Common Deficiencies Found During Marine Safety Inspections on Large and Small Fishing Vessels

Under Water Hull Inspections

1. Shell Plate Doublers

    - Doubler plates are the preferred method of temporary hull repair for shell plate corrosion due to the reduced cost versus inserting new plate. Fishing vessels have the additional problem of fish hold insulation that must be cut back and removed in way of corrosion/damage when making permanent repairs with welded inserts
    - Doublers used to cover corroded or holed shell plating impart little strength to the hull structure, and only provide local water tightness
    - Doublers used to cover damaged shell plating impart little strength to the shell plating
    - Small doublers can be an effective method of sealing such things as box keels that have been used for cooling water services and where sea water in the bilge has created small holes on the inside of the keel. Inserting these types of areas is usually cost prohibitive and the use of small doublers (patches) do not affect the structural integrity of he hull
    - Compensation rings etc around shell openings should not be confused with doublers
    - Increased plate scantlings in way of machinery seats should not be confused with doublers
    - Ground bars in way of bilge keels should not be confused with doublers
    - More info on shell plate doublers can be found at the following locations
    - http://www.shipstructure.org/pdf/443.pdf
    - Section 6.3 of http://www.iacs.org.uk/document/public/Publications/Guidelines_and_recommendations/PDF/REC_47_pdf193.pdf
    - While a doubler may be considered a permanent repair, many factors need to be considered and addressed

2. Grounding Plate

    - The grounding plate fitted to the underwater hull is intended to provide a path for electrical current to flow into the sea from a lightning strike.
    - Should a robust path not be provided for this dissipation of electrical energy, then serious personal injury, or death may occur. Without adequate protection, the antenna's associated with communication equipment often become the path to ground, effectively destroying the equipment and putting those nearby the equipment at risk – Sections 23 and 53 of TP 127

3. Stainless Steel Fastenings on Palm Bolts and Pintles

    - Steering gear torque is transmitted to the rudder through the rudder stock and palm (flange between rudder stock and rudder). The clamping of the palm by the palm bolts is important, as the torque applied is transferred through this clamp fit, and not on the shear strength of the fasteners. In order to obtain a satisfactory clamping force, the fasteners (cap screws) are required to be placed under considerable tension. On vessels of steel, fiberglass or wood construction, stainless steel fasteners should be avoided, as their tensile strength is low when compared to a Grade 8 steel fastener. On aluminum vessels where corrosion issues could result from using steel fasteners, care must be taken to ensure that

the stainless fasteners are not overtorqued and stretched, leaving the palm clamp fit compromised

Engine Rooms and Steering Compartments

4. Watertight Integrity – Bulkhead Penetrations

    - In order for a fishing vessel to withstand flooding of any one compartment, it is important that there is no communication between other compartments, and the flooding remains confined to the one space. Bulkheads are required to be robust, and capable of withstanding the head pressure of water up to the main deck. Penetrations (pipe work, electrical cables, etc) through the bulkheads need to be executed correctly, and watertight integrity maintained using good shipbuilding practice
    - Examples of these types of spaces include engine room, engine room/tunnel, steering compartment, forepeak etc.
    - Reference to the stability book (if available) will identify the spaces on the vessel which are critical in maintaining seaworthiness

5. Main and Auxiliary Engines Cannot be Stopped Outside the Engine Room (fire)

    - The propulsion engines on large and small fishing vessels (SFV's after June 1, 1974) are required to be capable of being stopped from outside the machinery space, without using the fuel shut-offs located on the fuel tanks. This requirement is based on the premise that the engine room is generally unmanned, and, should the fire detection system detect a fire in the engine room, then the machinery can be stopped without entering the space.
    - Smothering systems (CO2 and Halon) are the most effective when all machinery as been stopped, since a running engine acts as an air pump, to both pull fresh air into the space and discharge partial amounts of the smothering agent out the exhaust pipe – SFVIR Sec.14 and LFVIR Sec.10

