



Maritime and Coastguard Agency

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## In-Water Surveys

Notice to Owners, Superintendents, Masters, classification societies, ship builders and repairers, diving and survey companies.

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### *Summary*

This Notice provides guidance on the conduct of In-Water Survey (IWS) inspection of the ships bottom in lieu of inspection out of the water. It specifies which ships may be eligible and the limits between surveys. It details the preparations required prior to embarking on IWS, the procedures to follow before, during and after the IWS.

It applies to In-Water Surveys of UK ships, primarily those conducted by MCA, but equivalent arrangements should be applied by authorised certifying authorities when conducting surveys on behalf of the UK.

### **BACKGROUND**

Formal agreement to the use of in-water survey (IWS) techniques was first given in the early 1970's. This was done, at that time, to counter the worldwide shortage of suitable dry-docking facilities for very large ships, in particular VLCC's. Since those early days the effectiveness of the IWS has been greatly improved and as a consequence agreement to their use has been given for certain types and sizes of ships. However, there have been recent initiatives at the International Maritime Organization (IMO) to require older tankers and bulk carriers to be seen in dry-dock<sup>1</sup>.

While an examination of a ship's hull and fittings can now be undertaken using IWS techniques, it is recognised that such a survey may not always be as effective as one conducted with the ship in dry-dock. Nevertheless, the MCA is prepared to

consider application for the IWS of ships, provided the principles and procedures detailed in these notes are followed.

Although it is not anticipated that the requirements for the periodic examination or survey of propeller shafts will affect the intervals between hull surveys, due cognisance of the requirements in this respect should be made when the programme for dry dock and IWS is developed.

In all cases where an IWS is proposed the Owners must make a formal application, indicating where and when it is to be conducted.

To date, the MCA has only approved IWS, in lieu of a dry dock survey, for Classes I and VII ships. However, proposals for ships of other classes will now be considered, provided the attached guidance is followed. IWS techniques are of course regularly used for the initial assessment of damage.

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<sup>1</sup> Where reference is made to inspection in dry-dock in this notice, this shall include any other method to inspect the ship's bottom out of the water.

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### 1. INTRODUCTION

The procedures referred to in these notes may not always be suitable for full adoption due to particular constraints, conditions and/or variations in availability of divers and equipment. The aim must be to achieve equally efficient alternative procedures that are likely to result in a satisfactory survey.

The IWS will be regarded as an acceptable alternative to a survey in a dry dock only if it is comprehensive and carried out in an efficient manner. The owner must appreciate that the principal condition of the MCA's acceptance of any proposed IWS is that a survey in dry dock is to be arranged if the IWS is not to the surveyors satisfaction.

This advice, or equivalent arrangements, should be taken into account for the survey of any UK vessel, by whichever organisation is authorised to carry out the survey.

### 2. TYPES OF SHIP ELIGIBLE FOR IN-WATER SURVEY

Subject to the requirements contained in this guidance and any subsequent amendment, the outside hull of the following types of ship may be inspected by means of an in-water survey:

- a. Passenger Ships which go to sea (i.e. UK Classes I, II, II(A), III, VI and VI(A))
- b. Other Ships (excluding Tankers and Bulk Carriers over 15 years of age)

- c. Domestic Passenger Ships (ships which do not go to sea; i.e. ships of UK Classes IV and V): Special arrangements may be accepted. (Refer to Appendix E)

IWS techniques may also be used to verify satisfactory condition of the ship's bottom for other purposes, such as for the initial assessment of damage, for all classes of ship.

### 3. INTERVALS AT WHICH AN IWS MAY BE UNDERTAKEN

Passenger Ships; An inspection of the ship's bottom is required annually. In a period of five years, two such inspections shall take place out of the water. The maximum interval between these inspections is 36 months. IWS may be carried out each year when an inspection out of the water is not required.

