This Compendium contains the following Case Studies issued in year 2015:

1) Case Study 1/ 2015 “Main engine failure resulting in cruise cancellation”

2) Case Study 2/ 2015 “Pitting of fuel tank bulkhead leading to internal leakage of fuel into engine room”

3) Case Study 3/ 2015 “Port State detention in Australia”

4) Case Study 4/ 2015 “ME failure”

5) Case Study 5/ 2015 “Ballast water contamination”

6) Case Study 6/ 2015 “Grounding”

7) Case Study 7/ 2015 “Noise and vibrations”

CASE STUDY Nr. 1/ 2015 (17 Nov. 2014)
Main engine failure resulting in cruise cancellation

WHAT HAPPENED

A managed passenger ship – (two M.E.) - was berthed alongside, ready to start operation.
The standard procedure of both main engines starting was performed by engine department as normal routine.
After 1 minute from a main engine starting, the emergency shutdown was activated by hi temperature signal from sensor of a main bearing.
The Chief engineer carried out a crank case inspection to look for finding of damages of main bearing without carry out a visual inspection of bearing shell in subject to the alarm ; the result of the visual inspection of crank case was satisfactory- no findings .
The chief Engineer checked the temperature of bearing by infrared temperature sensor at a distance of about 1/1.5 mtr (from crank case opening), no hot spots were found. The surface analysed by temperature sensor was about 10-15 cm2.
A further functional check of all temperature sensors of main bearings was performed with no findings. It means the sensors were properly performing the temperature signal from own probes.
The Chief Engineer decided to start again the main engine considering to have carried out all necessary checks.
After 1 minute the emergency shutdown of the main engine in subject was activated again by the same temperature sensor of main bearing.
Afterword the inspection of main bearing was carried out by the Chief Engineer and damages on the lower upper shell of main bearing was found with damages in way of main crankshaft journal .
Consequences : ship disabled for 20 days ; cruise cancellation (up to 20 days) .

ROOT CAUSE/ CONTRIBUTORY FACTORS /

Human Error: failure to detect and understand critical information or significant information
An inadequate assessment by chief engineer of root causes of first activation of the emergency shutdown is to be highlighted.
Considering that the temperature sensors of main bearing were found in a satisfactory condition, the first emergency shutdown had to be considered as a real alarm due to high temperature of main bearing.
The Chief Engineer considered the first shut down due to a false alarm.
The Main bearing and journal inspection should have been performed after the first shut down.
The main bearing temperature check by the infrared sensor could not be considered accurate being a reading of an average temperature of a 10/15 cm2 surface. This device could not read a hot spot of +15/20C over the standard operating temperature of the main bearing (45-50 c). The chief engineer, underestimating the problem, had considered as accurate the check by infrared sensor.

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

The ship:

- Ship's Senior Management is recommended not to underestimate the activation of any alarm on board ; every alarm must be carefully investigated to identify causes and possible associated consequences . If necessary they should seek for support and assistance of the shore management

The Company

- This report will be circulated to all managed ships and relevant ship managers as case study / lesson to be learnt.

Procedures and guidelines

ISM Code : 10 – Maintenance of the ship and equipment

CASE STUDY Nr. 2/ 2015 (February 2015)

Pitting of fuel tank bulkhead leading to internal leakage of fuel into engine room.

WHAT HAPPENED

Following completion of bunkering operations a small fuel leak (about 5 litters) was found on stbd forward bottom bulkhead of the FO storage tank. Following cleaning, a small corroded area 50 x 40 mm with two holes of 2-3mm in diameter was identified. This corrosion appears it may have been previously contained by coating which may have recently failed allowing this leak.

ROUTE CAUSE/CONTRIBUTORY FACTORS

Breach of structural integrity – External Condition: Different temperature
Metal pitting. Probable cause of this local pitting/corrosion believed to be water condensation accumulation in corner of the bilge and this bulkhead of the fuel tank bulkhead caused by temperature differential of the fuel in the tank and seawater underneath the ship's hull. The fuel tanks are fitted with thermal oil coils to heat fuel stored in the tanks. (Photos of thermal oil heater coils and finished permanent repair (inserted).

