

**Armed Forces Pest Management Board
Technical Guide No. 38**

**Protecting Meal, Ready-to-Eat Rations
(MREs) and Other Subsistence
During Storage**



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AFPMB Technical Guides

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Introduction

This Technical Guide (TG) implements guidance for the protection of Meal, Ready-to-Eat (MRE) Combat Rations (Fig. 1) owned or under the custody of military installations and forces, consistent with the references listed at the end of this document.



Figure 1. Meals, Ready-to-Eat, Individual (MRE)

Historically there have been few incidents of infestation by insects or rodents in MREs. However, the 10 mil polyethylene bags used to package MRE rations are susceptible to insect and rodent infestation and damage (Fig. 2). Until different packaging is used for the rations, pest prevention measures must be taken ashore and afloat to protect them. Currently, MRE rations are stored in dry storage (ambient temperature) warehouses; refrigerated/cold storage facilities, both above and below ground; and aboard ships, including the Maritime War Reserves (MWR). Furthermore, the rations are included in the Marine Corps Landing Force Operational Reserve Materials (LFORM), which at present are stored for extended periods on board ships below deck, and in areas that are not accessible to thorough inspection. Since high temperature and humidity in shipboard storage are highly conducive to development of stored-product pests, action must be taken to prevent infestation prior to and during storage aboard ship.

This TG provides pest control measures for the two broad MRE storage situations: ashore and aboard ship. Although this guide concentrates on MRE storage, most of the information also applies to other stored subsistence.



Figure 2. A damaged MRE.

I. Installation Programs

A. Instituting an Integrated Pest Management Program.

Develop and implement MRE rations protection programs through integrated pest management (IPM), which involves a combination of chemical and non-chemical prevention and control strategies. Portions of the IPM program may not be applicable to cold storage facilities. The basic IPM program for MREs includes:

1. Initial inspection of goods and premises, identification of problem areas, and identification of pests present.
2. Application of pest management techniques:
 - a. Structural design and pest exclusion.
 - b. Sanitation and housekeeping.
 - c. Stock handling practices.
 - d. Non-chemical control and exclusion methods.
 - e. Chemical control methods.

3. Frequent inspection of goods and storage areas and pest monitoring to continually evaluate the program and correct problem areas are essential. The success of any IPM program is dependent upon communication and cooperation between warehouse management, medical, veterinary and entomological personnel, and military or civilian pest control operators. The responsibilities for each element of the program overlap, thus, the breakdown of any element can jeopardize the program.

B. Initial Inspection

Joint inspection between the pest management consultant (PMC), warehouse management and Veterinary Services personnel will be performed to identify problem areas and to review current practices. The PMC will discuss techniques for effective pest management and pinpoint deficient areas per Section I of DLAR 4155.37 (reference (d)). Immediately following the inspection, PMC and warehouse management personnel will discuss problem areas, develop a working plan, and determine courses of action to correct deficiencies.

C. Inspection/Survey/Monitoring Techniques

1. Conduct thorough veterinary/entomological/pest control commodity inspections for possible infestations. Emphasize receipt inspections of the product and method of conveyance to detect infested products before acceptance.

2. Conduct, at a minimum, monthly veterinary/preventive medicine/pest management inspections of sanitary conditions both inside and outside warehouses. If no critical deficiencies are reported, documented sanitary inspections are required quarterly (DSCP Handbook 4155.2). Sanitary problems shall be reported to the activity commander and warehouse/facility management when observed. Reported problems should be monitored until corrected. **Actively involve facility employees in the pest management program to observe conditions during daily activities that may contribute to a pest infestation.**

3. Effective inspection techniques are critical for the efficient operation of an IPM program. Conducting a proper inspection requires several items, such as a flashlight, knife for opening boxes, clipboard, paper, pen/marker, vials and tape for resealing boxes. Inspector/s may mark infested pallets, and use a magnifying hand lens to aid in initial insect identification and a telescoping inspection mirror for inspecting hard-to-reach locations. A portable black light can determine rodent contamination, as rodent urine fluoresces under ultraviolet light (Note: many substances will fluoresce when exposed to a black light. Experience is necessary to distinguish rodent urine from other materials).