Other Ships; For ships subject to the international SOLAS or Load Line Conventions, two inspections of the ship's bottom are required within a period of 5 years, and the maximum interval between these inspections is 36 months. One of these inspections shall be conducted out of the water, which should coincide<sup>2</sup> with the renewal survey for Safety Construction or Load Line. Other intermediate inspections of the ship's bottom may be carried out in the water. Dredgers issued with Load Line Exemption Certificates shall continue to be surveyed in dry-dock twice in a five-year period.

Domestic Passenger Ships: As indicated in Appendix E.

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<sup>2</sup> Coincide means within 15 months. This allows for 12 months + 3 months flexibility for the previous annual survey window. (ie. between the 4th and 5th annual survey dates).

#### 4. AGE LIMITS OF SHIPS ELIGIBLE OF IWS

Special consideration must be given before IWS can be considered for ships which are more than 15 years of age. A submission to the certifying authority may be made for special consideration if fully justified and supported by their surveyors' reports concerning the condition of the hull. Oil Tankers and Bulk Carriers, to which Enhanced Survey Programme (ESP) applies, over 15 years of age will not be considered for IWS.

#### 5. APPLICATION FOR PERMISSION TO UNDERTAKE IWS IN PLACE OF SURVEY IN DRY DOCK

##### ALL SHIPS

Application should be made through the appropriate certifying authority. For surveys to be conducted by MCA, owners should make formal application for an IWS not less than 4 weeks before the survey is intended to be undertaken. A separate application should be made to the appropriate Marine Office on each individual occasion on which an owner wishes to offer an IWS in place of a survey in dry dock. The application, together with any relevant comments and recommendations based on these notes and appendices and the known history of the ship, should be submitted to the Surveyor in Charge for consideration. The application is to be accompanied by the payment of a deposit equal to the estimate of fees and expenses likely to be incurred, and give: –

- a. The date and venue,
- b. A schedule of the detailed proposal for undertaking the IWS, and
- c. A signed statement from the owners confirming that the vessel has not knowingly suffered any grounding or contact below the waterline since the last inspection, or provide details of the nature of any contact confirming that there is no known damage.
- d. An undertaking that the vessel will be dry docked if necessary following survey, within 3 months, or sooner if considered necessary.

The proposed time scheduled for the survey must allow for all reasonable eventualities with a view to enable an efficient survey to be conducted. Past experience has shown that it is prudent to plan for a follow-up venue so that, in the event of any delays occurring, the manpower and equipment assembled can be efficiently utilized.

Consideration for IWS will not be extended to ships which have been issued with short-term certificates or extensions due to reasons of condition of the vessel.

Where any ship proposed for IWS has unusual operational features, such as; multi-berthing, services in shallow water and/or narrow channels, hard usage due to loading and/or unloading procedures, regular high stressing of structure due to conditions of loading and/or weather conditions, etc, the MCA should be provided with all the relevant information.

For surveys to be conducted by the relevant certifying authority on behalf of the UK, equivalent arrangements should be applied.

With reference to questions relating to application of this guidance to particular vessels, contact should be made to the local Marine Office of the Maritime and Coastguard Agency.

##### PASSENGER SHIP

For surveys carried out by the Classification Society, a declaration of satisfactory survey will need to be sent to the MCA prior to the issue of the Passenger Certificate.

##### CARGO SHIP

A condition of acceptance of an IWS is that the vessel is surveyed in dry dock at least once in each five-year period. The dry-dock inspection should coincide (within 15<sup>3</sup> months) with the renewal survey required for Safety Construction or Load Line (i.e. Special Survey for classed vessels). The intermediate bottom inspection in the same five-year period may be carried out in the water, subject to taking account of these guidance notes.

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<sup>3</sup> 15 months = 12 months + 3 months for annual survey flexibility.

