Society of Consulting Marine Engineers and Ship Surveyors

NewsLINK

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From the previous Editor

Gentlemen

Number 13 seems to have lived up to its unlucky reputation, and previous attempts to bring it to publication were thwarted by circumstances in the latter stages of preparation on several occasions.

In each instance these were primarily associated with my work and travel commitments connected with the daily business of earning a living as a marine surveyor, and I am sure my fellow practising members will be only too well aware that last minute changes to a client's requirements and schedule, often of a quite significant nature, have almost become the norm in these days of instant communication.

Nonetheless I wish to apologise most sincerely to the membership as a whole for the recent lack of NewsLINK, but I regret I found the dual workload of day-to-day commitments and the NewsLINK editorial to be beyond my resources.

In saying this I would like to express my admiration for all those who took on the role before me, including, but not by any means restricted to Norman Finlay and John Knott, as it is only now that I can fully appreciate just how much effort they contributed over an extended period.

I would like to extend to Andy Holder a very warm welcome as Editor of NewsLINK, and to encourage our membership to offer their support by taking the time to contribute any form of article that they think will be of interest to our members, or relevant to the Society as a whole, be it long, short or merely an extract.

I am sure that all contributions will be most gratefully received, and the Editor will gladly collate/edit articles received, in whatever form, to suit the space available.

As previously, NewsLINK remains a publication for and of the membership, and to ensure its continued circulation and relevance I would encourage all members to offer the new Editor their wholehearted support.

Regards,
Euan Davidson.

Inside this Issue of NewsLINK

From the President

Gentlemen,

Having recently taken over as your President I have been absorbing myself in the Society and its business as well as the quiet revolution that is taking place in the wider world of professional bodies.

We are witnessing a very full year for many of the Institutes and Societies in this country. I take no pleasure in making the very obvious comments regarding membership generally, the many changes to the traditional shipping areas, changes in the surveying industry, the "knock on" effect on marine consultancy generally and this Society in particular.

Total membership has remained reasonably steady but only by the increase in overseas members, as UK members continue to decline somewhat in line with, but years after, the shipyards and the ships have gone. The only active branches within the Society are Northwest and London District and the Hong Kong Division; all others are now dormant or simply not functioning. Many other organisations are suffering in the same way and it is surely time for us to consider who we are, where we are going and where we wish to be.

I note that the Civil Engineers are considering marriage with the Mechanical Engineers. The Energy Institute has swallowed the Institute of Petroleum whole (or so it seems). The Institute of Marine Engineers has expanded to include Science and Technology.

None of the above moves are of themselves either good or bad, merely a recognition of how interests and societies develop and change at a point in time. We in "The Society" are currently and have for some time survived with the assistance of the UK MCA's Code of Practice work. This is a narrowing of focus when we should be widening our views and considering how best to move forward in the 21st Century in an industry that has and is continuing to shift its emphasis away from traditional maritime skills to those of the modern academic and service skills.

Sadly it is also an era that ever more considers a Degree or Diploma of more importance than professional qualifications and practical experience, an era that considers price more important than professionalism.

I have therefore been giving careful thought to where we stand in "The Society" and the future of "The Society" and of what I view as potential future partners[1] including the obvious course of continuing as an independent body. I have considered the following organisations:

- ☐ IMarEst
- ☐ IIMS
- ☐ BACS
- ☐ RINA
- ☐ Nautical Institute
- ☐ YDSA

IMarEst is a large professional organisation that may appeal to many professionals in this Society but will inevitably mean the absorption of the Society totally into their organisation. They are not a surveying body as such but do have Chartered Status, a goal of mine for marine surveyors for many years. Joining with them could possibly achieve that. They have a large secretariat and publish several journals and organise many conferences.

RINA is a large professional organisation that may appeal to many professionals in this Society, but will inevitably mean the absorption of the Society totally into their organisation. They are not a surveying body as such but do have Chartered Status.

As many of you will know I have just spent 2 years as President of the IIMS, probably the youngest of the marine surveying organisations and an organisation I know well. It is a young surveying organisation with a developed and developing training and education programme. They have already got a full time Chief Executive and full time secretarial assistance. The membership mainly comprises non-professional members in the small craft business but they also have many professional members, though too few to form a proper critical mass of expertise.

Your Secretary and I have considered a number of factors but what I need most of all are the views of the members. I am concerned that the Society should continue in a form that its members are happy with. The Society has a long and honourable history but already many members have joined the IIMS and other Institutes for the advantages they find there and not otherwise available within this Society. It is time, gentlemen, to take a long hard look at where we are, where we are going and what we want to hand on to the next generation of Consulting Marine Engineers and Ship Surveyors.

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Other matters that should attract our attention are:

- How do we run the office in the future?
- How do we influence Flag States?
- How do we influence Governments?
- How do we bring pressure to bear on shipping matters through IMO?
- Can we influence design of future ships? (The President of the US has been doing it alone for some time now!)
- Should we be more proactive in design and risk assessment?
- What do we want to achieve and how should we go about that?

In respect of future options it may be possible, with the IIMS for instance, to develop into an organisation where the Society and its members would retain their identity and status but within an enlarged Institute with:

- Upwards of 1,000 members
- 600 boats under Code
- An enlarged training and education programme
- An identified Society of Professionals within a larger Institute
- Economies of scale in office organisation
- A fully manned office open every day

I have prepared a questionnaire to determine the questions that need to be asked of our membership so that you can let us know your views and we can act accordingly within council. The questionnaire is attached.

I am sure this is not the news that many of you want to hear from an incoming President but we have to face the facts: none of us are getting younger, the industry is changing and we (may) need to change too. (It is already difficult to obtain a quorum for council meetings). The decision however will be yours.

There is good news too: Newslink is up and running again ! (I have only been President for a few weeks and I have seen my workload increase hugely) so I can only doff my hat to all those past Presidents and those who have edited Newslink in the past and our thanks go out to them all.

Chris Spencer
President SCMS

[1] *If others should be considered please let council know.*

PRESIDENT'S QUESTIONAIRE:

1. Do you wish the Society to continue as at present without any changes at all?

Yes / No (If Yes, just send it back as it is. If No go to 2)

2. Do you wish the Society's Council to explore further the options explained in the President's article?

Yes / No (If No please explain or suggest what you do want)

.....
.....

3. Do you have any preferences with which Institutes or Societies you would prefer to cooperate with?

Yes / No (If Yes, please indicate preferences:)

a) 1st preference……
b) 2nd preference……
c) 3rd preference……

4. Do you have any suggestions for other organisations to cooperate with, or ideas on how the Society should proceed into the future?

.....
.....

5. Any other points or comments:

.....
.....

Please return this questionnaire to the address below by 31st October 2005

From your Secretary

After a pause in the production of NewsLINK, we are delighted to report that it is up and running again. The format may take a while to settle down, so if you have any suggestions on how it might be improved please let me know.

As the Professional Body for senior Consulting Marine Engineers and Ship Surveyors, we are in an excellent position to share our knowledge to the benefit of the whole membership. To this end I take this opportunity to remind you of paragraph 3(D) from the Society's Memorandum of Association:

"3. The objects for which the Society is established are:

(D) To provide opportunities for discussion amongst the members, and to promote the acquisition and dissemination of useful information connected with the professions, so as to assist the members in the application of modern technology."

