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| **Voyage Data Recorders**

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|  | 55th Batch(Nautical ): 27/03/2020 Lesson on voyage data recorder (VDR) **Voyage data recorder**, or VDR, is a [data recording](https://en.wikipedia.org/wiki/Data_recorder) system designed for all vessels required to comply with the [IMO](https://en.wikipedia.org/wiki/International_Maritime_Organization)'s International Convention [SOLAS](https://en.wikipedia.org/wiki/International_Convention_for_the_Safety_of_Life_at_Sea) Requirements (IMO Res.A.861(20)) in order to collect data from various sensors on board the vessel. It then [digitizes](https://en.wikipedia.org/wiki/Digitizing), [compresses](https://en.wikipedia.org/wiki/Data_compression) and [stores](https://en.wikipedia.org/wiki/Data_storage_device) this information in an externally mounted protective storage unit. The protective storage unit is a [tamper-proof](https://en.wikipedia.org/wiki/Tamper-proof) unit designed to withstand the extreme shock, impact, pressure and heat, which could be associated with a marine incident (fire, explosion, collision, sinking, etc.).**Data retention period:**The protective storage unit may be in a retrievable fixed unit or free float unit (or combined with [EPIRB](https://en.wikipedia.org/wiki/EPIRB)) when the ship sinks in a marine accident. The last 12 hours (48 Hours for the 2014 regulations MSC.333(90)) of stored data in the protected unit can be recovered and replayed by the authorities or ship owners for incident investigation. Besides the protective storage unit, the VDR system may consist of a recording control unit and a data acquisition unit, which are connected to various equipment and sensors on board a ship. The new MSC.333(90) regulations also state a minimum of 30 days of recorded data must be held internally (this could be within the recording control unit, data acquisition unit, Main Electronics Unit depending on the manufacturers terminology).Although the primary purpose of the VDR is for accident investigation after the fact, there can be other uses of recorded data for [preventive maintenance](https://en.wikipedia.org/wiki/Preventive_maintenance), performance efficiency monitoring, heavy weather damage analysis, accident avoidance and training purposes to improve safety and reduce running costs.[[1]](https://en.wikipedia.org/wiki/Voyage_data_recorder#cite_note-BowditchAgency2002-1)Simplified voyage data recorder (S-VDR), as defined by the requirements of IMO Performance Standard MSC.163(78), is a lower cost simplified version VDR for small ships with only basic ship's data recorded.Voyage data information:The information recorded in the unit(s) (sometimes also called the *ship's*[*black box*](https://en.wikipedia.org/wiki/Flight_recorder)) may include the following information:* Position, date, time using [GPS](https://en.wikipedia.org/wiki/Global_Positioning_System)
* Speed log – Speed through water or speed over ground
* [Gyro compass](https://en.wikipedia.org/wiki/Gyro_compass) – [Heading](https://en.wikipedia.org/wiki/Course_%28navigation%29)
* [Radar](https://en.wikipedia.org/wiki/Radar)\* – As displayed or [AIS](https://en.wikipedia.org/wiki/Automatic_Identification_System) data if no off-the-shelf converter available for the Radar video
* [ECDIS](https://en.wikipedia.org/wiki/ECDIS)\* – A screen capture every 15 seconds and a list of navigational charts in use every 10 minutes or when a chart change occurs
* Audio from the [bridge](https://en.wikipedia.org/wiki/Bridge_%28nautical%29), including bridge wings
* [VHF](https://en.wikipedia.org/wiki/Very_high_frequency) radio communications
* [Echo sounder](https://en.wikipedia.org/wiki/Echo_sounder)\* – Depth under [keel](https://en.wikipedia.org/wiki/Keel)
* Main alarms\* – All [IMO](https://en.wikipedia.org/wiki/International_Maritime_Organization) mandatory alarms
* [Hull](https://en.wikipedia.org/wiki/Hull_%28watercraft%29) openings\* – Status of hull doors as indicated on the bridge
* Watertight & [fire doors](https://en.wikipedia.org/wiki/Fire_door)\* status as indicated on the bridge
* Hull stress\* – Accelerations and hull [stresses](https://en.wikipedia.org/wiki/Stress_%28mechanics%29)
* [Rudder](https://en.wikipedia.org/wiki/Rudder)\* – Order and feedback response
* [Engine](https://en.wikipedia.org/wiki/Engine)/[Propeller](https://en.wikipedia.org/wiki/Propeller)\* – Order and feedback response
* Thrusters\* – Status, direction, amount of thrust % or [RPM](https://en.wikipedia.org/wiki/Revolutions_per_minute)
* [Anemometer](https://en.wikipedia.org/wiki/Anemometer) and [weather vane](https://en.wikipedia.org/wiki/Weather_vane)\* – Wind speed and direction