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## APPENDIX A

### PREPARATIONS IN A DRY DOCK IN ANTICIPATION OF A SUBSEQUENT APPLICATION FOR IWS

1. The hull is to be fitted with an approved/acceptable cathodic protection system which has been proven and all anodes/components shall be renewed and/or checked for effectiveness
2. The ship will not be considered suitable unless the hull is in a satisfactory condition (e.g. shot blasted and painted with suitable high quality paint or be in equivalent good condition). The certifying authority should agree that the vessel is suitable for IWS.
3. In preparation for the extended period between dry docking, measures should be taken such as renewal and/or recording of clearance of rudder bearings and bushes, shaft surveys, overhaul of ship's side valves etc to take account of the maximum time allowed before the next scheduled dry docking survey. Particular attention should be given to areas, which will be inaccessible to divers at the IWS, e.g. stabilizer boxes, sea inlet boxes, discharges etc. Repairs and surveys of such fittings should be suitably advanced in view of the extended period scheduled. Shell openings with gratings should be provided with hinged grid plates. The schedule for the progressive survey of hull fitting and tank testing should be adjusted appropriately for this same reason.
4. The colour of the paint on the underwater hull can be chosen by the owner to provide the optimum contrast with the underwater environment, noting that some paints will assist inspection by divers and others will not.
5. To facilitate an efficient survey it is recommended that the underwater hull and fittings are permanently and clearly marked externally (bead welding where appropriate) to identify and where appropriate indicate the positions and extent of:
  - a. Transverse and longitudinal bulkheads, including tanks boundaries (longitudinal frame markings at regular intervals, e.g. every 5m);
  - b. Decks and flats (below the waterline);
  - c. Opening in shell plating for suction and discharge valves, docking plugs, thruster units, stabilizer fins etc ;
  - d. Propeller blades, which it is suggested should be numbered; and
  - e. Liners on shafts and bushes of rudder and stern frames; these should be marked in such a manner that any relative movements can be detected underwater.
6. Folders containing the following information should be prepared for recording and future reference (copy for the owners/on board ship and one copy to the MCA).
  - A. A shell expansion drawing showing both sides of the vessel, the following information needs to be shown and kept up-to-date as surveys are undertaken.
    - a. External hull markings as required in Para 5 above;
    - b. Bilge keels;
    - c. Drain plugs (coding may be useful, such as square for water, hexagonal for oil etc);
    - d. All shell openings and means of access e.g. bolted plates, gratings, "opening";
    - e. Existing hull damage and/or blemishes;
    - f. The extent of any hull repairs effected;

B. Specific plan and data detailing (as relevant):

- a. rudder, stock, stern frame and associated fittings;
- b. Propeller(s), rope guard(s) and identification markings (e.g. liner datum marks);
- c. Spectacle/'A' frames, bossings, any other attachments to the hull;
- d. Stabilizer fin boxes, bow thruster(s);
- e. Agreed method of blanking off any shell openings for the safety of divers for the purpose of service and/or survey (carrying customised blanks is recommended);
- f. Any other items which might be considered to be a feature for which details would be useful in the context of undertaking an IWS. Photographic records of particular features taken at the time of dry-docking are useful for future reference.

7. The master must keep a continuous recording of all actual and suspected damages and/or contact during the period from the dry-docking to the in-water survey itself.

