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SHIPBOARD HYGIENE AND PREVENTIVE MEDICINE IN NATO NAVAL OPERATIONS

Edition A, Version 1

JULY 2026

NORTH ATLANTIC TREATY ORGANIZATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

8 July 2026

1. The enclosed Allied Medical Publication AMedP-4.15, Edition A, Version 1, SHIPBOARD HYGIENE AND PREVENTIVE MEDICINE IN NATO NAVAL OPERATIONS, which has been approved by the nations in the MILITARY COMMITTEE STANDARDIZATION BOARD (MCMedSB), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 6568.

2. AMedP-4.15, Edition A, Version 1, is effective upon receipt.

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4. This publication shall be handled in accordance with C-M(2002)60.

Thierry POULETTE
Major General, FRA (A)
Director, NATO Standardization Office

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Documents Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
USA	The US will implement this STANAG within the US Navy, however other branches do not have the capability to fully implement the requirements outlined. Para 3.5, This STANAG does not provide guidance for mitigating the significant risk of cold injury. US forces will follow national doctrine for cold weather medicine and safety.

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CHAPTER 1 INTRODUCTION

1. Historically Disease Non-Battle Injuries (DNBI) have had significant impact on military operations. More hospitalizations and lost man-days have been caused by DNBI than combat casualties. Recent real-world DNBI data shows a reduction from the historical rates which can be attributed to improved Force Health Protection (FHP) measures.

2. The One Health concept serves as the basis for FHP measures applied to military ships. One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and the environment. It recognizes that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent.

3. Aboard ships, the One Health components are defined as following points:

   a. The environmental aspects are derived from the living and the working spaces including factors such as thermal aggression, thermo-hygrometric and olfactory ambient conditions, etc.

   b. Animal health interacts as food comes from animal origins and pest control.

   c. Human health considers the baseline health conditions of crewmembers and their susceptibility to disease and injury leading to the necessity of health care.

4. The FHP targets for health threat mitigation strategies include: food, water, sanitation, pest control, hygiene and conditions of living and working, biological, psychological, chemical and radiological exposures. Mitigations help to ensure that the crew carries out their tasks in the best possible conditions. While many exist, only the major mitigation concepts are considered in this document and recommendations provided are not an exhaustive list.

5. The scope of this document is focused on the shipboard environment. The document's purpose serves to provide a Maritime Occupational Hygiene approach to protecting health and preventing disease and injury of naval personnel during NATO naval operations. Medical care and practice are excluded and considered in other NATO documents.

6. Other published NATO documents describe general requirements that are not repeated here. References are established to these documents and when necessary. A bibliography is provided in Annex C. Readers should keep in mind that STANAGs contain requirements when operating in NATO operations. International Maritime

Organization (IMO) documents may contain useful information for consideration but are not required to be applied to warships.

CHAPTER 2 ROLES, RESPONSIBILITIES AND AUTHORITIES IN THE POLICY ON HYGIENE ON MILITARY SHIPS

2.1. INTRODUCTION

1. This chapter identifies roles and responsibilities regarding shipboard hygiene conditions and defines the categories of personnel involved during naval armament programs, and throughout the vessel's active duty cycle including deployments and naval operations.

2. The population at risk mentioned in this document consists of ship's crew and passengers. If a risk particularly concerns a further sub-population, this will be indicated.

2.2. ROLES AND RESPONSIBILITIES

2.2.1. Naval Staff and Engineering Services

1. Requirements and specifications for capacities, performance, autonomy and standards concerning the living and working environment have to be defined and communicated to the shipyard as part of the first step to build a new naval ship. The naval staff defines the requirements, and naval engineering services draft the technical specifications needed to produce the required performance.

2. As soon as the ship is in active duty, maintenance operations must be performed to ensure the proper functioning and availability of the facilities without any short term or long-term risk for the crew. While crews provide the first level of maintenance, higher level services will likely be performed by depot shore facilities.

2.2.2. Force Health Protection (FHP) Experts

1. Force Health Protection (FHP) experts with naval competencies must be consulted and work closely with the naval staff and naval engineering services throughout the duration of a naval armament program. Further, they must be available to directly support commands and staffs during all phases of naval operations. FHP experts can be found among professionals trained as physicians, nurses, clinical personnel, veterinarians, pharmacists, psychologists, hygiene officers, occupational health officers, and environmental health officers. The key component is a thorough understanding in the field of shipboard hygiene. These experts may be part of the crew or may be assigned in a service or joint support command available to COs for consultation.

2. The role of FHP experts is to ensure that:

   a. health regulations are clearly defined and understandable by Force leaders. This includes assistance with implementation, monitoring of regulations, mitigation strategies and during any relevant maintenance procedures;

   b. expertise is available to construct safe facilities for the crew during both work and rest time;

   c. assessments and recommendations are available to ensure equipment is of an appropriate size, performance and suited to meet the performance requirements.

2.2.3. Commanding Officers (COs) and Crews

The CO is responsible for ensuring that the ship complies with national, local, and international regulations. They must ensure overall hygiene, health and safety of the crew on board, to include maintaining a clean and sanitary ship to prevent and avoid injuries and the spread of any disease or illness among the crew. As part of this responsibility, they will authorize or prohibit the use of facilities or equipment as necessary and ensure crewmembers are aware of any restrictions or precautions that are in place. COs are most strongly encouraged to make use of advice from FHP experts. Tools at their disposal include risk assessment, and hygiene inspection processes.

CHAPTER 3 MARITIME OCCUPATIONAL RISK PREVENTION

3.1. INTRODUCTION

1. Maritime occupational risk prevention is a core element of medical planning, requiring specific technical expertise on behalf of the Commander. It is important to define its concept in order to deliver meaningful risk mitigations.

2. Definition of Maritime Occupational Risk Prevention: Occupational Risk Prevention comprises of preserving the health and safety of the crew, improving working conditions and promoting well-being in the maritime environment. This concept can be characterized by Industrial Hygiene and Occupational Health.

3. Definition of Maritime Industrial Hygiene: Maritime Industrial Hygiene is the discipline of identifying, specifying and designing living and working environment areas and equipment with the objective of protecting the crew from injuries, diseases at sea, harbored, or in maritime facilities.

4. Definition of Maritime Occupational Health: Maritime Occupational Health is the discipline of anticipating, recognizing, evaluating and controlling health hazards in the living and working environment onboard ships with the objective of protecting crew health and well-being and safeguarding the community at large. Maritime Occupational Health has also been defined as the practice of identifying hazardous agents whether they are chemical, physical, psychological or biological. These agents could cause disease or discomfort in the maritime workplace and measures should be taken in order to prevent and control ill health in the long- and short-term.

5. Definition of Human and Organizational Factors (HOF): HOF identifies the gaps between the task (as prescribed or expected), and the activity (as actually performed or experienced and reported by workers). It encompasses the understanding of the human operator's tasks, its physical and psychological demands, and also the Human Machine Interface (HMI) with its function. The concept accounts for the maritime work environment, the relationship between individuals and systems, the human capabilities, the specified task, their individual resources and the limitations of the human operation.

6. Maritime occupational risk prevention comprises of the evaluation of the air/humidity, light, noise, heat, vibration, electromagnetic environment, chemical and human/machine interfaces. Additionally, the term of maritime occupational risk prevention includes all the requirements and measures that have to do with “Industrial Hygiene”, such as showers, toilets, rooms, beds, size and positioning to the role, washing machines, haircut, sport devices, etc.

7. NATO navies must develop, publish, and follow special military occupational safety and health standards, rules, or regulations which protect personnel from hazardous exposures due to military-unique equipment, systems, operations, or

workplaces. These regulations should cover all aspects that provide a healthy working environment by identifying health hazards, developing policies and procedures to prevent or minimize health risks and monitoring and documenting employee exposures.

8. Maritime occupational risk prevention includes the specialty of Occupational Health which is a broad multidisciplinary field of preventive medicine concerned with the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations, as well as the prevention and/or treatment of illness or injury induced by factors in the maritime environment. The major disciplines involved are general occupational medicine, occupational health nursing, epidemiology, toxicology, audiology, industrial hygiene, ergonomics, and health physics. NATO activities include the design, implementation and evaluation of comprehensive health and safety programs that promote employee health and safety in the maritime military setting.