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

During internal/external inspections of tanks, particular focus should be made on areas prone to regular exposure to excessive moisture caused by temperature differentials (such as heated fuel tanks) or other sources of moisture.
Areas of coating that appear suspect (i.e. cracked or bubbled) should be checked by descaling to identify evidence of corrosion beneath.
This report will be circulate to all managed vessels and relevant ship managers as case study/lesson learnt

REFERENCE

ISM CODE : 10 – MAINTENANCE OF THE SHIP AND EQUIPMENT

CASE STUDY Nr. 3/ 2015 (30 January 2015)

Port State detention in Australia

WHAT HAPPENED

Managed cruise ship detained by AMSA in Sydney in occasion of a PSC inspection , due to the following **detainable deficiencies** (Code 30) :

1. **Engine Room fire dampers VM No. 1 – 2 defective – (07115 Fire dampers - Solas 74 ChII-2/R14)**
2. **Fire-fighting sprinkler pump delivery pipe holed - (07109 Fixed FF equipment and appliances - Solas 74ChII-2/R14)**

Other 5 deficiencies were issued in relation to :

3. Receipt of marine safety Information not set up on ECG Radio Communications (05110 -Facilities for reception of marine safety information)
4. Unable to demonstrate the receipt of acknowledge of MF/HF DSC test call from RCC Canberra (05116 - Radio Communication :Operation/maintenance)
5. Boiler gauge glass No. 1 steam and water (13100 Leakage Propulsion and Aux machinery)
6. Emergency generator room dry powder DD extinguisher hose damaged (07110 FF equipment and appliances) :

An additional deficiency issued under the ISM Code :

7. Vessel's SMS does not ensure effective maintenance of ship and equipment as evident by deficiency # 1 and # 2 above (code 15109 - Maintenance of the ship and equipment)

The ISM deficiency was issued due to several deficiencies related to one particular area that may have indicated to the PSC Officers , that the SMS itself has failed in some way (deficiencies have resulted by operations not adequately covered by the SMS or the SMS covering these issues was not effectively implemented on board)

All deficiencies were corrected before ship's departure; no delay on scheduled itinerary.
Further to the PSC detention, a Class occasional survey was carried out at the next port of call.

Consequences :

A. additional internal ISM audit scheduled in 3 months (imposed by the Flag Administration) ;
B. negative impact on Company and ship PSC records: the ship is now categorised as High Risk Ship in the APCIS (Asia-Pacific Computerized Information System) ; each ISM deficiency weighted +5, as in Paris MOU, when calculating company performance ;
C. negative impact on the cruise operator reputation

ROOT CAUSE/ CONTRIBUTORY FACTORS

- Lack of preparedness on board in view of the PSC inspection which could reasonably have been expected in an Australian port: a recent Flag technical alert "Port State Control Inspections in Australia" dated 9 Jan 2015 was sent on board highlighting the areas of concerns and the risks for passenger ships.
  Furthermore the AMSA website provide very clear indications about all critical items subject to verification by PSC Officers , such as :

  - *Defects noted with the fire pump, fire hoses, isolating valves or the fire main in general are all grounds for detention*
  - *AMSA Inspectors will routinely request for a test of the GMDSS installation. This aspect accounts for around 12% of all detentions.*
  - *During a PSC inspection AMSA Inspectors may request that any damper closure is demonstrated and any failure of a damper to close the aperture is regarded as being grounds for detention*.

- Failure to detect critical situations and potential consequences: as according to the above mentioned Flag tech alert *"some detentions were imposed under the ISM Code, owing to the cumulative effect of a number of non-detainable deficiencies being identified during the inspection".*

- Shipboard organizational management failure: it appears that the consequence of the inspection may have been underestimated by the Ship Command as the assistance provided to the PSC Officers was not consistent and effective for the entire duration of the inspection.

- Lack of supervision : the responsible ship Officer/s failed to verify the effectiveness of Radio equipment functional tests and the critical fire-fighting equipment (engine dampers and Sprinkler system):
  A printout of the GMDSS tests and records were not available for each day; the most recent one was relevant to 5 or 6 days before, too far away for the PSC Officer to confirm that the test was regularly done. Furthermore the first coastal station contacted by the ship for the test failed to acknowledge the call.