## APPENDIX B

### REQUIREMENTS FOR PROPOSED IN-WATER SURVEY

1. The proposed survey site is to be in a protected position with calm water, weak tidal streams and currents (less than 0.5 knot), which normally provide good underwater visibility. A light sandy or rocky bottom can assist visibility. There must be an adequate depth of water below the ship's keel. As far as possible the site should be in an area where there are unlikely to be any other ship movements during the survey. Sand and other sediments can be easily disturbed and reduce visibility. The MCA or certifying authority may be contacted for guidance on locations which are likely to be suitable. Sometimes even the best areas can turn out to be poor on a particular day because of local weather or other conditions.
2. It is preferable that the ship is at anchor for IWS but if the proposal is that she should be alongside then there should be sufficient clearance from the quay using adequate fenders to allow, suitable and safe access for divers around the hull. Penetration of natural light through the water and the movement and attendance of a survey tender, if used should be considered.
3. It is essential that the company, which is to undertake the IWS, is fully experienced in this type of work and can provide suitable diving personnel and equipment. The surveyor and where appropriate, the relevant classification society should recognize the company as competent. Where the company is not known to the certifying authority, full details of their qualifications and experience and any flag state or classification society approval should be submitted for consideration.
4. The equipment and procedure for observing and reporting the survey should be discussed with the parties involved prior to the IWS, and suitable time should be allowed to permit all equipment to be tested beforehand.
5. An experienced diving team with sufficient relief and safety divers should be employed. In the UK, the Health and Safety Diving at Work Regulations (DWR) and the associated Approved Code of Practice for Commercial Diving Projects Inland/Inshore will need to be followed (e.g. minimum 4 divers). For surveys overseas, equivalent safety provisions should be applied.
6. The latest proven techniques and equipment for colour television-scanning, videos and still photography recording should be used. Spare backup equipment should be available to ensure that an uninterrupted survey can be carried out. For ships having large flatter bottoms, experience has shown that hand held cameras and lights may not always give satisfactory results. In such cases improved viewing may be obtained using lighting and cameras mounted on an underwater "trolley" which can be manoeuvred over the bottom of the hull.
7. The owner should arrange for checks to be made to ensure the hull is free of fouling immediately before the proposed date of the IWS. When considered necessary, the hull should be effectively cleaned well in advance of the IWS so as to prevent the visibility of the water being adversely affected by the cleaning procedure.
8. Records shall be maintained of oil usage for propeller shaft seals, thrusters and azimuth propellers to indicate the condition of the seals. On shafts with agreed long intervals of inspection (e.g. more than 5 years), condition monitoring is required which should be in accordance with classification society rules and normally includes keeping records of regular oil analysis and temperature of bearings. These should be available for inspection.
9. The ship should be at a suitable draught and trim to facilitate the IWS.
10. The rudder, propeller and fittings may be above the water in ballast condition on large vessels and the trim of the ship should be arranged to give the best results for the survey. For example, it may be better to have the propeller submerged so that the diver has full access. Arrangements for turning the propeller may be required, but account must be taken of diver safety and the use of the permit to work system.

11. The master should provide a written and signed declaration of all suspected or actual hull damage and all contacts made by the vessel in the period since the previous dry dock. Note that the owner is required to confirm that no contact damage has occurred at the time of application.
12. Time and facilities must be provided to permit survey of the hull at and above the water line in conjunction with the undertaking of the underwater IWS. Consideration must be given to the duration of daylight hours.



