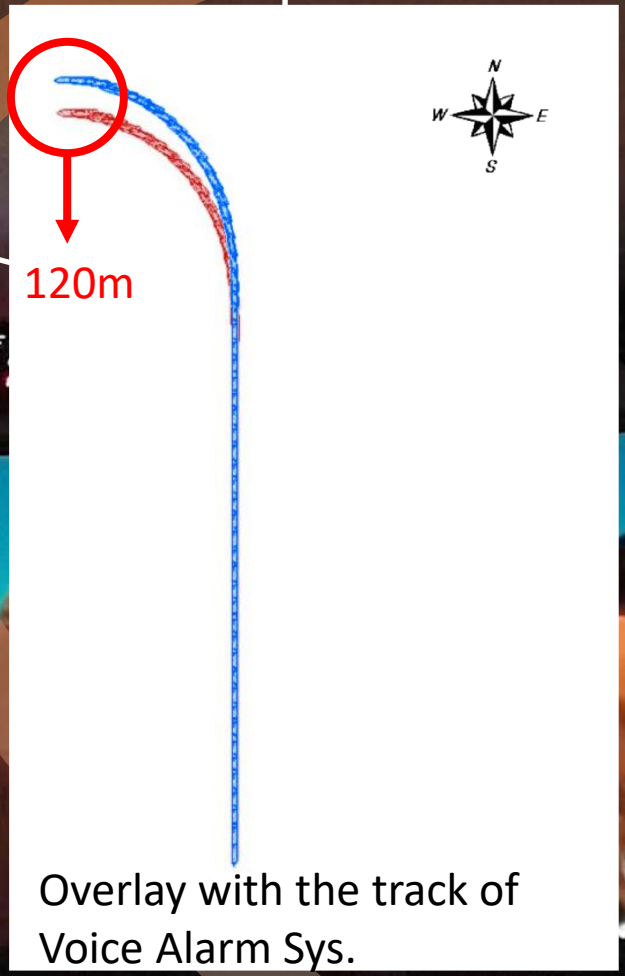
15p 31p

MODEL SHIP

30k BULK CARRIER
L.O.A. : 172m
Beam : 26m
Draft : 9.67m



Original Alarm Sys.



Overlay with the track of Voice Alarm Sys.

Difference about 8 seconds made by this sys.
made difference of 120 meters

Source : http://www.mar.ist.utl.pt/mventura/Projecto-Navios-I/EN/SD-1.4.3-Bulk%20Carriers.pdf

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PROPOSAL

The way to make “Voice Alarm Sys. on Bridge” to be effective.

- Proposals of new resolutions for introducing “Voice Alarm Sys. on bridge”
- Challenges
- Solutions

19p 31p

SOLAS

Regulation related with ECDIS from SOLAS

1995

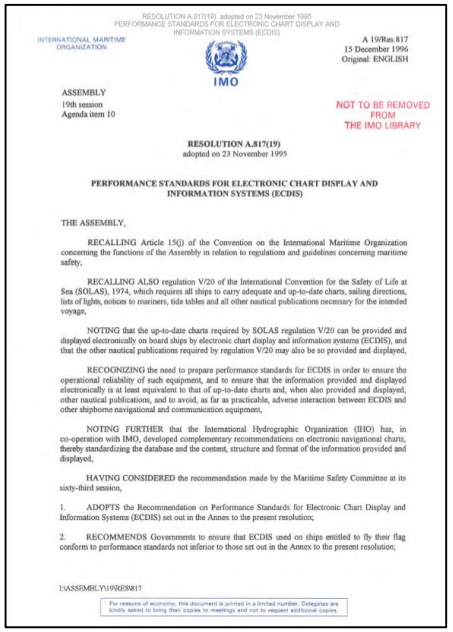
Regulation 18

4. For an electronic chart display and information system (ECDIS) to be accepted as satisfying the chart carriage requirement of regulation 19.2.1.4, that system shall conform to the relevant performance standards not inferior to those adopted by the Organization in effect on the date of installation, or, for systems installed before 1 January 1999, not inferior to the performance standards adopted by the Organization on 23 November 1995*.

