

3E453 – Pest Management Journeyman

Module 1, Lesson 1, Task 1 (8.1, 10.1.1, 10.1.2, 10.1.3) Principles of Integrated Pest Management

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

8.1, 10.1.1, 10.1.2, 10.1.3 Principles of Integrated Pest Management

Slide 1.3 – Instructions

Welcome to the lesson on Principles of Integrated Pest Management.

- Upon completion of this lesson you must successfully be able to identify the relationship of basic facts and state general principles relating to what Integrated Pest Management is and understand the basic concepts of how to identify, survey, and apply control measures for various pest management operations with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Introduction
- Pest Control vs. Integrated Pest Management (IPM)
- Control Strategies
- Survey Principles
- Identification Principles

Slide 2.1 – Introduction

Slide 2.2 – Introduction Video

- Video Closed Captions

To start off, we must understand what Integrated Pest Management (or IPM) is. The best way to do this, is to explain the difference between Pest Control and IPM. Some people may think of them as the exact same thing, but this is not the case. Pest control is strictly focused on only the pest and not the collateral environmental impact. The mindset behind pest control is finding a way to quickly knock down a pest population with no consideration for them coming back or the environmental impact that the pesticides used may have. This approach has an exclusive

reliance on the use of pesticides to control persistent pest species, without an emphasis on the safety and health of the personnel performing the control methods, or the impact on the surrounding environment. On the other hand, Integrated Pest Management provides a sustainable, environmentally-friendly approach to combatting persistent pests. It requires a great deal more education and effort, and sometimes has a slower pest reduction rate but will provide long lasting effects without the overuse of pesticides. The use of multiple control methods will prove effective not only in the short-term, but also have more sustainable long-term control effects. The long-term results when using IPM are usually far more favorable than traditional pest control.

Slide 2.3 – Takeaways

- Pest Control and Integrated Pest Management (IPM) are not the same thing.
- Pest control is strictly focused on only the pest and not the collateral environmental impact.
- The mindset behind pest control is finding a way to quickly knock down a pest population with no consideration for them coming back or the environmental impact that the pesticides used may have.
- It has an exclusive reliance on the use of pesticides to control persistent pest species, without an emphasis on the safety and health of the personnel performing the control methods, or the impact on the surrounding environment.
- IPM provides a sustainable, environmentally-friendly approach to combatting persistent pests.
- IPM requires a great deal more education and effort, and sometimes has a slower pest reduction rate but will provide long lasting effects without the overuse of pesticides.
- Use of multiple control methods will prove effective not only in the short-term but also have more sustainable long-term control effects.
- Long-term results when using IPM are usually far more favorable than traditional pest

Slide 2.4 – Introduction Part 2

- Integrated Pest Management (IPM) is much different than the old school approach of Pest Control.
- Instead of finding an insect and spraying in hopes of controlling the given pest, IPM is a more methodical and strategy-based approach that deploys multiple control tactics to ensure that pest populations are managed at acceptable levels, risks to people, other non-target organisms, and the environment are minimized, and the controls efforts are practical and economical.
- As such, the Department of Defense and Armed Force's Pest Management Board define IPM as a planned program, incorporating continuous monitoring, education, record keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, material, or the environment.
- IPM uses targeted and sustainable (effective, economical, and environmentally sound) methods including education, habitat modification, biological control, genetic control, mechanical control, physical control, regulatory control and where necessary, the use of least-hazardous pesticides to control a given pest.

- IPM is a science-based, environmentally sound approach to pest control developed in the 1970s in response to environmental and human health concerns about the overuse of pesticides. The DoD and Air Force have adapted this method to effectively implement long-term controls and lessen the amount of pesticides that are used on military installations.

Slide 2.5 – IPM Strategies

- Pest Prevention
 - Pest prevention is the application of control measures in advance of large pest populations aimed to keep the population sufficiently low, before they have an adverse impact or disrupt the environment. There are many actions we can take to build out insects and ensure they have no entrance into a facility or given area.
 - Taking a proactive approach in the design phase of a facility will help reduce future pest problems. Windows on screens, using door sweeps and air curtains are great examples of preventing pest problems.
- Pest Management
 - Pest Management is the application and implementation of certain strategies and techniques used to lower pest populations, but never truly achieve eradication. Pest Management is simply controlling pest populations to an acceptable and tolerable level.
 - This is where a Pest Manager must be able to explore the different control measures to help reduce pest populations. Habitat modification, sanitation, mechanical, and physical controls are great ways to reduce pest populations without having to use any pesticides.
 - If all other control measures fail, using a pesticide in conjunction with all other types of control may be needed to effectively control the given pests. These types of controls will be covered later in this lesson.
- Pest Eradication
 - Pest eradication is a formal approach normally used to eliminate a species of great medical or economic importance from a specific geographic area. Eradication efforts can be applied to international trade and travel and are very difficult and expensive to maintain.
 - The military doesn't normally use this approach in its own operations except in the context of fumigation. Military units are often involved in larger, government-wide programs and in the required quarantine follow-up action aimed at achieving or maintaining pest eradication.

Slide 2.6 – Key Roles Main Slide Menu

So, what is the difference between Pest Control and IPM? Click on each to learn more

Pest Control

IPM

Slide 2.7 – Pest Control

- Integrated Pest Management on the other hand, provides a sustainable environmentally friendly approach to combatting persistent pests

- It requires much more education and effort, and sometimes has a slower pest reduction rate
- This approach has an exclusive reliance on the use of pesticides to control persistent pest species without emphasis on the safety and health of personnel and the environment performing the control methods

Slide 2.8 – IPM

- Integrated Pest Management on the other hand, provides a sustainable environmentally friendly approach to combatting persistent pests
- It requires much more education and effort, and sometimes has a slower pest reduction rate
- The use of multiple control methods will provide both short-term and more sustainable, long-term control efforts
- The long-term results are usually much more favorable than traditional pest control

Slide 2.9 – Department of Defense Responsibilities

- Intra-Military Departments
 - The DoD has a responsibility to ensure that each branch of service has an has a plan in place to monitor and manage pest levels to ensure mission effectiveness.
 - Within the Air Force we can break down our control efforts into two major groups: Air Force Surveillance and Air Force Management.
 - Public health takes on the role of researching the medical aspects of pest problems such as disease vectors, medical personnel training in these diseases, and pest management contingency operations.
 - The Air Force Civil Engineer Pest Managers are responsible for protecting property, material, and people subject to infestation or destruction, including most pest management operations on DoD installations.
 - Cooperation between both public health and Pest Managers is crucial in having an effective pest management program.
- Inter-Military Department
 - Outside of the Air Force and within the DoD Air Force pest managers work hand in hand with other branches of service such as the Army and Navy.
 - The Armed Forces Pest Management board is combining DoD pest management effort, recommends policy, provides guidance, and coordinates the exchange of information on all matters related to pest management throughout the Department of Defense (DoD).
 - The Armed Forces Pest Management Board (AFPMB's) mission is to ensure that environmentally sound and effective programs are present to prevent pests and disease vectors from adversely affecting DoD operations.
 - Cooperation does not stop just within the DoD though, pest managers from all branches must work with other intra-government departments and agencies. Cooperation between DoD and other governmental departments and agencies involved in pest management is necessary to reduce duplication of effort.
- Intra-Government Department & Agencies

- The AFPMB maintains close liaison with United States Department of Agriculture (USDA), Commerce, Health and Human Services, Interior and States, Environmental Protection Agency (EPA), Veteran's administration, and other independent federal agencies. The AFPMB also coordinates on the DoD's behalf with many United States allies and maintains memoranda of agreement with most states regarding pesticide applicator certification.

Slide 3.1 – Control Strategies Intro

Slide 3.2 – Control Strategies

There are many different control measures that can be used and implemented into a successful pest management program. Because IPM is a combination of multiple methods of control we must be able to understand how to implement them and to use them to our advantage. Often, one type of control will supplement and help another type. Most customers you encounter are not familiar with proper pest management tactics so it is up to you, the pest management specialist, to educate people on the different ways we can come up with to control a given pest as opposed to just spraying pesticides.

Slide 3.3 – Habitat Strategies

- Habit Modification
- Biological Control
- Genetic Control
- Cultural Control
- Mechanical Control
- Physical Control
- Regulatory Control
- Chemical Control

Slide 3.4 – Environmental Protection Agency

- HABITAT MODIFICATION is simply altering the habitat, the condition of the host plant, or site or the behavior of the pest to prevent or suppress an infestation. Most of these practices have little to no cost aside from labor.
- Every species of pest has a specific habitat requirement. Some requirements have to do with physical conditions such as light, humidity, or temperature. Others may have to do with food and harborage. If we can alter a pest's habitat such as removing their food source, water, or moisture we can likely eliminate their breeding and future population production.
- EXAMPLES:
 - Mowing
 - Weed control
 - Plant selection
 - Fertilization

Slide 3.5 – Biological Control

- BIOLOGICAL CONTROL uses living organisms to manage other organisms that are pests. This type of control is more frequently used in agricultural pest management but can also be used in Air Force Pest Management efforts.
- Examples of biological controls could be simply introducing predatory animals into an area to remove the target pests, such as different types of raptors for birds and certain species of fish to eat mosquito larvae and aquatic weeds. Another example is for structural pests and using nematodes (which are microscopic worms), or parasites, bacteria, fungi, viruses, and other insects to control a given pest.
- For example, some wasps kill cockroaches by parasitizing their eggs, and some phorid flies have been used to control fire ants. Another common biological control is the use of pheromones, such as ascaricide pheromones from worms, that boosts plant growth and resistance of plants from a deadly fungus-like pathogen and from other pests.
- Lastly, grazing animals such as goats, sheep, and cattle could be used as a biological control for weeds and vegetation in areas where we do not want overgrowth. This is a very uncommon practice within military installations but shows the how using one pest can control another.

Slide 3.6 – Genetic Control

- GENETIC CONTROL for insects can be used and introduced to disrupt the genetic make up and reproduction of a pest population. Insect growth regulators also known as IGR's are used and work by hindering the ability of immature insects to develop into healthy adults. The two types of IGRs are juvenoids and chitin synthesis inhibitors.
- Juvenoids mimic natural insect hormones that regulate growth, maturation, and reproduction. When exposed to juvenoids, these insect's processes can be disrupted.
- Examples would be the eggs not hatching, wings and other body parts may not fully develop, and adults may become sterile or stop producing eggs. Chitin synthesis inhibitors disrupt the production of chitin which is the main component of what makes up the exoskeleton on arthropods.
- If an insect's exoskeleton is weakened it will absorb a pesticide more easily. Using IGRs is a great tool to implement along with other control strategies to get the long-term control results.

Slide 3.7 – Cultural Control

- CULTURAL CONTROL is very similar to habitat modification and involves human practices to manipulate the environment to make it less attractive to a given pest. The less desirable the location, the less attractive or suitable it will be for pest populations to grow.
- Cultural control also includes changes in human practices to reduce the acceptability of an area to pests, including exclusion and sanitation/housekeeping. Cultural control involves human behavior that needs to be changed such as removing backyard clutter, standing water, and cleaning gutters so debris and water don't collect.
- Other outdoor examples include removing old tree stumps and other rotting materials, cleaning up animal waste, eliminating hiding spots where rodents can nest, and simply keeping trash can lids tightly close on trash bins.

- Other cultural control tactics can be used to make a structure or area less attractive to pests such as moving outdoor lights away from doorways, removing clutter in a bedroom so bed bugs have fewer places to hide, and removing a bird's nest from a windowsill to prevent bird mites from getting into a home. These are all simple cultural control practices that help eliminate food, water, and harborage areas that pests need to thrive.

Slide 3.8 – Mechanical Control

- MECHANICAL CONTROL involves the use of machines or devices to trap, restrain, or kill a desired pest. The most common and obvious example is the use of a snap trap to catch rats or mice, but other devices such as vacuum cleaners, fans, and fly swatters are also considered mechanical controls.
- Vacuum cleaners can be very effective for removing flea eggs from carpets, or for removing occasional household invaders such as stink bugs or beetles. An electric fan would be a good tool to use against flying insects. Mosquitoes, for example, are poor flyers so using a fan would be a good way to push them away from the given area.
- For larger vertebrate pests we commonly use live animal traps to lure in a target pest, trap them, and then release them in an approved area according to the local pest management plan (that is away from people and in an area that will not hinder mission success). Mechanical control techniques such as using window screens, and patching and sealing cracks in small areas will not enable a pest to enter.
- Bird deterrents are also an example of mechanical controls that can be implemented. Many bird deterrents seek to prevent the roosting of birds by using bird strips, ultrasonic bird calls, and poses as a visual aid to deter birds from roosting in a given area.

Slide 3.9 – Physical Controls

- PHYSICAL CONTROLS generally involve manipulating physical factors such as heat, cold, humidity, or light in order to attract, repel, or kill a target pest. An example would be using a dehumidifier in a damp basement to discourage millipedes, crickets, and other pest that require high moisture content.
- When physical controls are combined with other tactics like exclusion by caulking cracks and seals, and ensuring sanitation such as removing the food source; this may eliminate the need for any chemical applications. Another example of physical control is by using the temperature to help control a given pest.
- Heating a room or structure can be used to treat infestations of bedbugs, termites, cockroaches, and other pests. Raising temperatures to at least 140 degrees Fahrenheit for an hour will kill most arthropods
- Cold treatments can also be used for pest management but require very low temperatures for an extended period of time. This is great in the winter months and for outside areas, but not very helpful within structures and office areas. Again, another methodical approach that reduces the use of pesticides which is what integrated pest management is all about.

Slide 3.10 – Regulatory Control

REGULATORY CONTROL

- Commercial pesticide applicators in regulatory pest management include state, federal, or other government employees or contractors who use pesticides in the management of regulated pests. Applicators shall demonstrate a practical knowledge of regulatory pest management including all of the following:
- Specific life cycles of the pest to be managed and appropriate management techniques
- The potential impact of pesticide applications to non-target areas or organisms
- General public notification procedures
- The objective of regulatory pest management is to prevent the introduction and/or spread of pests through the application of various pest management techniques such as pest exclusion, detection, eradication, mitigation, and public education. Both federal and state governments have the authority to enact and enforce laws and regulations pertaining to nuisance pests.
- It is important for regulatory pest managers to be familiar with both the federal and state laws and to know which quarantines are enforced within Michigan. The federal Plant Protection Act of 2000 consolidated 10 different USDA plant health laws into one comprehensive law that provides authority to regulate plants, plant products, certain biological control organisms, noxious weeds, and plant pests

Slide 3.11 – Chemical Control

- CHEMICAL CONTROL uses a substance or mixture of substances to control, prevent, attract, repel, or mitigate a pest problem. These substances are commonly known as pesticides and come in many different formulations such as sprays, liquids, dusts, gases, powders, granules, and baits
- The pesticides used within the pest management enterprise are very useful in controlling targeted pests. The use of other non-chemical control methods like the ones already discussed (such as physical, cultural, and mechanical) will provide the best long-term control. Pesticides are generally the fastest temporary way to control pests and sometimes the only available option.
- They provide many benefits such as being easy to use, quick acting, cheap, readily available, and can save lives while also preventing economic loss of crops and produce. Pesticides come in many different formulations which makes them a very versatile option when determining the best pesticide to control a given pest.
- Though pesticides seem like a very good choice and useful option we still must consider the negative impacts of using them. Pesticides are potentially toxic to humans, pets, livestock, and non-target insects such as bees and birds. Most importantly though we must consider the negative environmental impact pesticides can have on the world
- Some chemicals are more persistent than others and can stay in the environment for a long time. Others bio-magnify and get passed along the food chain, so animals high on the food chain (predators, including humans) can end up with toxic levels that can kill them or interfere with reproduction. Other chemicals are highly water-soluble and may leach into the ground water or run-off the land when it rains and end up in surface waters (streams, lakes, rivers).
- Pest resistance is another consideration when using pesticides. Pests develop immunities to multiple pesticides, so there is nothing to stop them. When pesticides are

used, different chemical categories should be applied over time rather than always using the same one over and over. The harsher the pesticide, the more quickly resistance develops in the pest population.

- Pesticides are very useful and can serve to be very beneficial, but we must remember that in a well balanced IPM program, pesticides should be used the least and along with many other control efforts.

Slide 4.1 – Survey Principles Intro

Slide 4.2 – Inspection or Survey Video

- Video Closed Captions

Now we will cover one of the most important aspects of any IPM program; surveys. The first step in any pest management program is the inspection or survey. Surveys are essential to determine the species present, their abundance and their potential to spread. A thorough inspection is the foundation of any IPM service provided in order to find the root cause of a problem. Conducting a survey provides a means of identifying problem areas and a way to educate customers on the process of IPM and to avoid pest problems in the future. Without a sound survey system and the ability to monitor threshold levels, a pest management program will not be as effective. After completion of this lesson, you will be able to understand why we conduct surveys, to look for and recognizing what signs to look for that are conducive conditions for a pest to thrive.

Slide 4.3 – Takeaways

- Now we will cover one of the most important aspects of any IPM program; Surveys:
 - The first step in any pest management program is the inspection or survey.
 - Surveys are essential to determine the species present, their abundance, and their potential to spread.
 - A thorough inspection is the foundation of any IPM service provided in order to find the root cause of a problem.
- Conducting a survey provides a means of identifying problem areas and a way to educate customers on the process of IPM and to avoid pest problems in the future.
- Without a sound survey system and the ability to monitor threshold levels, a pest management program will not be as effective.
- After completion of this lesson, you will be able to understand why we conduct surveys, to look for and recognize what signs to look for that are conducive conditions for a pest to thrive.

Slide 4.4 – Customer Interaction Video

- Video Closed Captions

When arriving to a job site it is extremely important to talk to the requester that called in the work request. The person who saw or has knowledge of the problem will be the best source to gather background information on the situation at hand. Normally, this will be the facility manager or the building occupant in the problem area. It is best to ask lots of questions regarding the situation so you as the pest manager have an understanding of who, what, when, where, and why a pest problem may exist. Many of times the customer can answer the questions they may have without you having to explain to them why a problem exists. Such as: Was the trash take out? Was there a door or window left open? How often are common areas

cleaned and trash taken out? Are there obvious holes or cracks that creating an entry for pests? These are all very typical questions that you can ask the customer to get a better understanding of what is going on and the best way to approach controlling the problem.

Slide 4.5 – Takeaways

- When arriving to a job site it is extremely important to talk to the requester that called in the work request. The person who saw or has knowledge of the problem will be the best source to gather background information on the situation at hand. Normally this will be the facility manager or the building occupant in the problem area.
- It is best to ask lots of questions regarding the situation so you as the pest manager have an understanding of who, what, when, where, and why a pest problem may exist.
- Many of times the customer can answer the questions they may have without you having to explain to them why a problem exists. Such as:
 - Was the trash taken out?
 - Was there a door or window left open? How often are common areas cleaned and trash taken out?
 - Are there obvious holes or cracks that create an entry for pests?
- These are all very typical questions that you can ask the customer to get a better understanding of what is going on and the best way to approach controlling the problem.

Slide 4.6 – What to Look For Video

- Video Closed Captions

Pest managers should inspect the problem area to determine the conditions that are conducive to a given pest. If pests are found, they must be properly identified and then the pest manager must determine the level of infestation. When completing the survey you should consider what a pest needs: Food Water and Habitat Modifying any of these conditions can help alter the environment and help the overall control efforts. While conducting the survey, pest managers must document the presence of these elements in order to determine activity levels and control efforts for future surveys.

Slide 4.7 – Takeaways

- Pest managers should inspect the problem area to determine the conditions that are conducive to a given pest
- If pests are found, they must be properly identified and then the pest manager must determine the level of infestation
- When completing the survey you should consider what a pest needs:
 - Food
 - Water
 - Habitat
- Modifying any of these conditions can help alter the environment and help the overall control efforts
- While conducting the survey, pest managers must document the presence of these elements in order to determine activity levels and control efforts for future surveys.

Slide 4.8 – Inspection Tools & Resources Menu

- Flashlight

- Moisture Meter
- Infrared Camera
- Flushing Agents
- Cameras & Boroscopes
- Magnifying Glasses & Microscopes
- Glue Traps & Monitor Stations
- Field Guides

Slide 4.9 – Flashlight Video

- Video Closed Captions

Flashlights are probably the most important tools used for surveys. They can be used to illuminate dark areas where pests are likely to hide and allow you see what the naked eye will not catch. A pest manager conducting a survey without a flashlight cannot possibly provide an honest or complete assessment of a pest problem.

Slide 4.10 – Takeaways

- Flashlights are probably the most important tools used for surveys.
- They can be used to illuminate dark areas where pests are likely to hide and allow you to see what the naked eye will not catch.
- A pest manager conducting a survey without a flashlight cannot possibly provide an honest or complete assessment of a pest

Slide 4.11 – Moisture Meter Video

- Video Closed Captions

Moisture meters are helpful in determining if there is a moisture problem in a given area. Many insects are attracted to moist habitats. Moisture meters are used to determine how moist or how humid an area is and can help control efforts.

Slide 4.12 – Takeaways

- Moisture meters are helpful in determining if there is a moisture problem in a given area
- Many insects are attracted to moist habitats
- Moisture meters are used to determine how moist or how humid an area is and can help control efforts

Slide 4.13 – Infrared Cameras Video

- Video Closed Captions

Infrared cameras are used to see part of the light spectrum that is not normally visible to the human eye. This can help reveal subtle temperature gradients that might indicate the presence of insect activity or moisture that may be attractive to insects.

Slide 4.14 – Takeaways

- Infrared cameras are used to see part of the light spectrum that is not normally visible to the human eye.
- This can help reveal subtle temperature gradients that might indicate the presence of insect activity or moisture that may be attractive to insects.

Slide 4.15 – Flushing Agents Video

- Video Closed Captions

Flushing agents are physical or chemical agents that cause pests to evacuate harborage
Flushing agents include compressed air, heat guns, certain aerosol sprays, liquids, and dusts.

Slide 4.16 – Takeaways

- Flushing agents are physical or chemical agents that cause pests to evacuate harborage
- Flushing agents include compressed air, heat guns, certain aerosol sprays, liquids, and dusts

Slide 4.24 – Cameras & Borescopes

- Video Closed Captions

Cameras and borescopes allow visual inspections inside walls and other places that cannot otherwise be seen. Digital cameras are excellent tools for documenting evidence of sanitation or maintenance problems, as well as pests.

Slide 4.17 – Takeaways

- Cameras/borescopes allow visual inspections inside walls and other places that cannot otherwise be seen
- Digital cameras are excellent tools for documenting evidence of sanitation or maintenance problems, as well as pests

Slide 4.18 – Magnifying Glasses and Microscopes

- Video Closed Captions

Magnifying glasses or microscopes are used in identifying pest such as mites. Microscopes may be needed to identify specific body part characteristics in order to distinguish different species.

Slide 4.19 – Takeaways

- Magnifying glasses or microscopes are used in identifying pest such as mites
- Microscopes may be needed to identify specific body part characteristics in order to distinguish different species

Slide 4.20 – Glue Traps & Monitor Stations

- Video Closed Captions

Glue traps and monitor stations can be strategically placed in a problem area to trap any insects. Traps should be used as a survey method and to monitor daily pest activity levels.

Slide 4.21 – Takeaways

- Glue traps/monitor stations can be strategically placed in a problem area to trap any insects
- Traps should be used as a survey method and to monitor daily pest activity levels

Slide 5.1 – Identification Principles Intro

Slide 5.2 – Identification Principles

- Overview
 - To effectively control a pest, it is important to accurately identify it. We have covered the first step which is to survey and look for signs of an infestation but what do we do once we have the information?
 - When we come across an insect or signs of a pest infestation, we must ask the following questions:
 - What is it?
 - Does it bite or can it sting?

- Is it beneficial or is it considered a pest?
 - Do we need to implement control methods due to its abundance, medical significance, or possibility of mission hindrance?
- We must properly identify the pest we are dealing with to best determine control measures. Misidentification of pests can contribute to misuse of time, resources, and unneeded pesticides being dispersed into the environment.
- Signs of A Pest
 - Since many pests are nocturnal or tend to avoid activity when humans are present, the signs they leave behind become very important for a pest manager. Different pests will leave distinct symptoms or signs that they are present and how active or abundant their population is. Each pest's identification and related signs of infestation will be covered in future lessons. Common general signs of activity are:
 - OBVIOUS SIGNS
 - Chew marks or rub marks from a rodent
 - Nests or burrows where you can tell something is trying to make themselves a home
 - Finding cockroach fecal matter that resembles black pepper
 - Finding bed bug fecal matter signs such as blood stains and black pepper around the seams of bedding
 - DROPPINGS
 - Droppings are a great source of a problem. Any type of excrement that shows signs of a presence will help a pest manager in the identification process. The different size, shape, and material can be helpful in identification. Understanding and knowing what different types of droppings will help indicate what type and possibly the species present.
 - DROPPINGS (EXAMPLES)
 - Powderpost beetle - the frass is fine and silky in texture
 - Drywood termite - the frass is hard, six-sided pellets one millimeter long
 - False powderpost beetle - the frass is coarse, tightly packed and tends to stick together
 - MUD TUBES OR NESTS
 - Subterranean termites are the most common insect most people associate with building mud tub-like structures
 - These tubes protect workers from predator insects and help keep moisture levels at an acceptable level while foraging for food
 - Different wasp species make different types of nests which help identify which type of wasps you may be dealing with
 - EGGS
 - Eggs and egg cases can provide evidence of a presence of a given pest
 - Though these are very small, if found, it can help identify a specific type of insect
 - DAMAGING SYMPTOMS

- Pests can look different and may be more destructive as they go through different life cycles
 - Larva stages of beetles can damage turf
- How to Identify
 - Identifying a given pest can be done in many different ways. The most important aspect to identifying a pest is ensuring you are correct. Speaking with the customer to gather as much information as possible is a great resource to get a good understanding of what they experienced.
 - During this time it is best to ask as many questions as possible so you can better understand what is going in the problem area. Once you have spoken with the requester and completed your survey now it is time to determine the target pest based off of all the information you have been dealt.
 - As you gain experience by completing multiple surveys and service calls, determining a given pest will come to be much easier. Until then using field guides, pictorial keys and dichotomous keys should be used to help identify pest species.
- Identification Resources
 - Within the Pest Management enterprise there are numerous resources to help pest managers just like you. Field guides are a quick and simple identification guide that help to determine specific pest species.
 - Another great resource within the Civil Engineer community is using your local Natural Resources and Environmental office. They can provide you great insight on local pests in the given area as well as wildlife. These offices can also help determine if they happen to be a protected or endangered species.
 - INTERNET RESOURCES
 - Pestworld.org
 - Interactive pictorial key
 - InsectIdentification.org
 - Provides a catalog of insect identification methods
 - By state or area
 - By color
 - Flying or non-flying

Slide 6.1 – Course Completion

Congratulations, you have completed the principles of integrated pest management lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 1, Task 2 (6.1) IPM Program and Resource Management

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

6.1 IPM Program and Resource Management

Slide 1.3 – Instructions

Welcome to the IPM Program and Resource Management lesson.

- Upon completion of this lesson, you must be able to successfully identify the relationship of basic facts and state general principles relating to IPM Programs and Resource Management with at least 75% accuracy.

Slide 1.4 – Overview

In this section, we will cover the following topics:

- Environmental Protection Agency (EPA)
- Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)
- Resource Conservation and Recovery Act (RCRA)
- Threatened and Endangered Species Act (ESA)
- Occupational Safety and Health Administration (OSHA)
- National Institute for Occupational Safety and Health (NIOSH)
- Air Force Occupational Safety and Health (AFOSH) Program
- Air Force Public Health
- Air Force Bioenvironmental Engineering
- United States Department of Agriculture (USDA)
- Host Country, State, and Local Agencies/Requirements
- State and Host Nation Quarantine Regulation and Co-operative Procedures

Slide 2.1 – Overview Intro

Slide 2.2 – Overview

- Pesticides are hazardous substances that can cause serious harm if used incorrectly; injury and even death can occur in severe cases.
- Because of this pesticides must be regulated to utilize their benefits while protecting public health and welfare and preventing harm to the environment.
- In this lesson we will cover many federal and state pesticide laws and regulations that help in controlling the labeling, sale, distribution, storage, transportation, use and disposal of pesticides in the best public interest.
- Specific states, territories, and some local jurisdictions may have their own legal requirements concerning pesticides that may be more restrictive than federal laws.
- Certified applicators are responsible for learning and complying with all such requirements before making any pesticide application. Ignorance of the law is never an excuse for noncompliance or violations.

Slide 3.1 – Environmental Protection Agency (EPA) Intro

Slide 3.2 – Environmental Protection Agency

- Agency Overview
 - The Environmental Protection Agency (EPA) was established December 2, 1970, with a mission to protect human health and the environment by writing and enforcing regulations based on laws passed by Congress
 - Title 40 Code of Federal Regulation (CFR), Protection of Environment, chapter- E Pesticide Programs addresses the EPA's mission and standards regarding pesticides.
 - Key areas of concern are as follows: pesticide registration and classification procedures, labeling requirements for pesticides, pesticide management and disposal, and certification of pesticide applicators.
 - The EPA ensures compliance by constantly monitoring all involved stakeholders. Monitoring is key to ensuring that the regulated community obeys environmental laws and regulation set out by the EPA.
- Compliance Monitoring
 - Onsite monitoring is done through evaluations and random spot compliance inspections.
 - Offsite monitoring is done by data collection, reviewing, reporting, and analyzing practices throughout the regulated community.
 - The EPA has a strict inspector training and credentialing program that representatives must go through to ensure the highest standards are upheld.
 - If users are not adhering to the laws set out by the EPA, there are three main types of enforcement actions the EPA can levy upon an individual or organization
 - Civil Administrative Actions is commonly known as the first strike which are non judicial enforcement actions taken by the EPA or state under its own authority. These normally do not involve a judicial court process, are commonly in the form of a notice of violation letter without any penalty.
 - Civil Judicial Actions are the second tier of offense and will be filed in court, against a persons or entities that have failed to:

- Comply with statutory or regulatory requirements Comply with an administrative order
- Pay the EPA the costs for clean-up work
- Criminal Actions are reserved for the most serious violations. Examples would be those that are willful or knowingly committed. Court conviction can result in fines and/or imprisonment.