## APPENDIX C

### PROCEDURES WHEN UNDERTAKING AN IN-WATER SURVEY

1. A meeting should be held before the IWS is to be carried out to co-ordinate the various participants (i.e. owner 's superintendent, deck and engineer officers of the ship, diving and survey personnel), to review and agree all aspects of the survey and adopt a final survey schedule. The responsibilities for the control and supervision of the survey, including arrangements for locking the propellers, rudders and thrusters, the stopping of all pumps and the provision of effective communication should be clearly assigned. This is not the role or responsibility of the surveyor, who is there to witness the results of the survey and request examination of particular areas. A Permit to Work System should be used to ensure the safety of divers and other personnel. This should include informing relevant ships staff and port authorities. However, where the surveyor considers the practice to be unsafe they should refuse to take part. The primary aim being to provide safe and effective conditions for the divers and a successful survey.
2. The programme agreed for the IWS should ensure that necessary priority is given to the examination of the major hull penetrations, shafting, rudder, stabilizers, bow thrusters, any suspected contact/damage, etc, in the best available conditions.
3. Ideally the survey should be conducted in a manner permitting the sighting of the forward and after ends of the hull towards midship in order that the shape of the hull can be sighted against the surrounding water. The amount of hog/sag should be recorded using draught marks or loading computer.
4. The survey of large areas of flat of bottom can prove difficult due to light and sight problems and advice must be taken from the senior diver as to the best procedure to be adopted.
5. When actual or suspected contacts have been recorded by the master, the surveyor should make an internal examination of the hull, if access is possible, either immediately before or after the IWS. In this respect attention must be given to the hazards associated with entering ship's tanks.
6. The survey should not be commenced unless the surveyor is satisfied with the visibility, scale effects due to using closed circuit TV and detail provided by the underwater cameras on site. The survey must be discontinued if the conditions or equipment deteriorate to the extent that the transmitted pictures and/or communications are no longer acceptable.
7. Visibility and scale checks should be undertaken at intervals during the survey. Visibility must be to the surveyors satisfaction, but if generally below 5 metres surveys should be discontinued.
8. It is essential that the entire hull and associated fittings are surveyed in order to accept the in-water survey in lieu of a survey in dry dock.
9. The out-of-water portion of the hull should be surveyed in conjunction with the IWS.
10. Caution should be taken not to underestimate defects observed externally during IWS. Where a defect/damage is detected or suspected as a result of the IWS, the internal structure should be examined as considered necessary and practical to clarify or confirm the findings. This examination will provide a basis for a decision regarding the need for either a temporary repair afloat or an earlier dry-docking to permit a permanent repair.
11. All findings and proposed actions should be agreed with the owner's representative at the time of survey and should be recorded for reference and correlation at the next dry-docking of the ship. Suitable records include videotapes, still photographs, notes and annotation of relevant plans referred to in Appendix A. The diving company must provide a diver's report, cross-referenced to the video and/or still photographs and plans.
12. Only when the surveyor is fully satisfied with the methods of undertaking the survey together with the recordings and any agreement with the owners as regards the findings and proposed future action, should the survey be considered as complete.

## APPENDIX D

### ACTION FOLLOWING THE IWS, INCLUDING RECORDS

1. The owners are required to submit, through the surveyor who witnessed the IWS, the report of the diving company and copies of any associated still photographs. Video records should be held by the owners and diving company and be available to the surveyor if required for reference and/or correlation at the next dry-docking. The surveyor should acknowledge receipt of the report adding his comments in writing as relevant.
2. The surveyor should advise the owners in writing of any action necessary on their part as a result of the findings of the survey, as agreed with their representative at the time of the IWS.
3. The surveyor should place the documents associated with the IWS with the MCA copy of annotated plans, on the CM 33/01 file for passenger ships or the CM 15/03 file for cargo ships surveyed by MCA, together with covering minute confirming the results of the survey. For surveys carried out by a Classification Society surveyor on a passenger ship on behalf of MCA, a copy of their declaration of satisfactory survey should be placed on file.
4. The IWS records should subsequently be compared with the survey undertaken at the next dry docking so that findings may be correlated. Confirmation or otherwise that the hull surface condition is still suitable for subsequent IWS's should be placed on file.
5. The IWS information is to be updated for each survey with continuous records kept for future reference.
6. Unless specifically directed otherwise by the surveyor, the diver should report on; the condition of the hull plating, weld seams, corrosion, distortion, any indentations, cracks, fractures or similar defects. The report should include the condition of the paint and the examination should include all hull openings, sea chests, stabiliser boxes, thruster tunnels and any special features. A report of the condition of propellers (including blades), liners, seals, rudders, bearings and any holding arrangements (bolts etc) should be included.

## APPENDIX E

### SPECIAL ARRANGEMENTS FOR DOMESTIC PASSENGER SHIPS

#### 1. Background

Difficulties have been experienced by some owners in trying to make arrangements for out of water surveys, particularly around the Thames because of the reduction in the number of dry docks and slipways. Following discussions with MCA HQ a system of biennial surveys was introduced on a trial period.