* Recommendation on Performance Standards for Electronic Chart Display and Information Systems (ECDIS) (resolution A.817(19)).

1995

Res. A 817(19) PERFORMANCE STANDARDS FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEMS



RESOLUTION A.817(19) adopted on 23 November 1995
PERFORMANCE STANDARDS FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEMS (ECDIS)

INTERNATIONAL MARITIME ORGANIZATION

IMO

A 19/Res.817
15 December 1996
Original: ENGLISH

ASSEMBLY
19th session
Agenda item 10

NOT TO BE REMOVED FROM THE IMO LIBRARY

RESOLUTION A.817(19)
adopted on 23 November 1995

PERFORMANCE STANDARDS FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEMS (ECDIS)

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO regulation V/20 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, which requires all ships to carry adequate and up-to-date charts, sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage,

NOTING that the up-to-date charts required by SOLAS regulation V/20 can be provided and displayed electronically on board ships by electronic chart display and information systems (ECDIS), and that the other nautical publications required by regulation V/20 may also be so provided and displayed,

RECOGNIZING the need to prepare performance standards for ECDIS in order to ensure the operational reliability of such equipment, and to ensure that the information provided and displayed electronically is at least equivalent to that of up-to-date charts and, when also provided and displayed, other nautical publications, and to avoid, as far as practicable, adverse interaction between ECDIS and other shipborne navigational and communication equipment,

NOTING FURTHER that the International Hydrographic Organization (IHO) has, in co-operation with IMO, developed complementary recommendations on electronic navigational charts, thereby standardizing the database and the content, structure and format of the information provided and displayed,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-third session,

1. ADOPTS the Recommendation on Performance Standards for Electronic Chart Display and Information Systems (ECDIS) set out in the Annex to the present resolution;

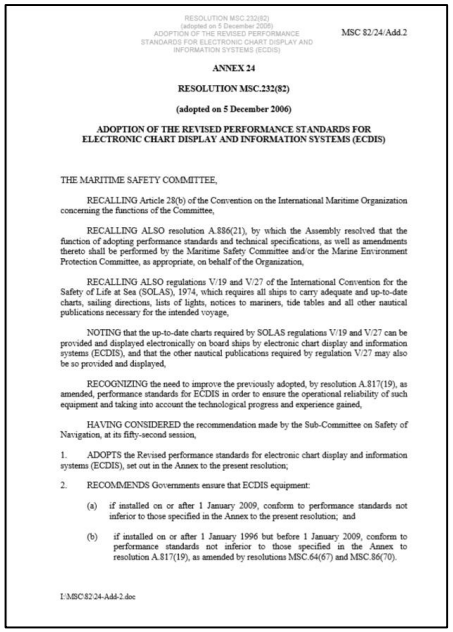
2. RECOMMENDS Governments to ensure that ECDIS used on ships entitled to fly their flag conform to performance standards not inferior to those set out in the Annex to the present resolution;

I:\ASSEMBLY\19RES\817

For reasons of economy, this document is printed in a limited number. Delegates are kindly asked to bring their copies to meetings and not to request additional copies.

2006

Res. MSC 231(82) ADOPTION OF THE REVISED PERFORMANCE STANDARDS FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEMS



RESOLUTION MSC.232(82)
(adopted on 5 December 2006)
ADOPTION OF THE REVISED PERFORMANCE STANDARDS FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEMS (ECDIS)

MSC 82/24/Add.2

ANNEX 24

RESOLUTION MSC.232(82)

(adopted on 5 December 2006)

ADOPTION OF THE REVISED PERFORMANCE STANDARDS FOR ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEMS (ECDIS)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the function of adopting performance standards and technical specifications, as well as amendments thereto shall be performed by the Maritime Safety Committee and/or the Marine Environment Protection Committee, as appropriate, on behalf of the Organization,