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

The ship:

- Senior Officers are reminded that all PSC inspections require **ALWAYS** maximum attention, supervision and on-scene assistance to PSC inspectors until completion of the inspection.
- Deck Officers are reminded to verify, as OOW, that the Radio Equipment functional tests are effectively carried out by the responsible person on board and that each test is duly recorded in the appropriate Radio/GMDSS Log.
- Ships command is reminded that periodical maintenance of critical FF equipment consist of three key operations: 1.Inspection, 2.Maintenance, 3.Test.
- Engine crew, Officers and ratings are reminded to always report to the CE any defect or failure, even if minor, noticed during the routine rounds in engine spaces, even those that are considered normal wear and tear for the ship type and age.
- Periodical pipelines investigation and close-up inspection of all systems (priority to FF and safety systems), keeping records of relevant maintenance/repair/replacement. The Company should be promptly advised in case external assistance will be required (specialists investigation or testing by UTM, eddy current tests, endoscope inspections, X –rays).

The Company

- To consider the implementation on board of Company Dry-Dock pre-inspections in order to prevent potential / latent technical conditions that may further develop in substandard conditions, and to add these items in the DD tech specs. (i.e. Fire dampers and flaps bolts should be inspected and changed if necessary; inspection of FF main line, SPK line, bilge and ballast systems).
- To consider the possible upgrading of multi-blade dampers with open / close indicators in order to provide a true representation of the damper's position on the synoptic panels .
- This case study will be circulated to all Company's managers and shipboard commands with the scope of highlighting and sharing lesson learnt and to increase safety awareness, on board and ashore.

REFERENCE

- ISM Code : 10 – Maintenance of the ship and equipment
- BMA Tech. Alert No.15-02 Port State Control in Australia

- Appendix :
    1. Internal investigation about defective Engine Room FD VM nr. 1 – 2
    2. Guidelines on maintenance of the ER fire dampers
    3. AMSA Marine Notice 03/2015 Directions and refusal of access to Australian ports

APPENDIX 1

Internal investigation about defective Engine Room Fire Damper VM nr. 1 – 2 (abstract).
(Dampers, remote control /activation point, control / synoptic panel)

The dampers are checked quarterly. In order to inspect and verify the correct closing, a large manhole cover has to be removed (see in photos) ; unfortunately during the periodical checks , the cover was not removed and tests were carried out by checking the synoptic panels below (synoptic panel in crew alley way and on Energy conservation fan panel in ECR).

Fan control shut down synoptic panel

Energy conservation fan panel in ECR

During tests carried out by the PSC, one of the bolts fitted on one flap broken up, and consequently the relevant flap failed to close properly with all other blades. This was noticed by the PSC Officer only by opening the cover and inspecting the trunk.
As the fan damper sensor (normally built in as an auxiliary switch for end position indication) is fitted in the actuator but not on blades, the indication on the synoptic panels is given by the end position indicator of the actuator. Only an open/close indicator provides feedback to the synoptic panel indicating if the blades are in an open or closed position as the switches are physically linked to a damper blade
In conclusion : open/close's indication at damper, end switch is at the actuator : both provide feedback to the control panel, but only the OCI give a true representation of the damper's position.

Similarly the energy saving controls for the VFD and fan starters have indicators and then fan starts – the whole operates to control ER temp according to the outside temp.
The installation of a slide window secured with thumb screws should allow the crew to inspect properly the damper.
The installation of additional sensors on each flap should prevent any further incorrect indication on the synoptic panels.

However the above does not prevent it occurring again as there might be a lot of unknown conditions for which one or more bolts in the flap / shaft may fail again during a PSC inspection, even if the devise will be tested weekly.

Best would be if at each Drydocking all bolts are inspected and replaced if necessary. As standard DD job, all casing dampers should be dismantled and all linkages and moving parts that can be subject to deteriorate over 5 years to be replaced.

APPENDIX 2

Recommendation on Fire dampers Maintenance

All fire dampers require routine maintenance procedures in order for dampers to operate as intended.

Periodic testing of all parts linked to the damper is essential to maintaining a working damper.