3.2. NOISE STRESS AND HEARING CONSERVATION

3.2.1. Definition and type of hazard

1. Noise aboard vessels arises principally from the propulsion machinery, auxiliary equipment, ventilation system and electronic apparatus. Airborne noise categories are based upon the functional requirements of shipboard spaces.

2. Continuous high-level noise with inadequate hearing protection results in:

   a. permanent high frequency hearing loss;

   b. interference with crew's recreation and sleep in accommodation spaces;

   c. interference with communications in operational and working spaces;

   d. reduction of crew effectiveness;

   e. adaptation to a degraded level of functioning with an unnoticed harmful increasing exposure to risks.

3. According to STANAG 4293 "Guidelines for the acoustical environment in NATO surface ships" expectations defined by Maximum Noise Levels (MNL), Noise Rating Curves (NRC) and Speech Interference Levels (SIL) should be fulfilled.

   a. Maximum Noise Levels (MNL) is the noise level normally acceptable within a space or a compartment as specified above and generated both from outside and from inside permanently installed equipment in its specified mode. MNLs are given in decibels on the A – weighted scale [dB (A)].

b. Noise Rating Curve (NRC) – the NRC of ISO 1996 – 1, shall be used when recorded levels exceed MNLs.

c. Speech Interference Levels (SIL) is an index for assessment of possible interference of noise with communication.

4. Non-harmful but continuous and permanent noise (< 65 dBA) also generates fatigue, with the same principle as cumulative dose rates (e.g. ventilation noise, muffled and distant engine noises, humming electronic equipment).

3.2.2. Exposed population

1. Personnel at risk for hearing loss from high noise exposure levels include engineers, machinist mates, deck personnel who are grinders, scrapers, or chippers, and flight deck crewmen.

2. On vessels with aircraft, noise levels on the flight deck approaching 150 dB(A) and below deck in excess of 100 dB(A) are hazardous to the health of the crewmembers and can result in reduced performance and potentially fatal accidents. In certain classes of ship additional noise can come from the vessel's propeller resonating through the structure. The resultant sound and vibration can then re-radiate as airborne noise.

3.2.3. Minimum requirements

Detailed information concerning noise stress is described in IMO MSC.337(91) “Code on Noise Levels on Board Ships” and Chapter 1 of ANEP – 25 “Guidelines for environmental factors in NATO surface ships” and STANAG 4293.

3.2.4. Recommendations

1. Commanders are responsible to ensure noise warnings are posted properly, crew are provided with appropriate hearing protection and frequent inspections are conducted to ensure compliance. Detailed information concerning hearing protection is described in IMO MSC.337 (91), STANAG 4293 and SRD AJMedP-4-8 “Protection of Hearing” of STANAG 2561.

2. A noise level survey should be available for all potentially hazardous areas to identify locations with dB(A) readings above acceptable levels [85 dB(A)] for single hearing protection and 115 dB(A) for double hearing protection]. All spaces should be posted as “noise hazardous areas” with the recommended type of protection needed in that space (single or double). These tags and posters should appear outside each location where a hazard exists and on each item that produces hazardous noise.

3. Nations should have hearing conservation programs with detailed information on exposure limits, protection and screening with audiograms. A hearing conservation

program should identify individuals exposed to noise hazard environments and monitor their hearing over time to prevent progressive loss.

4. Background noise levels which would be considered unacceptable in buildings are often quite normal at sea. This condition provides no audiological recovery time for ship personnel who are exposed to noise during off duty hours as well as their on duty time. Active noise reduction and protection is therefore an important consideration in vessel design. A total systems engineering approach should be used to identify effective acoustic solutions. This process integrates all potential noise sources, as a function of location, into the design of a ship. The entire vessel should then be measured and all noise sources mapped.

3.3. VIBRATIONS

3.3.1. WHOLE BODY VIBRATION (WBV)

3.3.1.1. Definition and type of hazard

1. Whole body vibration is often complex, contains many frequencies in several directions and changes over time. The effects of vibrations may be manifold. Exposure to WBV causes complex distribution oscillatory motions and forces within the body. There can be large variations between subjects with respect to biological effects. WBV may cause sensations (e.g., discomfort and annoyance), influence human performance capability or present a health and safety risk (e.g., pathological damage or physiological change). The presence of oscillatory force with little motion may cause similar effects.

2. Long-term exposure with high intensity WBV may affect lumbar spine and connected nervous system. It is sometimes assumed that environmental factors such as body posture, low temperature and draught can contribute to muscle pain. With a lower probability, the digestive system, the genital-urinary system, and the female reproductive organs are also assumed to be affected. It is assumed that it takes several years for health changes caused by WBV to occur.[1]

3. The most important frequency range is:

   a. 0,5 Hz to 80 Hz responsible for health, comfort and perception disorders

   b. 0,1 Hz to 0,5 Hz responsible for motion sickness.

3.3.1.2. Minimum requirements

Detailed requirements concerning whole body vibrations are described in ISO 2631 “Mechanical Vibration and Shock — Evaluation of Human Exposure to Whole-Body

[1] ISO 2631-1 second edition.

Vibration and Chapter 3 of ANEP – 25 “Guidelines for environmental factors in NATO surface ships”.

3.3.1.3. Recommendation

Protection from hazardous WBV means minimizing vibration source generation together with providing a protective whole-body working environment (both physical and theoretical). Within the mitigation program, exposed workers must employ sensible work practices and the vibration environment must be regularly monitored. Sensible work practices include:

a. Providing platforms with suspension systems that minimize vibration and, where possible, mechanical isolated/floating cabs.

b. Providing (remove and/or replace) "air-ride seats" (seats which provide a protective cushion of air), as applicable.

c. Adding or designing 'isolators' under machinery to reduce source vibration in some fixed facility situations. This would include foundation mounts that prevent vibration transmission to other structures.

d. Incorporating shock mount stand plates, chairs, and vibration dampened controls.

e. Using good work practices, which include crew (e.g., taking periodic rest breaks for every one to two hours of continuous WBV exposure, not lifting objects immediately after prolonged WBV exposure, leaving vehicles using simple egress motions, walking around for a few minutes, and performing other non-lifting tasks before attempting any lifting tasks).

f. Making crew aware of signs and symptoms of WBV-induced injuries/illness (e.g., back problems) and the need to report to their safety managers and health care providers if signs and symptoms occur.

3.3.2. Hand-Arm Vibration (HAV)

3.3.2.1. Definition and type of hazard

1. Hand-arm vibration (HAV) transmits vibration into the operator's hands and arms, which can also cause vibration white finger (a permanent and painful numbness and tingling in the hands and arms), painful joints and muscle weakening. There is also evidence that it may cause carpel tunnel syndrome, a syndrome of the median nerve and flexor tendons of the hand and wrist.

2. Regular and frequent exposure to HAV can lead to permanent health effects. This is most likely when contact with a vibrating tool or work process is a regular part of a person's job.

3. Symptoms include any combination of:

   a. Tingling and numbness in the fingers.

   b. Loss of touch sensation.

   c. Loss of strength in the hands.

   d. Fingers going white (blanching) and becoming red and painful on recovery (particularly in the cold and wet, and probably only in the fingertips at first).

4. For some people, symptoms may appear after only a few months of exposure, but for others they may take a few years. They are likely to worsen with continued exposure to vibration and may become permanent.

5. Those who work with hand-held portable power tools such as grinders, sanders, impact wrenches and air chisels are at greater risk.

3.3.2.2. Minimum requirements

Detailed requirements concerning HAV are described in ISO 5349 “Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration” and national regulations.