6. Emergency Steering and Emergency Steering Hydraulic Bypass Valve

    - Should the hydraulic oil system associated with the steering system lose all its oil (broken pipe, blown hose, etc), the emergency tiller, chain falls or other arrangement will not be able to turn the rudder stock unless the two sides of the actuating cylinders are hydraulically communicated with each other. A valve is required to be opened allowing the remaining hydraulic oil to flow freely back and forth as the rudder stock is turned with the emergency gear
    - The hydraulic bypass valve is often hidden from view, or installed under deck plates, which requires time to access. The bypass valve requires marking as to its function and operation

7. Exposed Exhaust Manifolds, Turbochargers and Exhaust Piping

    - Manifolds, turbochargers and exhaust piping requires adequate lagging to prevent burn injuries to personnel and protection against fire from spraying fuel or oil, and proximity to combustible materials, i.e. wood and fiberglass
    - In many cases, the exhaust manifold and turbocharger hot housings are water cooled and do not require lagging, however the exhaust piping does – SFVIR Sec.13 (4) and LFVIR Sec.13 (5)

8. Exposed Battery Terminals and Lack of Battery Isolation Switches

- Fires and explosions from improper battery handling and storage are well documented
- Exposed battery terminals present a risk from conductive materials (wrenches, screwdrivers etc) accidentally falling on the battery terminals, creating a dead short. Excessive current flow and sparking can cause fire or explosion of the hydrogen gases which result from charging the battery
- Battery isolation switches are required to isolate the batteries' energy should the feeder cables to the distribution centers become damaged, or develop a short circuit. They also provide a means of isolating the battery in an emergency, such as a cranking motor for starting an engine, where the actuating solenoid becomes permanently closed, and does not allow the starter to dis-engage once the engine starts. Should an isolation switch not be fitted, the cranking motor is likely to catch fire, if left energized for any amount of time
- Battery switches should be mounted as close as possible to the battery being served, and easily accessible to personnel – TP 127 Sections 19,51and 55

9. General Housekeeping of Machinery Spaces

- Fire prevention aboard any vessel starts with housekeeping. Machinery spaces are often seen as untidy, with many combustible materials unstowed and in close proximity to high heat sources. Oily rags and cardboard are the subject of many documented engine room fires. Miscellaneous parts and other objects not properly stowed create tripping and falling hazards to personnel.
- A clean, tidy engine room is generally a safe engine room. Machinery problems are much easier to identify, and react to, when equipment is kept wiped down and clean

REMEMBER – THE BEST FIRE AT SEA IS NO FIRE AT ALL – PLEASE BE DILIGENT

Deck

10. Correct Operation of Fixed CO2 and Halon Smothering System

- Fixed fire fighting smothering equipment is controlled from outside the space in which it protects. It is often noted that signage indicating the procedure to follow when discharging the system is missing. Most importantly, should the system be discharged before confirming that all personnel are accounted for and not in the affected space, death will likely result
- These procedures include not only accounting for personnel, but as well shutting off the fuel supply at the service tanks, closing all supply and exhaust air dampers and flaps, stopping ventilation, stopping fuel transfer pumps and purifiers, stopping the machinery etc
- Since smothering agents are stored under high pressure, cylinders should be checked regularly for signs of damage or corrosion, and that actuating gear is clear, unobstructed and ready for use when at sea

11. Deck Scuppers (freeing ports) Seized, Blocked or Disabled

- Many fishing vessel accidents have been linked to water on deck, unable to quickly and effectively drain. Freeing ports are an important safety feature on all vessels, and their operation is crucial in maintaining stability. Large amounts of water held captive on deck present a considerable free surface while raising the vessel's center of gravity – SFVIR Sec.29.1 and LFVIR – Sec. 23

12. Storm Shutters

- Fishing vessels that are certified to travel more than 20 nautical miles from shore require a means of preventing water from entering the hull through a broken window or port light. Often the securing arrangements for the shutters are corroded, broken or missing. Most often the shutters are not marked as to their location, during an emergency in heavy weather is not the time to be trying to figure out which shutter goes where. - SFVIR Sec.27 and LFVIR Sec.22

13. Means of Securing and Sealing Hatch Covers

- Often it is observed that hatch covers are not fitted with an effective means of being battened down and made watertight, or the hardware required is not readily available for use – SFVIR Sec.23 and LFVIR Sec.20