Slide 4.1 – Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Intro

Slide 4.2 – Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

- The Federal Insecticide, Fungicide, and Rodenticide Act or better known as FIFRA, is the federal law that regulates the production, transportation, sale, use, and disposal of pesticides.
- All pesticides distributed or sold in the United States must be registered by the EPA. Congress originally enacted FIFRA in 1947 to replace the Insecticide Act of 1910 and was amended significantly in 1972, 1978, 1988, and 1996.
- As time passed the EPA realized that pesticide manufacturing, labeling and use must be strictly analyzed and enforced.
- In 1947 the FIFRA act required pesticide manufacturers to register their products with the United States Department of Agriculture (USDA).
- In 1972 an amendment was made that transferred the management from the USDA to the EPA.
- The changes provided direct control over pesticide use, restricted the use of select pesticides, registration of pesticide manufacturing plants, pesticide monitoring programs, and categorized pesticides as “Restricted or General Use.”
- In 1978 another amendment was made that provided states to have primary enforcement responsibilities for the Act.
- This also required the EPA to work with the USDA to conduct research into Integrated Pest Management.
- In 1988 another amendment passed to require the EPA to intensify the degree of testing in its pesticide program to include: Chronic exposure; which are long term effects of handling pesticides.
- Prenatal effects include any effects found in the uterus that may affect impregnation or effects of someone that is pregnant. Neonatal effects- to include after birth effects by handling or using pesticides
- The 1988 amendment also accelerated the pesticide registration process to ensure that must needed pesticides were registered and available for use.
- DoD Instruction 4150.07, DoD Pest Management Program is based off of this amendment and provides an outline to what rules and regulations we must adhere to as Pest Managers.
- Lastly, the FIFRA was amended again in 1996 with a focus on food quality protection.
- The Food Quality Protection Act of 1996 Amendment
- of 1996 required that the EPA ensure that any pesticide approved for use on food would leave only a
- “safe” residue.

- A safe residue is the determined amount of residue that is found in a food that is deemed safe to consume. Many farmers use pesticides to protect their crops from pests and diseases so there must be a way to measure the after effects of applying these pesticides on consumables.
- The Food Quality Protection Act of 1996 also required the EPA to consider children's exposure to pesticides and susceptibility to health effects and to include all hazards on the pesticide labeling.

Slide 5.1 – Resource Conservation and Recovery Act (RCRA) Intro

Slide 5.2 – Resource Conservation and Recovery Act (RCRA) Video

- Video Closed Captions

The Resource Conservation and Recovery Act (RCRA), enacted in 1976, gives the EPA the authority to control hazardous waste from “cradle-to-grave.” This includes the generation, transportation, treatment and storage and disposal of hazardous waste. RCRA is a public law that mandates the proper management of hazardous and non-hazardous solid waste. The program is intended to address highly toxic waste, wastes from increasingly efficient air and water pollution devices, population growth that places larger demands on our natural resources and long-term stewardship of facilities that closed with waste in place. Within the Pest Management world, you will hear the phrase “Cradle to grave” a lot because of its importance. As pest managers, we must be cautious at each step of how we are purchasing, storing, handling and disposing of hazardous waste. RCRA's future and importance in continuing to fulfill its mission is carried out by: continuing to safeguard communities and the environment, mitigating and cleaning up contamination, championing sustainable, lifecycle waste and material management approaches and promoting economic development and community well-being.

Slide 5.3 – Takeaways

- The Resource Conservation and Recovery Act (RCRA), enacted in 1976, gives the EPA the authority to control hazardous waste from “cradle-to-grave.” This includes the generation, transportation, treatment and storage and disposal of hazardous waste.
- RCRA is a public law that mandates the proper management of hazardous and non-hazardous solid waste.
- The program is intended to address highly toxic waste, wastes from increasingly efficient air and water pollution devices, population growth that places larger demands on our natural resources and long term stewardship of facilities that closed with waste in place.
- Within the Pest Management world you will hear the phrase “Cradle to grave” a lot because of its importance.
- As Pest Managers we must be cautious at each step of how we are purchasing, storing, handling and disposing of hazardous waste. RCRA's future and importance in continuing to fulfill its mission is carried out by: continuing to safeguard communities and the environment, mitigating and cleaning up contamination, championing sustainable, lifecycle waste and material management approaches and promoting economic development and community well-being.

Slide 6.1 – Threatened and Endangered Species Act (ESA) Intro

Slide 6.2 – Threatened and Endangered Species Act (ESA) of 1973

- When Congress passed the Endangered Species Act (ESA) in 1973, it recognized that our rich natural heritage is of "esthetic, ecological, educational, recreational, and scientific value to our Nation and its people."
- It further expressed concern that many of our nation's native plants and animals were in danger of becoming extinct.
- The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the U.S. Fish and Wildlife Service (Service) and the Commerce Department's National Marine Fisheries Service (NMFS).
- The Service has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and fish such as salmon.
- Under the ESA, species may be listed as either endangered or threatened.
- "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened.
- For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments.

Slide 7.1 – Occupational Safety and Health Administration (OSHA) Intro

Slide 7.2 – Occupational Safety and Health Administration (OSHA) Video

- Video Closed Captions

The Occupational Safety and Health Administration or OSHA, was established under the Occupational Safety and Health Act of 1970. Congress created the Occupational Safety and Health Administration to ensure safe and healthful working conditions for workers by setting and enforcing standards and by providing training, outreach, education and assistance. OSHA is part of the United States Department of Labor. The administrator for OSHA is the Assistant Secretary of Labor for Occupational Safety and Health. OSHA's administrator answers to the Secretary of Labor, who is a member of the cabinet of the President of the United States. OSHA is commonly known as the enforcer of worker and workplace safety requirements. Responsibilities include the inspection of work areas and issues citations and penalties for non-compliance. The 29 Code of Federal Regulation, Labor is the framework for OSHA. OSHA regulations require that all chemical manufacturers and importers develop container labels and Safety Data Sheets (SDS) to downstream users of the chemicals. Employees exposed to hazardous chemicals in the workplace must receive Hazard Communication or HAZCOM training under the Hazardous Communication Standard (HCS).

Slide 7.3 – Takeaways

- Congress created OSHA to ensure safe and healthful working conditions for workers by setting and enforcing standards and by providing training, outreach, education and assistance
- OSHA is part of the United States Department of Labor
 - OSHA is commonly known as the enforcer of worker and workplace safety requirements

- Responsibilities include the inspection of work areas and issues citations and penalties for non-compliance
- Click next to learn more about each CFR and how it's related to Pest Management.

Slide 7.4 – Occupational Safety and Health Administration (OSHA)

- 29 CFR 1910.132
 - PERSONAL PROTECTIVE EQUIPMENT - Identifies general requirements for personal protective equipment for eyes, face, head and extremities, protective clothing, respiratory devices, and protective shields.
- 29 CFR 1910.133
 - EYE AND FACE PROTECTION - Identifies that each employee uses appropriate eye or face protection when exposed to eye or face hazards (i.e. flying particles, liquid chemicals acids or caustic liquids, chemical gases or vapors)
- 29 CFR 1910.134
 - RESPIRATORY PROTECTION - Identifies the control of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, also identifies definitions of important terminology.
- 29 CFR 1910.135
 - HEAD PROTECTION - Identifies that each employee wear a protective helmet when working in areas where there is a potential for injury to the head from falling objects.
- 29 CFR 1910.136
 - FOOT PROTECTION - Identifies use of protective footwear in areas where injuries occur due to falling or rolling objects or objects piercing the sole.
- 29 CFR 1910.151
 - MEDICAL SERVICES AND FIRST AID - Personnel should be adequately trained to render first aid.
- 29 CFR 1910.1200
 - HAZARD COMMUNICATION - Identifies the hazards of all chemicals produced or imported are classified and that information concerning the classified hazards is transmitted to employers and employees.

Slide 8.1 – National Institute for Occupational Safety and Health (NIOSH) Intro

Slide 8.2 – National Institute for Occupational Safety and Health (NIOSH)

- The Occupational Safety and Health Act of 1970 established the National Institute for Occupational Safety and Health (NIOSH) as a research agency focused on the study of worker safety and health, and empowering employers and workers to create safe and healthy workplaces.
- NIOSH is part of the US Centers for Disease Control and Prevention, in the US Department of Health and Human Services.
- It has the mandate to assure “every man and woman in the Nation safe and healthful working conditions and to preserve our human resources.”

- NIOSH has more than 1,300 employees from a diverse set of fields including epidemiology, medicine, nursing, industrial hygiene, safety, psychology, chemistry, statistics, economics, and many branches of engineering.
- NIOSH's goal is to protect workers by determining the extent and cause(s) of over-exposure to pesticides in the workplace.
- They then use this knowledge to prevent these exposures from happening.
- NIOSH is tasked with monitoring trends in pesticide-related illnesses and injuries through the SENSOR-Pesticides program; SENSOR stands for the Sentinel Event Notification System for Occupational Risk pesticide program.
- NIOSH also uses data from the National Poison Data System (NPDS) to track work-related acute pesticide poisonings.
- This kind of surveillance also serves as an early warning system of any harmful effects not detected by pesticide manufacturer testing.
- Although NIOSH is generally characterized as a non-regulatory agency, guidance and recommendations issued by NIOSH are often used by other agencies responsible for developing and enforcing workplace safety and health regulations.
- An example of how NIOSH applies to a pest manager is that they are the ones conducting tests and approves the use of respirators, protective clothing, and eye protection devices.

Slide 9.1 – Air Force Occupational Safety and Health (AFOSH) Program Intro

Slide 9.2 – Air Force Occupational Safety and Health Program (AFOSH)

- Overview
 - The Occupational Safety and Health Act of 1970, Executive Order 12196 and 29 CFR 1960 require the heads of Federal Agencies to establish programs to protect their personnel from work-related deaths, injuries and illnesses.
 - The Air Force Occupational Safety and Health (AFOSH) program is explained in DAFI 91-202, The USAF Mishap Prevention Program.
- Responsibilities
 - Comply with OSHA and AF guidance
 - Set up procedures for submitting and responding to reports of unsafe and unhealthful working conditions
 - Acquire, maintain, and require the use of approved protective equipment and safety equipment
 - Inspect all workplaces at least annually with participation by civilian employee representatives
 - Establish procedures to ensure personnel are not subject to restraint, interference, coercion, discrimination or reprisal for exercising their rights under the AFOSH program
 - Post notices of unsafe or unhealthful working conditions found during inspections
 - Ensure prompt abatement of hazardous conditions
 - Personnel exposed to such conditions shall be informed of the abatement plan
 - Mitigate or abate imminent danger situations immediately

- Maintain the AF Safety Automated System (AFSAS); the official system for recording occupational mishaps, injuries, illnesses and their causes
- Conduct occupational safety, health and fire prevention training for all AF personnel

Slide 10.1 – Air Force Public Health Intro

Slide 10.2 – Air Force Public Health

- Overview
 - Whether they're active in the field or performing duties on base, the safety of our Airmen is a top priority. It's the job of the Public Health office to protect our forces from a vast array of illness and disease by minimizing health risks within our community.
 - They are responsible for everything from educating Airmen on safety procedures and food inspection to investigating hazardous materials and sanitary standards.
 - The efforts provided by the Public health office are in place to protect the public's health and well being. Pest Managers will work hand-in-hand with Public health to safely manage all public health pests.
 - The relationship and communication between Pest Managers and the local public health office is imperative to a successful pest management program.
- Roles
 - Air Force Public Health roles include:
 - Determining the type, source, and prevalence of vectors which affect the health and efficiency of personnel
 - Educating home station and deploying personnel on threats of vector-borne diseases, emphasizing the importance of prevention
 - Scheduling and providing occupational physical exams, including baseline exams, for personnel who apply pesticides
 - Air Force Public Health roles include (continued):
 - Assisting in contingency site selection to minimize vector-borne disease potential in order to promote the management and control of vector-borne diseases
 - Developing a vector surveillance plan, if indicated by the installation and local health department data, to periodically evaluate health threat and efficiency of controls
 - Assisting base agencies to meet customs inspection program requirements when requested
- Coordination
 - Air Force Public Health roles include (continued):
 - Assisting in contingency site selection to minimize vector-borne disease potential in order to promote the management and control of vector-borne diseases
 - Developing a vector surveillance plan, if indicated by the installation and local health department data, to periodically evaluate health threat and efficiency of controls

- Assisting base agencies to meet customs inspection program requirements when requested

Slide 11.1 – Air Force Bioenvironmental Engineering Intro

Slide 11.2 – Air Force Environmental Engineering

- Overview
 - Life in the Air Force takes our Airmen to a variety of facilities and environments all over the world. It's the job of the Bioenvironmental Engineering office to focus on reducing health hazards in the workplace and the surrounding areas.
 - A job complicated by the proximity to everything from munitions to radioactive materials, these experts utilize their skills to ensure healthful working conditions and that the environment is not adversely affected by Air Force activities.
 - Within the Pest Manager's daily activities it is imperative to have Bioenvironmental Engineering on your side to help ensure safe work conditions.
 - Department of the Air Force Instruction (DAFI) 48-145, Occupational and Environmental Health Program outlines Bioenvironmental Engineering responsibilities. Their mission is to protect the health and welfare of workforce and community environments through upholding OSHA standards.
 - Key responsibilities include to identify, assess, and eliminate or control occupational and environmental health hazards workers are exposed to on a day-to-day basis.
- Coordination
 - Key examples of how this relates to Pest Managers are as followed:
 - They provide technical information to Civil Engineering on the safe storage and use of pesticides
 - Monitor the potential occupational health and environmental impact of pesticide application, including aerial spraying
 - Evaluate potential occupational exposures and the adequacy of exposure control through periodic shop visits
 - Evaluates shop processes, activities, and recommends the appropriate personal protective equipment for pest management personnel
 - Conduct respirator training and respirator fit testing of pest management personnel
 - Ensure medical treatment facility personnel are briefed/trained neither to store nor use EPA-classified pesticides, with the exception of disinfectants and germicides; insect repellents and permethrin-treated clothing for protecting deployed personnel against insect vectors

Slide 12.1 – United States Department of Agriculture (USDA) Intro

Slide 12.2 – United States Department of Agriculture (USDA)

- The United States Department of Agriculture (USDA) mission is to protect the health and value of American agriculture and natural resources.
- The USDA through its Animal and Plant Health Inspection Service, or APHIS, protects and promotes US agricultural health, regulating genetically engineered organisms,

administering the Animal Welfare Act and carrying out wildlife damage management activities

- APHIS works to protect America's animal and plant resources from agricultural pests and diseases. An example would be, if quarantined pests were left unchecked they would result in several billions of dollars in production and marketing losses annually.
- In the event that a pest or disease of concern is detected, APHIS implements emergency protocols and partners with affected states to quickly manage or eradicate the outbreak. This aggressive approach has enabled APHIS to successfully prevent and respond to potential pest and disease threats to US agriculture
- USDA/APHIS is responsible for inspections of aircraft and vehicles re-entering the United States.
- Pest Managers may aid the USDA and work alongside US Customs inspectors and load masters to ensure cargo is pest-free, and provide control procedures on aircraft if needed.
- We will go into further detail of aircraft disinfection in another lesson. Under the EPA, the USDA established the USDA Pesticide Data Program (PDP), which is a national pesticide residue monitoring program and produces the most comprehensive pesticide residue database in the US.
- PDP administers the sampling, testing, and reporting of pesticide residues on agricultural commodities in the U.S. food supply, with an emphasis on those commodities highly consumed by infants and children
- Not only does USDA carry out the Pesticide Data Program, they also play a major role with the Airport Wildlife Hazards Program.
- Wildlife Services (WS), a program within the US Department of Agriculture's Animal and Plant Health Inspection Service, provides Federal leadership and expertise to resolve wildlife conflicts that threaten public health and safety.
- Not only does USDA carry out the Pesticide Data Program, they also play a major role with the Airport Wildlife Hazards Program.
- Wildlife Services (WS), a program within the US Department of Agriculture's Animal and Plant Health Inspection Service, provides Federal leadership and expertise to resolve wildlife conflicts that threaten public health and safety.

Slide 13.1 – Host country, state, and local agencies/requirements Intro

Slide 13.2 – Host Country, State, and Local Agencies/Requirements

- OVERVIEW
 - Host country, state and local agencies/requirements. While deployed outside the US, you must always comply with the environmental laws in the host country.
 - In lieu of host country requirements, you may have to use a Status of Forces Agreement (SOFA), the Overseas Environmental Baseline Guidance Document (OEBGD), or host country specific Final Governing Standards (FGS).
- STATUS OF FORCES AGREEMENT (SOFA)
 - A Status of Forces Agreement is an agreement or understanding that lists the basic rights, which the stationing forces must adhere to while stationed in the host country.

- If a Status of Forces Agreement between the United States and a host nation is in place, the agreement must be followed. How this pertains to pest managers and to many other CE crafts is that if no agreement exists, host country laws will be compared with FIFRA
- The law which is more stringent will be followed. It's always best practice to follow the most stringent rules.
- The Overseas Environmental Baseline Guidance Document (OEBGD) is developed by the DoD to update established policy and assigned responsibilities for managing environmental compliance to protect human health and safety outside the US on installations under DoD control.
- APPLICATION
 - This applies to all DoD components outside the United States, but does not apply to:
 - Contingency locations and associated operations and deployments, including cases of hostilities
 - Contingency operations in hazardous areas, peacekeeping missions, or relief operations
 - Situations in which US forces operate as part of a multinational force not under full US control
 - The OEBGD is reviewed every five years and can be found at
 - <https://www.esd.whs.mil/Directives/issuances/dodm/>
 - Final Governing Standards (FGS) are a comprehensive set of country-specific substantive environmental provisions; typically technical limitations on effluent, discharges, etc, or a specific management practice.
 - FGS are developed In Accordance With (IAW) the OEBGD. The scope of the FGS for any nation is determined by the mission, facilities, and potential environmental impacts of DoD installations in that nation.
 - If no FGSs exist, you will comply with the OEBGD.
- STATE & LOCAL LAWS
 - In the United States, state governments play an important role in regulating pesticides. States work closely with the EPA and other federal agencies to enforce pesticide laws.
 - States can develop their own regulations that can be more strict than the EPA's federal pesticide regulations.
 - Local, and county governments may also issue regulations that are more stringent than state laws.
 - Pest Manager should always follow the law that is the most stringent.

Slide 14.1 – State and Host Nation Quarantine Regulation and Co-operative Procedures Intro

Slide 14.2 – State and Host Nation Quarantine Regulation and Co-operative Procedures Intro

- Overview

- Individual states and host countries have their own peculiar quarantine regulations and what may be legal in one state or host country is perhaps illegal in another.
- It is your responsibility to adhere to the regulations of your state or host country.
- These regulations are intended to prevent the introduction and dissemination of diseases of humans, plants, and animals.
- They can also prohibit taking illegal wildlife, arthropod vectors, and pests of health and agricultural importance.
- Introduction and dissemination of quarantine pests may occur by movements of vessels, aircraft, or other transport of the Armed Forces arriving at or leaving installations in and out of the US.
- Cooperation with Pest Management
 - In a combined effort, measures should be taken to prevent the movement of pests and disease vectors requiring quarantine in accordance with: DoDI 6200.03- Public Health Emergency Management within the Department of Defense, DTR 4500.9-R Part V- Passenger Movement and AFI 10-2519 Public Health Emergency and Incidents of Public Health Concern.
 - Pest Managers will work with customs inspectors and loadmasters to ensure cargo is pest-free.
 - The USDA and U.S. Customs personnel provide critical assistance on retrograde pest-prevention procedures and should be the main point of contact regarding quarantine and retrograde operations.
 - AFMAN 32-1053 states that Pest Management will disinfect aircraft using guidance in DoD Foreign Clearance Guides when directed by the aircraft commander.
 - Coordinate with local, state, and federal agencies on cooperative agreements for managing invasive and noxious species on Air Force land in accordance with AFMAN 32-7003, Environmental Conservation.
 - Docopy D Electronic Foreign Clearance Guide provides necessary information for international aircraft mission planning and execution, personnel travel to foreign countries, as well as general information on foreign locations.
 - The DoD FCG is directive in nature for all DoD and DoD-sponsored travel abroad. Travelers must ensure they comply with this guide.

Slide 15.1 – Course Completion

Congratulations, you have completed IPM program and resource management lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 1, Task 3 (4.1) Pest Management Publications

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

4.1 Pest Management Publications

Slide 1.3 – Instructions

Welcome to Pest Management Publications lesson.

Without reference, identify the relationship of basic facts and state general principles about Pest Management Publications with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Purpose
- Categories
- Types of Publications
- Publication Numbering
- How to Find Publications

Slide 2.1 – Purpose Intro

Slide 2.2 – Purpose

- Publications establish policy and guidance on how to carry out certain tasks to support mission efforts.
- Establishes Policy
 - The publications we use are guides and standards that senior Air Force leadership expect us to follow.
- Used as Guides
 - There are many different types of publications that outline anything from training, to the implementation of an effective Pest Management program
- Ensure Mission Effectiveness
 - You must always follow the appropriate publication when completing daily tasks

Slide 3.1 – Categories Intro

Slide 3.2 – Categories

- Directive

- A directive publication such as an Air Force Policy Directive (AFPD) or Air Force Instruction (AFI) are directive in nature and should be adhered to.
- Many career fields use publications such as Technical Orders, which are step by step directions on how to complete a certain task.
- Non-directive
 - Publications such as pamphlets, guides, and commercial based products are considered non directive, but they can provide insight and general guidance on a specific task or subject.
 - Within the Pest Management career field there are several technical guides that we can use as reference material and guides, but are not considered mandatory steps that we must follow

Slide 4.1 – Types of Publications Intro

Slide 4.2 – Types of Publications Part 1

- The Department of Defense and Air Force use different publications to establish guidance and policy. There is a hierarchy system in place that sets precedence on how supplemental guidance is delivered.
- An example would be the Department of Defense creating a policy on Integrated Pest Management Operations. The Air Force then creates a directive outlying how the Air Force will conduct Pest Management operations based off the guidance given within the DoD policy.
- Within each major command (MAJCOM) and each base, there could also be a more localized policy that relates to the specific operations at a given location.
- The publications discussed in this lesson provide a brief outline of some of the common publications that we will see and use within the Civil Engineer Community. More importantly, the Pest Management career field.

Slide 4.3 – Types of Publications Part 2

- AFPD
 - Air Force Policy Directives
 - These publications are issued by the Secretary of the Air Force and contain explanations of key terms, responsibilities, authority and policy interfaces. AFPD are not “how to” publications.
- AFI
 - Air Force Instructions
 - These publications are commonly used to provide guidance and policy. AFIs are mandatory publications from the Secretary of the Air Force and approved by the Secretariat or Air Staff Commands. Field Operating Agencies normally draft AFIs. AFIs provide direct actions, ensures compliance or gives detailed procedures to standard actions across the Air Force. AFIs are sometimes written vaguely to allow local leadership to direct actions without restricting the ability of the individual units to complete their missions.

Slide 4.4 – Types of Publications Part 3

- Air Force Manual (AFMAN)

- These manuals are extensions of instructions and are directive publications. AFMAN's contain more details than AFI's and provide procedural aspects of a task. Lower levels, such as major commands, and local bases may issue manuals.
- Air Force Pamphlet (AFPAM)
 - Air Force pamphlets are non-directive publications that are normally “how to” documents.
- Air Force Handbook (AFH)
 - Air Force handbooks are non-directive concise reference books on technical aspects of a particular subject or a compilation of factual data.
- Operating Instruction (OI)
 - These publications assign specific responsibilities such as direct action and prescribe certain procedures. They are normally written at the shop or unit level, defining functional or maintenance requirements for specific tasks or operations. An example would be the Pest Management shop writing an OI for mixing procedures in the shop. It will provide specific requirements for the entire task to include: personnel, safety items, procedures, and emergency response actions in the event of a spill or an emergency.

Slide 4.5 – Types of Publications Part 4

- Technical Guides
 - The next type of publication is technical guides or better known in the pest management career field, TGs. TGs are used as a basic template or reference tool when conducting certain Pest Management tasks. They provide detailed procedures or act as a guide for specific Pest Management operations. A TG should never replace a directive publication.
- Supplements
 - Supplements are additional publications that extend or add material to publications issued by higher headquarters or agencies. Supplements can add to the parent publication, but can not take away from it. Each supplement will have the same number of the publication which it supplements. Supplements derived from a directive publication will also be direct. Supplements derived from a non-directive publication will also be considered non-directive.
- Commercial Publications
 - The Air Force uses commercially produced publications, because it is cheaper to purchase a written requirement over several agencies. Commercial publications fall into two categories, regulatory and technical.
 - Regulatory Publications Provide direction to follow for processes. An example would be the National Fire Protection Agency (NFPA). The base fire department uses these codes to perform fire inspections for all base facilities
 - Technical Publications deal with the “How to” aspect of a job. They can take the place of a Technical Order and may come in the form of manuals, books, leaflets, or pamphlets.
- Technical

- If an Air Force publication is not available, AF personnel may use commercial publications for certain tasks such as Pest Management equipment manuals, pesticide supply catalogs, and commercial Pest Management industry publications.

Slide 5.1 – Publication Numbering Intro

Slide 5.2 – Publication Numbering

- The Air Force uses a numbering system to group common publications that are alike. The three most common series are Personnel, Civil Engineer, and Operations.
- 36 – Series – Personnel
 - This group covers policy on all acts of civilian and military aspects such as: Dress and Appearance, Leave, Awards and Decorations, and Evaluations.
- 32 – Series – Civil Engineer
 - These publications guide policy and procedures on all aspects of Air Force civil engineering and management of real property assets.
- 10 – Series – Operations
 - This series govern policy and procedures on Operations. They describe how bases operate day-to-day and during contingency missions.

Slide 6.1 – How to Find Publications Intro

Slide 6.2 – How to Find Publications

- How to Find Publications
 - Electronic Format
 - Visit the E-Publications website via the Air Force Portal: <https://www.e-publishing.af.mil/>
 - Pest Management specific publications can be found on the Armed Forces Pest Management Board: <https://www.acq.osd.mil/eie/afpmb/>
 - Conflicting Publications
 - When conflicts occur, the higher-level publication takes precedence over publications that were issued at a lower level. When a unit issues a publication that conflicts with one of its own, seek clarification from whoever issued the publication. Pending clarification, comply with the most current date.

- Searching for Air Force Publications

- Video Closed Captions

To search for Air Force Publications, you are going to go out to the Air Force Portal. Once you are there, you are going to hover over Library and Resources and click on Air Force ePublications. Once you are in ePublications, you are going to click on Publications and Forms. In the search bar, you will type in the publication number or key word for the item you are looking for. Once you have located the item, you will click to open and you will save that to your device as a PDF.

- Step 1: Go to Air Force Portal:
 - <https://www.my.af.mil/gcss-af/USAF/ep/globalTab.do?channelPageId=s6925EC1356510FB5E044080020E329A9>

- Step 2: Hover mouse over the Library and Resources Tab
- Step 3: Click AF ePublications
- Step 4: Click on Publications and Forms
- Step 5: In the search bar, type in the publication number or key word
- Step 6: Open and save file as PDF
- Searching for Pest Management Technical Guides
 - Technical Guides can serve as a great tool in finding information on specific pest management tasks such as surveying for disease vectors, controlling bed bugs and even going into contingency operation considerations.
 - Step 1: Go to the Armed Forces Pest Management Board Website
<https://www.acq.osd.mil/eie/afpmb/How to Find Content Within the PDF File>
 - Step 2: Click on Information Products
 - Step 3: Click "Technical Guides"
 - Step 4: Select which TG you are looking for
 - Step 5: Open and save file as PDF
- How to Find Content Within the PDF File
 - There are many ways to quickly find specific topics or subjects within a given publication
 - Use the table of contents to find key subject
 - Use the index to find specific words
 - On your keyboard push the "Ctrl" and "F" key at the same time; a search bar will pop up
 - Type the key word into search

Slide 7.1 – Course Completion

Congratulations, you have completed pest management publications lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 1, Task 4 (6.3.7) Standard Operating Procedures for Pest Management Activities

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

6.3.7 Standard Operating Procedures for Pest Management Activities

Slide 1.3 – Instructions

Welcome to the Standard Operating Procedures for Pest Management Activities lesson.

- Upon completion of this lesson, you must be able to successfully identify the relationship of basic facts and state general principles relating to Standard Operating Procedures for Pest Management Activities with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Overview of SOPs
 - Key Aspects of SOPs
 - Purpose
 - Writing Guidelines
 - Pest Management

Slide 1.4 – Standard Operating Procedures - Overview

- Standard Operating Procedures or SOPs are written instructions that document a standardized routine or repetitive activity followed by an organization. SOPs provides individuals with the information to perform a job properly and facilitates consistency in the quality and integrity of a process.

Slide 2.1 – Key Aspects Menu

- Purpose
- Writing Guidelines
- Pest Management SOPS

Slide 3.1 – Standard Operating Procedures Video

- Video Closed Captions
- SOPs detail recurring work processes that are to be conducted or followed within an organization. SOPs may describe fundamental programmatic actions and technical actions such as analytical processes, and processes for maintaining, calibrating, and using equipment. They are a way to document how activities are to be performed to

facilitate consistent conformance to technical and quality system requirements and to support data quality. SOPs need to be reviewed and re-enforced by management, preferably the direct supervisor of the Pest Management Shop. Current copies of the SOPs must be readily accessible for reference in the work areas of those individuals actually performing the activity, either in hard copy or electronic format. The Pest management career field has many different SOPs that are used and can vary from base to base depending on specific local mission requirements that must be met.