3.3.2.3. Recommendation

Protecting crew from hazardous HAV is multifaceted and begins with minimizing vibration source generation together with providing effective personal protection for those exposed, regularly monitoring the vibration environment, and employing sensible work practices. These include:

   a. Using only power tools certified as Anti-Vibration (A/V) and ergonomically built, which are designed to reduce vibration and to minimize musculoskeletal injuries. The latter solution alone, while reducing carpal tunnel syndrome, can still leave tool workers at risk for irreversible HAVs.

   b. Using full-finger protected Anti-Vibration gloves that fit well, allow maximum finger tactility and proper grip, and keep the fingers and hands warm and dry (to avoid cold-triggered HAV attacks.

   c. When using tools:

      i. Let the power tool do the work
      ii. Hold the power tool with the lightest grip possible consistent with safe work practices
      iii. Keep hands and body warm and dry
      iv. Do not smoke (nicotine, cold, and vibration all constrict blood vessels impeding circulation).

d. Maintaining power tools & associated implements in good condition. Thus, regularly scheduled HAV tool monitoring is necessary.

e. Training crew to be aware of HAV signs and symptoms and the need to report to their safety managers and health care providers if signs and symptoms occur.

3.4. HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

3.4.1. Definition and type of hazard

1. Shipboard HVAC systems have different requirements depending on the designation of the compartments and the type of ship and should aim to optimize human performance. Thus, there are compartments in which natural ventilation is sufficient, while the majority of compartments require forced ventilation using fresh air (FA) supply and/or foul air extraction by fans. For other compartments manned and/or fitted with heat emitting equipment, the ventilation is provided through an air conditioning system.

2. A satisfactory ventilation system must provide a continuous renewal of air by properly distributing a fresh supply of pure air in quantities sufficient to:

a. Avoid high concentrations of hazardous, flammable and toxic gases (e.g., CO_2) and free of odors.

b. Remove heat emitted in the compartment.

c. Control of relative humidity.

3. Dust and particles should be limited by the use of filtration system.

4. Well-designed and low-maintenance ventilation systems are critical to a safe and comfortable shipboard work environment.

5. All food preparation and sanitary rooms must have sufficient ventilation to keep them free of excessive heat, steam, condensation, vapors, obnoxious odors, smoke, and fumes. See STANAG 2556, AMedP-4.14.

3.4.2. Requirements for Fresh Air (FA)

1. The calculation of the air flow needed to ventilate rooms is done according to the NATO standards (ANEP 25) or national regulations and ISO standards. ANEP 25, Chapter 2 provides guidelines for shipboard habitability requirements for combatant surface ships. The total air volume is to be adequate to ensure carbon dioxide levels are below the maximum value as prescribed by the local human activities.

2. The exhaust airflow in common sanitary rooms (baths, shower, urinal or W.C.), laundries and drying-and ironing-rooms should be a minimum of 15 air changes per hour and in changing-rooms, washrooms, and cleaning-lockers a minimum of 10 air changes per hour. The living rooms, in general, are normally provided with common ventilation and air conditioning systems to ensure a proper climate for crew. The minimum required flow of FA is related to the number and the physical activity (breathing air volume) of persons (resting, light work, heavy work), but should not be less than 40% of the total air flow. In rooms such as the galley, pantry, dry provision room, sanitary rooms, mess rooms and laundry, recirculation is not allowed.

3. The concentration of CO_2, which is commonly used as an easily measured indicator of the ventilation effectiveness, should not exceed the limits according ANEP 25. Special attention should be given to Volatile Organic Compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short-and long-term adverse health effects. Products like household products, paints, varnishes, waxes, cleaners, disinfectants, cosmetics and degreasers can release organic compounds when being used or stored.

4. Air quality and ventilation requirements should be adapted to meet different needs in time and circumstances so that Human Factors are optimized to maximize operational requirements. Air temperature, relative humidity, radiant heat and air movement should also be part of the equation.

5. Common ventilation and air conditioning systems, which mix the air from rooms with FA and recirculate it back to the rooms, and poorly ventilated compartments or poorly maintained HVAC systems, may increase the risk of spreading communicable respiratory diseases. In future shipbuilding projects or modification of existing ships the risk should be assessed, and relevant measures implemented (e.g., HEPA-filters, increased use of FA, UV disinfection, use of negative pressure zones, pressure gradients).

3.5. TEMPERATURE STRESS

3.5.1. Definition and type of hazard

1. Unlike internal living and service areas (that can be easily equipped with air-conditioning systems) and decks (affected only by the external climate), thermo-hygrometric conditions in technical spaces such as engine rooms (ER) are affected by the external climate, the ventilation and the heat given off by the engine components, such as heat exchangers, pipes, cooling, and fuel preheaters, through convection and radiation. This occurrence results in air temperature values from 10°C/50°F to 20°C/68°F higher than the external temperature. Consequently, the thermo-hygrometric conditions in the engine room can be extremely dangerous during the hot periods.

2. In the past, several surveys which have been devoted to the characterization of working conditions on board ships have shown that the engine crew suffer the highest overall levels of stress followed by the deck and engine officers because of the higher levels of heat stress.

3. The heat stress program involves measuring heat stress at the workspace and calculating proper exposure times for the personnel in those areas. This area of responsibility is shared between the Engineering and Medical Departments, who usually conduct the measurement.

4. Desirable temperature will depend upon several factors including such parameters as work rates, clothing, personal preference, state of acclimatization to heat, physical activity, and many others.

3.5.2. Environmental considerations

1. The optimal temperature is 22°C/72°F in winter and 27°C/81°F in summertime.

2. Relative humidity (RH) ought to be between 35% and 65%.

3. A diagram for determination of acceptable zone for human, considering temperature, relative humidity and air velocity is available in Chapter 2 of ANEP-25.

4. An environment saturated with water vapor at a temperature of 52.8°C is painful to exposed skin.

5. If the relative humidity is lower than 35%, however, mucous membranes in eyes and respiratory tract will become irritated.

6. If the relative humidity is higher than 65%, bacteria and fungi may develop.

7. A Wet Bulb Globe Thermometer (WBGT) heat stress monitor uses a dry bulb, a wet bulb, and radiant heat measurement simultaneously to arrive at a “WBGT index.” This provides information about heat stress.

3.5.3. Minimizing heat stress conditions by design

Navies should consider all the above instruments to maintain their national limits in human factors from the start of the build of any new platform. Subject matter experts on human factors should be a part of the planning and design teams working on platforms from the start.

3.6. LIGHTING ONBOARD MILITARY VESSELS

3.6.1. Definition and context

1. This chapter covers general and specific requirements and additional considerations concerning illumination for surface ships. It contains information for assessing the lighting environment onboard as it affects performance and well-being.

2. The requirements contained in ANEP-25 (1991) « Guidelines for environmental factors in NATO surface ships », Chapter 5-Standard for illumination, have to be applied and are not covered in this document.

3.6.2. Purpose of lighting installation onboard

1. Conditions for optimum visual performance, at work and during rest time, must be adapted and contribute to the prevention of accidents, and sustain the general well-being of the crew.

2. Lighting must be designed and installed (type, location, intensity) to avoid visual fatigue and resulting visual disorders, and to enable the detection of hazards perceptible to the eye.

3. The design and installation of light onboard must consider both day and night conditions (red light).

4. Several categories of lighting, in addition of usual service lighting, can be installed: emergency lighting (emergency power supply), evacuation lighting (use of low-level lighting devices) and additional portable emergency lighting (backup lanterns, battle lanterns).

3.6.3. Minimum requirements

1. Important criteria for lighting are:

   a. Illumination.

   b. Luminance ratios in the visual field.

   c. Limitation of direct and indirect glare.

   d. Apparent colour and colour rendering index of the light source.

2. In work areas, the lighting level must be adapted to the nature and precision of the work to be carried out.

3. Workstations located on the bridge and other locations must be protected from direct sunlight and distracting reflections.

4. Appropriate measures must be taken to protect workers against glare and visual fatigue caused by high luminance surfaces or excessive luminance ratios between adjacent surfaces. Lighting sources must ensure colour rendering quality commensurate with the intended activity, and must not compromise crew safety. Fluctuating light must not be perceptible and must not cause stroboscopic effects.

5. Switches are easily accessible. In blind rooms, they are fitted with a system enabling them to be located in the dark.