14. Fuel Tank Vents and Flame Traps

- Fuel and oil tanks require the end of the vent pipe to be turned down 180 degrees to prevent sea or rain water from entering the tank. The vents are to be led high enough off the main to preclude sea water from entering during heavy weather. Many documented cases exist whereby the machinery was rendered inoperable from water contaminating the fuel, via faulty vent pipes. Care also needs to be taken where the tank vents penetrate the main deck, heavy corrosion often takes place on the back side of the pipe, where it is difficult to maintain due to being close to the house works, bulwarks, etc. Water ingress can often take place in these areas. Many companies fit stainless steel vent pipes, or heavy wall steel pipe in way of the deck penetration for this reason
- Fuel tank vents also require the open end to be covered with wire gauze. The purpose of the wire gauze, or flame screen, is to cool a fire's flame front and prevent the fire from igniting the vapour contents in the tank, which may lead to an explosion. The flame screens are often missing or damaged. It is very important that the flame screen is securely fastened to the end of the pipe and covers the open end entirely – SFVIR Sec.10 and LFVIR Sec.15

15. Rigging - Worn Components, Preventers and Safeties Not Used

- Standing and running rigging components such as shackles, blocks, pad eyes, goosenecks and safety preventers etc are often found neglected. Fishermen are advised where applicable to drop the booms to the deck and have a close inspection of the various connection points. On boats using trolling poles and or stabilizers the poles should be lowered and a close look at the various connections and line condition, particularly the bitter end on two part halyards. Mast connections should also be examined regularly.
- In cases where the running wire rigging has excessive jaggers, replacement is necessary to have adequate strength and the obvious risks from injury

Life Saving Equipment

16. EPRIB Stowage, Batteries and Registry

- EPIRB stowage is often observed to be such that in the case of float free units (those with hydrostatic release) overhangs of wheelhouse tops, rigging or other equipment may well prevent the unit from floating free from the ship
- All EPIRBS must be available for immediate use
- Batteries are to be renewed by an authorized service center before their expiry date indicated on the unit. Hydrostatic release units (HRU) also require renewal before their expiry date as indicated on the HRU
- EPIRBS must be registered in the National Search and Rescue Registry to be effective Tel 1-800-727-9414
- More information on the carriage of EPIRBS – SSRR Sec.13

17. Incorrect Storage of Life Rafts

- The location of the life raft(s) is critical in ensuring its float free feature. When the raft(s) is stowed under booms, masts and other gear, it is very likely that it may hang up if the vessel sinks, and not float to the surface as intended. Owners are urged to consider this point when deciding on the raft's location. Bearing this in mind, it is also necessary to ensure that the raft can still be launched manually from whatever location is chosen. As per EPIRB's, HRU's have an expiry date marked on the unit, and require renewal before that date.
- Life rafts can be arranged to float free using either a HRU, which releases the securing straps, or deep chock cradles whereby the raft is not rigidly secured, yet the cradle ensures that the raft remains secure during heavy weather. Both systems employ a "weak link" between the end of the life raft painter and a strong point on board. In the case of a HRU, the weak link is generally the lower portion of the release assembly and is marked as such. When an HRU is not used, a short piece of small line (usually red) is supplied with the raft, and is to be fitted between the end of the painter and the ship. While this may seem like a simple detail, it is often observed to be incorrectly assembled. All fishermen are urged to have a quick check that this vital piece of lifesaving equipment is ready for dependable use at any time
- Depending on the type of life raft, shipping straps may require removal after the raft is landed aboard and secured in its cradle. Straps that are meant to be left in place are usually marked with a diagram of a pair of scissors with a line through them, indicating do not cut. If in any doubt regarding the status of the shipping straps, owners are advised to contact the life raft service station for clarification

18. Line and Light on the same Life Ring

- Depending on vessel size, up to four life rings are required. In all cases, one half of the required number of life rings are to be fitted with 27m of buoyant line, while the other half are to be equipped with self igniting lights. In a number of cases, it is observed that the life ring with the line is also fitted with a light, which is incorrect. The intention behind this requirement is that if a person goes overboard, the ring with the light is used to mark the location at night, and the highly visible life ring by day. The ring with the line is intended to be thrown to the person and brought back to the ship by the use of the line. – SFVIR Sec.30 and LFVIR Sec. 24

