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United States Coast Guard

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MOC Policy letter 04-05

MAR 29 2004

From: Commandant (G-MOC)

To: Distribution

Subj: GUIDANCE WHEN CONSIDERING EXEMPTIONS FROM THE SOLAS REQUIREMENT TO CARRY VOYAGE DATA RECORDERS (VDR)

Ref: (a) SOLAS (2000 amendments) Regulation V/20, Voyage Data Recorders
(b) SOLAS (2000 amendments) Regulation V/1.4.1
(c) NVIC 02-03, Carriage of Navigation Equipment by Ships on International Voyages

1. Purpose: To provide guidance to field units on tendering requests for exemption from the requirement to install VDRs on applicable U. S. vessels, as noted in reference (a).

2. Directives Affected: None

3. Background:

a. Reference (a) requires that VDRs be installed on certain types of vessels, including passenger vessels, to assist in casualty investigations. Like the black boxes carried on aircraft, VDRs enable casualty investigators to review procedures and instructions in the moments before an incident, help to identify the cause of a casualty, and assist in the prevention of future casualties. However, SOLAS regulation V/20.2 states that Administrations may exempt ships, other than RO-RO passenger ships constructed before 1 July 2002, from being fitted with a VDR. This exemption is allowed where it can be demonstrated that interfacing a VDR with the existing navigation equipment on the ship is unreasonable and impracticable. Also, reference (b) grants Administrations some latitude in determining to what extent the provision of reference (a) shall apply to vessels less than 150 tons (ITC). Exemptions granted from any requirement set forth under SOLAS must be made available, along with supporting rational, for review by International Maritime Organization (IMO) member nations. Therefore, it is the Coast Guard's responsibility as the United States representative to the IMO to scrutinize each exemption request to determine if that request is valid and an exemption warranted.

b. Unlike other equipment required by SOLAS, the VDR is a passive device that does not directly affect passenger or navigational safety. Rather it is a device whose relative benefit can only be determined after the data it contains is analyzed following a casualty. The Coast Guard believes VDRs can be an invaluable tool for casualty investigators and may provide information that could prove crucial in preventing future casualties.

c. Enclosure (1), IMO Resolution A.861(20), sets the performance standards for VDRs. Among other things, the VDR should provide a secure means to store and retrieve information concerning the ship's position, movement, physical status, command and control.

4. Discussion:

a. There are many factors to weigh when considering a VDR exemption request from a vessel owner or operator. Although not all-inclusive, the below-listed elements should be considered before endorsing a VDR exemption request. While the burden of proof for such a request rests with the vessel operator, field units are encouraged to engage vessel operators and provide guidance in preparing submittals.

(1) Is the vessel less than 150 tons (ITC)? Reference (b) grants Administrations the latitude to exempt vessels less than 150 ITC. In most cases, we believe it would likely be excessive to install VDRs on vessels less than 150 ITC; therefore, these requests may be viewed favorably.

(2) Is it unreasonable or impracticable to interface a VDR with a vessel's existing equipment? What constitutes either unreasonable or impracticable can be open to broad interpretations; therefore, the Coast Guard must endeavor to maintain consistency in its interpretations. There may be grounds to grant an exemption if the electronics equipment onboard the vessel in question is too old and clearly not compatible with a modern VDR. To determine if this is so, we recommend that the vessel operator have an installation analysis performed by an independent technician authorized to perform VDR installations and performance tests. Also, the electronics suites on some vessels may not be physically capable of recording all the items noted in IMO Resolution A.861(20), though this alone is not grounds for an exemption. It may still be beneficial to record some items, depending on what they are, vice taking an "all or none" approach. If later in a vessel's operating life the existing equipment is replaced, then the conditions of a VDR exemption must be reviewed to determine whether the reasons for the exemption are still valid.

