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Shipboard Pest Management Manual

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Shipboard Pest Management Manual

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Chapter 1
Overview of the U.S. Navy Shipboard Pest Management Program

INTRODUCTION

This manual outlines DoD, OPNAV and BUMED policies and procedures; defines responsibilities; and provides detailed guidelines for the U.S. Navy Shipboard Pest Management Program. The information contained herein is the combined effort of Navy Medical Entomologists and Preventive Medicine Technicians to provide a "ready reference" to assist you in conducting a safe, effective, and environmentally sound program utilizing the concepts of integrated pest control. Your diligence in detecting potential problems and monitoring control measures is essential. However, controlling pests aboard naval vessels requires the cooperative effort of all hands in maintaining good sanitary standards in workspaces, berthing and common use areas.

RESPONSIBILITIES

The Commanding Officer of a Navy vessel must ensure the Senior Enlisted Medical Department Representative (SMDR) and Hospital Corpsmen responsible for pest control are certified in shipboard pest management. Responsible corps-men must establish and maintain a safe and effective program for controlling insects, rodents, and other pests that may affect the health and well-being of ship's personnel, lead to loss of materiel, or affect the deployment status of vessels.

The Senior MDR ensures an ongoing shipboard pest control program is maintained. The main elements of an effective program are:

- Rodent Control: An effective rodent exclusion program.

- Fumigation and Commercial Contracts: Prohibiting fumigation of ships' spaces and prohibiting commercial contracts for pest control services aboard ship, unless specifically approved in writing by a Navy Medical Entomologist.

- Procurement of Pesticides, Pesticide Dispersal Equipment, and Personal Protective Equipment (PPE): Ensuring all pesticides (Appendix A), pest control equipment (Appendix B), and PPE (Appendix C) have been approved for use aboard naval vessels by BUMED. A Navy Medical Entomologist must be contacted to receive approval for the procurement of non-standard stock pesticides.

- Meals Ready to Eat (MREs): Maintaining a control program for MRE rations, to prevent materiel loss from pest infestations.

- Inspections: Conducting ongoing pierside food acceptance inspections and shipboard pest surveillance (every two weeks, or

more often if necessary, as part of food sanitation inspections) to identify the presence of any pest species, including source locations and severity of the infestations. Evaluating the effectiveness of control measures through follow-up post-treatment surveys.

- Sanitation: Recommending appropriate sanitation procedures to exclude or eliminate shipboard pests.

- Pesticide Safety: Conducting and supervising safe pest control operations as outlined under current BUMED instructions, including:

  - Personal Protective Equipment (PPE): Coordinating with the Respiratory Protection Officer and Safety Officer to ensure appropriate National Institute for Occupational Safety and Health (NIOSH) approved pesticide respirators are readily available for use (see Chapter 5).

  - Respiratory Protection Program: Ensure that all personnel who perform pest control operations are adequately trained in respiratory protection and respirator use, medically evaluated, and are receiving annual respirator fit-testing.

- Material Safety Data Sheets (MSDSs): Maintaining MSDSs for all pesticides stored or used aboard ship.

- Record Keeping and Reporting: Maintaining an ongoing pest control log, which adequately documents pest control procedures and shipboard pest control training conducted aboard ship. Meeting mandated external reporting requirements, including documentation of pesticide use.

- Regulations and Program Guidance: Maintaining a basic reference library of written regulations and program guidance.

Vessels with no assigned MDR shall obtain technical consultation and assistance from their cognizant preventive medicine personnel, NECE or one of the NEPMUs.

Navy Medical Entomologists assigned to the Navy Entomology Center of Excellence (NECE) and Navy Environmental and Preventive Medicine Units (NEPMUs) oversee the shipboard pest control program. This oversight is achieved by:

- Providing guidance, on-site consultation, technical assistance, and recommendations to fleet commands on all matters relating to shipboard pest control. Commands requesting pest control services are responsible for adequately preparing spaces for treatment with pesticides and must provide post-treatment clean up.

- Conducting education and training of selected personnel for certification as shipboard pest control specialists, following

procedures outlined in BUMEDINST 6250.12C.

- Reviewing and evaluating all pest control procedures, pesticides, pesticide dispersal equipment, and new technologies before approval for shipboard use.

EDUCATION & TRAINING REQUIREMENTS

Medical Department Personnel responsible for pest control operations must be certified to conduct shipboard pest control operations by attending and successfully completing the Shipboard Pest Control Course (CIN: B-322-1075). Ship's stewards or other personnel assigned pest management responsibilities on Military Sealift Command (MSC) and U.S. Coast Guard vessels may be trained and certified in shipboard pest control.

Mess Control Specialists, Watch Captains, Mess Deck Masters-At-Arms, and Break-Out or Cargo personnel ***not assigned to MSC ships*** should be encouraged to attend shipboard pest management training to increase their understanding of sanitation practices related to shipboard pest control, pest recognition, and proper preparation of spaces before and after pesticides are applied. ***Although these personnel will not receive certification***, they may assist the MDR in applying pesticides when directly supervised by certified personnel.

Certification Training consists of one day of classroom (didactic) instruction and one-half day of field training aboard a ship or vessel. Classroom training is conducted under the supervision of a Navy Medical Entomologist currently certified as a DoD Pesticide Applicator in Category 8. A written examination with a minimum passing score of at least 70 percent must be achieved.

Classroom topics consist of:

Subject	**Hours**
Course Introduction and Administrative Requirements	0.75
Program Responsibilities and Training	0.25
Biology, Surveillance and Control of:	
• Cockroaches	
• Stored Products Insects	
• Rodents	
• Miscellaneous Shipboard Pests	2.50
Quarantine Issues	1.00
Pesticides	
• Recording and Reporting Pesticide Use	
• Safety, Health and Personal Protective Equipment	
• Pesticides and Pesticide Dispersal Equipment - Use and Procurement	2.50
Review and Examination	1.00
Total Classroom Hours	8.00

After ship's personnel have completed the classroom portion of the course, the SMDR may schedule the field training directly with the course's lead instructor or through the training department of NECE or your cognizant NEPMU. The requirement for field training aboard a vessel should be completed no later than 1-week after the classroom phase. A certificate of completion

will not be issued until both phases of training are completed.

Annual training is required to retain certification.

Classes are routinely conducted by NECE and the NEPMUs. Information on convening dates and quotas can be obtained by contacting these activities (Appendix D).

Chapter 2
Shipboard Pests

INTRODUCTION

Global presence and the increased operating tempo of naval forces greatly increase the chances of encountering pests that transmit pathogens, infest food supplies, or simply present a nuisance to crew members. This manual concentrates on the biology, surveillance, and control strategies of pests that are commonly found aboard ships. These pests are prone to inhabit certain areas, making continual monitoring important for the following spaces:

- Food service areas
- Sculleries
- Mess decks
- Ship's stores (e.g., soda storage areas)
- Snack areas
- Heads and showers
- Dry provision storage areas.
- Berthing areas
- Laundry and dry-cleaning shops
- Cleaning gear locker
- Garbage collection areas

THE GERMAN COCKROACH

Importance

The German Cockroach is the most commonly-encountered pest aboard Navy ships. Cockroaches contaminate food and food preparation areas, and lower crew morale. The construction characteristics of naval vessels make cockroach control very challenging. Abundant standing water, food, warmth, and numerous potential harborages provide the cockroach with an ideal habitat for growth and survival. Their habits and body structure enable them to potentially transmit pathogens that cause dysentery and diarrhea. Cockroaches also impart a foul odor where infestations are well established. Their presence indicates inadequate sanitary practices or ineffective cockroach control measures. Medical Department personnel must understand the biological characteristics of German cockroaches to provide an effective control program.

Biology

The German Cockroach (Fig. 2-1a, b, c) is a small, flattened, light brown insect which can be easily identified from other cockroaches (Fig. 2-2) by the presence of two dark longitudinal stripes behind the head ("Lieutenant's bars"). Adult German Cockroaches are approximately one-half inch long. Adult female cockroaches produce a visible egg capsule (called an ootheca) located at the tip of the abdomen (Fig. 2-1b, d). The egg capsule protects the developing 30-40 eggs until they are ready to hatch. Gravid females may carry the egg capsule up to three weeks, until the eggs are within 24 hours of hatching. The young cockroaches are called nymphs and look very similar to the adults. The nymphs shed their skins (molt) several times as they mature. As this process continues, they gradually develop wings and

increase in size. Depending upon environmental factors (temperature, moisture, food supply), nymphs will fully mature in 40 to 60 days. The adults are characterized by fully developed wings and sexual maturity. Adults can live up to one year and a single female is capable of producing up to six egg capsules during her lifetime.

German Cockroaches require food, water, warmth, and harborages (cracks and crevices usually less than 1/2-inch wide) for growth and survival. Their flattened bodies enable them to hide in tight places that are warm and dark. Even

Fig. 2-1. German Cockroach. a = male; b = female; c = nymph; d = egg capsule

though their exoskeleton is covered with a thin, water-resistant, waxy coating, they are especially intolerant of dry areas and will instead be found close to available sources of water. German Cockroaches are nocturnal and gregarious in habit. Typically, the cockroach spends approximately 80 percent of the time in the harborage and the remaining 20 percent foraging within a few feet of an established harborage. Studies have shown cockroaches prefer to have their body pressed against a solid surface in small cracks and crevices (positive thigmotaxis.)

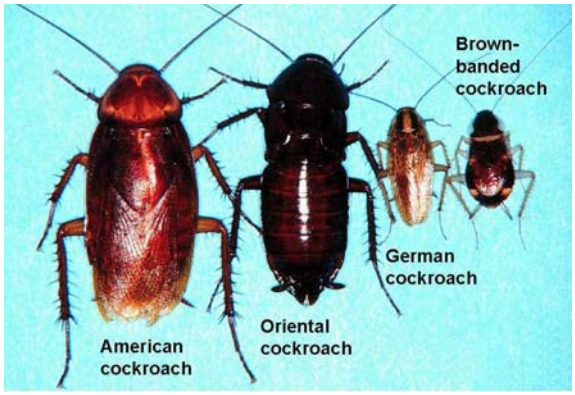

Fig. 2-2. Comparison of some common household cockroaches

Surveillance Procedures

A visual inspection for cockroach harborages is an essential part of a successful control program. Early identification of sites of cockroach infestations will reduce the need to apply pesticides by eliminating the breeding sources. Frequent inspections are especially important, because light infestations usually go unnoticed by ship's personnel until the infestation becomes more difficult to control.

Cockroaches normally forage in darkness. Therefore, if cockroaches are seen in lighted conditions, it may indicate (1) that an extremely large population exists in overcrowded harborages, resulting in overflow into the ship's spaces, or (2) that a harborage has been disturbed, causing the cockroaches to disperse. Additionally, the presence of immature and adult cockroaches in the same harborages often indicates a well-established infestation.

Cockroaches may also be located in areas not normally surveyed, and the infestation may quickly increase unnoticed. The goal of cockroach control will be met only when all harborages are located and properly treated or eliminated.

The shipboard pest control specialist should conduct a cockroach survey ***every two weeks in food service areas, and weekly until cock-roaches are no longer present***.

Fig. 2-3. Ice cream machine and motor housing

Infestations are most likely to be in and around:

- Steam lines
- Cable bundles
- Berthing
- False bulkheads, overheads, and splash boards
- Lagging and torn insulation
- Behind pictures and bulletin boards
- Around holes for plumbing and electrical lines
- Behind drawers
- Around iron supports of counters and serving lines
- In hollow furniture and utility legs (e.g., refrigeration and heavy equipment supports)
- Oncoming food stores (e.g., bagged onions, potatoes), soft drink containers, and cardboard containers
- Ovens and oven hoods
- Motor housings, esp., in refrigeration units, ice cream machines (Fig. 2-3)
- Deck drains (Fig. 2-4)

Fig. 2-4. Deck drain

- Sinks and drains (Fig. 2-5)
- Steam kettles (Fig. 2-6)
- Behind stainless steel plates and ventilation grating (Fig. 2-7)
- In expansion joints and under pipe insulation (Fig. 2-8)
- Inside electrical switch, fuse box,

and valve junction panels (Figs. 2-9, 2-10)

- Unsecured debris (Fig. 2-11)

Fig. 2-5. Deep sinks

Fig. 2-6. Steam kettles

Often the pest control specialist must stoop and crawl to locate harborages. The presence of cockroach feces is a good indication of an active or past cockroach population. Cockroach feces appear as small, straw-colored to reddish-dark brown dots near harborages and infested containers.

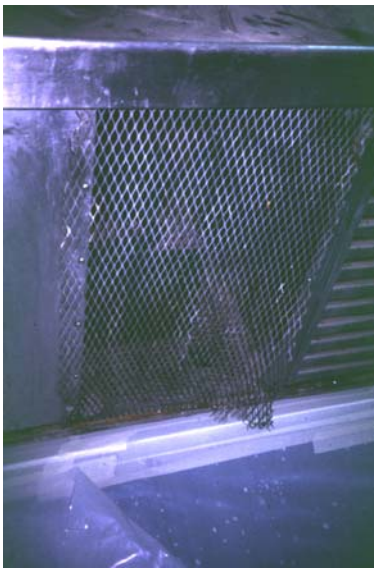

Fig. 2-7. Ventilation grating

Fig. 2-8. Pipe insulation

Special inspection techniques are necessary to locate cockroach resting sites and harborages. A flashlight is essential when searching for cockroach harborages in dark or dimly lit areas. A screwdriver is also needed to remove screen guards and motor housing covers (remember to disconnect power to

the motor before removing the housing). Replace guards and housings after inspection. Request assistance from Engineering Department personnel, when necessary.

Fig. 2-9. Electrical panel

Fig. 2-10. Valve junction panel

Flushing Agents

Flushing agents are useful in locating cockroaches and their harborages. Flushing agents consist of an aerosol pesticide formulation of synthetic pyrethroids, such as d-phenothrin (Appendix A). Spray a small amount of flushing agent into potential harborages using the tip extender on the aerosol can and observe the area for 3 to 5 minutes for cockroach activity. Flushing agents will produce a quick response, if cockroaches are present. Because of its repellent properties, do not apply d-phenothrin around bait stations or surfaces treated with boric acid aerosol dust.

Fig. 2-11. Unsecured packing material

Use caution in areas with electrical or fire hazards and never spray food preparation surfaces or equipment. Food cannot be prepared, served, or consumed during pesticide application. When using a flushing agent during pierside receipt inspections, avoid spraying the agent directly on food or food packages.

Cockroach Traps

Cockroach traps (sticky traps) are useful survey tools to detect low-level populations, locate harborages, and determine the effectiveness of treatment. Trapping alone will not eliminate an infestation. Traps with a glue board (sticky trap) and a protective covering are commercially available, and in the stock system (Appendix B).

Traps may consist of a rectangular box, a glass jar, or similar container

which holds an attractant (e.g., manufacturer supplied bait, slice of banana, fresh bread) to lure the insect into the trap. Spread an ***extremely thin*** layer of petroleum jelly just under the inside opening of the jar trap to prevent cockroaches from leaving the container.

Place traps near suspected harborages and allow them to remain in place for at least 24 hours. Place traps in the same locations each time. For best results, place them in dark areas along bulkheads or in corners and use a map of the surveyed spaces to record their locations. Do not place traps in areas that are wet. Count the trapped cockroaches and record the results in your pest control log. If two or more cockroaches per trap are caught in a 24-hour period, pesticide treatment may be necessary. Live cockroaches in the traps can be killed by spraying them with a 3% solution of dishwashing detergent (in water).

Prevention

Conduct pier-side acceptance inspections (random selection) when stores are coming aboard. This is a critical element of the shipboard pest control program while in port. German Cockroaches may be brought aboard the ship in the egg, nymph, or adult stages. Inspect potatoes, onions, soda cases, baked products, milk products, and any cardboard box pierside. Segregate and remove infested items from packing material. Ensure items are free of cockroaches before bringing them aboard the ship. Personal items carried aboard by crew members may also be infested with pests.

Preventive control strategies can reduce or eliminate most cockroach infestations by denying cockroaches the basic requirements for growth and survival. This includes preventing cockroaches from accessing food, water, warmth, and harborages, as well as excluding cockroaches from supplies being brought aboard ship. Use preventive control measures on a continuous basis even in the absence of a cockroach infestation. Not only are preventive measures effective in avoiding infestations, they also augment corrective control measures.

A high-level of sanitation is the first step to effective cockroach control. Store foods correctly, maintain good housekeeping, and eliminate water leaks and spills.

The four key factors that support cockroach infestations and to which cockroaches must be denied access are food, water, warmth and harborages:

Food

Cockroaches can exist on very small amounts of food. Strict adherence to the following guidelines will limit the increase of cockroach populations:

- Proper food handling techniques
- Store food and garbage in containers with tight-fitting lids to prevent access to foraging cockroaches
- Clean food preparation areas, equipment, and eating utensils thoroughly after each use

- Clean food spills immediately
- Prohibit food consumption in berthing areas

Water
German Cockroaches require a readily available source of water. Preventing access to water will affect population reproduction and survivability. To accomplish this:

- Eliminate water leaks
- Store wet swabs with the head up
- Repair clogged drains and eliminate standing water

Warmth
Cockroaches can be found in and around warm, sheltered areas. Food packages such as baked goods, bags of potatoes or onions, and other containers with signs of cockroach infestation can be placed in a refrigerator to kill the cockroaches. Cockroaches will be killed in from 48 to 72 hours at freezer temperatures (0°F).

Harborages
German cockroaches prefer very small cracks and crevices (harborages) for resting and hiding. All cracks and crevices should be suspected as harborage areas for cockroaches. Cockroach populations will be severely stressed if harborages are reduced or eliminated.

- Seal cracks and crevices with a caulking compound only when all cockroach access is eliminated. Incomplete sealing of cracks and crevices will provide a “safe zone” for the cockroach population by sealing sites where pesticides would normally be applied. If in doubt, do not seal.
- Repair torn, deteriorated, or damaged lagging and insulation. Check with engineering department personnel to repair or remove insulation and lagging.
- Promptly remove cardboard and cardboard boxes from food service areas.
- Prohibit the use of shelf liners.
- Eliminate false overheads and bulkheads, if possible.
- Eliminate unnecessary metal coverings or flashing.

COCKROACH CONTROL ABOARD SURFACE SHIPS

When cockroach populations become established, it may become necessary to apply insecticides to eliminate the infestation. This is accomplished through the use of dust, liquid, aerosol, and bait pesticide formulations. Conduct a thorough pre-treatment survey before initiating corrective actions. The only certain way to assess effectiveness of treatment is to compare pre-treatment surveys with post-treatment surveys. ***Actual treatment must be performed by certified shipboard pest control specialists.***

Preparation of Treatment Spaces
Before residual insecticide application, properly prepare food service spaces and implement procedures to prevent accidental exposures to food preparation surfaces.

Establish coordination between departments. This helps in scheduling date and time of the treatment, materials, and personnel.

Coordination also minimizes disruption of those areas requiring treatment. Ventilation may need to be secured during the treatment to prevent the spread of insecticide odors throughout the ship's spaces.

Notify all individuals directly involved in preparing the space and all who have responsibility for the space. These personnel should include the following:

- Executive Officer
- Food Service Officer
- Department Head
- Supply Officer
- Master-at-Arms
- Damage Control Assistant
- Watch Captain

Proper and timely preparation of each space to be treated is critical to a good pest control program. The following checklist provides general guidance for preparing spaces, and may be modified depending on the type of vessel, insecticide to be used, and severity of the cockroach infestation.