RECALLING ALSO regulations V/19 and V/27 of the International Convention for the Safety of Life at Sea (SOLAS), 1974, which requires all ships to carry adequate and up-to-date charts, sailing directions, lists of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage,

NOTING that the up-to-date charts required by SOLAS regulations V/19 and V/27 can be provided and displayed electronically on board ships by electronic chart display and information systems (ECDIS), and that the other nautical publications required by regulation V/27 may also be so provided and displayed,

RECOGNIZING the need to improve the previously adopted, by resolution A.817(19), as amended, performance standards for ECDIS in order to ensure the operational reliability of such equipment and taking into account the technological progress and experience gained,

HAVING CONSIDERED the recommendation made by the Sub-Committee on Safety of Navigation, at its fifty-second session,

1. ADOPTS the Revised performance standards for electronic chart display and information systems (ECDIS), set out in the Annex to the present resolution;

2. RECOMMENDS Governments ensure that ECDIS equipment:

(a) if installed on or after 1 January 2009, conform to performance standards not inferior to those specified in the Annex to the present resolution; and

(b) if installed on or after 1 January 1996 but before 1 January 2009, conform to performance standards not inferior to those specified in the Annex to resolution A.817(19), as amended by resolutions MSC.64(67) and MSC.86(70).

I:\MSC\82\24-Add-2.doc

Proposals

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for 5 mandatory alarms to be expressed in voice
by revising MSC 232 (82)

Change a term "an alarm" into "a voice alarm"

11.4.3 ECDIS should give a voice alarm if, within a specified time set by the mariner, own ship will cross the safety contour.

11.4.5 A voice alarm should be given when the specified cross track limit for deviation
from the planned route is exceeded.

11.4.8 ECDIS should provide a voice alarm when the input from position, heading or speed sources is lost.
ECDIS should also repeat, but only as an indication, any alarm or indication passed to it from position, heading or speed sources.

11.4.9 A voice alarm should be given by ECDIS when the ship reaches a specified time or distance, set by the mariner, in advance of a critical point on the planned route.

11.4.10 The positioning system and the SENC should be on the same geodetic datum.
ECDIS should give a voice alarm if this is not the case.

- Appendix 5: Alarms and indications

Section	Requirment	Information
10.5.3	Voice Alarm	Crossing safety contour
10.5.4	Alarm or Indication	Area with special conditions
10.5.5	Alarm	Deviation from route
10.5.7	Voice Alarm	Positioning system failure
10.5.8	Voice Alarm	Approach to critical point
10.5.9	Voice Alarm	Different geodetic datum
13.2	Voice Alarm	Malfunction of ECDIS

Change a term "an alarm" into "a voice alarm"

- Add a definition of "Voice Alarm" and revise the definition of "Alarm" on Appendix 5

In this performance standard the definitions of indicators and alarms provided in the IMO publication "Code on Alarms and Indicators" (IMO-867E) apply.

Alarm : An alarm or alarm system which announces by audible means including voice alarm, or audible and visual means, a condition requiring attention.

Voice Alarm : An alarm or alarm system which announces by audible voice form or audible voice and visual means, a condition requiring attention

Challenges We'll face with

There are **3 main expected challenges** that "Voice Alarm Sys. on Bridge" will face with.

