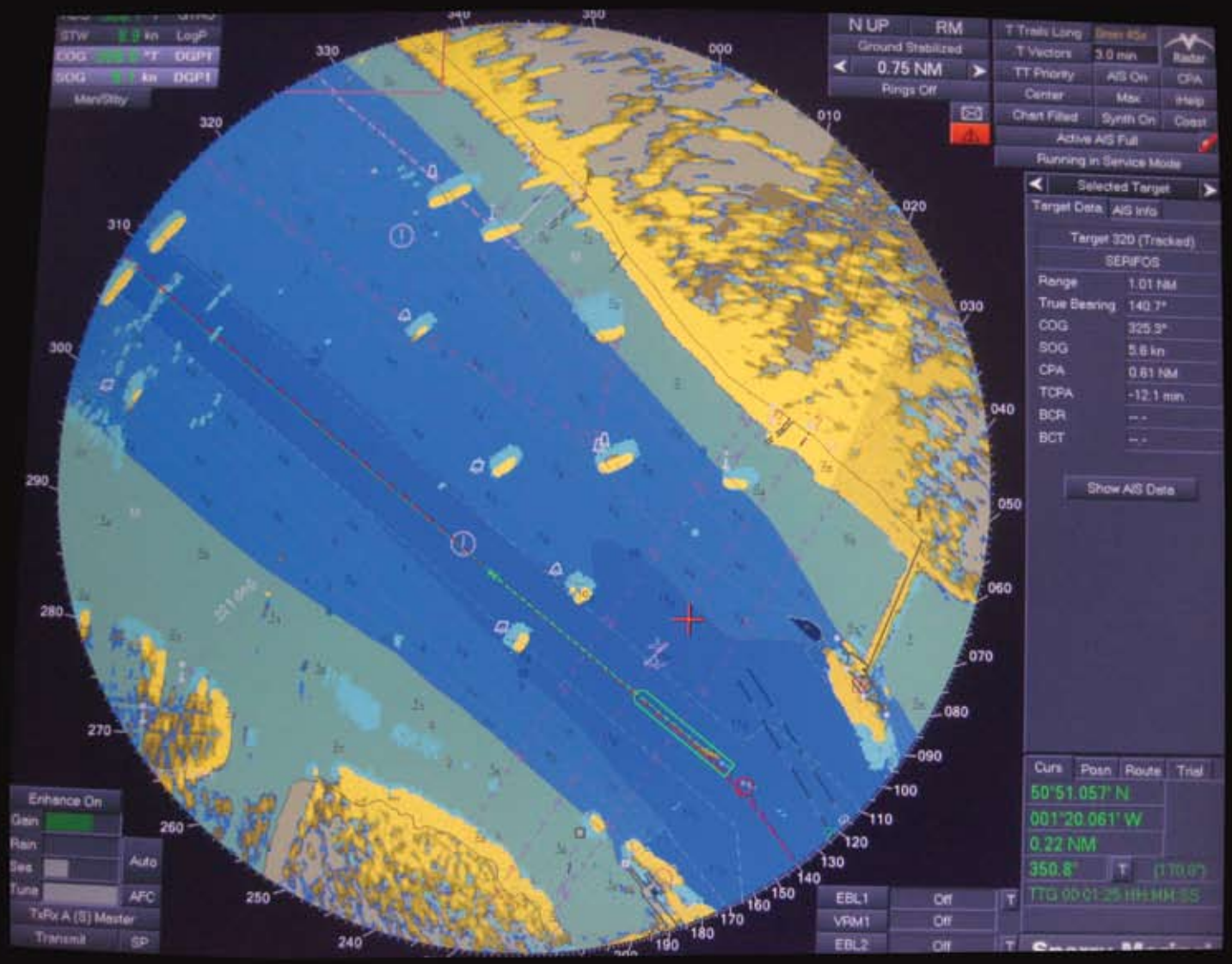
April 2013 www.nautinst.org

Seaways

The International Journal of The Nautical Institute



Learning from ECDIS

Is the technology ready?