4. During receipt inspections, inspector/s should note condition of boxes and pallets, then look for actual infestations in the food product itself. Over-aged items and products in severely deteriorated or damaged containers should be viewed with suspicion. Where possible, these items shall be returned to source. Never place infested products in a food warehouse. The conveyance vehicle/vessel should also be inspected for evidence of insect or rodent infestation; such evidence may be grounds for rejection of the products. Shipments of MREs showing evidence of infestation shall be reported to DSCP immediately for pest management guidance.

5. During the initial preprogram inspection, as well as during follow-up inspections, the inspector should note general sanitation levels, structural discrepancies, and signs of rodent or insect infestations. Inspection results shall be communicated to the activity commander and warehouse management, as well as any other involved agency, such as Public Works or Maintenance. Effective communication is necessary so that deficiencies may be corrected promptly to ensure an effective program.

6. Pest identifications must be confirmed from nearest pest management consultants or military entomologists located in:

a. U.S. Navy Entomology Center of Excellence (NECE), Naval Air Station, Jacksonville, FL. Comm: (904) 542-2424, DSN: 942-2424

b. U.S. Navy Environmental and Preventive Medicine Units (NEPMU):

NEPMU-2, Naval Station Norfolk, VA
Comm: (757) 953-6600, DSN: 377-6600

NEPMU-5, Naval Base San Diego, CA
Comm: (619) 556-7070, DSN: 526-7070

NEPMU-6, Joint Base Pearl Harbor-Hickam, HI
Comm: (808) 471-0237, DSN: (315) 471-0237

NEPMU-7, Naval Station Rota, Spain
Comm: 011-34-956-82-2230, DSN: 94-314-727-2230

c. U.S. Army Public Health Command Regions (PHCR):

PHCR-Atlantic, Fort George G. Meade, MD
Comm: (301) 677-3932, DSN: 622-3932

PHCR-Central, Fort Sam Houston, TX
Comm: (210) 221-3495, DSN: 471-3495

PHCR-Pacific, Joint Base Lewis-McChord, WA
Comm: (253) 966-0083, DSN: (312) 347-0083

PHCR-Europe, Landstuhl Regional Medical Center, Germany
Comm: 011-49-6371-86-8540, DSN: (314) 486-8540

PHCR-Pacific, Camp Zama, Japan
Comm: 011-81-46-407-8586, DSN: (315) 263-8586

d. U.S. Air Force School of Aerospace Medicine
Comm. (937) 938-3071, DSN: (312) 798-3071

7. These guidelines are helpful to inspectors in identifying insect and rodent infestations:

a. Insect pests

i. Note the number and type of dead insects on floors, ledges, and window sills, as well as any live insects crawling on or flying around commodities.

ii. If light traps are used, their contents must be checked weekly for the number and species of insects. A pest management consultant should provide a positive identification.

iii. Pheromone traps are recommended and may be used at the discretion of the responsible pest management consultant. Reference (f), TG 27: Stored-Product Pest Monitoring Methods, provides guidance on their use.

iv. Check food products by removing a layer or two of packages from the top of a pallet and examine for insects on package surfaces or in cracks and folds between packages. Insects infesting food products will usually be found on the underside of plastic bags, in and along folds and seams of bagged commodities, in the bottom of cartons and sacks, or underneath carton or box flaps. Existence of pest activity, such as droppings (frass), exoskeletons, webbing, and/or chewed entry/exit holes, indicates a positive infestation, even if actual insects are not immediately seen.

b. Rodents

i. Look for droppings, urine stains, rub marks, gnawing, and shredded nesting materials on, in, and under palletized goods. Rodents may infest the interior of palletized goods, especially if held for long periods in the warehouse before issue.

ii. Do not confine inspections to pallets of edible foods; rodents will nest with equal facility in pallets of canned goods or paper products.

iii. Check rodent bait stations periodically. Rodenticides are combined with a grain base and often become infested by stored-product insects.

