

deactivated or becomes inoperable where ammunition and explosives are present, the space shall be manned or a fire watch posted until the system has been repaired and returned to operational condition. In addition, the system shall be tagged out of service in accordance with local governing instructions.

2-23.3. ONLOADING OR OFFLOADING OPERATIONS. Prior to loading or offloading ammunition and explosives, either at a shore activity, anchorage, or underway, all fire main systems must be operating properly. For submarines in port, if the trim system (fire main) must be tagged out of service for essential repairs, a temporary fire fighting system must be used from topside to below decks. In this case a pierside or topside water source (fire hydrant or portable pump) capable of providing a minimum of 200 gallons per minute (GPM), to two hose lines with a minimum residual nozzle pressure of 60 psi for each operating hoseline, is authorized for use. Where portable pump(s) provide firefighting water supply, the pump(s) shall be tested prior to daily use. Fire hoses or Aqueous Film Forming Foam (AFFF) hoses shall be laid out, or AFFF hose reels manned ready for use in the immediate area of operations such that at least single-hose coverage is provided for all points along the weapons handling path. These hoses shall not cross damage control and fire boundaries and may be uncharged. At a minimum, each hose shall be manned by a nozzleman and two hosemen using Aqueous Film Forming Foam (AFFF) or sea water fire hoses. When loading or offloading submarines, the assigned nozzleman and hosemen may be part of the handling team and one of the hosemen will be the plugman. Where a Seawater Sprinkling System, designed in accordance with NAVSEA S9522-AA-HBK-010, is installed, manning of the manual control station may be used in place of fire hose coverage. Where an overhead AFFF system is installed manning of the control station may be used in place of fire hose coverage provided all aircraft cockpits in the applicable AFFF sprinkler zone are closed.

2-23.4. USE OF FLAME-, HEAT-, OR SPARK-PRODUCING DEVICES. Flame-, heat-, or spark-producing devices shall not be permitted where ammunition and explosives are located. Cigarette lighters, heaters, fires, welding tools, soldering irons, except as noted in paragraph 2-23.5a, cutting torches and uncovered lights are examples of such devices. Before beginning work in an explosive area requiring the use of flame-, heat-, or spark-producing devices, all ammunition and explosives must be removed and the area thoroughly cleaned. Once the work is accomplished, the area will again be cleaned before the ammunition and explosives are replaced. In addition, the precautions given in the following paragraph for hot work onboard a ship shall be observed.

2-23.5. HOT WORK. The following hot work precautions shall be observed aboard ship:

a. Within the ship, no hot work of any type will be performed in any space containing ammunition and explosives, except as noted in paragraph 2-23.5.1. Further, no hot work shall be performed in or on any space adjacent to, directly above, or directly below a space containing ammunition and explosives, as shown in figure 2-1, except as follows:

(1) After the Weapons/Ordnance Handling Officer (OHO) and the Officer of the Deck (OOD) have been notified.

(2) If the work area is adjacent to, (i.e., on the same level as and sharing a bulkhead with, another explosives area), hot work may be performed on the bulkhead furthest removed from the bulkhead shared with the space containing ammunition. Hot work may be performed on the overhead, deck and bulkheads at locations no less than 5 feet from the shared structural or nonstructural bulkhead.

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(3) In spaces directly below the explosive area, hot work may be performed on the deck and bulkheads at locations no less than 5 feet from the overhead as shown in figure 2-1. No hot work is permitted in spaces directly above an explosives area.

b. Hot work may be performed in other spaces in the vicinity of the explosives area, unless the above considerations prevent doing so. If hot work is required and these criteria cannot be met prior to entering the shipyard or SRF, the explosives and other hazardous materials (HAZMAT) must be offloaded or moved to another magazine, if compatible stowage is available. For hot work on external parts of the ship, these requirements may be waived by the shipyard or SRF commander provided safety precautions are taken and the work is not performed on a magazine boundary.

c. During normal ship upkeep periods outside the shipyard or SRF, the restrictions on hot work specified in this paragraph shall also apply, except that authorized hot work on the exterior of the ship, not involving magazine boundaries, shall be coordinated between the ship and the Naval shore activities commanders.

d. If the performance of hot work is necessary which will violate the preceding restrictions, or which will involve a magazine boundary, it may be authorized by the Fleet Commander on a one-time case basis. Such violations must be required by urgent operational necessity, as certified by the TYCOM. Requests for waiver of hot work restriction requirements will be submitted, via the TYCOM, in accordance with paragraph 1-9.1. Such requests must cite the location and nature of the work, the distance to the nearest compartment containing ammunition or explosives, and the special safety precautions proposed for the performance of hot work. The TYCOM will certify operational necessity for the hot work to be conducted in a message to the appropriate Fleet Commanders, who will then act upon the request. These waivers are considered canceled when the short-term evolution for which they were issued is completed.

e. Additional safety precautions that are described in NSTM S9086-CH-STM-010, -020 and -030/CH-074 shall be observed for any hot work in a ship.