The Nautical Institute

Philip Wake MSc, FNI Chief Executive

Focus

ECDIS, near misses and investigations

> It is everyone's responsibility to establish a reporting culture on board, and within the company, so as to be the initial safety barrier

With any new technology there is an increased risk of accidents which can only be mitigated by careful design based on thorough consultation with end users, intelligent and ergonomic siting of the equipment, appropriate and well documented procedures, and comprehensive training of all users. That is certainly the case with ECDIS, which is increasingly with us in the world fleet due to mandatory carriage being phased in through to 2018 depending on ship type. It has been the subject of numerous conferences and seminars in recent years, including the three 'ECDIS Revolution' conferences we have chaired, and features strongly in our publications list (*ECDIS & Positioning* and *From Paper Charts to ECDIS* – see website for details and to order). We have helped the industry representative organisations to formulate a coordinated stance on generic and familiarisation training. So, provided the training is done properly, there is a reasonable amount of mitigation in place.

However, casualties are already occurring in which the use of ECDIS is assessed as at least a major causal factor. John Murray, the Director Marine at the International Chamber of Shipping (ICS) provides a thoughtful article this month questioning whether the technology is ready with its associated training systems, and links this question to the wider worries concerning the advent, eventually, of e-Navigation (see pp 6-8). He contends that the technology was rushed in and is driven by manufacturers with little or no standardisation to assist the navigator moving from one ship to another. He sets out a number of imperatives if the technology is to provide the improvements in the safety of navigation that were claimed when it was proposed to and then imposed on the industry. Meanwhile, Captain Ian Hale FNI in the Letters pages (see pp 33-34) asserts that the ECDIS technology may already be obsolete, such is the pace of change and the usefulness of new technologies. So, turning to e-Navigation, John Murray appeals that lessons from the design and introduction of ECDIS are learned and the varied capabilities of flag and coastal states around the world are fully taken into account. If they are not, the likelihood is a European designed and implemented system with limited reach or relevance in other parts of the world despite the best intentions of the IMO. If all this seems too far in the future for you, the page of LinkedIn discussion on Parallel Indexing (p 35) following the Letters pages emphasises that navigation techniques that have been around for many years are still well worth debating and, more importantly, using. We hope you will join such discussions and think about how you carry out your professional duties.

A reporting culture

Regular readers of *Seaways* will be well aware of the benefits of using the MARS reports to learn lessons from the near misses and accidents involving others. This is an essential safety net for the industry, as is the CHIRP programme with which the Institute cooperates (see job advertisement, p28). Captain Paul Drouin AFNI, however, correctly points out that it is everyone's responsibility to establish a reporting culture on board, and within the company, so as to be the initial safety barrier and for this to operate in a 'no blame' or 'just' culture that encourages honest reporting (pp 11-14). However, if the worst happens and an accident occurs, legislative requirements will lead to formal investigations of one sort or another. Captain Fazlur Chowdhury AFNI sets these out and identifies here too, the benefit of a 'no blame' system to ensure that lessons are learned and communicated to the industry promptly (pp 15-16). Sadly, all too often, flag or coastal states lack the resources to do this efficiently with consequent delays in producing the report – or no report at all. He draws the distinction between these investigations for lessons learned and the national law enforcement agencies who may well bring civil or criminal charges relating to the casualty. We will continue to target such unnecessary criminalisation and highlight its detrimental effect on the people concerned as well as the industry's recruitment and retention of personnel.