According to IMO all fire dampers should be tested locally on quarterly basis and remotely every year.

The following inspections and checks are recommended to ensure compliance:

1. A responsible officer should be assigned to maintain and inspect all ventilation flaps.
2. The crew should be familiar with the operation of fire dampers and be able to demonstrate this during PSC inspections and Class surveys.
3. All dampers/ducts, should be marked with clear indication which space the damper serves and open/close positions of each flaps/ dampers.
4. Inspection, Maintenance and Test procedures :

    - All dampers should be visually inspected by dismantling the service opening which is located in the air duct adjacent to the fire damper
    - Check that ventilation flaps and dampers all actuators, blades, fans, etc. are functioning properly and that nothing is preventing blades or controls from operating.
    - Be sure to check that nothing is blocking or hindering air way passage.
    - In any case where the damper is difficult to remove and/or impossible to test due to size and accessibility, it is recommended a complete examination for damper to have no obstructions and no deterioration in any of its internal parts.
    - Check also that nothing hinders or prevents full operation of blades and airflow.
    - Operating devices, handles and stoppers are in good working condition.
    - Check interior and exterior sides of dampers for any major defects or material disintegration, rust, wear, corrosion, or any signs of damage that may prevent proper functioning of damper. a.
    - Make sure all items linked to damper are in good condition, such as closure spring and fusible links, if any. Damper blades, Shafts, bearings, pivot points etc. should be cleaned and lubricated
    - Blades should be visually checked through their complete cycle for defects, binding or misalignment. Check blades and see that they are fully closed when operated.

    For guidance of the shipboard command and superintendents, the following checks on ventilation system fire dampers are generally conducted in occasion of the SAFPASS survey:

- external examination and operation test of the means of closure of air intake and exhaust open-ings of all ventilation systems;
- operation test of the remote stopping of fans in ventilation systems;
- external examination of all accessible fire dampers in ventilation ducts;
- operation test of the remote means of closure of all fire dampers in ventilation ducts (from both sides of the main fire division);
- operation test of all ventilation controls interconnected with fire-protection systems;
- checking that fire dampers provided on board are indicated with labels made from photoluminescent material and marked with the symbol used on the Fire Control Plan.

The above recommendations should be read in conjunction with the manufacture's maintenance manuals and Company's planned maintenance procedures .

Incident – CASE STUDY Nr. 04/ 2015
ME FAILURE

WHAT HAPPENED

On January 15th, starboard main engines three and four stopped whist on stand by departing the berth in Cherbourg, the vessel was being towed from the berth whilst having two tugs made fast, one forward one aft. Port shaft remained engaged and bow thruster was connected.

Engineers attempted to restart both engines but it was discovered the fuel pressure on the starboard side was erratic and engineers discovered air in the system, the air was bled from the fuel line, engine number four was restarted and the starboard shaft was reengaged and back in service before the tugs were let go.

Fuel filters cartridges had just been changed and the filter housings do not appear to have been primed refilled with gas oil on closing and the air was then transferred to the fuel lines when the system pump was started and vessel was operating in SECA area

ROOT CAUSE/ CONTRIBUTORY FACTORS /

Initial investigation pointed toward the a human error

- re the incorrect priming of the fuel filters

A further investigation pointed towards

- Higher pressure on the fuel system whilst in port when MGO is re-circulating on the stopped engines.
- For although the cause was seemingly air in the system the problem continued for some days after, it was noted that the vessel had been operating in SECA area on MGO and whilst in port the pressure in the system was higher than normal on the stopped engines due to re-circulation and this was creating foam and air in the system.
  The fuel pressure is being reduced every time the engines are stopped in order to avoid this phenomenon and since that time no further problems occurred.

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

The ship:

- Correct fuel pressures to be monitored and adjusted as required when using different fuels whilst in port
- All EOOW to be briefed/reminded by Staff Chief Engineer on the correct way of changing fuel filters cartridges and to ensure it is refilled with gas oil properly on closing.
- ER staff to be reminded that unless completely satisfied that the ER is in a full state of readiness for departure and or that more time is required to prepare a safe departure then the Bridge is to be informed in sufficient time
- Chief Engineer's Standing Orders to be amended and include adjustment of the fuel pressure on arrival and prior to departure from port.