D. Structural Design/Pest Exclusion.

1. Proper structural design and other techniques can prevent or minimize arthropod, rodent and bird entry into warehouses and storerooms, thereby minimizing additional resources needed to remove them.

a. Outside Grounds.

i. Eliminate heavy vegetation and debris near the storage facility, particularly near doors and windows. These areas serve as harborage for insects and rodents, increasing the risk of facility access by these pests.

ii. Empty refuse receptacles and pick up trash daily. Ensure receptacles have lids and are covered when not in use. Ensure areas around dumpsters are maintained debris free. Additionally, refuse receptacles should be washed frequently to prevent the collection of debris.

iii. Locate and organize surplus pallets well away from the warehouse building, as they will provide harborage for rodents and insects.

iv. Install yellow or sodium vapor exterior lighting to reduce insect attraction. Conversely, mercury vapor lights are highly attractive to insects and should not be used in or around warehouses. When possible, direct light away from the facility.

b. Buildings.

i. Identify and repair holes/cracks in or under walls. Seal all cracks around door jams or at the wall-ground junction with concrete or other suitable material.

ii. Maintain tight closure of doors - the gap along bottom and sides should not exceed ¼ inch. Keep doors closed when not in use. If railroad tracks run into the warehouse, a block or plate should be attached to the door to fill the gap next to the track itself.

iii. Seal grooves and channels where utility lines enter the building.

iv. Cover operable windows and air ducts with 16-mesh screening. Ensure screening is in good repair without holes or tears.

v. Cover exhaust fans with operable louvers and/or 16-mesh screening with ¼-in mesh to prevent rodent access. Seal nonfunctioning floor drains. Flush or clean drains on a regular basis.

vi. Appropriately screen or cover floor drains and heating/cooling vents.

vii. Properly seal expansion joints and other joints or cracks to eliminate pest entry or harborage. Use air curtains at entry points.

c. Warehouse Interior

i. If there is an open area below the loading dock, keep it open, accessible and clean. Keep the dock itself free of debris, excess pallets and packing materials, which can provide pest harborage.

ii. To aid surveillance and cleaning efforts, maintain a minimum 46 cm (18 in) perimeter clearance between walls and shelves or pallets.

iii. Store packing material in repack areas off the floor; similarly, store tools and parts in mechanical and recharging areas.

iv. Ensure damaged goods are isolated from all other consumables and returned or properly discarded in a timely manner.

v. Provide lockers for employee storage of personal items and lunches. An area must be designated for eating and drinking, separate from storage operations.

E. Sanitation/Housekeeping.

1. Proper sanitation and housekeeping efforts will substantially reduce pest food sources and harborage, as well as facilitate effective chemical and non-chemical control measures. Good sanitation practices include:

a. Promptly cleaning spilled stored commodities. When possible, avoid storing commodities on wooden shelving or wooden pallets. Wood is absorbent and extremely difficult to clean thoroughly. Avoid storing commodities directly on the floor. All storage racks/shelving must be periodically inspected and cleaned.

b. Repair or remove and dispose of broken food containers and packages, especially in salvage and recoupment areas. Thoroughly clean metal or plastic refuse containers located in the recoupment area as often as necessary with hot water or steam. Use disposable liners in refuse containers to minimize cleaning frequency.

c. Use snug-fitting covers or lids for refuse containers. Additionally, when emptying refuse containers daily, ensure the containers are thoroughly clean.

2. Deep cleaning is absolutely necessary to remove food resources, which may be exploited by pests. Sweep floors regularly, paying special attention to debris removal, which accumulates around posts, shelf legs, and pillars. Use an industrial vacuum sweeper to thoroughly clean warehouses and storerooms containing subsistence assets. Empty stock locations should be swept prior to new stock placement. ***This applies for trailers, containers, government-owned vans and rail cars to be loaded with MREs.***

3. If rodent droppings are found, notify pest control immediately. Prior to removal, thoroughly review the area (including commodities, packaging, pallets, and floors) for contamination, and assist in identifying the source of the infestation. Note: Special precautions may be necessary in certain regions. Refer to MILSTD 904B (reference (g)).

4. Maintain pallets in good repair, keeping them clean and free of debris.

5. Ensure all rail cars and truck vans are clean and without holes prior to loading and upon receipt.

6. Restrict food consumption and smoking to designated areas and remove empty food containers, open containers of food scraps, and smoking material residue from those areas.