p10

p15

mars
Marine Accident Reporting Scheme

p17

p29

Mariners' Alerting and Reporting Scheme

MARS Report No. 246 April 2013

MARS 201318

Buoy fouled after loss of propulsion

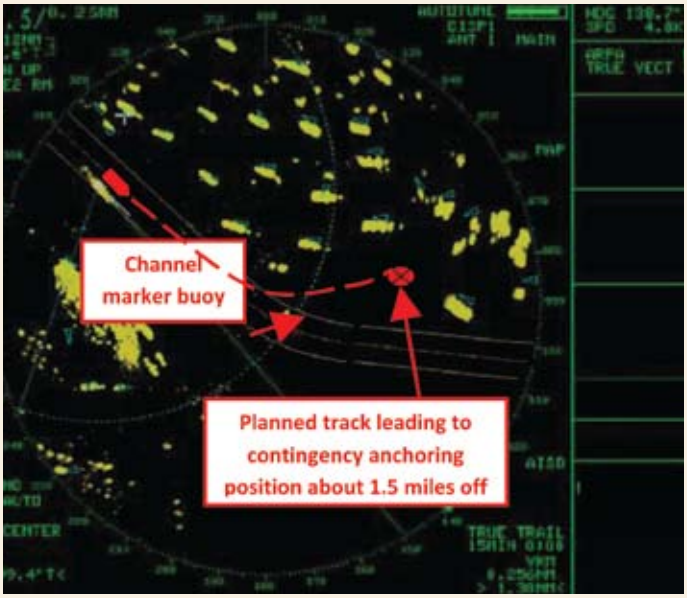
➔ After completing repairs at a shipyard, a tanker concluded sea trials and was approaching her assigned anchorage berth. As she negotiated the buoyed channel to the south of a crowded anchorage, a sudden fault in the main engine lubricating system resulted in the automatic shutdown of the main engine. In response to the vessel's safety (SECURITÉ) alert, the port quickly identified a contingency anchorage berth in the nearest clear area among other anchored vessels. It was reckoned that even if propulsion was not restored, the tanker would have sufficient steerage way to safely pass the nearest vessels before a gentle turn to port would lead her to the position. However, due to the combined effects of a tidal stream and loss of steering due to decreased speed, the vessel drifted on to the channel marker buoy, which got fouled briefly with the rudder. After some minutes, the tanker drifted clear of the buoy and no damage was observed on the vessel or the buoy.

Result of investigation

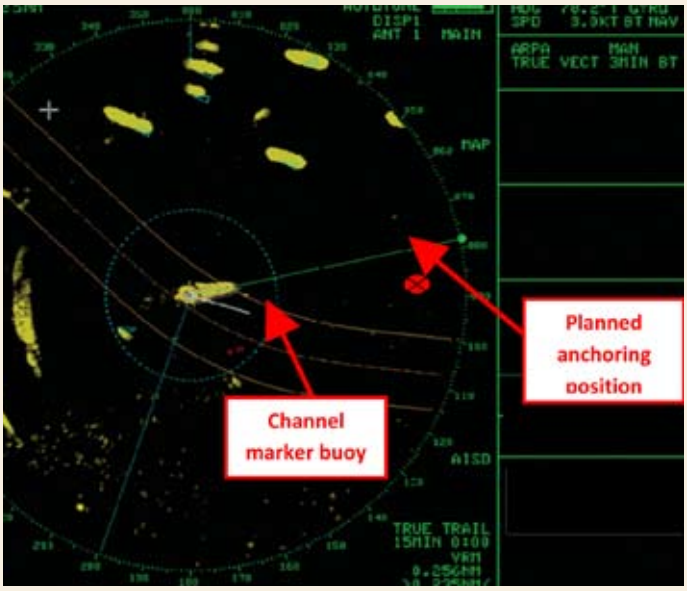
1. After departing from the shipyard, all the tugs were dismissed – it would have been prudent to retain at least one escorting tug;
2. The outward pilot was apparently unaware that the vessel was intending to conduct engine trials off port limits (OPL) and was scheduled to return and anchor in the waiting area;
3. The Master failed to properly respond to the emergency – the operation of the main engine manual override facility and a prompt astern movement could have taken the way off and, with the consent of the port, the anchor(s) should have been let go while stopped inside the channel;
4. After the engine stopped, neither the Master nor the port control issued a timely call for tug(s) assistance;
5. Communications between the bridge and engine room were ineffective and did not convey the vessel's dangerous location and the seriousness of the engine problem;
6. The approach to the contingency anchorage did not adequately consider the vessel's limited manoeuvring ability in very light ballast condition and the influence of the tidal stream;
7. The better option of passing the buoy to port before turning into the anchorage was overlooked.