- Conduct a complete field day, ensuring a thorough "deep cleaning" of all surfaces, as grease and dirt will reduce the effectiveness of the applied pesticide. Food service spaces must have all food contact surfaces covered before application. After the treatment is complete, thoroughly clean these surfaces with soap and hot water before use.
- Do not allow exposed food or food utensils in treatment areas. Remove all stored food and materials from the treatment area. Completely cover foods that cannot be removed with impervious material such as aluminum foil or waxed paper.
- Move all non-fixed equipment and furniture away from bulkheads to facilitate proper treatment.
- Disconnect equipment with potential electrical spark hazards.
- Have an electrician secure both exhaust and supply ventilation. Cover vent openings with plastic.
- Ensure access panels to all power boxes, motor compartments, and the ventilation system are opened before beginning treatment. These access panels should be opened only by authorized personnel.
- Open spaces having false bulkheads or overhead panels to provide access for treatment.
- Cover all hatches and doorways which do not have covers, cannot be adequately sealed, or will not be used, with a plastic or paper cover and tape.
- Post warning signs on all entrances to spaces under treatment.

Crack and Crevice Treatment

This technique involves the precise placement of insecticide residues into all existing and potential cockroach harborages. Crack and crevice treatment reduces the chance that the insecticide material

will be washed away during routine cleaning procedures. Dust, liquid, and aerosol insecticide formulations can be used. Avoid depositing these products onto exposed surfaces or introducing excessive material into the air. Random spraying of insecticides will not give effective cockroach control. ***Avoid contamination of food, food utensils, and food processing surfaces.***

For crack and crevice treatment, all pesticides in aerosol formulations shall be applied using extender tips.

Direct the spray into all cracks and crevices, including: breaks in insulation and pipe lagging, overhead wiring, deck drains, motor compartments of machinery (when electrical components can be avoided), metal supports under counters and installed tables and equipment, behind splash-boards and shields, false bulkheads, pictures, and bulletin boards). Use extreme caution when spraying areas where possible electrical or fire hazards may exist.

Void Treatments

To access voids behind false bulkheads, an extender tip must first be attached to an aerosol can, or aerosol container pesticide dispersal unit (Whitmire® PT® System III). The extender tip is then inserted into the void through any existing hole in the bulkhead, deck, overhead area, or place where screws can be removed and replaced. ***Do not make new holes for placement of void treatments***. Widest dispersal of a pesticide (e.g., boric acid aerosol dust) into a void can be achieved with a 4-way extender void injector tip.

Post-Treatment Procedures

After insecticide treatments have been completed, keeping the area secured and unventilated for one to several hours will greatly increase the effectiveness of the pesticide application (read the pesticide label for reentry statement requirements). In addition:

- Prohibit reentry of personnel into treated spaces until the space has been ventilated for at least one-half hour. It may be necessary to extend this time in poorly ventilated spaces or based on specific pesticide label requirements.

- Residual insecticides are not effective in killing cockroaches developing in egg capsules. It is very important for food service personnel to promptly sweep up dead cockroaches and egg capsules immediately upon reentry to the space to prevent new cockroaches from hatching and seeking untreated harborages.

- Wash all food contact surfaces thoroughly after application.

- Refrain from a complete field day in treated spaces for a minimum of 24 hours to prevent insecticides from being washed out of cracks and crevices.

Pesticide Baits

Pesticide baits authorized for shipboard use consist of a food attractant, a humectant (keeps bait

moist), and a stomach poison, all of which are enclosed in a plastic container for easy placement near cockroach harborages. Baits are non-repellent, nonvolatile, and do not produce air contaminants. The stomach poison is slow acting compared to residual insecticides, so an immediate decrease in cockroach population levels may not be observed. It may take from 1 to 2 weeks before there is a noticeable reduction in cockroach numbers. Baits can be used in all locations where liquids would otherwise present the danger of electrical shorting or fire. There are no restrictions on where these baits can be placed and no special site preparations necessary, except clean surfaces to place the baits. Apply the baits per label directions. When placing bait stations, adhere to the following recommendations:

- Place baits where cockroaches or their excreta have been detected. Baits may be placed behind equipment, inside fuse boxes, the underside of tables, in overheads, inside torn or damaged lagging, in enclosed motor areas, and in corners of food preparation surfaces (including shelving).

- Bait stations should be placed ***horizontally*** with the label side against the surface. Vertical placement significantly reduces the likelihood that cockroaches will enter the bait station.

- Check a representative sample of placed baits periodically (10%, every 3-7 days). High heat or high moisture conditions can cause the bait to dry and crack or soften and run. Under these conditions, it may be necessary to replace bait more frequently. In heavily infested areas, the bait in bait stations may be consumed quickly and the empty stations used as a harborage for surviving cockroaches. Check some of these by cutting them open and replacing them as needed.

- Do not place bait or bait stations directly on the deck. When exposed to liquids baits can rapidly degrade and become unattractive to cockroaches.

- Do not place baits out in the open such as along the middle of a wall or on top of a table. Cockroaches typically only forage a few feet from a harborage. Placing baits as close to harborages as possible significantly increases their effectiveness.

- Do not spray insecticides on or near baits. Residual insecticides repel cockroaches and they will not enter a bait station on a treated surface. If a flushing agent is used for surveys (conducted every two weeks), take care to avoid contamination of the bait or areas near the bait.

COCKROACH CONTROL ABOARD SUBMARINES

Sanitation

Berthing spaces are to be inspected every other week by the MDR to ensure the compartment is free from insects. Insects in berthing compartments shall be reported to the Commanding Officer on the formal sanitation report. Absolutely

no open food containers shall be stowed in personal lockers, under bunks, or elsewhere in berthing compartments, working spaces, or offices. No open food packages will be left uncovered." (COMSUBLANT/COMSUBPACINST 6000.2C).

Pierside Inspections
"Cardboard cartons containing fresh provisions…are ideal for the laying of cockroach eggs. These items will be inspected and unloaded topside on submarines, or left unpacked and the cartons discarded immediately. Spraying of d-phenothrin is authorized for pierside inspection of canned, bottled, and individually packaged stores. For the inspection of vegetables, fruits, and other items such as bagged onions, potatoes, etc., [d-phenothrin] is not authorized." (COMSUBLANT/COMSUBPACINST 6000.2C).

Pesticides
Only when in port and able to ventilate outboard for at least 24 hours can residual crack and crevice pesticide treatment against cockroaches be used. Currently, a 2% aerosol formulation of d-phenothrin and the Whitmire aerosol (PT 565) formulations of pyrethrins are recommended approved pesticides.

Methods for applying insecticides aboard submarines are the same as those used aboard surface vessels. Read and closely adhere to pesticide label directions and precautions.

Authorized baits may be used aboard submarines at any time. Sufficient quantities of this bait should be maintained to control cockroaches adequately in all food service areas. Apply baits per the label instructions.

With the exception of approved baits, pesticides cannot be stored aboard submarines. Supporting submarine tenders maintain an adequate supply of insecticides and insecticide dispersal equipment to meet the needs of these vessels.

Residual insecticides are repellent to cockroaches and they will not enter a bait station placed on a treated surface. If a flushing agent is to be used aboard a submarine when in port and venting, take care to avoid contamination of baits or areas near baits. If in doubt, replace with fresh baits or bait stations before the submarine deploys.

The following also applies when using residual pesticides aboard submarines:

- **Residual pesticides are limited to crack and crevice treatment while using extender tips, and will not be used as a space spray at any time.** Avoid covering large areas with residual insecticides.
- Determine outboard ventilation time during and following treatment based on treatment conditions and the amount of pesticide used. The general rule is that the exhaust air shall be discharged overboard for at least 24 hours following application. This should be adequate for evacuating the propellant and pesticide odor.

- Use residual pesticides only when the submarine is not expected to submerge for a period of 24 hours following application.

- Secure all equipment having flame or electrical spark hazards during treatment and for 24 hours after application.

- Secure all food preparation and service areas. Cover all food and food contact surfaces. Wash all food contact surfaces thoroughly with soap and hot water after application.

- Prohibit reentry of personnel into treated spaces until the space has been ventilated for at least one-half hour. It may be necessary to extend this time in poorly ventilated spaces or due to specific pesticide label requirements.

STORED PRODUCTS PESTS (SPPs)

General Information

Over 100 species of insects, mostly beetles and moths, can infest food products brought aboard ship. Only a few species are responsible for the majority of damage to stored commodities.

SPPs can cause considerable damage to stored subsistence. Losses are much greater than the amount actually consumed because food, contaminated by feces, odors, webbing, cast skins, and live or dead insects, may need to be discarded or destroyed, depending on the degree of contamination. Insect populations raise the humidity within the food product, increasing mold and fungal growths. Total losses from infestations of SPPs are unknown, but are thought to be in the millions of dollars annually. When proper procedures are absent, the potential for loss is enormous.

Some of the contaminated food supplies found on ships may already have been infested before they were taken aboard. The most susceptible supply items are farinaceous products (those made from flour or other processed grains). Dry beans and peas, candy, spices, and dried fruit may also be easily infested.

In addition to the monetary losses described above, some species of SPPs may cause illness. Beetle larvae belonging to the family Dermestidae are covered with tiny hairs, which, if eaten, may cause serious intestinal distress.

Some stored products pests, such as the Khapra Beetle are internationally quarantined pests. Caution must be taken to prevent infestations and, if found, to ensure against infesting other ships or port areas through infested consumables.

Biology

The majority of SPPs are small, avoid light, and multiply rapidly under favorable conditions. Stored subsistence provides an ideal environment for the development of SPPs because of an abundance of nutrients, a stable environment under most storage conditions, and a lack of natural parasites and predators. Detection is difficult

because the infestation often remains hidden inside packaging. Discovery is often delayed until insect populations are well established.

A key feature of the biology of SPPs is their ability to conserve water. This makes them well adapted for infesting dry stores. They are extremely resistant to dehydration, excrete only dry material, and retain metabolic water resulting from the breakdown of foods. Because of these adaptations, they are able to thrive in low moisture environments.

Like all cold-blooded animals, activities of SPPs are temperature-dependent. Below an upper limit, development is faster as temperature increases. Thus reduction of temperature and cold storage of susceptible or infested commodities are effective measures for the prevention and control of SPPs.

The more important stored products pests, which may be found aboard ship, are divided into two groups: (1) Medically Important and (2) Non-Medically Important.

Medically Important SPPs

Dermestid Beetles

Beetles in the family Dermestidae (Fig. 2-12) are medically important because hairs on the outside of the larvae can cause intestinal trauma, eye irritation, dermatitis and allergic reactions (Wirtz 1991). Adult dermestids can be recognized by the characteristic patterns of various colors on their wing covers. An adult female can produce approximately 100 eggs during her lifetime.

Most members of the family feed on animal products such as fur, hides, skins, feathers, and dead insects, and are common pests in warehouses throughout much of the world. The adults and larvae are capable of penetrating both polyethylene and foil packaging.

Fig. 2-12. Dermestid beetle larva

The Khapra Beetle

This dermestid beetle probably originated from India, and has become a quarantinable insect of medical importance worldwide.

The adults and larvae are generally brown in color and covered with yellowish hairs. In contrast to other dermestid species, it feeds on grains and cereal products, instead of animal products.

Adult Khapra Beetles may live a few days to several months. However, the larvae of the Khapra Beetle are especially resistant to starvation, and may live for several years without food (Munro 1966). A small infestation can very quickly develop into large populations and, unless completely eradicated from a ship, can continue to survive unnoticed in small numbers for long periods of time.

Because all dermestid larvae have external hairs, and because the Khapra Beetle, in particular, is difficult to distinguish from other dermestid species, ***any dermestid infestation*** must be handled extremely aggressively. Every effort must be taken to ensure complete control and thorough destruction of the infested product. An infestation of ***one or more living or dead larvae of*** **Trogoderma** ***or other dermestid species*** shall be justification for condemnation of the ***lot***

Flour Beetles

The Red Flour Beetle and the Confused Flour Beetle are very similar in appearance. They are also called "Tribolium" beetles. The terminal three antennal segments of the Red Flour Beetle are distinctly larger than the other antennal segments (Fig. 2-13.)

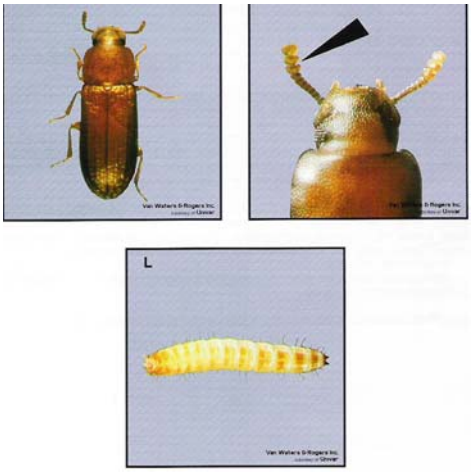

Fig. 2-13. Red Flour Beetle

In contrast, the antennal segments of the Confused Flour Beetle gradually increase in size throughout their length, similar to the shape of a baseball bat (Fig. 2-14).

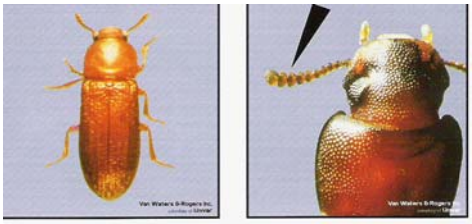

Fig. 2-14. Confused Flour Beetle

Both species are common pests of crackers, cereals, flour, and other grain products. While adults of the Red Flour Beetle can fly, the Confused Flour Beetle does not. Neither are good package penetrators, usually relying on existing openings.

When present in large numbers, both species cause flour to turn gray in color and impair its baking qualities. Adult flour beetles also secrete benzoquinones, which impart a disagreeable taste and odor to infested products. The reported toxic and carcinogenic effects of the benzoquinones and possible levels in stored foods indicate a potential hazard (Wirtz 1991). Because of this, a tolerance level of only ***3 or more insects per pound for flour beetle*** infestations is lower than the limit of ***7 or more insects per pound for most other insects*** (MIL-STD-904B).

Flour beetles appear as shiny, flattened, reddish-brown insects. The head and upper parts of the thorax are densely covered with minute pitting. The wing covers are ridged lengthwise. The female flour beetle lays an average of 440 eggs in her lifetime. Each egg is covered with a sticky secretion that allows the

egg to adhere easily and securely to the seams of sacks and boxes. The adult may live 2-3 years.

Non-Medically Important SPPs

Saw-Toothed Grain Beetle

The Saw-Toothed Grain Beetle (Fig. 2-15) is the most common SPP aboard ship. It can infest a wide range of commodities including grain products, dried fruits, candy, sugar, dried meats, and tobacco products. The adult is slender, flat, and brown. It is easily recognized by the six saw-toothed-like projections on each side of the thorax. The female can lay as many as 280 eggs during her lifetime. The adult usually lives 6 to 10 months, but some may live for up to 3 years. The Merchant Grain Beetle is nearly identical in appearance, similar in habit, but more abundant in the Pacific region. Both are poor package penetrators, normally utilizing breaks along seams, vent holes, or other openings.

Fig. 2-15. Saw-Toothed Grain Beetle

Rice Weevil

The Rice Weevil (Fig. 2-16) is considered to be one of the most destructive of the stored products pests, feeding on a variety of raw grains and grain products. Adults are reddish-brown and have a long “beak” or ”snout” that extends out from the head. It may be as long as ¼ the length of the body. The adult can be easily recognized by the presence of two yellowish or reddish spots on the top of each front wing.

Fig. 2-16. Rice Weevil

Indian Meal Moth

The Indian Meal Moth (Fig. 2-17) has a worldwide distribution and is the number one pest of dried fruits in storage. It also infests other commodities, including grain products, nuts, powdered milk, candy, and pet food.

It can be a problem, especially in packaged food items in vending machines and snack areas aboard ship. When infesting grain products, it prefers coarse flours and is commonly found in items like corn meal. The fully-grown larvae are large compared to other common SPPs (about one-half inch long). The most commonly seen “white worms” found in packaged dried fruits are nearly always the larvae of this moth. They also produce silk webbing, which further lowers the quality of the infested commodity. The adults of this moth have a grayish band across the upper 1/3 of

their reddish-bronze wings. The wings are folded over the abdomen when resting. The female moth lays from 100 to 300 eggs during her lifetime.

Fig. 2-17. Indian Meal Moth

Cigarette Beetle

The Cigarette Beetle (Fig. 2-18) infests a wide variety of foods including grains, spices, herbs, dried meats, drugs, and pet food. The adults are very active and fly readily, increasing the risk of adjacent food

Fig. 2-18. Cigarette Beetle

stores becoming quickly infested. **They are capable of penetrating both polyethylene and paper packaging**. The adult is light-brown in color and appears rounded. The head is bent downward, giving the adult a hump-backed appearance. The last segments of the antennae are saw-like or triangular, and the hardened front wings are smooth in appearance.

Drugstore Beetle

The Drugstore Beetle (Fig. 2-19), like its close relative the Cigarette Beetle, is very active and will eat almost anything. They can even ingest poisons such as strychnine

Fig. 2-19. Drugstore Beetle

and belladonna. In addition to food products, they can consume paper and wood and can be serious pests in books. They have been known to bore through sheet lead, and have little difficulty penetrating metal foil packaging. The adult is reddish-brown in color. In contrast to the Cigarette Beetle, the last 3 segments of the antennae are elongated and sausage-like in shape. The front wings have parallel lines along their length. Its life history and habits resemble the Cigarette Beetle.

Booklice (psocids)

Booklice (Fig. 2-20) are minute insects about the size of a pinhead and are sometimes found covering stored food products (flour, cereals). These almost transparent insects are about 1 mm long. They feed on cereal products, vegetable and animal debris, paste, glue, and other organic substances. However, their

preferred foods are molds and fungi, indicative of conditions of high humidity, which can also attract other SPPs to the site or product. Each female lays up to 100 eggs, growing from egg to adult in about 3 weeks. One common psocid, the Booklouse, is often extremely abundant in stored grain products.

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A more comprehensive list of selected stored products pests that may be encountered aboard ship is found in Table 2-1 (next page.)

Fig. 2-20. Booklouse

Table 2-1. Characteristics of some stored products pests found aboard ship

Insect	Length of adult (mm)	Days to develop (egg to adult)	Adults can fly	Presence	Common type of product attacked[1,2,3]
Saw-Toothed Grain Beetle	2-3	30-50	No	Very common	Packaged cereals, crackers, dried fruits, candy, flour, meal, sugar, dried meat, tobacco, wide variety of grain products
Merchant Grain Beetle	2-3	30-50	Yes	Very common (Pacific region)	Oatmeal, rice, flour, cake mixes, macaroni, cookies
Cigarette Beetle	2-3	30-50	Yes	Very common	Tobacco, breakfast cereals, spices (esp., dry cocoa powder), raisins, rice, teas
Drugstore Beetle	2-3	60-210	Yes	Very common	Flour, oatmeal, spices, leather goods
Bean Weevil	2-3	20-90	Yes	Very common	Dried Navy beans, kidney beans, peas, seeds
Pea Weevil and Cow Pea Weevil	3-5	20-90	Yes	Very common	Dried peas and other beans
Rice Weevil	2-4	30-50	Yes	Very common	Pasta, rice, raw grains, nuts, fruits
Red Flour Beetle	3-4	30-120	Yes	Very common (health concern, if 3 or more per pound)	Flour, other grain products,, beans, peas, dried fruits, shelled nuts, spices, chocolate
Confused Flour Beetle	3-4	30-120	No	Very common (health concern, if 3 or more per pound)	Flour, other grain products, beans, peas, dried fruits, shelled nuts, spices, chocolate
Furniture Carpet Beetle	2-3	90-200	Yes	Common (health concern, dermestid species, if 1 or more larvae/lot)	Woolens, feathers, silk, animal fibers (hides with hair), natural bristles, products of animal origin
Common Carpet Beetle	3-5	80-200	Yes	Common (health concern, dermestid species, if 1 or more larvae/lot)	Woolen goods, rugs, upholstered furniture
Khapra Beetle	2-3	60-300+	Seldom	Rare (USA quarantine dermestid species, if 1 or more/lot)	Raw grains, including wheat, barley, rice; dry milk products, breakfast cereals, dried fruits (a concern with products from SW Asia, Middle East and North Africa regions)
Varied Carpet Beetle	2-3	1 generation per year	Yes	Common (health concern, dermestid species, if 1 or more larvae/lot)	Grain products, woolens, silks, feathers, products of animal origin, rodent nests, dead insects

Table 2-1 (continued)
Characteristics of some stored products pests found aboard ship

Insect	Length of adult (mm)	Days to develop (egg to adult)	Adults can fly	Presence	Common type of product attacked[1,2,3]
Warehouse Beetle	2-3	40-60	Yes	Common (health concern, dermestid species, if 1 or more larvae/lot)	Grain products, dead insects
Lesser Grain Borer	2-3	30-60	Yes	Common	Flour and other raw grains, esp., wheat, corn
Flat Grain Beetle	1-2	35-85	Yes	Rare	Broken raw grain, and other grain products, including flour
Spider beetles (Family: Ptinidae)	2-3	90-300	No	Rare	Broken grain, seeds, dried fruits and meats, woolens and dried animal products, rat and mouse droppings
Indian Meal Moth	8-10	25-135	Yes	Very common (esp., in vending machine areas)	Flour, corn, cornmeal, dried fruits, nuts, powdered milk, crackers, biscuits, chocolate, dried red peppers, dried flowers
Almond Moth	10-12	60-120	Yes	Common	Cereals, cocoa beans, dried fruits, flour, grain, peanuts, seeds, shelled nuts
Mediterranean Flour Moth	10-14	30-40	Yes	Rare	Flour, cereals, bran, biscuits, seeds, chocolate, dried fruits

[1] Processed grain products: flour, pasta, rice, grits, oatmeal, cornmeal, farina (cream of wheat), bakery mixes (cake, biscuit mixes), cookies, crackers, ice cream cones, (dry pet food is not commonly found aboard ship, but is a highly infestible item if on-loaded).
[2] Raw grains (unprocessed grain products): wheat, rice, corn, barley, oats, rye.
[3] Spices: red & black pepper, cinnamon, dry cocoa powder, dry chili spice mix.