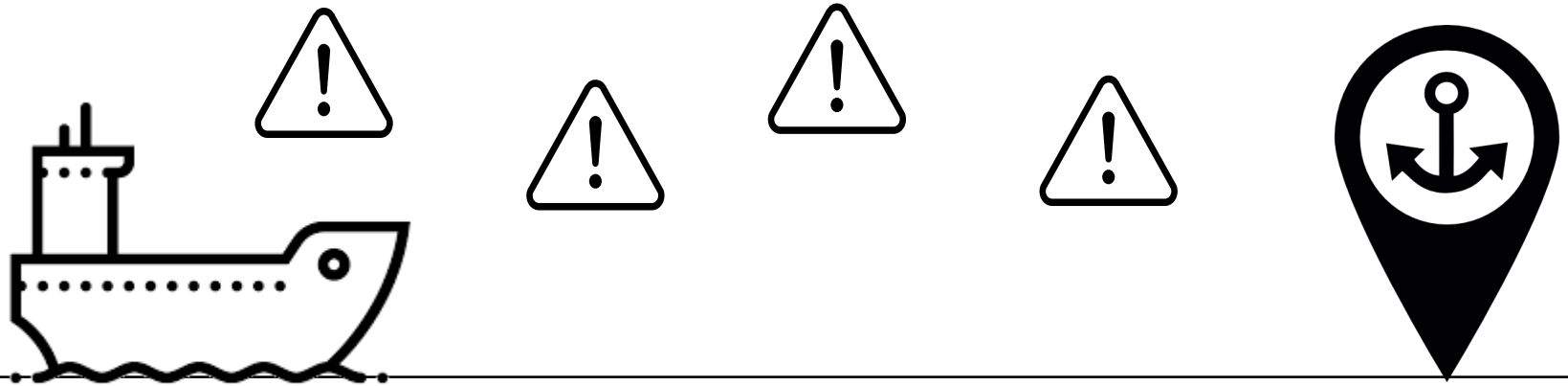
1 VARIOUS ALARMS FROM VARIOUS MAKERS

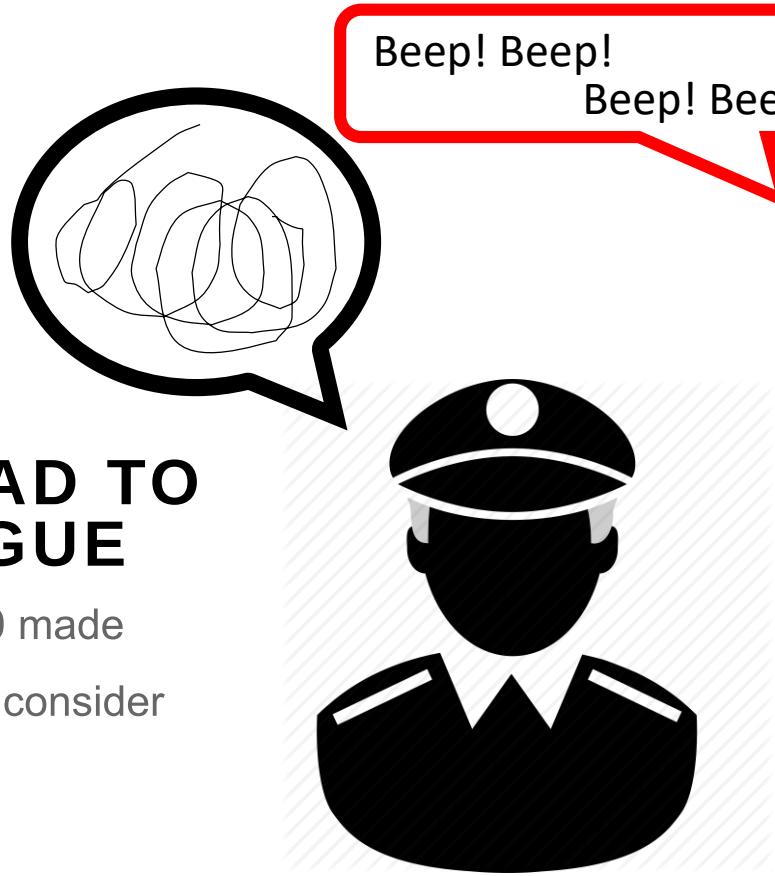
There are possibilities that several ECDIS makers will develop various forms of voice alarms.

2

LESS IMPORTANT ALARMS

Under the situations like arriving, and leaving port, there will be many less important alarms.





SIDE EFFECTS LEAD TO INCREASING FATIGUE

3

Considering the reason why PL 4.0 made alarms to be selected, officers can consider this system as interference.

