This Compendium contains the following Case Studies issued in year 2014:

1) Case Study 1/ 2014 “Automatic sprinkler system heads failed to operate during periodical test”

2) Case Study 2/ 2014 “Serious crew injury during mooring operation”

3) Case Study 3/ 2014 “Oil record Book (ORB) inaccuracies”

4) Case Study 4/ 2014 “Life rafts davit detached from deck”

5) Case Study 5/ 2014 “Ballast water exchange violation for discharge in California waters”

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INCIDENT/ NEAR MISS – CASE STUDY Nr. 1 / 2014 (10 January 2014)

Automatic Sprinkler system heads failed to operate during periodical test.

WHAT HAPPENED

During a Sprinkler system heads test carried out on board a managed ship (as per Bahamas bulletin 150) some sprinkler heads failed to operate as required as resulting blocked by water particles deposit (Sprinkler system maker : Softex . SPK Head type SE 27 w - approx.. 900 spk heads of this type fitted on board the vessel).

All Sprinkler heads of the mentioned type have been treated immediately on board with specific cleaning product (i.e. WD 40).

ROOT CAUSE/ CONTRIBUTORY FACTORS

Sprinkler heads were never tested before by breaking the bulb as the BMA bulletin issued by the Flag Admnistration .
The faliure was most likely caused by a faulty manufacture or due to the specific Spk heads design (failure to provide for safe operaions under nornal operaing conditions)

Other Sprinkler heads of a different type (SE 14 w) have been found in order and operating in accordance with the manufacturer specifications.

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

All vessels are recommended to test annually, at least nr. 10 Sprinkler heads for any type of SPK system fitted on board.

All Sprinkler heads type SE 27 w should be cleaned every year (considering an acceptable window of +/- 3) .

REFERENCE

- IMO MSC.1/Circ.1432
- Clia circular dated 25 April 2013
- ISM Code Ch. 10 – (Maintenance of the ship and equipment)

Sprinkler System Testing BMA Bulletin 1

24 April 2013 - reported failure of SP

spk test for guidance.pdf

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INCIDENT/ NEAR MISS – CASE STUDY Nr. 02/ 2014 (January 30, 2014)
Serious crew injury during mooring operation

WHAT HAPPENED

An OS got seriously injured under a mooring operation as a result of a parted mooring rope.

Ship mooring operation was in progress alongside at Philipsburg (St. Marteen) main pier, with strong wind gusting ENE 25/28 kts ; moderate swell of about 1,7 m, causing pitching of the ship alongside .
No tug was available in assistance.

Two spring lines and two breast line made fast at winches at the time of the occurrence: one short breast line and one long breast line.

The 3rd stern long breast line coming from Port Side aft winch drum suddenly broken up when one stopper was already in place to secure the 2nd breast line (short one) to the bollard.

Sea swell and ship movements resulted in extra load on the line already tightened .The long breast line snapped back hitting the left leg of the OS standing next to the line.
The OS sustained internal injuries and was initially assisted by the on-board medical team and then brought to the shore hospital where his leg was later on amputated

ROOT CAUSE/ CONTRIBUTORY FACTORS /

There were moderate swell and winds gusting up to 28 kts in the harbour leading the previously fasten ropes to frequently slack and tight conditions. This likely resulted suddenly in a heavy load on the only long breast line at the winch that led the rope to part in the way from the winch drum to the bollard.

The OS was hit by the rope that snapped back due to extra tension caused by the persistent sea swelling. This resulted suddenly in a heavy load on the breast line.

The aft mooring team worked in a risk zone, while there was a heavy load on a single mooring line. The safety depended also on how good the operator was to estimate the load on the line and his ability to ease out the line, before the load became too high. Thereby there was a latent risk during the work anyway.

To be noted that the mooring snap back zones were not highlighted with yellow paint (the company's instructions and guidance on mooring operations included the dangers of ropes parting and the observance of snap-back zones as per FOM 145)

It appears that the OS has unfortunately underestimated the warning given by the Assistant Carpenter at the winch, that the rope was already under tension .

The Assistant Carpenter was unable to slack the rope before it parted.