Surveillance Procedures

Pierside and Onboard Inspections

Inspection of infestible commodities before on-loading is critical in preventing infestations of SPPs aboard ship. Inspect all dry food products upon receipt and reject them if evidence of infestation is found. Conduct pierside inspections at time of receipt (Fig. 2-21). Conduct onboard inspections of all

Fig. 2-21. Conducting a pierside inspection

replenishments within 48 hours of receipt, including newly-acquired stored products transferred from supply ships at sea (Fig. 2-22).

Fig. 2-22. Ship-to-ship onloading

Personnel performing the receipt inspection can be either medical or supply department members, but all shall be trained in inspection procedures. Detailed inspection procedures are provided in MIL-STD-904B. It is not necessary to inspect every package. However, the greater the number of packages inspected, the greater the probability of discovering infestations. ***Random inspection*** of packages should detect infestations of SPPs. Sample sizes, based on the number of packages per primary container, are provided in Table 2-2.

General inspection and surveillance procedures are as follows:

- Perform the receipt inspection with the aid of a flashlight.
- Examine packaging (e.g., individual boxes, plastic bags, or cardboard boxes) for the presence of live or dead insects; cast "skins," or pinholes made when SPPs enter or exit the packaging.
- Invert items in plastic bags and look for insect excrement (a fine powdery substance) which may have fallen to the bottom of the package.
- Examine seams and folds in packaging and the inside corners of cardboard boxes.
- Pay special attention to any items at or near the inspection test date (ITD). These items have a higher risk of infestation.
- The Jack-of-the-Dust, Cargo-King, or other personnel responsible for maintaining the storage space should conduct ***biweekly storage inspections***. The Medical Department should be immediately notified whenever live or dead insects are found.

Table 2-2. Recommended sample sizes to determine infestation levels of SPPs

Lot size (Primary container)	Sample size
2 to 15	2
16 to 50	3
51 to 150	5
151 to 500	8
501 to 3,200	13
3,201 to 35,000	20
35,001 to 500,000	32
500,001 and over	50

- Medical Department personnel should inspect storerooms at least monthly, or more often as needed, to ensure the highest level of sanitation is maintained. SMDR's should recommend that

all broken containers, torn sacks, and spilled food should be removed immediately. Decks should be swept and vacuumed, especially prior to receipt of new food stores.

- Items most susceptible to infestation should receive priority during storeroom surveys. Carefully check cereals and other products containing raisins. They are especially vulnerable to SPPs.

Past experience has shown the following items have the highest probability of infestation:

- Grits
- Cornmeal
- Farina
- Fry mix
- Macaroni/Pasta
- Barley
- Cookie and cake mix
- Flour
- Dry beans and peas
- Ready to eat cereal
- Spices

Reporting Infestations of SPPs - DD Form 1222. All infestations of SPPs must be submitted for identification and reported. Send labeled SPP specimen samples with a completed DD Form 1222, "Request for and Results of Tests" to the nearest NEPMU or to NECE. Instructions for completing DD Form 1222 and examples can be found in Appendix E.

Minimum requirements for submitting specimens include:

- Preserving at least two specimens in 70 percent ethyl alcohol (or isopropyl alcohol, if ethyl alcohol is unavailable). This is especially important for immature or adult soft-bodied stages, e.g., lice, which will otherwise "shrink" and be hard to identify if preserved and shipped dry.

- However, adult moths should be submitted ***dry*** in vials ***without alcohol***, or carefully placed into folded postage envelopes. If an envelope is used, place it on a piece of cardboard with a short section of cardboard on each side of the envelope to act as protective "spacers". Place another piece of cardboard over the envelope and the other cardboard pieces, taping them all together.

- This dry preservation technique will keep their scales from falling off into the alcohol, while maintaining key color patterns used for identification. However, it is still advisable, if several specimens are available, to preserve a few in alcohol, since species that are difficult to identify by color patterns alone can often be more easily examined microscopically using characters preserved in alcohol.

- Whether a dry or alcohol-filled vial is used, place tissue (***do not use cotton***) in each end of the vial to prevent movement of the specimens during mailing or hand delivery. If cotton is used instead of tissue, specimens will be tangled in the fibers, and

extremely hard to free for identification without damaging the specimens. Several specimens of the same suspected type from the same collection site can be packed in a single vial, alternating layers of tissue on either side of each specimen.

- Carefully pack all vials and/or cardboard protected paper envelopes in thick, well-padded mailing envelopes or cylinders before final shipping.

Following identification, the DD 1222 will be returned to the submitting activity, which should forward a copy to the appropriate accountable officer and the Defense Supply Center Philadelphia, DSCP-HROS, 700 Robbins Ave. – Building 6, Philadelphia, PA 19111-5092.

Additional Reporting Requirements for Infested Stores

NAVSUP Publication 486 Volume 1, Food Service Management, states that the presence of insect-infested products warrants a "Suspected Hazardous Food Item Message" to be sent to DSCP, Philadelphia. This message is in addition to submission requirements of a DD Form 1222. A sample message is provided in NAVSUP P-486. Responsibilities and procedural guidelines for recall of hazardous food products are outlined in NAVSUPINST 10110.8C.

When hazardous food messages are sent, include NECE or an NEPMU as an information addressee and:

- Ship's address and Unit Identification Code (UIC).
- Point of contact, with telephone number when in port.
- Quarantine measures taken.
- Amount of product at risk.
- Storage site and type of product infested.

MIL-STD-904B lists the following thresholds for determining fitness for human consumption of commodities infested with SPPs. **Products require disposal when the insects are found *within* (not external) inspected packages, as follows:**

- **One or more dermestid larva(e), adult(s), or cast skin(s) per lot.**
- **Three or more flour beetle (Tribolium) larvae or adults per pound of product.**
- **Seven or more of any other insects (larvae or adults) per pound of product.**

Prevention

Preventive controls are the first line of defense against SPP infestations. If properly conducted, the following measures should keep any vessel SPP free:

Sanitation

Sanitation is extremely important in prevention of infestations of SPPs. Infested items shall be isolated or promptly disposed of to prevent contamination of other materials. A small amount of flour on the deck or

accumulations of dust in cracks and crevices is enough to maintain a SPP infestation. Always keep storerooms clean. Adhere to the following principles of storeroom sanitation at all times:

- Clean up all spills immediately.
- Dispose of items found in open or damaged packaging.
- Vacuum - do not sweep - deck grates and horizontal ledges
- Rotate stock by date of pack. Good stock rotation procedures are essential to minimize the potential spread of SPP infestation. The rule for good stock rotation is "first in, first out."
- If space permits, leave inspection aisles between commodities.
- Ensure decks are clean before receiving new stores.

Inspection and Surveillance

A rigorous inspection program will help prevent the introduction of infested commodities to storerooms and detect the presence of infested commodities before cross infestation can occur. Storage conditions and product history affect inspection frequencies:

- Poor sanitation is conducive to pest infestations and is justification for frequent inspections, monthly or shorter if conditions warrant.
- Any recent pest infestation/ activity where products are used or stored is justification to increase inspection frequency to monthly or shorter.
- Warm temperatures shorten insect development time and are justification for frequent inspection of infestible items.
- Cool temperatures and negative findings for pests and sanitation are justification to reduce frequency of inspection.

Segregation of Infested Commodities

When infested commodities are discovered in the storeroom, segregate them from other subsistence and put them in cold storage. Items with an infestation below the levels specified in MIL-STD-904B can be placed in a freezer space for at least 3 days. This will kill many of the insects, which can then be sifted out of the food material to remove the various insect stages, cast skins and excrement. The food items should then be used as soon as possible. Freezing infested food materials for a minimum of 2 weeks at 0° F will kill all stages of insects. Dispose of items infested above the allowable levels. Isolate the products and expedite administrative procedures for disposal.

Low Temperature Storage

All SPPs are temperature sensitive and low temperature arrests development and reduces survival. Low temperature storage will retard the development of infestations in food products. To the extent permitted by available space, keep all items at high risk of infestation in cold storage.

SPPs Control Measures

Meals, Ready to Eat (MREs)
Current pest control program guidance for MREs stored aboard ship is contained in the Armed Forces Pest Management Board (AFPMB) Technical Guide No. 38

Fumigation
When large quantities of product are infested, fumigation may be the only practical control measure. On-shore fumigation is normally carried out by public works or contract personnel, usually in a warehouse or on the pier. ***Fumigation aboard ship is conducted only under special circumstances and requires the approval of a Navy Medical Entomologist.***

Residual Pesticide Application
Insecticides can be used to prevent infestation of non-infested commodities or to control the spread of an existing infestation. All insecticides applied aboard ship require extreme caution to prevent contamination of food products. Residual insecticides are applied per label directions (e.g., to cracks and crevices, or as spot or area treatments on decks and bulkheads.) For corrective spraying, treat an infested area according to the pesticide label. If spot or area treatment is required, empty and clean the storeroom before applying the insecticide. If total removal of food products from the space is impractical, completely cover all food products with impervious materials. Consult NECE or an NEPMU for the current recommendations on storeroom treatment.

Aerosol Insecticides
Aerosol can be used to control the flying stages of SPPs in storerooms when used as a space treatment. ***Never spray aerosols directly on packaging***. Insects inside packages will not be controlled by space treatment. Consult NECE or an NEPMU for the current recommendations on aerosol insecticide use in storerooms.

RODENTS

Importance
The effective control of rodent populations (rats and mice) is extremely important to the Navy. Rodents can carry serious communicable diseases such as plague, murine typhus, leptospirosis, and food-borne illnesses (e.g., salmonellosis). Rodents eat, contaminate, or destroy enormous amounts of food annually. Rodents also gnaw electrical insulation that can cause electrical shorts, outages, or fires.

Biology
Rodents have been in close association with humans for ages. Several species are particularly well suited for specialized conditions found aboard ship, where they can impact greatly the health and welfare of ship's personnel, food supplies and morale. A successful rodent control program must be based on understanding the behavior and habits of each species. Specifically, rodents:

- Use a sense of touch when moving about, and prefer to run alongside vertical surfaces rather than across "open ground."
- Have poor vision.

- Have an excellent sense of smell, and are not repelled by human odors.

- Have a good sense of taste, preferring fresh foods.

- Have excellent hearing.

- Are excellent climbers, jumpers, and swimmers.

The most important rodents of concern onboard ship are:

Norway Rat
The Norway Rat, (Fig. 2-23,) also called the “common rat,” “brown rat,” “water rat,” “wharf rat,” or “sewer rat,” probably originated from Central Asia, arriving in North America in 1776 in boxes of grain brought by Hessian troops hired by the British during the American Revolution. It is associated with diseases such as tularemia, spotted fever and bubonic plague. It is a comparatively large aggressive rat, brown-gray above, gray on the underside, and weighs approximately 7 to 17 ounces. Its tail length of 5-8” is slightly less than half its total body length (12-18 inches, tip of nose to tip of tail). It has relatively small eyes.

The Norway rat is present wherever human activity creates suitable harborages and there is an adequate food supply. It is an excellent swimmer and a good climber. It is found mainly in the holds and decks of ships. Preferred foods include meat or fish mixed with a diet of grains, vegetables, and fruit. If these items are absent, any food may be eaten.

Fig. 2-23. Norway Rat

Roof Rat
The Roof Rat, “ship rat,” or “black rat” (Fig. 2-24,) probably originated in Southeast Asia, spreading through Europe and then into the Americas long before the Norway Rat. It was the carrier of bubonic plague during the “Black Death” of the 14th century, which killed a third of Europe’s population. It arrived in North America in 1609 with the early colonists at Jamestown. When the Norway Rat finally arrived, large numbers of Roof Rats began to disappear, and today the Roof Rat is much less common than the Norway Rat. Some propose that this is because the larger, more aggressive Norway Rat has outcompeted the Roof Rat. Others suggest that the Roof Rat is more suited to warm tropical climates. Regardless, the roof rat is far more common on ships than the Norway rat, and continues to be reintroduced into the U.S at seaports. It is an excellent climber and may be found in the overhead wiring and upper decks of ships. It weighs 4-13 ounces, with its tail length (6-10”) greater than half its total body length (13-18”). There are many color and body type variations worldwide. Most are brown or gray above, and gray or white on the underside. These rats prefer seeds,

cereals, vegetables, and fruit, but may subsist on leather goods, chocolate, and even weaker

Fig. 2-24. Roof Rat

members of their own kind.

House Mouse

The House Mouse (Fig. 2-25) is a small rodent, adults weighing only about ¾ ounce, with a total length of 5-8". It is gray-brown above and below. It is commonly associated with humans and may cause serious

Fig. 2-25. House Mouse

damage to electrical wiring or food stores, especially sweets and grains.

Surveillance Procedures

Careful surveillance helps to identify rodent infestations and is necessary to determine control measures. The following signs help determine location and degree of rodent infestation, the species involved, food and water sources, and needed improvements in exclusion and sanitation.

Runways and Rub Marks

Routes frequently traveled by rodents are called "runways." A dark color at the base of a bulkhead or where the rat climbs stanchions usually identifies the runways. This discoloration results from the repeated passage of rats. Since their hair is moderately oily, they leave behind a mark (much like a scuff-mark) that continues to darken as more oils and dirt are rubbed off with repeated use of the runways.

Runways are usually hidden from obvious view and may be anywhere. For example, if a runway is inside a pipe, it will usually be inside the casing, which will need to either be opened to reveal it, or followed, inch-by-inch, to discover the entrance and exit openings. Because roof rats prefer to travel along overhead wires or steam lines, the most common runways will be found in those areas. Where the point of contact of the cross beams occurs, their roughly semicircular rub marks are usually evident. Other locations of runways may be the free edge of an angle iron, a pipe, an electric cable, or the top of sheathing.

Tracks

Hold a flashlight at an angle to the deck to observe tracks in the dust. The tracks will cast a distinct shadow (Fig 2-26).

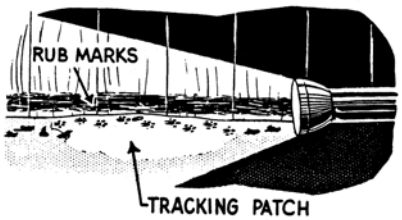

Fig. 2-26. Positioning the flashlight

Fresh tracks will appear sharp and distinct (Figure 2-27), whereas old tracks may be less distinct, because of dust accumulation. The five-toed tracks of the rear paws are more commonly observed than the four-toed front paws, yet both may be present. It is very useful to spread a thin band of talcum powder along runways to check for rodent direction and the amount of recent activity.

Fig. 2-27. Fresh rodent tracks in dust

Gnawing

Because rodent teeth continue to grow, rodents constantly gnaw to prevent their front teeth (incisors) from becoming too long to use in feeding. They gnaw to gain entrance into containers and obtain food (Fig. 2-28), but will sometimes gnaw on wood and metal simply to keep their teeth worn down to a suitable length. Fresh gnawings are light in color (like freshly chopped wood) with

Fig. 2-28. Gnawing on a grain sack

distinct teeth marks present. Small chips of wood or other materials in the survey area may also indicate recent gnawing. With time, the wood around gnawed holes appears dark and smooth because of frequent contact with the rodent's body.

Droppings

Fresh fecal droppings appear soft, shiny, and dark (Fig. 2-29) and vary in shape and size, depending on the species (Table 2-3).

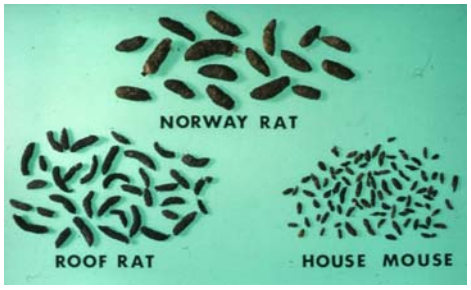

Fig. 2-29. Comparison of rodent droppings

After a few days, droppings may appear dry and hard. Old droppings appear dull and gray in color and easily crumble when pressed with a stick. Droppings are usually more

abundant near the food source, but they may also be found along runways.

Species	Shape	Length
Norway Rat	Blunt	¾”
Roof Rat	Pointed	½”
House Mouse	Pointed	¼”

Table 2-3. Characteristics of rodent droppings

Urine
Rodents cannot regulate or control their urine output, so they constantly urinate. To search for rodent signs along runways, hold a black (UV) light at an angle to the deck. Fresh rodent urine fluoresces a lime green color. Old rodent urine appears bluish-white.

Rodent Hairs
Rodent hairs, particularly rat hairs, appear as a bluish-white color when seen under a black light.

Prevention

Sanitation
The elimination of food and shelter by proper handling of food and prompt disposal of garbage and rubbish reduces the attractiveness of the ship to rodents. Sanitation is the key cornerstone in successful rodent control programs.

Exclusion
Rat guards (Fig. 2-30) should be used on all tending lines. International health regulations no longer require the use of rat guards by ships except when berthed in ports where plague is endemic. However, continuing efforts to prevent entry of rodents onto ships and reinforcement of proper sanitary measures to eliminate food and harborage sources aboard each vessel are still necessary, especially in ports where large populations of rodents exist.

Fig. 2-30. Rat guard on hawser

Consequently, there may be instances when CO’s or SMDR’s determine the use of rat guards to be advisable as an additional protective measure against rodent entry (SECNAVINST 6210.2A). For example, while COMSUBLANT/ COMSUBPACINST 6000.2C requires rat guards for plague-endemic areas and recommends rat guards for all foreign ports, CINCPACFLTINST 5440.3H requires rat guards on all lines in all ports.

Rat guards should have a 36-inch minimum outside diameter, a cone angle of 30 degrees, and be made of 18 gauge steel or aluminum. Rat guards must be mounted with the point of the cone toward the ship ***on***

all tending lines, at least 6 feet from the pier and greater than 2 feet from the ship. Use rags to plug gaps, securing the rags tightly to prevent loosening or being pulled apart by the rat. Ensure stray lines are kept out of the water. If two lines are in close proximity to each other, either group the lines to pass through a single rat guard, or install the rat guards side-by-side or touching to prevent rats from jumping from one line to another, skirting the rat guards and making them ineffective.

The use of rat guards is further detailed in SECNAVINST 6210.2A, BUMEDINST 6250.14A, and Manual of Preventive Medicine, NAVMED P-5010, Chapter 8.