Modern technology can be a useful and sometimes an essential tool, particularly in today's surveying environment. Do you have experience of such modern tools? If so, the editor of NewsLINK would like to hear from you. We need to involve the Membership more in the production of our journal, so please consider writing an article for publication. Although we have received commitments from members to contribute on a regular basis, we need to add more to the mix to ensure a balanced flow of information and a more readable journal.

Another possibility for promoting information might be an Internet based message forum for the exchange of ideas – what do you think of this? If enough members express an interest in this idea then your Council may agree to implement such a facility. I am involved in other forums on the Internet and there is nothing worse than a message forum with no messages. Would you welcome a properly run forum for the Society Members? Please let me know.

Marine Engineers
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The Society is a Member of the Small Craft Surveyors Forum (SCSF). Membership includes The Institute of Marine Engineering, Science and Technology (IMarEST), The Royal Institution of Naval Architects (RINA), The International Institute of Marine Surveying (IIMS), Yacht Designers and Builders Association (YDSA), and other organisations are also involved. The SCSF meets periodically to discusses matters of mutual interest to its members. One item that recently arose was the topic of Professional Indemnity insurance, and that led to the compilation of a list of insurers and brokers. This list, while not exhaustive, may be helpful to members and is published in this edition of NewsLINK for your information. The list is not an endorsement or otherwise of the organisations contained therein; it is simply a list of sources for PI insurance provided by the various members of SCSF that their members have used.

The Society is also now a member of the Federation of European Maritime Associations of Surveyors and Consultants (FEMAS). Activities include representation of two important bodies – Maritime Industries Forum (http://www.mif-eu.org), which provides us with a voice, albeit a small one, and opportunities for networking with the people in Europe who make the decisions and other interested parties. FEMAS members are also active in the International Union of Marine Insurers (http://www.iumi.com) and are hoping to achieve permanent recognition by this organization in the near future. It is hoped to present relevant papers during forthcoming meetings. FEMAS are also producing publications which it is hoped will help surveyors in their work, hopefully some more news on this will be available next year.

Seeing things in a different light

David Booth, MCMS, explains infrared thermography and outlines the life of a thermographer

People often become curious when I set off with my thermal imager to begin an inspection and I am frequently approached by interested individuals who want a glimpse of this strange and fascinating world.

What is infrared thermography?

Any object with a surface temperature above absolute zero (-273°C) radiates infrared energy proportional to its temperature. This energy is invisible to the naked eye but by using a radiometric thermal imaging system we are able to create a thermal image of the view, called a "thermogram," and measure temperatures with a differential of less than 0.5°C.

One huge advantage that infrared thermography has over other predictive technologies is that it is visual and instant. So, as the images are seen in real time, they allow us to gather data quickly and to monitor many types of equipment, even dynamic processes.

This ability to observe working machinery or live electrical systems without contact makes infrared thermography an invaluable predictive maintenance tool.

How is this technology being used?

Probably the most widespread use is for electrical inspections where the early detection of developing faults can lead to major savings in time and money, avoiding damage to equipment, personal injury and reducing the potential for fire.

Exhaust gas leaks, insulation integrity, bearing temperatures, steam and hydraulic systems, fluid level and flow, are further examples of how this technology is being used very effectively and the number of applications continues to grow. Basically, if temperature is a consideration then thermography may be used to monitor equipment or processes, allowing us to see anomalies that would otherwise be invisible.

Classification Societies have moved towards acceptance of approved condition monitoring programs forming the basis of a new approach to class inspections and infrared thermography is seen as a major component of these programs and deservedly so.

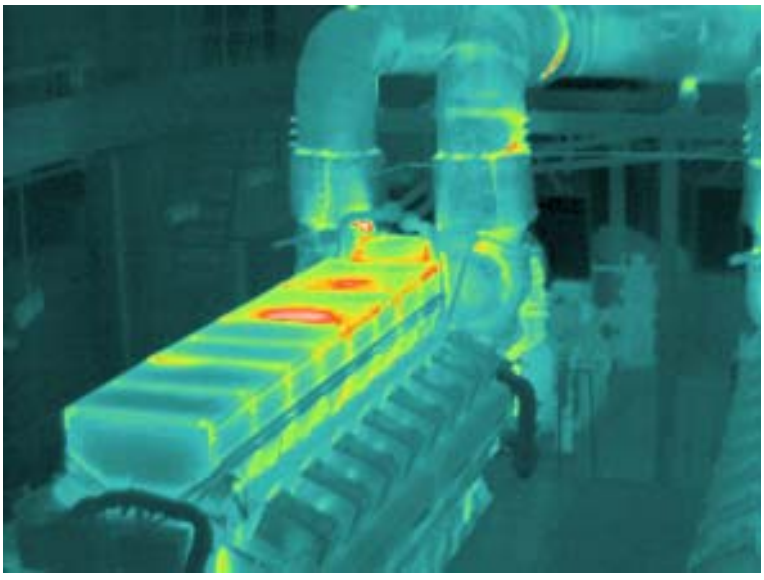
So what are the benefits?

The potential benefits of a thermographic inspection are many and studies carried out ashore bear this out.

- Show compliance with SOLAS "hot surface" regulations
- Reduced potential for fire
- Reduced maintenance costs
- Reduced plant failures
- Reduced downtime
- Increased safety of personnel
- Increased plant availability
- Increased useful life of equipment
- Improved return on investment

Furthermore, a thermographic inspection will nearly always find something which more than compensates for the financial cost of the inspection. Sometimes the savings can be astounding.

I have not yet met another thermographer who doesn't get a huge amount of satisfaction from discovering a potentially disastrous fault for a client. One of my favourite discoveries came early on during my first inspection of a fishing vessel. The engineer was not particularly enthusiastic but had been persuaded to go ahead by the shoreside electrician who happened to be an old friend of mine. Ten minutes after arriving on board we were inspecting a small MCC when the engineer arrived to see how we were getting on. The rear panel of a cableway was removed at that moment and although all inside was in darkness I could see a loop of cable 'glowing' at about 130°C. The insulation was mostly gone and the implications of this find were immediately obvious to all of us, as it was highly unlikely that this extremely serious fault would otherwise have been found.



Engine exhaust affected by rain

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This was a major fault that was attended to immediately but it is not always the case. All of this money and effort is wasted if the warning signs are ignored. After the results of a survey are known then repairs must be made. A fairly obvious statement to be sure, but it is not unknown for faults to find their way to the 'too hard basket' and eventually be forgotten. Of course, by the time the next survey comes around a large percentage of them will be in a worse condition and some will have made themselves known in spectacular fashion.

Some insurance companies ashore have long required that certain 'high risk' clients not only undergo infrared inspections of their premises on a regular basis, but also have any subsequent repairs re-inspected to ensure that the faults found have indeed been rectified. This is certainly a great incentive to get the job done and it has the added bonus of being driven by the 'bean counters'. And with luck the cost of the survey won't even come out of the maintenance budget.

Regular thermographic inspections are also a very effective tool for enabling labour to be directed at the most pressing problems and the reports can be archived, either electronically or as hardcopy, to help engineers to trend the thermal footprint of machinery and electrical systems over time.

Condition monitoring has now become an important part of marine plant maintenance activities and infrared thermography is arguably the most immediately useful technology at the marine engineer's disposal.

David Booth is the managing director of Blue C Engineering Services Ltd, which conducts thermographic inspections for marine and industrial clients in New Zealand and overseas.