Slide 3.2 – Key Takeaways

- SOPs detail recurring work processes that are to be conducted or followed within an organization.
- SOPs may describe fundamental programmatic actions and technical actions such as analytical processes, and processes for maintaining, calibrating, and using equipment.
- SOPs need to be reviewed and re-enforced by management, preferably the direct supervisor of the Pest Management Shop.

Slide 4.1 – Writing Guidelines Video

- Video Closed Captions

SOPS are locally developed for a specific shop and operation. Normally, the individual tasked with drafting an SOP is the NCOIC or as a team effort with shop personnel that are experienced in the given task. SOPs should be reviewed annually or as needed depending on if the procedures change for a given task. It's important when reviewing that the reviewer or reviewers have the appropriate training and experience with the process to ensure the validity of the standardized process. The same thing can be said for when these are created as well. SOPs should be tested by individuals other than the original writer before the SOPs are finalized; this is to ensure the average user can understand the tasks outlined to perform. Generally, the shop supervisor, will review and approve each SOP created by any one or more individuals with appropriate training and experience for the given process. SOPs need to remain current to be useful; whenever procedures are changed, SOPs should be updated and re-approved. If desired, modify only the pertinent section of an SOP and indicate the change date/revision number for that section in the Table of Contents and the document control notation. SOPs should also be reviewed on a periodic basis, to ensure that the policies and procedures remain current and appropriate, or to determine whether the SOPs are even needed. The review date should be added to each SOP that has been reviewed. If an SOP describes a process that is no longer followed, it should be withdrawn from the current file and archived. A good rule of thumb, is to annually go through each SOP and validate them for legitimacy.

Slide 4.2 – Key Takeaways

- SOPs should be reviewed annually or as needed depending on if the procedures change for a given task.
- It's important when reviewing that the reviewer or reviewers have the appropriate training and experience with the process to ensure the validity of the standardized process
- Generally, the shop supervisor or designated approving authority with appropriate training and experience will review and approve SOPs

Slide 5.1 – Pest Management SOPs Video

- Video Closed Captions

Pest Management SOPs are intended to be specific to the organization or facility whose activities are described and assist that organization to maintain their quality control and quality assurance processes and ensure compliance with governmental regulations. Depending on where you are at in the world, may dictate the different types of SOPs you have and how you will locally complete a given task. Some examples include: the use of Pellet Rifles on the installation, Shop Chemical Mixing Procedures, Base Mosquito Fogging Procedures, and Bed Bug Treatment Procedures. Each of these tasks may be roughly the same but can vary depending on local policy and procedures.

Slide 5.2 – Key Takeaways

- Pest Management SOPs are intended to be specific to the organization or facility whose activities are described.
- Depending on where you are at in the world, it may dictate the different types of SOPs you have and how you will locally complete a given task.

Slide 6.1 – Course Completion

Congratulations, you have the standard operating procedures for pest management activities lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 1, Task 5 (6.3.6) Integrated Pest Management Plan

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

6.3.6 Integrated Pest Management Plan

Slide 1.3 – Instructions

Welcome to the Integrated Pest Management Plan Lesson.

- Upon completion of this lesson, you must be able to successfully analyze facts and principles concerning Integrated Pest Management Plan with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Overview
- Program Approval and Review
- IPM Plan Elements
- Developing and Implementing an IPM Plan

Slide 2.1 – Overview Intro

Slide 2.2 – Overview

- During this lesson, we will dive into what an integrated pest management plan is and how it relates to pest management operations, the plan approval and review process, the different parts that make up a pest management plan and then finally we will get into how to develop an integrated Pest Management plan.
- This section will cover the general information as to what an integrated pest management (IPM) Plan is and why they exist. In accordance with Department of Defense Instruction (DoDI) 4150.07, Department of Defense (DoD) Pest Management Program, the development of an installation pest management plan is the first step in establishing an installation's pest management program. DoD installations must have an IPM plan.

- The plan must list pest management program objectives according to potential or actual impact on mission and readiness. A pest management consultant (PMC) is permitted to recommend a DoD installation plan be included within the scope of another location or a larger command's IPM plan. A PMC reviews plans for technical sufficiency before plan approval by the responsible commander. IPMCs oversee compliance with the plan
- The plan becomes the basic design document for pest management operations and lists all major objectives arranged in priority according to potential or actual impact on: health, morale, structures, material, property and specific requirements such as: staffing, training, equipment and material needs.
- The installation pest management plan is the key document that ties together all of the installations plan's, programs, and tactics, techniques, and procedures to execute an effective pest management program.
- DoD installations must have an IPM plan that lists the program's objectives according to potential or actual impact on mission and readiness. Once an installation pest management plan is developed the Pest Manager will use this as a guide to carry out daily operations.

Slide 3.1 – Program Approval and Review Intro

Slide 3.2 – Program Approval and Review Menu

- Installation Natural Resources Manager
- Installation Environmental Coordinator
- Public Health Officer
- Bio-Environmental Engineer
- Base Civil Engineer (BCE)
- Mission Support Group Commander
- Installation Commander

Slide 3.3 – Installation Natural Resources Manager

- To ensure all local laws and any endangered species are identified and implemented into the plan.

Slide 3.4 – Mission Support Group Commander

- Will review and approve all interagency coordination and processes.

Slide 3.5 – Installation Environmental Coordinator

- To ensure local laws and pesticides used are identified and to provide proactive measures to avoid any environmental degradation from the use and implementation of the pest management plan.

Slide 3.6 – Public Health Officer

- Will review coordination and processes relating to the pest management shop and base public health office to survey and control vectors and medical pests.

Slide 3.7 – Bioenvironmental Engineer

- Reviews and approves safe pesticide use and storage.

Slide 3.8 – Base Civil engineer (BCE)

- The installation base civil engineer (BCE) is responsible for planning and executing vector and medical pest control using IPM techniques.

Slide 3.9 – Installation Commander

Will review and approve all interagency coordination and processes.

Slide 4.1 – IPM Plan Elements Intro

Slide 4.2 – IPM Plan Elements Menu

- Cover and Title Page
- Executive Summary
- Responsibilities and Contact Information
- Sensitive Areas
- Health and Safety
- Environmental Considerations
- Program Administration
- IPM References and Links
- Annexes

Slide 4.3 – Cover and Title Page

- IPMC - Installation Pest Management Coordinator; normally the NCOIC of the pest management shop or the civilian foreman.
- INSTALLATION ENVIRONMENTAL COORDINATOR OR ENGINEER - Most senior Environmental Manager within the civil engineer squadron
- PUBLIC HEALTH OFFICER - The Public Health office commander, normally a Captain or Major that oversees the installation public health program.
- PMC - Your MAJCOM Pest Management Consultant. They work on behalf on the Air Force Civil Engineer Center and are there to help with questions, concerns, and help enforce integrated pest management programs across the globe. Your PMCs also have the right to provide a waiver and allow the use of pesticides that are not found on the DoD's Approved Pesticide listing.
- NATURAL RESOURCES MANAGER- Most senior natural resource officer in the civil engineer squadron. Sometimes there are rare occurrences that happen regarding fish and wildlife. You may need to contact them in order to determine the best control and mitigation practices for a given pest.
- INSTALLATION CONTRACTING OFFICER - In many cases the review and signature of the base contracting office is required based on the amount and scope of work that falls under the pest management category but is contracted out to an agency that does not fall under the federal government.
- COMMANDER OR COMMANDER'S REPRESENTATIVE - The Commander or BCE is responsible for implementing and supporting an integrated pest management plan to support base operations and to sustain base infrastructure. By endorsing the IPMP it empowers the pest management craft to carry out the operating procedures within the approved pest management plan.

Slide 4.4 – Executive Summary

- A quick overview of the installation mission, general information about the pest management program, and provides information on specific focus areas incorporated

into the pest program. This could be related to mission priorities or local geographical considerations. Anything that is unique and plays a major role in the pest management plan should be introduced here.

Slide 4.5 – Responsibilities and Contact Information

- Within this section, the pest plan will describe the different key players and roles that each person or persons will have within the plan. Just like with many other Air Force instructions or publications it gives a brief description on what key roles and responsibilities each person is required to carry out or fulfill.
- Contact information within this area is very important and must be up to date at all times. This is where a young Airmen can go within the plan and find contact information for a given party and be able to contact them with any questions or concerns they may come across.

Slide 4.6 – Sensitive Areas

- Within this area of the pest management plan the goal is to identify any area or areas that should be considered a sensitive area. Areas such as schools, day care centers, hospitals, and food service facilities would be considered sensitive areas.
- When controlling any pests in such areas we must take a special precaution and understand how and where we deploy those control measures. There are many restrictions and precautions when applying pesticides to child care areas, hospitals and food handling establishments. We will cover this area in much detail in a future lesson on pesticide labeling.

Slide 4.7 – Health and Safety

- This section of the pest management plan is extremely important and can sometimes be the longest and most in depth portion of the integrated pest management plan. Within this section the goal is to capture all safety and health related information that is incorporated into the installation pest management plan.
- This should include medical surveillance of pest management personnel and the process public health has in place to ensure worker safety. Normally an annual physical is required to get a general baseline of health and then checked on every year to ensure no health concerns are developed.

Slide 4.8 – Environmental Considerations

- This section should touch on sensitive areas, threatened and endangered species and reference the base integrated cultural resource management plan and integrated natural resources management plan. The integrated cultural resource management plan, the natural resources management plan and the integrated pest management must all be in sync.
- Other areas of consideration should include: hazard communication, personal protective equipment, fire protection services, pest management vehicles, protection of the public, pesticides shop health, safety and hazard surveys (including air sampling and ventilation systems), and pesticide spills. Many of these areas are considered core training requirements and will be covered in more depth throughout your career development courses (CDCs).

Slide 4.9 – Program Administration

- Within the administration portion it is best to capture all of the behind the scenes and scope of work that people do not normally think of. In this portion you want to highlight and identify all of the daily administrative work such as managing work tasks, contracts, resources, reporting and record keeping, training programs, and coordination between multiple agencies whether it be inter-service or other DoD, federal, state or local agencies to support base wide pest management efforts.
- Further detail will be provided later in this lesson when developing this portion of the plan.

Slide 4.10 – IPM References and Links

- This section allows the author to list any references cited within the plan. Any governing DoDIs, AFIs or any other regulatory publications should be used and reference to show why and how we do certain things regarding pest management operations.
- When providing references it is best practice to guide the reader exactly to where they can find the information. An example would be identifying the AFI number, paragraph number or table along with a page number of the document. Hyperlinks to common references are also a great tool that can take the reader right to the information with a click of a button.

Slide 4.11 – Annexes

The Federal Insecticide,

Slide 5.1 – Developing and Implementing An IPM Plan

Slide 5.2 – Developing and Implementing An IPM Plan

- [illegible]

- When developing a pest plan, follow the guidance outlined in DoDI 4150.07 Volume 1, DoD Pest Management Program Elements and Implementation: Structure and Operation.
- When developing a pest plan, follow the guidance outlined in DoDI 4150.07 Volume 1, DoD Pest Management Program Elements and Implementation: Structure and Operation.
- When developing a pest plan, follow the guidance outlined in DoDI 4150.07 Volume 1, DoD Pest Management Program Elements and Implementation: Structure and Operation.

Slide 6.1 – Course Completion

Congratulations, you have completed the integrated pest management plan lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 2, Task 1 (9.1, 9.2, 9.3, 9.4) Pesticides in the Environment

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

9.1, 9.2, 9.3, 9.4 Pesticides in the Environment

Slide 1.3 – Instructions

Welcome to the lesson on Pesticides in the Environment.

- Upon completion, and without reference, you must be able to identify the relationship of basic facts and state general principles about pesticides in the environment with at least a 75% accuracy.

Overview

In this section, we will cover the following topics:

- Overview of Pesticides in the Environment
- Pesticide Classifications
- Pesticide Characteristics
- Pesticide Formulations
- Environmental Impacts

Slide 2.1 – Overview of Pesticides in the Environment Intro

Slide 2.2 – Pesticides in the Environment Menu

- The Environment
- Pesticide Characteristics
- Pesticide Movement
- Benefits of Pesticides
- Harmful Effects on Non -Target Plants & Animals

Slide 3.1 – The Environment

- The environment is everything that is around us, including not only the natural elements but also people and the man-made components of our world.
- The environment is not limited to the outside, it also includes the indoor areas in which we live and work.

- It includes the air, soil, water, plants, animals, houses, restaurants, office buildings, factories and all that they contain.
- Anyone who uses pesticides must consider how the pesticide will effect the environment.
- Users of pesticides must ask themselves:
 - Where will the pesticide go after it leaves the container or application equipment?
 - What are the dangers that the pesticide will move out of the use site and cause harm to other parts of the environment?
 - What can I do to minimize harmful effects?

Slide 4.1 – Pesticide Characteristics

- Key Characteristics
 - To understand how pesticides move in the environment you must first understand certain physical and chemical characteristics of pesticides and how they determine a pesticide's interaction with the environment.
 - The key characteristics of pesticides to consider are solubility, adsorption, persistence and volatility.
- Solubility
 - Solubility is the measure of a pesticide to dissolve in a solvent, usually being water.
 - Pesticides that are considered highly soluble dissolve easily, which makes them easier to move with water in surface runoff or through the soil.
- Absorption
 - Absorption is the process where pesticides can bind to soil particles due to the attraction between the two contents.
 - Oil-soluble pesticides are more attracted than water-soluble pesticides to clay particle and organic matter.
 - A pesticide that has a low absorption rate will more likely move away from the application site.
- Persistence
 - Persistence is the ability of a pesticide to remain present and active in its original form for an extended period of time before breaking down.
 - A chemical's persistence is described in terms of its "half-life": a comparative measure of the time needed for the chemical to break down (degrade).
 - The longer the half-life of a chemical the more persistent the pesticide is.
 - The remains of the pesticide is consider a residue therefore it is very important to prevent persistent pesticides from moving from the target area to a non-target are.
- Volatility
 - Volatility is the tendency of a pesticide to turn into a gas or vapor.
 - The chance of volatilization increases as temperatures and wind increase.
 - Volatility is more likely under conditionst of low humidity because evaporation increases in drier conditions.

Slide 5.1 – Pesticide Movement

- Movement in Air
 - Pesticide movement away from the application site by wind or ventilation systems air currents is called "Drift".
 - Drift from the target site may injure wildlife, pets, livestock, sensitive plants, and people.
 - Drift of herbicides can damage sensitive nearby plants, including crops.
 - Drift also can kill beneficial parasites and predators that are near the target site.
 - Pesticide vapors move about easily in air.
 - Lightweight particles, such as dusts and wettable powders, are easily carried by moving air.
 - Granules and pellets are much heavier and tend to settle out of the air quickly.
- Movement in Water
 - TWO IMPACTS:
 - Runoff and Leaching.
 - Runoff results from water carrying the pesticide off-target.
 - Pesticide runoff most likely will reach streams, ponds, and lakes and cause harmful effects to fish and other aquatic life
 - Leaching occurs when pesticide travels through soil to non-target areas or organisms.
 - Pesticides can contaminate underground water aquifers and may lead to local residents water wells used for drinking.
 - Both can occur when too much pesticides are applied or spilled onto a surface.
 - Too much rainwater or irrigation water moves pesticides through the soil off-site or into ground water.
 - The stronger the soil content the less likely it will be able to leach through the soil example: clay soil with high organic material.
- Movement in Objects, Plants or Animals
 - Pesticide residue may stick to shoes or clothing, to animals fur, or to blowing dust and be transferred to other surfaces.
 - Pesticides may stick to treated surfaces, such as food or feed products that are to be sold.
 - Illegal pesticide residues usually result when:
 - Pesticides move out of the release site and contaminate plants or animals nearby.
 - Too much pesticide is applied to the crop or animal.

Slide 6.1 – Benefits of Pesticides

- Pesticides are chemicals used to destroy pests, control their activity, or prevent them from causing damage.
- Some pesticides either attract or repel pests.
- Chemicals that regulate plant growth or remove foliage are also classified as pesticides.
- Pesticides are generally the fastest way to control pests.
- In many instances they are the only tactic available.

Slide 7.1 – Harmful Effects on Non-Target Plants and Animals

- **Pesticide Effects**
 - Pesticides may harm non-target organisms that are present during a pesticide application, such as bees.
 - Pesticides applied over large areas, such as in mosquito and forest pest control, must be chosen with great care to avoid poisoning non-target plants and animals in or near the target site.
 - Persistent pesticides leave residues that stay in the environment without breaking down for long periods of time.
- **Bioaccumulation**
 - The ability of a pest or organism to accumulate or store pesticides in their fat tissues that can lead to injury or death.
 - Bioaccumulation occurs when pesticides are taken up by plants or animals from direct exposure or eating pesticide contaminated food.
 - Pesticide drift and runoff pose a high risk for environmental contamination.
- **Biomagnification**
 - The process whereby some organisms accumulate pesticide residues in higher concentrations than those found in the organisms they consume.
 - Pesticide levels in plants or animals increase from transfer through the food chain (predation).
 - Predators at the top of the food chain have higher concentrations of pesticides in their bodies than their prey. This continued buildup of pesticides from prey to predators is called biomagnification.
- **Natural Resources Conservation Program**
 - DoD Directive 4700.4 requires all DoD bases to establish the program.
 - Natural resources include: soil, water, plants, animals, products occurring on grassland, rangeland, cropland, forests, and aquatic systems.
 - Natural Resources Management Programs include:
 - Land Management
 - Forest Management
 - Fish and Wildlife Management
 - Outdoor Recreation
 - The Natural Resources Management Plan is designed to conserve and protect all natural resources specified in the program.
- **Pest Management Role**
 - Pest Management's role for the program is not to damage natural resources such as: beneficial plants and animals, contaminate water through drift, runoff, or leaching of pesticides.
 - Pesticides are used to control disease vectors, noxious weeds, vertebrates, and other pests. If not done correctly, pesticides will harm the environment and natural resources.
 - Follow pesticide label directions to protect our natural resources and sensitive sites.

- Sensitive Sites & Times
 - SENSITIVE SITES
 - Schools, playgrounds, and recreational areas where children frequent
 - Hospital wards and patient care areas
 - Food storage and preparation areas
 - Pets and domestic animal sites such as aquariums or pet bedding
 - Desirable plants and agricultural crops
 - Bodies of water
 - SENSITIVE TIMES
 - When the wind exceeds 5 miles per hour (MPH)
 - When it may downpour later that day
 - When the operator has a record of poor performance
 - When personnel are not trained sufficiently

Slide 8.1 – Pesticides Classifications

Slide 8.2 – Pesticide Classification Menu

- Pesticide Classification
- Types of Pests to be Managed
- Stage of Pests to be Controlled
- Mode of Action
- Chemical Class
- Natural Organic Compounds
- Types of Herbicides
- Fumigants
- Rodenticides

Slide 8.3 – Pesticide Classification

- Methods of Classifying Pesticides:
 - The "type of pest"
 - The "stage of the pest"
 - The "mode of action"
 - The "chemical class"

Slide 8.4 – Types of Pests to be Managed

- The first step in classifying a pesticide is to determine what pest it controls.
- A pesticide is a chemical designated to kill pests.
- Most pesticides begin with the pest type and ends with "cide" which means "kill."
- Insecticide - A pesticide designed primarily to kill insects and non-insect arthropods such as mites, ticks, and spiders
- Herbicide - A pesticide used for killing or interrupting the normal growth of plants
- Rodenticide - A variety of compounds used mostly as poisons in food baits or in water solutions to control rats and mice
- Fungicide - A pesticide designed to control fungus

Slide 8.5 – Stage of Pests To Be Controlled

- The second step in classifying a pesticide involves the pest stage to be controlled.

- The stages are the developmental process of certain insects and include the egg, larva, pupa, and adult stage.
- If the insecticide is to be used for controlling the larval stage, the insecticide would be further classified as a larvicide.
- If the insecticide controls adults, it would be further classified as an adulticide.
- Herbicides can be classified as being pre-emergent or post-emergent as it pertains to the growth stages of plants.
- Pre-emergent herbicides are those designed to prevent the germination of seeds by inhibiting a key enzyme.
- Post-emergent herbicides are designed to kill after the plant has broken the ground surface.

Slide 8.6 – Mode of Action

- The next step in classifying pesticides is by the method in which it kills.
- Stomach Poisons
 - These pesticides are designed to kill pests when taken into the digestive system.
 - They are applied directly to the natural food of pests, mixed into bait material, or sprinkled over runways.
 - These poisons are effective against pests that chew, suck, and have protective shields.
 - Stomach poisons are very toxic to humans and other vertebrate animals.
- Contact Poisons
 - These pesticides are designed to kill pests through absorption.
 - They are applied directly to the pests or to surfaces the pests will crawl over.
 - Contact poisons are used more than any other type of pesticide.
- Respiratory Poisons
 - Must be inhaled by the pest
 - Normally highly toxic, and very dangerous

Slide 8.7 – Natural Organic Compounds

- BOTANICALS
 - This group of pesticides is derived from plants.
 - Pyrethrum is the term used for insecticides which are extracted from the chrysanthemum plant (painted daisy). They are used successfully in aerosol space sprays against fleas, mosquitoes, and other flying insects.
- NICOTINE
 - A product found in tobacco plants that has been used against soft-bodies, sucking insects such as aphids and scales.
 - It is highly toxic to insects and its volatility makes it an excellent contact insecticide.
- PETROLEUM AND COAL TAR NATURAL ORGANICS
 - This group of pesticides is derived from fossil fuels such as kerosene, summer oils, and dormant oils.

Slide 8.8 – Chemical Class

- PESTICIDE CHARACTERISTICS

- DoD Pest Managers have a variety of pesticides available to them. Many are toxic to people and animals and can damage the environment if not used properly.
- The ideal pesticide has the following characteristics:
 - Low toxicity to non-target organisms
 - Low cost
 - Readily available
 - A stable shelf life
 - Non-flammable
 - Easy preparation
 - Non-staining
 - Non-corrosive
 - Low odor
 - Rapid breakdown to nontoxic by-products
- No insecticide has all these characteristics, but all military insecticide stocks are reviewed and selected with the goal of having as many of these traits as possible.
- INORGANIC
 - These are made from naturally occurring minerals.
 - Boric acid is the only inorganic insecticide available through the military supply system. It's used for the control of cockroaches in buildings
 - Synthetic organic insecticides - are man-made insecticides.
 - They have replaced the inorganic insecticides as the major chemical group used against arthropods.
- CHLORINATED HYDROCARBONS
 - These are central nervous system poisons and were used against a wide range of insect pest.
 - Persistence in the environment and insect resistance has led to a decrease in their use.
 - The EPA monitors and strictly limits the use of any chlorinated hydrocarbon in use today and are not used in the military.
- ORGANOPHOSPHATES
 - These insecticides replaced chlorinated hydrocarbons in pest control programs.
 - They are less persistent in the environment. It contains phosphorous and kills by inhibiting certain enzymes necessary for proper nerve function in arthropods (and people).
 - They are generally more acutely toxic to handlers.
 - Insects may develop a resistance to these pesticides.
 - Malathion is an insecticide that belongs to this group.
- CARBAMA
 - Carbamates act by inhibiting enzymes for proper nerve function.
 - Carbamates have selective toxicity. Example: they have no effect on houseflies but are very toxic to honeybees.
 - Many provide rapid knockdown of insect pests.
- PYRETHROIDS

- Pyrethroids are synthetic but similar to natural pyrethrins.
- It acts on the central nervous system of the arthropod and produces a more complete kill than natural pyrethrum products.
- Used as a flushing agent in food processing plants, food handling establishments, and aircraft disinsection.
- GROWTH REGULATORS
 - Insect growth regulators (IGR) cause pest to improperly develop or could stop the reproduction process completely.
 - Designed to disrupt insect growth cycles at critical developmental stages.
 - Essentially nontoxic and affects only targeted pest.
 - Leaves no residue to cause staining and odor problems.

Slide 8.9 – Types of Herbicides

- Selective Herbicides
 - Selective herbicides kills some plants while having little effect on others.
 - It eliminates weeds without damaging desirable plants in the same location.
 - An example of a selective herbicide is 2, 4-D, which is used to control broadleaf weeds, but leaves grasses unaffected.
- Non-Selective Herbicides
 - Non-selective herbicides kills vegetation without regard to species.
 - Examples of non-selective herbicides are paraquat and Bromacil.
- Modes of Herbicidal Action
 - There are three modes of action by which herbicides affect vegetation.
 - In order to properly use herbicides, pest managers need to know the plant to be controlled and the mode of herbicide action needed to get the desired results.
 - Contact
 - The herbicide kills only the plant tissue it actually contacts.
 - Normally applied in a liquid form
 - Effective control depends on whether a plant's growing points are protected from or exposed to the spray
 - EXAMPLE: Perennial weeds with underground buds are not completely killed by a contact spray that reaches only top growth
 - Translocated
 - These herbicides are absorbed by the leaves, stems or roots, and move through the vascular system to leaves, buds and root tips.
 - They are effective against perennial weeds with deep roots since the herbicide reaches all parts of the plant.
 - Soil Sterilants
 - Makes treated soil incapable of supporting higher plant life.
 - Toxic effects may remain for only a short time or for years

Slide 8.10 – Fumigants

- FUMIGANTS
 - Fumigating food products in storage is a fast, direct, and effective way to eliminate all life stages of pests.

- Fumigants are the most dangerous pesticides used in military pest operations.
- They have no residual effects and come in several forms.
- COMPRESSED GAS
 - In this form, the fumigant is compressed under pressure into liquid form.
 - The liquid reverts to a gas at normal atmospheric pressure.
 - Made available in cans and large metal cylinders.
 - Methyl bromide and sulfuryl fluoride are examples of compressed gases.
- TABLETS
 - Tablets are one of three forms aluminum phosphide is sold in.
 - It is the most common form used in stack fumigation of processed foods.
 - When tablets are exposed to moisture in the air, the conversion to gas begins.
 - Packaged in re-sealable aluminum cans.
- PELLETS
 - Pellets are another form of aluminum phosphide.
 - Packaged in re-sealable cans.
 - Pellets are more commonly used in large scale operations where larger quantities may be needed.
- POWDER OR DUST
 - Aluminum phosphide can also be procured in powder or dust form.
 - The powder is contained in premeasured air-permeable bags so the powder reacts with moisture to produce hydrogen phosphide.

Slide 8.11 – Rodenticides

- MULTIPLE DOSE RODENTICIDES
 - Fumigating food products in storage is a fast, direct, and effective way to eliminate all life stages of pests.
 - Fumigants are the most dangerous pesticides used in military pest operations.
 - They have no residual effects and come in several forms.
- SINGLE DOSE RODENTICIDES
 - Single dose rodenticides come in two forms - baits and gases.
 - Both forms are highly toxic to all warm-blooded animals and must be handled with care.
 - Bait material may be chunks of solid fruits or vegetables coated with a rodenticide or mixed with the toxicant depending on labeling instructions.
 - Toxic gases may be used to kill rodents in their burrows if the label permits.
 - International poison symbol must be on bait boxes.

Slide 9.1 – Pesticides Characteristics

Slide 9.2 – Pesticide Characteristics Menu

- Pesticide Toxicity
- Types of Exposure
- Toxicity Breakdown
- Solubility
- Persistence
- Volatility

Slide 9.3 – Pesticide Toxicity

- Toxicology is the study of the adverse effects of chemicals on living organisms. It is the study of symptoms, mechanisms, treatments, and detection of poisoning, especially the poisoning of people.
- Pesticides are designed to control pests, but they can also be toxic to desirable plants, animals, and humans.
- Some pesticides are so highly toxic that a very small quantity can kill a person.
- Exposure to a sufficient amount of almost any pesticide can make a person sick.
- Toxicity refers to the ability of a poison to produce adverse effects - the ability of a compound to cause death or injury.
- Effects may range from slight to severe symptoms.
- Poisons work by altering normal body functions.
- During research, the manufacturer must establish toxicity levels for the pesticide being tested - a new chemical is tested on mice, rats, rabbits, and dogs; then used to assess safety to humans.
- Acute or chronic toxicity. Acute meaning short term and chronic long term or over time.
- Hazard is the likelihood that the compound will cause injury or death
- All pesticides can be handled safely by using safety practices that minimize or eliminate exposure
- $\text{Toxicity} \times \text{Exposure} = \text{Hazard}$

Slide 9.4 – Solubility

- Solubility is a measure of the ability of a pesticide to dissolve in a solvent, which is usually water.
- Pesticides that are highly soluble in water dissolve easily and are more likely to move with water in surface runoff or to move through the soil in water than less-soluble pesticides.
- Manufacturers use relative terms—such as miscible, dispersible, suspension, emulsifiable, and water solubility—to describe their product's solubility.

Slide 9.5 – Toxicity Breakdown

- ACUTE TOXICITY
 - Acute toxicity refers to its ability to do damage as a result of a one-time exposure to relative large amounts of chemical.
 - Signal words on label are based on acute toxicity of pesticide.
 - May be measured as acute oral, dermal, or inhalation.
 - Acute toxicity measure - LD50.
 - LD = Lethal Dose and 50 means dose was acutely lethal for 50% of animals tested.
 - The lower the number, the more toxic a pesticide - a low number indicates a smaller amount of toxicant is required to cause death.
 - LD50 values are expressed as milligrams of toxicant per kilogram of body weight (mg/kg).
 - LD50 values are expressed on the basis of active ingredient.
 - Acute toxicity measure - LD50.

