

MARINE SURVEY AND THE SAFE CARRIAGE OF HAZARDOUS SUBSTANCES

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Summary

This paper outlines the surveys carried out by or on behalf of AMSA of the hull, machinery, safety and pollution prevention equipment carried on Australian cargo ships engaged in overseas or interstate voyages. AMSA's actions to safeguard ships from cargo hazards are summarised. The importance of safe manning and crew competence are highlighted.

Introduction

Many of the cargoes carried by sea today are hazardous not only to the crew of the ships carrying them but also to the marine environment. These include not only substances carried in packages but also solid and liquid substances carried in bulk. As the world becomes increasingly industrialised and more complex the range and quantity of hazardous substances transported by sea will continue to rise. It is essential if the shipping industry is to improve its safety and pollution prevention record that such cargoes are carried without incident.

Conditions for Safe Carriage

Safe carriage of cargoes requires: the condition of the hull, machinery and equipment to be properly maintained; correct stowage of the cargo taking its properties into account, the number and qualifications of the crew to be satisfactory and for the ship not to be overloaded.

Hull, Machinery and Equipment

Compliance with the International Convention on Load Lines 1966 ensures, amongst other things, the watertight integrity of ship, adequate hull strength when loaded and sufficient stability for the intended service. Compliance with the Convention is mandatory for Australian ships engaged in overseas or interstate voyages.

A Load Line Certificate is issued to a ship after the satisfactory completion of the initial survey before the ship enters service. The certificate is valid for a period of 5 years and is subject to satisfactory annual surveys to ensure the ship remains unchanged and in a satisfactory condition. Load line surveys and issue of certificates are normally carried out by class societies authorised by AMSA for that purpose. Examples of the items included in a load line survey are given in Appendix 1.

The International Convention for the Safety of Life at Sea 1974 (SOLAS), includes, amongst other things, standards for machinery, electrical installations, fire prevention, detection and extinction systems, and cargo stowage requirements. Compliance with the SOLAS requirements is mandatory for Australian ships engaged in interstate and overseas voyages.

The Cargo Ship Safety Construction Certificate is prima facie evidence that a ship complies with the SOLAS requirements. The certificate is issued after the first survey is satisfactorily completed before a ship enters service. The certificate has a period of validity of 5 years and is valid subject to satisfactory annual surveys which ensure that the SOLAS standards have been maintained. Surveys are conducted by classification societies

authorised by AMSA for that purpose. Examples of the items included in the survey for the certificate are given in Appendix 2.

SOLAS '74 requires chemical tankers to meet the requirements of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code). The IBC Code applies to chemical tankers built after July 1986.

The purpose of the Code is to provide international standards for the safe carriage by sea of dangerous and noxious liquid chemicals in bulk by prescribing the design, construction and equipment standards for ships engaged in such carriage. They therefore minimise the risk to a ship, its crew and the environment. The Code does not apply to petroleum or similar flammable products.

The Code contains standards for such things as ship survival capability, location of crew accommodation and machinery spaces, cargo containment, cargo transfer systems, cargo temperature control, control of the environment within cargo tanks, electrical installations, fire protection and extinction, instrumentation and personnel protection. Special requirements for specific cargoes are also included. The Code is mandatory in Australia.

A certificate called the International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk is issued under the IBC Code to a ship following satisfactory completion of the initial survey before the ship first enters service. The surveys are carried out by class societies authorised by AMSA for that purpose. The certificate is valid for 5 years after which it is renewed. Annual surveys are conducted during the period of validity of the certificate. Examples of the items included in the surveys are given in Appendix 3.

Pollution Prevention

The International Convention for the Prevention of Pollution from Ships, modified by the 1978 Protocol (MARPOL 73/78) contains operational and equipment requirements aimed at minimising pollution of the marine environment. Annex I contains operational and equipment standards to reduce pollution of the seas by oil. It applies to oil tankers of 150 tons gross tonnage and above and every other ship of 400 tons gross tonnage and above. These ships are surveyed for an International Oil Pollution Prevention Certificate before they first enter service. This certificate is valid for 5 years and is subject to satisfactory annual surveys during to maintain its validity.