The company:
This report will be circulated to all managed ships and relevant managers as case study / lesson to be learnt.

Procedures and guidelines

FOM 2 Section 252

52.0 ENGINE ROOM PRE-ARRIVAL AND PRE-DEPARTURE CHECKS

Incident – CASE STUDY Nr. 05/ 2015

Ballast Water contamination

WHAT HAPPENED

On March 03rd 2015 during his 04 - 08 watch Second Engineer, who is responsible for fuel oil transfers and soundings, observed that the daily ROB for HFO had dropped 7.63mt.
At the point in time the MEs, AE's and Boilers were consuming MGO due to the vessels geographic location and therefore the consumption from HFO tanks should have been 0.
This discrepancy was reported to the Staff Chief Engineer Igor Novak, who in turn reported it to the Chief Engineer, Staff Captain and Master.
Chief Engineer consulted the Tank Plan to see which tanks and piping were adjacent and running through HFO 5P Tank. The SCE advised that the ballast main definitely passed through HFO 5P.
Ballast water tanks BW4P, BW4S (heeling tanks) and BW5C (adjacent to HFO 5) were opened to check for the “lost” oil. The visual inspection of BW4P and BW4S found the presence of HFO. This was reported immediately to the DPA/Managers/Owners
Permission was sought to enter HFO 5P tank under a force majeure in order to investigate further the source of leakage. BW5C was found clean. HFO 5P tank was pumped out to HFO 9P. Ventilation of the tank was started. The force majeure entry was completed and approved by the DPA
The forward ballast pump pipe work was opened and traces of oil were found.
As BW 6P and BW 6S are also used for heeling purposes, the tank lids were removed in the compressor room and traces of HFO were also observed in these tanks.
On entry to HFO 5P tank the Staff Chief Engineer discovered that the ballast line was corroded with a small hole. A Straub coupling was fitted to the pipe and the line tested.

ROOT CAUSE/ CONTRIBUTORY FACTORS /

Primary Root Cause

- Corrosion from inside of the Ballast Water pipeline passing through HFO 5P

Secondary Root Cause

- Correct documentation and attention to the previous temporary straub repair would have highlighted the potential condition of the ballast water pipes passing through FO tanks. These would have been UTM tested and attended to in the previous drydock, preventing what appears to be a second similar event, although this is undocumented and cannot be conclusively confirmed.

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

The ship:

- All contaminated tanks and ballast main sections to be cleaned and proven so to the satisfaction of Class prior to being returned to service.
- Repair to ballast main pipe in HFO tank 5P to be agreed with Class and completed at the earliest opportunity and not later than the next DD
- UTM gauge to be delivered to vessel ASAP as per requisition 3652-01492, to enable the ship to make UTM.
- All ballast water pipelines passing through FO tanks and fuel oil pipes passing through ballast tanks to be UTM tested by an approved company. Pipes not meeting class requirements to be renewed at the next DD.
- Technician to attend vessel for calibration of the ballast water tank gauges or a new sounding system to be installed and/or sounding pipes to be installed.
- Fuel tanks that have ballast lines running through them fuel oil pipes passing through ballast tanks to be identified on all managed ships. Inspection then to be scheduled not later than the next DD.
- Investigate installation of OCM and auto valve closure on ballast discharge

The company:

This report will be circulated to all managed ships and relevant managers as case study / lesson to be learnt.