(3) Would the installation of a VDR significantly reduce emergency refuge area for passengers, significantly increase the fire load or necessitate major structural modifications to facilitate installation? In considering any exemption, we must weigh the benefits of a required installation versus any potential reduction of passenger or vessel safety factors. We contend that it would be unreasonable to require the installation of equipment at the expense of significantly reducing a refuge area for passengers or significantly increasing the fire load. Vessel operators that desire an exemption will need to submit information for their vessel, detailing how much refuge area would be lost, what the increase in fire load would be after the installation of a VDR system, or details on what structural modifications would be necessary to install the VDR. The inclusion of drawings and photographs would greatly assist in the decision making process.

(4) Does the vessel operate solely in a zone covered by a Vessel Traffic Service (VTS)? The purpose of a VDR is to record certain data that can be used to assist in casualty investigations. It may be that the VTS where the vessel will be operating may be capable of capturing enough data as to render a VDR installation as unreasonable. Detailed information regarding VTS recording capabilities should accompany these requests.

b. Although there may be a host of reasons why an operator may object to VDR installations, the following list provides arguments that we cannot support, therefore, absent amplifying information from the arguments listed in paragraph (a) above, will not merit an exemption from this requirement.

(1) Cost: While we understand that many operators presently consider VDR systems expensive, and while we sympathize with the burden this requirement places on passenger vessel operators in general, the Coast Guard will not grant exemptions where the basis is primarily financial in nature. We also envision that cost of these systems will decrease as this technology proliferates the industry, just as with other technology.

(2) Route: There have been comments that because a vessel operates within 20 miles of shore or only makes infrequent international voyages, a VDR is not necessary. We submit that a vessel's proximity to shore or the number of international voyages has no bearing as to whether or not a VDR is required as a casualty may occur anywhere and at anytime.

(3) Operating History: Some operators will contend that their safe operating record leads them to doubt the benefits of installing a VDR. While the Coast Guard applauds the safety conscious attitude of these operators, there is no guarantee that their vessels, regardless of operating history, will not be involved in a marine casualty. In such circumstances, a VDR could prove crucial in determining the cause of the casualty and possibly the prevention of other such occurrences.

(4) VDRs do not actively promote safety: VDRs don't directly protect passengers and crew on the vessels that carry them and are not part of the lifesaving, firefighting or navigational safety equipment. As mentioned in paragraph 3, VDRs are post casualty tools that record certain information that may be used by investigators to help determine the cause of a vessel casualty.

5. Action: Marine Safety units shall utilize the information contained in this memo when considering requests from the maritime industry for exemptions from reference (a). The authorization to grant such exemptions rests with COMDT (G-MOC) and all requests for exemption from reference (a) shall be forwarded along with supporting documentation for review. COMDT (G-MOC) will review and evaluate each request individually to determine whether an exemption is warranted. This guidance shall be incorporated into a future revision of the Marine Safety Manual. Additional questions on this subject may be directed to COMDT (G-MOC-1).

J. A. SERVIDIO
By direction

Enclosure: (1) IMO Resolution A.861(20)

Distribution: G-MOA
G-MWV
Marine Safety Center
CG LANTAREA (Am)
CG PACAREA (Pm)
All Districts (m)
All Activities
All Marine Safety Offices
All Marine Safety Units

# 11.2

**Resolution A.861(20)** – *Adopted on 27 November 1997*

## PERFORMANCE STANDARDS FOR SHIPBORNE VOYAGE DATA RECORDERS (VDRs)

*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 that, by resolution 12, the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, being of the opinion that it would be desirable that ships, in particular passenger ships, be fitted with voyage data recorders (VDRs) to assist in investigations into casualties, requested the Maritime Safety Committee to develop, as a matter of urgency, operational requirements and performance standards for such recorders, taking into account any potential human element implications,*

*NOTING that consideration is being given to the development of carriage requirements for VDRs for inclusion in the SOLAS Convention at the earliest opportunity,*

*HAVING CONSIDERED the recommendations made by the Maritime Safety Committee at its sixty-eighth session and by the Sub-Committee on Safety of Navigation at its forty-third session,*

*1. ADOPTS the Recommendation on Performance Standards for Shipborne Voyage Data Recorders (VDRs), set out in the annex to the present resolution;*