- LD = Lethal Dose and 50 means dose was acutely lethal for 50% of animals tested.
- The lower the number, the more toxic a pesticide - a low number indicates a smaller amount of toxicant is required to cause death.
- LD50 values are expressed as milligrams of toxicant per kilogram of body weight (mg/kg).
- LD50 values are expressed on the basis of active ingredient.
- TOXICITY LEVELS
 - A pesticide is considered highly toxic if the LD50 value ranges from 0-50 mg/kg.
 - A pesticide is considered moderately toxic if the LD50 value ranges from 50-500 mg/kg.
 - A pesticide is considered slightly toxic if the LD50 value ranges from 500-5000 mg/kg.
 - A compound is considered relatively nontoxic if the LD50 value range is 5000 mg/kg and greater.

Slide 9.6 – Types of Exposure

- Oral Exposure
 - ORAL EXPOSURE
 - May occur because of an accident
 - More likely to occur as the result of carelessness, such as:
 - Blowing out a plugged nozzle with your mouth
 - Smoking or eating without washing your hands after using a pesticide
 - Seriousness of the exposure depends upon the oral toxicity of the material and
- Dermal Exposure
 - DERMAL EXPOSURE
 - Dermal or skin exposure accounts for about 90% of all pesticide exposure.
 - It may occur any time a pesticide is mixed, applied or handled, and it is often undetected.
 - Seriousness of dermal exposure depends upon the dermal toxicity and rate of absorption through the skin:
 - Size of the skin area contaminated.
 - Length of time the material is in contact with the skin.
 - Amount of pesticide on the skin.
 - Rates of absorption through the skin are different for different parts of the body.
 - EXAMPLE: Absorption is faster in the lower groin area than on other parts of the body. Absorption will continue to take place as long as the pesticide is in contact with the skin.
- Inhalation Exposure
 - INHALATION EXPOSURE
 - Results from breathing in pesticide vapors, dust, or spray particles.

- Inhalation exposure is more serious with some pesticides than with others, particularly fumigant pesticides.
 - Can occur from smoking, breathing fumes from pesticides without protective equipment, and inhaling fumes while mixing and pouring pesticides
- Ocular Exposure (Via the Eyes)
 - Ocular Exposure (via the eyes) is most often caused by failure to wear or use appropriate eye protection during mixing, loading, or storage of pesticides.

Slide 9.7 – Volatility

- The tendency of a pesticide to turn into a gas or vapor.
- Some pesticides are more volatile than others.
- The likelihood of pesticide volatilization increases as temperatures and wind increase.
- Vapors from such pesticides can move off-site and cause injury to susceptible plants.
- The potential for a pesticide to volatilize is measured by its vapor pressure.
- This measurement may be described in units of Pa (Pascals) or mmHg (millimeters of mercury).
- Pesticides that have high vapor-pressure values are more volatile.
- Some volatile pesticide products carry label statements that warn handlers of the product's potential for vapor movement.

Slide 9.8 – Persistence

- The ability of a pesticide to remain present and active in its original form during an extended period before degrading.
- The longer a pesticide's half-life, the more persistent the pesticide.
- Application of persistent pesticides presents a hazard to persons and non-target animals entering a treated area and may lead to the presence of illegal residues on rotational food or feed crops.
- Degradation processes break down pesticide compounds into simpler and often less-toxic chemicals.
- Some pesticides break down rapidly – in a matter of days or even hours.
- Other pesticides can be detected in the environment for a year or more.
- Water and temperature both affect the degradation of pesticides.
- Warm, wet conditions can increase the speed of pesticide degradation.
- Cool, dry conditions slow the degradation process.

Slide 10.1 – Pesticides Ingredients and Formulations

Slide 10.2 – Persistence Ingredients

- There are a number of ingredients that may be included in any pesticide:
- Toxicant
 - This is the basic ingredient that has a toxic action on pest
 - It is shown on the label as the active ingredient
- Carrier
 - Inert material such as water or talc
 - Aids in the dispersal of an active ingredient
- Solvent

- Used to dissolve a toxicant that is not soluble in a common carrier.
- Mixture can then be added to the carrier.
- Although water is considered a solvent, an oil based ingredient is used for the formulation make-up of a pesticide.
- Synergist: a chemical product added to a pesticide to increase or enhance the effectiveness of the pesticide's active ingredient.
- Surfactant
 - Increases the dispersing and spreading ability of a pesticide formulation
 - The most common surfactant is called a wetting agent
 - A wetting agent causes a liquid to cover treated surfaces more thoroughly
 - Most commonly used in pesticides applied to vegetation

Slide 10.3 – Chemical Class I

- TECHNICAL GRADE PESTICIDE
 - The basic toxic agent in its purest form.
 - Can be in either liquid or solid form.
 - Technical grade pesticides are usually mixed with a carrier before use, forming a dust, granule, suspension, solution, or emulsion.
- AEROSOLS
 - Aerosols are pressurized cans containing a small amount of pesticide driven through a small nozzle.
 - Commonly used as space sprays for flying insects and as residual sprays, depending on the formulation.
 - Controlled use of aerosols include aircraft disinsection and as flushing agents during residual treatment.
 - Uncontrolled (general use) aerosols are commonly used in small areas such as tents and office buildings.
- BAITS
 - Commonly used to manage scavenging pests such as rodents, ants, flies, and cockroaches.
 - Consists of a toxicant mixed with a food attractant or water.
 - Liquid baits are effective in areas of poor sanitation where dry baits will not work.
- DUSTS
 - Normally comes in ready-to-use formulations with a low percentage of active ingredients plus a very fine inert carrier such as talc, chalk, diatomaceous earth, or volcanic ash.
 - Dust is usually low in cost, easy to apply, non-staining, and nontoxic to vegetation.
 - These materials are always used dry and can easily drift into non-target areas if not applied carefully.
 - Common use for dust include crack and crevice or spot treatment indoors in out-of-sight areas.
- EMULSIFIABLE CONCENTRATES
 - Consist of the technical grade pesticide, a solvent, and an emulsifying agent.

- The emulsifying agent is used to allow the concentrate to be diluted in water.
- EMULSION
 - When water is added to an emulsifiable concentrate, an emulsion is formed.
 - The concentration of pesticide is reduced to the desired field strength.
 - Emulsions need periodic agitation.
 - Emulsions are used to apply residual treatments to solid surfaces
- GRANULES
 - Basically the same as dust formulation except the carrier particles are larger.
 - In most granular formulations, vermiculite is used as the inert carrier instead of talc.
 - Penetrates dense foliage better than dusts due to having heavier particles.
 - Granules are also available in timed release formulations that release a dosage of the pesticide over an extended period of time.
 - Granule use provides longer lasting effects and less drift than dust and liquids.

Slide 10.4 – Chemical Class II

- MICROENCAPSULATED
 - Very small spheres of polyvinyl, plastic, or polymer encapsulate active ingredients.
 - Provide a slow release over an extended period of time.
 - Manufacturers can control the rate of release by adjusting the thickness of the capsules wall.
- PASTES AND GELS
 - Active ingredient mixed with a gel or paste like carrier.
 - Designed to be applied to syringes and bait guns.
 - Mainly used for ant and cockroach control.
 - Minimize human and pet exposure by hiding or concealing application sites.
- SUSPENSIONS
 - When water is added to a wettable powder, it makes a suspension.
 - One advantage of a suspension is the pesticide's tendency to stay on porous surfaces like concrete, plaster, adobe, or unpainted wood.
 - Once applied, water penetrates the surface, leaving the carrier and the pesticide available to kill pest.
- OIL SOLUTIONS
 - Consist of a technical grade pesticide dissolved in a solvent such as kerosene, diesel oil, or xylene forming a solution.
 - Available as ready-to-use formulations and as concentrates.
 - Ordinary fly and mosquito spray is an example of a ready-to-use formula.
- ULTRA LOW VOLUME (ULV) CONCENTRATE
 - Designed to be used as is or to be diluted with only small quantities of a specified carrier.
 - Used mostly in outdoor applications such as mosquito control programs.
- ADVANTAGES
 - Easy to handle, transport, and store
 - Little agitation required

- Not abrasive to equipment
- DISADVANTAGES
 - High drift hazard
 - Specialized equipment required
 - Calibration and application must be done very carefully because of the high concentration of active ingredient.
- WETTABLE POWDER
 - Consists of the technical grade pesticide, an inert carrier, and a wetting agent that helps it mix with water.
 - Contains an anticaking agent to prevent lumping while in storage
- FUMIGANTS
 - Primarily used in fumigation operations.
 - May come as liquefied gases in pressure containers or in solid form that reacts with moisture in the air to form a gas.
 - Gas molecules can penetrate cracks, crevices, and tightly packed material.

Slide 11.1 – Course Completion

Congratulations, you have completed the pesticides in the environment lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 2, Task 2 (5.5.1, 5.5.2, 5.5.3, 5.5.4) Pesticide Safety

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

5.5.1, 5.5.2, 5.5.3, 5.5.4 Pesticide Safety

Slide 1.3 – Instructions

Welcome to the Pesticide Safety lesson.

- Upon completion of this lesson, you must be able to successfully determine proper pesticide poisoning first aid procedures with at least a 75% accuracy.

Overview

In this section, we will cover the following topics:

- General First Aid Information
- Oral Pesticide First Aid Procedures
- Dermal Pesticide First Aid Procedures
- Ocular Pesticide First Aid Procedures
- Respiratory First Aid Procedures

Slide 2.1 – General First Aid Information Intro

Slide 2.2 – General First Aid Information Video

- Video Closed Captions

All personnel handling or applying pesticides should be well trained in basic first aid procedures. Failure to provide first aid to pesticide poisonings could result in serious harm, illness, or death. First aid kits and personal protection equipment should be maintained by pest management personnel and carried on pest management vehicles. Pesticide labels and SDSs should be kept on hand for general use and emergency purposes. The best first step is to stop the source of exposure. Ensure you do not become exposed yourself; don PPE if necessary. If alone with the victim, check for consciousness and to see if they are breathing. If victim is not breathing, call or have someone call 911 and begin applying artificial respiration. Check label for directions on first aid for that product. Call the Poison Control Center at (800) 222-1222 for first aid information.

Slide 2.3 – Takeaways

- All personnel handling or applying pesticides should be well trained in basic first aid procedures
- Failure to provide first aid to pesticide poisonings could result in serious harm, illness, or death
- First aid kits and personal protection equipment should be maintained by pest management personnel and carried on pest management vehicles
- Pesticide labels and safety data sheets (SDSs) should be kept on hand for general use and emergency purposes
- The best first step is to stop the source of exposure
- Ensure you do not become exposed yourself; don proper protective equipment (PPE) if necessary
- If alone with the victim, check for consciousness and to see if they are breathing
- If victim is not breathing, call or have someone call 911 and begin applying artificial respiration
- Check label for directions on first aid for that product
- Call the Poison Control Center at (800) 222-1222 for first aid information

Slide 3.1 – Oral First Aid Procedures Intro

Slide 3.2 – Oral First Aid Procedures Video

- Video Closed Captions

STEP 1 - Stop the source of exposure. STEP 2 - Rinse mouth with plenty of water to remove as much pesticide/residue as possible. STEP 3 - Call 911 if person is unconscious, having trouble breathing, or having convulsions. STEP 4 - Reference pesticide label, give victim large amounts of water or milk depending on label recommendations; this will aid in diluting the pesticide and coating the stomach. STEP 5 - Induce vomiting; if label or SDS recommends. Do not induce vomiting if victim is unconscious or having convulsions; victim may choke. Do not induce vomiting if victim swallowed a corrosive pesticide; it may burn mouth, esophagus and lungs worse coming up than it did going down. STEP 6 - Keep victim calm and accompany them to local medical services; bring label and SDS to provide to medical staff. STEP 7 - First Aid does not replace medical attention. Always seek medical attention following immediate first aid procedures.

Slide 3.3 – Oral First Aid Procedures Video

- STEP 1 - Stop the source of exposure.
- STEP 2 - Rinse mouth with plenty of water to remove as much pesticide/residue as possible.
- STEP 3 - Call 911 if person is unconscious, having trouble breathing, or having convulsions.
- STEP 4 - Reference pesticide label, give victim large amounts of water or milk depending on label recommendations; this will aid in diluting the pesticide and coating the stomach.
- STEP 5 - Induce vomiting; if label or SDS recommends.

- Do not induce vomiting if victim is unconscious or having convulsions; victim may choke. Do not induce vomiting if victim swallowed a corrosive pesticide; may burn mouth, esophagus and lungs worse coming up than it did going down.
- STEP 6 - Keep victim calm and accompany them to local medical services; bring label and SDS to provide to medical staff.
- STEP 7 - First Aid does not replace medical attention. Always seek medical attention following immediate first aid procedures

Slide 4.1 – Dermal First Aid Procedures Intro

Slide 4.2 – Dermal First Aid Procedures Intro

- Video Closed Captions

STEP 1 - Stop the source of exposure to limit human contact. STEP 2 - Call 911 if person is unconscious, having trouble breathing, or having convulsions. STEP 3 - Immediately drench skin and clothing with water for 10 to fifteen minutes to dilute and remove pesticides. Use any clean water source. If possible, immerse the victim a pond, creek or any useable body of water. Water in irrigation and ditches should be used as a last resort as they could be potentially contaminated or filled with bacteria. STEP 4 - Reference pesticide to determine specific dermal first aid procedures. STEP 5 - Remove contaminated PPE. STEP 6 - Remove contaminated clothing. STEP 7 - Wash skin and hair thoroughly with a mild detergent and water; degreasers should be avoided due to known skin reactions and can burn human tissue. STEP 8 - Dry victim and wrap in clean blanket or clothes to keep them from becoming cool or chilled. If skin is burned, do not apply ointments, powders, or greases; this could further damage the severity of the burn. STEP 9 – First aid may precede but should not replace professional medical treatment. Always seek medical attention following immediate first aid procedures; bring label and SDS to provide to medical staff.

Slide 4.3 – Takeaways

- STEP 1 - Stop the source of exposure to limit human contact.
- STEP 2 - Call 911 if person is unconscious, having trouble breathing, or having convulsions.
- STEP 3 - Immediately drench skin and clothing with water for 10 to fifteen minutes to dilute and remove pesticides. Use any clean water source. If possible, immerse the victim a pond, creek or any useable body of water. Water in irrigation and ditches should be used as a last resort as they could be potentially contaminated or filled with bacteria.
- STEP 4 - Reference pesticide to determine specific dermal first aid procedures.
- STEP 5 - Remove contaminated PPE.
- STEP 6 - Remove contaminated clothing.
- STEP 7 - Wash skin and hair thoroughly with a mild detergent and water; degreasers should be avoided due to known skin reactions and can burn human tissue.
- STEP 8 - Dry victim and wrap in clean blanket or clothes to keep them from becoming cool or chilled. If skin is burned, do not apply ointments, powders, or greases; this could further damage the severity of the burn.

- STEP 9 – First aid may precede but should not replace professional medical treatment. Always seek medical attention following immediate first aid procedures; bring label and SDS to provide to medical staff.

Slide 5.1 – Ocular First Aid Procedures Intro

Slide 5.2 – Ocular First Aid Procedures Video

- Video Closed Captions

STEP 1 - Stop the source of exposure to limit human contact. STEP 2 - Call 911 if person is unconscious, having trouble breathing, or having convulsions. STEP 3 - Immediately hold eyelid open and wash quickly and gently with clean running water from the tap or emergency eye wash system. Ensure water runs across the eye and not into the eye; this will direct the pesticides away from the eye socket. STEP 4 - Continue rinsing for 15-20 minutes; if contact lenses are worn, remove after the first five minutes of the initial rinse. STEP 5 - Cover the eye with a clean piece of cloth; Do not use eye drops, chemicals or drugs in the wash water as they may further injure the eye. STEP 6 - First aid may precede but should not replace professional medical treatment. Always seek medical attention following immediate first aid procedures; bring label and SDS to provide to medical staff.

Slide 5.3 – Takeaways

- STEP 1 - Stop the source of exposure to limit human contact.
- STEP 2 - Call 911 if person is unconscious, having trouble breathing, or having convulsions.
- STEP 3 - Immediately hold eyelid open and wash quickly and gently with clean running water from the tap or emergency eye wash system. Ensure water runs across the eye and not into the eye; this will direct the pesticides away from the eye socket.
- STEP 4 - Continue rinsing for 15-20 minutes; if contact lenses are worn, remove after the first five minutes of the initial rinse.
- STEP 5 - Cover the eye with a clean piece of cloth; Do not use eye drops, chemicals or drugs in the wash water as they may further injure the eye.
- STEP 6 - First aid may precede but should not replace professional medical treatment. Always seek medical attention following immediate first aid procedures; bring label and SDS to provide to medical staff.

Slide 6.1 – Respiratory First Aid Procedures Intro

Slide 6.2 – Respiratory First Aid Procedures Video

- Video Closed Captions

STEP 1 - Stop the source of exposure to limit human contact. STEP 2 - Call 911 if person is unconscious, having trouble breathing, or having convulsions. STEP 3 - Ensure area is safe to enter and remove victim from hazard area. If needed don PPE to ensure your safety before trying to remove victim. If victim is outside, carry or move the victim away from the area where pesticides were applied. If victim is inside, carry or move the victim to fresh air immediately. STEP 4 - Loosen the victim's tight clothing to ensure it does not constrict breathing. STEP 5 - Keep victim warm, quiet and do not allow them to become chilled or overheated. When inhaled, pesticides enter the bloodstream very rapidly and can cause organ failure. STEP 6 - If victim's skin becomes blue or victim stops breathing, give artificial respiration and/or call 911.

Administer CPR until emergency services arrive. STEP 7 - Ensure windows are doors are open to ventilate fumes so no one else is poisoned. STEP 8 - First aid may precede but should not replace professional medical treatment. Always seek medical attention following immediate first aid procedures; bring label and SDS to provide to medical staff.

Slide 6.3 – Takeaways

STEP 1 - Stop the source of exposure to limit human contact.

STEP 2 - Call 911 if person is unconscious, having trouble breathing, or having convulsions.

STEP 3 - Ensure area is safe to enter and remove victim from hazard area. If needed don PPE to ensure your safety before trying to remove victim. If victim is outside, carry or move the victim away from the area where pesticides were applied. If victim is inside, carry or move the victim to fresh air immediately.

STEP 4 - Loosen the victim's tight clothing to ensure it does not constrict breathing.

STEP 5 - Keep victim warm, quiet and do not allow them to become chilled or overheated.

When inhaled, pesticides enter the bloodstream very rapidly and can cause organ failure.

STEP 6 - If victim's skin becomes blue or victim stops breathing, give artificial respiration and/or call 911. Administer cardiopulmonary resuscitation (CPR) until emergency services arrive.

STEP 7 - Ensure windows are doors are open to ventilate fumes so no one else is poisoned.

STEP 8 - First aid may precede but should not replace professional medical treatment. Always seek medical attention following immediate first aid procedures; bring label and SDS to provide to medical staff.

Slide 7.1 – Course Completion

Congratulations, you have completed the pesticide safety lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 2, Task 3 (5.3.1, 13.1) Labeling & Pesticide

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

5.3.1, 13.1 Labeling & Pesticide

Slide 1.3 – Instructions

Welcome to the Fundamentals of Labeling & Pesticide Management Lesson.

Upon completion of this lesson, you must be able to identify basic facts and principles relating to Fundamentals of Labeling & Pesticide Management with at least 75% accuracy.

Slide 1.4 – Overview

In this section, we will cover the following topics:

- Overview
- Types of Pesticide Registration
- Parts of Label
- Types of Pesticides, Formulation, Restricted Use Designation
- Environmental, Physical and Chemical Hazards
- Re-entry, Storage and Disposal
- Pesticide Management

Slide 2.1 – Overview Intro

Slide 2.2 – Labeling and Pesticide Management Menu

- Purpose of Pesticide Labels
- Pesticide Labels and Labeling

Slide 2.3 – Purpose of Pesticide Labels

- Pesticides are products which are intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant, or desiccant.
- The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) provides federal regulation of pesticide distribution, sale and use.

- FIFRA authorizes environmental protection agency (EPA) to review and register pesticides for specific uses).
- All pesticides distributed or sold in the US must be registered (licensed) by EPA and have an approved label.
- Pesticide labels provide critical information about how to safely and legally handle and use pesticide products.
- Pesticide labels are legally enforceable, and all of them carry the statement: "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."
- The label is the law.
- A key function of the pesticide product label is to manage the potential risks from pesticides. In support of that function:
 - State and Federal agencies enforce pesticide label requirements
 - Educational programs certify pesticide users
 - Pesticide users read and follow the label directions

Slide 2.4 – Pesticide Labels and Labeling

- Labeling
 - Label: Information printed on or attached to the pesticide container
 - Labeling: Labeling includes the label itself, plus all other information received from the manufacturer about the product
 - Provides instruction on how the product is mixed and applied correctly and safely
 - Pesticide users are required by law to comply with all the instructions and directions specified on the label
- EPA Approval
 - No pesticides may be sold in the US until the EPA has reviewed the labeling and registered the product.
 - The EPA will determine that the use of the product will not present an unreasonable risk to humans, wildlife, or the environment.
- Classification of Pesticide Uses
 - Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) categorizes pesticide use as either "General Use" or "Restricted Use."
 - General Use - pesticides that can be bought and used by the general public without special permits or restrictions.
 - Restricted Use - pesticides that can only be purchased and applied exclusively by certified applicators.

Slide 3.1 – Types of Pesticide Registration Intro

Slide 3.2 – Types of Pesticide Registration

- Federal EPA Federal EPA or Section 3 registration:
 - Most common
 - Used for general use within the United States
- Special Local Needs
 - Special Local Needs or 24 C registrations:

- Allows states to further control how the pesticides are used in their jurisdiction including registering additional uses or adding limitations for a federally registered pesticide
 - You must have supplemental labeling in your possession to apply the pesticide
 - It is legal only in the state or local area specified in the labeling
- Emergency Exemptions
 - Emergency Exemptions from registration or Section 18 Exemption:
 - Used when an emergency pest situation arises for which no pesticide is registered
 - Handled by the highest government official- usually a state governor or federal agency head
 - The pesticide can only be sold and used for a specific time period

Slide 4.1 – Parts of Label Intro

Slide 4.2 – Parts of Label

- Brand (Trade Name)
 - Each manufacturer has a brand name for each of its products
 - Many companies use the same basic name with only minor variations to designate entirely different pesticide chemicals
- Ingredient Statement
 - Each pesticide label must list what is in the product
 - The ingredient statement must list the official chemical name or common name for each active ingredient
 - Inert ingredients need not be named but the percentage must be shown
- Net Contents
 - Located on the front page of the label
 - Tells how much product is in the container
 - It can be expressed as pound (lb.), ounce (oz.), gallon (gal.), quart (qt.), pint (pt.), Liter (L), milliliter (ml.), gram (g.), and milligram (mg.)
- Establishment Number
 - Identifies the facility where the product was made
- EPA Registration Number:
 - Numbers are needed by the pesticide applicator for pesticide usage recording, also in case of poisoning, claims of misuse, or liability issues.
 - Indicates product has been approved by the EPA
 - Example: EPA Reg. No. 3120-280-AA
 - The first set of numbers indicate the manufacturer or company.
 - The second set identifies the product
 - The letters may be required for a specific state for that label

Slide 5.1 – Types of Pesticides, Formulation, Restricted Use Designation Intro

Slide 5.2 – Types of Pesticides, Formulation, Restricted Use Designation

- Types of Pesticides

- The type of pesticide is usually found on the front page of the label. It tells what the product will control such as:
 - Insecticide
 - Rodenticide
 - Herbicide
- Formulation
 - The formulations may show only an abbreviation such as:
 - WP = Wettable Powder
 - D = Dust
 - EC = Emulsifiable Concentrate
 - M or ME = Microencapsulated
- Restricted Use Designation
 - The label states "Restricted Use Pesticide" in a box at the top of the front panel.
 - Below that statement will read something to the effect - "For retail sale and use only by certified applicators or persons under their supervision and only for those uses covered by the certified applicator's certification."

Slide 6.1 – Environmental, Physical and Chemical Hazards Intro

Slide 6.2 – Environmental, Physical and Chemical Hazards

- Environmental Hazards
 - Environmental Hazards indicates precautions for protecting the environment when you use the pesticide.
- Physical and Chemical Hazards
 - Will list any fire, explosion, or chemical hazards the product may pose
 - May be found in a variety of locations
- Directions for Use
 - Always states "It is a violation of Federal law to use this product in a manner inconsistent with its labeling." Illegal use can result in penalty fines and imprisonment.
 - Will contain specific directions for using the product to include: label rates, registered pest names, mixing, and application procedures.
 - The directions and instructions for use are not advice, they are requirements.

Slide 7.1 – Re-entry, Storage and Disposal Intro

Slide 7.2 – Re-entry, Storage and Disposal

- Re-Entry Statement
 - Not required to be included in the labeling but when present it tells how much time must pass before people can enter a treated area
 - Set by the EPA and some states
- Storage and Disposal
 - Re-Entry Statement:
 - Not required to be included in the labeling but when present it tells how much time must pass before people can enter a treated area
 - Set by the EPA and some states
- Manufacturer's Information

- Name and Address of Manufacturer - mandated by law to appear on label, identifies who made or sold the product

Slide 8.1 – Pesticide Management

Slide 8.2 – Pesticide Management Menu

- Pesticide Management
- Inventory
- Storage
- Transportation
- Hazardous Disposal
- Requirements
- Preparation and Signature

Slide 8.3 – Pesticide Management Video

- Video Closed Captions

To meet FIFRA requirements, EPA and OSHA regulations, and to protect individuals and the environment from adverse effects of pesticides, DOD installations must establish programs and policies that implement proper storage and handling requirements. All pest managers are responsible and held accountable for the safe use and handling of all pesticides and any applications. It is essential to establish safety and security practices for moving pesticides on the highways and at storage and job sites. Because spills and accidents are more likely to occur while transporting or applying pesticides, drivers and pesticide applicators must be trained to respond quickly to a spill. It is best practice to have all your pesticides and program nicely organized; the more organized you are the less likely we are to have an accident.

Slide 8.4 – Key Takeaways: Pesticide Management Overview

- To meet FIFRA requirements, EPA and Occupational Safety and Health Administration (OSHA) regulations, and to protect individuals and the environment from adverse effects of pesticides, DoD installations must establish programs and policies that implement proper storage and handling requirements.
- All pest managers are responsible and held accountable for the safe use and handling of all pesticides and any applications.
- It is essential to establish safety and security practices for moving pesticides on the highways and at storage and job sites.
- Because spills and accidents are more likely to occur while transporting or applying pesticides, drivers and pesticide applicators must be trained to respond quickly to a spill.
- It is best practice to have all your pesticides and program nicely organized; the more organized you are the less likely we are to have an accident.

Slide 8.5 – Inventory

- Keep an up-to-date inventory of the pesticides in storage
- Update the inventory list each time a pesticide is added to or removed from storage
- Good management practices suggest conducting a formal inventory once a month
- Proper inventorying will aid in estimating future pesticide needs

- Per Air Force manual (AFMAN) 32-1053, monthly inventories should be completed and sent no later than 10 days after the close of the month to the local public health, bioenvironmental engineer and major command (MAJCOM) Pest Management Consultant.
- Pest Management shops must provide the fire department a hardcopy of pest management, self-help, and golf course building location(s) and layout(s) indicating pesticide storage areas.
- Provide the fire department with a hardcopy of installation pesticide inventories and SDSs annually

Slide 8.6 – Storage

- Storage Overview
 - Pesticide structure requirements include the facility and the area in which pesticides are stored
 - A well designed pesticide storage site:
 - Limits access
 - Permits better inventory control
 - Protects people from exposure
 - Reduces the chance of environmental contamination
 - Prevents damage to pesticides from temperature extremes and excess moisture
 - Safeguards pesticides from theft, vandalism and unauthorized use
 - Allows fire departments to know the location of products
- Storage Procedures
 - Proceeds to Slide 8.7
- Warehouse
 - Store pesticides in a dry, well-ventilated building where temperature and humidity levels can be controlled
 - Maintain temperatures between 50° F and 100° F. Protect pesticides from both freezing and direct sunlight
 - It's essential that the area have adequate lighting, firefighting equipment, and exhaust systems to remove pesticide fumes from the building
 - Indoors, stack all pesticides off the floor on nonabsorbent shelves so labels are clearly visible
 - Never use structures or shelves made of wood to store pesticides
 - Store pesticides in a dry, well-ventilated building where temperature and humidity levels can be controlled
 - Maintain temperatures between 50° F and 100° F. Protect pesticides from both freezing and direct sunlight
 - It's essential that the area have adequate lighting, firefighting equipment, and exhaust systems to remove pesticide fumes from the building
 - Indoors, stack all pesticides off the floor on nonabsorbent shelves so labels are clearly visible
 - Never use structures or shelves made of wood to store pesticides

Slide 8.7 – Storage Procedures Video

- Video Closed Captions

Store pesticides in a dry, well-ventilated building where temperature and humidity levels can be controlled. Maintain temperatures between 50° F and 100° F. Protect pesticides from both freezing and direct sunlight. It's essential that the area have adequate lighting, firefighting equipment, and exhaust systems to remove pesticide fumes from the building. Indoors, stack all pesticides off the floor on nonabsorbent shelves so labels are clearly visible. Never use structures or shelves made of wood to store pesticides. Keep aisles clear to provide easy access and inspections. Keep insecticides and herbicides in separate areas; use separate rooms if practical. The warehouse must have fire and smoke detectors. Separate pesticide storage areas from any work areas where people work for extended periods of time. Don't let wall-mounted exhaust fans in the warehouse directly over sidewalks or other normally occupied places.