7. Keep all rest rooms and "break" or lunch areas clean.

F. Stock Handling Practices.

Certain stock handling practices have been effective at reducing the potential food supply and harborage for pests:

1. Inspect incoming products to ensure they are pest free upon receipt. Dispose of any infested products. See Section I of DLAR 4155.37 (reference (d)).
2. Store MRE rations separate from commissary and fleet/troop issue food items to the maximum extent possible, except when stored under refrigeration.
3. Avoid combining different commodities on the same pallet.
4. Consolidate items on pallets to eliminate empty spaces where rodents can find harborage.



5. With palletized MREs in a warehouse, rotate stock on a regular basis. Proper stock rotation is critical; the older the product, the more likely it is to be infested. ***Base rotation on the date of pack of the item, rather than the date the item was received in the warehouse or storeroom, unless food inspection personnel indicate otherwise.*** Management must be aware of the turnover time on various items in order to reduce the likelihood of overstocking, and consequent over-aging of products.

6. In areas where MRE rations are co-located with commissary or troop issue items, conduct a thorough inspection of the most highly infestible commodities to determine whether or not an infestation exists. Conduct the same inspection on all other infestible commodities

shortly thereafter. The following commodities are considered to have high risk of infestations by stored-product pests:

Dry pet food	Flour mixes
Bakery mixes	Nuts
Dried fruit	Pasta
Cookies	Grits
Cereals	Dry beans
Rice	Cornmeal
Candy	Spices

(Note: Packaged flour and bakery mixes are subject to packaging infestation because of product dust/residue on the cans and in the cases.)

7. Food items, other than MREs, found to be infested with insects should be isolated as quickly as possible and fumigated or discarded (reference e), in accordance with the manufacturer's labeling. If this cannot be done within 24 hours, cover the infested commodity with plastic and seal the plastic to the floor with tape. This will serve as a temporary means of minimizing contamination of other products. If all of the above are impossible, place the infested commodity in refrigerated storage. ***The fumigation of MRE rations is not recommended and will only be done if no other options are available, and only after consultation with a Defense Logistics Agency Troop Support Command entomologist*** (Directorate of Subsistence, Operational Rations, Commercial 215-737-3876 or DSN 444-3876). Reworking the MRE cases, placing the rations under refrigeration, or freezing are preferred options. If rations are frozen, they must be thawed prior to handling to avoid damage to the packaging and compromising food safety.

8. Most spillage and commodity damage are caused by carelessness during forklift operations. Special care must be taken with soft-packaged items, such as flour, sugar, and rice.

G. Pest Exclusion Methods

These methods are designed to exclude pests from storage environments and prevent their establishment:

1. Properly installed plastic or wire screening attached or suspended beneath warehouse overhangs can be an effective means of excluding birds from access to roosting or nesting sites.

2. Screening (16-mesh) in good repair properly installed over windows on outside walls is an effective way to prevent bird entry.

3. Large doors leading outside should be tight-fitting and have no gaps larger than ¼ inch on any edge when the door is closed. If doors are left open for extended periods, they should be fitted with full-length plastic strips or properly installed air curtains (air current blowing down and out of the facility) to discourage and prevent pest entry.

4. No electronic, magnetic, and sonic devices have been found to be effective *nor are any authorized* for rodent or bird control (reference (h)).

H. Non-chemical control methods

These methods are designed to control pest infestations by catching, killing, or excluding pests without the use of pesticides. Warehouse design must be considered from the standpoint of control and exclusion.

1. Repeating traps and snap traps are used for rodent control around the inside perimeter of the warehouse. They are set at regular intervals (distance will vary depending on the potential for rodent activity and the type of rodent normally encountered) or within stacks in high-susceptibility areas, such as those used for pet food, rice, and flour storage. Traps should be checked at least weekly, or daily if activity is observed. If possible, have either a warehouse worker or food inspector check traps during the interval between routine pest control visits. They should notify pest control of any activity found.

2. Glue boards may be used for rodent control and should be placed in the same manner as traps. They can also be used for monitoring some insects. Note: Glue boards are often ineffective when used in very hot or dusty environments.

3. Eliminate unnecessary water sources readily available to rodents, including leaking pipes and excessive condensation. This will also improve the effectiveness of liquid rodenticides.