There was a request from the Domestic Passenger Ship Steering Group that this should be a national policy which this document now takes forward. Surveyors have also requested the policy be extended to all passenger vessels and align more closely with that accepted for Class I and II vessels (ie now two inspections in five years instead of biennial surveys). This advice does not apply to passenger ships which go to sea, which should in general comply with the main requirements of this notice as far as reasonable and practical to the surveyors satisfaction. (i.e. This Appendix only applies to passenger ships of UK Class IV and V).

#### 2. Arrangements

Owners must apply in writing to their local MCA Marine Office, and should prepare for survey.

Annual surveys for the renewal of the passenger certificate are still required.

Passenger ships shall be subject to inspections of the ship's bottom out of the water:

- (i) at least two inspections within any five year period,
- (ii) at intervals not exceeding 36 months, and
- (iii) at any other time whenever the surveyor is not satisfied, by examination in the water, that the vessel remains in good condition, and in particular where the criteria below are not met.

The condition for acceptance of the extended interval between out-of-water surveys is that the hull has been thoroughly surveyed and found to be in good condition. Surveyors must be satisfied that the condition is suitable for the recommendation of the extended period.

#### 3. The criteria for survey and acceptance:

Subject to the requirements in paragraph 2 above, annual surveys may be carried out in the water, subject to;

- (i) Larger vessels (over 24m) not restricted to category A, B and C waters, must be inspected by divers<sup>4</sup> to ensure there is no damage to the bottom, propeller or rudder and to confirm sea inlet grids and paintwork are still in good condition. The visibility must be to the satisfaction of the attending surveyor, but it is recognised that the choice of location may result in less visibility than acceptable for other international trading vessels. In addition;
  - (a) There shall be in effect an agreed programme of survey on integral tanks covering the entire vessel at least once in five years, and;
  - (b) There is a complete examination of other hull spaces, and;
  - (c) There is written confirmation from the owner/skipper that to his knowledge the vessel has suffered no hull or grounding damage.

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<sup>4</sup> Health and Safety Diving at Work Regulations (DWR) and associated Approved Code of Practice must be complied with (e.g. minimum 4 divers).

The internal examination must show no signs of damage to the hull, which could cause loss of watertight integrity or weakness to the internal structure.

- (ii) Other vessels do not require an underwater survey, provided that the other requirements in (i) above are met;
- (iii) Vessels over 20 years of age built of wood or steel will not normally be considered for in-water surveys, unless the original scantlings were in excess of present day standards and the condition of the vessel has been maintained to a high standard.
- (iv) Vessels which frequently suffer bottom damage (e.g. ro-ro vessels which use a ramp rather than a link-span by being driven hard and repeatedly up on to concrete ramps). These vessels should not be considered for either an extended period between slipping or in-water surveys i.e. out of water hull survey should be required each year.

#### **4. Factors that should be taken into account when assessing the condition:**

- (a) Number, location and quality of any repairs.
- (b) Steel vessels – ultrasonic readings should be taken at least once every five years. Thicknesses should be within acceptable limits having regard to the extended survey interval and to the satisfaction of the attending surveyor.
- (c) Wooden vessels – evidence of the onset of timber rot or softening or evidence of the reducing effectiveness of fastenings. The condition of caulking.
- (d) GRP vessels – evidence of operational damage, crazing or osmosis.
- (e) Shafting and bearings – evidence of weeping, wear or pitting.
- (f) Paintwork – good condition and of a satisfactory specification for the extended survey interval.

Subject to compliance with the criteria in paragraph 3 above, where vessels are maintained in class with one of the UK authorised classification societies, that may be accepted as equivalent arrangements. The owner will need to provide a declaration from the classification society that the hull and machinery are satisfactory on an annual basis in the same way as for other larger vessels.

#### **5. Declaration**

Surveyors must make a formal recommendation on the survey declaration that they consider the vessel is considered suitable for an extended period between out of water surveys. This should be submitted to the Surveyor in Charge for approval.