Slide 8.8 – Key Takeaways: Storage Procedures

- Store pesticides in a dry, well-ventilated building where temperature and humidity levels can be controlled
- Maintain temperatures between 50° F and 100° F. Protect pesticides from both freezing and direct sunlight
- It's essential that the area have adequate lighting, firefighting equipment, and exhaust systems to remove pesticide fumes from the building
- Indoors, stack all pesticides off the floor on nonabsorbent shelves so labels are clearly visible
- Never use structures or shelves made of wood to store pesticides
- Keep aisles clear to provide easy access and inspections
- Keep insecticides and herbicides in separate areas; use separate rooms if practical
- The warehouse must have fire and smoke detectors
- Separate pesticide storage areas from any work areas where people work for extended periods
- Don't let wall-mounted exhaust fans in the warehouse exhaust directly over sidewalks or other normally occupied places

Slide 8.9 – Transportation

- Transportation Overview
 - Jump to slide 8.10
- Procedures
 - Small Quantities:
 - Ensure the pesticide container is properly closed
 - Place the chemical in a secure, lockable compartment
 - Check to make sure copies of the label and SDS are in the vehicle
 - Ensure pesticide containers are secured while the truck is unattended
 - Large Quantities:
 - Ensure the pesticide container is properly closed
 - Check to make sure copy of the label and SDS are in the vehicle
 - Ensure the container will not fit into lockable storage compartment

- Determine how you will secure the container in the bed of the truck
- Secure the container to prevent it from moving, or spilling during transport
- Ensure large quantities of pesticides are never left unattended on the vehicle

Slide 8.10 – National Institute for Occupational Safety and Health (NIOSH)

- Video Closed Captions

You are responsible for the safe transport of pesticides in your possession. The first line-of-defense is knowing how to prevent transportation mishaps involving pesticide vehicles or dispersal equipment. Department of Transportation 49 CFR part 173.6 states the requirements for the safe transport of pesticides. Use vehicles assigned only to the pest management staff to transport pesticides safely to work sites. Never carry pesticides in the passenger compartment of a vehicle. Never allow children, other passengers, or pets to ride with pesticides. Never transport pesticides with food, clothing, or other things meant to be eaten by or in contact with people or animals. Never leave the vehicle unattended when transporting pesticides in on open-bed truck. Ensure the vehicle has a spill kit, eye wash dispenser, safety first aid kit, and a binder with labels and Safety Data Sheets (SDS) of all chemicals. Protect pesticides from extreme temperatures. Transport all pesticides in labeled containers.

Slide 8.11 – Key Takeaways: Transportation Overview

- You are responsible for the safe transport of pesticides in your possession
- The first line-of-defense is knowing how to prevent transportation mishaps involving pesticide vehicles or dispersal equipment
- Department of Transportation 49 CFR part 173.6 states the requirements for the safe transport of pesticides
- Use vehicles assigned only to the pest management staff to transport pesticides safely to work sites
- Never carry pesticides in the passenger compartment of a vehicle
- Never allow children, other passengers, or pets to ride with pesticides
- Never transport pesticides with food, clothing, or other things meant to be eaten by or in contact with people or animals
- Never leave the vehicle unattended when transporting pesticides in on open-bed truck
- Ensure the vehicle has a spill kit, eye wash dispenser, safety first aid kit, and a binder with labels and safety data sheets (SDS) of all chemicals
- Protect pesticides from extreme temperatures
- Transport all pesticides in labeled containers

Slide 8.12 – Hazardous Pesticide Disposal

- Overview
 - Guidance for pesticide disposal can be found in Technical Guide 21.
 - No pesticide, pesticide container, pesticide-related waste, or pesticide container residue should be stored or disposed of in a manner inconsistent with its label or labeling, or in a manner so as to cause or allow:
 - Open dumping
 - Open burning

- Water dumping or ocean dumping
 - Direct exposure
 - Violations of any applicable federal, state, or local pollution control standard
 - Violation of FIFRA
- Procedures
 - Jump to Slide 8.13
- Excess Disposal Procedures
 - To avoid excess pesticide residues, mix only the amount needed for the job.
 - If you have pesticides left over after a job, you can apply them at the application site or a similar site.
 - If excess pesticides cannot be used at the site you should use them to mix with compatible formulations on a same or next day basis.
 - Excess mixes that cannot be disposed of by application or mixing should be poured into larger container to await disposal.

Slide 8.13 – Hazardous Pesticide Disposal Overview

- Video Closed Captions

Fill container with the recommended amount of water 1 gallon or less = 1/4 container volume 5 gallons = 1 gallon 5.1 to 29 gallons = 1/5 container

30 and 55 gallon drums = 5 gallons Close container and shake to agitate Drain rinse solution from container into tank; mix for at least 30 seconds Repeat two and three above two more times to provide a total of three rinses After the final rinse, puncture metal containers on the top of the rim to allow remaining rinse solution to drain Properly dispose of rinsed and punctured containers IAW their labels

Slide 8.14 – Key Takeaways: Hazardous Pesticide Disposal Overview Triple Rinse

- Fill container with the recommended amount of water
 - 1 gallon or less = 1/4 container volume
 - 5 gallons = 1 gallon
 - 5.1 to 29 gallons = 1/5 container
 - 30 and 55 gallon drums = 5 gallons
- Close container and shake to agitate
- Drain rinse solution from container into tank; mix for at least 30 seconds
- Repeat ii and iii above two more times to provide a total of three rinses
- After the final rinse, puncture metal containers on the top of the rim to allow remaining rinse solution to drain
- Properly dispose of rinsed and punctured containers in accordance with (IAW) their labels

Slide 8.15 – Requirements Menu

- Clean up Procedures
- Spill Emergency Procedures
- Containment and Control
- Pesticide Spill Reporting

Slide 8.21 – Clean Up Procedures

- Clean Up Procedures
 - Jump to Slide 8.16
- Containing the Spill and Clean Up
 - Contain the spill
 - Prevent the spill from spreading by trenching or encircling the area with a dike of sand, absorbent material, or, as a last resort, soil or rags
 - Clean it up
 - Clean up spilled pesticides
 - Decontaminate area

Slide 8.16 – Clean Up Procedures Video

- Video Closed Captions

All pest management personnel must receive training in proper spill prevention procedures. Pesticide spill kits must be available in both the pesticide storage facilities and pesticide dispersal vehicles. Shop personnel must receive annual pesticide spill prevention refresher training on the proper procedures for handling pesticide during receipt, storage, mixing, application, transport, and disposal operations. Follow the guidance outlined in TG 15, Pesticide Spill Prevention and Management. Emergency contact telephone numbers must be readily available. Remember the three C's – Control the spill, contain the spill, and clean up. When you control the spill, you must don appropriate personal protective equipment from a spill kit or the pest control shop. Containing the spill prevents further leakage by repositioning the pesticide container. Smaller containers can be put into larger containers to prevent further release of the chemical.

Slide 8.17 – Key Takeaways: Clean Up Procedures

- Pesticide spill kits must be available in pesticide storage facilities and pesticide dispersal vehicles
- Shop personnel must receive annual pesticide spill prevention refresher training follow the guidance outlined in TG 15, Pesticide Spill Prevention and Management
- Emergency contact telephone numbers must be readily available
- When you control the spill, you must don appropriate PPE from a spill kit or the pest control shop
- Reposition the pesticide container to prevent further leakage
- Smaller containers can be put into larger containers to prevent further release of the chemical

Slide 8.20 – Spill Emergency Procedures

- Identification
 - Determine the pesticide involved in the spill incident. Information such as the formulation, percent active ingredient, and manufacturer's name and address should be obtained from the Safety Data Sheet (SDS).
- Safety and First Aid
 - Jump to Slide 8.18
- Care of Injured

- Pesticide spill emergencies will differ, but the immediate concern should be to minimize contamination of personnel
- Although the sequence may vary, the following basic procedures should be accomplished as rapidly as possible
- PRIOR TO ENTERING A CONTAMINATED AREA, DON PERSONAL PROTECTIVE EQUIPMENT (PPE)
 - 1. Quickly assess the spill to determine if personnel are involved
 - 2. Eliminate all sources of ignition (e.g., pilot lights, electric motors, gasoline engines) in order to prevent the threat of fire or explosion from inflammable vapors (if present).
 - 3. If personnel are involved, the rescuer should quickly remove the injured to a safe location upwind from the spill.
 - If the spill occurs in an enclosed area, doors and windows should be opened to enhance ventilation of the area
 - 4. Remove contaminated clothing from the victim and/or rescuer, and wash affected areas of body with soap and water.
 - Administer first aid for the symptoms/signs and as specified on the pesticide label
 - 5. Obtain medical assistance for injured or contaminated persons
 - Do not leave injured or incapacitated persons alone—instruct someone to stay with them until medical assistance is provided

Slide 8.18 – Safety and First Aid Video

- Video Closed Captions

All persons working with pesticides should be well trained in basic first aid procedures. It must be emphasized that when managing any spill the most immediate concern is for the health and well-being of persons in and around the immediate spill area. First aid kits and personal protective equipment should be maintained at pest control facilities and storage areas and carried on pest control vehicles. In addition to SDSs, the telephone numbers of the local medical unit and poison control center should be posted in conspicuous locations and always carried by pest management personnel when on the job.

Slide 8.19 – Key Takeaways: Safety and First Aid

- All persons working with pesticides should be well trained in basic first aid procedures.
- It must be emphasized that when managing any spill the most immediate concern is for the health and well-being of persons in and around the immediate spill area.
- First aid kits and personal protective equipment should be maintained at pest control facilities and storage areas and carried on pest control vehicles.
- In addition to SDSs, the telephone numbers of the local medical unit and poison control center should be posted in conspicuous locations and always carried by pest management personnel when on the job.

Slide 8.24 – Pesticide Spill Reporting

- Reporting
 - Not all pesticide spills warrant reporting to EPA or the Coast Guard.

- However, spills that involve pesticides equal to or exceeding the designated reportable quantity (RQ) specified in the EPA's Clean Water Act list of hazardous substances, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) list of hazardous substances—see Appendix D for RQs of major pesticides—must be reported.
- All pesticide spills should be reported in accordance with each service's regulations (Air Force, AFI 32-7001, Environmental Management; Navy, OPNAV M-5090.1, Environmental Readiness Program Manual; Army, AR 200-1, Environmental Protection and Enhancement; Marine Corps, MCO 5090.2, Environmental Compliance and Protection Program) and the installation's spill contingency instruction. Pesticide spills should be reported to the spill coordinator designated in the installation's spill contingency directive.
- The coordinator in turn will report the spill to EPA or the Coast Guard, as required
- Clean Up
 - Adequate cleanup of spilled pesticides is essential in order to remove any health or environmental hazards. When cleaning up pesticide spills, it is advisable NOT TO WORK ALONE and to make sure the area is properly ventilated.
 - All personnel must use appropriate protective equipment.
 - Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses.
 - Minimum initial training and refresher training requirements are specified in the Occupational Safety and Health Standards of 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response, "HAZWOPER" training) or NFPA 472.
- Dry Spills
 - Video Closed Captions

Dry spills (dusts, wettable powders, granular formulations) should be picked up in the following manner: Immediately cover powders, dusts, or granular materials to prevent them from becoming airborne. This can be done by placing a polyethylene or plastic tarpaulin over the spilled material. Weight the ends of the tarp, especially the end facing into the wind. Begin cleanup operations by systematically rolling up the tarp while simultaneously sweeping up the spilled pesticide using a broom and shovel or dust pan. While sweeping, avoid brisk movements in order to keep the dry pesticide from becoming airborne. If indoors, a cover may not be necessary. When practical, a light sprinkling of water may be used instead of a cover. Collect the pesticide and place in plastic or metal containers. Heavy-duty plastic bags should be used as a last resort as some pesticides may corrode through the plastic bags. Properly secure and label the bags, identifying the pesticide and possible hazards; set the bags aside for later disposal.

- KEY TAKEAWAYS

- Dry spills should be picked up in the following manner:
- Immediately cover powders, dusts, or granular materials to prevent them from becoming airborne. This can be done by placing a polyethylene or plastic tarpaulin over the spilled material.

- Weight the ends of the tarp, especially the end facing into the wind
- Begin cleanup operations by systematically rolling up the tarp while simultaneously sweeping up the spilled pesticide using a broom and shovel or dust pan
- While sweeping, avoid brisk movements in order to keep the dry pesticide from becoming airborne
- If indoors, a cover may not be necessary
- When practical, a light sprinkling of water may be used instead of a cover
- Collect the pesticide and place in plastic or metal containers. Heavy-duty plastic bags should be used as a last resort as some pesticides may corrode through the plastic bags
- Properly secure and label the bags, identifying the pesticide and possible hazards; set the bags aside for later disposal
- Liquid Spills
 - Liquid spills should be cleaned up by placing an appropriate absorbent material (floor sweeping compound, sawdust, sand, etc.) over the spilled pesticide
 - Work the absorbent into the spill using a broom or other tool to force the absorbent into close contact with the spilled pesticide
 - Collect all spent absorbent material and place into a properly labeled leak-proof container
 - Depending upon the spilled substance, contaminated soil may have to be removed to depths where no detectable amounts of the substance are evident
 - Residues may need to be placed in properly labeled leak-proof containers
 - For this determination, contact the installation environmental engineer/coordinator
 - Decontamination
 - Reference TG 15, Pesticide Spill Prevention and Management for decontamination procedures
- Calculations
 - Calculate Pesticide Requirements:
 - The purpose of this section is to show pest managers how to quickly and easily determine how much pesticide is needed to treat a given area
 - Use the information in the following table for general conversion rates and for computing total active ingredient use
 - The following table outlines the typical calculation formulas you use on a daily basis to convert units of measure, calculate area and perimeter, total product and the amount of active ingredient used
 - INSERT CALCULATION FORMULA

Slide 8.22 – Containment and Control Video

- Video Closed Captions

Spilled pesticides must be contained at the original site of the spill. The pesticide must be prevented from entering storm drains, wells, water systems, ditches, and navigable waterways

by following these procedures: Don appropriate protective equipment Prevent further leakage by repositioning the pesticide container Prevent the spill from spreading by trenching or encircling the area with a dike of sand, absorbent socks, or booms, loose absorbent material, or, as a last resort, soil or rags Cover the spill; if the spill is liquid, use an absorbent material appropriate to the type of material

Slide 8.23 – Key Takeaways: Containment and Control

- Spilled pesticides must be contained at the original site of the spill
- The pesticide must be prevented from entering storm drains, wells, water systems, ditches, and navigable waterways by following these procedures:
 - Don appropriate protective equipment
 - Prevent further leakage by repositioning the pesticide container
 - Prevent the spill from spreading by trenching or encircling the area with a dike of sand, absorbent socks, or booms, loose absorbent material, or, as a last resort, soil or rags
 - Cover the spill; if the spill is liquid, use an absorbent material appropriate to the type of material

Slide 8.25 – Preparation and Signage

- Prepare Finished Pesticide Products
 - Jump To Slide 8.26
- Facility Signage
 - Proper signs should be used to identify risks associated with all pesticides during transport and storage operations
 - Signs such as “DANGER, POISON and “PESTICIDE STORAGE AREA” outside appropriate rooms and on buildings and fences to advise personnel of the contents and warn of their hazardous nature
 - Install a sign to read “NO SMOKING” in the pesticide areas
 - Install a sign over the mixing sink that reads “DO NOT DISCHARGE PESTICIDES INTO THE SINK”
 - Provide a sign at the entrance(s) to the toilet to read “WASH HANDS BEFORE USING TOILET”
 - Provide warning signs on the exterior of the building at each entrance except the utility room
 - Provide a sign to read “CLOSE DRAIN WHILE HANDLING PESTICIDES ON HARDSTAND.”
 - Provide a sign to read “FLAMMABLE PESTICIDES” if flammable liquid storage cabinet is included in design
 - A sign shall be provided near the pit valve stating “RECOVER PESTICIDE SPILLS. USE VALVE TO DRAIN WASH WATER AND RAIN
 -
 - (NOTE: Consult with the Environmental office before draining wash water.)
 - Signs should be posted in the both English and any predominant local language(s) where appropriate

- Provide building identification information on the outside of the structure visible from 100 feet (30.48 m). Provide a 3 foot (914 mm) by 4 foot (1219 mm) notice board in the office or hallway near the office for emergency instructions and notices

Slide 8.26 – Prepare Finished Pesticide Products Video

- Video Closed Captions

In mixing a finished spray, it is most important to add the correct amount of pesticide to the diluents. Too little may result in unsatisfactory control

and too much may result in injury to the treated surface, illegal residues, and possible harm to the environment and health of individuals in the area. Directions for mixing are given on the label. The following dilution formulas will aid you in preparing the correct amount of finished sprays, dusts, and baits.

Slide 8.27 – Key Takeaways: Prepare Finished Pesticide Products

- In mixing a finished spray, it is most important to add the correct amount of pesticide to the diluents
- Too little may result in unsatisfactory control and too much may result in injury to the treated surface, illegal residues, and possible harm to the environment and health of individuals in the area
- Directions for mixing are given on the label
- The following dilution formulas will aid you in preparing the correct amount of finished sprays, dusts, and baits
- Pesticide Calculations:
- R Find the product rate on the label for Sevin 80 WSP
- An example of this is “30 pounds per acre” This product contains 80 percent of active ingredient
- A Find out the size of the area to be treated
- Example, to treat an area that measures 500 by 850 feet, then $500 \times 850 = 425,000$ square feet to be treated
- C Convert the area units in step 2 to match the area unit in step 1
- Notice that in step 2, the unit was square feet; in step 1, it is acres. Now reference the provided table and use the formula for converting square feet to acres. This is how the above problem works out: $425,000 \text{ sq. ft.} \div 43,560 \text{ sq. ft.} = 9.8$
- M Multiply the answers in steps 1 and 3
- For the above problem, it works out like this: $30 \text{ lbs./acre} \times 9.8 \text{ acres} = 294 \text{ pounds of total product}$
- A.I. Calculate pounds of A.I. Use formula 1 for calculating A.I.
- Multiply the answers in step 4 and the percent of A.I. in step 1. It works out like this: $294 \text{ lbs.} \times 80\% \div 100 = 235.2 \text{ pounds of A.I.}$
- formulas you use on a daily basis to convert units of measure, calculate area and perimeter, total product and the amount of active ingredient used
- INSERT CALCULATION FORMULA

Slide 9.1 – Course Completion

Congratulations, you have completed the pesticides labeling & management lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 2, Task 4 (5.1, 14.1, 14.2, 14.3) Pesticide Management Facilities and Asset Security

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

5.1, 14.1, 14.2, 14.3 Pesticide Management Facilities and Asset Security

Slide 1.3 – Instructions

Welcome to the lesson on Pesticide Management Facilities and Asset Security.

- Upon completion of this lesson, you must be able to successfully identify the relationship of basic facts and state general principles relating to Pesticide Management Facilities and Asset Security with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Facility Planning
- Facility Design Criteria
- Facility Security
- Asset/Equipment Security
- Vehicle Security

Slide 2.1 – Overview Intro

Slide 2.2 – Overview Part 1

- During this lesson, we will dive into pest management facilities and asset security. Within all long-term installation pest management programs, planning must include a special facility to house the pest management administrative offices, personnel, equipment, and materials.
- All Department of Defense (DoD) pest management facilities must meet the requirements of the environmental protection agency (EPA), the Occupational Safety and Health Administration (OSHA) and each service's own regulations.

Slide 2.3 – Overview Part 2

- TG 17, Military Handbook, Design of Pest Management Facilities provides basic criteria to design military installation pest management facilities and it includes some operational information to justify certain design features.
- TG 17 promotes compliance with measures for safety and environmental protection established by host state or country regulations
- A facility designed, will support operations and provide for safe storage of pesticides, safeguard the health and safety of employees, prevent environmental contamination, contain spillage, and be secure against theft and vandalism.

Slide 3.1 – Facility Planning Intro

Slide 3.2 – Facility Planning Menu

- Purpose
- Intended Users
- Functional Considerations
- Facility Cost
- Environmental Concerns
- Location
- Safety and Security

Slide 3.3 – Purpose

- The design of pesticide storage facilities shall comply with standards described in TG 17.
- Existing facilities must comply with all applicable regulatory standards and shall, where feasible, be modified to meet the minimum standards for new pesticide storage facilities (per DoD 4150.07, Vol 1 Jan 22, 2020).

Slide 3.4 – Intended Users

- The primary users of pest management facilities are the installation personnel responsible for pest management operations. At no time should a pest management facility ever be repurposed.

Slide 3.5 – Functional Considerations

- FACILITY SIZE
 - Facilities shall provide adequate space for personnel and equipment necessary to address installation pest problems. In general, a small facility serves one to three workers or pest managers, a medium facility serves four to nine workers, and a large facility serves 10 or more workers.
- MULTI-PURPOSE FACILITIES
 - If two pest control functions (e.g., public works and the golf course) require facilities that can be located at the same location, modify the design to include:
 - a common mixing room
 - separate storage areas
 - a shared office, laundry, and toilet facilities
- SINGLE-USE FACILITY
 - For a single-use facility, the size should be a minimum of 1000 square feet (93 square meters) to include pesticide storage and equipment areas, mixing area, and a deluge shower and eyewash as a minimum.

- Depending on the distance from other facilities, a small office, toilet, and laundry area may also be required. Include additional variations in the design to account for staffing and climatic differences and to comply with individual state or host country requirements for pesticide handling.
- For further square footage requirements reference TG 17, Military Handbook, Design of Pest Management Facilities.

Slide 3.6 – Environmental Concerns

- Pesticide use is closely regulated by the U. S. Environmental Protection Agency (EPA) and state regulatory agencies. Pest management facilities are subject to Occupational Safety and Health Administration (OSHA) regulations as well as the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), DoD and military service instructions and criteria. Facility planning shall include safety, public health, and environmental protection issues.
- The storage and use of pesticides is often regulated by state or location pollution abatement agencies. The use of water to extinguish fires in facilities may generate hazardous liquid wastes that can readily contaminate materials, soil, and ground water. Another concern is for the proper disposal of wastes generated with normal operations.
- Pesticide spills and cleanup procedures are addressed separately in the Armed Forces Pest Management Board (AFPMB) Technical Guide No.15

Slide 3.7 – Facility Cost

- Pest management facilities are expensive to construct and, unless they are designed economically, funding through the military construction program will be required. This is attributable to the high square footage costs for utility connections, specialized ventilation, and safety requirements. It is essential that installations design and construct minimum sized facilities to meet their mission requirements.
- Installations should also consider the future use of a pest management facility. Facility planners should consider all options, including pre-fabricated storage facilities in lieu of constructing an entire pest management facility as described in this document. The Pest Management Consultant can provide guidance on whether a prefabricated storage facility is appropriate for the installation's pest management operations.

Slide 3.8 – Location

- Pest management facilities contain toxic pesticides and related chemicals and may be required in emergencies for interim storage of pesticides classified as hazardous materials. Isolated single-purpose structures are essential if construction of a new facility is planned. Pesticide storage and mixing facilities that are integral parts of multiple-occupied buildings present actual and potential problems.
- Unless the pest management facility is tightly sealed off, noxious vapors will permeate nearby spaces. Pest control materials are highly pilferable and expensive; thus creating a security problem. When locating a pest management facility in a multiple-use building is the only alternative, the pest management facility shall be located on the end of the structure separated from the other areas by secure vapor impervious partitions.

Slide 3.9 – Safety & Security

- Due to the hazardous nature of various pesticides, (e.g., insecticides, acaricides, herbicides, rodenticides, fungicides, wood preservatives, avicides, nematocides, and

molluscicides) stored and mixed in pest management facilities, it is essential that such materials are secured and available only to qualified individuals. Security fencing, security gates, and other measures are essential. A climb resistant fence shall enclose the entire facility.

- If other security measures are taken, such as security devices on the windows, fencing shall enclose the vehicle storage area and outside mixing areas.
- Design review shall include installation security requirements; see Air Force Pest Management Board (AFPMB) Technical Guide #7 for more details about pesticide security and use Unified Facilities Guide Specifications (UFGS) 32 31 13.00 40 Chain Link Fences and Gates (07-2007) for guidance on installing fences
- All pest management facilities should have the following:
- A climb-resistant chain link fence, minimum of seven feet that is twisted at both the top and bottom, to prevent unauthorized entry.
- Exterior lighting should be used to illuminate all areas within the fenced area. Particular attention should be directed toward eliminating any dark spots or shadows; especially where there are doors or windows. The lighting should be timer controlled.
- Video cameras should be considered for use at facilities on remote sites or facilities with large quantities of pesticides that pose a significant risk to the community as a result of theft, vandalism, or sabotage.
- Alarm systems should be installed on windows and doors, including the doors of hazardous material containers. The alarm system can be tied into the main installation security office. Have exterior self-locking and self-closing doors to prevent unauthorized entry.
- Interior doors to pesticide storage areas should also be locked to prevent unauthorized access during normal duty hours and to prevent entry during non-duty hours. Locks on doors of hazardous material containers used for pesticide storage should be case hardened and of sufficient size to preclude easy tampering or destruction.
- Equip windows with interior security mesh if the facility is not enclosed (surrounded) by a climb-resistance chain link (security) fence and security gate. As an alternative, do not provide windows.
- Secure pesticide dispersal equipment when not in use. Vehicles should be identified and registered with the security office. Sprayers should be disabled if left outdoors—this can be done by using a removable startup device or equipping the sprayers to operate only when activated by a PIN or magnetized card.
- Pesticides should be removed from vehicles during nonduty hours if they are left outdoors. Serial numbers of all spray equipment should be recorded, with a copy kept on file at the security office.
- Post the names, addresses, and telephone numbers for contact persons at the primary entrance to the storage area (list at least two people, if possible). Indicate location of the nearest accessible telephone.
- Post all storage areas to indicate pesticide storage: “DANGER, POISON, PESTICIDE STORAGE” and “UNAUTHORIZED PERSONS KEEP OUT”.

- Signs should be bilingual, if applicable. Pesticides are often transported from secured storage locations to job sites for mixing and application. All pesticides must be stored in locked containers affixed to the vehicle.

Slide 4.1 – Facility Design Criteria Intro

Slide 4.2 – Facility Design Criteria Menu

- Size
- Functionality
- Vehicle & Equipment Storage
- Mixing Room & Storage Areas
- Siting
- Facility Needs

Slide 4.3 – Size Video

- Video Closed Captions

The design pest management facilities should be implemented to best suit the amount of people and the operations for the given location. Consider also the number of pest control functions required; even small shops may be providing the full range of operations involving three items of trailer mounted equipment, two vehicles, and an inventory of 40 or more pesticides and related chemicals.

Slide 4.4 – Takeaways

- The design of pest management facilities should be implemented to best suit the amount of people and the operations for the given location.
- Consider also the number of pest control functions required; even small shops may be providing the full range of operations involving three items of trailer mounted equipment, two vehicles, and an inventory of 40 or more pesticides and related chemicals.

Slide 4.5 – Functionality Video - Part 1

- Video Closed Captions

Arrangement of spaces and corridors shall allow workers to arrive in a clean area, dress for hazardous exposure in the change area, leave through a pesticide area doorway, and retrace that path at the end of the workday. Examples of Pest Management facilities can be found in Technical Guide 17 It is essential that the mixing room be located adjacent to the storage area and the equipment storage area (if indoors). The mixing room must also be accessible through the corridor to the shower and locker rooms and the exterior. Pest Management facilities should be divided into the three areas - clean, transitional, and pesticide.

Slide 4.7 – Takeaways

- Arrangement of spaces and corridors shall allow workers to arrive in a clean area, dress for hazardous exposure in the change area, leave through a pesticide area doorway, and retrace that path at the end of the workday.
- Examples of Pest Management facilities can be found in TG 17.
- It is essential that the mixing room be located adjacent to the storage area and the equipment storage area (if indoors) and be accessible through the corridor to the shower and locker rooms and the exterior.

- Pest Management facilities should be divided into three areas - clean, transitional and pesticide.

Slide 4.8 – Functionality Video - Part 2

- Video Closed Captions

Clean areas - include an office, vestibule and airlock, and mechanical and electrical spaces

Office space - Provides a space to perform office work. Heating, ventilation, and air conditioning are recommended for effective workplace habitability. It is essential that there be no direct access between office and pesticide storage and mixing areas Equipment storage, cabinets, and lockers provide separate space in the clean area personal protective gear such as new gloves, respirator cartridges, etc. This needs to be located away from pesticides. General storage area provides a storage closet for uniforms and other items not contaminated with pesticides. A general purpose room is for medium and large facilities in remote sites where meeting space is not available, and provide an area for personnel training, conferences and break room.

Slide 4.9 – Takeaways

- Clean areas - include an office, vestibule and airlock, mechanical and electrical spaces
- Office space - Provides a space to perform office work
- Heating, ventilation, and air conditioning is recommended for effective workplace habitability
- It is essential that there isn't direct access between the office and pesticide storage and mixing areas

Slide 4.10 – Transitional Areas Video

- Video Closed Captions

Transitional areas provide a dressing area for changing clothes, men's shower and lockers, toilet, laundry and cleaning gear room and additional women's shower and lockers, as needed. The shower and locker room serves as a transition area between clean and pesticide handling areas. It contains lockers for street clothing on one side, storage for work clothing (shoes, coveralls, caps, etc.) on the other side, and a third area for personal protective equipment such as respirators. The room shall be accessible to the showers and lockers, toilet, and laundry and cleaning gear areas. Personnel locker space is essential. Provide a hot water shower for personnel to use at the end of the day for personal decontamination. Laundry and clean gear room must be provided adjacent to or near the shower and locker room area.

Slide 4.11 – Takeaways

- Transitional areas provide a dressing area for changing clothes, men's shower and lockers, toilet, laundry and cleaning gear room and additional women's shower and lockers, as needed.
- The room serves as a transition area between clean and pesticide handling areas.
- It contains lockers for street clothing on one side, storage for work clothing (shoes, coveralls, caps, etc.) on the other side, and a third area for personal protective equipment (respirators, etc.).
- The room shall be accessible to the showers and lockers, toilet, and laundry and cleaning gear areas.