Illumination and Movement Restrictions

Since rodents are basically nocturnal, lighting up gangways and landing ramps at night can discourage rodents from coming onboard. Isolate gangways and other means of access to the vessel from the shore by a distance of at least 6 feet, unless guarded. Raise or remove cargo nets when not in use.

Pierside Inspections

Inspect all incoming subsistence items for signs of rodent activity (e.g., droppings, urine, hair, gnawing, or live rodents).

Rodent Contamination

Contaminated units (boxes, cases, bags, bales) shall be condemned under the following conditions:

- When any evidence of rodent infestation/contamination i found within product packaging.
- Penetration of packaging by rodent feces/urine, as evidenced by urine stains and/or feces visible under normal light or black light.
- Existence of one or more holes gnawed through the innermost layer of packaging.
- External contamination of waterproof containers (e.g., cans) containing the product, unless it is possible to recondition the container by disinfecting and rinsing under the direction of medical authority. The entire pallet shall be condemned when rework cost is estimated to exceed the value of the product salvaged.

Handling Rodent-Contaminated Products

Be careful when handling rodent-contaminated materials.

- Wear protective gloves to avoid direct contact with urine or feces.
- Decontaminate the surface of infested packages with a household bleach solution (three tablespoons per gallon of water) or other sanitizer.
- Seal any holes in packaging to prevent leakage, or place damaged packages in a plastic bag.
- If entire pallets are condemned, seal them with plastic sheeting and tape. Segregate damaged materials for reimbursement, or dispose of them.

Rodent Control

Because the odor from dead rats in confined spaces of a ship is unacceptable, rodent trapping is the prescribed method for rodent control. Use of poison baits must be approved by the cognizant Medical Entomologist at NECE or an NEPMU.

Trap Placement

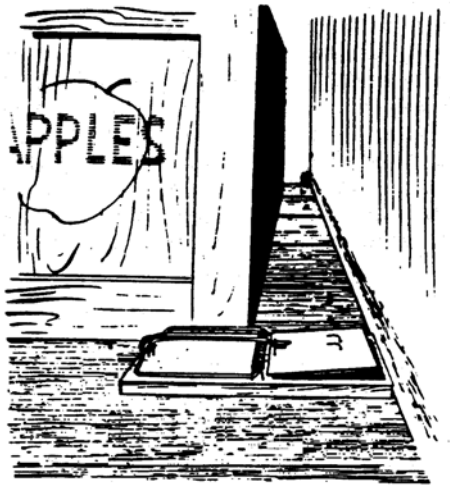

Fig. 2-31. Create a directed runway

- The conventional wood base, spring (snap) trap is also an effective way to kill rats and mice. Set traps at right angles to the runway, with the trigger end toward the bulkhead. Once traps are in use, replace bait every 2 days. On the deck, set traps behind objects that are stacked close to a bulkhead, along rows of boxes and between crates. Boxes and barrels can be positioned to create directed runways to force the rodents to pass over the traps (Fig. 2-31).

  Place traps so as not to be visible from the passage way entrances. Tie or nail down traps to prevent an injured rodent from crawling off. Secure vertical traps to overhead pipes, beams, and wires, or wherever runways are identified (Fig. 2-32).

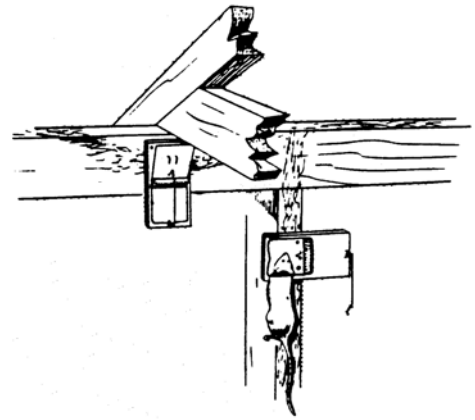

Fig. 2-32. Attach traps to vertical surfaces

- **Setting the Trap**. Rodents, being creatures of habit, will frequently avoid traps as unfamiliar items in the environment. Place unset baited traps in the trapping location for a few days before actually setting the spring and trigger. This gives the rodent a false sense of security as it becomes used to the location of the trap and available food. Preferred trap baits vary with each rodent species and regionally available food sources. Traps and bait are usually accepted as part of the environment within 2 to 3 days. When it is time to set the trap, fasten the bait securely to the trigger with cheesecloth or by wrapping it in a 2 x 2-inch gauze square before attaching it to the trigger. This prevents the rodent from taking the bait without

springing the trap. Set the trigger on the traps to spring at this time.

- **Expanded triggers**. The trigger may be expanded with cardboard, stainless steel, or screen wire to increase the contact area of the trigger and its sensitivity (Fig. 2-33). Do not set the trap until actual feeding is noted in the unset traps. Usually the catch is best the first night of trapping.

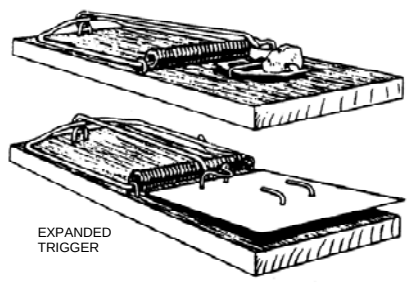

Fig. 2-33. Expanded trigger

- **Cleaning the Trap**. Before reusing heavily soiled or bloodied traps, wash traps with soap and hot water. Rats are not repelled by human odors.

Other Traps

- **Glue boards** have been effective in reducing small populations of mice (and probably rats) within 2 to 3 weeks, if properly placed in the area of rodent activity.
- **Live traps**, which consist of a wire-enclosed cage with a spring or gravity-controlled door, can be used to collect rodents for ectoparasite or disease studies.

MISCELLANEOUS SHIPBOARD PESTS

Bed Bugs

Bed bugs are blood-sucking insects that feed on sleeping hosts. They may occasionally be found aboard ship.

Fig. 2-34. Bed bug

These insects are not vectors of any known human diseases but many people consider the presence of these insects and their bites extremely annoying. These insects can seriously affect crew morale.

Biology

Bed bugs are oval-shaped and flat (when not engorged with blood). Adults are approximately 7 mm long. They appear brownish in color, are wingless, and have piercing-sucking mouthparts (Fig. 2-34).

Bed bugs hide during the day in mattresses, bedsprings, and other small cracks and crevices in sleeping quarters. They may live for several months without a blood meal. They usually feed at night, and the host is

usually unaware of being bitten. Signs of bed bug infestations are tiny spots of red blood from the wound site, or the presence of dead insects that were crushed as the sleeping humans rolled over onto them. Other signs of infestation include brown or black fecal spots on mattresses and other hiding places.

People vary in their reactions to bed bug bites. Some are little affected, while others may experience intense itching and a large inflamed area at the bite site. Bites often occur on the face, neck, arms, and hands.

Bed bugs glue their eggs to the surface of cracks and crevices. Aboard ship, they may lay their eggs in privacy curtains. A female can lay up to 200 eggs at the rate of 1 to 5 per day. Eggs hatch in 6 to 10 days under warm conditions, reaching maturity in 1 to 2 months.

Bed bugs have a characteristic odor produced by scent glands located between the hind legs. The odor may be described as unpleasant, sweet, or fruity.

Infestations are not necessarily associated with unsanitary conditions. Often inadvertently transported in clothing, baggage, and laundry, they are easily introduced into spotlessly clean quarters.

Control

Effective bed bug control depends on locating and treating all actual or potential hiding places. They can be found in any location that offers darkness and protection. Even when live bugs are not seen, spots of fecal material may reveal their harborages.

To determine harborages, conduct a complete survey of the suspected area in question before considering treatment with insecticides. Treat only the seams, folds, and buttons of mattresses with insecticides labeled for bed bug control. Never soak mattresses with spray. Allow mattresses to dry thoroughly and cover before use. Steam cleaning is also effective in controlling mattress-dwelling bed bugs.

Follow label instructions to treat all cracks and crevices in the infested area, including the corners of bunks, empty lockers, springs, canvas bottoms, grommets, and stanchions. Apply insecticide behind all equipment close to bulkheads. All bunks in the space from which the complaint originated should be treated. Remove and launder privacy curtains and mattress coverings. Bed bugs are destroyed during normal laundry procedures.

Fruit Flies

Fruit flies are occasional pests in food service and berthing areas.

Figure 2-35. Fruit Fly

These small insects can be brought aboard in infested fruit and

vegetables, either in the ship's stores or by crewmembers. They have been encountered in berthing areas of ships that allow food in berthing. Once aboard, they can breed in rotting food or flour found in cracks and crevices in food service areas. They may also be attracted to sugar build-up in cracks and crevices around beverage dispensers.

Biology

Fruit flies are attracted to yeast produced by fruits and vegetables as they ripen and decay. At least one species is also attracted to human and animal feces and may serve as a vector of disease. If ingested, some may cause stomach upset and diarrhea.

Fruit flies can occur in large numbers in very small amounts of decaying organic material. Any substance capable of supporting fermentation can act as a source of infestation. Some potential sources include rotting potatoes, dishwater from sinks or drain water from refrigerators (if allowed to stand), soured swabs or brooms, and clogged drains.

Control

The key to controlling these pests is sanitation and locating and removing the source of infestation. Often disposal of rotting fruit or vegetables may be enough. If the source of infestation is organic debris in cracks and crevices, these areas should be cleaned and, if practical, sealed with caulking compound to provide permanent control.

Space treatment with approved aerosol insecticides is usually adequate to control the occasional fruit fly problem aboard ship. Personnel should leave the space to be treated, with ventilation secured, and the area closed after treatment for the period of time specified on the label.

Always ventilate the area before re-entry. Do not expose food during treatment, and clean all exposed food contact surfaces after treatment.

Phorid Flies

Phorid flies ("humpbacked flies") are active, dark flies, smaller than one-eighth of an inch, that develop in any type of decaying organic material. In addition to their small size and humpbacked appearance (Fig. 2-36,) they can be recognized by the way

Fig. 2-36 Phorid Fly

they move in a jerky manner across surfaces. They are more often seen running in this manner than flying.

Biology

Phorid flies are often pests in food-handling areas because of the moisture, food and garbage that are often present there. The tiny immature stages develop in drains, algae, food debris in cracks and joints in equipment, wet garbage, or

any other source of wet filth. A tiny amount of material is all it takes to allow flies to develop.

Control

Sanitation is the key to preventing or eliminating phorid flies. If floor drains are present, they should be opened and cleaned well. If you see adult flies in the drain, chances are good the drain is an important breeding site. Look for small amounts of food or other organic debris in the seams, joints and cracks of food-processing machinery, work surfaces, and storage equipment. Inspect where devices meet the floor, looking for wet organic “muck”.

Adult flies can be knocked down with a space spray (see Fruit Fly section for details) or they can be vacuumed or trapped on tape or other sticky material that is placed near the breeding site(s).

Drain Flies

Drain flies (<5 mm in size) can be occasional pests in heads and galleys aboard naval vessels. They breed in semi-aquatic habitats containing organic debris and are often found on the deck and bulkheads near drains, urinals, and shower stalls. They are often called moth flies because they resemble small moths due to the many long

Fig. 2-37 Drain Fly

hairs lining their body and wings. They fly about with a characteristic hopping motion, usually flying short distances. Drain flies breed in areas that may contain disease-causing organisms which could pose a health risk for fleet personnel. Control of these flies can be obtained by identifying the breeding source and thoroughly cleaning it with soapy water and a wire brush to destroy the eggs and larvae. Glue boards or an approved aerosolized space spray near the source of infestation will kill the adults.

Chapter 3
Quarantine Issues

BACKGROUND

Large volumes of DoD equipment and thousands of DoD personnel move across international boundaries every day. These activities provide many opportunities to accidentally transport a wide variety of pests and disease organisms from country to country. Accidental introductions of organisms into new geographic areas can cause enormous damage to agriculture and health interests, and can adversely impact U.S. foreign relations if an overseas pest introduction is traced to U.S. military activities.

DoD interests in quarantine issues increased during and immediately after the Vietnam Conflict, when tremendous volumes of retrograde cargo were shipped back to the continental United States. Quarantine and retrograde cargo issues were again given intense scrutiny when troops and equipment returned from the Middle East following Operation Desert Storm. Events such as the Japanese Beetle problem in the Azores, the Brown Tree Snake in Guam, and *Aedes albopictus* (the "Asian Tiger Mosquito"), the Asian Gypsy Moth, the Asian Tiger Beetle, and the Zebra Mussel introductions into the United States are but a few examples that exemplify the need for an increased vigilance to ensure that U.S. and foreign shores are protected

The International Plant Protection Convention (IPPC)

The IPPC is a multilateral treaty administered through the Food and Agriculture Organization (FAO) of the United Nations. The IPPC was created to prevent the spread of pests of plants and plant products and to promote measures for their control. It provides a framework and forum for international cooperation and technical exchange, in collaboration with regional and national plant protection organizations. The IPPC is mostly concerned with the shipment of plant and animal products, including timber and farm animals, and foodstuffs. Since the U.S. is a signatory nation, the U.S. Armed Forces fully supports this treaty.

Medical Service Quarantine Regulations of the Armed Forces (OPNAVINST 6210.2)

This instruction outlines quarantine policies and procedures of the U.S. Public Health Service and the U.S. Department of Agriculture in U.S. Navy programs. It conforms to the regulations of the United States Departments of Health and Human Services, Agriculture, Treasury, Interior, and Commerce. This regulation is intended to prevent the introduction and dissemination, domestically or elsewhere, of diseases of humans, plants and animals, prohibited or illegally taken wildlife, arthropod vectors, and pests of health and agriculture importance.

Ships, aircraft, or other conveyances of the Armed Forces proceeding to a foreign port will meet the quarantine requirements published by the proper authority for such port.

Executive Order 13112
Heightened concern for this ever increasing threat to our food production and natural resources was reinforced on February, 3, 1999, with the signing of Executive Order (EO) 13112, Invasive Species, by President Clinton. This EO established an invasive species management policy for Federal agencies, and created the National Invasive Species Council (NISC), charged with developing a National Invasive Species Management Plan. The purpose of this order is "to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts invasive species cause."

U.S. NAVY VESSELS ENTERING U.S. PORTS

Because the United States has some of the strictest quarantine regulations in the world, the U.S. Navy has an inherently important role in preventing the entry of unwanted organisms into the U.S. because of its potential for introducing invasive species from foreign ports. When entering the Continental United States (CONUS) from foreign countries, Hawaii, or U.S. Territories and its possessions, federal agricultural quarantine laws apply to U.S. Navy vessels as a condition of entry (CFR Title 9, Animals and Animal Products, and CFR Title 42, Public Health). "Inspectors are authorized to board ships, aircraft, and any other means of conveyance of the Armed Forces, and to inspect ports and facilities. Commanders will provide full support for inspections, however, all examinations will be subject to all restrictions necessary to preserve the security of classified material" (OPNAVINST 6210.2).

To help ensure an effective quarantine program and protect the U.S. from importation of exotic pests, the United States Department of Agriculture's (USDA) Animal Plant Health Inspection Service (APHIS) and the U.S. Navy have a Memorandum of Understanding, through which a USDA/Military Cooperator Program has been established. This program coordinates the inspection of U.S. Navy ships for unwanted organisms, illegal items, and improperly stowed garbage to expedite entry into U.S. ports.

U.S. Navy vessels have two officers (or E-7 or above enlisted personnel) who have been trained by the USDA as Cooperator Plant Protection Quarantine Officers (CPPQOs). A senior MDR, when possible, should be one of the two CPPQO's. Although this program is intended to support USDA quarantine policy and ease entry of U.S. naval vessels into U.S. ports, the same principles, techniques and procedural protocols are applicable to excluding invasive plant and animal species from U.S naval vessels enroute to foreign ports.

U.S. NAVY VESSELS ENTERING FOREIGN PORTS

Under the tenants of the IPPC, the U.S. Navy has a responsibility to ensure that potentially harmful organisms are not introduced into foreign ports-of-call. It is the responsibility of not only the Medical Department, but also the entire ship's crew to ensure that potentially harmful organisms are not released into another country. This can be best accomplished by immediately reporting infestations, observed during routine inspections, to the SMDR.

Maritime Declaration of Health and Controlled Free Pratique

U.S. Navy Regulations, articles 0828 and 0859 prohibit inspection of U.S. warships and military aircraft, USNS vessels, and afloat prepositioned force ships by foreign personnel. The following guidance (SECNAVINST 6210.2 series; NAVADMIN MSG R 240023Z MAR 00 ZYB PSN 394755Z33) is provided.

It is a fundamental principle of international law that ships and aircraft being used in exclusive, non-commercial government service fully assert the privilege of sovereign immunity; that is, freedom from the jurisdiction of foreign nations. This applies whether within a foreign territory, foreign territorial seas/airspace, or international waters/airspace. They will not be subject to inspections or searches by officials for any purpose.

Although immune from law enforcement actions by foreign authorities, U.S. military ships and aircraft proceeding to and from a foreign port under diplomatic clearance shall comply with reasonable host country requirements and/or restrictions on traffic, health, customs, immigration, quarantine, etc. The host country's remedies for U.S. noncompliance, however, are limited to asking sovereign immune U.S. ships or aircraft to comply, pursuing diplomatic protest, or ordering sovereign immune ships or aircraft to leave the host country's territory or territorial sea/airspace.

Commanding Officers, Masters, and Aircraft Commanders may themselves, or through their representative, certify compliance with host country quarantine regulations and restrictions to foreign health officials. If requested by host country authorities, certification may include a general description of measures taken by U.S. officials to comply with local requirements. Unless otherwise stipulated, certification can be provided as a locally prepared Maritime Declaration of Health by the SMDR

At the discretion of the Commanding Officer, Master, or Aircraft Commander, foreign officials may be received on board for the purpose of receiving certification of compliance. The foreign official should then provide a *Controlled Free Pratique* for the ship. A Controlled Free Pratique grants a ship permission to enter a port, disembark, and begin operation under stipulated conditions. Foreign officials may not inspect the ship or aircraft, or act as

observers while U.S. personnel conduct inspections. Actions by foreign officials must be reported immediately to the chain of command and the U.S. embassy.

Each country will have its own quarantine concerns and regulations. Before leaving on deployment, gather country specific quarantine regulations for scheduled or unscheduled port visits. You can obtain this information from the Navy Entomology Center of Excellence (NECE) and Navy Environmental and Preventive Medicine Units (NEPMUs).

Shipboard Sanitation Control Exemption Certificates/Shipboard Sanitation Control Certificates

Shipboard Sanitation Control Exemption/Shipboard Sanitation Control (SSCE/SSC) certificates (Appendix F) have replaced the deratting/deratting exemption certificates (DERATs) that were used as the sanitation document required for international shipping in the past. The change is due to a 2005 World Health Organization (WHO) International Health Regulations (IHR) mandate that became effective 18 JUL 07 for the United States. The Centers for Disease Control and Prevention (CDC) is the lead agency implementing the IHR changes for the U.S., however, as of this publication date, the CDC has yet to establish final guidance. The Navy has implemented an **interim program** to comply with the WHO mandate until further guidance is provided by the CDC.

The Navy's **interim program**, as outlined in BUMEDNOTE 6210, requires all U.S. naval vessels to provide the SSCE/SSC certificates and the Maritime Declaration of Health to foreign port authorities upon request. Previously qualified DERAT inspectors will retain interim authority to conduct SSCE/SSC inspections. Deployed ships can be inspected by PMTs assigned to large decks. The SSCE/SSC certificates are valid for six months and a one month extension can be granted by the original inspector. For the latest guidance, contact the Navy and Marine Corps Public Health Center.

Pierside/Onloading: Inspection of Infestible Products

Inspection of oncoming consumables, especially fresh fruits, vegetables, and dry grain products for pests and disease vectors, is necessary to reduce degradation of product and to ensure the health and well being of all crew members while underway. By excluding these same organisms from the ship, transportation of unwanted and destructive invasive pest/disease species from port to port will also be prevented. Each foreign country may have varying specific requirements or concerns. Thorough inspections and quick action, when pests or disease vectors are found, will prevent spread of multiple infestations. Detailed documentation of problems detected and corrective actions taken will help provide information foreign quarantine authorities may request.