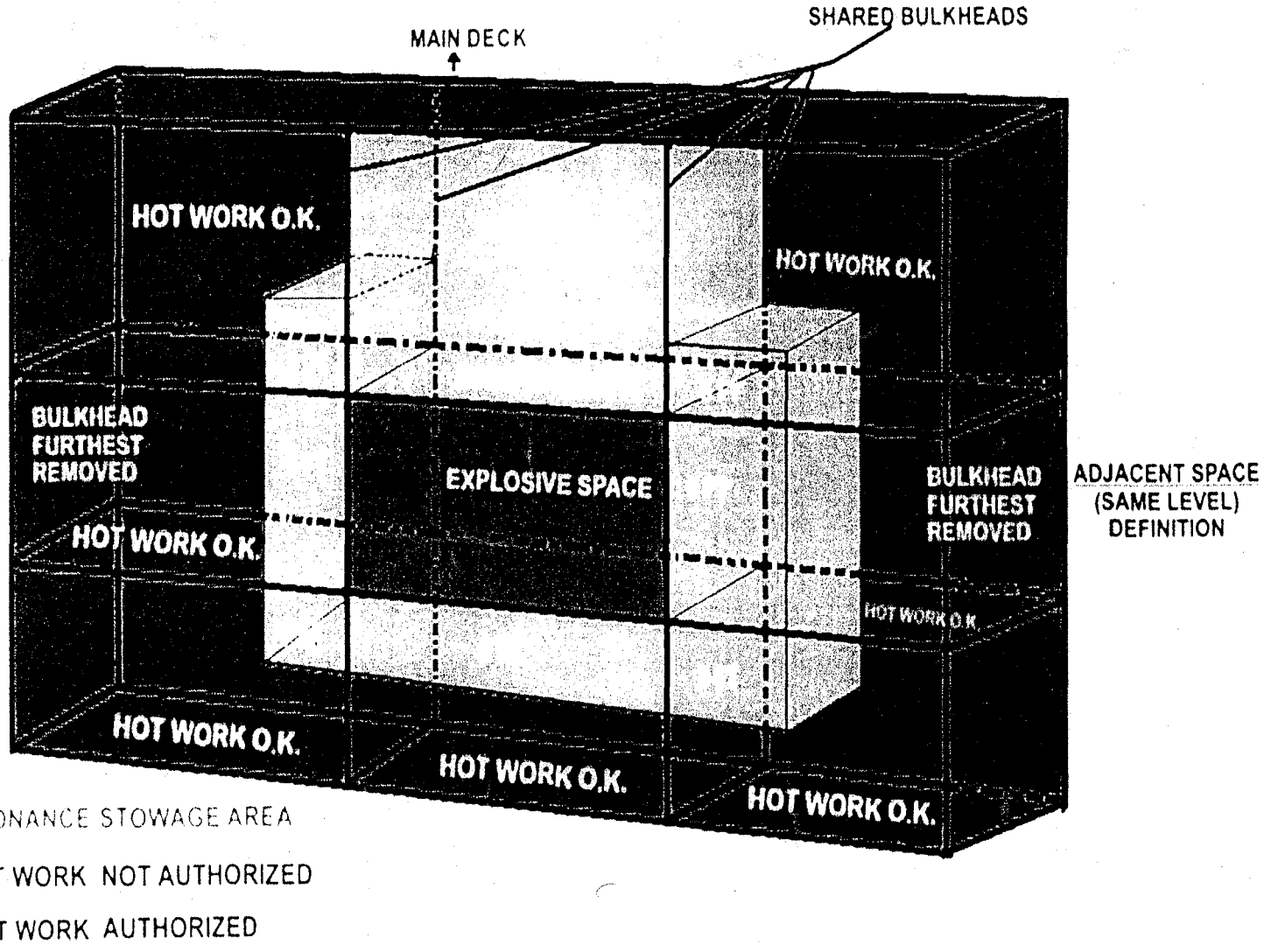


FIGURE 2-1. Permissible and Non-Permissible Hot Work Areas.

2-23.5.1. VLS Launchers (Surface Ships). As an exception to the hot work restrictions described in paragraph, soldering with 50 watts or less than rated soldering irons is authorized on VLS launchers aboard surface ships and is not considered hot work.