19. Expired Batteries on Immersion Suit Lights

- Large fishing vessels require by Regulation to carry one approved immersion suit for each person on board. While the Small Fishing Vessel Inspection Regulations does not require immersion suits for the crew, a large majority of fishermen have taken the initiative to pack immersion suits on the smaller boats.
- Fishermen are reminded to check the expiry date of the battery for the light, as it is often found expired. Often, the date is in very small print and difficult to see, in these cases the use of a Sharpy or similar permanent marker to write the date on the battery is advisable.
- Regular drills and practice will make the use of the immersion suits easy. During drills and donning of the suits check to make sure that the zipper moves freely and the rest of the suit is in good condition

20. Emergency Response Drills, Donning of Immersion Suits etc

- Large Fishing Vessels require monthly Fire and Boat Drills as per the Fire and Boat Drills Regulations. This regulation requires the Master to develop a Muster List, a document that describes the specific duties of each crew member during an emergency. Drills witnessed by Inspectors have been noted as unorganized, with a general lack of emergency awareness, including the donning of immersion suits. Drills are just that, they serve as a chance for the crew to act as if a real emergency was taking place, and learn from the outcome. This approach makes the crew far more effective when a real emergency presents itself.
- While Small Fishing Vessels have no requirements for a formal drill structure, the safety culture that comes from them makes it highly advisable for these vessels to have a plan and rehearse that plan. Inspectors will ask Masters and crew how they would deal with certain situations, practice beforehand will make discussing the responses more beneficial.
- All Masters are reminded to log any drills in the Bridge of Drill log, as this indicates that drills were being performed in the prescribed time frames. - F&B Drills Regulations

21. Modifications Carried out which may have an Adverse Effect on Stability

- Modifications to a fishing vessel may have a considerable impact on the vessel's stability and sea keeping ability. Different gear types and fisheries are often undertaken well after the vessel was built as intended for a specific fishery. The effect of these modifications is well documented, and a number of vessels and lives have been lost.
- Fishing vessel owners are strongly urged to consider an stability assessment, particularly for those vessels that have been modified for different gear types and fisheries. Should an owner decide to employ a naval architect or other individual to assess his vessel's stability characteristics, it is advisable to request that whatever report is produced, can provide the Master with useful, easily understood information
- Small fishing vessels built after 1977 catching herring or capelin, and those converted to catch herring or capelin, require to have on board an approved stability book. All large fishing vessels, regardless of fishery, require to have on board a similar book – SFVIR Sec.3 & 29 and LFVIR Sec.9

Wheelhouse

22. DSC Radio / MMSI Number / GPS Input

- Since August 2003 all fishing vessels larger than 8m in length were required to fit a VHF-DSC Radio, that operate outside of a Vessel Traffic Services zone in Home Trade IV waters.
- It is frequently found during inspection that an MMSI (Mobile Marine Service Identity) number has not been obtained from Industry Canada. This unique identity number provides search and rescue with up to date information regarding the vessel. The MMSI number needs to be programmed into the radio to provide the identification benefits of DSC. The MMSI number should also be displayed on the radio or in the wheelhouse near the radios
- In order for search and rescue agencies to accurately locate a vessel in distress in a timely manner, the vessel's GPS needs to communicate with the VHF-DSC Radio. In an emergency, when the distress button on your VHF-DSC is pressed, the ship's location obtained from the GPS is passed via Channel 70, to MCTS centers, providing up to date, real time rescue information
- Although most fishing vessels are now fitted with VHF-DSC, many are found with no MMSI programmed, nor is the input from the GPS receiver linked to the radio. Fishermen are advised to ensure that the radio installations are correct, its for your benefit – SSTR Sec.15 and SSB 04/2002

23. Charts and Publications are not Updated

- The Charts and Nautical Publications Regulations are found at: http://laws.justice.gc.ca/eng/SOR-95-149/index.html, and maintain that charts are to be kept updated through the Notices to Mariners, or the most recent edition of the particular chart. Many fishing vessels are observed to have very old charts, in some cases dating back to early 1970. Notices to Mariners can be downloaded from the Internet at http://www.notmar.gc.ca/go.php?doc=eng/services/2010-annual/table-of-contents. List of Lights, Bouys, and Fog Signal can also be downloaded at http://www.notmar.gc.ca/go.php?doc=eng/services/list/pacific-coast-2007
- Fishing vessels less than 100GRT are not required to comply with carrying the most up to date publications if the watch keeping officers have sufficient local knowledge of the area that navigation is not compromised
- Many fishermen are of the belief that their ECDIS (electronic charts) systems satisfy the chart carriage requirement. While this may be the case, most systems are not compliant. Further information on the requirements of a fully functioning (compliant) ECDIS can be found in the Charts and Nautical Publications Regulations.