- Personnel locker space is essential. Provide a hot water shower for personnel to use at the end of the day for personal decontamination
- Laundry and Clean Gear Room
- Must be provided adjacent to or near the shower and locker rooms

Slide 4.12 – Pesticide Handling Areas Video

- Video Closed Captions

The pesticide handling area includes pesticide storage and mixing rooms. This is the area of greatest pesticide exposure and hazard to applicator personnel from toxic materials. Pesticides shall be stored in an area sealed or separated from clean areas, with direct access to the exterior. All pesticides stored indoors shall be off the floor so that all labels are visible, with 3-foot lanes to provide effective access and inspection, and stored no more than eight feet (2.44 m) high. Pesticides shall be stored in a dry room or building where temperatures are maintained above 50 degrees Fahrenheit (12 degrees Celsius) and below 100 degrees Fahrenheit (38 degrees Celsius). Pesticide storage shall be separated from mixing areas, shower and locker room, offices, or any area where personnel work for prolonged periods. Pesticide concentrates shall not be stored in rooms containing a floor drain of any type; containment by curbing or sloped floors is required in the pesticide mixing and storage areas. Provide open non-absorptive shelving for pesticides. Do not provide floor drains in storage areas.

Slide 4.13 – Takeaways

- The pesticide handling area includes pesticide storage and mixing rooms
- This is the area of greatest pesticide exposure and hazard to applicator personnel from toxic materials
- Indoor storage areas
- Pesticides shall be stored in an area sealed or separated from clean areas, with direct access to the exterior.
- All pesticides stored indoors shall be off the floor so that all labels are visible, with 3-foot lanes to provide effective access and inspection, and stored no more than eight feet (2.44 m) high.
- Pesticides shall be stored in a dry room or building where temperatures are maintained above 50 degrees Fahrenheit (10 degrees Celsius) and below 100 degrees Fahrenheit (38 degrees Celsius).
- Pesticide storage shall be separated from mixing areas, shower and locker room, offices, or any area where personnel work for prolonged periods (essential).
- Pesticide concentrates shall not be stored in rooms containing a floor drain of any type; containment by curbing or sloped floors is required in the pesticide mixing and storage areas.
- Provide open non-absorptive shelving for pesticides
- Do not provide floor drains in storage areas

Slide 4.6 – Siting

- Pest Management facilities must be isolated and away from congested areas for health and safety, fire protection, environmental protection, and security reasons. Site pest management facilities a minimum of 200 feet (61 m) from surface water, existing wells and cisterns, or 100-year flood plain levels. Site pest management facilities downhill

from any sensitive areas (e.g., wells, cisterns, etc.), or provide diking (essential) where space is limited

- Do not site facility downhill because of flood potential. Consideration must also be given to prevailing wind conditions and the location of populated areas. Facilities shall not be located uphill from potable water sources or continuously occupied structures. Facilities should not be sited over aquifers (subsurface potable water supplies) unless the aquifer is adequately protected through containment measures.
- Location and design of pest management facilities should be selected to avoid potential adverse impacts to threatened, endangered, and at-risk species. Facilities shall be sited at least 100 feet (30.4 m) from other structures. Siting shall be approved by an industrial hygienist, a sanitary engineer, and by a fire protection engineer.

Slide 4.14 – Vehicle & Equipment Storage Video

- Video Closed Captions

Provide storage space for one vehicle and one trailer-mounted equipment item in small facilities. In larger facilities, additional space, as required, shall be provided for parking vehicles and storing trailer-mounted application equipment. Motor vehicles and any other gasoline engine (such as lawn mowers) will not be stored in the same area as pesticides. Whenever possible, motor vehicles shall be located outside or in a separate building from the pesticide storage or handling area; they shall be separated from the pesticide area by a minimum of two-hour fire rated construction.

Slide 4.15 – Takeaways

- Provide storage space for one vehicle and one trailer-mounted equipment item in small facilities.
- In larger facilities additional space, as required, shall be provided for parking vehicles and storing trailer-mounted application equipment
- Motor vehicles and any other gasoline engines (i.e. lawn mower) will not be stored in the same area as pesticides.
- Whenever possible, motor vehicles shall be located outside or in a separate building from the pesticide storage or handling area; they shall be separated from the pesticide area by a minimum of two-hour fire rated construction.

Slide 4.16 – Mixing Room & Storage Areas Video

- Video Closed Captions

Pesticide mixing room is an area used to mix concentrated pesticides into ready-to-use formulations. Mixing rooms must have electricity and hot and cold water. Open non-absorptive shelves should be situated near the pesticide storage racks, drum stands, exterior personnel door and in mixing areas. Metal or plastic pallets to hold pesticides off the floor are essential; plastic is preferred. Steel stands to keep drums off the floor are recommended. The work area shall contain a pesticide-resistant sink with a closeable drain, a contiguous self-draining drip-proof counter top at least 5 feet long, sideboards, a splash panel on back, and an adjacent shelf for holding measuring devices and concentrates. The drain should discharge into a container (not be connected to plumbing) to collect any rinsate or spilled pesticide. An additional unhooded deep sink for washing small equipment, gloves, etc.,

is recommended for medium and large facilities. Galvanized metal fixtures are acceptable. Additional nonabsorbent shelving, 12 inches, or 305 mm deep, is recommended to store mixing equipment items.

Slide 4.17 – Takeaways

- A mixing room is an area used to mix concentrated pesticides into ready-to-use formulations.
- Mixing rooms must have electricity and hot and cold water.
- Open non-absorptive shelves should be situated near the pesticide storage racks, drum stands, exterior personnel door and in mixing areas.
- Metal or plastic pallets to hold pesticides off the floor are essential; plastic is preferred.
- Steel stands to keep drums off the floor are recommended.
- The work area shall contain a pesticide-resistant sink with a closeable drain, a contiguous self-draining drip-proof counter top at least 5 feet long, sideboards, a splash panel on back, and an adjacent shelf for holding measuring devices and concentrates.
- The drain should discharge into a container (not be connected to plumbing) to collect rinsate or any spilled pesticide.
- An additional unhooded deep sink for washing small equipment, gloves, etc., is recommended for medium and large facilities.
- Galvanized metal fixtures are acceptable. Additional nonabsorbent shelving, 12 inches (305 mm) deep, is recommended to store mixing equipment items.

Slide 4.18 – Facility Needs

- Access must be provided to pest management facilities for vehicles carrying supplies or pulling trailer mounted dispersal equipment. The facility must be accessible to vehicles and pedestrians on at least two sides.
- PARKING
 - Adequate spacing must be available to park all pesticide dispersal equipment inside the pest management area but out of the building and under cover. Employee parking, if provided, shall be outside of the security fence or perimeter
- SECURITY FENCING AND GATES
 - Security measures described in AFPMB TG 7 should be followed including the fencing.
- OUTDOOR PESTICIDE MIXING AREAS
 - Provide outdoor areas for medium and large pest management facilities consistent with provisions for the safe filling and mixing of pesticide equipment on vehicles and trailer-mounted equipment.
- HARDSTAND AREA
 - A covered outdoor hardstand and parking apron may be used for vehicles and equipment consisting of a concrete pad sufficiently large to park a truck and trailer. Hardstands are recommended for use during cleaning and for filling truck/trailer mounted dispersal equipment. Refer to TG 17 regarding hardstand sump pump and drainage requirements
- EMERGENCY EYE WASH, DELUGE SHOWER AND DRAIN

- An eye wash and deluge shower is essential for emergency washing of individuals accidentally contaminated with pesticides, IAW 29 CFR 1910.151. If the eye wash and deluge shower are located in the outdoor mixing area, they must be protected from freezing. An emergency eye wash and deluge shower must be provided with manually-operated, delayed-closing valves located adjacent to the mixing counter. Site eye and deluge shower(s) must be accessible within 10 seconds from indoor and outdoor mixing areas.

Slide 4.19 – Facility Needs Video

- Video Closed Captions

Provide a separate ventilation system for the mixing and storage areas. The system shall be provided with roof mounted centrifugal fan selected for six air changes per hour minimum. Fans shall discharge vertically. Replacement air shall be heated to 55 degrees Fahrenheit, which is 13 degrees Celsius. Provide a motorized damper at the air intake louver and at the exhaust fan discharge. The damper shall close when the ventilation system is turned off.

Provide a ventilation system control switch with light to indicate “ON” at the entrance to the pesticide handling areas, and a sign at the switch which reads, VENTILATION SYSTEM SHOULD OPERATE CONTINUOUSLY. DO NOT ENTER UNLESS VENTILATION SYSTEM HAS OPERATED FOR AT LEAST TEN MINUTES”.

Slide 4.20 – Takeaways

- Provide a separate ventilation system for the mixing and storage areas
- System shall be provided with roof mounted centrifugal fan selected for six air changes per hour (minimum). Fans shall discharge vertically
- Replacement air shall be heated to 55 degrees Fahrenheit (13 degrees Celsius)
- Provide a motorized damper at the air intake louver and at the exhaust fan discharge. Damper shall close when the ventilation system is turned off. Provide a ventilation system control switch with light to indicate “ON” at the entrance to the pesticide handling areas, and a sign at the switch which reads, ‘VENTILATION SYSTEM SHOULD OPERATE CONTINUOUSLY. DO NOT ENTER UNLESS VENTILATION SYSTEM HAS OPERATED FOR AT LEAST TEN MINUTES”

Slide 5.1 – Facilities Security Intro

Slide 5.2 – Facilities Security Menu

- Perimeter
- Exterior Lighting
- Security Cameras
- Alarm System
- Self-Locking & Self Closing Exterior Doors
- Post Contact Info & Warning Signs

Slide 5.3 – Perimeter

- PERIMETER OF FACILITY MUST BE SECURED
 - A climb resistant chain link fence shall surround facilities
 - Must be a minimum of 7 feet high, with no top bar, and barbed at the top and bottom

- Security gates to the fence must be kept locked

Slide 5.4 – Exterior Lighting

- Used to illuminate all areas within the fenced areas

Slide 5.5 – Security Cameras

- Should be considered on remote or facilities with large quantities of pesticides that may pose a significant risk to the community as a result of theft, vandalism or sabotage

Slide 5.6 – Alarm System

- Alarm systems should be installed on all windows and doors and be tied into the main installation security office

Slide 5.7 – Self-Locking & Self-Closing Exterior Doors

- Interior doors to pesticide storage areas must remain locked to prevent unauthorized access
- Locks on doors of hazardous material containers used for pesticide storage should be case handed to avoid tampering or destruction
- Equip windows with interior security mesh if the facility is not enclosed by a climb-resistant chain link fence and security gates
- Secure pesticide dispersal equipment when not in use
- Sprayers should be disabled if left outdoors and free of pesticides

Slide 5.8 – Post Contact Info. & Warning Signs

- At a minimum, names, addresses, and telephone numbers should be placed on main entrance to facility
- Post all storage areas to indicate pesticide storage:
 - “Danger, Poison Pesticide Storage”
 - “Unauthorized Persons Keep Out”
 - Signs should be bilingual, if applicable

Slide 6.1 – Asset/Equipment Security Intro

Slide 6.2 – Asset/Equipment Security - Part 1

- TG 17, Military Handbook, Design of Pest Management Facilities provides basic criteria to design military installation pest management facilities and it includes some operational information to justify certain design features.
- A facility should provide an area for safe storage of pesticides, safeguard the health and safety of employees, prevent environmental contamination, contain spillage, and be secure against theft and vandalism.
- Due to the risk of pesticides and the equipment used to disperse them, security measures should be put in place to avoid theft and vandalism intentional misuse of concentrated pesticides to cause illness or death is considered to be a “low probability, high impact” event, it must be seriously considered as part of overall installation security.
- All pesticide applicators should be trained in security awareness; each individual should understand how to safeguard pesticides and application equipment in the community, who to contact in an emergency, and where to report incidents of theft, vandalism, or

sabotage. This is especially important for contract personnel coming onto the installation to do work

Slide 6.3 – Asset/Equipment Security - Part 2

- SAFEGUARDING PEST MANAGEMENT EQUIPMENT
 - Pest managers must implement necessary measures to ensure maximized security for a pest management facility as well as the equipment that is used for daily operations.
 - Do not allow unauthorized personnel to have.
 - The use of a climb resistant fence is essential and provides extra security; that way equipment is not easily accessible and able to be removed or stolen from any unauthorized personnel.
 - Pesticide sprayers can be used to disperse biological agents as well as pesticides.
 - Special attention must be made to ensure that these types of equipment pieces are secured and accounted for at all times.
People who are unfamiliar with pest management operations would never know the difference if someone were to steal a sprayer and produce a biological substance.
 - Secure pesticide dispersal equipment when not in use. Vehicles should be identified and registered with the security office.
- Ballasts have three main functions:
 - provide correct starting voltage, (because lamps require a higher voltage to start than to operate).
 - match the line voltage to the operating voltage of the lamp.
 - limit the lamp current to prevent immediate destruction (because once the arc is struck the lamp impedance decreases).
 - Serial numbers of all spray equipment should be recorded, with a copy kept on file at the security office.
 - A good rule of thumb to follow is to conduct an inventory of application equipment quarterly to ensure the good standing of your equipment while also ensuring everything is accounted for.

Slide 7.1 – Vehicle Security Intro

Slide 7.2 – Vehicle Security

- TG 17 AND TG 7 outline facility requirements that help protect pest management vehicles including designated vehicle storage and parking areas for pest management vehicles.
- AFMAN 32-1053 outlines specific requirements for managing pest management vehicles.
- These requirements include the following:
 - Only pest management personnel may use pest management vehicles
 - Pest Management vehicle should only be used
 - Use equipment according to the manufacturer's instructions

- Equip vehicles with locking compartments to ensure the pesticides and other chemicals are safely handled, stored, and transported; telephone maintenance will suit the purpose
- Low-speed vehicles used for pesticide application should be properly equipped for safety and operated in accordance with the manufacturer's specifications.
- Make sure that all prime movers used for fogging, misting, dusting, and ultra-low-volume application have enclosed cabs and internal recycling air-conditioners to protect the operator from excessive pesticide exposure.
- The appropriate level of respiratory protection and other personal protection equipment will be provided to the driver (in addition to rolling up the windows).
- The truck must carry emergency phone numbers in case of spills or chemical exposures and carry a spill cleanup kit capable of containing 110 percent of the largest pesticide volume on the vehicle.
- Pest management personnel must carry radios or portable phones in vehicles.
- In the event of an emergency the vehicle operator must be able to contact emergency services and shop supervision.
- Attach placards to vehicle- or trailer-mounted sprayers identifying the product name (brand name from product label) preceded by the word "Diluted" or "End-Use Concentrate"; EPA registration number from concentrate product label; name of active ingredient(s) and percentage(s) of end-use dilution; and appropriate signal word, that is: Poison, Danger, Warning, Caution (from product label)
- Keep all pesticide dispersal equipment in the CE pest management section
- EXCEPTION: Equipment at base golf course that have certified pesticide applicators.
- NOTE: Pest managers must not transport pesticides within vehicle cabs or use assigned vehicles for anything except pest management activities

Slide 7.3 – Safeguarding Pest Management Vehicles

- Vehicles should be identified and registered with the security office
- Pesticides should be removed from vehicles during non-duty hours if they are left outdoors
- A canopy roof over the hardstand area may be provided to protect parked vehicles and equipment and to minimize accumulation of water

Slide 8.1 – Course Completion

Congratulations, you have completed the pesticide management facilities and asset security lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 2, Task 5 (6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5) Pesticides Tracking and Record

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5 Pesticides Tracking and Record

Slide 1.3 – Instructions

Welcome to the Pesticide Tracking and Record Keeping lesson.

- Upon completion of this lesson, you must be able to successfully identify basic facts and principles relating to Pesticide Tracking and Record Keeping with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- General Pesticide Tracking Information
- Computer Based Tracking
- Paper Based Tracking
- AF Form 1070, Termite and Wood Decay Inspection Form
- DD Form 1532-1, Pest Management Maintenance Record
- DD Form 1532, Pest Management Report

Slide 2.1 – Overview Intro

Slide 2.2 – Overview

- During this lesson, we will discuss computer and paper-based tracking. We will also discuss how to complete forms 1070, 1532-1, and 1532.
 - General Pesticide Tracking Information
 - Computer Based Tracking
 - Paper Based Tracking
 - Air Force (AF) Form 1070, Termite and Wood Decay Inspection Form
 - Defense Department (DD) Form 1532-1, Pest Management Maintenance Record
 - DD Form 1532, Pest Management Report

Slide 3.1 – General Pesticide Tracking Information Intro

Slide 3.2 – General Pesticide Tracking Information

- Hardware & Software
 - Video Closed Captions

To search for Air Force Publications, you are going to go out to the Air Force Portal. Once you are there, you are going to hover over Library and Resources and click on Air Force ePublications

- Installation Pest Management personnel shall obtain necessary computer hardware and use the Air Force designated pesticide database software to track pesticide inventories and pesticide applicator certifications. Installation pest management personnel shall record daily pesticide use in Air Force-approved pesticide database software.
- Compliance
 - Installation Pest Management personnel shall ensure pesticide recordkeeping complies with state or host nation requirements.
- DD Form 1532
 - If an Air Force designated pesticide database software is not available, record use on Department of Defense (DD) Form 1532, Pest Management Report and DD Form 1532-1, Pest Management Record.
- Accurate Recordings
 - The success and continuity of a sound installation pest management program is often determined by the availability of accurate operational records and reports. The best way to ensure timely and proper management measures, justify funds and personnel, and meet supply and equipment requirements is to maintain detailed records.
 - Such records also help support the value of long-term and preventative management actions.
- Electronic Records
 - This lesson addresses DD Form 1532, Pest Management Report, and DD Form 1532-1, Pest Management Maintenance Record. You may use electronic versions of these forms if such use is approved by your command entomologist.

Slide 4.1 – Computer Based Pesticide Tracking Intro

Slide 4.2 – Computer Based Pesticide Tracking

- Installation Pest Management personnel shall obtain necessary computer hardware and use the Air Force designated pesticide database software to track pesticide inventories and pesticide applicator certifications.
- Installation Pest Management personnel shall record daily pesticide use in Air Force-approved pesticide database software. If the Air Force designated pesticide database software is not available, record use on DD Form 1532, Pest Management Report.
- Installation Pest Management personnel shall ensure pesticide recordkeeping complies with state or host nation requirements.

- Installation Pest Management personnel shall keep historical records on termite inspections and pesticide applications in accordance with the records disposition schedule.

Slide 4.3 – Disposition Rule

- Disposition Rule: Destroy two years after building is disposed of or base is inactivated and dropped from real property accounts.
- Installation Pest Management personnel shall send monthly reports no later than 10 days after close of month to the local public health, bio-environmental engineer, and major command (MAJCOM) Pest Management Consultant (PMC) (or Air National Guard (ANG) Directorate of Civil Engineers).

Slide 5.1 – Paper Based Pesticide Tracking Intro

Slide 5.2 – Paper Based Pesticide Tracking

- Installation Pest Management personnel shall obtain necessary computer hardware and use the Air Force designated pesticide database software to track pesticide inventories and pesticide applicator certifications.
- Installation Pest Management personnel shall ensure pesticide recordkeeping complies with state or host nation requirements.
- Installation Pest Management personnel shall record daily pesticide use in Air Force-approved pesticide database software.
- If an Air Force designated pesticide database software is not available, record use on Department of Defense (DD) Form 1532, Pest Management Report and DD Form 1532-1, Pest Management Record.

Slide 5.3 – DD Form 1532, Pest Management Report

- Used when there is no computer-based pesticide tracking system available.
- Completed monthly per DoD 4150.07, Pest Management Program to capture daily operations.
- Must be submitted to your Major Command (MAJCOM) Pest Management Consultant (PMC) on a monthly basis.
- Data entries can be transcribed from DD forms 1532-1 that are completed each day.
- Disposition Rule: Destroy after two years after calendar year end.

Slide 6.1 – AFCEC Form 1070, Termite and Wood Decay Inspection Form Intro

Slide 6.2 – AFCEC Form 1070, Termite and Wood Decay Inspection Form

- AF Form 1070
 - Used to document termite and wood decay inspections.
 - Inspection must be completed for each building made of or partially made of wood and will have a Termite Inspection Form filled out.
 - Provides a record of building inspections, past problems, and action taken on the building.
 - Inspections should be made annually, semi-annually if necessary.
 - Disposition rule: Destroy 2 years after building is disposed of, or base is inactivated and dropped off real property accounts.
- Survey Procedures

- The first step in any termite and wood decaying inspection is to gather equipment.
 - Probe: used to investigate wood
 - Flashlight
 - Hard hat
 - Coveralls
 - Hammer
 - AF Form 1070

Slide 7.1 – DD Form 1532-1, Pest Management Maintenance Record Intro

Slide 7.2 – DD Form 1532-1, Pest Management Maintenance Record

- DD Form 1532-1
 - Maintained for all facilities requiring pesticide treatment.
 - Completed each time a pesticide is applied in the facility and its exterior surrounding area.
 - Provides a record of all past problems and pesticide treatments.
 - Generate a DD Form 1532-1 for each facility on the installation.
 - Disposition Rule: Destroy 2 years after building is disposed of or base is inactivated and dropped from real property accounts
- Access
 - The DD Form 1532-1 Pest Management Maintenance Record is accessible via the E-Pubs website: <https://www.e-publishing.af.mil/>
 - An electronic Excel version of the DD Form 1532-1 Pest Management Maintenance Record can be found at the Armed Forces Pest Management Board website: <https://www.acq.osd.mil/eie/afpmb/>
 - Step 1: Go to Armed Forces Pest Management Board website.
 - Step 2: Click on “Pest Management” Tab.
 - Step 3: Click on “Contingency Pest Management”.
 - Step 4: Scroll down until you see “Pesticide Reporting Forms”.
 - Step 5: Click link to Pest Management Report.(DD Form 1532)/ Pest Management Maintenance Record (DD Form 1532-1).
 - Step 6: Open and save Excel on desktop.
- Completion Procedures
 - Step 1: Completion of the 1532-1 must be completed after the treatment. Do not attempt to fill out before hand as chemical usage amounts may vary from projected amounts thought to be used.
 - Step 2: Ensure that you have all the relevant information needed to complete the form’s Target pest(s) and pesticide label information section.
 - Step 3: Follow each section on the 1532-1 Pest Management Maintenance Record and complete each section as thorough as possible. Example: document amount of area treated in the UNITS SERVICED section.
 - Step 4: After completing both sides of the DD Form 1532-1, start a new one by transcribing the information from the top four blocks of the old form to the new one

- Step 5: File all completed 1532-1's for historical purposes and only dispose of two years after the building is destroyed, the base is inactivated, or dropped from real property accounts.

Slide 8.1 – DD Form 1532, Pest Management Report

Slide 8.2 – DD Form 1532, Pest Management Report

- DD Form 1532
 - IAW AFMAN 32-1053, Air Force Integrated Pest Management Program, installation Pest Management personnel shall record daily pesticide use in the Air Force approved pesticide database software.
 - If the software is not available, usage records must be annotated on the DD Form 1532 Pest Management Report.
 - Installation Pest Management personnel shall ensure pesticide record keeping complies with state or host nation requirements.
 - Maintained to track all pesticide usages on a given installation.
 - Data entries can be transcribed from DD Forms 1532-1 that are completed each day.
 - Per AFMAN 32-1053, Air Force Integrated Pest Management Program, installation Pest Management personnel shall send monthly reports no later than 10-days after close of the month to Public Health, Bioenvironmental, MAJCOM PMC.
 - Disposition Rule: Destroy 2 years after building is disposed of or base is inactivated and dropped from real property accounts
- Access
 - The DD Form 1532-1 Pest Management Maintenance Record is accessible via the E-Pubs website: <https://www.e-publishing.af.mil/>
 - An electronic Excel version of the DD Form 1532-1 Pest Management Maintenance Record can be found at the Armed Forces Pest Management Board website: <https://www.acq.osd.mil/eie/afpmb/>
 - Step 1: Go to Armed Forces Pest Management Board website.
 - Step 2: Click on "Pest Management" Tab
 - Step 3: Click on "Contingency Pest Management".
 - Step 4: Scroll down until you see "Pesticide Reporting Forms".
 - Step 5: Click link to Pest Management Report (DD Form 1532) / Pest Management Maintenance Record (DD Form 1532-1).
 - Step 6: Open and save Excel on desktop.
- Completion Procedures
 - Step 1: Compile each 1532 used throughout the month and calculate total pesticide usage.
 - Step 2: Follow each section on the 1532 Pest Management Report and complete each section as thorough as possible.
 - Step 3: Ensure accuracy and obtain Shop supervisor approval.
 - Step 4: Send monthly report no later than 10 days after close of month to public health, bioenvironmental, and MAJCOM PMC.

- Step 5: Store all 1532s for historical purposes and only dispose of two years after the building is destroyed, the base is inactivated, or dropped from real property accounts.

Slide 9.1 – Course Completion

Congratulations, you have completed the pesticide tracking and record keeping lesson. Please click complete lesson to receive credit.

3E451 – Pest Management Journeyman

Module 1, Lesson 3, Task 1 (5.4.1) Personal Protective Equipment

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X1 Career Development Course

5.4.1 Personal Protective Equipment

Slide 1.3 – Instructions

Welcome to the Pest Management Personal Protective Equipment lesson

- Upon completion, and without reference, you must be able to identify the relationship of basic facts and state general principles about Personal Protective Equipment with at least a 75% accuracy

Slide 1.4 – Overview

In this section, we will cover the following topics:

- Purpose of PPE
- Determining PPE
- Types of PPE

Slide 2.1 – PPE Main Menu

- Purpose
- Determining PPE
- Types

Slide 3.1 – Purpose

- Overview
 - The purpose of PPE is to minimize exposure to hazards that cause serious injuries and illnesses.
 - Personnel who handle and/or apply pesticides are required to wear PPE and clothing according to:
 - Federal Insecticide, Fungicide and Rodenticide Act (40 CFR 170)
 - Occupational Safety and Health Standards (29 CFR 191)
 - DoD Instruction 4150.07, and individual pesticide labels
- Guidance

- When engineering, work practice, and administrative controls do not provide sufficient protection, employers must provide PPE to their employees and ensure their proper use.
- Considerations
 - Employers should also ensure each worker required to use PPE know:
 - When is it necessary
 - What kind is necessary
 - How to properly put it on, wear and take off
 - The limitations of the equipment
 - Proper care, maintenance, useful life, and disposal of PPE procedures

Slide 4.1 – Determining PPE

- Pest Management supervisors are responsible in determining PPE requirements used for different pesticides and then to ensure shop personnel wear the required items.
- Equipment requirements are dictated by the type of pesticide used, its toxicity characteristics, percentage of active ingredients, and phase of handling.
- The Pesticide label is the law—if the pesticide label requires specific PPE items for use of the product, it is a lawful requirement to have it on hand and to use it.
- TG 14, Personal & Protective Gear for Pest Management Personnel provides general PPE requirements for Pest Management operations.