4. Repellent glues may be used to keep birds off roosting points, if they cannot be entirely excluded. In some situations, slip sheets (cardboard sheets used between the pallet base and load) or plastic may be placed on top of pallets to protect products from contamination.

5. Insect pheromone traps, New Jersey-style light traps, and insect electrocutors, while not effective control measures, do provide surveillance of insect populations. Pheromone traps may also be used outside a storage facility, away from the building, to monitor outside pest insect populations and intercept pest insects before they can enter the facility.

I. Chemical Control Methods

1. Ensure that all pesticide applicators are trained and certified or appropriately licensed to apply pesticides.

2. When necessary, use ultra-low volume (ULV) fogging machines with an approved insecticide as a warehouse space treatment during non-duty hours. ULV can control flying and crawling stages of many insects but will not affect eggs or insects inside food containers. It is not a substitute for fumigation. Specific recommendations shall be obtained from the responsible pest management consultant and shall be based upon surveillance results.

3. Apply crack and crevice residual pesticides, insect growth regulators (IGR) or baits (approved for food processing establishments) per label instructions in dry storage warehouses or similar facilities. ***The frequency of application should be adjusted, reduced or increased, based on surveillance results; however, it shall not exceed label recommendations.***

4. Dry rodenticide bait may be used in storage environments in tamper-resistant and secured bait stations. Rodent bait stations should be placed along the outside warehouse perimeter, as well as at points of evident need based on surveys and a map made recording location (Note: ***Rodents feeding on bait will die, possibly in inaccessible areas, resulting in odor and filth flies***). Mechanical traps (windup, snap, and bait stations with snap traps) may be used along interior walls (e.g., fire walls) as an alternative to bait stations. Place rodent control devices only in locations (map locations to prevent misplacing) that are accessible for inspection and servicing, and are protected from operations that may cause damage. Stations should be checked at least monthly for rodent activity. Old bait material must be completely replaced with new at regular intervals, since many insect pests can feed on the bait without ill effect. Bait stations should be used outside all storage facilities. For products stored in wet caves, bait stations should be placed at intervals of 50 feet (15 meters) or closer. Bait stations placed outside must be tamperproof and secured. Baits must be protected from mechanical damage and be readily accessible to the rodent population. If rodent activity is noted indoors, both liquid bait stations and mechanical traps should be used to supplement dry rodenticide baits, and the frequency of monitoring should be increased.

5. Rodent bait stations are especially effective for rapid reduction of high rodent populations.

6. ***Routine fumigation of MRE rations is prohibited.*** MRE fumigation will be performed only as noted in paragraph F.7.

7. To eliminate active infestations and prevent the spread of insects to MREs or other commodities, isolate and return or destroy infested product, deep clean storage areas, and apply residual pesticides and/or IGRs if required. If necessary, fumigate any non-MRE product in which there is evidence (direct or indirect) of insect infestation. Fumigation should be accomplished in place, if possible, and as promptly as possible. When identified, report infestation to the Senior Installation Medical Authority. If infestation affects the mission or facilities, also notify the Garrison Commander or Station Commanding Officer.

II. Shipboard Programs

A. Background

The Meal, Ready-to-Eat (MRE) is a combat ration packaged in a 10 mil polyethylene bag, which is strong and lightweight but can be penetrated by rodents and certain insects. Under the confined conditions found aboard ship, MREs may be at risk for infestation or damage by such pests. Because of the critical importance of the MRE during contingency operations, it is essential that ship commanders ensure these rations are protected through an effective shipboard pest management program.

B. Ships Carrying MREs.

1. MRE rations are stocked aboard Navy ships when specifically authorized by a fleet commander and the Navy Food Service System Office. For example, an LSD (Dock Landing Ship) may requisition MREs to feed the ship's landing party during training or field exercises. In that situation, the rations will be found in the food service storerooms and will be the responsibility of the supply department. Additionally, the Marines and the U.S. Army store pre-positioned MRE stocks aboard contract vessels and United States Naval Ship (USNS) vessels (Military Sealift Command).

2. Navy replenishment and USNS vessels may carry MREs, some of which will be transported in refrigerated spaces. Certain types of amphibious assault ships have been designed to carry large quantities of MREs under a program called Landing Forces Operational Reserve Materials (LFORM). The very nature of the LFORM program makes the MRE vulnerable to invasion by insect and rodent pests.