Rodents and Rat Guards

While important in all U.S. ports, movement of rodents onto U.S. naval vessels is an even greater concern in foreign ports, where rodent-borne disease may be a significant health threat to ship's personnel. Required use and correct placement of rat guards are critical elements of this program (OPNAVINST 6210.2, BUMEDINST 6250.14A, and Manual of Preventive Medicine, NAVMED P-5010, Chapter 8).

Chapter 4
Records and Reports

RECORDS

Records of your pest management activities should be kept in your journal or log. The following records are required or recommended:

Materiel Inventory

Key inventories that must be routinely maintained include: pesticide safety gear, pest control inspection and surveillance items, pesticide dispersal equipment, pesticides, and miscellaneous parts and supplies.

Pierside/On-Board Inspections

All inspections of incoming food and non-food items for pest and invasive species following receipt of items pierside, from supply ships at sea, or routinely on-board when underway must be recorded. It is important to describe non-chemical methods of control, when used.

SSCEC/SSCC Inspections

Record date(s) of inspection, person(s) conducting inspection, and the certifying authority.

Courtesy Technical Assistance Visits and Informal Surveys

Record the date(s) of formal assistance from NECE, NEPMUs, or other preventive medicine personnel, as well as the person(s) making visit, and the reason for visit (e.g., technical assist, informal survey).

Pesticide Use

Only pesticides from the "Authorized Shipboard Pesticide Use List" (Appendix A) may be used aboard U.S. Navy vessels. Each pesticide use must be recorded, archived, and reported (see "Reports" section for specific requirements and formats).

REPORTS

Pesticide Use

Memorandum, DASN (I & E), subject: Recording and Archiving Pesticide Use During Military Operations, April 27, 1999 (Appendix N) states that DoD Instruction 4150.7, "DoD Pest Management Program," requires that pesticide use during all military operations, including those applications performed by contract, be recorded, reported, and archived. This requirement includes all pesticide use, *except arthropod skin and clothing repellents*. To comply with this requirement, all personnel who apply pesticides during military operations ashore and afloat will *record and report pesticide applications using DD Form 1532-1, "Pest Management Maintenance Record,"* or a computer generated equivalent. Each month, these records will be consolidated at each command and forwarded directly to the Navy and Marine Corps Public Health Center (NMCPHC), ATTN: Preventive Medicine, 620 John Paul Jones Cir, Suite 1100, Portsmouth, VA 23708-2130 for archiving. Negative reports are strongly encouraged.

Historically, shipboard pesticide use records have been maintained in a hand written pest control log book or electronically through a computer

based pest control log contained within the “SNAP Automated Medical System (SAMS)” software program. However, many of the data entry fields required by DD Form 1532-1 are missing or out of sequence in current versions of the “SAMS” program.

Therefore, the only format that will be accepted by NMCPHC to report all pesticide use aboard U.S. Navy vessels will be a paper or electronic copy of DD Form 1532-1. Any attempt to meet this reporting requirement through a format other than DD Form 1532-1 will negatively impact the ability of NMCPHC to merge all fleet pesticide-use data efficiently into a single, centralized database.

Instructions for completing DD Form 1532-1, a blank form, and a sample form incorporating pesticide examples from the “authorized shipboard pesticide use list” are included in Appendixes H, I and J, respectively. A copy of each monthly DD Form 1532-1 should be retained onboard each vessel.

The information provided through this recording and reporting system is essential to document pest control efforts in the fleet, track total pesticide use at specific locations, and identify pest control program deficiencies.

Infested Products -**DD Form 1222, “Request for and Results of Tests”**

Preliminary recognition and accurately confirmed identification of pest or invasive species is critical to prompt isolation and subsequent disposal of suspected contaminated products. This is of special concern in the case of organisms that may cause medical or health concerns to ship’s personnel when underway. Conversely, it goes without saying that if a suspected pest is incorrectly identified, vital and costly food supplies may be needlessly destroyed.

Infested Products -NAVSUP P-486, Vol. 1, Food Service Management – “Suspected Hazardous Food Item Message”

If food is found to be unfit for human consumption, specific detailed instructions on disposing of unacceptable food items may be found in MIL-STD-904B, NAVSUP 486, and NAVMED P-5010, Chapters 1 and 8. Indicate the survey technique used and the name of the person who determined the food to be unacceptable. Specify whether the food was isolated until it could be further inspected by a more competent authority, or discarded as unfit. Automated record keeping has become routine, and software is continually being improved.

Chapter 5
Pesticides

Appendix A contains information on all authorized pesticides for shipboard use, including baits, quick knockdown/flushing agents and those used for long-term residual control of pests. Information is also available for choosing the appropriate pesticide for control of a specific pest and all pertinent ordering information necessary for pesticide acquisition.

PESTICIDE LABEL

Before applying any pesticide, read all label directions for use and precautions. Review the MSDS and any other product information sheets that may be available. The text on the label and the MSDS has been carefully written and contains information on the safe and effective use of the product. The contents and format of pesticide labels are specified under federal law. Pesticide labels must provide the following information:

- Name, brand, or trademark under which the product is sold.
- Name and address of the producer, registrant, or person for whom the product was produced.
- Net weight or measure of contents.
- Environmental Protection Agency (EPA) registration number.
- Producing establishment registration number.
- Ingredient statement.
- Warning or precautionary statements.
- Statement of use classification.
- The statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."
- Directions for use, including:
  - Sites of application.
  - Target pests associated with each site.
  - Dosage rate associated with each site and pest.
  - Method of application and types of application apparatus or equipment required.
  - Frequency and timing of applications necessary to obtain effective results without causing unreasonable adverse effects on the environment.
  - Specific time limitations on reentry to areas where the pesticide has been applied.
  - Specific directions concerning storage and disposal of the pesticide and its container.
  - Any limitations or restrictions on use required to prevent unreasonable adverse effects.

- Category of toxicity. The text required on the front panel of the label is determined by the toxicity category of the pesticide

Toxicity categories, precautionary statements, and key signal words are listed below in Table 5-1 and 5-2.

Table 5-1. Toxicity categories, precautionary statements, and key signal words (oral, inhalation, or dermal toxicity and eye local effects[1])

Category	Precautionary statements	Signal word	LD_{50} (mg/kg)
I	Fatal (poisonous) if swallowed, inhaled, or absorbed through skin Corrosive, causes eye and skin damage (or skin irritation)	Danger Poison	0-50
II	May be fatal if swallowed, inhaled or absorbed through skin Causes eye (and skin) irritation	Warning	50-500
III	Harmful if swallowed, inhaled or absorbed through skin Avoid contact with skin, eyes or clothing. In case of contact, immediately flush eyes or skin with water	Caution	500-5000
IV	No precautionary statements required	Caution	>5000

[1]Eye tissues are particularly absorbent. Besides chemical injury to the eyes, some pesticides may be absorbed in sufficient amounts through the eye to result in serious or fatal illness.

PESTICIDE SAFETY

Pesticides, if not applied correctly, can pose a serious health hazard to shipboard pest control specialists and other personnel that inhabit the areas where pesticides were misapplied.

Routes for Pesticide Exposure

There are three routes of exposure to pesticides by which poisoning can occur. Pesticides can enter the body through: (1) the mouth (oral ingestion), (2) the nose or lungs (inhalation or respiratory exposure), and (3) the skin (dermal absorption).

Oral

Oral pesticide poisoning occurs when pesticides or pesticide-contaminated items are ingested. To prevent oral pesticide poisoning:

- Always check the pesticide label for special instructions or warnings concerning exposure.
- Never eat, drink, or smoke while handling pesticides.
- Always wash hands and arms thoroughly with soap and water after using pesticides and especially before eating or drinking.
- Never touch the lips to pesticide-contaminated objects or surfaces. Never clear pesticide dispersal equipment nozzles by blowing or siphoning by mouth.
- Never wipe the mouth with forearms, hands, clothing, or rags contaminated with pesticides.
- Never expose food, beverages, utensils, or food and beverage containers to pesticides.
- Never bite nails or put fingers in the mouth when handling pesticides.
- When handling pesticides, always wear a NIOSH approved full face-piece respirator, or a NIOSH approved half-face respirator with non-vented or indirectly vented goggles.
- Never store pesticides in unlabeled containers.

Inhalation or Respiratory Exposure

Inhalation pesticide poisoning occurs when persons are exposed to aerosols, mists, dusts (including dusts from working with granular pesticides), and volatile liquid formulations. Applying pesticides in confined spaces increases the potential for respiratory exposure. To prevent inhalation pesticide poisoning:

- Always open and pour pesticides in well-ventilated areas.
- Always wear a properly fitted NIOSH certified respirator, specifically approved for use with pesticides. OPNAVINST 5100.19C and OPNAVINST 5100.23E provide specific guidelines on respirator use aboard ships. Personnel using respirators shall have had a medical evaluation and been properly fit-tested. Personnel using respirators also shall be

- provided training in proper respirator usage and care, and be included in the command's respiratory protection program.

- Always inspect the respirator before each use to ensure that it fits and functions properly. Check for cracks and proper fitting of valves, filters, and cartridges.

- Always change the respirator filter cartridge after every 8 hours of use or sooner if pesticide odors are detected while wearing the respirator. To ensure 8 hours are not exceeded, mark the respirator filter cartridge for each hour of use.

- Always restrict unprotected personnel from entering areas where pesticide operations are being conducted, and for at least 30 minutes after spraying, or until the space can be properly ventilated.

- Always remove pesticide-contaminated clothing before removing the respirator.

Dermal Absorption

Dermal pesticide poisoning can occur when pesticides contact the skin. Dermal exposure is the most frequent route of pesticide poisoning. High temperatures, dermatitis, or damage to the skin (e.g., sunburn) can increase the dermal absorption rate of a pesticide 4 to 10 times. Occlusive clothing such as sweat bands, coveralls, and leather boots also increases the absorption rate of pesticides 4 to 10 times. Different pesticide formulations penetrate at different rates. Oil solutions penetrate most quickly. To prevent dermal pesticide poisoning:

- Immediately wash any pesticide from the skin with soap and water to minimize absorption of pesticides.

- Always read the pesticide label and follow all recommended personal protection measures against exposure to the pesticide ***before use***.

- Select and wear proper personal protective clothing to ensure skin contact with the pesticide does not occur. Coveralls with long sleeves and made of closely woven material should be worn. At the minimum, wear long-sleeved shirts and long pants.

- Depending on the pesticide to be applied, wear rubber boots or impermeable shoe coverings when spraying. Pants should be worn outside the boots to prevent pesticides spilling into the boot. Leather boots will absorb pesticides, and can cause chronic dermal exposure.

- Always wear waterproof headgear, such as a hard hat, when working with pesticide mists or conducting overhead spraying.

- Always wear unlined neoprene, nitrile, or rubber gloves.

- Never wear contact lenses when handling pesticides.

- Always wear good and snug fitting, non-vented, or indirectly

vented goggles to prevent eye contamination.

- Never wipe the eyes with forearms, hands, clothing, or rags contaminated with pesticides. If pesticides get in the eyes, flush eyes with a gentle stream of clean water for at least 15 minutes; then seek prompt medical attention.

- Always wash with soap and water after using pesticides, especially before eating, drinking, smoking, or using the toilet.

- Always launder clothes/coveralls after ***each*** pesticide application.

Exposure to pyrethroids has resulted in few systemic poisonings of humans. Some pyrethroids may cause distressing paraesthesia (stinging, burning, itching, and tingling with some progressing to numbness) when liquid or volatilized materials contact human skin. The skin of the face seems to be most commonly affected. The hands, forearms, and neck are sometimes involved. Sweating, exposure to sun or heat, and application of water may enhance the disagreeable sensations. Sometimes the effect is noted within minutes of exposure, but a 1 to 2 hour delay in symptoms is more common. Sensations rarely persist more than 24 hours. Little or no inflammatory reaction is apparent where paraesthesia is reported (the effect is presumed to result from pyrethroid contact with sensory nerve endings in the skin).

Not all pyrethroids cause a marked paresthetic reaction. This reaction is prominent following exposure to pyrethroids whose structures include cyano-groups: fenvalerate, flucynthrinate, cypermethrin, and fluvalinate (none of which is on the current shipboard pesticide list). The paresthetic reaction is not allergic in nature and sensitization does not occur.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Safety Rules for Maintaining and Wearing PPE

Requirements and training for wearing appropriate personal protective devices (i.e., face shields, respirators, eye protection, impervious gloves, and protective clothing), are provided in OPNAVINST 5100.23F, Navy Occupational Safety and Health Administration (NAVOSH) Program Manual; OPNAVINST 5100.19D, NAVOSH Program Manual for Forces Afloat; Title 2 Code of Federal Regulations (CFR), part 1910; and the pesticide label. Respirators shall be NIOSH approved for the pesticides used. Individuals who apply pesticides shall not have facial hair that comes between the skin and the sealing surface of the respirator. Obtain guidance for selecting essential pest control protective equipment from the Safety Officer, MDR, or cognizant NECE or NEPMU.

PPE for Shipboard Pest Control Programs

PPE for shipboard pest control and their applicable National Stock Numbers (NSN) are listed in Appendix C. Additional information on PPE is located in the Shipboard Safety Equipment Shopping Guide available from the ship's safety officer.

Types of PPE

- Head Protection: Wear hard hats for protection from protruding objects and possible exposure of the scalp to pesticides sprayed overhead.

- Foot Protection: Depending on the pesticide to be applied, wear rubber boots or impermeable shoe coverings when spraying. Do not wear leather shoes or boots.

- Hand Protection: Wear only ***unlined*** neoprene or nitrile, chemical-resistant gloves while handling pesticides. Surgical gloves are not acceptable substitutes.

- Eye and Face Protection: Wear non-vented or indirectly vented goggles while handling pesticides.

- Respiratory Protection: Wear only NIOSH respirators approved specifically for pesticides during all phases of handling.

- Clothing: Wear coveralls while handling pesticides. ***Before*** leaving the treated space, remove contaminated coveralls to prevent skin absorption and unnecessary pesticide contamination to other areas. Place contaminated clothing in a plastic bag or a biodegradable laundry bag labeled accordingly and treat as contaminated clothing for ***designated laundry systems***. On ships without such systems (designated for contaminated clothing), a full wash and rinse cycle is recommended to clean the washer after rinsing contaminated clothing and before continued washing of non-contaminated items.

Cleaning and Storage of PPE

- Store and properly maintain PPE to ensure its effectiveness.

- Always clean PPE after each use. Clean respirators, gloves, goggles, and boots in warm water with mild detergent.

- Never store PPE in the same enclosed space (locker) as pesticides or pesticide dispersal equipment.

- Always store PPE in a clean, dry area away from pesticides and pesticide dispersal equipment.

PROCUREMENT OF PESTICIDES AND PESTICIDE DISPERSAL EQUIPMENT

Requisitions Submittal. Standard Material Requisitions for NSN pesticides (Appendix A) and pesticide dispersal equipment (Appendix B) will be submitted directly through normal supply channels.

Non-standard materials include nonstandard pesticides or pesticide dispersal equipment that may be required for effective vector and pest control. The requisitions will contain a statement of planned use and will be forwarded to normal supply sources ***via the appropriate area***

Entomologist for technical review and approval. If procurement is approved, the Entomologist will enter the appropriate code and the requisition, and forward it to the supply source indicated in the requisition document. If the Entomologist does not approve procurement, the requisition will be returned to the originator. ***Only under unusual circumstances will non-standard materials be approved***.

The area Entomologists who are authorized to approve requisitions for nonstandard pesticides and pesticide dispersal equipment, and who are available for technical assistance in vector and pest control procedures, can be contacted at cognizant NECE and NEPMUs (Appendix D).

PESTICIDE STORAGE

- Store all pesticides in safe, secure (locked), well identified areas that meet shipboard ventilation specifications. Keep pesticides in approved flammable storage lockers.

- Never store pesticides inside patient care areas. Store pesticides according to label and MSDS requirements.

- Store pesticides in the original labeled container with the label clearly visible. Ensure that the container is tightly sealed and the cap on the aerosol can is in place and secure

- Never store pesticides near food or drink.

- Always store pesticides in areas protected from freezing or excessive heat.

- Stock rotation (first in – first out) helps to prevent pesticides expiring.

PESTICIDE MIXING AND SPILLS

Mix and pour all pesticides into dispersal equipment in ship's spaces that meet ventilation and spill containment specifications. For some ships, it is not practical for the SMDR to maintain all of the equipment and materials needed to contain and clean up every type of spill. However, a basic spill kit should be available to handle most small spills (Table 5-3).

Nomenclature	NSN
Coveralls, disposable	Appendix C
Gloves, protective	8415-01-013-7382
Goggles, non-vented	4240-00-190-6432
Pesticide respirator	Appendix C
Dustpan	7290-00-616-0109
Sponge, 4 ¼″ x 6 ½″	7920-00-633-9906
Liquid detergent	7930-00-282-9699
Brush, dusting	7920-00-178-8315
Scrub brush, household	7920-00-282-2470
Bag, plastic, polyethylene	8105-00-848-9631
Labels, hazardous waste	0116-LF-051-0020
Compound, absorbent, HAZMAT spills (25 lb)	7930-01-145-5797

Table 5-3. Recommended pesticide spill kit

Mark the kit "FOR PESTICIDE SPILLS ONLY" and keep it where pesticides are stored, mixed, and poured. Absorbent material, (e.g., cat litter, vermiculite, or sand) should be readily available in the event of a

spill. Some type of absorbent material is usually available from the engineering department. Keep a 5 to 10 pound bag of absorbent material where it is easily accessible. Discard all brooms or swabs used to clean up the absorbent material and hazardous materials. Do not use these for other purposes. Place contaminated absorbent material, swabs, and brooms in appropriately labeled containers, and hold as hazardous waste for suitable disposal on return to port. For additional information on pesticide spills, contact the ship's Safety Officer or nearest NECE or NEPMU.

Containment Procedures for a Pesticide Spill:

- Immediately secure the spill site from entry by unauthorized personnel.
- Notify the Damage Control Assistant (DCA) of the spill and location where the spill occurred.
- Put on appropriate PPE.
- Prevent spill from spreading by using absorbent materials.
- Ensure the space is well ventilated, during and after clean-up procedures.
- Use a broom or brush and dustpan to collect spilled pesticides and absorbent materials. Put spilled materials into durable plastic bags. Double the bags to prevent further spillage. Write the name of the pesticide and associated health hazards on a card or piece of paper and attach it securely to the bag.
- Use liquid detergent and sponge to remove excess spillage.
- Bleach may be required for decontamination (see pesticide label or MSDS). Pour detergent on spill site and wash area with a sponge. Wring the sponge out into the plastic bag containing the contaminated materials.
- Put all contaminated cleanup items into bag with contaminated absorbent material. Turn bags into the hazardous materials coordinator for disposal.
- Remove PPE. Place disposable coveralls, gloves, and items heavily contaminated with pesticides into a plastic bag. Turn bag into the hazardous materials coordinator for disposal. If coveralls are reusable, bag for washing in appropriate ship’s laundry systems.
- Shower with hot water and soap as soon as possible.

Chapter 6
Pesticide Dispersal Equipment

AEROSOL CONTAINER PESTICIDE DISPERSAL UNIT

The aerosol container pesticide dispersal unit uses a series of aerosol container insecticide formulations and a crack and crevice injector gun to deliver survey and residual insecticides directly into insect harborages. This system requires very little preventive maintenance. It is a convenient, dependable, safe and effective tool for treating insect harborages. Certain minor repairs can be easily handled on the job.

Component Parts and Assembly

Save the manufacturer's manual that comes with the unit. Current units recommended for use aboard naval vessels are the Whitmire® PT® System III (Fig. 6-1) and the B&G® Aerosol Dispersal Unit (ADU.) Both are available through the NSN system (Appendix B). The following applies to the Whitmire® PT® System III:

To attach the aerosol can clamp, set the can on a flat surface and place the can clamp in the disengaged position over the “lip” of the insecticide can. Turn the handle clockwise to engage. Be sure the valve stem on the insecticide can is centered in the screw hole opening of the can clamp.