Procedures and guidelines

FOM 2 Section 233

- 33.0 PLANNED MAINTENANCE

FOM 2 Section 229

- 29.0 SHIP’S STRUCTURE AND COMPARTMENTS INSPECTIONS

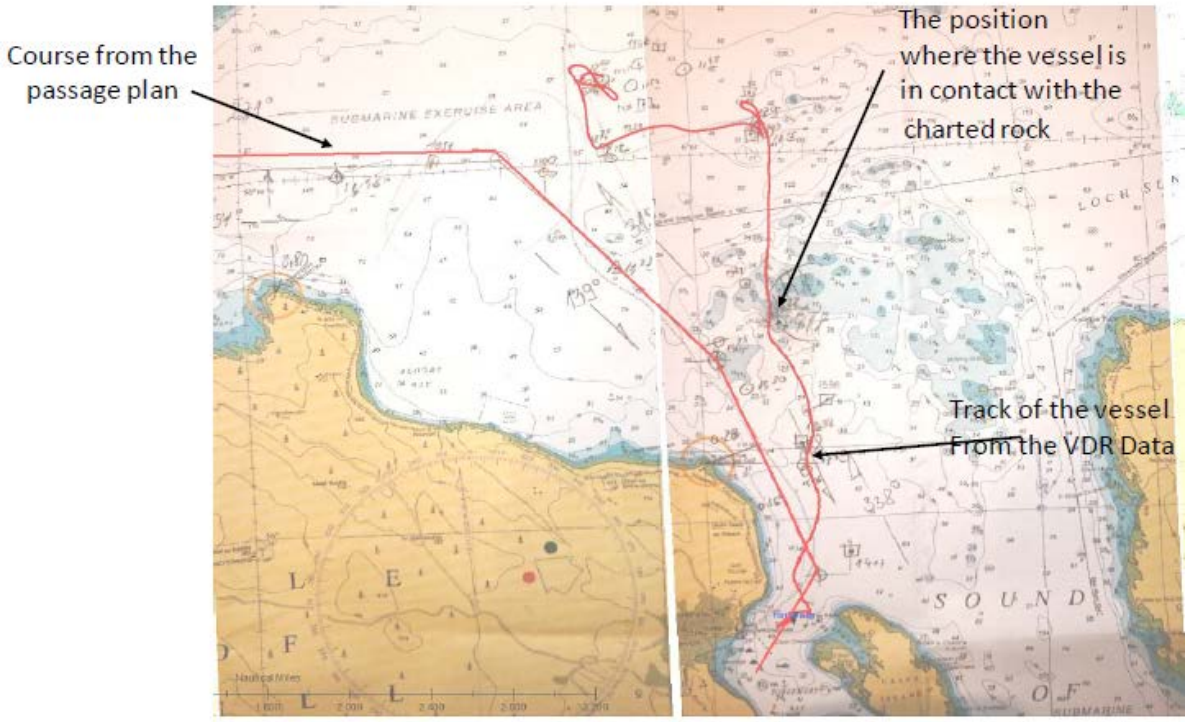
FOM 3 Section 331

- V. Group form TEC36 “Machinery Space Tank Sounding Record Book”

INCIDENT – CASE STUDY Nr. 06 /2015 :
GROUNDING

WHAT HAPPENED

When waiting adrift to enter a congested port in heavy wind/weather and with significant traffic in the immediate vicinity, a managed cruise vessel ran aground on a submerged rock damaging its propeller and associated hull equipment. There were no injuries or pollution.



Consequences:

- vessel in dry-dock
- seven cruises cancelled
- Captain under criminal investigation by Irish Court

FINDINGS:

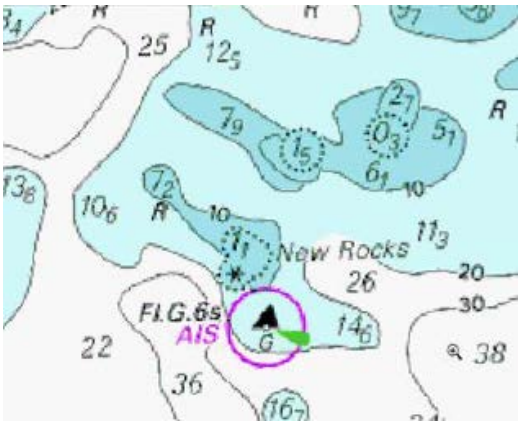
The following issues have been identified during the internal investigations:

- **Voyage planning** :
  a) a deviation from the voyage plan was done
  b) the voyage plan was not re-assessed / not updated with all new elements
  c) no new courses were laid

- **Bridge Management**:
  a) music was played on the bridge
  b) not all conversation was in English
  c) communication between bridge team members was ineffective
  d) the bridge team lost situational awareness