*2. INVITES Governments to encourage shipowners and operators of ships entitled to fly their flag to install VDRs on such ships, as soon as possible, especially considering that the carriage of VDRs may soon be made mandatory under the SOLAS Convention;*

*3. RECOMMENDS Governments to ensure that VDRs installed on board ships flying their flag conform to performance standards not inferior to those specified in the annex to this resolution;*

*4. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary.*

## *Annex*

# RECOMMENDATION ON PERFORMANCE STANDARDS FOR SHIPBORNE VOYAGE DATA RECORDERS (VDRs)

## 1 PURPOSE

The purpose of a voyage data recorder (VDR) is to maintain a store, in a secure and retrievable form, of information concerning the position, movement, physical status, command and control of a vessel over the period leading up to and following an incident having an impact thereon. Information contained in a VDR should be made available to both the Administration and the shipowner. This information is for use during any subsequent investigation to identify the cause(s) of the incident.

## 2 APPLICATION

A VDR with capabilities not inferior to those defined in these performance standards is required to be fitted to ships of classes defined in SOLAS chapter V, as amended.

## 3 REFERENCES

3.1 SOLAS:

- 1995 SOLAS Conference, resolution 12.

3.2 IMO resolutions:

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|---|---|
| – A.662(16) | Performance standards for float-free release and activation arrangements for emergency radio equipment |
| – A.694(17) | General requirements for shipborne radio equipment forming part of the GMDSS and for electronic navigational aids |
| – A.824(19) | Performance standards for devices to indicate speed and distance |
| – A.830(19) | Code on Alarms and Indicators, 1995 |
| – MSC.64(67), annex 3 | Performance standards for heading control systems |
| – MSC.64(67), annex 4 | Performance standards for radar equipment, as amended |

## 4 DEFINITIONS

4.1 *Voyage data recorder (VDR)* means a complete system, including any items required to interface with the sources of input data, for processing and encoding the data, the final recording medium in its capsule, the power supply and dedicated reserve power source.

4.2 *Sensor* means any unit external to the VDR, to which the VDR is connected and from which it obtains data to be recorded.

4.3 *Final recording medium* means the item of hardware on which the data is recorded such that access to it would enable the data to be recovered and played back by use of suitable equipment.

**4.4** *Playback equipment* means the equipment, compatible with the recording medium and the format used during recording, employed for recovering the data. It includes also the display or presentation hardware and software that is appropriate to the original data source equipment.*

**4.5** *Dedicated reserve power source* means a secondary battery, with suitable automatic charging arrangements, dedicated solely to the VDR, of sufficient capacity to operate it as required by 5.3.2.

## 5 OPERATIONAL REQUIREMENTS

### 5.1 General

**5.1.1** The VDR should continuously maintain sequential records of preselected data items relating to the status and output of the ship's equipment, and command and control of the ship, referred to in 5.4.

**5.1.2** To permit subsequent analysis of factors surrounding an incident, the method of recording should ensure that the various data items can be co-related in date and time during playback on suitable equipment.

**5.1.3** The final recording medium should be installed in a protective capsule which should meet all of the following requirements:

**.1** be capable of being accessed following an incident but secure against tampering;

**.2** maximize the probability of survival and recovery of the final recorded data after any incident;

**.3** be of a highly visible colour and marked with retro-reflective materials; and

**.4** be fitted with an appropriate device to aid location.

**5.1.4** The design and construction, which should be in accordance with the requirements of resolution A.694(17) and international standards acceptable to the Organization,† should take special account of the requirements for data security and continuity of operation as detailed in 5.2 and 5.3.

### 5.2 Data selection and security

**5.2.1** The minimum selections of data items to be recorded by the VDR are specified in 5.4. Optionally, additional items may be recorded provided that the requirements for the recording and storage of the specified selections are not compromised.

**5.2.2** The equipment should be so designed that, as far as is practical, it is not possible to tamper with the selection of data being input to the equipment, the data itself nor that which has already been recorded. Any attempt to interfere with the integrity of the data or the recording should be recorded.

**5.2.3** The recording method should be such that each item of the recorded data is checked for integrity and an alarm given if a non-correctable error is detected.