24. Radio Inspection not Valid

- Fishing vessels over 20m in length require a Radio Inspection by CCG either on a quadrennial or annual basis, depending on the vessel's voyage limits. Problems with the radio equipment often show up during the inspection, which often won't show up in operation until an emergency presents itself. The Radio Inspectors are a great source of knowledge, and can help answer any questions that fishermen may have regarding their radio communications. – SSTR Sec.51

25. Navigation Lights / NUC Lights

- Navigation lights are fitted in accordance with the International Regulations for Preventing Collisions at Sea 1972, with Canadian modifications. The Rules concerning lights shall be complied with from sunset to sunrise, and during periods of restricted visibility.
- Note that Rule 26 applies to fishing vessels while engaged in fishing operations only, when the vessel is underway to and from the fishing grounds she is required to display the lights required for a vessel of her length
- Vessels over 15m are required by Rule 46 to have an alternate means of displaying the masthead, side, stern and anchor lights. Spare electric navigation lights or oil type fonts may provide this alternate means, if the vessel was built before 1991. Dual electric navigation lights, require the alternate (spare) lights to be fed from the emergency source of electrical power. These types of control also have feature where an audible signal alerts the operator that a light is burnt out
- Navigation lights are tested during safety inspections, please ensure that all fitted lights are operational – Collision Regulations - http://laws.justice.gc.ca/eng/C.R.C.-c.1416/index.html

Crew Certification

26. Expired Certificates of Competency

- Many fishermen obtained their Fishing Masters Certificates many years ago. Most are of the belief that the ticket is good for life and requires no further action such as renewal. While renewal was not actually undertaken under the previous Regulations, the fishermen were actually supposed to present evidence of sea time and at which time they would be issued a Continued Proficiency Endorsement.
- All Fishing Master Certificates now require renewal every five years
- All inspected fishing vessels over 15 GRT are now required to have on board a Minimum Safe Manning Document. This document lists the minimum crew complement along with the minimum qualifications of the crew to carry out the intended operation. Along with the deck officers, the document will lay out the certification and training requirements for Engineers and Deckhands. It is the Authorized Representative's (Owner's) legal obligation that the vessel is crewed in accordance with it's Minimum Safe Manning Document, under the Canada Shipping Act 2001
- To qualify for renewal, the candidate must provide evidence of at least one year of sea time in the last five years, or, 3 months in the past year.
- Much has been written and distributed in this regard, should you require any more information then please contact your nearest TC office or visit the Marine Personnel Regulations at http://laws.justice.gc.ca/eng/SOR-2007-115/index.html for more information.

27. Medical Certificates

In general, personnel listed in the Minimum Safe Manning Document and required to hold a certificate of competency, are also required to hold a valid Marine Medical Certificate (Two exemptions: holders of Certificate of Service as Master of a Fishing Vessel of Less Than 60 Gross Tonnage, and holders of Certificate of Service as Watchkeeping Mate of a Fishing Vessel of Less Than 100 Gross Tonnage). Marine medicals are valid for two years. Please contact your nearest Transport Canada office for guidance or visit the Marine Personnel Regulations – subsection 200. (7) and Division 8. at http//laws.justice.gc.ca/eng/SOR-2007-115.

Abbreviations:

SFVIR – Small Fishing Vessel Inspection Regulations
LFVIR – Large Fishing Vessel Inspection Regulations
TP 127 – Transport Publication – Ships Electrical Standards
SSRR – Ship Station Radio Regulations
SSTR – Ship Station Technical Regulations
SSB – Ship Safety Bulletins

All of these documents are available through the internet at:

http://www.tc.gc.ca/eng/marinesafety/menu.htm

or, through the Department of Justice (Acts and Regulations only) website at:

http://laws.justice.gc.ca/en/index.html