Corrective/preventative actions

1. The SMS was amended to include new procedures for vessels departing from dry dock, building or repair yard following significant repairs/refits;
2. Preparations for sea trial shall incorporate:
   i) passage plans that ensure ample sea room, avoid transiting congested inshore waters, and provide for contingency anchorages;
   ii) loading of sufficient ballast to achieve normal ballast condition before proceeding;
   iii) the provision of at least one escort tug until the vessel has reached open waters or the satisfactory completion of sea trials;
   iv) Refresher training, and, if practicable, the testing of emergency overrides/recovery systems designed to overcome failure of critical equipment/systems;
3. Master/Pilot information exchange must ensure that pilots are made aware of planned trials of engines or other critical systems.



With a significant residual headway at the time of main engine shutdown, the Master was hoping to safely steer the dead ship along the track shown, leaving the buoy to starboard and anchor the vessel in the area north of the channel, clear of other anchored vessels



The tanker drifted off the planned track and on to the buoy due to the easterly setting current and loss of steerage way (see true vector setting just south of east)

MARS 201319

Battery damage caused by charger failure

(Edited from Marine Safety Forum Safety Flash 13-02)

➔ A ship's engineer was carrying out planned maintenance of the emergency generator. When he started the generator, he heard a loud bang from the battery container. On investigating, he discovered that one of the starter batteries had exploded, with the top of the battery detaching from the body. The battery was safely removed and the engine was temporarily left in the manual starting mode.

On investigation, it was discovered that for an unknown period of time, the vessel's emergency generator battery charging system was wrongly set up in such a way that two chargers could be charging the battery simultaneously. This resulted in excess evaporation of the water content in the electrolyte, substantially lowering the liquid level and exposing the plates. It is thought that internal arcing occurred across an air gap, triggering an explosion.

Lessons learnt

1. All charging systems should be checked to ensure that the charging current cannot exceed the specified safe range;
2. All battery containers / receptacles should be checked for tightness of fixtures and overall integrity as part of planned maintenance.

View of battery with shattered top

MARS 201320

Hazards of improperly moored bunker vessels

➔ In some ports and terminals, bunker supply barges tend to moor on the sea side of ships with a considerable length of their hull overhanging the stern of receiving vessels. Such a practice shows poor seamanship and is hazardous for both the barge and the vessel moored at or manoeuvring off the next berth.

Often, an incoming vessel under pilotage is put in great difficulty when, on approaching the berth astern, she finds the quay length has been effectively reduced by the protruding hull of the barge. The legal implications of a collision between the offending barge and a vessel attempting to berth / unberth under such circumstances and a consequent oil spill can be serious not only for the vessels involved, but can even potentially implicate the port or terminal for negligence.

'Inconvenient' locations of the manifolds on the supplying or receiving vessels should be remedied by joining additional hose lengths instead of inconsiderate positioning of the barge.

Unsafe overhang severely restricts manoeuvring room for the vessel berthed astern and increases risk of contact during mooring/unmooring

MARS 201321

Door edges can inflict hand injury

(Edited from Marine Safety Forum – Safety Flash 12-25)

➔ A crewmember suffered a serious laceration when his hand came into contact with the edge of the steel finishing strip (usually a pre-formed or extruded 'C' channel) that is commonly fitted around the perimeter of the accommodation door shutters onboard ships. On investigation, it was found that the steel channel that was wrapped around the door margins had become slightly raised and its flange presented a burred and razor sharp lip. This was most likely caused by the cutting process of the steel during the door's manufacture. It was subsequently discovered that several doors had the same hazardous defect. As a remedial measure, the crew spent considerable time and effort in depressing and then blunting the edges of the strips with a smooth file and emery cloth/paper. As a preventative measure, the ship's operator passed the information on the hazard to the vessel's builder and the door supplier.

Peripheral strip edges can be as sharp as a knife blade. Crewmembers engaged in any type of work on the doors and fittings must take all precautions and don appropriate PPE.