SOLUTIONS

1 VARIOUS ALARMS FROM VARIOUS MAKERS

There are possibilities that ECDIS makers will develop various forms of voice alarms.

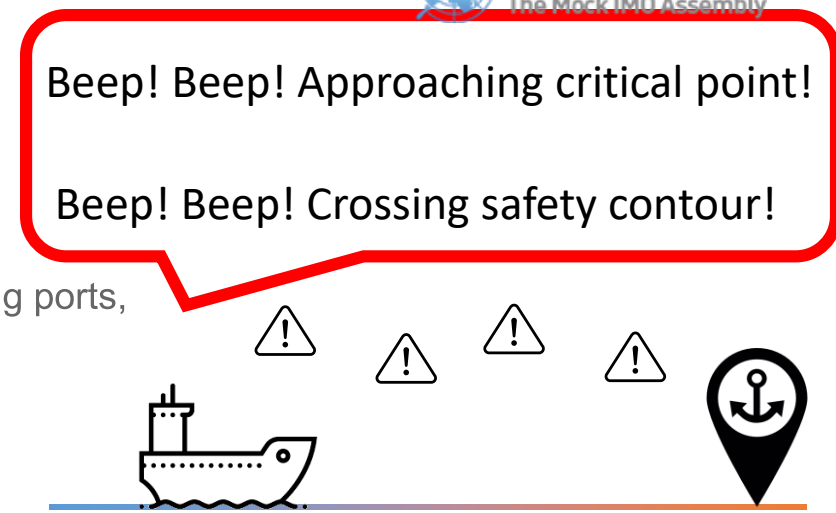
“Specific Standard” will be given.

When the alarm sys. is introduced, specific standard should be given. For instance, various aircrafts from various makers also give same alarms.

2

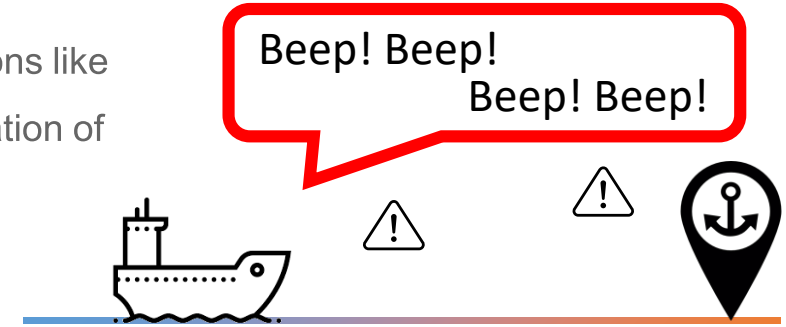
UNNECESSARY ALARMS

Under the situations like arriving and leaving ports, there are many unnecessary alarms.



"ORIGINAL ALARMS" WILL BE GIVEN

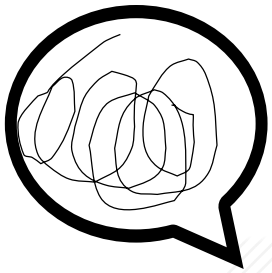
We suggest to give original alarms in situations like departing or arriving ports to reduce the duration of specific alarms except 5 mandatory alarms.



3

SIDE EFFECT LEADS TO INCREASING FATIGUE

Considering the reason why PL 4.0 made alarms to be selected, officers can consider this system as an interference.



Beep! Beep!
Beep! Beep!

False alarms again..

SD 2 ; Integrate new and advancing technologies in the regulatory framework

"TECHNOLOGY" IS GROWING FASTER

Considering S-100, new technologies for improving maritime safety have been introduced. Officers will trust the system that grows with the era 4.0.

e-Navigation underway 2019
Asia-Pacific

Early action in ample time is the answer for avoiding accidents

Voice Alarm System will show the way to the safer seas & cleaner oceans

Q&A

Any question
will be appreciated