In the aftermath of Katrina

Paul Owen lists the impact of the Hurricane on the Gulf area

Hurricane Katrina, which hit the US Gulf Coast on the morning of 29th August 2005, devastated the ports of New Orleans, Gulfport, Pascagoula, Port Fourchon, Mobile and many others. In Gulfport a three-storey barge was found in the middle of the Great White Fleet's facility, while P&O Ports and the Dole terminals were completely flattened.

In the maritime press it was reported that at the Dole berth some 150 containers were a total loss with many swept miles away leaving the port in chaos. Around 4,000 tons of frozen chicken in a P&O warehouse were strewn across the city.

Although the river front terminals in New Orleans survived the hurricane in fairly good condition they will be utilised by the military for the following few weeks and therefore not necessarily available for commercial use. Two passenger ships, Carnival's Ecstasy and Sensation were brought in to primarily house law enforcement officers and fire fighters. New Orleans port was expected to restart commercial operations by 13th.

The lower Mississippi was reopened to traffic by 13th September, although a damage estimate put the cost of repair at $1.6bn for the port of New Orleans including two bridges and a lock. This waterway is critical for grain exports from central USA at this time of year.

The most damage to rigs and manned platforms was sustained in the Gulf of Mexico although information is not easy to come by as oil companies are reluctant to divulge information about their operations.

Many rigs were swept away from their moorings with the Ocean Warwick Rig, drifting 60 miles to ground 100 yards off Dauphin Island at the mouth of Mobile Bay. The Coast Guard reported on the 2nd that up to 20 rigs were adrift and one was on fire.

Royal Dutch Shell's huge tension-leg Mars platform, which produces 250,000 bbl of crude oil – one-sixth of the *entire* Gulf's output – and 365 million cubic feet of natural gas, is reported to have sustained "significant damage".

The American Petroleum Institute reported during the week of September 5th that Katrina damaged or displaced 58 platforms and rigs and totally destroyed 40 others. Two weeks after Katrina an estimated 122 out of 819 manned platforms and three out of 134 rigs were still evacuated. At that time the oil companies had only just started inspecting the submerged facilities and the pipelines that lie along the Gulf's seafloor for damage.

On 10th September around 60% of the US Gulf's daily crude oil production. 38% of natural gas production and four major refineries representing 5% of national capacity were still shut down two weeks after Katrina struck. Normality of oil supplies was not expected to return until November.

There remains much work to be done to repair the damage from Hurricane Katrina, and it remains to be seen whether the consequences will turn out to be worse than Hurricane Andrew, which hit Florida in 1992.

Water Ingress Monitoring

A guide for masters of bulk carriers

New regulations that became part of the Safety of Life At Sea (SOLAS) Convention entered into force on 1st July 2004. Bulk carriers are now required to carry equipment that will give early warning of water ingress to the hull. For ships that exist at the time of introduction of the new regulations it will be permissible to fit this equipment after the date of coming into force but not later than the first annual, intermediate or renewal survey after that date.

Water Ingress Monitoring (WIM) is not a new concept. Masters will recognize that daily monitoring of bilges and tanks has been a feature of prudent seamanship since antiquity. However, this method of monitoring does not provide continuous information. Furthermore, when weather deteriorates the manual process is usually suspended because of the dangers to crewmembers taking the soundings. In such conditions the risk of flooding in the ship is increased and therefore some method of continuous monitoring should be introduced. The concept now adopted for bulk carriers by IMO monitors not only for the presence of water, but also, in the cargo hold spaces, the speed of ingress. To achieve this a two stage alarm is used, one at a low level in the hold, the second a short distance above it.

Methods of detection may vary. Some manufacturers use simple float switches, others may have other methods of detecting water. It is even permissible to install alarm points at the levels prescribed in the regulation in remote tank sounding systems.

This article describes an example WIM system in more detail and how the provision should be used within the ship's Safety Management System. There are many variations in bulk carrier design. Each must be addressed individually. For example, some ships do not have lower stools in which detection equipment can be positioned and thereby be well protected. In such cases WIM can be installed in protective tubes alongside existing sounding pipe arrangements.

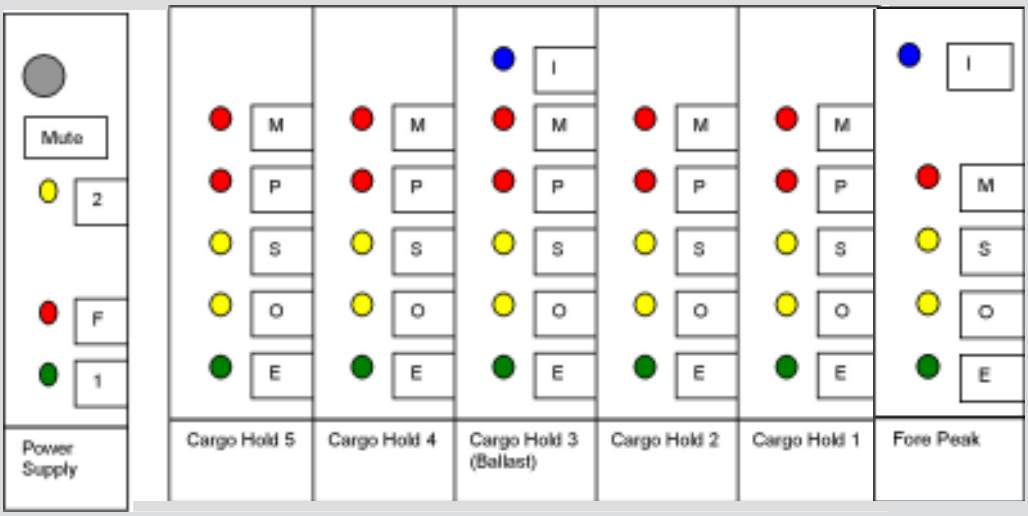
Equipment description

Equipment designed for the purpose of monitoring water ingress to the hull of a bulk carrier must conform to a performance standard. Different manufacturers may design their equipment with variations in layout but all must be provided with certain minimum indicators and alarms. The alarm panel shown below does not represent any particular manufacturer's product neither does it depict any particular ship. It is intended to illustrate a typical layout that incorporates all the requirements of the performance standard.

The panel shown represents one fitted to a bulk carrier with five cargo holds. The spaces monitored are all the cargo holds and the forepeak tank. Other spaces forward of the collision bulkhead (such as forward Bosun's stores) may be monitored if they are deemed as having a significant effect on the reserve of buoyancy or stability within the hull in the event of such spaces flooding.

The example shown also has one of the cargo holds – number 3 – capable of being filled with ballast. Designations used may vary between manufacturers but the terms "Pre-alarm" and "Main alarm" are stipulated in the new regulation. The panel must be positioned on the bridge together with the audible alarms associated with it. Repeater panels may be placed in other spaces but are not compulsory.

Representative Panel for Water Ingress Monitor



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Actions in the event of activation

Masters of bulk carriers should be aware that the purpose of the Water Ingress Monitor (WIM) is to provide the maximum possible early warning of a condition that may seriously threaten the vessel's survival. Bulk carriers, through necessity of the need to carry large volumes of bulk cargo, are fitted with cargo spaces that, in the event of flooding, represent a major loss of buoyancy. Added to this is the possibility that the cargo in the holds may be small in volume but high in density, which allows for a larger volume of water to enter the hold than would be the case for vessels carrying lighter cargoes occupying larger volumes of internal space.

The Water Ingress Monitor therefore serves a similar function to a fire alarm. It signals a condition that requires immediate attention and could – if the condition progresses - eventually lead to the need to evacuate the ship. For this reason the performance standard has been written to include many similar features to fire alarm systems.