AMSA has authorised six classification societies to conduct the surveys and issue certificates to Australian oil tankers. Pollution prevention equipment and arrangements on all other types of ships are surveyed by AMSA surveyors. Examples of the items surveyed for the certificate are given in Appendix 4.

Annex II of MARPOL 73/78 contains regulations to control pollution by noxious liquid substances carried in bulk, and it applies to all ships carrying these cargoes.

The International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk is issued after a ship has been satisfactorily surveyed and is valid for 5 years. Annual surveys are carried out to ensure that the equipment and arrangements on a ship remain in all respects satisfactory for the intended service of the ship. Noxious liquid substances are normally carried by dedicated chemical tankers, which are surveyed by class societies on behalf of AMSA. Examples of items included in the survey are given in Appendix 5.

Cargoes

The properties of some cargoes have the potential to cause a ship to founder and cause pollution. The dangers of mineral bulk cargoes include chemical hazards such as the

emission of toxic or explosive gases, depletion of oxygen in the atmosphere of a hold, spontaneous combustion and severe corrosive effects. AMSA surveyors can inspect ships intending to load mineral bulk cargoes at any time but some cargoes are regularly policed. These include coal and ferrosilicon.

The prime purpose of coal inspections is to ensure that adequate means are in place to prevent the ignition of methane gas which may be evolved during a voyage. Electrical wiring, electric motors, the suitability of hold ventilation arrangements and gas detection equipment used to monitor the presence of methane in the space above the coal cargo are examples of items inspected.

Ferrosilicon evolves hydrogen gas when in contact with water or moisture. This product contains impurities which produce the toxic gases phosphine and arsine. Inspections of ships intending to load ferrosilicon include bilge wells, precautions to prevent the ingress of gas into machinery spaces, pipes passing through holds in which ferrosilicon is to be loaded, electrical circuits within holds, mechanical ventilation systems to ensure they are explosion proof or arranged so that motors are not in the direct path of hold atmosphere exhausts.

Grain cargoes when carried in their natural state in ships have a tendency to move and represent a potential hazard to ships, crew and the environment. Consequently the carriage of grain by sea is subject to international requirements. These requirements are mandatory in Australia and are applicable to all ships loading grain at Australian ports for discharge in Australia or overseas. Ships intending to load grain in Australia are inspected by AMSA surveyors to verify that the ship is permitted to load grain by the flag State, and has approved grain stability data on board together with an approved plan. The stability under the proposed loading is checked to ensure it meets the international stability criteria, and that the bilge wells are clean, efficient and protected against the ingress of grain. The trimming of the grain surface in completed holds is also checked.

Spaces used for the carriage of dangerous goods must meet special requirements under SOLAS '74. These govern water supply, ignition sources, fire detection systems, ventilation, bilge pumping arrangements, insulation of machinery space bulkheads, personnel protection, firefighting equipment and water spray systems. The requirements for particular ships are determined by ship type and the type of dangerous goods to be carried. The arrangements provided on a ship are surveyed by AMSA as part of the Cargo Ship Safety Equipment Certificate before it enters service and annually thereafter to ensure that the arrangements are in a satisfactory condition. A document of compliance is issued to a ship by AMSA following satisfactory completion of the initial survey.

The principles in SOLAS '74 concerning the carriage of packaged dangerous goods are embodied and elaborated in the International Maritime Dangerous Goods (IMDG) Code. The Code is mandatory for ships loading dangerous goods in Australia. Surveyors normally inspect ships loading explosives or radioactive materials. Other classes of dangerous goods are inspected randomly. Around 30 per cent of ships carrying inward dangerous goods or dangerous goods in transit are inspected. These inspections ensure that dangerous goods are correctly labelled, stowed and incompatible goods effectively segregated to prevent pollution through a fire and explosion at sea or in port. Compliance with the Document of Compliance is also verified.

Manning and Crew Qualifications

It is a requirement of the International Convention on Standards of Training, Certification and Watchkeeping of Seafarers (STCW) for the crews of ships to be properly trained and qualified. These elements of manning are important as the safety of a ship, its crew, cargo and the protection of the marine environment depend to a large extent on the competence of crew.

It is the responsibility of each flag State to determine the manning of ships under its jurisdiction. SOLAS '74 requires flag States to issue safe manning certificates to their ships.