To attach the sprayer assembly to the pressurized can, hold the sprayer assembly (including spray gun, coiled hose, shutoff valve, and valve-clamp adapter) in one hand and the aerosol can (with can clamp attached) in the other. Center the assembly can clamp and hand tighten by rotating the can clockwise. Place the void injector with attached tip onto the spray gun. Insert the aerosol can into pouch. Put on the belt and pouch. Open the shutoff valve and begin applying the pesticide.

To change insecticides, close the shutoff valve. Empty the hose. Unscrew the aerosol can and can clamp from the sprayer assembly.

Caution: Do not disengage the can clamp without first unscrewing and detaching the sprayer assembly.

To change the hose, first work the hose spring guards away from the fittings. Unscrew the hose fittings from the spray gun and shutoff valve. Replace with a new hose and fittings. Use Teflon tape on both joints.

Caution: Do not remove the hose and gun from the pressurized insecticide can after a spray operation without first closing the shut-off valve.

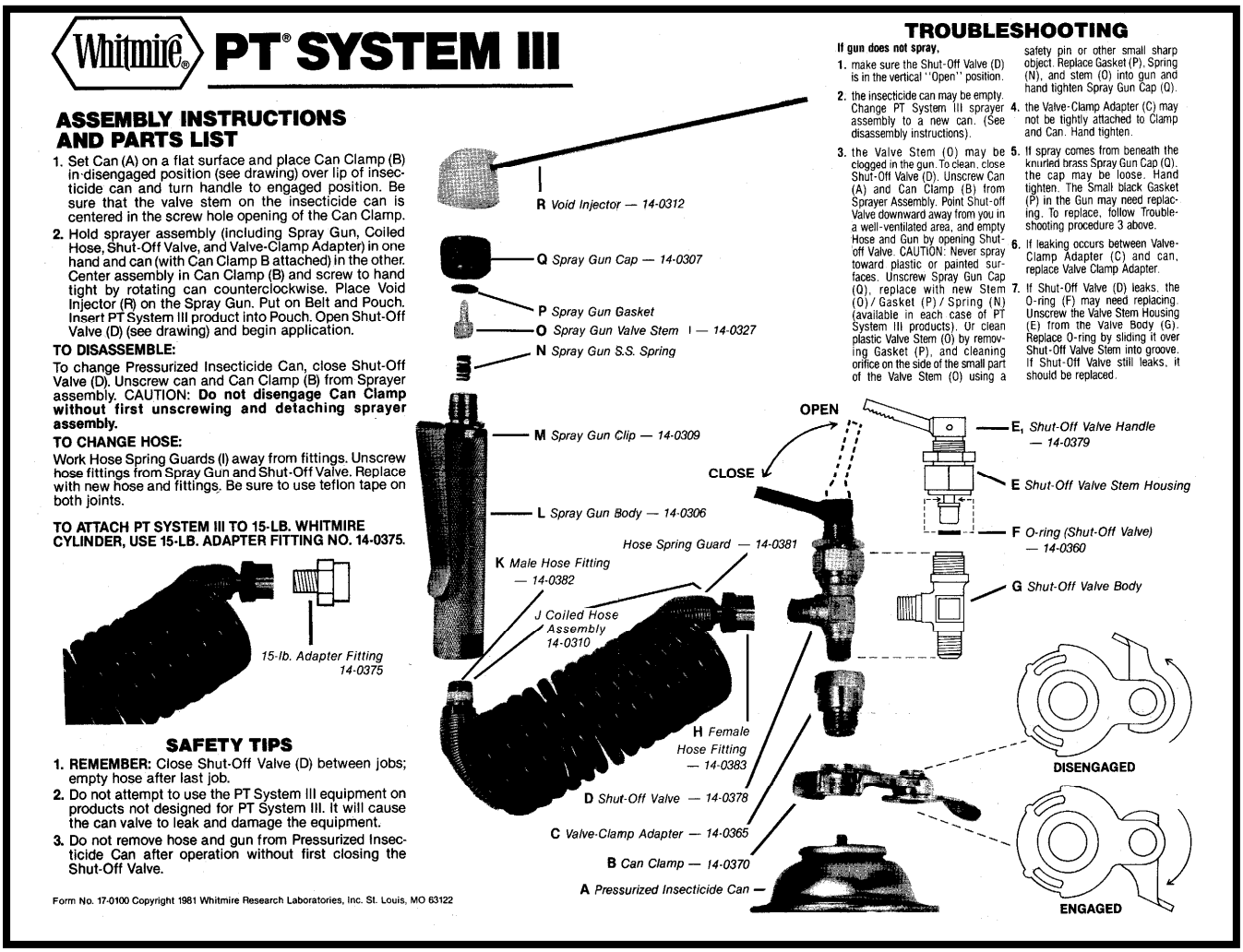

Fig. 6-1. Whitmire® PT® System III aerosol container pesticide dispersal unit.

Operation of the Pesticide Dispersal Unit

This unit shall only be used for crack and crevice treatment. Depress the void injector to apply insecticides precisely into harborages.

Maintenance

The aerosol container pesticide dispersal unit requires little maintenance. It is not generally necessary to perform routine maintenance to keep it in working order. Insecticide canisters can remain attached when not in use without system deterioration. Because of excessive wear and potential leakage, it is recommended that the stem, spring and gasket (located directly underneath the gun cap) are replaced after every six aerosol cans are dispensed. These replacement items usually come with the aerosol products.

Repair

- Save the manufacturer's manual that comes with the unit. Repairing the pesticide dispersal unit is not difficult. The manual will be needed to troubleshoot

and repair the unit if it malfunctions.

- Retain all repair parts that come with aerosol cans. This is especially important for deployed ships. Additional repair assistance is available upon request from the NECE and NEPMUs.

- ***Safety Precautions***. If a hose ruptures or a slow leak in the equipment or the hose occurs, immediately turn off the valve. Cover the hole with paper towels if available. Empty the equipment and make all repairs in a well-ventilated area.

Table 6-2 provides basic trouble-shooting techniques for the aerosol container pesticide dispersal unit.

Table 6-2. Basic troubleshooting guide for the aerosol container pesticide dispersal unit (Whitmire® PT® System III)

Problem	Probable cause(s)	Solution
Actuator or gun cap leaks	Loose gun cap	Hand tighten gun cap
	Worn actuator	Replace actuator
	Worn stem or gasket	Replace stem or gasket
Hose leaks near compression fittings	Hose wear	Cut hose above leaking point and replace[1]
Fails to spray	Clogged hose or valve stem (or other parts)	Check and clean hose, valve stem[2], shutoff valve, valve-clamp adapter, or can clamp.
	Empty can	Remove can, place actuator directly on can to see If it functions
Leaks below valve	Loose valve clamp adapter	Hand tighten adapter, shut off, then loosen ¼ to ½ turn or replace

[1]Shut off the valve and empty the hose. Detach the gun and hose from the can by unscrewing the valve clamp adapter from the can clamp. Work the hose spring guards away from fittings. Unscrew the hose fittings from the spray gun and shutoff valve. Using two $^{7}/_{16}$" wrenches, remove the old compression fitting without removing the $^{7}/_{16}$" brass adapter fitting from the end of the spray gun. Cut the hose above the leaking point. Slide the replacement compression fitting onto the hose, (make sure hose protrudes through the ferrule at least ⅛"). Tighten the compression fitting down onto the knob of the brass adapter at the end of the spray gun. Attach the hose to the gun or shutoff valve and slide the hose spring guards back into position.

[2]Shut off the valve and unscrew the can and the can clamp from the sprayer assembly. Point the shutoff valve downward away from you ***in a well-ventilated area***, and empty the contents of the hose and gun by opening the shutoff valve. ***Caution***: Never spray toward plastic or painted surfaces. Unscrew the spray gun cap and replace old stem, gasket, and spring with new parts. Replace and hand tighten the brass cap or clean the plastic valve stem by removing the gasket and cleaning the orifice on the side of the small part of the valve stem, using a safety pin or other small sharp object. Replace the gasket, spring, and stem into the gun and hand tighten the spray gun cap.

HAND-COMPRESSED-AIR SPRAYER

The hand-compressed-air sprayer can be used for applying insecticides aboard ships. It is available through the stock system (Curtis Dyna-Fog® Model #2981-A; Appendix B). The "B & G" hand compressed air sprayer is available only through "open purchase." The best sprayer is one that has low maintenance and

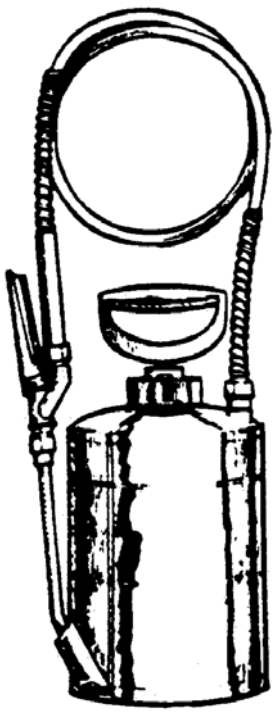

Fig. 6-2. The hand compressed

high reliability. The hand-compressed sprayer ranges in size from a one-half to two-gallon cylindrical tank, fitted with an air pump, hose, spray gun, and other components necessary for applying liquid insecticide formulations.

Component Parts

- The tank of the sprayer is made of stainless or galvanized steel, but remains susceptible to corrosion if not properly cleaned after each use (Fig. 6-2).

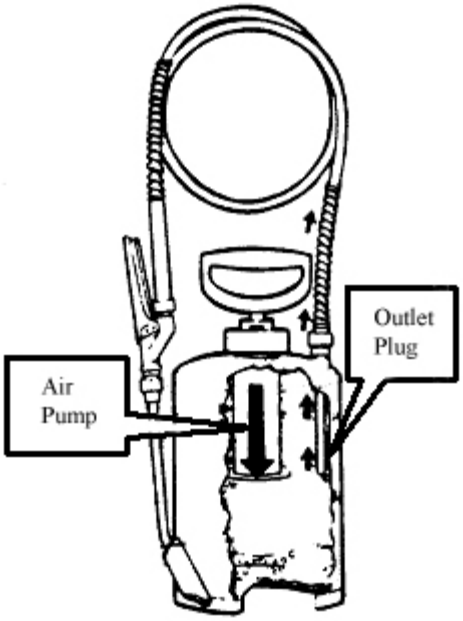

Fig. 6-3. Internal air pump and outlet plug.

- The air pump (Figs. 6-3, 6-4), consisting of a handle, rod, and piston, forces air into the sealed tank through a check valve in the bottom of the cylinder. The piston has either a leather or synthetic rubber cup, which requires regular inspection and maintenance.

- The spray gun consists of a cutoff valve, strainer, wand, and nozzle (Fig. 6-5).

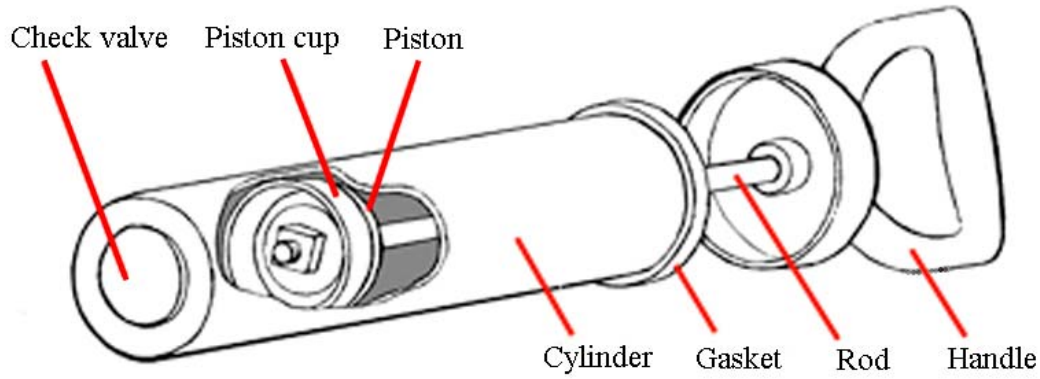

Fig. 6-4. Air pump assembly

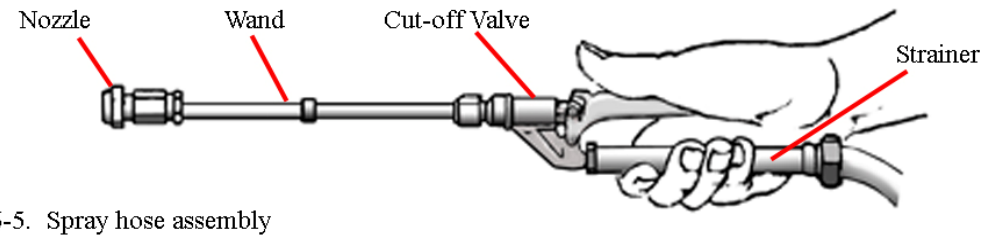

Fig. 6-5. Spray hose assembly

The cutoff valve or trigger assembly is a spring-loaded valve to regulate the spray flow rate. Poor-quality or poorly-maintained cutoff valves do not completely stop the pressurized flow of liquid, resulting in some pesticide dripping from the nozzle.

- The wand is a metal tube extending from the cutoff valve to the nozzle. Two or more wands may be joined together for applying insecticides to hard-to-reach areas.

- The strainer is a heavy screen mesh, usually located inside the metal fitting that connects the hose to the cutoff valve. This screen prevents large, solid particles from entering and clogging the cutoff valve and nozzle.

- The nozzle is the most important part of the sprayer. The nozzle determines the amount and pattern of the insecticide spray dispensed. The two basic nozzles used in hand-compressed sprayers are the solid or pin stream nozzle and the flat or fan spray nozzle.

  - The solid or pin stream nozzle applies a fine jet of insecticide for treating cracks and crevices. A sprayer should also have a crack and crevice tip for inserting into cracks and crevices.

  - The flat or fan spray nozzle applies the insecticide in a wide, fan-shaped pattern for residual coverage over large areas.

- A combination nozzle is available for most sprayers to allow the operator to change spray patterns easily.

Operation of the Sprayer
Test the sprayer with water before using the insecticide. This prevents wasting time and reduces potential exposure to insecticide if the sprayer is leaking or not functioning properly. Place a funnel into the sprayer, filling the sprayer no more than two-thirds full with the pesticide to be sprayed. Do not mix or add more pesticide than necessary to complete the job. Pump pressure depends on which treatment method is chosen.

Crack and Crevice Treatment

- Use a pin stream nozzle or extender tip. Apply this treatment at low pressure to avoid splash back. Four or five pump strokes should give enough tank pressure.

- Hold the nozzle as close to the crack and crevice as possible. An extender tip can be placed into the crack or crevice for direct application.

Spot and Area Treatment

- Use a fan spray nozzle. Pump the plunger until it becomes difficult to pump. Approximately 40 pounds per square inch (psi) will be needed for residual treatment. It will be necessary to repeat charging the tank as the sprayer empties. If the sprayer and nozzle are in good condition, adequate pressure will yield very fine droplets.

- Hold the nozzle 18 to 24 inches from the surface to be sprayed.

Maintenance
The hand-compressed sprayer requires proper maintenance to ensure long service life. Empty and clean sprayers thoroughly after each day's use.

- Empty unused insecticide into its original container.

- To clean, add a warm detergent and water solution to the sprayer, agitate, pressurize, and spray through the hose and nozzle.

- Repeat the above step three times with clean water.

- Remove the pump and let the tank air-dry (upside down).

- Place a few drops of oil on the leather plunger cup to keep it pliable. Silicon lubricant (grease) should be used instead for synthetic rubber plunger cups.

Repair

- Save the manufacturer's manual that comes with the sprayer. Repairing the hand-compressed air sprayer is not difficult. Most sprayers are similar in construction. Some parts are interchangeable. Many parts may *appear* to be interchangeable; however, ensure correct parts are used. The manual will be needed to troubleshoot and repair the sprayer when if it malfunctions.

- Maintain extra gaskets, valves, nozzles, hoses, and small spare parts used in the sprayers. This is especially important for deployed ships. Repair assistance is available upon

request from NECE and NEPMUs. Most manufacturers produce a service kit, which contains small parts needed for sprayer repair. Table 6-3 presents common troubleshooting problems and their solutions for the basic hand-compressed sprayer.

Table 6-3. Basic troubleshooting guide for the hand compressed sprayer

Problem	Probable cause	Solution
Fails to build pressure, may be hard to pump	Dry or worn plunger	Oil cup with clean oil (no heavier than 30 SAE); if this fails, replace worn cup.
	Worn or missing pump cylinder gasket	Clean seating surfaces and replace gasket.
Hard to pump, liquid in pump cylinder	Worn check valve	Replace check valve.
Fails to shut off, drips at nozzle	Improper wand valve spring tension	If sprayer has a trigger assembly, which is adjustable, tighten or loosen tension of valve spring.
	Worn gaskets or “O” - ring	Replace worn parts. note: some trigger assemblies can not be serviced and may require replacement.
Inadequate spray or failure to spray, but pressure is o.k.	Improper wand valve spring tension	Adjust wand spring tension.
	Clogged strainer	Tight fittings.
	Clogged nozzle	Replace worn parts.
Leaks around threaded fittings	Loose fittings	Tight fittings.
	Worn gaskets or “O” – rings	Replace worn parts.
	Worn fittings	Plumbers tape will seal fittings.
Cracked and worn hose at attachment points	Normal wear and tear	Cut off worn ends and replace hose.
	Missing hose springs	Replace springs and reattach hose.

