The Bahamas Maritime Authority

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Entry into Enclosed Spaces, Opening of Spaces and Management of Hazardous Atmospheres

Notice to ship owners, managers, Masters, Inspectors, Recognised Organisations and surveyors

1. Purpose

1.1. This Marine Notice sets out the requirements for the identification and control of hazards associated with enclosed and potentially hazardous spaces on board Bahamian ships.

1.2. It reflects IMO Resolution MSC.581(110) *Revised Recommendations for Entering Enclosed Spaces Aboard Ships*, adopted in recognition of the continued loss of life associated with enclosed space operations. This Notice should be read in conjunction with that Resolution and the ship-specific safety management system, risk assessments and procedures; it does not reproduce the Resolution in full. Where this Notice uses "shall", the provision constitutes a BMA requirement for Bahamian ships, notwithstanding that MSC.581(110) may express the corresponding provision as a recommendation.

1.3. It also incorporates lessons identified from casualties involving Bahamian ships and comparable international marine safety investigations.

2. Application

2.1. This Notice applies to all Bahamian ships.

2.2. It is also relevant to Companies[1], Masters, shipboard personnel and shore-based personnel, including contractors and port or terminal personnel, who may open or enter enclosed or potentially hazardous spaces, or work in the vicinity of enclosed, connected or adjacent spaces, on board a Bahamian ship.

[1] The 'Company' is the entity responsible for the operation and management of the ship in accordance with the ISM Code (SOLAS Chapter IX), as applied under the Merchant Shipping Act, 2021. Where the ISM Code is not applicable, the Company is the entity recorded as responsible for the operation of the ship in accordance with regulation 5(3)(d) of the Merchant Shipping (Registration) Regulations, 2026.

3. General

3.1. Enclosed space accidents continue to occur where personnel do not recognise the hazards associated with a space or that a hazardous atmosphere may be present or may develop.

3.2. These accidents are most commonly associated with:

i. assumptions that a space is safe based on previous entry, ventilation, atmosphere testing or certification;
ii. failure to assess the hazards and atmosphere prior to opening or entry; and
iii. failure to recognise that conditions may change rapidly.

3.3. Hazardous atmospheres may exist or develop in any space that:

i. is enclosed or partially enclosed;
ii. is connected or adjacent to another space containing hazardous substances or an unsafe atmosphere;
iii. contains cargoes, residues or systems capable of generating hazardous gases; or
iv. is normally entered or occupied but may become hazardous because of cargo, machinery, ventilation failure, leakage or changes in operating conditions.

3.4. Examples include cargo holds and tanks, ballast tanks, void spaces, cofferdams, pump rooms, compressor rooms, inert gas rooms, pipe tunnels, forecastle stores and accommodation or machinery spaces connected or adjacent to spaces containing hazardous substances. The identification of a space shall be based on its characteristics and potential hazards and not solely on its name or normal use.

3.5. An atmosphere previously found to be safe may become unsafe without warning.

4. Recognition of Hazardous Atmospheres

4.1. The safe management of enclosed space operations depends on recognising, at an early stage, the hazards associated with the space and whether a hazardous atmosphere may exist or may develop.

4.2. Hazardous atmospheres may arise from:

i. biological activity within organic cargo or residues resulting in oxygen depletion or carbon dioxide generation;
ii. decomposition or contamination within tanks and systems, including the generation of hydrogen sulphide;

iii. chemical or physical processes associated with cargoes or shipboard operations; and
iv. fumigation of cargo and associated toxic gases: see the Annex to this Notice for additional requirements applicable to ships carrying cargoes subject to fumigation.

4.3. The following characteristics are of particular importance:

i. gases may be heavier or lighter than air and may be stratified;
ii. hazardous concentrations may exist locally or at different levels within an otherwise acceptable atmosphere;
iii. gases may be odourless or rapidly overcome the ability to detect smell; and
iv. hazardous atmospheres may be present in, or migrate from, adjacent or connected spaces.

4.4. Any space that meets the definition of an enclosed space, or which may otherwise contain or develop a hazardous atmosphere, shall be treated as potentially hazardous until demonstrated otherwise.

5. Risk Assessment (Pre-Opening Requirement)

5.1. A risk assessment shall be carried out and recorded by a competent person before opening any enclosed or potentially hazardous space. This requirement is critical, as opening a space may result in the sudden release of toxic, flammable or oxygen-deficient atmospheres, or the release of liquid, steam or another substance under pressure.

5.2. The risk assessment shall determine:

i. the likelihood that a hazardous atmosphere is present;
ii. the potential for release of gas, vapour, liquid or other hazardous substances upon opening;
iii. any non-atmospheric hazards associated with opening, entering or working in the space;
iv. the method and equipment to be used for effective communication between personnel involved in the operation and personnel stationed in a safe location; and
v. the control measures required to protect personnel.

5.3. The assessment shall take into account:

i. cargo information, Safety Data Sheets and shipper's declarations;
ii. previous use of the space;
iii. the presence of organic material, residues or contaminated liquids;

iv. adjacent and connected spaces and systems, including their contents, previous use, connections and operating condition where these may result in a hazardous atmosphere or uncontrolled release;
v. ventilation arrangements and their effectiveness; and
vi. the work to be undertaken and whether it may create or change a hazard.