Where the number and category of seafarers on a ship comply with such a document it is accepted as evidence that a ship is safely manned. If a ship does not carry such a document and doubt arises as to whether it is safely manned, the matter is resolved in consultation with the appropriate authority of the flag State concerned. The manning and crew qualifications are checked by AMSA surveyors.

Tanker Surveillance

The operation of tankers in Australian waters is monitored by AMSA under a Tanker Safety Surveillance Programme, developed after discussions with the then Tanker Technical Committee of the Australian Chamber of Shipping. The oil companies, in their capacity as owners or charterers of tankers visiting Australian ports, co-operate closely with AMSA and other government bodies. The program applies to tankers carrying crude oil or petroleum products, including high flash point products such as lubricating oil, but not to tankers carrying vegetable oils. Surveillance of chemical tankers and gas carriers is included in the program.

The principal objective is to reduce the risk of pollution and fire particularly during the loading and unloading operation. Australian and foreign flag tankers are treated alike. The inspection of the tanker operations is based on the International Safety Guide for Oil Tankers and Terminals.

During an inspection the qualifications and experience of the ship's officers are investigated and recorded. The following inspection program has been implemented by AMSA:-

- . Tankers engaged in Australian coastal trade are inspected about every 3 months.
- . Crude carriers engaged in overseas trade are inspected at the first port of loading or discharge on each occasion the vessel visits Australia.
- . Refined Products Tankers engaged in overseas trade visiting ports where a surveyor is stationed are inspected at the first port of loading or discharge on each occasion the vessel visits Australia.
- . Refined Products Tankers engaged in overseas trade visiting only outports where there is no surveyor stationed are inspected about every 3 months.

Future Developments

Flag State Compliance

It has been internationally recognised that not all States effectively implement international standards for safety or pollution prevention. A new sub-committee on Flag State Implementation has been established at IMO. Its purpose will be to facilitate implementation of international maritime safety and pollution prevention standards by flag States.

Crew Competence

The IMO Sub-committee on Standards of Training and Watchkeeping is to review the STCW Convention with the broad aims of making the Convention more effective and to incorporate modern training and certification systems. The review will not be completed until mid-1995 at the earliest.

Evaluation of Solid Bulk Cargoes

Work is currently underway at IMO which may lead to MARPOL 73/78 being extended to include solid bulk cargoes.

APPENDIX 1

INTERNATIONAL LOAD LINE CERTIFICATE

Items examined for this certificate include: stability information; superstructures; doors; cargo and other hatchways; machinery space openings; air pipes; openings in the ships side; scuppers; discharges; freeing ports; crew accommodation strength; bulwarks and access to working

APPENDIX 2

CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

Items surveyed for this certificate include: bulkheads; watertightness of doors and decks; bilge pumping arrangements; main and auxiliary machinery; steering gear arrangements; boilers; engine-room ventilation; engine-room/bridge communication systems, main and auxiliary electrical power sources and unattended machinery space arrangements.

APPENDIX 3

INTERNATIONAL CERTIFICATE OF FITNESS FOR THE CARRIAGE OF DANGEROUS CHEMICALS IN BULK

Items surveyed for this certificate include: location of cargo tanks; cargo containment, construction materials, cargo temperature controls, cargo tank vent systems, environmental control; electrical installations; fire protection and extinction; instrumentation; personnel equipment; stability, location of crew accommodation and machinery spaces; bilge and ballast systems and cargo transfer systems.

APPENDIX 4

INTERNATIONAL OIL POLLUTION PREVENTION CERTIFICATE

Item surveyed for issue of this certificate include: oily water separating equipment; oil filter equipment and arrangements for alarm and automatically stopping discharge; oil content meter; segregation of oil fuel and ballast water systems, sludge tanks and Oil Record Book. Additional items for oil tankers include: segregated ballast tank arrangements; crude oil washing arrangements; cargo transfer system; shipboard oil pollution emergency plan; and oil discharge monitoring control systems.

APPENDIX 5

INTERNATIONAL POLLUTION PREVENTION CERTIFICATE FOR THE CARRIAGE OF NOXIOUS LIQUID SUBSTANCES

Items surveyed for this certificate include: pumping systems; stripping system; tank washing system; Procedures and Arrangements Manual; underwater discharge arrangements; ventilation arrangements for the removal of cargo residue; Cargo Record Book; and devices to record the discharge time of cargo residue/water mixtures.