6. Lighting devices must comply with specific and adapted standards when installed in explosive or humid environment.

7. Red light:
Switching to red lighting automatically replaces and switches off the normal lighting in the premises concerned. A centralized command for normal and red lighting switching shall be available on the bridge. Local switching to change the current ship lighting status shall be possible in operational and technical spaces leading to the outside when the doors leading to the outside are closed. Berthing nightlights are independent of dark adaptation lighting. Red night-lighting concerns the following areas:

a. all passageways used by the crew to reach their operational stations from berthing areas,

b. airlocks leading to the outside,

c. toilets serving the navigation bridge.

8. The level of red lighting in passageways must be between 2 lux (for movement) and 5 lux (when reading is necessary). These measurements are taken at ground level. Obstacles must be effectively marked to allow safe movement.

9. Under no circumstances, even at very close range, should a red light be mistaken for a side navigation light.

3.7. PHYSICAL EXPOSURE

3.7.1. Definition and context

The risk of exposure of the crew to physical hazards must be taken into account right from the ship design phase and throughout all operating phases. This includes any exposure to potentially injurious structural parts, as well as onboard equipment, devices, and tools.

3.7.2. Purpose

Accidents and injuries must be avoided in order to keep the operational capacities of the crew at maximum level.

3.7.3. Minimum requirements

1. The risk of physical injury is highest when moving around the ship or handling heavy tools or equipment:

    a. Doors and hatches must be easy to handle and equipped with an assistance system if too heavy.

    b. The ship’s stairs must be easy to use and secured if too vertical.

    c. Handling heavy or bulky objects (including ammunition) must be made easy and safe.

    d. Tripping, slipping and snagging hazards must be minimized, identified and signaled.

2. Asbestos exposure:

    a. If it is not definitively established that a ship is completely free of asbestos, it is required to have an asbestos control plan. The type of asbestos control plan required is based on the type of asbestos containing material present (friable or non-friable) and whether the ship has a mission to provide asbestos abatement. Crew health monitoring must be implemented and follow national guidelines.

3. Other physical hazards: all other physical hazards such as smoke soot, abrasive metal protrusions, etc. must be taken into account in the ship's prevention plan.

3.8. CHEMICAL EXPOSURE

3.8.1. Definition and context

The risk of exposure of the crew to chemical hazards must be taken into account right from the ship design phase and throughout all operating phases. This includes any exposure to chemical components contained in structural parts (paint for example), as well as onboard chemical products.

3.8.2. Purpose

1. Accidents and injuries must be avoided in order to keep the operational capacities of the crew at maximum level.

2. Loading, storage and handling of chemicals must be included in the ship's prevention plan. The material safety data sheets (MSDS), the terms of use and the wearing of personal protective equipment (PPE) must be mentioned. Toxic products must be clearly identified. Crew must be aware of the signs of chemical exposure and the recommended maximum exposure times.

3.8.3. Minimum requirements

1. NATO Fuels:

    a. In many Military Forces, exposure to military fuels constitutes the most common potential chemical exposure for personnel. The exact composition of military fuels can vary and is dependent in part on the crude oil from which it is made. In the marine setting, other kerosene-based fuels (various grades of marine diesel) may still be used in engines, and in other applications.

    b. Exposure can occur while handling fuel, working around engines that use fuel or doing maintenance of those systems.

    c. Acute high exposures, in particular with aerosolization of fuel or fuel vapors, particularly with heat, can cause respiratory irritation and central nervous system depression. Chronic exposures governed by regulatory occupational exposure limits (OEL) to components have in general fallen over time in a number of jurisdictions. Monitoring of exposures by personnel such as industrial hygienists, or similarly qualified personnel, is important. Where indicated, appropriate control measures to limit inhalational exposures (e.g., ventilation, respirators) or dermal exposures (e.g., gloves, protective clothing) may be required.

    d. Notably, OELs for substances like benzene that have the potential for hematopoietic toxicity, or other potential health effects, and may require medical surveillance.

2. Otto Fuel:

    a. Otto fuel II is a distinct-smelling, reddish-orange, oily liquid that is used as a fuel for torpedoes and other weapon systems. It is a mixture of three synthetic substances: propylene glycol dinitrate (PGDN) (the major component), 2-nitrodiphenylamine, and dibutyl sebacate. Otto fuel II is

the second iteration of the fuel and sometimes is simply known as Otto fuel.

b. Exposure to Otto fuel II can be through skin absorption or by inhalation. It is a systemic toxicant with effects on the cardiovascular and neurological systems. Its vasodilatory action can result in headaches, dizziness, loss of balance, nasal congestion, eye irritation, palpitations, and chest pains.

c. Methemoglobinemia reported at high concentrations used in animal experiments has allowed occupational biological exposure indices to be established that merit observation as over-exposure can be fatal.

d. Minimum requirements:

i. When workers are handling this chemical, they must use positive pressure air breathing equipment, neoprene aprons and gloves, and freshly laundered coveralls. The work area should also be well ventilated. The odor threshold is 0.2 parts per million (ppm) but the rapid onset of olfactory fatigue limits its usefulness.

ii. Personnel working with Otto Fuel II above action levels are recommended to have a pre-placement and periodic physical examinations. The occupational history must inquire about previous occupational exposure to nitrates. The medical history review must check for cardiovascular disease, hypo- or hypertension, and frequent or severe headaches, particularly migraines. The clinical physical examination emphasizes the cardiovascular and neurological systems.

3. Hydrogen sulfide gas (H2S):

a. For ships equipped with gray water or black water storage tanks, oily water, or ballast water tank, the risk of hydrogen sulphide formation may be high.

b. H2S is a potentially deadly toxic gas for the crew, produced from biological materials in anaerobic condition. In environments where there is little or no oxygen, sulphite-reducing bacteria use sulphur instead of oxygen to create energy. They oxidize organic matter, producing H2S. Pockets can accumulate in enclosed spaces or accumulate in the liquid material itself, and be released when disturbed.

c. H2S gas inhibits cellular respiration and oxygen uptake. Prolonged exposure between 2-5 ppm of H2S can cause nausea and headaches and bring tears to eyes. At 20 ppm, symptoms include fatigue,

headaches, irritability, dizziness and memory impairment. The severity of symptoms increases with concentration: cough, conjunctivitis, olfactory paralysis (loss of smell, starting at around 100 ppm), collapse and rapid loss of consciousness. Exposure to higher levels can cause death almost instantly.

d. Adverse health effects of H2S inhalation:

H_2S (in ppm)	Effects
0.002 -0.2	odor threshold
3 - 5	strong odor
10	occupational exposure limit
10 - 50	eye irritation
50 - 100	severe eye damage
250	loss of sense of smell
300 - 500	severe respiratory disorders - life-threatening
500 - 1000	severe central nervous system disorders, respiratory paralysis
1000	immediate death

e. A risk assessment of the presence of H2S gas onboard must be carried out, and a prevention plan drawn up. If necessary, fixed measurement sensors must be installed in specific places and monitored (due to the fact that H2S is a heavy gas, these sensors have to be implemented below 500 mm from the ground). These sensors must be calibrated in compliance with national legislation.