Contributory factors:
Equipment Failure :
Structural (Breach of structural integrity)

External Conditions (prevailing wind and sea swell)

Human Error:
Inattention (loss of attention, not paying attention; the failure to detect, attend to, or be aware of critical or significant information)
Procedural Error (unintentional deviation from, or failure to follow an established procedure)
Contempt (the taking of unnecessary risks, with scant regard for regulations and guidelines)

Organizational / Management Failure

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Inadequate Implementation of Procedure/Policy (failure to ensure procedures or policies are followed)

Personnel/ Lack of supervision (the absence of proper situational guidance, direction, information or instruction to operating personnel)

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

The Ship:

- to conduct a thorough review of risk assessment relevant to mooring operations (in particular in adverse external conditions) and review of the on board mooring planning procedures .
- to arrange for an extraordinary safety meeting with all mooring teams to discuss the accident ; additional training to be carried out with Officers and ratings at the mooring stations .
- reminded of the importance of the occupational training for all crew, to be completed before to be assigned to the relevant duties on board
- Conduct training for mooring team members on identifying and understanding the dangers associated with snap-back zones. In this regard Videotel VOD Box, available to all managed ships provides a series of three videos covering safe mooring operations.
- Ensure that the original mooring plan is followed, as far as applicable, and no modifications are made to the layout of mooring arrangements and mooring plan without completing a risk assessment.
- Distribution on board of the guidance "Mooring – Do It Safely "

The Company :

- The incident report is circulated as lesson to be learnt to all managed ships and to reiterate the procedure of FOM 145
- The publication "Mooring – Do It Safely " (a guide to prevent accidents while mooring) is distributed to all managed ships and relevant crew as additional information and guidance to prevent recurrence.
- To verify on board the regular inspection all mooring ropes to identify and replace damaged ropes in line with company procedures and ensure a detailed record of inspections and condition is maintained;(i.e OP 27 or Computerized PMS)

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INCIDENT/ NEAR MISS – CASE STUDY Nr. 04 / 2014 (24 Mar 2014)
Oil Record Book (ORB) Inaccuracies

WHAT HAPPENED

A recent desktop review of the Oil Record Book (ORB) of a managed vessel showed a series of discrepancies in quantities, times of transfers and inaccuracies across a number of related records such as sounding log, engine log book as follows:

1. Obsolete [Flag Bahamas] edition v.2 Dec 2006 of ORB used. *(some ORB Codes were revised in Jan2011 and hence the guidance for their entries in an ORB would be obsolete)*
2. Not all transfers to the bilge tank (when compared with the sounding log (or the r.o.b. quantities recorded in the Engine Log Book) were recorded in the ORB (or in the SMS transfer log SAF47 "Bilge Waste Transfer Log (including Sludge Waste)") in full correspondence and/or without delay
3. Furthermore some transfers were recorded in the ORB (or in SAF47) earlier in time than in the Engine logbook soundings
4. The weekly sludge collection code C11.1/2/3 was:
    a. used more frequently than once a week
    b. not used strictly every week/7 day
    c. not used every week to record all sludge tanks listed on the IOPPC 3.1
5. Weekly sludge code C11.4 was not in use (to sum up the manually initiated transfers to sludge tanks during the week ie to summarize those recorded as transfers via code C 12.2)
6. Engineers make and sign entries in the ORB (and SAF47) for operations performed in another Engineer's watch
7. Some amended/corrected entries in the ORB were not endorsed also by a signature of the Chief Engineer
8. ORB page was not signed by C/E
9. Mathematical error in the total quantity bunkered vs the breakdown of "added to" tanks in codes H 26.1/2/3

Inaccurate ORB record keeping could be a potential problem for PSC and other authorities and may have significant implications for the individuals making entries/signing the ORB, the vessel, Owner and the management Company.