Every system must have:-

Indication of power supply status
(in the panel on the extreme left in fig.1).
1 = Indicates primary electrical supply
2 = Indicates secondary electrical supply (when provided). Many systems will incorporate a standby source of electrical power.
(in each of the segments of the panel representing individual spaces)
E = Electrical supply: Lit when that part of the system is supplied normally.

Indication of a fault
(in the segment of the panel on the extreme left in fig. 1)
F = Fault
(and in each segment representing a particular space)
O = Open-circuit indication. Lit when a fault is detected in the form of open-circuit.
S = Short-circuit indication. Lit when a fault is detected in the form of a short circuit.

The "O" and "S" indications may be duplicated in the Power Supply panel in place of the single "F" indication but the individual space monitors must have the two distinct alarm indications operating from internal diagnostics.

Indication of an alarm condition
(in each of the segments in the panel for individual spaces)
P = "Pre-alarm" indication. Lit when water is detected in the space at the lower of two sensors (0.5 meters above the bottom of the space (excluding bilge wells).
M = "Main alarm" indication. Lit when water is detected in the space at the higher of two sensors or, in a space provided with only one sensor, (such as a ballast, void or other significant space forward of the collision bulkhead), at that sensor. In holds this is 15% of the depth of the hold or 2 meters, whichever is greater. In ballast tanks forward of the collision bulkhead this level is 10% of the depth of the space and in dry and void spaces, any part of which extends forward of the collision bulkhead the level is 0.1 meters. All measurements exclude bilge wells.

Indication of ballast interlock activation
(in the segments of the panel representing the ballast hold and the fore peak tank)
I = Interlock indication. Lit in the event of a ballast tank or hold having the system overridden during carriage of ballast water. Such systems are only permissible if they automatically reset when the water level falls below the Pre-alarm level.

Audible alarms
Pre-alarm: The visual indicator is accompanied by an audible alarm.
Main alarm: The visual indicator is accompanied by an audible alarm that is distinct from (and preferably louder than) the other audible alarm.
Fault alert: The visual indicator is accompanied by an audible alarm, which may be the same as the pre-alarm but must not be mistakable for the main alarm.

All alarms should be distinct from other alarms on the bridge except that a main alarm may be linked to an emergency alarm in the same way that fire alarms often are.

Also in the left hand "power supply" segment of the example panel is a mute button.

All audible alarms should be connected to a mute button. This is to prevent interference with communication caused by loud alarms during the investigation process. The mute button cannot extinguish the indicator lamp, which must remain lit until the condition causing its activation is no longer present. An exception to this rule is in the case of spaces in which ballast is carried. The monitors for these spaces may be fitted with interlocks that disable the alarms and indicators but this interlock must be arranged so that when the (ballast) water level falls below the lowest alarm the monitor returns to the active condition.

The systems must be provided with internal monitoring arrangements aimed at detecting faults. The two principal types are open and short circuit and these should be detectable on each branch of the system so that – for example – an open circuit detected on a monitoring sensor in a hold is clearly identified in that part of the system. Furthermore, the existence of such a fault should not affect the operation of the remainder of the system that serves other spaces.

Water Ingress Monitoring - continued

In the event of an alarm sounding the officer of the watch should, without delay, attend to determining its precise nature. As with fire alarms, activation of the WIM should signal the first stage in going to emergency stations.

After this first stage, which should include the mustering of all crew at their respective emergency stations, a responsible officer should be detailed to investigate the alarm.

Investigation

It is important that investigation is carried out responsibly and that the process does not endanger lives. Seafarers have been swept overboard in heavy weather conditions when they have ventured on deck to investigate a known ingress of water. Adverse weather conditions may make such operations extremely dangerous and masters should not commit crewmembers to open decks unless there is no alternative. In making such a decision masters should consider the value of such action. The purpose of WIM is to make it possible to know the condition in each hold without having to locally investigate.

If an alarm is activated, the master should – without delay - seek to verify the condition by reference to other indicators:

- Is the vessel taking a list?
- Is the vessel trimming excessively?
- Is anything visible on deck such as dislodged hatch covers and water emerging from spaces that would otherwise be dry?

These indicators may be provided by such systems as heel indicators, trim indicators and draft gauges.

It should be remembered that the purpose of the investigation is to determine first, that a real alarm situation exists and second, the extent to which the situation has progressed. The WIM may overtake this activity. For example, if an alarm has activated in one space and this is followed by another alarm, either in the same space or, more onerously in an adjacent space, it is reasonable to conclude that the situation is real. In the case of a bulk carrier, if two holds are flooding the ship almost certainly cannot remain afloat. The master should act swiftly to protect the lives of those on board. Unless the vessel is in such shoal waters that grounding will occur before immersion of the hull, the crew should be prepared for evacuating the vessel without delay.

EVACUATION ITSELF, HOWEVER, SHOULD BE A LAST RESORT AND ONLY ON THE DIRECT ORDER OF THE MASTER.

Precautions

Some key actions should be considered essential in the event of any activation of WIM.

Vessel's crews should:
In the event of activation of a "pre-alarm", go to emergency stations. This should include preparation of life-saving appliances in readiness for evacuation but the craft should not be lowered or boarded.

Alert shore rescue co-ordination stations using Urgency or if rapid sinking is detected early, Distress[1].

In the event of a main alarm, muster (all personnel) at abandon ship stations with the exception of those crew members engaged in investigation of the alarm and/or keeping systems running. Upgrade any urgency signal to one of Distress.

In the event of a second space alarm activation – either Pre-alarm or Main alarm – ensure all personnel are recalled from investigation and other duties and sent to abandon ship stations. This should include any crew remaining in the engine room or other spaces;

BOATS, LIFERAFTS OR OTHER LIFE-SAVING CRAFT MUST NOT BE LAUNCHED UNLESS THE SPECIFIC ORDER TO DO SO HAS BEEN GIVEN BY THE MASTER.

The master should only order evacuation of the vessel:

• If the vessel is truly sinking. Checks of other indicators should be made quickly e.g. draft gauges, heel indicators, rapid air expulsion from vents serving spaces suspected of flooding, dislodgement of hatch covers, water emerging from spaces where it should not be expected.
• The depth of water is greater than the depth of the hull (a beached ship should not be abandoned).
• The speed of sinking is such that launching of life-saving craft must begin immediately in order to reach the water before the ship sinks[2]. Bulk carriers are renowned for sinking fast – particularly if loaded with heavy cargoes such as iron ore.

Warning

- Seafarers have been lost when bulk carriers have sunk due to having insufficient time to evacuate the vessel.
- Bulk carriers have, on occasions, sunk so fast that not even distress signals were not sent out.

These are two good reasons not to become complacent about water ingress alarms.

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Update - MCA Small Code Vessels

Report by Norman Finlay

It is difficult to know where to start, but I suppose the first item is to report that the Harmonisation of the Codes for under 24m loadline length vessels for Commercial use is now finished. Unfortunately, due to the Government's legal process, the Code has not been officially ratified and made legal. However, the MCA have agreed that it can be used, but Owners have to decide which of the two Codes they wish to be certified under. There can be no cherry picking, ie taking the best of both Codes to get the best possible arrangement for their boat.

Most of the work on the Code done by SCMS is for workboats and there is not a lot of difference in the overall content of the Codes, but Surveyors need to be aware that there are some subtle differences.