4. Heavy Metals

a. Mercury

i. Elemental mercury is liquid at room temperature. It is used in some thermometers, dental amalgams, fluorescent light bulbs, some electrical switches, and some industrial processes.

ii. People may be exposed when they breathe air containing elemental mercury vapors. Vapors may be present in dental offices, and locations where mercury has been spilled or released. High mercury vapor concentrations can quickly cause severe lung damage. At low vapor concentrations over a long time, neurological disturbances, memory problems, skin rash, and kidney abnormalities may occur.

iii. Mercury exposure may occur on any ship with restorative dentistry, calibration laboratories, or other mercury use site. The

details regarding use, handling, disposal and control must be described within a mercury control program which is subject to periodic inspection. If substitution with a non-Hg alternative is not possible, there must be a warning sign in the space or attached to the item.

iv. Mercury exposure areas must be well ventilated with a fresh air exchange and an outside exhaust. The air should be sampled periodically for mercury vapour. Mercury must be kept in tightly sealed containers away from heat and flame. Lastly, there must be a mercury clean-up procedure to be followed in case of a spill, e.g., spill kits.

v. Routine medical surveillance for mercury exposure among dental/calibration laboratory personnel is not required but may be prescribed based on biological monitoring in a spill situation.

b. Lead

i. Lead is a naturally occurring heavy metal that is solid at room temperature. Its use in the military is widespread, most notably in munitions both as the bullet or primer, aerosolized upon firing.

ii. While much work has been done to reduce the amount of lead materials on ships, there is still plenty of lead in routine use. Lead is found in some older paints already present on ships' surfaces and in some newer paints and coatings still in use. It can also be found in foundry work, welding solders, cast iron pipe gaskets and fittings, structural steel primer, cables and wire casings, radiation shielding, batteries, ballast, small arms ammunition, weights, and many other materials.

iii. Lead has long been recognized as a health hazard. Harmful effects can follow a high exposure over a short-term (acute exposure), or a low exposure over a long-term (chronic exposure). Exposure may cause lead poisoning, which has a myriad of adverse health effects including kidney and nervous system damage, gastrointestinal symptoms, reproductive hazards, and blood disorders. While occupational exposure limits have been set, there is no recognized safe level of lead exposure.

iv. Occupational exposure to lead is primarily through inhalation or ingestion. When lead is present in the air as dust, fume or mist, it can be inhaled and then absorbed into the body. Incidental ingestion may also occur where lead on work surfaces is transferred to clothes and hands, and then to the mouth during

eating, drinking, smoking, vaping, chewing, biting one's nails, or touching of the face. Poor workplace hygiene and cleaning practices may increase the risk of incidental ingestion.

v. The industrial hygienist (or qualified specialist) can inform which areas and jobs have the potential for lead exposure so that proper procedures and protective measures can be taken. Safe work procedures must be developed for tasks where there is the potential for lead exposure. Engineering controls, procedures, hygiene and PPE must all be considered. Measures to prevent taking lead home are also important to prevent contamination of vehicles, homes, and families.

vi. Personnel involved with elevated lead air concentrations or who are at risk of hand-oral ingestion, could benefit from lead medical screening.

vii. A physical examination is unlikely to show abnormalities unless blood lead levels are 30 micrograms/100 ml or higher, but when indicated should focus on the cardiovascular, gastrointestinal, renal and neurologic systems.

viii. Those at risk may need baseline, periodic, and termination blood lead level (BLL) examinations. Screening is also indicated in those at risk of lead exposure who have potential lead-related symptoms, or those planning reproduction; males may suffer effects on spermatogenesis and female exposure can impact offspring IQ.

c. Halogenated hydrocarbons

i. Halogenated hydrocarbons are chemical compounds containing carbon and hydrogen atoms and one or more halogens (bromine, chlorine, fluorine, iodine) in their chemical structure.

ii. Halogenated hydrocarbons are included here because most personnel are unaware of their toxic potential. Halogenated hydrocarbons may be present in some refrigerants, solvents, and gases in liquid form such as Freon, Isotron, and TCPFE. They are also widely used as paint thinners, fumigants, propellants, pesticides, degreasers and dry-cleaning solvents, etc.

iii. Physical hazards associated with the use of halogenated hydrocarbons include flammability of some compounds as well as toxic effects to the kidney and/or liver from low-grade chronic exposure. Skin and eye exposure can be very irritating and cause

conjunctivitis, severe contact dermatitis and skin sensitization. An acute, heavy exposure can result in hypoxia and death as some halogenated hydrocarbons are heavier than oxygen and may displace oxygen.

iv. Health hazards depend on the specific chemical, route of exposure, the airborne concentration and duration of exposure. High temperatures may degrade vapors to extremely toxic and irritating gases. Some halogenated hydrocarbons are human carcinogens.

v. Mitigation measures must be in-place and monitored by the appointed individual/supervisor to ensure the safety of all personnel. Engineering and other departments involved should obtain the necessary PPE and conduct training in its safe use, handling and first aid measures. The following mitigation measures must be considered:
    a) Proper labelling of containers and equipment using these products.
    b) Adequate ventilation.
    c) Implementation of recognized safety and environmental requirements for systems using halogenated hydrocarbons or when such compounds could contaminate compressed air cylinders.
    d) Use supplied air respirators during fires involving these substances or organic vapor cartridge respirator when handling or near these substances.
    e) Don appropriate PPE for the task.
    f) Air monitoring, in consultation with a specialist, to determine if additional control measures are required.

vi. All personnel who are authorized to work with halogenated hydrocarbons may require annual physicals to ensure that they have received no ill effects from them and that the PPE they are using is effective.

vii. Personnel who handle halogenated hydrocarbon pesticides (e.g., lindane, DDT, aldrin, dieldrin) must also have their pseudocholinesterase levels checked regularly.

3.9. RADIATION AND ELECTROMAGNETIC EXPOSURE

3.9.1. Ionizing radiation and radiological contamination

3.9.1.1. Context and purpose

On nuclear-powered ships, ships with nuclear weapons, or if x-ray equipment is held onboard, the crew can be exposed to ionizing radiation (Gamma or X) or radiological contamination (Alpha or Beta). Even if the exposure may be low, some chronic or long-term disorders due to irradiation or radiological contamination must be considered, avoided, and controlled.

3.9.1.2. Minimum requirements

1. A radiation health and safety program must be applied to crew members. Overall responsibility resides with the CO however, medical responsibility can be delegated to the MO, or if a radiation health officer or radiation health technician onboard, they can run the program. Particular attention is necessary if Navy policy allows sailors who are in early pregnancy to serve at sea, so as to limit exposures.

2. There are national regulations laid down in radiation health manuals for x-ray, nuclear power and the nuclear weapons program, some of which may be confidential. There are various dosimetry measurement requirements including wearing radiation measurement badges, reporting, and inspection criteria. Further regular individual monitoring of internal contamination is required with all examinations and reports filed in the person's medical record.

3. All radiation exposure received will be recorded and filed in the individual's health record. Even if the radiation exposure is zero, it must be entered. There is also a monthly report to the CO and the Radiological Controls Officer listing all the radiation exposure for the month and any dangerous levels of exposure. Transferal letters and situational reports for personnel transfer or overexposures will be conducted by the MO. All these reports are time critical. There are also internal and external audits that must be undertaken on the radiation health program.

3.9.2. Electomagnetic Frequency Exposures

3.9.2.1. Context

1. The potential for hazardous electromagnetic radiation to personnel (HERP) on ships often relates to emissions from ship's radar arrays and from incoming air platforms' landing guidance systems. It can also arise from communications antennae or other electronics, and potentially from weapons. In the case of radar, the potential for overexposures typically arises when safe separation distances are not respected or standard operating procedures are not followed, such as when radar is left on after use with inadvertent exposure of personnel. In the far field, the power per unit area falls with the square of the distance from the emitter. In the near field, exposure can

be partial or whole-body and be affected by re-radiation from nearby objects. HERP occurs when exposures exceed the maximum exposure limit (MEL), established by regulations based typically on agencies like the International Commission on Non-ionizing Radiation Protection (ICNIRP). Such regulations are based on thermal effects of electromagnetic radiation specific absorption rate or induced currents, but do not consider non-thermal effects.

2. Overexposure may cause no symptoms at all but can be associated with an internal sensation of warmth in the region of the body exposed that turns into pain or a burning sensation usually prompting the individual to move away, thereby limiting exposure. Heat or actual burns, in particular at points of contact with metal, can occur if the person remains in the beam. Overexposure of the head can cause signs or symptoms similar to post-concussion syndrome and delayed cataract formation can occur.

3.9.2.2 Minimum requirements

1. If an overexposure is suspected, a detailed history of symptoms during and after exposure should be recorded, the skin examined for any erythema or burns, as well as a neurological and ophthalmology examination (looking for lenticular opacities) performed. Any ophthalmological findings should be referred to an ophthalmologist. Depending on the severity and likelihood of the overexposure, laboratory investigations in the form of appropriate serum or urinalysis can be performed.