Appendix A

Authorized Shipboard Pesticide List

Item	Active ingredient	EPA Reg. #	User code[1]	Unit package	Unit issue	NSN
Insecticide, cockroach bait station, regular size (Combat® Quick Kill)	0.03% fipronil	64240-33	A	12 bait stations/box/12 boxes	PG	6840-01-180-0167
Insecticide, cockroach bait station, large size (Combat® Quick Kill)	0.03% fipronil	64240-34	A	8 bait stations/box/12 boxes	PG	6840-01-224-1269
Insect repellent, clothing application, aerosol (Permethrin Arthropod Repellent)	0.05% permethrin	50404-5	A	(12) 6-oz cans	BX	6840-01-278-1336
Insect repellent, personal application (3M)	33.33% DEET	58007-1	A	(12) 2-oz tubes	BX	6840-01-284-3982
Insecticide, Boric Acid, aerosol (Perma-Dust®)	35.5% Boric acid	499-384	N	(12) 9-oz cans	BX	6840-01-287-3938
Insecticide, D-Phenothrin, aerosol	2% D-phenothrin	901-82	N	12-oz can	CN	6840-01-412-4634
Insecticide, Pyrethrin, aerosol (PT® 565 Plus XLO®)	0.25% pyrethrins; 0.25% d-trans allethrin; 1% piperonyl butoxide, technical; 1% n-octyl bicycloheptene dicarboximide. 0.5% pyrethrins; 1% piperonyl butoxide, technical; 1% n-octyl bicycloheptane dicarboximide	499-310 499-290	N	(12) 20-oz cans	BX	6840-00-823-7849
Insecticide, Siege® Gel Bait	2% hydramethylnon	241-313	N	12 reservoirs	BX	6840-01-398-6799
Insecticide, Maxforce® Roach Killer Bait Gel	0.01% fipronil	64248-14	N	4-30 gm reservoirs	BX	6840-01-471-5650
Insecticide, Avert® Cockroach Bait Station Formula 1	0.05% abamectin B1	499-467	A	72 stations per bag, 4 bags per box	BX	6840-01-561-9649
Insecticide, Avert® Dry Flowable Cockroach Bait Formula I	0.05% abamectin B1	499-294	N	12 30-gram tubes per box	BX	6840-01-561-9766
Insecticide, PT® 221L Residual Insecticide aerosol	0.05% λ-cyhalothrin	499-473	N	12 aerosol containers per box	BX	6840-01-561-9669
Insecticide, PT® Crack & Crevice I aerosol	0.1% cyfluthrin	499-470	N	6 aerosol containers per box	BX	6840-01-561-9717
Insecticide, CB Air Devil HPX® residual with cypermethrin	1.0% cypermethrin	9444-182	N	8 aerosol containers per box	BX	6840-01-561-9726

Insecticide, CB D-Force® HPX ®Residual Insecticide	0.06% deltamethrin	9444-217	N	8 aerosol containers per box	BX	6840-01-561-9745
Insecticide, Gentrol® Point Source®	90.6% hydroprene	2724-469	N	20 per box	BX	6840-01-561-2905

[1]Indicates who is authorized to use the product aboard ship
N - Navy Shipboard Hospital Corpsmen, PMT's or Navy Medical Entomologists
C - Controlled use by Navy Medical Entomologists or PMTs at a NECE or NEPMU
A - All hands use approved, when issued by the ship's Corpsman

Pesticides Recommended for Control of Pests

Pest	Flushing and Quick Kill	Long-term Control	
		Bait	Residual Pesticide
Cockroaches	PT 565 Plus XLO, D-Phenothrin, Crack & Crevice I	Combat Quick Kill bait station, Seige Gel Bait, MaxForce Roach Killer Bait Gel, Avert bait stations, Avert Dry Flowable Powder	D-Force HPX, Perma-Dust, PT 221L, Air-Devil HPX, Crack & Crevice I, D-Phenothrin, Gentrol Point Source
Stored product pests	PT 565 Plus XLO, D-Phenothrin		D-Force HPX; PT 221L, Air-Devil HPX, Crack & Crevice I, D-Phenothrin, Gentrol Point Source
Bed bugs	PT 565 Plus XLO, D-Phenothrin		D-Force HPX
Flies	PT 565 Plus XLO, D-Phenothrin		

Pests Listed on Insecticide Label

Item	Active ingredient	Pests Labeled for Control[a]
Insecticide, cockroach bait station, regular size (Combat Quick Kill®)	0.03% fipronil	**Cockroaches**
Insecticide, cockroach bait station, large size (Combat Quick Kill®)	0.03% fipronil	**Cockroaches**
Insect repellent, clothing application, aerosol (Permethrin Arthropod Repellent)	0.05% permethrin	Protection from biting arthropods
Insect repellent, personal application (3M)	33.33% DEET	Protection from biting arthropods

Insecticide, Boric Acid, aerosol (Perma-Dust®)	35.5% Boric acid	Ants, Booklice, Boxelder Bugs, Carpenter Ants, Carpenter Bees, Centipedes, Chocolate Moths, Clover Mites, Cluster Flies, **Cockroaches**, Crickets, **Dermestids**, **Drugstore Beetles**, Earwigs, Elmleaf Beetles, Firebrats, **Flour Beetles, Grain Weevils**, Ground Beetles, **Indian Meal Moths**, Millipedes, Pillbugs, Scorpions, Silverfish, Sowbugs, Spiders, and **Trogodermas**.
Insecticide, D-Phenothrin, aerosol	2% D-phenothrin	**Cockroaches**, mosquitoes, house flies, **gnats**.
Insecticide, Pyrethrin, aerosol (PT® 565 Plus XLO®)	0.25% pyrethrins; 0.25% d-trans allethrin; 1% piperonyl butoxide, technical; 1% n-octyl bicycloheptene dicarboximide.	Angoumois Grain Moths, Ants, **Bed Bugs**, Booklice, Carpet Beetles, Centipedes, Chocolate **Moths**, **Cigarette Beetles**, Clover Mites, Cluster Flies, **Cockroaches**, **Confused Flour Beetles**, Crickets, **Drug Store Beetles**, Fleas, **Flies, Fruit Flies, Gnats**, Grain Mites, **Granary Weevils**, Horn Flies, **House Flies**, **Indian Meal Moths**, **Mediterranean Flour Moths**, Millipedes, Mosquitoes, Mud Daubers, **Red Flour Beetles**, **Rice Weevils**, **Sawtoothed Grain Beetles**, Silverfish, **Small Flying Moths**, Sowbugs, Spiders, Stable Flies and Wasps.
Insecticide, Siege® Gel Bait	2% hydramethylnon	**Cockroaches**
Insecticide, Maxforce® Roach Killer Bait Gel	0.01% fipronil	**Cockroaches**
Insecticide, Avert® Cockroach Bait Station Formula 1	0.05% abamectin B1	**Cockroaches**
Insecticide, Avert® Dry Flowable Cockroach Bait Formula I	0.05% abamectin B1	**Cockroaches**
Insecticide, PT® 221L Residual Insecticide aerosol	0.05% λ-cyhalothrin	Ants, Booklice, Boxelder Bugs, Carpenter Ants, Carpenter Bees, Centipedes, Chocolate Moths, Clover Mites, Cluster Flies, **Cockroaches**, Crickets, **Dermestids, Drugstore Beetles,** Earwigs, Elm Leaf Beetles, Fire Ants, **Flour Beetles**, Grain Weevils, Millipedes, Scorpions, Silverfish, Sowbugs, Spiders, Springtails, Above-Ground Termites, Ticks, **Trogoderma** (**Cabinet, Khapra and Warehouse Beetles**), Wood Infesting Borers and Beetles and Wood Wasps
Insecticide, PT® Crack & Crevice I aerosol	0.1% cyfluthrin	Ants, Booklice, Boxelder Bugs, Carpenter Ants, Carpenter Bees, Centipedes, Chocolate Moths, Clover Mites, Cluster **Flies, Cockroaches**, Crickets, **Dermestids**, **Drug Store Beetles,** Earwigs, Elm Leaf Beetles, **Flour Beetles**, Grain **Weevils**, Millipedes, Scorpions, Silverfish, Sowbugs, Spiders, Springtails, Termites*, Ticks, **Trogoderma** (**Cabinet, Khapra, and Warehouse Beetles**), Wood-Infesting Borers and Beetles, and Wood Wasps.
Insecticide, CB Air Devil HPX® residual with cypermethrin	1.0% cypermethrin	**Cockroaches**, Ants, Spiders, Crickets, Silverfish, Sowbugs, Pillbugs, Millipedes, Centipedes, Firebrats, and Earwigs; Carpenter Ants, and Termites

Insecticide, CB D-Force® HPX Residual Insecticide®	0.06% deltamethrin	Ants, Bees, **Bedbugs**, **Carpet Beetles**, Centipedes, **Cockroaches**, Crickets, Firebrats, Fleas, **Flour Beetles**, **Grain Beetles**, Ground Beetles, **Gnats**, **Midges**, Mole Crickets, **Moths**, Pillbugs, Silverfish, Sowbugs, Spiders, Ticks, Termites (Subterranean, Formosan & Drywood), Carpenter Ants and Carpenter Bees.
Insecticide, Gentrol® Point Source®	90.6% hydroprene	**Cockroaches and Stored Products Pests**

[a] Bolded pests are those more likely found aboard ships.

Appendix B

Pest Control Equipment and Supplies

Nomenclature	NSN
Brush (small; to transfer insects)	8020-00-503-0000
Flashlight	6230-00-243-6069
Funnel, polyethylene, 1 quart	7240-00-404-9793
Funnel, polyethylene, 2 quart	7240-00-404-9795
Magnifier (reading glass)	6650-00-252-6250
Rat guard, ship, 38" diameter	2040-00-272-2353
Rat guard, ship, 48" diameter	2040-00-272-2355
Traps, mouse, 3 or 4 way snap, wood base	3740-00-252-3384
Traps, rat, spring, wood base, 1 doz.	3740-00-260-1398
Trap, glue, rodent, box of 24	3740-01-240-6170
Traps, cockroach, box of 48	3740-01-096-1632
Screens, porthole, 10 inches	2040-00-371-8031
Screens, porthole, 12 inches	2040-00-371-8032
Screens, porthole, 16 inches	2040-00-371-8033
Screw cap vials, 9 ml	6640-00-408-2200
Screw cap vials, 3 ml	6640-00-408-2300
Sprayer (hand compressed air), pesticide, manually carried, 1-gal stainless tank, with pressure gauge. Formerly MIL-S-14102, replaced by CID A-A-55748. Flow rate – 0.8 l/min. Current inventory on hand does not include a spare parts package. Future purchase will include 3 sets of spare parts including: crack and crevice tip assemblies, nozzle gaskets and “O”- rings, plunger cups, check valves, and strainer/filters. Cage Code 58536	3740-00-191-3677
Sprayer, pesticide, manually carried, Whitmire System III single pack, part number 20-2300, includes pouch for 3 product aerosols and a 10 foot memory coiled hose. Pesticide aerosols must be ordered separately. Cage Code 67184	3740-01-338-5390
Sprayer, pesticide, manually carried, B&G Aerosol Dispersal Unit	3740-01-561-9633
Ultraviolet light (specimen examining)	6530-00-663-2140
Ultraviolet light batteries, two 45-volt	6135-00-100-0464

Appendix C

Personal Protective Equipment

Nomenclature	Model	Size	NSN
Coveralls, disposable		X-Small	8415-00-601-0792
		Small	8415-00-601-0793
		Medium	8415-00-601-0794
		Large	8415-00-601-0797
		X-Large	8415-00-601-0801
Coveralls		36S	8405-01-057-3482
		36R	8405-01-057-3483
		38S	8405-01-057-3484
		38R	8405-01-057-3485
		38L	8405-01-057-3486
		40S	8405-01-057-3487
		40R	8405-01-057-3488
		40L	8405-01-057-3489
		42S	8405-01-057-3490
		42R	8405-01-057-3491
		42L	8405-01-057-3492
		44R	8405-01-057-3494
		44L	8405-01-057-5582
		46S	8405-01-057-3495
		46R	8405-01-057-3496
		46L	8405-01-057-3497
		48R	8405-01-057-3498
Gloves, protective		Size 7	8415-01-147-2637
		Size 8	8415-01-147-9540
		Size 9	8415-01-012-9294
		Size 10	8415-01-013-7382
		Size 11	8415-01-013-7384
Respirator, air filtering (3M brand), with pre-filter	Model 5111	Small	4240-01-300-9416
	Model 5211	Medium	4240-01-300-9417
	Model 5311	Large	4240-01-300-9418
	Model 7200S	Small/medium	4240-01-246-5401
	Model 7300S	Medium/large	4240-01-246-5404
Retainer cartridge rings			4240-01-235-0823
Retainer, filter respirator			4240-01-246-5414
Respirator, air filtering (Scott brand)	PN66STC-OVP	Small	4240-01-250-0751
	PN66MTC-OVP	Medium	4240-01-250-0748
	PN66LTC-OVP	Large	4240-01-250-0749

Continued on next page

Nomenclature	Model	Size	NSN
Face-piece, gas mask (Pro-Tech)	PN B122	Small	4240-01-249-9169
	PN B222	Medium	4240-01-249-9170
	PN B322	Large	4240-01-249-9171
Respirator, air filtering (Cabot/AO): AO 5-star half-face-piece		Small	4240-01-251-1574
		Medium	4240-01-251-1577
		Large	4240-01-251-1579
Respirator, air filtering (Cabot/AO): cartridge			4240-01-245-7233
Respirator, air filtering (Cabot/AO): pre-filter			4240-01-249-9289
Respirator, air filtering (MSA)		Small	4240-01-150-7937
		Medium	4240-01-022-8501
		Large	4240-01-086-7670
Respirator, air filtering (MSA): cartridge			4240-01-248-9155
Respirator, air filtering (U.S. safety brand)	PM300	Small/medium	4240-01-250-6521
	PM300	Medium/large	4240-01-250-6519
Respirator, air filtering (U.S. safety brand): cartridge			4240-01-247-7229
Face piece, gas mask (North/Norton), rubber		Small	4240-01-249-3559
		Medium	6515-01-231-7194
		Large	4240-01-220-7617
Respirator, air filtering (Wilson)	Model 6111S	Small	4240-01-269-4170
	Model 6111M	Medium	4240-01-269-4171
	Model 6111L	Large	4240-01-269-4172
Respirator, air filtering (Wilson): Pre-filter			4240-01-249-2577
Respirator, air filtering (Wilson): Pesticide Pre-filter			4240-01-268-0567
Goggles, Industrial			4240-00-190-6432
Helmet, Safety			8415-00-836-8618

Note 1: Consult the Shipboard Safety Equipment Shopping Guide available from the ship's Safety Officer for other PPE.

Note 2: Retainer rings for respirators are required to hold in the cartridge or to hold a pre-filter on a cartridge.

Note 3: All respirators are available through the paperless order placement system (POPS). POPS is a computer ordering system operating between the Defense General Supply Center (DGSC) in Richmond, VA and various manufacturers. To use POPS, use S9G in the Routing Identifier Code (RIC) on the NAVSUP Form 1250 (top left-hand corner of the form). This will automatically send your request to DGSC through the fastest possible route for procurement.

Appendix D

Navy Shipboard Pest Management Training Centers

Navy Entomology Center of Excellence
P.O. Box 43
Naval Air Station
Jacksonville, FL 32212-0043
DSN: 942-2424; Com: (904) 542-2424
FAX: (904) 542-4324
PLAD: NAVDISVECTECOLCONCEN JACKSONVILLE FL

Navy Environmental and Preventive Medicine Unit No. 2
1887 Powhatan Street
Norfolk, VA 23511-3394
DSN: 564-7671; Com: (757) 444-7671
FAX: (757) 444-1191
PLAD: NAVENPVNTMEDU TWO NORFOLK VA

Navy Environmental and Preventive Medicine Unit No. 5
Naval Station, Box 368143, Building 3235
3035 Albacore Alley
San Diego, CA 92136-5199
DSN: 526-7070; Com: (619) 556-7070
FAX: (619) 556-7071
PLAD: NAVENPVNTMEDU FIVE SAN DIEGO CA

Navy Environmental and Preventive Medicine Unit No. 6
1215 North Road
Pearl Harbor, HI 96860-4477
DSN: (315) 473-0555; Com: (808) 473-0555
FAX: (808) 473-2754
PLAD: NAVENPVNTMEDU SIX PEARL HARBOR HI

Appendix E

DD Form 1222: Instruction Sheet, Blank and Sample Forms

INSTRUCTION SHEET FOR DD FORM 1222

BLOCK NO. SECTION A (Completed by activity submitting specimens for identification)

1. Laboratory or Entomologist to which specimens are being submitted.
2. Name and address of submitting activity, and telephone number (where mail and messages are normally received). Also enter veterinary activity code number.
3. Complete name and address of contractor, and contract no. (as stated in contract).
4. Manufacturing plant, if different from Block 3. If identical, state, "same as Block 3."
5. Complete nomenclature of end item as stated in contract, with NSN if listed.
6. Assign sample numbers consecutively for all samples submitted to the laboratory during this calendar year, preceeding each sample number with veterinary activity code number.
7. Contractor's lot number.
8. Enter "Insect Identification."
9. Date specimens are shipped for identification.
10. Mark out "TESTED," and add "IDENTIFIED." Enter "Insects" in block.

10a. Number and type of containers holding insects. Example, "2 vials," "1 box," "1 bottle."

11. Number pounds of product involved, if known. If the medical authority has put a product on medical hold, enter total amount on hold.
12. Enter "DLAM 4155.5, App 2," or other appropriate reference.
13. Name and address of supplier, or "Same as Block 3," if applicable. In parentheses, state the immediate source of the product. Example, (DLA Depot, Memphis, TN").
14. Means of specimen transmittal. (Surface mail, Air mail, Hand-carried, Express.)
15. Inspector's name, grade, and signature, and date sample was collected.
16. Enter any necessary clarification of entries made in this request. As a minimum:

    a. Exact location insects were found. Examples, "inside sealed packages," "crawling on shelf near product," "on outside of bag, near small penetration holes."

    b. Request immediate telephonic notification of identification. Insure correct telephone number is in Block 2.

    c. Point of contact at your activity. Two or three names if possible.

17. Enter, same as Block 2, and copy to: (if purchased by DPSC), DPSC, ATTN: DPSC, STQX (Med Entomol), 2800 20th St., Philadelphia, PA 19101; HQ, AAFES, ATTN: Staff Veterinarian, Dallas, TX 75222 (if purchased by AAFES); or the appropriate accountable officer (if purchased by other than DPSC or AAFES).

BLOCK NO. SECTION B. (Completed by laboratory or activity providing identification)

1., 2., 3. Self-explanatory

4. State how identification was made (usually "microscropic identification"), List number of specimens used in identification, scientific name(s), and stage of develop-

ment. Common name may also be included. When species is uncertain, identify to genus. Pertinent comments may be included.

SECTION B must be signed by an entomologist. If listed in the American Registry of Professional Entomologist, indicate by adding, "R.P.E." after typed name.

REQUEST FOR AND RESULTS OF TESTS	PAGE NO	NO. OF PAGES

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*	2. FROM: *(Include ZIP Code)*
3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)* CONTRACT NUMBER	4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)* P. O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS.

Please send telephonic or message report of specimen identification.

17. SEND REPORT OF TEST TO

Address in Block #2 with copy to:

COMMANDER
Defense Personnel Support Center
ATTN: DPSC-STPX, 2800 South 20th St.
Philadelphia, PA 19101-8419

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER

4 TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE

DD FORM 1 FEB 62 1222 REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

REQUEST FOR AND RESULTS OF TESTS

PAGE NO.	NO. OF PAGES

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*
Navy Disease Vector Ecology and Control Center, Bangor
19950 7th Ave. N. E., Ste 201
Poulsbo, WA 98370

2. FROM: *(Include ZIP Code)*
HM1 James J. Smith
Medical Department
USS RUSSELL (DDG-59)
FPO-AP 66312-2477

3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)*
Paddyland Rice Corp.
123 East Avehue
Atlanda, GA 30333

CONTRACT NUMBER

4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)*
Same as Block 3

P.O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED
Rice, bleached, enriched (5 lb bag)	1300-22	56	Insect Identification	3 Dec 01

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE
Insects	2 vials (#1, #2)	2400 lbs(on MedHold)	DLAM 4155.5, App S

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY
(DLA Depot, Memphis, TN Same as Block 3	Surface Mail	LT John J. Jones. 2 Dec 01

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS.

a. Insects in #1 vial were inside packaged product, but no penetration holes or other visible means of entry into the package were found. Insects in vial #2 were crawling inside the cardboard shipping carton, and on shelf near product.

b. Request immediate telephonic notification of identification on DSN 396-1234/5.

c. Points of contact: LT J. Jones, HM1 J. Smith, HM2 B. Andrews.

17. SEND REPORT OF TEST TO
Defense Supply Center, DSCP-HROS, 700 Robbins Ave. - Bldg. 6, Philadelphia, PA 19111-5092

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER
6 Dec 01	7 Dec 01	E-12-345

4. TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS
Microscopic identification: Vial #1	a. *Triboluim confusum* (confused flour beetle) 6 larvae, 12 adults b. *Oryzaephilus surinamensis* (saw-toothed beetle) 5 adults		
Vial #2	*Trogoderma sp.* (dermestid beetle), 1 adult		

Note: Presence of 2 species (Vial#1) in the same visible-sealed package may indicate that infestation occurred during manufacturing, and warrants further inspection. *Tribolium* in Vial#1, and *Trogoderma* in Vial #2 have special condemnation levels.