In general, the Code has been very successful, particularly where the workboats are concerned and the overall standard in the UK is now very good. It has also encouraged many Operators to upgrade their fleets so that now UK Operators have one of the best fleets in the world. A side effect of this is that UK Operators are now working in many overseas areas. Whilst this is good in itself, it has highlighted other problems that were not apparent earlier. The main problem is with crewing of the vessels. Other Flag States are insisting that crews have STCW 95 Certificates, which few of the crews have.

Crew Certificates were geared around the Royal Yachting Association (RYA) Offshore Power Boat Certificates in compliance with MCA agreements. In concert with the National Workboat Association, we have been lobbying the MCA to recognise the Workboat Industry as an entity in itself, and that there should be a means whereby crews of large workboats can progress from nothing to holding a STCW 95 Masters Certificate of Competency for vessels up to 200 tons: this covers the largest workboats. In this, we have been successful and are currently finalising the details of the scheme. In a sense, this is not our concern, but as a Certifying Authority, we get involved in Owners day to day requirements under the Code.

It must be pointed out also that some Flag States do not recognise either the Code or RYA Certificates. One such Country is the Republic of Ireland and I stress that if a Surveyor is involved in a vessel going there to work, they need to contact me to get the latest information on this. The Irish are being particularly difficult and recently all workboats going there have been detained.

Hanging around in the background is the European Directive for Inland Waterways, which could soon be enacted. Unfortunately it does not appear to be user friendly, and in many cases is incompatible with the Harmonised Code which operates in the same areas. We are involved in trying to find a solution to this and will keep people informed as and when news is to hand. Anyone with queries on the Codes can contact the Secretary at the office or myself on +44 (0)2380 767882.

Vessels currently under the Code:

- Workboats 198
- Small Commercial craft 161
- Line boats 6
- Other (Police and Pilot Boats) 48

Water Ingress Monitoring - continued

If alarms frequently malfunction, the equipment should receive priority attention to rectify the fault. Crewmembers should not be reticent to muster. If an alarm is false, the crew can be stood down, but if it is genuine and crew are not mustered, there could be insufficient time to do so if flooding progresses rapidly – loss of sleep is less serious than loss of life. These are principles that are well established with fire alarms. Flooding is potentially more serious than a fire that can be fought. Only the most serious fires can threaten the survivability of the ship in terms of buoyancy but flooding is the beginning of sinking. It should therefore be afforded higher status than fire. It should be the highest status alert condition on board the ship.

(Footnotes)

[1] It is always possible to downgrade an earlier urgency or distress signal if a situation is not as serious as originally anticipated. It is not possible to upgrade a signal that was never sent if a situation is truly serious and escalates rapidly.

[2] Vessels fitted with Free-Fall lifeboats may also have the capability for these craft to Float-free. This gives additional time for evacuation.

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Learning from others mistakes

Our thanks to Casebourne, Leach & Co for sharing this cautionary tale of less haste, more speed, and the need for close superintendence

The incident involved a bulk carrier of about 20,000 grt, which drydocked in the former USSR for a special survey and dry dock inspection in the late nineties. The four bladed, fixed pitch propeller was removed with some degree of difficulty. After the stern seals were replaced, the propeller was fitted and the "Pilgrim" type hydraulic tailshaft nut incorporating a hydraulic jack was lifted from the dock bottom using a 'D' shaped tool which was fitted with a zinc surfaced roller and lifted towards the shaft. The nut was rotated along the shaft using a basic hand spanner. The progress was slow, so a rope was fitted around the nut and hauled in by an 80 tonne dockside crane. The nut was rapidly moved over the threads until it was at distance of approximately 10-15mm short of the hub, when it stopped and was found to be seized upon the tailshaft.

The rope was disconnected and the yard then suspended a six tonne pneumatic powered chain hoist from a strong point located on the stem, with the hook attached to the recess in the nut and some of the remaining chain wrapped around the nut. When the six tonne chain hoist was hauled in it imparted a rotary force to the nut. A sledgehammer was also used to strike an adjacent recess on the nut. The nut moved approximately half a revolution forwards and then stopped again.

The chain hook was then shifted to the opposite side of the nut and force was again applied in an attempt to loosen it. The movement proved to be very slight; efforts were halted and thinking caps donned.

Changing tack

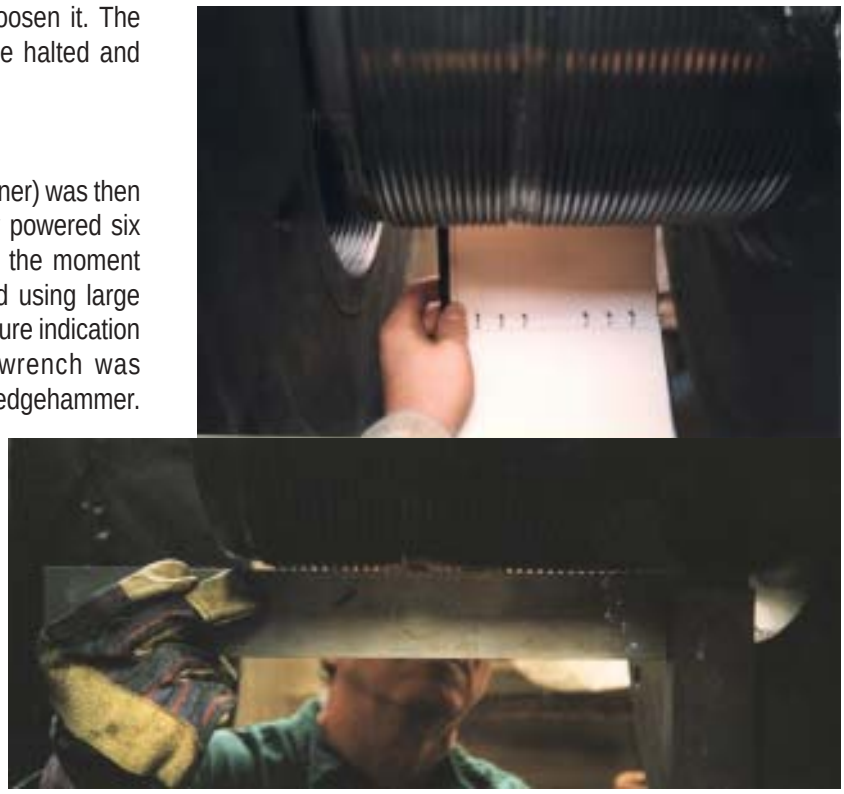
A large moment impact wrench (big flogging spanner) was then fitted over the nut. The hook of a pneumatically powered six tonne chain hoist was connected to the end of the moment impact wrench. The nut was additionally heated using large industrial burners until it turned blue in places, a sure indication of overheating. The large moment impact wrench was additionally struck from above by a very large sledgehammer. The nut failed to move but the torque applied was so great that the whole shaft with the propeller attached revolved and was only restrained by the turning gear.

The yard then proposed to fit a split shim to make up the distance between the nut and the propeller hub. The shim would then be welded to the nut and the nut rotated the required revolution in order to tighten it up against the hub. This method of repair was disapproved by the attending Class Surveyor.

The yard then decided that there was no alterative but to remove the nut by flame cutting it in two. The attending Classification Surveyor was asked by the yard if, after flame cutting, it was possible to then repair the nut by re-welding. The Classification Society Surveyor informed the yard that any attempt to repair the nut would not be satisfactory.