2. If no acute symptoms were experienced and no physical findings found, long-term effects are unlikely, and reassurance is typically given. For those with symptoms, physical findings or laboratory abnormalities, appropriate serial follow-up is indicated with careful documentation of findings.

CHAPTER 4 RISK ASSESSMENT OF HAZARDOUS WORKPLACES ONBOARD MILITARY VESSELS AND SAFETY OF PERSONNEL

4.1. HAZARDOUS WORKPLACES

1. Personnel perform activities and operations which involve potential exposure to chemical, physical, biological hazards and ergonomic hazards which can cause occupational disease if not effectively controlled. The Risk Assessment must include workplace, workforce and environmental agents. The operations, tasks and work practices that take place at the workplace must be described, along with the number of persons assigned to the operation/task, and the specific work areas occupied. The frequency and duration of events taking place should be noted.

2. Trained personnel must conduct a survey of each workplace to obtain, as a minimum, the following information:

a. A list of equipment used in the workplace that presents significant risk.

b. Descriptions of operations, tasks and work practices that take place onboard (e.g., welding, spray painting).

c. For fixed locations onboard the description may include a layout sketch incorporating relevant aspects of the factors listed, along with the number of persons assigned to the operation or task and the specific work area(s) occupied. Health protection experts must note the frequency and duration of events taking place within all workplaces.

d. A list of hazardous materials (HM) used in the workplace onboard that present significant risks.

e. The list must include a description of use at each workplace. Reproductive and development hazards as well as carcinogens must be specifically identified.

f. A list of physical hazards (e.g., noise, ergonomic stressors, non-ionizing radiation, etc.) in the workplace that present significant risk including a brief description of their source(s).

g. A description of existing controls (e.g., ventilation, fall protection equipment, and personal protective equipment).

h. The existence and effectiveness of protective devices must be noted (e.g. ventilation of the workplace including any local exhaust systems, ambient pressure, ambient pressure gradients in the vessel, personal protective equipment).

i. It is necessary to ascertain that the protective equipment is actually in use or to get information why it is not used. If feasible, onsite evaluations should be made without command representatives, thereby permitting a freer exchange between personnel and experts in vessel hygiene.

4.2. SAFETY OF PERSONNEL

The best way to protect personnel from exposure to hazards in the workplace is to eliminate the hazard. When this is not possible, substitution or engineering controls must be implemented to eliminate or minimize hazard risk. When elimination and engineering controls are not feasible, or unable to reduce the hazard risk to an acceptable level of risk, activities must implement a personal protective equipment (PPE) program for personnel potentially exposed to hazards in the workplace. National Policy dictates that PPE is utilised when undertaking hazardous activities. Personnel require training to ensure they are proficient in use and maintenance of issued PPE. Any identified deficiencies in PPE must be reported using the relevant feedback system.

CHAPTER 5 PREVENTION OF COMMUNICABLE DISEASES ON BOARD MILITARY SHIPS

5.1. INTRODUCTION

1. Since the environment on ships is usually very confined, infectious diseases have the potential to spread rapidly and affect significant proportions of the personnel on board.

2. Onboard infectious diseases are transmitted mainly through these six routes:

   a. Food

   b. Water

   c. Vectors (e.g., insects and rodents)

   d. Air

   e. Contact with an infected person (direct or indirect through droplets)

   f. Contact with contaminated objects and surfaces.

3. Procedures designed to ensure maximum security against the international spread of diseases with a minimum interference of world traffic were prepared by the World Health Organization (WHO) and published as the International Health Regulations (IHR, 2005). Further guidance concerning disease outbreak prevention and investigation can be found in the following guides:

   a. Guide to Ship Sanitation (WHO, 2011).

   b. International Medical Guide for Ships (WHO, 2007).

   c. Updated guides for management of COVID-19 (WHO and IMO, 2021).

5.2. GUIDELINES

5.2.1. Good Hygiene Practices

Good hygiene practices are of utmost importance. Good personal hygiene should be promoted and maintained. Good manufacturing practices and stringent hygiene practices regarding cleaning and waste management are paramount in the prevention of disease outbreak.

5.2.2. Outbreak Management and Mitigation

1. The ship's deployment plan should contain appropriate measures to prevent spreading of communicable diseases. Relevant measures should be based on the probability of outbreaks occurring. Containing an outbreak may seem challenging, but the key is early detection by identifying unusual clusters of illness, as it allows the onboard management to implement control measures in a timely manner. It is very important to have on board an Outbreak Management Plan (OMP).

2. The Ship's Commander has full responsibility of activation and of any actions related to the implementation and management of an OMP. The OMP should be in a common language and written in a simplified way so that any member of the crew can understand its requirements and actions.

3. Medical personnel on board should be trained in recognizing early warning signs and basic outbreak investigation. The most relevant points of this plan are:

   a. Act early. Once the Commander is aware of the outbreak of infection, the OMP should be activated, and actions taken quickly. Getting the priorities right is important. To prevent exposure to other crew, it may be that isolation of infected crew members needs to be prioritised while waiting for guidance from medical experts. If that is the case, isolations will have to be managed with care as other crew may be hesitant to report their symptoms.

   b. Develop a strategy for deciding the appropriate isolation, quarantine and evacuation of patients.

   c. It is important that crew members are familiar with the contents and requirements of the OMP for its quick and effective implementation.

      i. Managing infections and suspected cases on board.

      ii. Control measures to reduce exposure of uninfected crew. This will also include carrying and distribution of protective equipment.

      iii. Handling ship-to-shore interactions.

      iv. Reporting format to be used when contacting NATO authorities.

      v. Testing and monitoring.

   d. Monitor the situation. Once all the measures as directed in the OMP have been taken to contain the infection, management should continuously monitor the progress made in recovery of any infected crew and to identify additional crew members that shows signs of infection.

4. Use of isolation and quarantine on board. The clinical distinction between isolation and quarantine is that isolation is the procedure for personnel that are already

sick, whereas quarantine is often applied to exposed but seemingly healthy contacts. A strategy to provide quarantine space for contacts of cases for a recommended duration should also be determined. Individuals in quarantine or isolation must be provided with sustenance, basic hygiene provisions and recreation materials. Medical spaces may not be the appropriate location for isolated patients as the ship would lose access to its medical department. Transmission routes and risks should be minimized. For example: Do not allocate rooms close to frequently visited spaces (dining or sanitary facilities). Map the transport route, storage and disposal of potentially contaminated waste. Good air quality is important in the prevention of airborne disease transmission, but not all spaces and/or ventilation systems on board are designed for negative pressure airflow and proper air isolation. Consider a possible back-up plan in case the outbreak evolves quickly, and more quarantine/isolation rooms are needed.

5. Evacuation. Aim to evacuate isolated personnel on board as soon as possible if appropriate. Prioritize their medical evacuation to reduce the threat to others and minimize transmission routes.

6. Personal and collective protective measures. Mechanisms of transmission are direct or indirect. Knowing the transmission-mode of a disease facilitates strategies to prevent this disease. Universal precautions in personal protective equipment for the treatment of patients range from very basic protective material like surgical facemasks, non-sterile examination gloves and basic protective eyewear to protective gowns, which are at least fluid-resistant with outer-air independent respirator systems fulfilling FFP3-standard. The basic equipment must be on board of every unit. Additional equipment must be stored and personnel must be trained in its use in advance. Adequate disinfection products suitable for shipboard and protective clothing must be available. Collective protection on board can be implemented by providing physical separation of personnel. Ensure ventilation systems operate properly for the occupancy level for each space as stated before.

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CHAPTER 6 BERTHING AND GENERAL HYGIENE

6.1. GENERAL REMARKS

The ultimate responsibility for health and safety rests with the CO. Every person on board has a duty to conduct themselves and their work in a safe manner and to ensure that they do not place themselves, others and the vessel at risk.