ROOT CAUSE/ CONTRIBUTORY FACTORS

Human Error:
- Communication (Difficulties in the transfer of information (not language related); failure to understand or comply)
- Inaccurate computation (Mathematical error)
- Inattention (Loss of attention, not paying attention; the failure to detect, attend to, or be aware of critical or significant information)
- Procedural Error (Failure to follow an established procedures)

Organizational/ Management Failure:
- Inadequate Implementation of Procedure/Policy (Failure to ensure procedures or policies are followed)
- Poor oversight (Failure of management to effectively oversee subordinates; lack of involvement, inspection, communication, etc.)
- Inadequate training (Inadequate technical knowledge due to insufficient training)

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

COMPANY:

1. circulate this Case Study as lessons learnt to all managed ships and ship managers
2. focus on the proper recordkeeping of Oil Record Books
3. select vessels for onboard visits/audits/inspections for further verification of environmental compliance
4. perform ship specific assessments of "machinery spaces" onboard and verify their technical arrangements for transfer of oily bilge water
5. reviewed SMS for further improvement as required
6. enhance and intensify training on OPPP/OWS/ORB including by means of computer based training (CBT)

Annex 1A (Bulletin 63)

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SHIPS - Masters, Chief Engineers and all engineers making oil transfers and/or entries in the ORB:

1. hold an extra ordinary meetings to review Bulletin #63 (on ORB & OPPP) and this Case Study #3/14 on ORB Inaccuracies
2. revisit Marpol I, Flag and SMS provisions on oil pollution prevention per the attached **OPPP Self-Assessment**
3. re-familiarize with the Company's training presentation **"Guidance on Correct Oil Record Book Codes Entries"** v.8 and with the latest version of the **INTERTANKO "Guide for correct entries in the ORB (Part I- Machinery space ops)"**, 3rd edition.

REQUIREMENTS

1. MARPOL Annex I, reg. 17.4:

   Each operation … shall be fully recorded without delay in the Oil Record Book Part I, so that all entries in the book appropriate to that operation are completed. Each completed operation shall be signed by the officer or officers in charge of the operations concerned and each completed page shall be signed by the master of ship
2. SMS on Oil Pollution Prevention
3. Flag specific environmental requirements

Annex 1A
(Bulletin 63)

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INCIDENT/ NEAR MISS – CASE STUDY Nr. 04 / 2014 (13 May 2014)
Life rafts davit detached from deck

WHAT HAPPENED

During the 5 yearly dynamic test at 2.3 tons of the stbd side life raft davit in the Shipyard, the davit foundation bolts suddenly failed at the crane base, causing it to detach from deck falling in the dry dock basin .
No casualty or injuries reported.
Crane to workshop for opening up of gear as the davit arm was not deformed.
Replaced all foundation bolts from port side crane before the test, done for the correct SWL
(Flag was contacted for provisional exemption).

ROOT CAUSE/CONTRIBUTORY FACTORS

After the internal investigation carried out on board , it was found that the davit was built for SWL of 1.1 ton while the test was carried out in accordance with the previous dynamic load test - certified for 2.3 tons- and in line with the SWL of the hook fitted –also 2.3 tons.
There was no Makers name plate on the crane, while the SWL marked by paint was for 3 tons.

Contributory factors:
Equipment Failure :
Structural (Breach of structural integrity)

Human Error:
Inattention (the failure to detect, attend to, or be aware of critical or significant information): manufacturer plate missing and the official SWL unknown .
Procedural Error (unintentional deviation from, or failure to follow an established procedure) : failing to verify the effective SWL on the manufacturer technical specifications , prior to carry out the test.

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

The ship, for immediate action :

- to verify that LSA davits and winches marking is reporting the relevant Safe Working Load , Type designation and serial number (in accordance with LSA Code 1.2.2.9)
- In the absence of the manufacturer's plate on the davit reporting the relevant SWL, the manufacturers' instruction manual should always be verified before conducting any test.
- If the above information are not available, the manufacturer should be contacted directly, even if the previous test certificates have been issued by Class .
- Shipboard Command required to verify the compliance with the provision of MSC Circ. 1206 and SMS FOM 353.9

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A full set of maintenance manuals and associated documentation issued by the manufacturer or authorized service provider (for survival craft, launching appliances and on-load release gear) should be available onboard for use during inspection, maintenance, adjustment and re-setting of the lifeboat and associated equipment, such as davits and release gear.

53.9.2 Any inspection, service and repair should be carried out according to the maintenance manuals and associated technical documentation referenced above, which should be up-to-date.