QUESTIONS AND ANSWERS*

Ted Clements's presentation

Question

There are obviously very detailed regulations which are required and I suppose that supports a comment expressed this morning about being over-regulated. I also note that a lot of these regulations are determined through international systems and negotiations which means you could get the lowest common denominator. Therefore, are these standards adequate to do the job expected of them and meet environmental objectives and as well as meet the standards for the GBR Marine Park?

Answer

The international opinion of the IMO is that the hardware is there and is adequate to do the job. What is happening is the standards of training and standards of seafarers are declining. For reasons that have been mentioned earlier in the day like traditional maritime countries losing their ships to non-traditional maritime countries, the role of ownership and flag of convenience vessels, all these tend to bring the standard of seafarer lower than what it has been, for example, when I was at sea.

This has also been recognised by IMO because the STCW convention is to be reviewed to bring it into line with the modern day methods and training schemes. Now the secretary general of IMO attaches such importance to this matter that he's told the committee charged with this that the review has to be completed in 2 years. So we wouldn't expect anything to come out of that review until around about the middle of 1995.

Question

Hazardous materials may stowed in containers which in turn may be stowed on deck. Is the loss of containers from a ship a problem? Does AMSA inspect container lashings on ships before they sail?

Answer

We have the power to do that but we would not normally do it as a matter of routine, because as you can appreciate, there are an awful lot of containers and ships carrying containers leaving Australia. But this is a very interesting point, because it brings up another point about dangerous goods that are not packed in containers, but are stowed on deck. As I said this afternoon, the IMDG code lays down principles which govern the safe carriage of those materials. Those materials can get washed over the side and they could cause pollution. Again, IMO has picked up that point, and it has picked up a point from American experience involving a vessel where several containers of arsenic trioxide were washed over the side. That report went to IMO and they are now looking at the stowage segregation requirements of the IMDG code to see what can be done, including ways to store these substances below deck. They are also looking at the lack of IMO standards for securing of containers. The class societies have their standards for container lashings, but there are no IMO standards on container lashings at the moment. Now the American experience may very well lead to the development of a minimum international standard for lashing of containers.

Comment from the floor

I think we'd like to see industry being able to self-regulate how they lash their cargoes and containers.

Question

Waste reception facilities in ports are very important in getting rid of pollutants. ANMA did a survey which is in the hands of AMSA on waste reception facilities. It found there is a very wide range of adequacy, ranging from reasonably adequate to quite inadequate.

I'm not singling out the GBR ports in this regard; it applies to all ports in Australia. But some of the Reef ports aren't really very adequate. Some of the more irresponsible ship operators from overseas will just flush pollutants overside and into the sea if facilities are inadequate.

Answer

I'm not sure what the current status is but several months ago when AMSA received that report from ANMA it was passed to the Department of Transport and Communication so that it could be considered by the Marine and Ports Group under the ATAC umbrella. My understanding is that at the Marine and Ports Group, it was agreed by AAPMA that they would take that issue on board and as it's been the association responsible for ports and authorities around Australia, they would look at the question of waste reception facilities in the ports and respond to the ANMA report.

Question

You made mention of the STCW convention for the training of crews and this morning it was mentioned that achieving a high standard of training is one of AMSA's goals. Are you going to now review your policy of issuing Australian certificates of competency for foreign certificates?

Answer

We recognise the STCW convention. People from overseas who come here with certificates issued under the STCW convention will have their certificate recognised if they pass a prestructured oral test, do a short course and have a command of English. To do otherwise would put us in a lot of trouble with the equal opportunity and anti-discrimination bodies in Australia. It's a problem for employers and for the unions, but we are bound by some pretty strict Commonwealth laws. We're looking into it and we realise the sensitivity of the issue but there's no overnight solution. Our oral tests and short courses and English tests will hopefully achieve a certain level of competency which will not endanger the integrity of the Australian fleet.

* Note: This text is not a verbatim record of the questions and answers. To assist with comprehension, the Editor has deleted some text and made modifications to highlight key points. Speakers are not identified.