6.2. BERTHING AND PERSONAL HYGIENE

6.2.1. Minimal Technical Requirements

1. Sanitary Facilities. To sustain suitable level of hygiene, appropriate quantity of sanitary facilities should be provided (i.e. showers, lavatories, washbasins). With respect to requirements for sanitary facilities, all crew shall have convenient access on the vessel to sanitary facilities meeting minimum standards of health, hygiene and reasonable standards of comfort. The number of sanitary facilities and accommodation space area shall be in correspondence with the number of the crew.

2. Berthing facilities. Berthing facilities should be designed to provide adequate accommodation space for the crew and facilitate cleaning and sanitizing procedures.

3. Minimal Technical Requirements for Sanitary and Laundry Facilities" are specified in ANEP – 24.

6.2.2. General Cleanliness

1. Each person in charge of a particular area is responsible for keeping it clean and secure. This means that everything is clean, stored correctly, and rigged securely for sea. Hours devoted to cleaning should be held once a week. Every space, passageway etc. should be cleaned thoroughly. The overheads need special attention because they are hard to clean and are often ignored.

2. Periodically, the deck will need stripping and waxing.

3. Bulkheads will need to be washed down.

4. Berthing spaces must be clean at all times, well ventilated, and well illuminated.

5. Water closets, urinals, lavatories, and showers must be clean and operable. Shower curtains, mats, bulkheads, and decks must be cleaned and sanitized at sufficient intervals to prevent mildew, odor, and soap accumulations.

6. Sewage backflow through deck drains and overflowing water closets constitute extremely unsanitary conditions. If these conditions occur, the space or unit must be

immediately secured until the situation is corrected and the spaces are cleaned and sanitized.

6.2.3. Personal Hygiene

The crew of the vessel should keep up general appearance, cleanliness, proper uniforms, haircuts, and shaves. To make this viable, appropriate number of sanitary facilities should be provided. Personnel must be aware of the risks associated with poor hygiene on-board. A sufficient supply of clean bed linen must be maintained. Bedding must be changed frequently to prevent odor accumulation. To keep uniforms clean, an appropriate number of washing machines should be provided.

6.2.4. Sanitary Hot Water and Legionella Risk

1. The temperature of sanitary hot water (under showers particularly) must be permanently at or above 55°C/131 °F at the output of the production or storage equipment or be raised to a sufficient temperature at least once every 24 hours. STANAG 2136 and CHAPTER 3.9. AMedP 4.14 provides the minimum water temperature maintenance time.

CHAPTER 7 OCCUPATIONAL HEALTH AND HYGIENE INSPECTIONS ONBOARD

7.1. CONTEXT AND PURPOSE

1. Occupational health and hygiene inspections are specifically intended to identify all safety and occupational health related hazards onboard a ship. Inspectors should assess all workplace elements, including the environment, equipment and processes. Environmental assessment includes noise, vibration, lighting, temperature and ventilation. Equipment, such as materials and tools, should be assessed as part of the inspection. Assessment of processes should examine how crewmembers interact with other elements in their tasks or operations.

2. Other factors to consider are chemical reaction, corrosion or potential misuse.

3. All workplaces on board, including office spaces, should be inspected at least annually. Workplaces with a higher risk of accident, injury or illness may require more frequent inspections. Occupational health and hygiene inspections should encompass the entire ship rather than a representative sampling of only some spaces. This includes any area where crewmembers may conduct work including, but not limited to, mechanical rooms and locked areas.

7.2. RESPONSIBILITIES FOR OCCUPATIONAL HEALTH AND HYGIENE INSPECTIONS

Occupational health and hygiene inspections are ultimately the responsibility of the Commanding Officer although they may have little knowledge about this area. Medical Officers are the experts in ship hygiene and must act as advisors to the Commanding Officer. Inspections should be conducted systematically and with a critical approach to identify major and minor deficiencies. These should be documented and assigned a priority for repair or resolution.

7.3. INSPECTION PERSONNEL

Inspectors are safety or occupational health professionals who meet national naval standards and are equipped with the tools and competence to recognize hazards in the workplace. Qualifications for these personnel should be based on the degree of hazard and complexity of the workplaces.

7.4. INSPECTIONS PERFORMED

1. Following are the different types of occupational health and hygiene inspections:

   a. WHO Ship Sanitation Control Exemption Inspections. Under WHO regulation, Ship Sanitation Control Certificates/Ship Sanitation Control Exemption Certificates (SSCC/SSCEC) are valid for six months, extendable by one month if the renewal inspection cannot be accomplished at the port of arrival. These inspections should be completed by an authorized inspecting officer at a ship's home port prior to departing for a mission. Renewal inspections should be planned and scheduled with sufficient time in advance of expiry dates by authorized ports (updated list available at the WHO website). An example of SSCC/SSCEC is found in Annex A.

   b. Major Occupational Health and Hygiene Inspections. Ships should undergo major occupational health and hygiene inspections annually at their home port. In order to provide the Fleet Commander with a complete ship status, they should include occupational hygiene inspection as well as inspections of the medical facilities, food preparation areas and potable water system. Inspectors should not belong to the crew, but rather official naval inspection offices.

   c. Routine Occupational Health and Hygiene Inspections. Routine occupational health and hygiene inspections are conducted during missions or while the ship is sailing in order to ensure that standards are maintained over time. Inspections are conducted by members of the crew appointed by the CO. Sample inspection items are provided in Annex B.

CHAPTER 8 GENERAL WELLNESS

8.1. RECREATION AND RELAXATION SPACES

1. Shipboard duty involves unusual stressors, including sleep cycle disruption, noise, vibration, as well as many others. For optimal operational capability, it is vital to plan for and support recovery as described below.

2. For good physical and psychological wellbeing of the crew, spaces for rest and relaxation should be provided aboard, as possible. Such spaces for personal wellbeing should meet the following requirements:

a. Space for quiet relaxation, reading, study, hobbies, etc.

b. Space for noisy and group recreation, sports, television, and games.

c. Space for reflection, meditation and religious observance.

3. Spaces should be multifunctional in design and noisy spaces should be placed in order to account for the impact of sound on surrounding locations.

4. Detailed requirements concerning recreation and relaxation spaces on board are specified in ANEP – 24 “Guidelines for shipboard habitability requirements for combatant surface ships”.

8.2. ENERGY CONSUMPTION, RECREATION MOVEMENT AND SPORTS

1. Off-duty activities and access to sporting equipment needs to be provided as they are important for health and wellbeing. Systematic sporting activities have positive consequences for organisations, depending on different ranges of performance.

2. Sports programming includes:

a. Preventive health training.

b. General fitness training (extensive).

c. Special fitness training (intensive).

d. High fitness training (very intensive to maximum).

3. Providing for and engaging in a variety of physical activities offers benefits to physical and psychological health.

8.3. NUTRITION AND HEALTHY LIFESTYLE

To ensure a healthy lifestyle, WHO recommends eating fruits and vegetables, and reducing fat, sugar and salt. WHO provides publications to promote and support healthy lifestyles. When possible, during port visits, a variety of fresh products should be provided including whole grains, bread, pasta, rice, potatoes, dairy products, fish, and poultry.

ANNEX A EXAMPLE OF SHIP SANITATION CONTROL EXEMPTION CERTIFICATE/SHIP SANITATION CONTROL CERTIFICATE

CERTIFICAT D'EXEMPTION DE CONTROLE SANITAIRE DE NAVIRE / CERTIFICAT DE CONTROLE SANITAIRE DE NAVIRE
SHIP SANITATION CONTROL EXEMPTION CERTIFICATE / SHIP SANITATION CONTROL CERTIFICATE
Port : ..... Date : ……..

Le présent certificat rend compte de l'inspection et 1) de l'exemption du contrôle ou 2) des mesures appliquées
This Certificate records the inspection and 1) exemption from control or 2) control measures applied
Nom du navire ou du bateau de navigation intérieure ..... **Pavillon** (*Flag*)..... **N° d'immatriculation/OMI** (*Registration/IMO No*) .....
Name of ship or inland navigation vessel
Au moment de l'inspection, les cales étaient déchargées/chargées de ..... **tonnes de cargaison** (*tonnes of cargo*)
At the time of inspection the holds were unladen/laden with
Nom et adresse du bureau d'inspection (*Name and address of inspecting officer*).....