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE
7 Dec 01	LT THOMAS T. THOMPSON, MSC MEDICAL ENTOMOLOGIST	

DD FORM 1222, FEB 62 (EG) REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

Appendix F

Shipboard Sanitation Control Exemption Certificate/ Shipboard Sanitation Control Certificate (SSEC/SSCC)

United States Navy Shipboard Sanitation Control Exemption / Ship Sanitation Control Certificate

Issued IAW Article 39 of the International Health Regulations

☐ SHIP SANITATION CONTROL EXEMPTION CERTIFICATE (SSCEC) ☐ SHIP SANITATION CONTROL CERTIFICATE (SSCC)

SSCC RE-INSPECTION DATE (DD MMM YYYY):

THIS CERTIFICATE RECORDS: ☐ INSPECTION AND EXEMPTION FROM CONTROL ☐ INSPECTION AND CONTROL MEASURES APPLIED	PORT NAME:		SHIP NAME:
	OF (FLAG OF VESSEL REGISTRY) USA	HULL NUMBER:	ON DATE (DD MMM YYYY):
AT THE TIME OF THE INSPECTION THE HOLDS WERE: ☐ LADEN ☐ UNLADEN			IF LADEN, TONS OF CARGO:

AREAS, SYSTEMS, AND SERVICES INSPECTED	EVIDENCE FOUND [1]	SAMPLE RESULTS [2]	DOCUMENTS REVIEWED	CONTROL MEASURES APPLIED IF EVIDENCE FOUND	COMMENTS REGARDING CONDITIONS FOUND
GALLEY			Food Safety Inspection		
PANTRY			Food Safety Inspection		
STORES			Food Safety Inspection		
HOLD(S) / CARGO					
QUARTERS:			Habitability Inspection		
* CREW					
* OFFICERS					
* PASSENGERS					
* DECK					
POTABLE WATER			Potable Water Log		
SEWAGE					
BALLAST TANKS					
SOLID AND MEDICAL					
STANDING WATER					
ENGINE ROOM					
MEDICAL FACILITY					
OTHER AREAS SPECIFIED					
SEE ATTACHED					

[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).

[2] Results from samples taken on board. Analysis to be provided to ship's Captain/Master by most expedient means and, if re-inspection is required, to the next appropriate port of call coinciding with the re-inspection date specified in this certificate.

NAME OF QUALIFIED US NAVY DEPARTMENT INSPECTOR:	COMMAND:	SIGNATURE:	SIGNATURE DATE (DD MMM YYYY):

NAVMED 6210/1 (11-2007) ORIGINAL: SHIP'S MEDICAL COPY: INSPECTING AUTHORITY Page 1 of 2

United States Navy Shipboard Sanitation Control Exemption / Ship Sanitation Control Certificate
(Continued)

PORT NAME:		SHIP NAME:	
OF (FLAG OF VESSEL REGISTRY) USA	HULL NUMBER:	ON DATE (DD MMM YYYY):	
RESULTS AND RECOMMENDATIONS			

NAVMED 6210/1 (11-2007) ORIGINAL: SHIP'S MEDICAL COPY: INSPECTING AUTHORITY Page 2 of 2

Appendix G

Ship's Pesticide Inventory and Pierside Inspection Log Entry Samples

Pesticide Inventory					
Log entry number	Location	Date	Item	Uses	Amount on hand
1.	Paint locker	29DEC00	D-Phenothrin (2%) aerosol. NSN 6840-01-412-4634	Cockroaches and mosquitoes	(10) 12-oz cans
2.	Paint locker	29DEC00	Whitmire Micro-Gen PT® Engage®, 0.5% chlorpyrifos, aerosol. NSN 6840-01-338-2487	Cockroaches	(8) 20-oz cans
3.	Paint locker	29DEC00	Whitmire Micro-Gen PT® Perma-Dust®, 35.5% Boric acid, aerosol. NSN 6840-01-287-3938	Cockroaches	(12) 9-oz cans

Pierside Inspection						
Log entry number	Location	Date	Item	Type of pest	Action taken	Name of inspector
1.	Pier 7, San Diego, CA	28DEC00	Bag of onions	German cockroach. 2 NYMPHS, 3 ADULTS	Informed SUPPO, filled out DD1222, removed bagging and took onions to galley for washing.	HM2 Jones
2.	Pier 4, Sasebo, Japan	10JAN-01	Bag of Flour	1 - Trogoderma beetle larva.	Informed SUPPO. Sample with DD1222, msg to DSCP, Phil., PA. Refused loading.	HM2 Jones
3.	Pier 8, Everett, WA	26FEB-01	Farina (Crème of Wheat)	Saw-toothed grain beetle; Twelve adults per pound	Informed SUPPO, Filled out DD1222, refused loading.	HM2 Jones

Appendix H

Instructions for the Use of the Pest Management Use Record, DD Form 1532-1

1. Value of Records. The Pest Management Maintenance Record (DD Form1532-1) provides a standard method for recording pesticide use and pest management operations.

a. Use of the record complies in part with Federal Regulations 40 CFR 171-11(c)(7) of the Federal Insecticide, Fungicide and Rodenticide Act as amended.
b. It is used as permanent record and history of pest control operations at a particular site (structure or area).
c. The record also provides continuity in the management and performance of pest control operations.
d. Use and analysis of these records will identify structures, designs and areas that have significantly more pest problems than others.
e. Historical pest control data can be used to correlate sites and treatment and to facilitate tracking soldier and environmental exposure to pesticides. These data also facilitate monitoring the health and safety of soldiers who apply pesticides.
f. Archival of pesticide use data facilitates development of answers to inquiries regarding pesticide use occurring during deployment operations.

2. Maintaining Records. These records shall be maintained and permanently archived at the designated Military Service's archival sites (Navy Environmental Health Center, Norfolk).

3. Report Language. Since pest management information is machine processed; all report data must adhere to a uniform system of "report language." Standard report terms have been developed for describing and reporting most pest control techniques and materials.

a. The terms are arranged in functional groups or categories.
b. Both the descriptive terms used to look up and classify any given operation and the report terms for actual entry on the DD Form 1532-1 are listed in section "**6. Descriptive and Report Terms**," below.
c. Where standard units are required, such as for acres, pounds, gallons, etc., report units are also listed.
d. Only report terms and report units listed in this instruction shall be used on the form.
e. The processing unit will reject all other terms.
f. In many cases the descriptive term and the report term are similar, while others may differ by only one letter, so it is necessary to carefully check the report terms.
g. Descriptive terms and report terms are listed in three principal categories: (1) Target Pests; (2) Operations; (3) Pesticides.

4. Top Line Data Entry on DD Form 1532-1.

a. BUILDING/AREA. On the top of the record form, in the space marked "BLDG/Area," enter the name of the U.S. naval vessel.

b. SIZE. Enter the size of the BLDG/Area (U.S naval vessel) to be maintained. Size should be recorded as linear feet (LLF; See the "Measurement Units" in the bottom legend of DD Form 1532).

c. TYPE OF CONSTRUCTION. In the space marked "Type of Construction," enter a code letter from the legend to designate the major type of construction (e.g., steel, sheet metal = ST). More than a code letter may be used if desired (See "Type of Construction Codes," in the bottom legend of DD Form 1532-1).

d. USE DESIGNATION. In the last space marked “Use Designation,” enter information to identify the major use of the vessel (U.S Navy Warship or U.S. Navy Submarine).

5. Pest Control Operation Information Data Entry on DD Form 1532-1.

a. RECORDING OPERATIONS. Each line of DD Form 1532-1 can be used to record a complete pest control operation.

(1) Most operations using a single pesticide can be entered without difficulty.

b. FIELDS AND COLUMNS OF THE FORM. DD Form 1532-1 is divided into specific fields and columns. Use the most appropriate descriptive term and report terms from section “**6. Descriptive and Report Terms**,” below, for each pest or vector. For certain fields and columns, use the codes from the bottom legend of the front page of DD Form 1532-1 (e.g., “Work Origin,” “Measurement Units”). These fields and columns are further described, in the order they appear on the form, as follows:

(1) Date. Enter the date of the Pest Management Operation.

(2) Units Serviced. Enter the part of the vessel involved, including the designated “space” number and brief description of the “space.”

(3) Work Origin. Enter the codes (See “Origin of Work,” in the bottom legend of DD Form 1532-1).

(4) Unit of Measure. Enter the numerical size of the area treated (See “Measurement Units,” in the bottom legend of DD Form 1532-1).

(5) Target Pest. Find the most appropriate descriptive term from the section for the pest and enter the corresponding report term on the form. In some cases you will need to use a generic report term such as OTH (Other), ODV (Other disease vector), etc., and then add the name of the pest for which no descriptive report term is listed.

(a) Example. For mosquito control, find “Mosquitoes” in the descriptive terms and enter the corresponding report term “MOSQUITOES” in the TARGET PEST column. If there is no suitable descriptive term, find the general grouping, which is most appropriate, and use the “Other” designation.

(6) Control Operation. Find the most appropriate descriptive term listed in Category 2, Operations, below, and enter the corresponding report term. Note that operation names are paired with area units (e.g., AC, MSF, LFF, etc.). Only the indicated area unit can be used.

(7) Pesticide Use. If a Pesticide is used, record the following.

(a) Name. Enter the report term for the pesticide used in the control operation, if any. If two or more pesticides are simultaneously used, they must be reported separately.

(b) EPA Registration Number. Enter the EPA Registration number (Appendix A of the “U.S Navy Shipboard Pest Control Manual” or the actual “Pesticide Label”).

(c) Percent Concentration. Enter the % concentration of the finished pesticide formulation.

(d) Amount. Enter the total amount or quantity used. Record the actual amount of pesticide used (lbs as PDW; gallons as ZGL, and oz. as FLO), not active ingredient, and not finished spray quantity. These codes are paired with the pesticide formulation report terms (Appendix O, "Category 3, Pesticides").

1) Aerosol Formulations:

a) Example 1: For a cockroach crack and crevice application using PT® Perma-Dust®, if 120 linear feet of a ship's bulkhead were treated at the recommended rate of 1 second (rate = 0.05 oz./sec) of spray per 3 linear feet rate, then 2.0 oz. of product would be required. Therefore, 0.2 can AERFLO would be recorded in the amount column. Use a dispersal rate of 0.057 oz/sec for Whitmire Micro-Gen PT® 565 Plus XLO®, respectively. For the Airosol Company's "D-phenothrin," apply at the rate of 1 sec (= 1gm or 0.035 oz) per 2 linear feet).

2) Solid Formulations (Bait Stations and Gels):

a) Example 1: Record the number of cockroach bait stations used (e.g., 10 "Combat® Quick Kill Bait Stations") as 10 BTSPDW (assume as a starting point for control, 1 bait station per 10 ft^2).

b) Example 2: Record gels, such as "Siege® Gel Insecticide" or Maxforce Roach Killer Bait Gel, as lbs. For example, if the maximum rate of 1 gram/yd^2 were used to treat 120 ft^2 (10 feet x 12 feet), then 13.3 grams or 0.029 lbs of gel would be required. Therefore, 0.03 POGPDW would be recorded in the amount column on DD Form 1532-1.

(e) Labor Time. This is not a mandatory field. However, logging time spent on pest management operations provides historical records on time spent on specific pest management operations, as well as providing general information on time spent on pest management operations during various periods of a deployment.

(f) Applicator Initials (back side of DD Form 1532-1). In the left-hand column, enter the pesticide applicator's name and initials.

(g) Pesticide Certification Numbers (back side of DD Form1532-1). In the center columns, enter the DoD Pesticide Applicator Certification Number, and/or Shipboard Pest Control Number (including certification expiration dates) for each DoD and/or BUMED certified pesticide applicator.

(h) Ship's Unit Identification Code (UIC) (back side of DD Form 1532-1). In the far right-hand column, enter the ship's UIC.

Continued on next page

6. Descriptive and Report Terms

a. CATEGORY 1 - TARGET PESTS

DISEASE VECTORS – FLIES, GNATS AND MOSQUITOES	
Descriptive terms	**Report terms**
Culicoides (sand flies, punkies, no-see-ums)	CULICOIDS
House flies and other filth flies	FILTHFLIES
Mosquitoes (culicids)	MOSQUITOES
Filter flies, drain flies (psychodids)	PSYCHODA
Black flies, buffalo gnats (simuliids)	SIMULIIDS
Stable flies, dog flies, biting house flies (muscids, *Stomoxys*)	STOMOXYS
Horse flies, deer flies (tabanids)	TABANIDS
Other Diptera (Miscellaneous flies, gnats, etc)	OTH (add name)

HOUSEHOLD, NUISANCE, AND MISCELLANEOUS ARTROPOD PESTS	
Descriptive terms	**Report terms**
Ants	ANTS
Bedbugs	BEDBUGS
Centipedes	CENTIPEDES
Cockroaches	ROACHES
Fleas	FLEAS
Lice	LICE
Mites and chiggers	MITES
Scorpions	SCORPIONS
Spiders	SPIDERS
Ticks	TICKS
Urticating insects (caterpillars, etc.)	URTICATING
Wasps, bees, and hornets	WOB
Other disease vectors and venomous arthropods	ODV (add name)
Other arthropod pests	OAR (add name)

STORED PRODUCTS PESTS	
Descriptive terms	**Report terms**
Arthropod pests of stored foods	FOODPESTS
Arthropod pests of fibers and fabrics	FIBFABPST

VERTEBRATE AND MISCELLANEOUS PESTS OTHER THAN ARTHROPODS	
Descriptive terms	**Report terms**
Rats	RATS
Mice	MICE
Bats	BATS
Birds	BIRDS
Fish	FISH
Snails and slugs	SNAILSLUGS
Snakes	SNKES
Other miscellaneous pests	OTP (add name)

Continued on next page

b. CATEGORY 2 - OPERATIONS

INTERIOR CONTROL OPERATIONS		
Descriptive terms	**Report terms**	**Report units**
Indoor residual treatment (report area treated); for crack and crevice treatment (report area protected)	RESIDTR	MSF, LFF
Baiting (chemical or biological control only (report area protected)	INBAIT	MSF, LFF

INDOOR SITES AND STRUCTURES		
Descriptive terms	**Report terms**	**Report units**
Food handling buildings (preparation and serving only)	FHB	MSF
Barracks and BOQs	BRQ	MSF
Hospitals and medical laboratories	HOL	MSF
Recreation buildings and chapels	RCH	MSF
Office and administrative buildings	OFF	MSF
Industrial buildings, shop areas, and nonmedical laboratories	IND	MSF
Storage buildings and warehouses	WHS	MSF
Exchanges and commissaries	EXC	MSF
Brigs or prison cells	BRG	MSF

MISCELLANEOUS SITES		
Descriptive terms	**Report terms**	**Report units**
Trucks and vans	TRV	MSF
Aircraft	ACF	MSF

c. CATEGORY 3 - PESTICIDES

INORGANIC INSECTICIDES AND ACARICIDES	
Descriptive terms	**Report terms**
Boric acid crystals	BRICACID
Other inorganic insecticides and acaricides	OII (add name)

MISCELLANEOUS INSECTICIDES	
Descriptive terms	**Report terms**
D-Phenothrin	D-PHENOTHRIN
Pyrethrin	PYRETHRIN
Hydramethylnon	HYDRAMETHYLNON
Fipronil	FIPRONIL

DRY FORMULATIONS	
Descriptive terms	**Report terms**
Baits	BTSPDW

LIQUIDS, PASTES, GREASES, GASSES, AND MISCELLANEOUS FORMULATIONS	
Descriptive terms	**Report terms**
Emulsions	EMLZGL
Solutions	SLNZGL
Suspensions	SUSZGL
Pastes and greases (include invert emulsions)	POGPDW
Aerosols	AERFLO
Other liquid Forms	OLPZGL

Appendix I

Pest Management Use Record, DD Form 1532-1

BUILDING / AREA:	SIZE:	TYPE OF CONSTRUCTION:	USE DESIGNATION:

Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		

Form Approved OMB No. 07404-0188 **REPORT CONTROL SYMBOL**: **PEST MANAGEMENT MAINTENANCE RECORD**

The public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for information Operations and reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control Number. PLEASE DO NOT RETURN YOUR FORM TO THIS ADDRESS.

MEASUREMENT UNITS

MSF = 1,000 Sq. Ft.
MCF = 1,000 Cu. Ft
LFF= Linear Feet
Ac = Acres

ORIGIN OF WORK

SW = Scheduled work
WR = Work Request
SC = Service or Trouble call
R = Routine Inspection

TYPE OF CONSTRUCTION

CO = Concrete
BL = Block
BV = Brick Veneer
ST =Steel, sheet metal
WO = Wood
OT = Other

DD FORM 1532-1, AUG 96 (EG)

Designed using Perform Pro, WHS/DIOR, Aug 96

Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		

REMARKS

Name (Initials)	Rate	DoD Pesticide Applicator Certification Data		Shipboard Pest Control Certification Data		Ship's Unit Identification Code (UIC)
		Certification Number	Expiration Date	Certification Number	Expiration Date	

DD FORM 1532-1 (BACK), AUG 96

(Attach additional card to continue record)

Appendix J

Sample Pest Management Use Record, DD Form 1532-1

BUILDING/AREA: USS AIRCRAFT CARRIER (CVN - 000)	SIZE: 1200 LFF	TYPE OF CONSTRUCTION: ST	USE DESIGNATION: U.S WARSHIP

Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		
00-06-25	Dry store room (05-58-4-L)	SW	0.10 MSF	ROACHES (GERMAN)	INBAIT	Combat® Quick Kill bait station, regular size	64240-33	0.03	10 BTSPDW	0.25	RS, PJ
00-06-26	Dry store room (05-58-4-L)	SW	0.10 MSF	ROACHES (AMERICAN)	INBAIT	Combat® Quick Kill bait station, large size	64240-34	0.03	10 BTSPDW	0.25	RS, PJ
00-06-28	Food preparation area (01-66-2-L)	SW	120 LFF	ROACHES (GERMAN)	RESIDTR	Whitmire Micro-Gen PT® Perma-Dust® (Boric acid)	499-384	35.50	0.2 can AERFLO (= 2.0 oz)	1.00	RS
00-07-14	Ship's store (01-78-7-Q)	WR	120 LFF	ROACHES (GERMAN)	RESIDTR	D-phenothrin	901-82	2.00	0.2 can AERFLO (= 2.1 oz)	1.00	RS
00-07-18	Breakout store room (01-58-2-L)	WR	120 LFF	ROACHES (GERMAN)	RESIDTR	Whitmire Micro-Gen PT®565 Plus XLO® (pyrethrins, d-trans allethrin piperonyl butoxide, n-octyl bicycloheptene dicarboximide)	499-310	2.50	0.2 can AERFLO (= 2.3 oz)	1.00	PJ
00-07-19	CPO mess 6-190-0-A	SC	0.12 MSF	ROACHES (GERMAN)	RESIDTR	Siege® gel insecticide	241-313	2.00	0.01 lbs POGPDW (=5.6 grams)	1.00	RS
00-10-29	Galley admin office (01-70-2-L)	SW	0.12 MSF	ROACHES (GERMAN)	RESIDTR	Maxforce Roach Killer Bait Gel	64248-14	0.01	0.03 lbs POGPDW (= 13.3 grams)	1.00	RS

Form Approved OMB No. 07404-0188 **REPORT CONTROL SYMBOL**: **PEST MANAGEMENT MAINTENANCE RECORD**

The public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for information Operations and reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control Number. PLEASE DO NOT RETURN YOUR FORM TO THIS ADDRESS.

MEASUREMENT UNITS

MSF = 1,000 Sq. Ft. LFF= Linear Feet
MCF = 1,000 Cu. Ft Ac = Acres

ORIGIN OF WORK

SW = Scheduled work SC = Service or Trouble call
WR = Work Request R = Routine Inspection

TYPE OF CONSTRUCTION

CO = Concrete BV = Brick Veneer WO = Wood
BL = Block ST =Steel, sheet metal OT = Other

DD FORM 1532-1, AUG 96 (EG)

Designed using Perform Pro, WHS/DIOR, Aug 96

Date	Units Serviced	Work Origin	Unit of Measure	Target Pest	Control Operation	If Pesticide is Used				Labor Time	Applicator Initials
						Name	EPA Reg	% Conc	Amount		

REMARKS

Name (Initials))	Rate	DoD Pesticide Applicator Certification Data		Shipboard Pest Control Certification Data		Ship's Unit Identification Code (UIC)
		Certification Number	Expiration Date	Certification Number	Expiration Date	
Robert E. Smith (RS)	HM1	NB-056-97-0200	04JUN00	B-0012	02JUN00	62987
Paul B. Jones (PJ)	HM2	NB-001-97	02FEB03	B-0027	14APR00	62987

DD FORM 1532-1 (BACK), AUG 96

(Attach additional card to continue record)

Appendix K
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