### 5.3 Continuity of operation

**5.3.1** To ensure that the VDR continues to record events during an incident, it should be capable of operating from the ship's emergency source of electrical power.

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* Playback equipment is not normally installed on a ship and is not regarded as part of a VDR for the purposes of these performance standards.

† Refer to publication IEC 945 - Maritime navigation and radiocommunication equipment and systems - General requirements, methods of testing and required test results.

5.3.2 If the ship's emergency source of electrical power supply fails, the VDR should continue to record Bridge audio (see 5.4.5) from a dedicated reserve source of power for a period of 2 h. At the end of this 2 h period all recording should cease automatically.

5.3.3 Recording should be continuous unless interrupted briefly in accordance with 6 or terminated in accordance with 5.3.2. The time for which all stored data items are retained should be at least 12 h. Data items which are older than this may be overwritten with new data.

## 5.4 Data items to be recorded

5.4.1 *Date and time*

Date and time, referenced to UTC, should be obtained from a source external to the ship or from an internal clock. The recording should indicate which source is in use. The recording method should be such that the timing of all other recorded data items can be derived on playback with a resolution sufficient to reconstruct the history of the incident in detail.

5.4.2 *Ship's position*

Latitude and longitude, and the datum used, should be derived from an electronic position-fixing system (EPFS). The recording should ensure that the identity and status of the EPFS can always be determined on playback.

5.4.3 *Speed*

Speed through the water or speed over the ground, including an indication of which it is, derived from the ship's speed and distance-measuring equipment.

5.4.4 *Heading*

As indicated by the ship's compass.

5.4.5 *Bridge audio*

One or more microphones positioned on the bridge should be placed so that conversations at or near the conning stations, radar displays, chart tables, etc., are adequately recorded. As far as practicable, the positioning of microphones should also capture intercom, public address systems and audible alarms on the bridge.

5.4.6 *Communications audio*

VHF communications relating to ship operations should be recorded.

5.4.7 *Radar data, post-display selection*

This should include electronic signal information from within one of the ship's radar installations which records all the information which was actually being presented on the master display of that radar at the time of recording. This should include any range rings or markers, bearing markers, electronic plotting symbols, radar maps, whatever parts of the SENC or other electronic chart or map that were selected, the voyage plan, navigational data, navigational alarms and the radar status data that were visible on the display. The recording method should be such that, on playback, it is possible to present a faithful replica of the entire radar display that was on view at the time of recording, albeit within the limitations of any bandwidth-compression techniques that are essential to the working of the VDR.

5.4.8 *Echo-sounder*

This should include depth under keel, the depth scale currently being displayed and other status information where available.

**5.4.9** *Main alarms*

This should include the status of all mandatory alarms on the bridge.

**5.4.10** *Rudder order and response*

This should include status and settings of auto-pilot if fitted.

**5.4.11** *Engine order and response*

This should include the positions of any engine telegraphs or direct engine/propeller controls and feedback indications, if fitted, including ahead/astern indicators. This should also include status of bow thrusters if fitted.

**5.4.12** *Hull openings status*

This should include all mandatory status information required to be displayed on the bridge.

**5.4.13** *Watertight and fire door status*

This should include all mandatory status information required to be displayed on the bridge.

**5.4.14** *Accelerations and hull stresses*

Where a ship is fitted with hull stress and response monitoring equipment, all the data items that have been pre-selected within that equipment should be recorded.

**5.4.15** *Wind speed and direction*

This should be applicable where a ship is fitted with a suitable sensor. Either relative or true wind speed and direction may be recorded, but an indication of which it is should be recorded.

## 6 OPERATION

The unit should be entirely automatic in normal operation. Means should be provided whereby recorded data may be saved by an appropriate method following an incident, with minimal interruption to the recording process.

## 7 INTERFACING

Interfacing to the various sensors required should be in accordance with the relevant international interface standard, where possible. Any connection to any item of the ship's equipment should be such that the operation of that equipment suffers no deterioration, even if the VDR system develops faults.