5.4. Where an enclosed or potentially hazardous space may contain an unsafe atmosphere, it shall be assumed unsafe until appropriate testing demonstrates that the applicable entry criteria are satisfied.

6. Opening of Spaces

6.1. The opening of enclosed or partially enclosed spaces shall be treated as a hazardous operation and shall not be undertaken unless authorised by the Master or a responsible person nominated by the Master and the applicable shipboard safety procedures have been followed.

6.2. Opening may result in:

i. the sudden release of a toxic, flammable, oxygen-deficient or otherwise unsafe atmosphere;
ii. the release of liquid, steam or another substance under pressure;
iii. rapid movement, dilution, mixing or stratification of gases; and
iv. exposure of personnel in or near the opening.

6.3. Where atmosphere testing before opening is not reasonably practicable, the space shall be opened:

i. in a controlled and staged manner;
ii. from a position of safety;
iii. with access to the surrounding area appropriately controlled;
iv. with suitable atmosphere monitoring in use; and
v. with suitable direct communication arrangements established with personnel in a safe location before the opening operation commences.

6.4. The existence of an open hatch or access point shall not be taken as evidence that a space is safe.

7. Atmosphere Testing and Evaluation

7.1. Atmosphere testing shall be conducted in accordance with MSC.581(110), using calibrated equipment suitable for the hazards identified.

7.2. Testing shall be carried out:

i. prior to entry;
ii. after ventilation has been applied;
iii. for final acceptance of the atmosphere for entry, with ventilation temporarily stopped and after conditions within the space have stabilised; and
iv. at intervals appropriate to the operation.

7.3. Steady readings shall be obtained for all applicable acceptance criteria. Following satisfactory acceptance testing, ventilation shall be restarted and maintained during entry and occupancy, as required by the risk assessment.

7.4. Testing shall be representative of the space and shall:

i. be conducted at multiple levels and locations to account for stratification;
ii. consider internal structures, cargo and obstructions which may affect airflow; and
iii. include remote sampling where necessary, allowing sufficient time for the sample to reach and pass through the equipment.

7.5. Atmosphere testing shall verify, as applicable to the hazards identified by the risk assessment, that:

i. oxygen content is approximately 20.9% by volume;
ii. flammable gases or vapours are below 1% of the lower flammable limit (LFL);
iii. carbon dioxide is below 0.5% by volume (5000 ppm); and
iv. carbon monoxide, hydrogen sulphide and other toxic gases and vapours are below 50% of the applicable occupational exposure limits.

7.6. The acceptance criteria in paragraph 7.5 are subject to any stricter requirement applicable to the ship, location or operation.

7.7. The acceptance criteria for oxygen content, flammability, carbon dioxide, toxic substances and any other identified atmospheric hazard are separate requirements, as applicable. An acceptable result for one does not demonstrate that the atmosphere is acceptable in relation to the others.

7.8. Where any applicable atmosphere acceptance criterion is not satisfied, entry shall not be permitted. The space shall be further ventilated, where appropriate, and retested after a suitable interval. Entry shall not commence until all applicable acceptance criteria are satisfied. Where a hazardous atmosphere is suspected or cannot be confirmed as safe, the space shall be treated as unsafe.

7.9. Continuous or enhanced monitoring shall be provided where the risk assessment identifies that:

i. the atmosphere may change during entry or as a result of the work undertaken;
ii. cargoes, residues or systems may emit gases or deplete oxygen;
iii. the space is adjacent or connected to a hazardous source; or
iv. ventilation may be interrupted or may not maintain uniform conditions.

7.10. The risk assessment shall consider potential sources of carbon dioxide, including cargoes, residues, biological activity and shipboard systems, when determining the arrangements necessary for carbon dioxide testing and monitoring.

7.11. The Company shall provide sufficient atmosphere-testing and personal gas-detection equipment for the hazards identified and the ship's enclosed space entry arrangements. Taking into account MSC.581(110), at least two sets of atmosphere-testing equipment should be provided. For ships carrying cargoes capable of generating hazardous vapours where regular entry into cargo spaces is required, two additional sets of atmosphere-testing equipment should be provided. The safety management system shall address the selection, calibration, testing, maintenance and use of the equipment and the training of personnel using it.

7.12. For ships to which regulation 7 of SOLAS Chapter XI-1 applies, the atmosphere-testing equipment provided shall, as a minimum, be capable of measuring concentrations of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide.

8. Entry into Enclosed or Potentially Hazardous Spaces

8.1. Entry shall not be permitted unless authorised by the Master or a responsible person nominated by the Master and the applicable shipboard safety procedures have been followed.

8.2. Entry shall be conducted under a permit to work system. The validity of an enclosed-space entry permit shall be determined by the risk assessment and shall not exceed eight hours. The permit shall cease to be valid where conditions change, ventilation is interrupted, an atmosphere-monitoring alarm activates, or another circumstance

invalidates the risk assessment or atmosphere test. A new assessment and permit shall be completed before entry resumes.