C. Landing Force Operational Reserve Material (LFORM)

1. Concept of LFORM: LFORM are part of Marine Corps Pre-positioned War Reserves Materiel are stocked and maintained aboard selected amphibious warfare ships to provide support for embarked troops in contingencies. Embarked Marines aboard for training operations do not draw stocks from LFORM. The combat cargo officer is responsible for LFORM stocks, not the supply officer.

2. Ship Types Carrying LFORM MREs: MRE rations for a Marine Expeditionary Unit (MEU) will be pre-positioned and stored in secure spaces aboard amphibious warfare vessels. These include:

- a. Amphibious Helicopter and Landing Craft Carriers:
 - Amphibious Assault Ship, General-Purpose (LHA)
 - Amphibious Assault Ship, Multi-Purpose (LHD)
 - Amphibious Transport Dock (LPD)
- b. Landing Craft Carriers
 - Dock Landing Ships (LSD)

Designated ships each receive and hold five to seven thousand cases with 12 rations per case. Note: For most pre-positioned situations, the MREs are stored in certified containers (sealed containers, no openings/vents). As long as the MREs are pest free when the containers are loaded and packed tight, there is little likelihood of pest infestations. Additionally, once staged aboard the pre-positioned ships, MREs are not readily accessible.

3. Palletizing MREs in LFORM. MREs are palletized and banded on standard 40" x 48" wooden pallets. There are 48 cases per pallet.

4. Rotation of MREs in LFORM. MREs have a three-year shelf life under normal conditions. Current policy is to rotate MREs every deployment. Rotation will return MREs to supply channels for reissuing and consumption.

D. U.S. Marine Corps and U.S. Army pre-positioned Stocks.

Newly assembled MRE rations are used for pre-positioned stocks. MREs are stored in containers aboard contracted, chartered or USNS vessels maintained by the Military Sealift Command. Once placed aboard ship, the rations are not readily accessible and generally will not be inspected until the stocks are rotated off the ships. Some ships have containers equipped for remote monitoring of container conditions. The rations are stored for 30 months (U.S. Marine Corps) or 24 months (U.S. Army). When rotated, the rations are replaced with new rations to maintain the serviceability of the stocks. **It is critical that these containers receive a proper inspection prior to loading.** Container integrity and cleanliness are key components of this program.

C. Stacking Requirements.

1. Stacking. MREs shall be stacked no more than four (4) pallets high in a warehouse to prevent crushing the cases at the base of the stack. Continual vibration while under way will hasten the settling or crushing effects on the lower cases of MREs pallets. On those ships having overhead clearance allowing stacking of MREs, it is recommended that stacks be no more than three (two preferred) pallets high. While other LFORM gear may be placed under the MREs, no items shall be placed over the MRE rations. MREs shall not be stacked over or immediately adjacent to petroleum products (oils, greases, fuels, solvents, cleaning agents, explosives or ammunition).

2. Inspections. Marine Logistics Group (MLG) LFORM loading plans should allow accessibility to MRE rations for stored-product pest inspections by medical department personnel. In this situation, accessibility means sufficient space for an individual to closely inspect a minimum of one side and the top of the MREs as stacked on a pallet.

3. Temperature Guidelines. MREs stored in LFORM blocks can be expected to experience temperature ranges that allow them to last for at least one year. Recommended temperature storage guidelines for MREs are the following: for 7 years at 60° F, 5 years at 70° F, 4 years at 80° F, 30 months at 90° F, and 5 months at 110° F (based on studies by the U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC)). Spaces with MREs should be monitored for temperature on a regular basis. Designated supply officer or personnel should consider placing MREs in the coolest sections of LFORM stowage spaces when designing the load plan.