A spare tailshaft nut was found in the engine room store and the offending nut was cut in two with care being taken not to cut the tailshaft threads. However, an inspection of the tailshaft after cutting revealed at least four threads were heavily damaged, the threads being stripped by between a quarter and up to half of the circumference.

Additionally, several threads had small notches cut into the peaks over a depth of about 2 mm, and at least four other threads were totally stripped. Other threads displayed varying degrees of damage. The attending Classification Society Surveyor concluded that the tailshaft was not damaged to such an extent that it would have to be replaced and he was satisfied the threads on the tailshaft could be repaired in-situ using hand tools.



Photos showing the damaged tailshaft

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The tailshaft nut "D" shaped lifting tool was inspected and the device was found to be constructed from mild steel plate with fabricated lifting lugs at one end and a zinc-surfaced roller at the other. The zinc surface was heavily grooved with the impression of the nut internal threads. Where the grooves had crossed over small pieces of zinc had broken and flaked off in the form of swarf and zinc 'shreddies'.

The spare nut, having been cleaned in the yard workshops, was transported back to the ship. Compressed air was used to blow away dirt and debris from the internal thread surfaces. The tailshaft threads were similarly cleaned, then lubricated with a graphite-based grease. The nut was offered to the shaft but failed to take to the threads. Shipyard fitters then removed the grease and commenced removing material from the deformed and damaged threads of the tailshaft using grinding tools. This process was repeated during the course of the day. Eventually it was realised the internal diameter of the nut was far less than the tailshaft diameter and it was decided to machine down the internal diameter of the thread of the nut to suit that of the shaft.

Cause and effect

The seizure of the pilgrim nut was caused by foreign bodies trapped between the threads of the shaft and nut, most probably swarf from the zinc coating of the lifting tool. It is likely that the speed at which the nut was run up on the tailshaft threads was greater than the speed the zinc roller could rotate, with the result that the nut revolved on the zinc roller, the threads churning the zinc into 'shreddies'

It was evident that the shipyard did not employ experienced staff to work on the vessel. During initial removal of the nut the proper tools that were required, such as a rotary nut cradle,

The split tailshaft nut

The tailshaft nut lifting tool

were not used. Had they been used the incident could have been averted. There is no substitute for close superintendence.

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The correct way to replace a tailshaft nut

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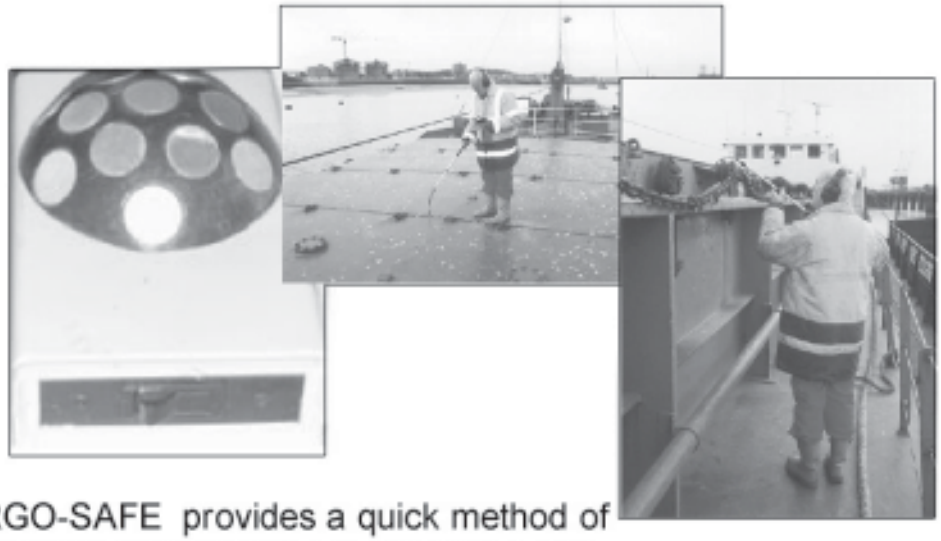

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AIS & Ballast Water Management

Euan Davidson outlines the origins of the *International Convention for the Control and Management of Ship's Ballast Water and Sediments 2004*, and considers some of the practical problems of implementation for seafarers.

Seafarers could be forgiven if their initial response to the title of this article was: "What has the Automatic Identification System for ships, introduced by the International Maritime Organisation (IMO) in 2000, and a mandatory requirement with effect from December 2004, got to do with Ballast Water Management. Is this a new 'spy in the sky' project?"

In this case, however, the initials AIS stand for Aquatic Invasive Species, and the title refers to the well established link between the transfer of aquatic organisms and the normal ballasting operations carried out by all types of vessels around the world.

A general introduction to the origins and necessity for an internationally agreed policy on Ballast Water Management can be gained by selecting the Marine Environment and Ballast Water Management sections on the IMO web site at www.imo.org, and is summarised in the following opening paragraphs of this article.

Origins

The effects of the infiltration of local waters by alien species of aquatic organisms were first recognised in 1903, when scientists recorded the presence of Asian phytoplankton algae in the North Sea. The overall significance of the scale and extent of the problem was, however, not fully recognised until more in depth investigations began during the 1970s.

The problem came more to the forefront when it became evident that Canadian and Australian waters were experiencing specific problems due to the presence of unwanted species in the 1980s, and the national governments brought their concerns to the attention of IMO through the offices of the Marine Environment Protection Committee (MEPC).

The MEPC adopted Resolution 50 (31) in 1991, '*Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ship's Ballast Water and Sediment Discharges*', and the issue gained recognition as a matter of major international concern at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992.

After considering the MEPC Guidelines of 1991, IMO adopted Resolution A.774 (18) in 1993, incorporating the MEPC guidelines, and requesting both the MEPC and MSC (Maritime Safety Committee) to continue with a review of the guidelines, with a view to developing internationally applicable and legally-binding provisions. In turn, this led to the adoption of Resolution A.868 (20) by IMO in 1997, and ultimately to the adoption of the '*International Convention for the Control and Management of Ship's Ballast Water and Sediments*' in February 2004.

Understanding the consequences

While seafarers and ship operators around the world may consider the ballasting and de-ballasting of a vessel as an apparently harmless, and entirely normal and essential routine part of a vessel's operations, which results in no evident adverse effect on the vessel other than a gradual accumulation of sediment in ballast tanks, and the effects of corrosion on the tank structure if anodes/coatings are not adequately maintained, there can be no doubt that the procedure can contribute to much more significant consequences below the surface of the water in the de-ballasting port.

These consequences become even more significant when the operation is considered on a global scale rather than an individual vessel basis. It is estimated that 3 – 10 billion tonnes of ballast are currently transferred from one area to another on an annual basis, and with the overall volume of seaborne trade continuing to rise, this figure will inevitably increase.

Furthermore it is also evident that a major proportion of this overall volume will be concentrated around the ports serving the major trading routes of the world, resulting in significantly greater local impact in major port areas handling high volumes of shipping cargoes.

AIS & Ballast Water Management - continued

For an extended period the debate appeared to be one of scientific and ecological interest, with little impact on the practical seafarer or ship operator, and there may have been a tendency on the part of the shipping industry to be dismissive of what may have appeared to be a theoretical debate.

With the introduction of the Convention, however, all of that is now required to change, and ship operators are required to take notice of the impact on their day-to-day operations.

Ship operation issues

The writer is not a marine scientist, and it is not intended to enter into detailed discussion of the proof of the extent and type of invasion by aquatic species that has been documented around the world, or the ecological impact that this has caused, but rather to address the issues more directly relevant to ship operations.