8.3. Prior to entry, it shall be ensured that:

i. hazards have been identified and controlled;
ii. the atmosphere has been tested and found acceptable;
iii. ventilation is maintained;
iv. appropriate equipment is available and in use;
v. rescue equipment is available and ready for immediate use; and
vi. communication arrangements have been established and tested.

8.4. Personnel entering the space shall be provided with properly calibrated personal gas-detection equipment capable of monitoring oxygen, carbon dioxide, flammable gases or vapours, toxic gases including carbon monoxide and hydrogen sulphide, and any other gases identified by the risk assessment.

8.5. Entry shall be supported by:

i. an attendant remaining outside the space and maintaining continuous watch;
ii. reliable and continuous communication between the attendant and personnel inside the space throughout the operation; and
iii. a prepared and adequately resourced rescue plan.

8.6. Single person entry shall not be permitted.

9. Emergency Response

9.1. Where a person collapses or becomes unresponsive within an enclosed or potentially hazardous space, the atmosphere shall be presumed unsafe unless demonstrated otherwise.

9.2. No person shall enter the space for rescue purposes unless:

i. properly trained and equipped for enclosed space rescue;
ii. wearing breathing apparatus appropriate to the atmosphere and hazards identified;
iii. suitable rescue and resuscitation equipment is available and ready for immediate use; and
iv. acting in accordance with the ship's emergency response and rescue arrangements.

9.3. Uncontrolled rescue attempts are a recognised cause of multiple fatalities. Emergency escape breathing devices shall not be used for entry into an enclosed space or for rescue entry.

10. Company Responsibilities

10.1. Companies shall ensure that their safety management systems include ship-specific procedures for:

i. identification and periodic review of enclosed, connected, adjacent and potentially hazardous spaces;
ii. maintenance of an Enclosed Space Register;
iii. risk assessment before opening, entry and work;
iv. atmosphere testing and monitoring;
v. selection, calibration, testing, maintenance and use of atmosphere-testing and personal gas-detection equipment;
vi. communication arrangements for opening, entry and emergency response;
vii. enclosed space entry permits and controls;
viii. emergency response and rescue; and
ix. management of simultaneous operations where an enclosed space entry is taking place.

10.2. The Enclosed Space Register shall identify, as applicable:

i. the space and its location;
ii. access and escape arrangements;
iii. connected and adjacent spaces;
iv. foreseeable atmospheric and physical hazards;
v. ventilation arrangements;
vi. atmosphere testing requirements;
vii. signage and lighting arrangements;
viii. entry controls; and
ix. rescue arrangements and equipment.

10.3. The Register shall be reviewed whenever the use, contents or configuration of a space changes, including where a space is temporarily used for a purpose for which it was not designed.

10.4. Personnel assigned duties relating to enclosed space opening, entry, atmosphere testing, attendance or rescue shall receive training appropriate to their duties. Records of training and drills shall be maintained in accordance with the safety management system.

11. Queries

11.1. Any queries on this Notice may be addressed to tech@bahamasmaritime.com or any BMA office.

ANNEX 1 — Fumigated Cargo (Additional Requirements)

1. This Annex applies to ships carrying cargoes subject to fumigation.

2. Fumigation shall be carried out in accordance with the following IMO guidance, as applicable:

    a. MSC.1/Circ.1264/Rev.1 *Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds*;
    b. MSC.1/Circ.1358/Rev.1 *Recommendations on the safe use of pesticides in ships*; and
    c. MSC.1/Circ.1361/Rev.1 *Revised Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Transport Units*.

3. Fumigated cargoes shall be treated as presenting a continuous and potentially migrating toxic hazard.

4. Fumigant gases may:

    a. remain within cargo despite ventilation;
    b. persist at hazardous concentrations in localised areas; and
    c. migrate into connected or adjacent spaces, including accommodation and working spaces, through ventilation systems, structural openings or defects.

5. A gas-free certificate or previous acceptable atmosphere test shall not, by itself, be relied upon as evidence that a cargo space, connected space or adjacent space remains safe to enter.

6. Monitoring arrangements shall:

    a. take account of the limitations of periodic atmosphere testing;
    b. include cargo, connected and adjacent spaces where fumigant gases may accumulate or migrate;
    c. include accommodation and working spaces where migration may occur through ventilation systems, structural openings or defects; and
    d. be increased where conditions change or migration of fumigant gases is suspected.

7. Companies shall ensure that:

    a. the suitability of the ship for the intended fumigation is verified;
    b. procedures for fumigation, atmosphere testing, monitoring and entry are included in the safety management system;

c. appropriate atmosphere-testing and personal gas-detection equipment is provided for the fumigant and other hazards identified;
d. personnel involved are trained in the hazards, monitoring arrangements and applicable procedures; and
e. procedures address the foreseeable migration of fumigant gases into connected or adjacent spaces, including accommodation and working spaces.

Revision History

Version	Description of Revision
1.0	First Issue