- **Navigation**:
  a) the radars/ARPA were not adequately used to acquire all potentially hazardous targets
  b) radar centres were offset preventing timely detection of targets

c) ECDIS alarms were not adequately set up
d) position fixing methods and intervals were ineffective and inadequately marked on the chart
e) IALA - marking buoys were not adequately recognized and their meaning understood



- **COLREGs:**
  a) Regulations were not followed
  b) VHF was used to arrange avoidance of close quarters situations

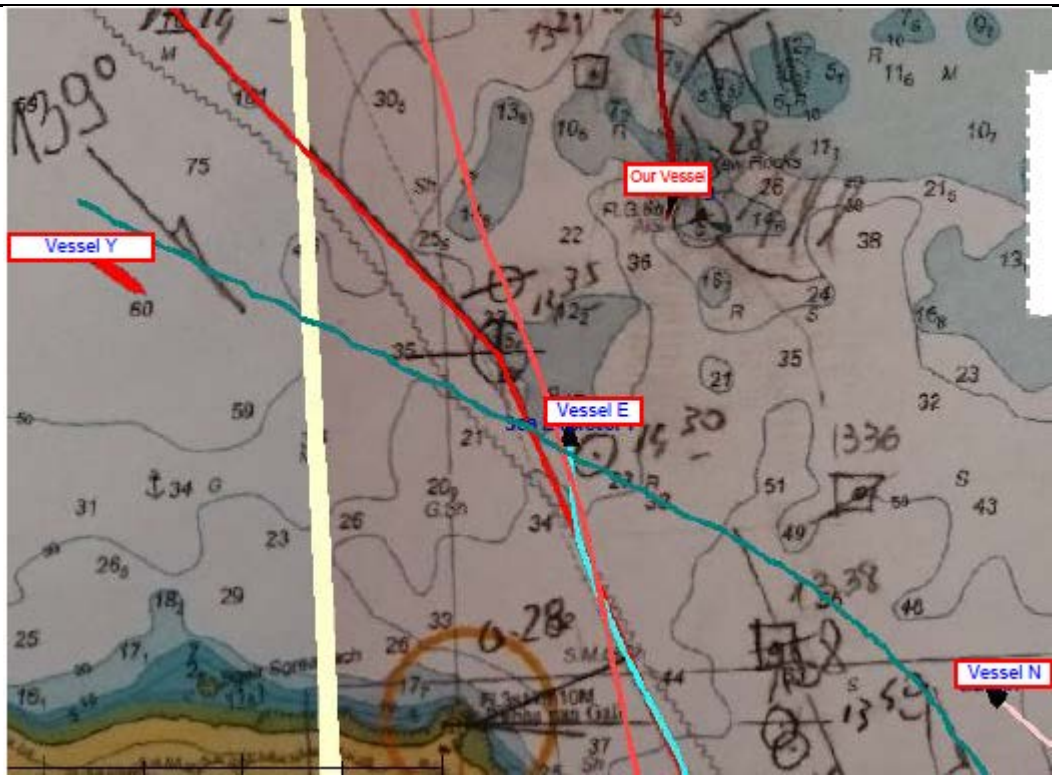
- **Manning:**
  a) Bridge was considered undermanned as the Quartermaster, OOW and the Captain were only on the Bridge in the above critical situation of arrival in heavy weather and intensive traffic

- **Watertight Doors**:
  a) WTDs were not closed in a potentially hazardous situation / before the incident

- **Reporting:**
  a) the shipboard command failed to report the incident and the vessel's hazardous condition to the relevant coastal authorities / MRCC

- **Recordkeeping:**
  a) nothing was recorded in the bell/movement book
  b) the incident checklists used after the grounding were incomplete

INCIDENT – CASE STUDY Nr. 06 /2015 :
GROUNDING



WHY IT HAPPENED - ROOT CAUSE / CONTRIBUTORY FACTORS

Per Local Working Instruction (LWI) #37 "Reporting and Analysis of Hazardous Situations and Categorization in Significance":

- EC.7 –External Conditions – Wind:
  Wind of around 30kts gusting to 40/45kts

- EC.10 –External Conditions – Other:
  Congested port and intense traffic

- HE.1 – Human Error – Communications – Difficulties in the transfer of information; failure to understand or comply:
  The Bridge team failed to communicate critical information on navigational hazards and vessel's position