2-23.5.2. Submarine Requirements. In addition to the hot work restrictions described in paragraph 2-23.5, the following additional restrictions apply aboard submarines. When ordnance is located in the torpedo room, it is considered a magazine. When all ordnance is offloaded from the torpedo room, with the exception of torpedoes, missiles and mines in the tubes, only the torpedo tube is considered a magazine. Welding in the area of loaded submarine vertical launch missile or torpedo tubes shall conform to the following safety requirements:

a. A firewatch shall be posted at the welding site throughout all phases of the operation.

b. Prior to commencement of hot work, the submarine's weapons officer shall verify the safety of the intended operations and shall ensure that a person from the submarine weapons department who is knowledgeable of these requirements is present to monitor these operations.

c. Welding shall be in accordance with NAVSEA T9074-AD-GIB-010 or with NSTM S9086-CH-STM-010/CH-074.

**2-24. SMALL ARMS RANGES ABOARD SHIP.** NAVSEA SW370-AH-11N-010 provides guidance on the installation and operation of small arm ranges on some, but not all, ship classes.

**2-25. INERT DISPLAY ORDNANCE.** Display ordnance items shall not contain any explosive material or any other hazardous components such as batteries, high pressure vessels, or other devices such as spring high tension assemblies which may injure personnel. The requirements for inerting ammunition are detailed in NAVSEA OP 5 Volume 1.

2-25.1. **CERTIFICATION AND CONTROL.** Display ordnance that has had the explosive material removed and left empty or replaced with inert material shall be certified inert. Display ordnance shall be certified by qualified and certified EOD personnel. As a minimum, the following data shall be recorded:

- a. Item description.
- b. Assigned serial number.
- c. Certifying official's name.
- d. Date certified.
- e. Method by which the item was determined inert.
- f. Item location.
- g. Disposition.

3-5.2. Air-Launched Missiles. AURs in carriers are usually stowed in magazines located below the water line within the armored box. Air-launched missile (AUR) ready service magazines may be located above the water line or within the armored box.

3-5.3. Sub-Surface Missiles. AURs are stowed in either specially designed magazines, launchers or missile tubes. When an encapsulated TOMAHAWK AUR is installed in a submarine missile tube, it is considered to be a "loaded launcher," and not a missile magazine.

3-5.4. Missile magazines contain electrical, hydraulic and pneumatic power operated handling equipment. Restraining equipment may be provided to prevent movement of an accidentally ignited motor. In some missile magazines, specialized detection devices and/or equipment is installed in order to provide adequate and continuous surveillance and to provide assurance that a special hazard is not actively present. Missile magazines may be equipped with specialized ventilation systems designed to ensure that magazine air pressures do not reach dangerous levels if a missile motor ignites. Plenum vents or relief ports are usually provided in missile magazines for this purpose. Additional firefighting equipment and/or systems are usually provided in missile magazines. These may consist of carbon dioxide, foam, water injection (into the missile motor exhaust nozzle), or sprinkling equipment or a combination of these systems.

#### NOTE

Special requirements for stowage of hypergolic fueled missiles and fuel-air-explosive (FAE) weapons are found in NAVSEA S9000-AB-GTP-010.

3-5.5. Missile Launchers/Launching Systems. Missile launchers and launching systems contain the same safety features provided in missile magazines. In addition, they are provided with special electrical control circuitry to prevent accidental firing of missiles. In general, once missiles are loaded into the launcher or launching system (Armored Box Launcher (ABL) or Ver-

tical Launching System (VLS) (surface or sub-surface) for example), they are not accessible to shipboard personnel. These missiles are therefore considered to be in a loaded launcher vice a magazine, and subject to the monitoring and safety requirements of a loaded launcher rather than to the requirements of a conventional magazine or locker. These monitoring and safety requirements are unique and are equal to or greater than the requirements for a conventional magazine or locker.

#### 3-5.6. Surface Combatant Vertical Launching System (VLS).

3-5.7. The surface combatant Mk 41 Vertical Launching System (VLS) provides individual cells within modules for canistered missiles. The canisters are sealed and the missiles are not accessible to shipboard personnel. In addition, launchers are provided with special electrical circuitry to prevent accidental firing and to preclude any electrical current reaching a missile until it is intended to fire that specific missile.

3-5.8. Each VLS canister is a wholly self-contained magazine with its own hazard monitoring and water deluge system available to maintain the safety of the ordnance loaded therein. Additionally, the space containing the sealed canisters is environmentally controlled and is designated the launcher support space. This launcher support space contains the electronic and electrical equipment necessary for launcher operation plus the strikedown crane. The launcher support space and canistered missiles together constitute the launcher portion of the Mk 41 VLS. As long as the hazard monitoring and deluge system are in operation, safety considerations allow preventive and corrective maintenance (including soldering), not in direct contact with a loaded canister, to be performed within the launcher support space.

3-5.9. Should the hazard monitoring and deluge system become non-operational, then the launcher support space is to be treated as a missile magazine, with preventive and corrective maintenance actions being limited to those permissible in such a magazine.