Visit www.nautinst.org/MARS for online database

■ **Editor's note:** Similar sharp edges can potentially exist in pressed stainless steel or aluminium fittings around the living and common spaces onboard ship, eg air louvres, galley countertops and sinks, insulated bulkhead claddings, deckhead panelling, corrugated / perforated shelving, gratings etc. Direct contact with unprotected hands with these fittings must be strictly avoided during handling or cleaning.

MARS 201322

Iron ore fines that may contain DRI (C)

(Edited from UK P&I Club LP Bulletin 859 - 12/12)

➔ The process of manufacturing Direct Reduced Iron (DRI) from iron ore and the subsequent hot briquetting procedures generate unwanted by-products in the form of dust and broken chips during most of the stages. Some manufacturers recover these materials and offer them for shipment.

In the 2009 edition of the IMSBC Code, such a material is listed as DIRECT REDUCED IRON (C) (By-product fines), and the definition of the material is based only on its production, particle size and density, without reference to the metallic iron or moisture content.

Despite extensive publicity and in clear violation of regulations, shippers continue to use misleading names for patently DRI cargoes (e.g. re-oxidised iron fines, iron fines (blend), iron ore pellet chips, oxide fines, pond fines, sludge fines, remets, clarifier slush and dust, spent iron fines and lodos etc.). Other similar cargoes include DRI in the description, but are offered on the basis that they are not DRI (C) and therefore do not need to be carried in accordance with the DRI (C) Schedule of the Code. Mariners should also be aware that, even if the cargo offered is not DRI (C), in some instances, stockpiles of different DRI cargoes are usually located in close proximity in the open, and non DRI cargo can become contaminated with DRI fines. DRI (A) and (B) cargoes typically contain about 85% metallic iron, whereas in blends containing DRI (C), it can be as low as1% or 2%. Such blended cargoes should be regarded as the hazardous commodity DRI (C) and be carried in accordance with the provisions of the Code.

Precautions before loading

Cargo blends containing DRI (C) can be identified by their chemical composition, details of which must be requested. The chemical composition must include the total iron content (Fe), the metallic (or free) iron content and the moisture content. This information should preferably be supported by a certificate from an independent testing laboratory and must relate to the cargo that is being offered for shipment. The certificate should state the method and standards that have been followed when obtaining the samples that have been tested (preferably ISO 10835: 2000) and the standards that have been followed to determine the metallic iron content (preferably BS ISO 5416: 2006). The date on which the sampling took place should also be checked to ensure relevance.

Having identified the cargo as DRI (C), the following documents/ evidence/information must be provided to the Master:

1. A certificate issued by a competent person recognised by the National Administration of the port of loading, stating that the cargo, at the time of loading, is suitable for shipment; that it conforms with the requirements of this Code;
2. The moisture content is less than 0.3% and the temperature does not exceed 65°C;
3. The cargo meets the loading criteria in regards to ageing and material temperature;
4. Comprehensive information on the cargo and safety procedures to be followed in the event of emergency;
5. After loading, a certificate shall be issued by a competent person recognised by the National Administration of the port of loading, confirming that throughout the whole consignment of fines and small particles, the moisture content has not exceeded 0.3% and the temperature does not exceed 65°C.

Exemptions from the requirements of the IMSBC Code

For cargoes that are listed in Appendix 1 of the IMSBC Code, such as DRI (C), Section 1.5 allows a competent authority to authorise any other provision or exemption if satisfied that such alternative provision is at least as effective and safe as that required by the Code. Three competent authorities are recognised: the Port State of departure, Port State of arrival and the Flag State. Prior to any shipment covered by such an exemption, the recipient of the exemption must notify the other competent authorities concerned, who may or may not accept that exemption. For cargoes that are offered for transport in accordance with an exemption as described above, the loading, carriage and safety procedures must be clearly stated. In particular, the Master must be advised of the ventilation rates and durations for each cargo space; the required standard of explosion protection of the ventilation fans; details of the arrangement of ventilation ducts into the holds; the method and frequency of monitoring the hydrogen concentrations in each cargo space; the method and frequency of monitoring the cargo temperatures in each cargo space; the criteria defining an emergency; the procedures to follow in the event of emergency; shipper's contact numbers in the event of emergency; and the procedures to follow before and during discharge.