Among the overall provisions the Convention requires, the following are directly relevant to ship operations :-

- Vessels will require to be issued with an International Ballast Water Management Certificate.
- Ships must have on board and implement a ballast water management plan approved by the administration.
- Except where expressly provided otherwise, the discharge of ballast water shall only be conducted through ballast water management in accordance with the provisions of the annex.
- Ships must maintain a ballast water record book to record when ballast water is taken on board, circulated or treated for ballast water management purposes, and discharged to the sea or to a reception facility. Accidental or exceptional discharges of ballast must also be recorded.

The convention includes 2 optional standards for ballast water management defined as :-

- Ballast Water Exchange Standard
- Ballast Water Performance Standard

The ballast water exchange standard requires that :-

Vessels achieve an efficiency of 95% volumetric exchange of ballast water.

The ballast water performance standard requires that :-

The ballast discharge shall contain less than 10 viable organisms/m^3 greater than or equal to 50 micrometres in minimum dimension, and less than 10 viable organisms/millilitre less than 50 micrometres in minimum dimension and greater than or equal to 10 micrometres in minimum dimension, and discharge of the indicator microbes shall not exceed the specified concentrations.

The specified concentrations are currently defined as :-

Less than 1 colony forming unit (CFU) per 100 millilitres Toxicogenic Vibrio Cholerae, or less than 1 CFU/gram zooplankton.

Less than 250 CFU/100 millilitres Escherichia Coli.

Less than 100 CFU/100 millilitres Intestinal Enterococci.

Vessels may be subject to Port State Control Inspections in respect of their Ballast Water Management Certificate, Ballast Water Record Book, or in case of doubt/dispute, sampling of the ballast water.

The current net effect of the regulations is to impose a requirement for the exchange of all ballast water at sea, or to require that all ballast water is treated such that it complies with the specifications laid down under the Ballast Water Performance Standard.

Where ballast water exchange is the method to be adopted, the convention places further restrictions for the vessel to be at least 200nm from shore, and in a water depth of at least 200m, when any such exchange is carried out.

In due course, as new-buildings are delivered, and improved treatment technology becomes available, it will be necessary for all vessels to comply with the Ballast Water Performance Standard.

Compliance

The regulations allow for an extended introductory period, giving some variations in the method of compliance with ballast water management depending on the year of build for a vessel, or its total ballast carrying capacity. Existing vessels will be permitted to meet with the ballast exchange requirements up until 2014 or 2016, depending on their ballast capacity. For new buildings the cut-off dates before vessels have to comply with the full requirements of the ballast water performance standards will be 2009 or 2012, depending on their ballast capacity.

Since the prime area of interest for ship operators at present, will be implementation of the requirements of the Convention on their existing fleet, it is intended to concentrate on the ballast

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AIS & Ballast Water Management - continued

water exchange method of compliance for the ballast water management programme in this article.

The requirements for handling of ballast water and sediments discharged/removed from tanks at repair yards etc., existing and future treatment technologies, and methods of compliance with the ballast water performance standard, will be considered in a subsequent article.

Ballast water exchange methods

If the exchange method of ballast water management is to be adopted, it can be carried out by 2 methods, either the sequential method, or the flow through (pump through) method.

It has been estimated that the proportion of the volume of ballast in any tank exchanged by the flow through method varies approximately as follows :-

100% Flow Through = 63% Exchange
200% Flow Through = 86% Exchange
300% Flow Through = 95% Exchange
400% Flow Through = 98% Exchange

From this it has been established that in order to achieve a 95% volumetric exchange of ballast water in a tank it is necessary to either discharge and refill the tank, referred to as the sequential method, or to exchange the water in the tank by pumping through at least 3 times the volumetric capacity of the tank, referred to as the flow through, or pump through, method.

The Convention does allow for pumping through less than 3 times the tank volume if it can be shown that 95% efficiency can still be achieved with a lesser volume, but in practice it is considered that 3 times the volumetric capacity would be the norm.

Unlike many of the existing IMO Conventions, which allow for variations in interpretation or application for different types of vessel, the requirements of the Ballast Water Management Convention apply equally to all types of vessel, from Passenger Ships, Tankers and Bulk Carriers etc., right down to mini-bulkers.

Existing passenger vessels, and some categories of Ro/Ro and coastal vessels, may be able to avoid the implications of the Convention due to their generally lower ballasting volume requirements, or relatively static displacement characteristics, by adopting a fresh water ballasting strategy, but it appears clear that the most heavily affected class of vessel will be the larger tankers and bulk carriers.

Practical experience

Some time ago, former SCMS President John Knott, drew the writer's attention to an article published in the 2001 Annual Review of the International Cargo Handling Co-ordination Association (ICHCA), in which Captain N.Cooper reported on his experiences in attempting to follow the IMO guidelines for ballast water management on a Cape Size bulker under his command.

Captain Cooper was a serving Master on a conventional Cape Size bulk carrier, and reported that a proposed programme for sequential change of ballast had been checked on the vessel's loading computer, to confirm that all shear force and bending moments, and the resulting draft/trim conditions, remained within acceptable sea-going limits.

The vessel was arranged with Fore peak, Aft peak, Nos.1 – 5 P/S double bottom tanks, and Nos.1 – 5 P/S topside ballast tanks, with the DBT and TST separated, and the sequential method involved the discharge and refilling of the DBT and TST in a staggered pattern.

The loading computer results indicated all conditions remained satisfactory and the vessel proceeded to implement the calculated programme under calm weather conditions.

During discharge of No.4 double bottom and No.2 topside tanks the vessel experienced severe vibration, and abnormal flexure was evident along the entire length of the hull. The vessel reduced speed, and discharge of the double bottom tanks was immediately stopped, with refilling of the tanks commenced without delay.

It was reported that the frequency of the hull flexure coincided with approximately half of the engine rpm, and this pattern continued even after reducing engine speed and altering course. Captain Cooper stated that the vibration and flexure only stopped once the double bottom tanks were restored to almost full condition.

The problem was resolved by restricting the discharge of the double bottom tanks to approximately 50% and refilling with fresh ballast, then repeating the procedure in order to achieve the equivalent of a full discharge and refill of each tank.

As an alternative to emptying the tanks Captain Cooper also reported that he had experimented with the flow through procedure for the topside tanks, by continually pumping the tanks and allowing them to overflow through the air vents over a 12 hour period, in order to ensure that 3 times the volumetric capacity of the tanks was pumped through. At first sight this

AIS & Ballast Water Management - continued

procedure appeared to have been successful, but on later investigation it was noted that the air vent floats had suffered significant damage.

Captain Cooper's article also touched on the difficulties of arranging to exchange the ballast in a ballast hold at sea, and the relatively limited weather windows that may be available to vessels for carrying out ballast water exchange programmes on some specific trades.