D. Pest Management Guidelines.

1. Initial Inspection and Treatment of LFORM MRE Stowage Spaces.

a. Designated supply officer must coordinate initial inspection of storage space with the Preventive Medicine Technician (PMTs) or Medical Department Representative

(MDR) prior to loading LFORM MRE rations. A thorough survey for any insects or rodents should be performed during the loading procedure. Maintenance of sanitation and housekeeping practices will substantially reduce the likelihood of pest infestation, as well as facilitate chemical and non-chemical control measures for any pest that may be introduced later. See U.S. Navy Shipboard Pest Management Manual (reference i).

b. Thoroughly deep clean (surface sanitation is not sufficient) the entire stowage space where MREs are to be placed. Any nearby spaces that hold or have recently held foodstuffs or animal products (boots, blankets, brushes, wool uniforms, etc.) must receive similar attention. Remove debris from the ship after each cleaning.

c. ***Once the storage area is cleaned, residual insecticide sprays may be applied; however, this treatment is not warranted unless pest activity is noted during cleanup.*** If stored-product pest activity is detected, consider using insect growth regulators (IGRs) as a crack and crevice treatment to reduce the risk of pest population expansion. The preventive medicine authority certified to apply pesticides or station pest control personnel will apply approved compounds. The specific pesticide recommendation, rate, and type of application must be obtained from the respective area medical entomologist.

d. If subsistence supplies are procured at overseas ports, ensure they receive a proper receipt inspection (pier-side inspection) to prevent the introduction of stored-product pests into ship storage areas.

2. Inspection of LFORM MREs Prior to Loading. Paragraph 4200 of reference (a) states that stores received from military installations require only a quantity inspection. This guidance further states that quality inspections are made by the supply activity upon acceptance of the material from the original supplier and will not be duplicated aboard ship. However, quality inspections are encouraged before the stores are transferred to onboard storage areas. It is during this inspection that the MDR should check closely for signs of insects and rodents. Receipts of stores from government installations other than military are to be inspected for both quantity and quality. Due to the absolutely critical importance of the LFORM MRE in future contingency operations, only stocks in good condition and free of defects should be accepted.

3. Loading of LFORM MREs. Loading can begin once the combat cargo officer has determined the quality and quantity of LFORM MREs, and that stowage spaces are properly prepared. Care must be taken to avoid damaging the rations during loading operations. Damaged cases with exposed foodstuffs must be removed from the pallet and repackaged. Prompt cleanup of spillage is essential. Supervisors must encourage caution and conscientiousness among forklift and elevator operations to avoid damage to these rations.

4. Routine Inspection Program for MREs Stored Aboard Ship.

a. Inspection of Ship's Company MREs. In those storerooms where MRE rations are co-located with ship's company food stuffs, the Medical Department should conduct a thorough monthly inspection of several of the most highly infestible commodities (Section F.6.). Handle infestations detected as a result of those inspections per reference (a).

b. LFORM MRE Inspection Program Requirements. Due to the absolutely critical nature of these rations, conduct intense surveillance of the LFORM MREs. Any insect life form found in stowage spaces must initially be considered a threat to the MREs. The combat cargo officer should coordinate with the medical officer to have designated MDRs conduct weekly inspections for stored-product pests. The LFORM load plan must allow for reasonable access; otherwise, adequate inspections cannot be performed.

c. Surveillance Equipment. To conduct an adequate and thorough inspection, the inspector will need to carry several items, such as a flashlight, clipboard, paper, pen, alcohol vials for preserving insect specimens, magnifying hand lens to aid in initial pest identification, and, optionally, a portable black light to identify rodent urine (Note: many substances will fluoresce when exposed to a black light. Experience is necessary to distinguish rodent urine from other materials).

d. The inspector should note the condition of pallets and cases, as well as look for actual infestations in the products stored adjacent to MREs. Damaged cases should be viewed with suspicion. Note: Open-package inspection of MRE meals for insect infestation is not necessary, nor is it recommended unless the pouch bag has been damaged or a special inspection has been requested.

5. Insect Inspection.

a. The inspector should note the number and type of dead insects on the deck, as well as any live insects on or around pallets and packages. The locations and lot numbers of infested rations should be recorded.

b. Check MREs by removing cases from the top of the pallet and looking closely for insects on package surfaces or in cracks or folds between packages. Insects may be found on the underside of plastic bags, in the bottom of cases, or between the box and the sides of the MRE case. The existence of "frass" or silk in or on the product, or chewed entry or exit holes, are indications of an infestation, even if actual insects are not immediately seen. Breaking open pallets of all MREs stowed aboard ship is not recommended.

c. Positive insect identification may be obtained from the nearest area medical entomologist or PMC listed in reference (h).