The IMSBC Code schedule for DRI (C) sets maximum allowable moisture content as 0.3% for carriage. When cargoes are offered with moisture content in excess of this, then they are not compliant, and at higher moisture contents they may additionally pose a realistic risk that they may liquefy in a similar manner to certain iron and nickel ore cargoes. Therefore, any Declaration relating to such cargoes must classify the material as Group A and B and the accompanying test certificate(s) must state the Transportable Moisture Limit (TML) and actual moisture content (MC) of the shipment.

MARS 201323

Windlass damage when weighing anchor in gale force winds

(Official report - Edited from MAIB Accident Flyer – Norcape)

➔ A vessel was anchored in an exposed roadstead with gale conditions expected after a few hours. As a precaution, the Master had brought the vessel up to 8 shackles on the port anchor with the starboard anchor on the seabed to reduce anticipated yaw. A short time after anchoring, the vessel began to yaw. The intensity of the yawing increased, and eventually, the port cable began to slip, overcoming the combined holding power of the brake and the guillotine stopper.

The decision was taken to get underway, and the starboard anchor was weighed. The crew then began to weigh the port anchor, using engines to reduce the load on the cable. The wind strength was increasing steadily and the windlass struggled to recover the cable when, suddenly and without warning, the dog clutch shattered and the cable ran out of control. Fortunately, no one was injured and the securing arrangement of the bitter end held. The cable was subsequently slipped and the vessel was taken out of service due to the damage to the windlass and the loss of her anchor.

Safety lessons from investigation

1. The selected location for anchoring did not provide sufficient shelter to prevent the vessel's anchoring equipment from being subjected to excessive loads;
2. The guillotine bar's locking pin had not been engaged;
3. The vessel's SMS for anchoring operations contained no reference to the use of the locking pin when anchoring;
4. The severe yaw that developed was due to the windage of the vessel's superstructure, which generated forces in excess of the design load of the anchoring equipment.

Recommendations

Owners and operators are strongly advised to review their SMS procedures for anchoring to ensure they address the above safety issues and, specifically:

i) That masters have clear guidance on the capability of their vessel's anchoring system, including any limitations of the anchor system components, including that of the windlass;
ii) Effects of windage in various load conditions;
iii) Risks associated with excessive yaw;
iv) Guidance on anchoring is vessel-specific and highlights that, when at anchor, the weight of the cable should be taken on the guillotine fittings, which should be correctly engaged (Nautical Institute, Mooring and Anchoring Ships, Volume 1, 2009. ISBN: 978 1 870077 93 4).

Broken dog clutch and bent shaft on port windlass

MARS: You can make a difference.

You can save a life, prevent injury and contribute to a more effective shipping community.

Everyone makes mistakes or has – or sees – near misses. By contributing reports to MARS, you can help others learn from your experiences. Reports concerning navigation, cargo, engineering, ISM management, mooring, leadership, design, training or any other aspect of operations are welcome, as are alerts and reports even when there has been no incident. The freely accessible database (http://www.nautinst.org/mars/) is fully searchable and can be used by the entire shipping community as a very effective risk assessment, loss prevention and work planning tool and also as a training aid.

Reports will be carefully edited to preserve confidentiality or will remain unpublished if this is not possible.

Email: mars@nautinst.org or MARS, c/o The Nautical Institute, 202 Lambeth Road, London SE1 7LQ, UK

The Nautical Institute gratefully acknowledges sponsorship provided by:

American Bureau of Shipping, AR Brink & Associates, Britannia P&I Club, Cargill, Class NK, Constellation Marine Services, DNV, Gard, IHS Fairplay *Safety at Sea International*, International Institute of Marine Surveying, Lairdside Maritime Centre, London Offshore Consultants, MOL Tankship Management (Europe) Ltd, North of England P&I Club, Sail Training International, Shipowners Club, The Marine Society and Sea Cadets, The Swedish Club, UK Hydrographic Office, West of England P&I Club.

Visit www.nautinst.org/MARS for online database