Data marked with \* may not be recorded in S-VDR, except Radar and Echo Sounder if data and standard interfaces available. |
| A Float Free Capsule used on ships to store a minimum of 48 hours of recorded data. if the vessel sinks the capsule case (white) will open and release the Yellow capsule from inside, this capsule will then float to the surface and emit a distress signal to alert shore side authorities**Regulations:**​Passenger ships and ships other than passenger ships of 3000 gross tonnage and upwards constructed on or after 1 July 2002 must carry voyage data recorders (VDRs) to assist in accident investigations, under regulations adopted in 2000, which entered into force on 1 July 2002.The mandatory regulations are contained in chapter V on Safety of Navigation of the International Convention for the Safety of Life at Sea, 1974 (SOLAS).Like the black boxes carried on aircraft, VDRs enable accident investigators to review procedures and instructions in the moments before an incident and help to identify the cause of any accident. **VDR requirements**Under regulation 20 of SOLAS chapter V on Voyage data recorders (VDR), the following ships are required to carry VDRs:· passenger ships constructed on or after 1 July 2002;· ro-ro passenger ships constructed before 1 July 2002 not later than the first survey on or after 1 July 2002;· passenger ships other than ro-ro passenger ships constructed before 1 July 2002 not later than 1 January 2004; and· ships, other than passenger ships, of 3,000 gross tonnage and upwards constructed on or after 1 July 2002.VDRs are required to meet performance standards "not inferior to those adopted by the Organization".Performance standards for VDRs were adopted in 1997 and give details on data to be recorded and VDR specifications. They state that the VDR should continuously maintain sequential records of preselected data items relating to status and output of the ship's equipment and command and control of the ship. The VDR should be installed in a protective capsule that is brightly coloured and fitted with an appropriate device to aid location. It should be entirely automatic in normal operation.Administrations may exempt ships, other than ro-ro passenger ships, constructed before 1 July 2002, from being fitted with a VDR where it can be demonstrated that interfacing a VDR with the existing equipment on the ship is unreasonable and impracticable.Regulation18 of SOLAS chapter V on Approval, surveys and performance standards of navigational systems and equipment and voyage data recorder states that:*The voyage data recorder (VDR) system, including all sensors, shall be subjected to an annual performance test. The test shall be conducted by an approved testing or servicing facility to verify the accuracy, duration and recoverability of the recorded data. In addition, tests and inspections shall be conducted to determine the serviceability of all protective enclosures and devices fitted to aid location. A copy of a the certificate of compliance issued by the testing facility, stating the date of compliance and the applicable performance standards, shall be retained on board the ship*. **Simplified VDRs**The MSC at its 79th session in December 2004 adopted amendments to regulation 20 of SOLAS chapter V (*Safety of Navigation*) on a phased-in carriage requirement for a shipborne simplified voyage data recorder (S-VDR). The amendment entered into force on 1 July 2006.The regulation requires a VDR, which may be an S-VDR, to be fitted on existing cargo ships of 3,000 gross tonnage and upwards, phasing in the requirement for cargo ships of 20,000 gross tonnage and upwards first, to be followed by cargo ships of 3,000 gross tonnage and upwards.The S-VDR is not required to store the same level of detailed data as a standard VDR, but nonetheless should maintain a store, in a secure and retrievable form, of information concerning the position, movement(speed & direction), physical status(sea condition), command, voice , conning and control of a vessel over the period leading up to and following an incident.The phase-in is as follows:To assist in casualty investigations, **cargo ships**, when engaged on international voyages, shall be fitted with a VDR which may be a simplified voyage data recorder (S VDR) as follows:* in the case of cargo ships of 20,000 gross tonnage and upwards constructed before 1 July 2002, at the first scheduled dry-docking after 1 July 2006 but not later than 1 July 2009;
* in the case of cargo ships of 3,000 gross tonnage and upwards but less than 20,000 gross tonnage constructed before 1 July 2002, at the first scheduled dry-docking after 1 July 2007 but not later than 1 July 2010; and
* Administrations may exempt cargo ships from the application of the requirements when such ships will be taken permanently out of service within two years after the implementation date specified above.

Capt. I. K.Taimur, 27/03/2020 | **http://www.imo.org/en/OurWork/Safety/Navigation/PublishingImages/vdr.jpg** |
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