The writer recently attended a Cape Size bulker of similar arrangement to that described by Captain Cooper (although in the case of this vessel the Double Bottom and Top Side tanks were arranged as common tanks) and noted the following points regarding the vessel and the ballast water programme prepared on board :-

Vessel Particulars :-

LOA/LBP	312.00/300.00m
Breadth	50.00m
Depth	25.30m
Summer Draft	18.00m
Summer Deadweight	211485mt
Summer Displacement	236770mt
Built	1997
Ballast Tank Arrangement :-	
	Capacity (M^3)
FPT	3868
1CDB + 1P/S TST	6245
2P + S DB+TST	8073 each
3P + S DB + TST	8243 each
4P + S DB + TST	8167 each
5P + S DB + TST	7326 each
APT	1282
No.4 HOLD	26438
Ballast Pumps	2 x 3200m^3/hour capacity

The vessel operated a ballast water management programme on the basis of the exchange method, with a typical sequential exchange of the ballast being carried out as follows :-

Discharge & Refill	1P + 5P + 3S
Discharge & Refill	1S + 5S + 3P
Discharge & Refill	2P + 4S + APT
Discharge & Refill	2S + 4P
Discharge & Refill	FPT

Whenever possible ballasting of No.4 Hold was avoided. If it was not necessary to ballast No.4 Hold due to air draft restrictions in the discharge port, but it was considered necessary to ballast the Hold for the intended ballast voyage, the preferred option was to defer the ballasting operation until the vessel was in excess of 200nm from shore, and to discharge the ballast from No.4 Hold shortly prior to arrival at the loading port, or at anchorage.

The writer has also noticed a tendency to defer ballasting of the designated ballast hold on the majority of Cape Size and Panamax vessels that he has attended since they have commenced operating under a ballast water management programme. These circumstances bring memories of attendance to a series of conventional VLCC's in the San Francisco area during the early 1990's, when the vessels only took on the minimum necessary quantity of dirty ballast during discharge, in order to maintain a balanced Inert Gas pressure in the tanks, and avoid venting off IG/Hydro-carbon vapours within the port limits.

The net result remains the same, since this practice results in the vessels manoeuvring within confined harbour/estuarial waters, and close to the coastline, under minimum ballast conditions, and in some instances with excess trim compared to the normal sea-going ballast condition. In the case of San Francisco, in particular, this also often involved manoeuvring within the port limits under reduced visibility conditions.

It seems as if, in attempting to comply with the relevant regulations in accordance with safety or pollution requirements, some vessels are being exposed to a higher level of risk due to their reduced manoeuvrability within port under pilotage conditions, or exposure to prevailing weather conditions within 200nm from the coastline.

Time constraints

Returning to the case of the Cape Size bulker noted in the previous paragraphs, the exchange of ballast by the drain & refill method on this vessel required the discharge and refilling of approximately 75,000m^3 of ballast water if the ballast hold was excluded, or approximately 101,500m^3 including the ballast hold, i.e the handling of 150,000m^3 or 203,000m^3 of ballast water in total during the exchange.

This would have required continuous pumping over a period of almost 48 hours with one ballast pump, if operating at the rated capacity, excluding the ballast hold, or 63 hours if the ballast hold was included. However, in view of the sequential stripping and filling of the tanks it is clear that the pumping would have been carried out at a significantly reduced average rate overall, and hence the operation would have required significantly more time.

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AIS & Ballast Water Management - continued

If the flow through method had been adopted the total volume of ballast water to be handled would evidently have been significantly greater, and the time required proportionately longer.

Furthermore consideration has to be given to the working hours of the personnel in charge of the operation, and it would be normal for the Chief Officer to oversee a ballast operation such as this, since it would be necessary to monitor the trim, draft, shear force and bending moment conditions at each stage, in which case it would be more likely to be restricted to daylight hours operation.

Additional factors that would require to be taken into account include the following :-

- Weather forecast including sea state and/or wind speed/direction.
- Ice conditions or sub zero temperatures.
- Crew availability. (Tank sounding, valve operation, E.R manning)
- Equipment/machinery availability. (Ballast pump(s), auxiliary diesels)
- Over/under pressurisation of ballast tanks/ ballast hold.
- Free surface/sloshing effects.
- Contingency planning. (Failure of ballast pump or power failure)

From the above it can be seen that completing a full exchange of ballast water at sea on some ballast passages, particularly relatively shorter voyages such as trans-Atlantic routes, or similar, can become a time consuming exercise, and reduce crew availability for other routine tasks such as deck maintenance, hold cleaning etc.

Cost factors

Apart from the obvious need to avoid structural damage to the vessel due to slamming/pounding of the hull, or sloshing in the tanks, the ballast exchange procedure will also result in a significant cost element when repeated on a regular basis during each ballast passage, due to overtime payments, increased fuel consumption during operation of the ballast pump(s), increased maintenance of ballast pumps/lines/valves, increased running hours and maintenance of auxiliary diesels, increased spare parts/repair costs, and possibly increased steelwork/coating maintenance/repairs in the ballast tanks due to the increased erosion rates within some areas of the tanks.

Ways to improve compliance

As the requirements of the Convention have entered into the practical realm of ship operation, ship owners, builders and designers have started to address ways of improving the means of compliance for vessels currently on order.

The writer noted the first positive signs of this during a recent visit to a 2004 built Cape Size bulker. This vessel was of similar overall dimensions and capacity to the vessel highlighted in the preceding paragraphs, but the ballast tank arrangement comprised the Fore Peak, Aft peak, Nos.1 – 7P/S combined DBT + TST, and Nos.8 & 9P/S DBT, corresponding to a ballast tank in way of each cargo hold.

The ballast pumping capacity was also slightly reduced, comprising 2 x 2500m^3/hr ballast pumps, presumably taking account of the reduced capacity of the individual ballast tanks, although the ballast hold (No.6 in this case) remained of approximately the same capacity as the previous vessel highlighted.

The obvious advantage of this arrangement over the more conventional arrangement outlined previously is the reduction in relative size of each tank, giving a corresponding reduction in the effects of the ballast exchange operations on the free surface, sloshing, shear force and bending moments.

In considering the wider aspects however, it is clear that there would have been an increase in the new-building costs due to the provision of additional watertight bulkheads in way of each DB/TST, additional suction branches, bellmouths and isolating valves for the tank suction/filling connections, additional hydraulic system for valve operation, additional tank gauging facilities, and more instrumentation for the ballast control panel etc., and there would also be an increase in the routine maintenance costs due to the increased number of isolating valves and the extended hydraulic system.

These alterations give an indication of the first stages of modification to vessels to take account of the requirements of the Ballast Water Convention. However, until such time as the developing technology for treatment of ballast water, or means of preventing the ingress of micro-organisms into the ship's tanks during ballasting, become available, it would appear that ballast exchange by the sequential or flow through method remains the only viable option for existing vessels to ensure compliance with the Convention.

Members wanting more information should contact Euan Davidson at: marcon.marine@btinternet.com

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We can inspect and appraise the goods just as soon as we can get someone there. Once we have purchased the goods, transportation and storage are our responsibility.

Thanks to our network of shipping agents and storage facilities we are in a position to move the goods promptly.

We can also handle the trans-shipment of cargo should it be required ether at sea or land and we also offer to source alternative cargo to replace any damaged goods if necessary.

Since its formation, the Company has grown into a fully fledged salvage company with agents in most areas to offer a truly worldwide service.

We specialise in the following areas:

Agricultural Products Cocoa, Tea, Grains, Groundnuts, Coffee, Pulses and Seeds, Oils, Animal Feeds, Fertilisers, Frozen products

Machinery Port equipment, Plant equipment, Motor and Commercial Vehicles, Industrial Equipment, Water Treatment plants, Power plants

Chemicals Organic and Inorganic

Raw Materials Steel, Pulp, Paper, Timber, Plastics, Minerals, Ores and Aggregates

Commodities Spices, Essences, Cottons

Consumer Goods Textiles, Clothing, Electrical Goods

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