Slide 5.1 – Types of PPE Menu

Click on Each Type to Learn More

- Type A
- Type B
- Type C
- Type D

Slide 6.1 – PPE Type A Menu

- Gloves
- Face Shield
- Aprons

Slide 6.2 – Gloves

- DESCRIPTION
 - Nitrile or natural synthetic rubber gloves, organic solvent resistant, high sleeve, with a rolled edge cuff
- USE
 - Pesticide applicators should wear gloves to prevent skin contamination during all phases of pesticide handling and to clean dispersal and protective equipment.
 - Leather, cotton or medical examination gloves are not to be worn when handling pesticides.
- MAINTENANCE
 - Wash gloves after each day's use with soap and water, inside and out
 - Inspect for holes and tears

- Fill each glove with water and gently squeeze while holding top of the glove with one hand; if water leaks out of hole dispose and replace

Slide 6.3 – Face Shield

- DESCRIPTION
 - Industrial face shield with a 6-inch wide plastic mask and forehead guard
- USE
 - Worn to protect eyes and face from pesticide splashing or wind drift when mixing or applying pesticides
 - Always keep pesticide containers below eye level during mixing to prevent splashes to the face
 - Goggles and face shield may be worn as extra precaution
- MAINTENANCE
 - Wash with warm soapy water after each use and hang dry
 - Inspect before and after cleaning for scratches and defects

Slide 6.4 – Aprons

- DESCRIPTION
 - Impermeable, cotton woven fabric, both sides coated with chloroprene rubber
 - Tie tape fasteners in back
 - No sleeves or pockets
 - Universal size; 48 inches long and 34 inches wide at waist
- USE
 - Wear when measuring and mixing pesticides, filling sprayers, or working with solvents
 - Serves as additional precaution to prevent contamination of the groin area, which is very susceptible to pesticide absorption
- MAINTENANCE
 - Wash with soapy water and hang to dry
 - Inspect them regularly and discard if tears or holes are found;
 - DO NOT REPAIR

Slide 7.1 – PPE Type B Menu

- Boots, Knee
- Respirator
- Coveralls

Slide 7.2 – Boots, knee

- DESCRIPTION
 - Non-Insulated
 - Black rubber
 - Fifteen inches high with waterproof uppers and cleated soles
 - Must be nonslip
- USE

- Rubber boots shall be worn when mixing or applying liquid pesticides, especially large scale operations
- Wear rubber boots with the tops beneath the legs of trousers, coveralls or other protective clothing
- MAINTENANCE
 - Wash after each use with soap and water, inside and out to remove pesticide contaminants

Slide 7.3 – Respirator

- DESCRIPTION
 - Full or half-faced respirators are used to filter airborne particles that be considered hazardous to the human body
 - Pesticide labels with specify if a respirator is recommended as well as the filtration needed
 - DAFI 48-137 Respiratory Protection Program requires anyone that uses a respirator for daily work routines to get an annual Respirator Fit Test and upkeep a shop Respiratory Protection Program
- USE
 - Respirators are uses as needed dependent on the type of pesticide being used
 - Always refer to pesticide label for specific PPE requirements
- MAINTENANCE
 - Wash all rubber surfaces with soap and water after each use
 - Store respirators separate from cartridges in a clean, cool, dark area to avoid over-heating and breakdown of rubber material
 - Cartridge change out/storage schedule is based off of the type and life expectancy; consult Bioenvironmental Engineering (BE) for recommended schedule
- FIT TEST
 - All pesticide applicators are required an annual respirator fit test
 - Fit tests are completed by BE to ensure applicators have a clean seal on their respirator and are not inhaling toxic fumes

Slide 7.4 – Coveralls

- DESCRIPTION
 - Cotton
 - Slide fastener closure with protective fly piece at front
 - Leg bottoms and wrists closed with nylon fasteners
 - Three patch pockets and a draw cord at the waist
- USE
 - To mix and apply pesticides
 - Coveralls should cover the entire body to protect the skin from contamination
 - Coveralls are only authorized while performing job duties
- MAINTENANCE
 - Used or worn coveralls should be washed in a shop designated washing machine in soap and water and separately from other clothing

- Inspect before use and after laundering for holes, tears or thinning of material

Slide 8.1 – PPE Type C Menu

- Coveralls, disposable
- Hearing Protection

Slide 8.2 – Coveralls, disposable

- DESCRIPTION
 - Coveralls made of spun bonded olefin fabric (DuPont TYVEK ®)
 - Intended to be thrown away after use
- USE
 - According to manufacturer specifications, coveralls should be discarded after eight hours of use and not to exceed one day
 - If garments become contaminated, discard immediately after use
- MAINTENANCE
 - Inspect for holes, tears prior to use
 - Discard after use DO NOT REUSE

Slide 8.3 – Hearing Protection

- DESCRIPTION
 - Two types of hearing protection are used Ear plug and ear muffs
 - Ear plugs are made of silicone rubber
 - Single or triple flange holding the plug in the ear
 - Ear Muffs have plastic outer shell covering each ear
 - Sound absorbent material and replaceable plastic ear pads inside each shell
 - Ear plugs or ear muffs should provide sound reduction of 24 decibels
- USE
 - Pest managers must wear ear protection devices whenever they operate noisy equipment or work in hazardous-noise areas
 - Ear plugs are appropriate when noise hazards are intermittent and bulk of ear muffs are undesirable
 - Ear muffs will be used when working/exposed to noise levels above 85 decibels
- MAINTENANCE
 - Dispose of disposable ear plugs, if reusable, wash with soap and water and inspect before next use
 - Wash ear muffs with soapy water; inspect padding for cracks, hardening or absorbent material
 - If any defects are detected on either type, replace them

Slide 9.1 – PPE Type D Menu

- Insect Bar, Heade Net

Slide 9.2 – Air Force Occupational Safety and Health Program (AFOSH)

- DESCRIPTION
 - Stiff, oxford crown hat with quilt stitched brim
 - Black nylon insect net is attached to the hat by an elastic cord
- USE

- Used to protect against flying insects that may bite or sting
- MAINTENANCE
 - Replace net when worn down

Slide 10.1 – Types Continued

- Helmet
 - DESCRIPTION
 - Brimless safety helmet with a copolymer (hard plastic) shell
 - Adjustable inner lining
 - USE
 - Used in areas where flying, falling and protruding objects present hazards
 - MAINTENANCE
 - Periodically wash with soap and water
 - Inspect for crack, holes and replace as needed
- Goggles
 - DESCRIPTION
 - Chemical splash goggles, anti-fog, indirect venting, acetate frame
 - USE
 - Worn to protect eyes and face from pesticide splashing or wind drift when mixing or applying pesticides
 - Always keep pesticide containers below eye level during mixing to prevent splashes to the face
 - Goggles and face shield may be worn as extra precaution
 - MAINTENANCE
 - Wash after each use with soap and water
 - Dry with soft cloth to prevent scratching
- Boots, Hip Waders
 - DESCRIPTION
 - Non-Insulated
 - Black rubber
 - High enough on body where you can enter water at waist height
 - USE
 - Hip waders are used to prevent the lower body getting wet
 - At times, where Pest Managers may be required to go waist deep into water
 - MAINTENANCE
 - Wash after each use with soap and water, inside and out to remove pesticide contaminants, dirt or debris

Slide 11.1 – Course Completion

Congratulations, you have completed the personal protection equipment lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 3, Task 4 (7.1.1 & 7.1.2) Types and Uses of Pest Management Equipment

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

7.1.1 & 7.1.2 Types and Uses of Pest Management Equipment

Slide 1.3 – Instructions

Welcome to the Type and Uses of Pest Management Equipment lesson.

- Upon completion, and without reference, you must be able to identify the relationship of basic facts and state general principles about the Types of and Uses of Pest Management Equipment with at least a 75% accuracy.

Overview

In this section, we will cover the following topics:

- Equipment Overview
- Equipment Selection
- Types of Pest Management Equipment
- Uses of Pest Management Equipment

Slide 2.1 – Types and Uses of Pest Management Equipment Intro

Slide 2.2 – Types and Uses of Pest Management Equipment Menu

Your selection of the best equipment for a Pest Management program is of great importance, since pesticide equipment-related problems may seriously affect your Integrated Pest Management (IPM) program. Safe and efficient pesticide application also requires knowledge of pesticide application equipment and training about application methods. This lesson addresses the factors you use to select equipment. Click each to learn more.

- Equipment Overview
- Equipment Selection
- Types

Slide 3.1 – Equipment Overview

- General Information
 - Several different types of equipment are used for Pest Management operations.
 - Depending on the situation and pest in need of control, Pest Managers can choose from a wide variety of equipment that best suits the operation.
 - Pest Managers must be familiar and efficient with all types and uses of equipment to best suit the control of the given pest.
- Website
 - All Department of Defense (DoD) approved general Pest Management equipment can be found on the Air Force Pest Management Board (AFPMB) website on the DoD Pest Management Material Other than Pesticides List.
 - Click on the link below or, go to the AFPMB homepage at:
<https://www.acq.osd.mil/eie/afpmb/>.
Click Pest Management, Contingency Pest Management.
 - Click on DoD Pest Management Material Other than Pesticides List. Equipment is separated as either “Manual” or “Powered”.

Slide 4.1 – Equipment Selection

- Safety
 - Safety of chosen equipment is imperative; if an applicator cannot apply or use the equipment in a manner that will result in putting themselves in danger.
 - Do not use any equipment if it poses a safety threat
- Availability
 - Always consider if the equipment is present and operational. Also, ensure the equipment can be used/acquired in a contingency environment.
 - Use the DoD Pest Management Material Other than Pesticides List on the AFPMB website as a resource and to find National Stock Numbers.
- Effectiveness
 - This is a prime factor in considering what type of equipment to utilize and how well the equipment works for a given pest.
 - If a piece of equipment is not effective, it serves no purpose.
- Cost
 - The price of a piece of equipment should be considered when acquiring such equipment.
 - Some equipment may not be worth the money if it is not properly utilized or actually needed for daily operations.
 - Consider purchasing equipment with low initial costs and that is inexpensive to maintain.
- Durability
 - When purchasing any Pest Management equipment, the durability and life expectancy should always be considered.
 - Purchasing a more reliable and durable piece of equipment will allow continued Pest Management control efforts.
 - The more durable a piece of equipment is, the longer the service life will be and the less down time for maintenance.

Slide 5.1 – Types of Equipment Menu

- Manual
- Powered

Slide 5.2 – Types of Equipment - Manual

- HAND TOOLS
 - Examples of hand tools are:
 - Screwdrivers
 - Hammer
 - Pliers
 - Wrenches
- DUSTERS
 - A duster blows fine particles into hard to reach areas.
 - It allows user to determine amount of pressure, which allows neatness of application.
- COMPRESSED AIR SPRAYER
 - B&G sprayer is the most common used in Pest Management operations. It is a versatile tool used for a number of different pesticide formulations.
- GRANULE SPRAYER
 - Granule sprayers spread larger particle sized pesticides to create an even coverage in a given area.
 - Granular spreaders can be broadcast or drop sprayers. Broadcast sprayers spread pesticides in a swath in a given area.
 - They can be walk behind or handheld.
 - Drop sprayers releases the seed or pesticides directly on the ground beneath.
- TRAPPING DEVICES
 - Different size traps are used to capture a variety of different pests. Examples of trapping devices are:
 - Mosquito light trap
 - Animal trap
 - Insect trap
 - Bird trap
- ANIMAL CONTROL DEVICES
 - Animal control sticks, snake tongs and control tongs are used to safely control animals.

Slide 5.3 – Types of Equipment - Powered

- POWERED HAND TOOLS
 - Roto-Hammer Drill
 - Cordless Drill
 - Flashlights
 - Borescopes
 - Air Compressors
- HIGH PRESSURE SPRAYERS
 - High pressure sprayer is:

- Non-portable
 - Used in larger scale operations where spray must reach farther areas (ie; spraying into the middle of a pond)
- LOW-PRESSURE BOOM SPRAYERS
 - Low pressure sprayer is:
 - Non-portable
 - Normally mounted on trailer or utility vehicle for herbicide operations
 - Designed to be driven over large areas of turf or pavements to apply pesticides in a swath
- ULTRA-LOW VOLUME (ULV) FOGGER
 - Ultra Low-Volume (ULV)
 - Fogger:
 - Non-portable Ultra low volume aerosol generators create very small, fine droplets
- BACKPACK MIST/DUST BLOWER
 - Backpack Mist /Dust Blower:
 - Portable
 - Small engine driven with integral fan that creates an high stream air flow that disperses pesticides
- HAND CARRIER ULV FOGGER
 - Hand Carried ULV Fogger:
 - Portable
 - Electric hand carried ULV fogger used to control a variety of pests in small to large indoor areas

Slide 6.1 – Uses of Pest Management Equipment Intro

Slide 6.2 – Manual Equipment Menu

- Hand Tools
- Duster Tools
- Compressed Air Sprayer
- Granule Spreader
- Aerosol
- Trapping Devices
- Animal Control Devices

Slide 6.3 – Duster Tools

- Most often used to perform maintenance on Pest Management shop equipment
- Used on the job site for assisting in inspections or making small repairs

Slide 6.4 – Threatened and Endangered Species Act (ESA) of 1973

- HAND BELLOWS AND BULB DUSTERS
 - Blows fine particles into hard to reach areas
 - Allows user to determine amount of pressure, which allows neatness of application
 - Good for placing dusts into wall voids

- **PLUNGER DUSTER**
 - Suitable for applying patches of pesticide dusts outdoors
 - Most common use is for treating rodent burrows, allowing dusts to reach areas where ectoparasites are living within the burrow

Slide 6.5 – Compressed Air Sprayer

- Compressed air sprayer is the most common equipment used to apply liquid formations in Pest Management operations.
- It's a versatile tool used for a variety of different control operations.
- It offers different types and sizes of nozzles to create different spray patterns.

Slide 6.6 – Aerosol

- Aerosol is used most commonly as an inspection tool to flush indoor pests from cracks, crevices and other harborage areas.
- It's used to apply small spot treatments to cracks and crevices. Spraying wasps nests.
- It treats doorways/base boards.

Slide 6.7 – Granule Spreader

- Granule spreader is used to spread granules over small to large outdoor areas to control insects and/or unwanted vegetation.
- Often times using a liquid pesticide is not feasible, so a granular will be used instead.
- Granule spreader is used when winds are too high for liquid application. Dense size of granular creates a limited drift and falls to treatment area.
- It's used in time release treatments.

Slide 6.8 – Animal Control Devices

- Animal control devices are durable devices that enable the safe control of animals or reptiles.
- Animal control sticks are used to humanly control a pest without causing harm to the animal.
- Animal control devices are commonly used to control and place pest into a trap for transport and relocation of pest.
- Snake tongs are the most humane and effective reptile handling device available.

Slide 6.9 – Trapping Devices

- **MOSQUITO LIGHT TRAP**
 - Used and designed to attract and trap or kill mosquitoes
 - Used in problematic areas to collect active mosquitoes to determine species and possible diseases
- **ANIMAL TRAP**
 - Used to capture pests in a given area to control halt further damage or annoyance to customer
 - Commonly used as a transport device when having to transport a live animal

Slide 7.1 – Aerosol

Slide 7.2 – Powered Equipment Menu

- Portable Powered Equipment

- Powered Hand Tools
- Hand Carried ULV Fogger
- Backpack Mist/Dust Blower
- Powered Duster
- Non-Portable Powered Equipment
 - High Pressure Sprayer
 - Low-Pressure Boom Sprayer
 - Ultra Low-Volume Sprayer

Slide 7.3 – Powered Equipment Menu

- Powered Hand Tools are most often used to perform maintenance on pest management shop equipment.
- They are used on the job site for assisting in inspections or making small repairs.
- Examples of powered hand tools are:
 - Roto-Hammer Drill
 - Cordless Drill
 - Flashlights
 - Borescopes
 - Air Compressors

Slide 7.4 – Backpack Mist/Dust Blower

- Backpack mist/dust blower is portable. Its small engine is driven with integral fan that creates a high stream air flow that disperses pesticides.
- It's used to apply liquid, dusts or granules at small to medium sized outdoor areas.
- Backpack mist/dust blower allows applicators to direct application on areas where a larger dust or fogger would not reach, such as sewage drains, dense foliage, crawlspaces and attics.

Slide 7.5 – Hand Carrier ULV Fogger

- Hand carrier ULV fogger is used for space treatments of indoor and small outdoor areas.
- It's primarily used to control flying insects, fogging dining facility kitchen areas or any area where a space spray will not suffice.

Slide 7.6 – Powered Duster

- Powered duster is normally powered by electricity. It's used when large amounts of dusts are needed.
- It is also used in areas where placement and neatness of application are not required (crawl space or attic).

Slide 7.7 – High Pressure Sprayer

- High pressure sprayer is used in larger scale operations where spray must reach farther areas (ie; spraying into the middle of a pond or reaching the tops of trees).
- It's commonly mounted on a trailer or utility task vehicle (UTV) with a large tank to hold pesticides.
- The most common use is for herbiciding operations; where large amounts of herbicides are needed to cover large areas such as the air field or fence lines

Slide 7.8 – Ultra Low (ULV) Fogger

- ULV fogger is non-portable.
- ULV aerosol generators create very small, fine droplets.
- It is used for large outdoor areas to control flying insects such as mosquitoes and flies.
- It is most commonly used in mosquito fogging applications.

Slide 7.9 – Low Pressure Boom Sprayer

- Low pressure boom sprayer is non-portable and it is normally mounted on trailer or utility vehicle for herbicide operations.
- It is designed to be driven over large areas of turf or pavements to apply pesticides in a swath.

Slide 8.1 – Course Completion

Congratulations, you have completed the types and uses of pest management equipment lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 3, Task 3 (7.2.1, 7.2.3, 7.2.5, 7.2.7) Manual

Equipment: Inspection, Calibration, & Principles of Operation

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

7.2.1, 7.2.3, 7.2.5, 7.2.7 Manual Equipment: Inspection, Calibration, & Principles of Operation

Slide 1.3 – Instructions

Welcome to the Manual Equipment: Inspection, Calibration, & Principles of Operation lesson.

Upon completion of this lesson, you must be able to identify basic facts and principles relating to Manual Equipment Inspection, Calibration, and Principles of Operation with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Manual Equipment Inspection Principles
- Maintenance of Manual Equipment
- Operation of Manual Equipment

Slide 2.1 – Manual Equipment Inspection Principles

Slide 2.2 – Overview Video

- Video Closed Captions

All pest management equipment should be monitored for its condition and inspected regularly to ensure it is working properly. The purpose of an inspection is to identify whether the equipment can be operated, adjusted and maintained safely and that no deterioration is detected and remedied before it results in unacceptable risk. Inspections are not just to ensure you are compliant, but can save money in the long run; it is much cheaper to make repairs than to replace a piece of equipment. A trained pest management technician should be able to identify if small repairs or maintenance is needed to help ensure your equipment is operating efficiently. Regular inspections are very important and warrant the safety of your workers; if the equipment is working properly, you know your technicians have a safe working piece of equipment to complete their job. Lastly, inspections help in protecting your investment and are critical to your equipment's lifespan.

Slide 2.3 – Takeaways

- All Pest Management equipment should be monitored for its condition and inspected regularly to ensure it is working properly.

- The purpose of an inspection is to identify whether the equipment can be operated, adjusted and maintained safely and that no deterioration is detected and remedied before it results in unacceptable risk.
- Regular inspections are very important and warrant the safety of your workers; if the equipment is working properly, you know your technicians have a safe working piece of equipment to complete their job.

Slide 2.4 – Inspection of Equipment

- When should equipment be inspected?
 - Regular intervals of inspection are paramount
 - Equipment should be inspected at a minimum
 - Before use
 - During use (operational check or operational inspection)
 - Immediately after use and cleaned
 - Annually, if needed for scheduled maintenance
 - Use equipment owner's manual for reference for inspection frequency and required maintenance schedule
- What equipment should be inspected?
 - All equipment should be inspected on a regular basis to ensure it can be properly used to disperse pesticides or help in pest management efforts.
- What parts of the equipment should be inspected?
 - All parts of any equipment should be inspected regularly.
 - Normally you want to start inspecting your equipment starting from the power source and eventually finishing where the product comes out of the equipment.

Slide 2.5 – Pre-Op Check

- Consider all equipment contaminated and don proper personnel protective equipment (PPE) before starting any inspection.

Slide 2.6 – Inspection Equipment (Pre-Op)

- DUSTER
 - Dusters should be free of any cracks, holes or obvious defects
 - If holes or leaks are present, this will result in low pressures when trying to produce the dust
 - Ensure inside of bulb or bellows are dry and free of obstruction
- SPRAYERS
 - Start by examining the tank for cleanliness and obvious defects
 - Cracks, holes, dents, rust spots
 - Inspect hose looking for cracks, holes or if hose looks worn or discolored
- GRANULAR SPREADER
 - Visually look for cracks, holes or any defects on the hopper
 - Inspect the gears and spin/drop plate where granules are dispersed for freedom of movement
 - Inspect broadcast rate adjustment mechanism; may need to lubricate from time to time

○

Slide 2.7 – Operational Inspection

- Once the preoperational inspection is complete, fill up the equipment with desired amount of pesticide.
- If the equipment was just serviced for maintenance, be sure to use a substitute formulation to ensure it is working properly before adding pesticides.
- Follow owner's manual for best practice operational inspections.
- At any point, if there are malfunctions or any leaking parts, stop the equipment and begin trouble shooting for the cause of a problem.

Slide 2.8 – Operational Inspection (Post-Op)

- Once you have completed your applications it is always best to get your equipment back to storage ready status.
- All excess pesticides should be removed from the equipment before being placed into storage
- Only mix the amount of pesticides you really need for the job; leaving excess pesticides for extended periods of time can ruin equipment.
- Any pesticides are very acidic and breakdown the components on a piece of equipment.
- Remain checking all external and internal parts for defects.
- It is always best to ensure everything is cleaned, tightened and oiled that way the equipment is ready to be stored or ready to go for the next use.
- Ensure you are using the most up to date owner's manual to reference needed maintenance for the equipment.
- Depending on how much the equipment is used will determine the maintenance schedule needed; always reference owner's manual for specifics.

Slide 3.1 – Maintenance of Equipment Intro

Slide 3.2 – Maintenance of Equipment Part 1

- Principles
 - All Pest Management equipment should be cleaned after each use and repaired as needed.
 - The purpose of equipment maintenance is to prolong the life of the equipment and ensure it is in working order when needed.
 - If equipment is not properly maintained, it will not work correctly and could potentially put technicians at risk while using.
 - A pest management technician should be trained on proper maintenance procedures for all equipment used at their installation.
- Considerations
 - When is maintenance required on equipment?
 - The equipment owner's manual should be used to reference maintenance schedule
 - If there are obvious defects or malfunction, repairs should be completed
 - What parts of the equipment need to be maintained?

- All parts of any equipment should be inspected routinely and maintained to ensure proper functionality.
- NOTE: Consider all equipment contaminated and don proper PPE before starting any inspection.

Slide 3.3 – Maintenance of Equipment Part 2

- Duster
 - Dusters should be free of any cracks, holes or obvious defects
 - If holes or leaks are present, this will result in low pressures when trying to produce the dust
 - Ensure inside of bulb or bellows are dry and free of obstruction
 - Ensure screw threads on the cap of bulb or bellows are not cross threaded and are clean and free of debris
 - Inspect application tips for cracks and ensure it is not clogged
 - The bulb, bellow or plunger can be cleaned with a nylon brush or clean towel and soap and water
 - Replace any parts that are damaged or broken
- Sprayer
 - Flush tank, valve and extension with clean water regularly
 - Do not use bleach or ammonia based cleaners, these will damage stainless steel and brass parts
 - After rinsing the tank with clean water, pressurize the tank and flush the valve and hose
 - Inspect hoses and hose connections, gaskets, washers, and other fittings for wear; replace when necessary
 - Clean the filter at the hose/valve connection regularly with a heavy stream of water or nylon brush
 - Do not use a wire brush or any metal object to clean the orifices in the nozzle; this will result in a disrupted spray pattern
 - Clean the filter at the hose/valve connection regularly with a heavy stream of water or nylon brush
 - Do not use a wire brush or any metal object to clean the orifices in the nozzle; this will result in a disrupted spray pattern
- Granular Spreader
 - Always empty spreader of any remaining material
 - Thoroughly wash spreader and allow to completely dry before storing
 - To prevent corrosion, spray a light oil inside the tubing of the chassis and on all metal parts
 - Refer to owner's manual for specific requirements that may be needed

Slide 4.1 – Operation of Manual of Equipment Intro

Slide 4.2 – Operation of Manual of Equipment

- OVERVIEW
 - Several different types of equipment are used for Pest Management operations

- Depending on the situation and pest in need of control, Pest Managers can choose from a wide variety of equipment that best suits the operation
- Pest Managers must be familiar and efficient with all types and uses of equipment to best suit the control of the given pest
- DUSTER (Filling)
 - Don PPE based on chemical label requirements
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
 - Keep the duster upright during filling and capping to reduce the likely hood of accidental spill
 - Do not use more than 50 percent of max capacity of duster; too much dust will not allow enough air inside the duster to pressurize the application
 - Use a funnel to add insecticide to the duster to prevent spilling
 - Hand tighten the cap on the duster before application
 - Unused pesticide in the duster should be removed prior to long term storage
 - Empty excess pesticides back into original container
- DUSTER (Dispensing)
 - Place application tip in or near the application site
 - Squeeze bulb, bellow, plunger to disperse into desired location
 - Ensure careful placement of product is applied only to the target areas
- SPRAYER (Filling)
 - Mix all pesticides according to the label requirements
 - Don PPE based on chemical label requirements
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
 - Fill tank halfway with water, add chemical, and then continue to fill remainder of the required water
 - Use the gallon marks on the side of the tank to mix accordingly
 - Place the pump and tank cap assembly, ensuring the tank gasket fits properly
 - Tighten cap until snug; do not over tighten as this can cross thread the cap and damage the threading
- SPRAYER (Dispensing)
 - Choose the correct nozzle for the job
 - Pin stream (small): used to reach far areas or crack and crevice treatments
 - Pin stream (large): used to flood cracks and crevices
 - Coarse fan: larger droplet intend to create an even swath with larger application rate
 - Pressurize the tank by disengaging the handle from locked position by pressing down and turning ¼ turn to the left
 - Pump plunger up and down until desired pressure for application is achieved

- Once pressurized, engage handle in the locked position
 - Squeeze trigger on gun assembly and apply treatment to given area
- GRANULAR SPREADER
 - Don PPE based on chemical label requirements
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
- GRANULAR SPREADER (Dispensing)
 - Fill the hopper with desired product
 - Set dispersal rate to what was calibrate and begin to walk at a constant speed in treatment area
 - Product should be dispersed at an even rate with no overlaying application
 - Continuously walk until all product has been dispersed
- GRANULAR SPREADER (Considerations)
 - Always check the weather before applying granules in outdoor areas
 - Place any unused granules back into the original container

Slide 5.1 – Course Completion

Congratulations, you have completed the manual equipment: inspection, calibration, & principles of operation lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 3, Task 4 (7.3.1, 7.3.3, 7.3.5, 7) manual equipment: inspection, calibration, & principles of operation

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

7.3.1, 7.3.3, 7.3.5, 7.3.9) Powered Equipment: Inspection, Calibration & Principles of Operation & Maintenance

Slide 1.3 – Instructions

Welcome to the Powered Equipment: Inspection, Calibration & Principles of Operation & Maintenance Lesson.

- Upon completion of this lesson, you must be able to identify basic facts and principles relating to Powered Equipment: Inspection, Calibration & Principles of Operation & Maintenance at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Powered Equipment Inspection Overview
- Powered Equipment Maintenance Principles
- Powered Equipment Calibration
- Principles of Powered Equipment

Slide 2.1 – Power Equipment Inspection Overview

Slide 2.2 – Overview

- All pest management equipment should be monitored for its condition and have regular inspections to ensure it is working properly. The purpose of an inspection is to identify whether the equipment can be operated, adjusted and maintained safely and that no deterioration is detected and remedied before it results in unacceptable risk.
- Inspections are not just to ensure you are compliant, but can save money in the long run; it is much cheaper to make repairs than to replace a piece of equipment.

- A trained Pest Management Technician will be able to identify if small repairs or maintenance is needed to help ensure your equipment is running efficiently.
- Regular inspections are very important and warrant the safety of your workers; if the equipment is working properly, you know your technicians have a safe working piece of equipment to complete their job.
- Lastly, inspections help in protecting your investment and are critical to your equipment's lifespan.

Slide 2.3 – Inspections

- Introduction
 - WHEN SHOULD EQUIPMENT BE INSPECTED?
 - Regular intervals of inspection are paramount. Equipment should be inspected at a minimum:
 - Before use
 - During use (operational check or operational inspection)
 - Immediately after use and cleaned
 - Annually, if needed for scheduled maintenance
 - Use equipment owner's manual for reference for inspection frequency and required maintenance schedule. General Inspection Procedures
 - WHAT EQUIPMENT SHOULD BE INSPECTED?
 - All equipment should be inspected on a regular basis to ensure it can be properly used to disperse pesticides or help in pest management efforts.
 - WHAT PARTS OF THE EQUIPMENT SHOULD BE INSPECTED?
 - All parts of any equipment should be inspected regularly. Normally you want to start inspecting your equipment starting from the power source and eventually finishing where the product comes out of the equipment.
- General Inspection Procedures
 - Consider all equipment contaminated and don proper personal protective equipment (PPE) before starting any inspection.
 - First, start by looking at the motor or power source of the piece of equipment:
 - Ensure engine has gas, oil, spark plug and there are no obvious defects
 - On electrical powered equipment, ensure the battery is charged, wires are connected, and that no wires are exposed, warped, or cracked. There should never be any exposed metal wiring visible. This could result in shock when touched
 - Once the power source has been inspected the next area should be any hoses, clamps/fasteners, tanks, pumps, and any filters.
 - Hoses should be flexible, with no cracks, leaks, or any obvious defects
 - All clamps/fasteners should be tightly fastened to secure hosing
 - Tanks for gasoline, pesticides, or any flushing agents should be inspected for holes, leaks, cracks and to ensure they are clean before adding any liquids into the tank
 - Ensure all connections to the pump or pressure source are connected and look for any obvious defects

- Filters should be inspected for cleanliness and to ensure there will not be any clogging as fluids try to move throughout the filter
- Common filters are fuel filters, air filters, pump filters, hose filters, and wand filters on high pressure sprayers
- Last things to consider are the frame of the equipment, trailers, tire pressures, lights, and any other moving parts that are associated with the equipment
- Operational Inspection
 - Once the preoperational inspection is complete, fill up the equipment with desired pesticide and gasoline needed for the job. Follow owner's manual for best start up procedures. At any point if there are malfunctions or any leaking parts stop the equipment and being trouble shooting cause of problem.
 - Once the piece of equipment is up and running briefly go through the same procedures as you did for your preoperational inspection:
 - Starting at the power source move your way through the equipment looking for any defects and if anything is leaking
 - Consider the noise that the machine is making; if there are any uncertain or abnormal noises coming from the machine this can indicate that it's not working or functioning properly; if indicated turn off immediately
 - Now that you have gone through the equipment and there are no issues, operations can begin. Be mindful of traveling with large quantities of pesticides and if the engine needs to be on when traveling. Traveling with the equipment bring more risk of larger spills because the equipment is pressurized and create a large mess in the event of an accidental spill.
- Post Operation Inspection
 - Once you have completed your applications it is always best to get your equipment back to storage ready status. All pesticides and gasoline should never sit in a piece of equipment for too long. Only mix the amount of pesticides you really need for the job; leaving excess pesticides for extended periods of time can ruin equipment. Pesticides are very acidic and will break down the components on a piece of equipment.
 - Remain checking all hoses, clamps/fasteners, tanks, pumps, and any filters for any defects. It is always best to ensure everything is cleaned, tightened, and oiled; that way the equipment is ready to be stored or ready to go for the next use. Ensure you are using the most up to date owner's manual to reference needed maintenance for the equipment. Depending on how much the equipment is used will determine the maintenance schedule needed; always reference owner's manual for specifics.
 - Now that you have gone through the equipment and there are no issues, operations can begin. Be mindful of traveling with large quantities of pesticides and if the engine needs to be on when traveling. Traveling with the equipment brings more risk of larger spills because the equipment is pressurized and would create a large mess in the event of an accidental spill.