6. Rodent Inspection Program for MREs Stored Aboard Ship.

a. MREs are vulnerable to rodent attack, especially in the LFORM configuration. Rodents, for example, may be brought aboard in plywood boxes containing other materials in LFORM (burlap bags, ordnance, barbed wire, etc.).

b. Inattention to detail on the part of the inspector looking for rodents could have serious consequences. The inspector should look for droppings, urine stains, rub marks, gnawing, and shredded nesting materials on, in, and under palletized goods. Rats and mice may also infest the interior of palletized goods.

c. The inspector should not confine the search for rodents to the MRE rations because they may nest in non-food pallets and other harborage as well.

7. Procedures for insect pest infestation.

a. Notify the combat cargo officer and medical officer.

b. Determine the extent of infestation and record lot numbers of MRE containers.

c. Remove all infested/damaged cases from the LFORM stowage space immediately, in order to minimize the possibility of infestation of "clean" supplies. Refrigerate cases, if possible, or dispose of them following current directives. When cases are damaged during loading, the cases shall be replaced with undamaged cases from stock.

d. Contact the nearest Navy medical entomologist or PMC by phone or message for guidance and to transmit information on the lot numbers, condition and quantity of infested MRE rations. See Section I,C,6 for location of the nearest area entomologist.

e. ***Fumigation of MREs or other food stores aboard ship is not approved by DoD.*** Infested MREs and/or food stores must be isolated and sealed with plastic. If possible, the products should be placed in refrigerated storage. This will serve as a temporary means of minimizing cross contamination of other products. Local medical or veterinary representatives must then determine through ration breakdown what components can be salvaged.

8. Procedures for rodent infestations.

*****WARNING: Use care when handling rodent infestations. Personnel handling rodent infestations should be trained and/or certified in the Shipboard Pest Management course. This course is offered by NECE or the nearest NEPMU.*****

a. Set traps and dispose of rodent carcasses following guidance provided in references (g) and (i). Check all traps during weekly inspections. When in port, rat guards must be utilized on all ship-to-shore lines on any vessel carrying MREs.

b. ***Rodent poison baits are not approved for use aboard ships.*** Odor from dead rodents in confined spaces of a ship is unacceptable. Use of poison baits must be approved by the cognizant entomologist at NECE or nearest NEPMU.

c. Glue boards may be useful for rodent control, especially in inaccessible areas. As with traps, locate the glue boards in natural rodent runs. Glue boards are not recommended for use in excessively hot and dusty areas.

d. Remove damaged cases from storage. Pallets with damaged cases should receive 100% inspection of the cases to ensure there are no rodent nests present. Adjacent pallets should also be examined. A black light is useful for identifying rodent-contaminated cases. Remove MRE pouches from contaminated cases and destroy the boxes as appropriate. The pouches should be examined for damage or contamination.

e. ***MRE pouches with any evidence of rodent damage should be destroyed.***

References

- (a) NAVSUP PUB 485, Afloat Supply Procedures. Revision 3, with 6 changes through 4 October 2005.
- (b) DLA Troop Support Command Handbook 4155.2, Subsistence, Inspection of Meal, Ready-to- Eat (MRE) Rations, November 2010, Appendix A.
- (c) DLAI 4145.31 Subsistence, Inspections of Composite Rations, November 2010.
- (d) DLAD 4155.37/TB 702-18, Materiel Quality Storage Standards Policy for Shelf-Life Materiel, March 10, 2004.
- (e) [AFPMB Technical Guide No. 11, Hydrogen Phosphide Fumigation with Aluminum Phosphide.](#)
- (f) [AFPMB Technical Guide No. 27, Stored-Product Pest Monitoring Methods.](#)
- (g) [MILSTD 904C, Department of Defense Standard Practice: Detection, Identification, and Prevention of Pest Infestation of Subsistence, 15 July 2010.](#)
- (h) [DoD Instruction 4150.07, DoD Pest Management Program, 29 May 2008.](#)
- (i) NAVMED P-5052-26, Shipboard Pest Management Manual, May 2008.