- HE.7 – Human Error – Inattention – Loss of attention, not paying attention, the failure to detect, attend to, or be aware of critical or significant information:
  The Bridge Team lost situational awareness

- HE.11 – Human Error - Judgement - Incorrect assessment, estimation, interpretation or opinion:
  Failure to follow COLREG and IALA rules and SMS requirements on voyage planning (deviation/update)

- OMF.1.2 – Organizational / Management Failure – Inadequate Procedure /Policy:
  No procedure for minimum manning on bridge in arrival/departure or other critical situations

INCIDENT – CASE STUDY Nr. 06 /2015 :
GROUNDING

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS:

Ships:

- Bridge Teams are to discuss the identified issues under "What Happened" above during their next Voyage Planning Meeting and identify and confirm that adequate controls are in place to avoid recurrence on-board their ships

- The SMS Navigational Requirements in FOMs120-146, the reporting requirements per FOM380, COLREG provisions, IALA symbols and their meaning, are all to be revisited by the Bridge Teams in conjunction with the above

Company:

- Review and improve the navigational procedures (including setting up of a requirement for minimum manning on the bridge for arrival/departure or other critical situations) and incident checklists

- Provide additional training to bridge teams

Both above – for interactive and reflective learning:

- The DPAs will draw a list of questions on the above findings and contributory factors and will engage the Bridge Teams in a discussion in the lines of:
  - *How do you ensure vessel's position with regards to navigational hazards and ship traffic is adequately monitored?*
  - *How do you make sure collision avoidance is as per COLREG and effective?*
  - *When and under what circumstances do you consider the Bridge Team is adequately manned?*
  - *What do you do to make sure there is always situational awareness amongst the Bridge Team Members?*

PROCEDURES AND GUIDELINES:

- SOLAS Chapter. 5 Reg. 34 – Safe navigation and avoidance of dangerous situations

- European Directive 2002/59/EC – Article 17 – Reporting of incidents and accidents at sea

- SMS sections: Navigation FOM120-146, FOM 380 Emergencies (Incidents or Marine Casualties) and their Reporting

- Emergency Contingency Plan (ECP) – Master's Decision Support System (App.05) Checklists

- COLREG, IALA regulations

Lessons Learned (Oct.2015)
Noise and Vibrations

DESCRIPTION

The following deficiency was issued by the Recognized Organization during the external intermediate MLC audit carried out on two managed vessels.

- There is no evidence found on board for in place measures on the ship to monitor noise and vibration levels in seafarers working and living areas

Even if the vessels showed the Risk assessment (Shipsure) and related action in accordance with FOM 322, an immediate corrective action was required by the Auditor, as follow :

- A Company will be appointed in order to monitor the noise and vibrations

WHAT WENT WRONG - LESSON LEARNED

A prompt and thorough review on board of the Flag State requirement could have prevented the issue of the deficiency (Bahamas Bulletin N.139 section 4..8 and Bahamas National requirements, section 4.2.8.)

" For ships other than those listed above (i.e. the keels of which are laid or which are at a similar stage of construction before 1 January 2009), it is strongly recommended that a noise survey should be undertaken on each ship, in accordance with the provisions of A 468(XII) or MSC.337(91) *Code on Noise Levels On Board Ships,* and a noise survey report held on board.

Ship-owners shall also ensure that an assessment of risks, including exposure to noise, is carried out, in line with their obligations under the Maritime Labour Convention 2006."

Be reminded that the MLC requires the Company to immediately propose on board the corrective action to the RO auditor ; (there is no timeframe allowed like ISM)

RECOMMENDATIONS /ACTION TO PREVENT RE-OCCURRENCES

Therefore for existing Bahamas vessels, in accordance with the Bahamas Maritime Authority :

- a noise survey is strongly recommended but it is not mandatory;
- a risk assessment on the effects of noise and vibration is mandatory for ALL ships

DPA's to remind their managed vessels about to review and confirm the specific risk assessment is in place, (posted, and provided to the crew);

However, under the scope of the ISO 18001, the noise and vibration survey should be carried out at the first favourable occasion on board all managed ships. Certification to be kept in the MLC file audit