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- The safety measures must always be in place during LSA tests in order to prevent possible injuries to persons : technical personnel attending the test should have no other duties which might interfere with their primary task. They should be in a proper and protected position,

facing device and, so far as is practicable, with a clear view of the whole operation;
The area surrounding and below the device to be tested, should be clear of obstructions and its access restricted to persons in order to prevent injuries in case of accidental release or breach of LSA or deck structure .

The Company :

- The incident report is circulated as lesson learnt to all managed ships
- The Ship managers are reminded of the above mentioned requirements of MSC MSC Circ. 1206 and SMS FOM 353.9
- The specific Risk Assessment is reviewed and updated if deemed necessary in light of the event.

REFERENCE

- LSA Code Chp. 8 – 8.1
- Solas III/20.11
- MSC Circular 1206 "Measures to Prevent Accidents with Lifeboats" and Annex 1
- "Guidelines for periodic servicing and maintenance of lifeboats, launching appliances and on-load release gear" which relates to the requirements contained in SOLAS Chapter III.
- Code of safe Working Practice Ch. 21

INCIDENT/ NEAR MISS – CASE STUDY Nr. / 5/2014

Title : BALLAST WATER EXCHANGE VIOLATION FOR DISCHARGE IN CALIFORNIA WATERS

WHAT HAPPENED

During a transit from Mexico's Puerto Vallarta with intermediate stop in Ensenada bound for San Diego California, ship conducted ballast water exchange on planned passage at distances from shore of 58, 85, 93 and 103 miles. Ballast water reporting form submitted as required to US authorities. Ballast was discharged while in port of San Diego prior to bunkering.

Company was issued a letter of violation for this ballast water exchange and discharge into California waters that did not meet the California law requiring such a ballast water exchange from a voyage that began south of the Pacific Coast Region. California law requires such ballast water exchanges to occur beyond 200 nm from shore and in water of 2,000 m or deeper, or an exemption granted by the state in an alternative location in advance.

ROOT CAUSE/ CONTRIBUTORY FACTORS

Shipboard staff had referenced only one element of Bulletin 09 "Summary of Regional Ballast Water Legislation" that made reference to a Federal / Coast Guard regulation indicating ballast water could be discharged into US waters if the voyage does not take the ship into waters of 200 nm or greater. The State of California does not recognize this Coast Guard regulation for ballast water discharged into their waters.

<u>Contributing Causal Factors (per LWI#37 Hazardous Situations):</u>

- Human Error (HE.7) – Inattention
- (OMF.1.3) Inadequate Implementation of Procedure/Policy

Shipboard staff had not noted that further down in Bulletin 09 were the California Ballast Water Management rules that clearly specified requirements for ballast water exchange for a voyage starting from outside the Pacific Coast Region required to be done at a distance from shore of min 200 nm and in water depth of at least 2,000 m, or an exemption granted by the State of California in advance to a discharge.

- Organizational / Management Failure (OMF.1.2) – Inadequate Procedure/Policy

PROPOSED CORRECTIVE/ PREVENTIVE ACTIONS

The Ship :
The ship's captain will be issuing a standing order outlining the California Ballast Water Management requirements in Bulletin 09 and have it acknowledged by all deck/engine officer and file with the Ballast Water Management Plan.

The Company :
Recommended Bulletin 09 is reviewed and the paragraph on page 21 on discharge of ballast water in extraordinary circumstances and speaking to the Coast Guard Regulations is amended by incorporating again (similar to the beginning of the document and to the start of the section for USA) another clause that some states may have laws or regulations more stringent on ballast water management practices and to verify local and state regulations related to ballast water exchange prior to conducting ballast water exchange for intended discharge in port

Additionally, management is working with the California State Lands Commission to develop a mutually agreed upon ballast water exchange location for the ship's future passage from Puerto Vallarta via Ensenada to San Diego that minimizes threat of invasive species into California waters and limits as much as possible a voyage deviation of the ship. This agreement will be shared once completed.

REFERENCE
Local Working Instruction 09 – Summary of Regional Ballast Water Legislation California Code of Regulations – Title 2, Division 3, Chapter 1, Article 4.6 Ballast Water Regulations for vessels operating within the Pacific Coast Region California Marine Invasive Species Program (MISP) - Ballast water management options: Vessels arriving from outside the Pacific Coast Region