Certificat d'exemption de contrôle sanitaire de navire (*Ship Sanitation Control Exemption Certificate*) **Certificat de contrôle sanitaire de navire** (*Ship Sanitation Control Certificate*)

Secteurs, [systèmes et services] inspectés *Areas , [systems, and services] inspected*	**Signes constatés1** *Evidence found1*	**Résultats de l'analyse des échantillons²** *Samples results*	**Documents examinés** *Documents reviewed*	**Mesure de luttes appliquées** *Control measure applied*	**Date de réinspection** *Re –inspection date*	**Remarques concernant les conditions observées** *Comments regarding conditions found*
Cuisine (*Galley*)			Journal du médecin de bord (medical log)			
Cambuse (*Pantry*)			Journal de bord (Ship log)			
Entrepôts de stockage (*Stores*)			Autres (Other)			
Cale(s)/cargaison (Hold(s)/cargo)						
Quartiers : (Quarters)						
- poste d'équipage (Crew)						
- carré des officiers (Officers)						
- cabines des passagers (Passengers)						
-pont (Deck)						
Eau potable (*Potable water*)						
Eaux usées (Sewage)						
Ballast (*Ballast tanks*)						
Déchets solides et médicaux (*Solid and medical waste*)						
Eaux stagnantes (*Standing water*)						
Salle des machines (*Engine room*)						
Services médicaux (*Medical facilities*)						
Autres secteurs spécifiés – voir pièces jointe (*Other areas specified – see attached*)						
Pour les secteurs non concernés, indiquer « sans objet » (*Note areas bit applicable, by marking N/A*)						

Aucun signe constaté. Le navire/bateau est exempté de mesures de lutte.
Les mesures de lutte indiquées ont été appliquées à la date ci-dessous.
(*No evidence found. Ship/vessel is exempted from control measures. Control measures indicated were applied on the date below.*)
Nom et titre de l'agent qui délivre le certificat ..... Signature et sceau ..... Date .....

1 a) Signes d'infection ou de contamination, y compris : vecteurs à tous les stades de leur croissance, réservoirs animaux de vecteurs, rongeurs ou autres espèces qui pourraient être porteurs de maladies humaines, risques microbiologiques, chimiques et autres pour la santé humaine, mesures d'hygiène insuffisantes ; b) Information concernant des cas humains (à faire figurer dans la déclaration maritime de santé).
² 1 *(a) Evidence of infection or contamination, including: vectors in all stages of growth; animal reservoirs for vectors; rodents or other species that could carry human disease, microbiological, chemical and other risks to human health; signs of inadequate sanitary measures. (b) Information concerning any human cases (to be included in the Maritime Declaration of Health).*
Résultats de l'analyse des échantillons prélevés à bord : résultats à fournir dans les plus brefs délais au capitaine du navire et, si une nouvelle inspection est requise, à l'escale suivante, la plus appropriée compte tenu de la date de réinspection indiquée dans le certificat.
² *Results from samples taken on board. Analysis to be provided to ship's master by most expedient means and, if re-inspection is required, to the next appropriate port of call coinciding Sanitation Control Exemption Certificates and*
Les certificats d'exemption de contrôle sanitaire et les certificats de contrôle sanitaire sont valables six mois au maximum ; toutefois, la durée de validité peut être prolongée d'un mois si l'inspection ne peut pas être effectuée au port et s'il n'y a aucun signe d'infection ou de contamination. *Sanitation Control Certificates are valid for a maximum of six months, but the validity period may be extended by one month if inspection cannot be carried out at the port and there is no evidence of infection or contamination.*

PIECE JOINTE AU MODELE DE CERTIFICAT D'EXEMPTION DE CONTROLE SANITAIRE DE NAVIRE/ CERTIFICAT DE CONTROLE SANITAIRE DE NAVIRE

ATTACHMENT TO MODEL SHIP SANITATION CONTROL EXEMPTION CERTIFICATE/SHIP SANITATION CONTROL CERTIFICATE

Secteurs/ installations/ systèmes inspectés *Areas/facilities/systems inspected*	**Signes constatés** *Evidence found*	**Résultats de l'analyse des échantillons** *Sample results*	**Documents examinés** *Documents reviewed*	**Mesures de lutte appliquées** *Control measures applied*	**Date de réinspection** *Re-inspection date*	**Remarques concernant les conditions observées** *Comments regarding conditions found*
Nourriture / ***Food***						
Source / *Source*						
Stockage / *Storage*						
Préparation / *Preparation*						
Service / *Service*						
Eau / Water						
Source / *Source*						
Stockage / *Storage*						
Distribution / *Distribution*						
Déchets / ***Waste***						
Stockage / *Holding*						
Traitement / *Treatment*						
Evacuation / *Disposal*						
Piscines/Spas / ***Swimming pool***						
Equipement / *Equipement*						
Fonctionnement / *Operation*						
Services médicaux / ***Medical facilities***						
Equipement et appareils médicaux / *Equipment and medical devices*						
Fonctionnement / *Operation*						
Médicaments / *Medicines*						
Autres secteurs inspectés *Other areas inspected*						

Lorsque des secteurs figurant sur cette liste ne sont pas concernés, indiquez « sans objet » / *Indicate when the areas listed are not applicable by marking N/A.*

ANNEX B SAMPLE INSPECTION ITEMS

Note: This is a general approach rather than an exhaustive list and may not cover all items.

A.1. AREAS REQUIRING INSPECTION ON A REGULAR BASIS

- Food service: Informal-daily, formal-every two weeks.
- Barber shop: Monthly.
- Berthing areas: Daily, formal report-weekly.
- Heads: weekly for those not attached to berthing areas.
- Laundry: Monthly.
- Coffee messes: Periodically.
- Ship's store: Monthly.
- Sewage pump rooms: Weekly.
- Water sanitation: Daily for chlorine/bromine residuals, weekly for bacteriological surveys.
- Waste collection and disposal: As needed.
- Insect and pest control: Should set up system to inspect and spray if needed in each galley every two weeks.
- Mess cooks: Daily.
- Refrigerators and dry stores: Monthly.

Note: this is not an exhaustive list and other areas of the ship may require inspection.

A.2. SYSTEMATIC APPROACH TO INSPECTING A WORKSPACE

- Dirty vent covers.
- Broken or frayed wires.
- Burned out lights and/or nightlights.
- Leaky valves or pipes.
- Torn lagging (insulation).
- Burned out battle lanterns (emergency lights).
- Current fire extinguisher inspection tags.
- Current electrical safety tags on every piece of electrical equipment.
- Malfunctioning equipment.
- Dirty bulkheads and decks.
- Material condition of the deck.
- Safety items: goggles, shields, eyewash stations present and functional and not date expired.
- Is the compartment check-off list present, in its correct location and up to date?
- Proper labeling of the space and compartments.
- Proper gear in space.

- General cleanliness.
- Is personal gear in the space and not properly stowed?
- Are particularly heavy items secured for sea with brackets and screws?

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ANNEX C BIBLIOGRAPHY

- STANAG 2556 and AMedP-4.14 “Food and Water Safety, Defence, And Production in NATO Naval Operations”.
- STANAG 2557 and AMedP-4.11 “Measures to Reduce Risk of Transfer of Biological Hazards During Troop and Materiel Movement”.
- STANAG 2136 “Requirements for water quality during operations”.
- STANAG 4293 “Guidelines for the acoustical environment in NATO surface ships”.
- ANEP – 24 “Guidelines for shipboard habitability requirements for combatant surface vessels”.
- ANEP – 25 “Guidelines for environmental factors in NATO surface ships”.
- STANAG 2565 – “A psychological guide for leaders across deployment”.
- STANAG 2561 – “Allied joint medical force health protection doctrine” and AJMedP-4-8 “protection of hearing”.
- Guide to Ship Sanitation (WHO, 2011).
- International Medical Guide for Ships (WHO, 2007).
- Updated guides for management of COVID-19 (WHO and IMO, 2021).

AMedP-4.15(A)(1)