Slide 3.1 – Powered Equipment Maintenance Principles Intro

Slide 3.2 – Overview

- All pest management equipment should be cleaned after each use and repaired as needed. The purpose of equipment maintenance is to prolong the life of the equipment and ensure it is in working order when needed. If equipment is not properly maintained, it will not work correctly and could potentially put technicians at risk while they are using it or cause a chemical spill that could have long lasting environmental effects.
- A pest management technician should be trained on proper maintenance procedures for all equipment used at their installation. Continuous preventive care will maintain equipment in good condition, reduce potential failures, and help pest managers anticipate spare part requirements before failures occur.
- WHEN IS MAINTENANCE REQUIRED ON EQUIPMENT?
 - The equipment owner's manual should be used to reference maintenance schedule. If there are obvious defects or malfunction, repairs should be completed.
- WHAT PARTS OF THE EQUIPMENT NEED TO BE MAINTAINED?
 - All parts of any equipment should be inspected routinely and maintained to ensure proper functionality.
 - Consider all equipment contaminated and don proper PPE before starting any inspection

Slide 3.3 – Maintenance of Equipment Menu

- Powered Duster
- Sprayers
- Backpack Mist/Dust Blower
- Ultra Low Volume Dispensers
- ROTO-Hammers

Slide 3.4 – Powered Dusters

- Clean the interior and exterior of the duster with a dry towel
- Inspect the electrical cord ensuring there are no worn spots and any exposed wires; exposed wires can result in being electrocuted
- Inspect tank and hoses to ensure no holes or leaks are present, this will result in low pressures when trying to produce the dust
- Ensure inside of duster is dry and free of obstruction
- Ensure screw threads on the cap are not cross threaded and are clean and free of debris; if gaskets are present look for cracks or breaks, if not sealed correctly the duster will lose pressure
- Inspect application tips for cracks and ensure it is not clogged
- The bulb, bellow or plunger can be cleaned with a nylon brush or clean towel and soap and water
- Replace any parts that are damaged or broken

Slide 3.5 – Sprayers

- Ensure engine/power source is in good condition. Always refer to owner's manual for specific maintenance requirements. Check the following for serviceability:

- Engine oil
- Fuel level
- Air filter/fuel filter
- Spark plug
- Pull starter/on & off switch
- Triple rinse tank with clean water. Clean any filters after the triple rinse process to remove any debris; not doing so will cause poor flow rate to the pump assembly.
- Allow the sprayer to cool down before washing the exterior of the sprayer with soap and water.
- Lubricate pump assembly after each use.
- If storing sprayer for long periods of time, sprayer should be cleaned, empty of fuel and stored in a closed area or covered in an outside area to protect the equipment from the weather.

Slide 3.6 – Backpack Mist/Dust Blower

- Ensure engine is in good condition. Always refer to owner's manual for specific maintenance requirements. Check the following for serviceability:
 - Engine oil
 - Fuel level
 - Air filter/fuel filter
 - Spark plug
 - Pull starter/on & off switch
- Clean shoulder pads and belt after each use.
- Clean outside of sprayer with soap and water to get rid of any contaminants.
- Store in a clean dry area and ensure there is no fuel within the gas tank.

Slide 3.7 – Ultra Low Volume Dispensers

- Flush the system after every use with an approved solvent such as alcohol.
- Check the gas and oil levels; gasoline storage tank should be empty if being stored for a long period of time.
- Check the control box functionality and cable for any frayed lines or kinks; these are very fragile and extremely expensive.
- Inspect the mounting hardware to ensure that all nuts and bolts are tight.
- Following a cool down period, wash exterior of ULV with soap and water avoiding the engine as much as possible and let dry before storing.
- Store ULV Dispenser covered and inside; if not able to store inside, ensure it is covered and out of the elements.
- Refer to owner's manual for specific maintenance requirements for the motor and fogger pieces.

Slide 3.8 – Roto-Hammers

- Clean the exterior surface area of the drill with a dry cloth; do not use water as it is likely to short out the drill.
- Check all exterior nuts and bolts for tightness.

- Secure drill in the carrying case and ensure the drill bit is inside the carrying case to remove risk of losing or getting dull.

Slide 4.1 – Power Equipment Calibration Intro

Slide 4.2 – Overview

- All powered pest management equipment should be properly calibrated to ensure that the pesticides being applied are dispersed uniformly and at the correct rate according to the label. Calibration is the process of measuring and adjusting the amount of pesticide your equipment will apply over a target area.
- Calibration can be made by making a trial run using a pesticide substitute such as water or talcum powder, on a premeasured area and measuring the output. Calibrating equipment will save you money and time and prevents over application and prevents reapplications due to an initial under application.
- Too little pesticide may fail to control the target pest. Too much pesticide is illegal and can result in damage to the treated plant or surface and can cause adverse effects to the environment and non-target organisms.
- It is a violation of Federal law to use a pesticide inconsistent with its labeling, if equipment is not properly calibrated.
- Applicators would be applying pesticides inconsistent with the label requirement and could result in penalty, fines and even imprisonment.
- Whenever possible, calibration should be done using water or a non-toxic carrier. Consider all equipment contaminated and don proper PPE before calibrating equipment.
- Remember to always read and follow all of the pesticide label information.
- WHEN IS CALIBRATION REQUIRED?
 - The equipment owner's manual should be used to reference calibration procedures and frequencies. Application rates will differ dependent on the type of sprayer, nozzle size, sprayer pressure and vehicle speed when applicable.
 - Consider all equipment contaminated and don proper PPE before starting any inspection.

Slide 4.3 – Maintenance of Equipment Menu

- Powered Dusters
- Sprayers
- Backpack Mist/Dust Blower
- Ultra Low Volume Dispensers

Slide 4.4 – Powered Dusters

- Powered dusters disperse rates are calibrated by the manufacturer.
- Pesticide label rates will determine how much product is permitted per sq. ft. or linear ft.
- A pesticide substitute such as talcum powder can be used to determine how much product is coming out/dispersed of the duster.
- Applicators should adhere to the label rate as close as possible.
- Fill the duster with about 25 percent of capacity.

- Operate the duster over a measured area or distance at your normal working speed.
- The area should be large enough to use most of the contents.
- The amount of pesticide used to refill the hopper is the amount applied to the measured area:
 - If the amount applied does not fall within five percent of the recommended dosage per the unit of area, reset the gate opening and repeat the previous steps

Slide 4.5– Sprayers

- Different types of sprayers are used to control pests and calibration varies dependent on the type of sprayer being used.
- Examples:
 - Sprayers with a boom are calibrated differently than a sprayer with a wand or gun
 - Backpack sprayers are calibrated using an adjustment knob on the piece of equipment
- HYDRAULIC SPRAYER WITH BOOM
 - Fill tank with water.
 - Choose spray nozzles with low drift properties.
 - Measure the swath width in feet to be sprayed with the nozzles.
 - Nozzles vary in spray patterns and flow rated, reference owner's manual or nozzle specification to ensure you are using the best nozzle to meet application rate that's on the label.
- Determine sprayer speed:
 - Measure a given area and how long it takes to cover the area
 - Record the number of seconds it takes to spray the test area while maintaining the same speed
 - It is a good idea to complete this two or three times, then come up with an average
- Collect water sprayed from all nozzles for the amount of time it took for the test plot:
 - Record amount in gallons per minute (GPM)
 - The number of ounces or gallons collected equals the amount sprayed over that given area
 - Use this number to calculate the amount of pesticide and water needed to treat the target area
- Adjust the pump pressure or rate to meet label requirements

Slide 4.6 – Backpack Mist/Dust Blower

- Prepare sprayer to apply clean water or inert/granule to treat area with the engine rpm and nozzle adjusted.
- Using the dispense rate sheet on the handle of the sprayer, measure the amount of water into a measuring container for one minute and ensure the machine is producing the right amount of water per the setting you choose to calibrate.

- If the machine is not producing the right amount of liquid according to the dispense rate sheet, this will not allow the technician to accurately treat an area according to the pesticide label requirements.
- Maintenance may be required.
- This should give you the gallons per minute (gpm) or pounds per minute (ppm) the sprayer is producing.
 - Example 1.5 gpm or 1.5 ppm
- Time and flow rate will determine how your sprayer is calibrated.
- Output depends on how fast you are walking.
- Time to treat area:
 - Mark an area 20' x 20'
 - Prepare unit with clean water or inert dust/granule to treat area
 - Time how long it takes to treat the area
 - Treat in accordance with label directions
 - This information will give you the time it takes to treat a 400 sq. ft. area (Example: 62 seconds / 400 sq. ft.)
- Determine the flow rate or gallons/pound per minute:
 - Prepare sprayer to apply clean water or inert dust/granule to treat the area with the engine rpm and nozzle adjusted
 - This should give the GPM/PPM that your sprayer is producing
- Determine time and final product and how much time it will take you to treat a given area.
- Measure the area to be treated.
 - If the given area is 20,000 sq. ft., the amount of time that it will take to complete the job is expressed as $20,000 \times 62 / 400 = 3100$ seconds $3100 \text{ sec} / 60 \text{ sec} = 51.67 \text{ min}$
- Determine time and final product for a given area:
 - Determine how much finished product you will need. If it will take you 51.67 minutes to do 20,000 sq. ft., then you will need 77.5 gal of finished product $51.67 \text{ min} \times 1.5 \text{ gpm} = 77.5 \text{ gal}$
 - Calibration is based on your application rate for that day only
 - If someone else is going to do the treatment, they will need to calibrate the sprayer for them; walking speed will vary from person to person

Slide 4.7 – Ultra Low Volume Dispenser

- Disconnect insecticide delivery line leading into the nozzles.
- Place delivery line into a graduated cylinder to catch the liquid pesticide.
- Ensure all dispersal switches on the control box are in the “OFF” position; if not, lines will be charged and disperse pesticides.
- Turn rate knob to the desired rate and switch the “Spray” switch into the “ON” position.
- Using a stopwatch collect the pesticide into the graduated cylinder for two minutes. Once the two minutes is up divide the amount collected by two.
 - This will provide the amount of ounces per minute
- Ballasts have three main functions:

- Provide correct starting voltage, (because lamps require a higher voltage to start than to operate)
- Match the line voltage to the operating voltage of the lamp
- Limit the lamp current to prevent immediate destruction (because once the arc is struck the lamp impedance decreases)

Slide 5.1 – Principles of Powered Equipment Intro

Slide 5.2 – Principles of Powered Equipment

- Several different types of equipment are used for pest management operations. Depending on the situation and pest in need of control, pest managers can choose from a wide variety of powered equipment that best suits the operation. Pest managers must be familiar and efficient with all types and uses of equipment to best suit the control of the given pest.

Slide 5.3 – Maintenance of Equipment Menu

- Powered Dusters
- Powered Sprayers
- Ultra Low Volume Dispensers

Slide 5.4 – Powered Dusters

- FILLING DUSTERS
 - Don PPE based on chemical label requirements:
 - Common PPE required
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
 - Keep the duster upright during filling and capping to reduce the likely hood of accidental spill.
 - Do not use more than 50 percent of max capacity of duster; too much dust will not allow enough air inside the duster to pressurize the application.
 - Use a funnel to add insecticide to the duster to prevent spilling.
 - Hand tighten the cap on the duster before application.
 - Unused pesticide in the duster should be removed prior to long term storage.
 - Empty excess pesticides back into original container.
 - Dispensing pesticide:
 - Place application tip near the application site
 - Turn on power source to duster
 - Flip dispersal switch and point duster towards target area
 - Once the product starts flowing, treat target area ensuring an even coverage is achieved
 - Always work your way out of the room so you don't disturb or walk through the treated area

Slide 5.5 – Powered Sprayers Menu

Each tool below is created for a specific function or purpose. Remember to handle tools with care, as they have a high investment or replacement cost.

- Backpack Mist/Dust Blower
- Hydraulic Sprayer With Boom
- Hydraulic Sprayer Without Boom

Slide 5.6 – Hydraulic Sprayer without Boom

- Filling Sprayer:
 - Don PPE based on chemical label requirements. Common PPE required:
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
 - Fill tank halfway with water, add chemical, and then continue to add the remainder of the required water.
 - Use the gallon marks on the side of the tank to mix accordingly.
 - Place the pump and tank cap assembly, ensuring the tank gasket fits properly.
 - Tighten cap until snug; do not over tighten as this can cross thread the cap and damage the threading
- OPERATING PROCEDURES
 - Before Starting Engine:
 - Ensure gate valve in suction line is open
 - Open
 - Starting the Engine:
 - Open the fuel valve to allow gas to reach the carburetor
 - Set the choke to full
 - Grasp starter rope and pull out quickly to overcome compression kickback
 - Repeat previous step if necessary, with the choke slightly open
 - Once the engine starts, open the choke gradually until the engine runs smoothly
 - Adjust pressure regulator as needed:
 - Use high pressures to reach the tops of trees or to reach far distances
 - Low pressures are used for boom sprayers or applications where areas must be saturated, such as termite treatments
 - Make sure the discharge hose is capable of withstanding pressures in excess of the pressure that is capable of being produced by the pump to prevent hose rupture
 - Do not operate this unit dry, always make sure liquid is in the pump before you start or stop the unit; if not you will damage the pump
 - Make sure you are not dispersing pesticides over non target areas when traveling from one area to another
 - Timing
 - Consider the time of day it is and if the target area will be used later in the day or if there is projected rain
 - Wind

- Avoid using high pressure sprays; the higher the pressure, the more likely you will have drift
- Environmental Hazards
 - Secondary poisoning
 - Protected species
 - Pesticide movement; drift, runoff, leaching

Slide 5.7 – Backpack Mist/Dust Blower

- BACKPACK MIST/DUST BLOWER
 - Filling Backpack Mist/Dust Blower:
 - Don PPE based on chemical label requirements. Common PPE required:
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
 - LIQUID APPLICATION:
 - Fill tank halfway with water, add chemical, and then continue to fill remainder of the required water
 - Use the gallon marks on the side of the tank to mix accordingly
 - GRANULE/DUST APPLICATION:
 - Fill tank with approved pesticide and ensure the tank is on granule/dust mode.
 - OPERATING PROCEDURES
 - Move the throttle lever up to the intermediate position
 - Close the choke lever and then pull the recoil starter
 - Pull the recoil starter lightly and when the claw catches the crankshaft, pull two or three times to charge fuel
 - Start the engine by pulling sharply
 - Do not pull out the starter rope completely and stop pulling to leave a short length of rope Reference owner's manual for specific directions.
 - When the engine is started, gradually reset the choke lever to full opening and move down the throttle level to run the engine at idling speed; if the engine is warm, it will not require to be choked
 - After allowing the engine to run at idling speed, move the throttle lever up gradually
 - When the engine has attained proper engine revolution, reference owner's manual, start operating the unit
 - Squeeze application trigger to dispense formulation
 - Ensure application line is open or formulation will not spray

Slide 5.8 – Hydraulic Sprayer with Boom

- FILLING SPRAYER:
 - Don PPE based on chemical label requirements. Common PPE required:
 - Coveralls
 - Gloves

- Face Shield/Goggles
 - Respirator (full face or half face)
- Fill tank halfway with water, add chemical, and then continue to add the remainder of the required water.
- Use the gallon marks on the side of the tank to mix accordingly.
- Place the pump and tank cap assembly on the tank fill valve, ensuring the tank gasket fits properly.
- Tighten cap until snug; do not over tighten as this can cross thread the cap and damage the threading.
- OPERATING PROCEDURES
 - Before Starting Engine:
 - Ensure gate valve in suction line is open
 - Open the spray gun and place into tank
 - Ensure manifold discharge valve is open
 - Adjust the pressure regulating valve or unloader to LOW pressure
 - Starting the Engine:
 - Open the fuel valve to allow gas to reach the carburetor
 - Set the choke to full
 - Grasp starter rope and pull out quickly to overcome compression kickback
 - Repeat previous step if necessary, with the choke slightly open
 - Once the engine starts, open the choke gradually until the engine runs smoothly
 - Adjust pressure regulator as needed:
 - Use high pressures to reach the tops of trees or to reach far distances
 - Low pressures are used for boom sprayers or applications where areas must be saturated, such as termite treatments
 - BOOM OPERATIONS
 - Once you are at the target area open the boom on the sprayer.
 - After the boom is opened up, you will need to open the valve from the main tank to the boom lines, this will enable the product to flow to the boom.
 - Once the boom valve is open, close the valve to the spray gun; this will direct all pressure to the boom.
 - It is best practice to use a dye within the pesticide to identify where you have already applied; if you over treat you may kill untargeted areas.
 - SAFETY PRECAUTIONS
 - Make sure the discharge hose is capable of withstanding pressures in excess of the pressure that is capable of being produced by the pump to prevent hose rupture
 - Do not operate this unit dry, always make sure liquid is in the pump before you start or stop the unit; if not you will damage the pump
 - Make sure you are not dispersing pesticides over non target areas when traveling from one area to another

- Timing
 - Consider the time of day it is and if the target area will be used later in the day or if there is projected rain
- Wind
 - Avoid using high pressure sprays; the higher the pressure, the more likely you will have drift
- Environmental Hazards
 - Secondary poisoning
 - Protected species
 - Pesticide movement; drift, runoff, leaching

Slide 5.9 – Ultra Low Volume Dispensers

- Filling Ultra Low Volume Dispenser:
 - Don PPE based on chemical label requirements. Common PPE required:
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
 - Fill pesticide tank with desired amount of concentrate.
 - Use the gallon marks on the side of the tank to determine amount.
 - Place the tank cap assembly, ensuring the tank gasket fits properly.
 - Tighten cap until snug; do not over tighten as this can cross thread the cap and damage the threading
 - OPERATING PROCEDURES
 - Place the machine “ON/OFF” switch on the remote control box to the “ON” position
 - Place the “RUN/STOP” switch (normally located on the engine next to the starter button) to the run position
 - Ensure the “OUTPUT” switch on the remote control box is in the “OFF” position
 - Pull out the choke
 - Once the engine starts, gradually push in the choke
 - Place “OUTPUT” switch on control box to the “ON” position to dispense chemicals
 - When the application is complete, turn the unit off by placing the “OUTPUT” switch to the “OFF” position and the “RUN/STOP” switch to the “STOP” position
 - Once the chemicals have stopped dispersing, the unit must be flushed to clear the lines of any pesticides
 - Switch “Flush” button to the “ON” position and run for one minute
 - Once flushing is complete, place the “ON/OFF” switch to the “OFF” position and turn off the power switch on the control box or on the machine

Slide 5.10 – Hand-Carried Ultra Low Volume Generator

- Filling ULV:
 - Don PPE based on chemical label requirements. Common PPE required:
 - Coveralls
 - Gloves
 - Face Shield/Goggles
 - Respirator (full face or half face)
 - Keep the ULV upright during filling and capping to reduce the likely hood of accidental spill.
 - Do not use more than 50 percent of max capacity of machine; too much concentrate will not allow enough air inside the machine to pressurize the application.
 - Use a funnel to add insecticide to the machine to prevent spilling.
 - Hand tighten the cap on the ULV before application.
 - Unused pesticide should be removed prior to long term storage.
 - Empty excess pesticides back into original container.
 - Dispensing Pesticide:
 - Place application tip near the application site.
 - Turn on power source to duster
 - Flip dispersal switch and point ULV in the direction of target area.
 - Once the product starts flowing, treat target area ensuring you are pointing the nozzle in a 45 degree angle up towards the ceiling.
 - Keep in mind this is a type of space spray so you want it to stay in the air as long as possible
 - Use flexible hose to direct fog if unit is equipped
 - Always work your way out of the room so you do not walk through or disturb the treated areas you just treated.

Slide 6.1 – Course Completion

Congratulations, you have completed the powered equipment: inspection, calibration & principles of operation & maintenance management lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 4, Task 1 (7.3.6.2) Operator Checks, Gasoline Engines

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

7.3.6.2 Operator Checks, Gasoline Engines

Slide 1.3 – Instructions

Welcome to the Operator Checks, Gasoline Engine lesson.

- Upon completion of this lesson, you must be able to successfully identify relationship of basic facts and state general principles relating to Operator Checks on Gasoline Engines with at least 75% accuracy.

Overview

In this section, we will cover the following topics:

- Overview
- Safety Precautions
- Operator Check

Slide 2.1 – Overview Intro

Slide 2.2 – Overview

- Small engine pesticide applicators are effective and efficient methods of applying pesticides.
- As a Pest Management technician, it is important that you are familiar with proper small engine checks and maintenance to ensure proper operation of the applicators.
- In this lesson, you will learn gasoline engine safety and how to perform general operator checks.

Slide 3.1 – Safety Precautions Intro

Slide 3.2 – Safety Precautions

- Gasoline engine pesticide applicators will inevitably break and need repair. To ensure safety when checking and troubleshooting small engines, observe the following precautions:
- Shut down engines prior to performing operator checks or troubleshooting
- Engines may retain residual charge after shutdown. Wait at least 10 minutes before working on engines to prevent combustion from residual fuel charge
- Remove jewelry that could get caught or stuck in any moving parts of the engine
- Engine components such as exhaust area and main engine can become hot so wear gloves to avoid burns
- Check for leaks to prevent gasoline from accidentally igniting
- Avoid sparks, open flames, or other sources of ignition around fuel system components
- Gasoline vapor is heavier than air so fuel vapors may build up to hazardous levels in confined spaces. Perform operator checks outside or in a well-ventilated areas to reduce the risk of inhaling poisonous vapors

Slide 4.1 – Operator Check Intro

Slide 4.2 – Operator Checks Menu

- Inspect Fuel Tank
- Inspect Engine Oil
- Inspect Engine for Wear & Tear
- Inspect Spark Plug & Wiring
- Inspect Air Filter

Slide 4.3 – Inspect Fuel Tank

- If case of engine problems, one of the very first things you should accomplish is to inspect level of fuel in the tank:
 - Look for obvious damage or leaks coming from gasoline tank
 - Unscrew cap to determine fuel level; a flashlight may be required
- Fill gasoline tank with manufacturer recommended fuel type until full; wrong fuel can damage injector lines and fuel pumps that cost a lot to repair.
- Many small gasoline engines are equipped with a fuel filter that is used to filter any debris in the fuel; if not inspected and cleaned routinely this could result in not enough fuel getting to the carburetor and cause an engine to not start.

Slide 4.4 – Inspect Engine Oil

- Proper inspection of engine oil involves:
 - Ensuring engine has the right amount of oil according to the owner's manual
 - To check the amount of oil, turn engine off, and on a level surface find the dip stick on the engine
 - Pull dipstick out of engine and wipe away any oil from its end
 - Insert dipstick back into tube and push it all the way in
 - Remove dipstick again and examine oil level indicator on the dipstick
 - Add oil as needed

Slide 4.5 – Inspect Air Filter

- Proper inspection of filter:

- With engine off, find the air filter cover; normally located on the top side of the engine
- Remove and inspect the pre-filter and inspect primary filter
- If dirty, clean with owner's manual recommended cleaning solution, dry, and replace
- Replace filter cover
- Do not operate engine without an air filter as serious damage can occur from debris being sucked into engine

Slide 4.6 – Inspect Spark Plug and Wiring

- When checking spark plug and wiring:
 - Inspect for signs of damage or deterioration
 - Replace damaged spark plug or wiring
 - Inspect for loose connection on terminal and boots; if loose it could result in not getting the electrical energy needed to start the engine
 - Tighten connection
 - Inspect for cleanliness
 - Wipe off any residue or debris around terminals; if not cleaned could result in poor connection and malfunction

Slide 4.7 – Inspect Engine for Wear and Tear

- Inspect entire engine for any worn or damaged parts:
 - Pull the starter or electric start switch to verify proper operation
 - Check for cracks, breaks, or obvious defects
 - Look for leaks before, during, and after operation
 - Check for burning smell, other odd smells, or abundant amount of smoke when the engine is running
 - Turn in damaged engine for repair
 - Replace engine that is beyond repair

Slide 5.1 – Course Completion

Congratulations, you have completed the operator checks, gasoline engines lesson. Please click complete lesson to receive credit.

3E453 – Pest Management Journeyman

Module 1, Lesson 4, Task 2 (7.3.7.1 & 7.3.7.2) Centrifugal & Diaphragm Pump Fundamentals

Slide 1.1 – Introductory Slide

Slide 1.2 – Lesson Title Slide

3E4X3 Career Development Course

7.3.7.1 & 7.3.7.2 Centrifugal & Diaphragm Pump Fundamentals

Slide 1.3 – Instructions

Welcome to the lesson on Centrifugal and Diaphragm Pump Fundamentals.

- Upon completion, and without reference, you must be able to identify the relationship of basic facts and state general principles about Centrifugal and Diaphragm Pumps with at least a 75% accuracy.

Overview

In this section, we will cover the following topics:

- Centrifugal Pump
- Diaphragm Pump

Slide 2.1 – Centrifugal Pump Fundamentals Intro

Slide 2.2 – Centrifugal Pump Principles

- Principles
 - Mechanical device used to move fluids by means of transfer of rotational energy from one or more driven rotors called impellers
 - Simple design and very easy to operate and maintain
 - Offers simple and low-cost solutions to generate high-capacity pumping applications involving fluids such as water, solvents, chemicals and light oils
 - It is not self priming, so it must be mounted lower than the tank, so the gravity of the water is pulled into the pump
- How It Works
 - Pressure increase is created by transferring mechanical energy from the motor through the rotating impeller to the liquid.
 - Fluids enter the pump inlet and is then pushed out along the impeller blades.

- As the impeller rotates, the fluid surrounding it also rotates, which gives it centrifugal force to the water particles.
- The centrifugal force makes the liquid move radially outwards and both the pressure and the kinetic energy of the liquid increases.
- As the pump pushes pressurized water towards the outlet it creates a negative pressure which helps suck in fresh liquid into the inlet of the pump.
- The pump casing is designed to constrict the fluid from the pump inlet, direct it into the impeller and then slow and control the fluid before being discharged

Slide 2.3 – Centrifugal Pump Types

- Radial Flow
 - The impeller causes the fluid to make a 90 degree turn and move outward, from the suction eye to the tips of the impeller vanes.
 - Radial flow pumps operate at higher discharge pressures than other types of centrifugal pumps
- Axial Flow
 - The impeller moves the fluid through a pump in a straight path that is parallel to the pump's shaft.
 - Axial flow pumps can pump large volumes of fluid, but only with a relatively low discharge pressure.
- Mixed Flow
 - Combines the characteristics of radial flow pumps and axial flow pumps.
 - Mixed flow pumps can develop relative high discharge pressure and still move large amounts of fluids.

Slide 2.4 – Centrifugal Pump Components

- Volute and Casing
 - Volute and casing houses the impeller and has a decreasing chamber that changes velocity into pressure.
- Impeller
 - An impeller is a circular disk with vanes curved backwards to the direction of rotation.
 - It moves water through the pump
- Shaft
 - Shaft runs the entire length of the pump. It supports all the pump components.
- Shaft Sleeve
 - Shaft sleeve protects the shaft from excessive wear
- Bearings
 - Bearings hold the shaft in the proper position. It allows the shaft to rotate freely
- Slinger/Water Seal
 - Slinger/water seal prevents fluid from entering the bearings.
- Stuffing Box
 - PACKING:
 - Soft, pliable material resembling short lengths of rope

- Provides the seal that controls the leakage between the shaft and the pump casing
 - Prevents excessive leakage from the main cavity of the pump
- LANTERN RING:
 - Provides method of lubricating packaging in the stuffing box
- PACKING GLAND:
 - Compresses the packing to provide a seal
 - Adjusted by tightening the bolts or nuts that secure the gland

Slide 2.5 – Uses

- Hydraulic Sprayer
 - Herbicides treatments: cracks, roadways, rock beds
- Hydraulic Boom Sprayer
 - Herbicides treatments: treating airfields or large areas
- Termite Application
 - Sub-slab injections, pre-construction and trenching applications

Slide 3.1 – Diaphragm Pump Fundamentals Intro

Slide 3.2 – Diaphragm Pump

- DIAPHRAGM PUMPS PRINCIPLES
 - Reciprocating pumps use a back-and-forth motion inside a cylinder to displace a definite quantity of liquid.
 - Diaphragm pumps are a type of positive displacement pump which use a flexible diaphragm to move liquid.
 - The diaphragm forms a seal in the pump cylinder between the liquid being pumped and the rest of the pump components.
 - For this reason, diaphragm pumps are especially reliable for pumping abrasive liquids, chemicals, mud, slime, silt and other wastes or heavy liquids containing debris.
 - Liquid strainers are fitted at the suction inlet to prevent large objects from damaging the suction/discharge valves and the diaphragm.
- HOW IT WORKS
 - The diaphragm pump has two chambers that contains an inlet check valve and outlet check valve.
 - Air supply is shifted from one chamber to another with an air spool valve that is built into the pump.
 - The continual shifting of air from one chamber to another force's liquid out of one chamber and into the discharge piping while the other chamber is being filled with liquid
- COMPONENTS
 - AIR CHAMBERS
 - The pump has two chambers, one on the left and one on the right.
 - These chambers let the compressed air flow in and out.
 - AIR VALVE
 - Compressed air is directed to air chambers with the help of air valves.

- Air valves make sure that the compressed air enters the air chambers and leave from it through an exhaust port.filled with liquid.
- CHECK VALVE
 - There are four fluid check valves in a double diaphragm pump; two are inlet and two are outlet.
 - These valves control the flow of liquid in the fluid housing and manifolds.
- FLUID HOUSING
 - Each pump has fluid housing, one at each side of the pump.
 - The fluid housing is the part which holds the fluid and makes it flow through the pumping mechanism.
- INLET MANIFOLD
 - Fluid enters the pumping container via the inlet manifold and flows evenly to the left and right fluid housing.
 - Mechanism makes the distribution of fluid equal so that both fluid housings remain in operation.
- OUTLET DISCHARGE MANIFOLD
 - When the fluid is coming out of the container, it passes through a couple of components. First, the fluid passes through one of the exit check valves and then this check valve directs the fluid to the outlet manifold to finally exit the container altogether.
- DIAPHRAGMS
 - An air operated double diaphragm pump has two diaphragms in it
 - The diaphragm acts as a separation sheet in between the air chambers and fluid housing
 - Diaphragms are built to adjust themselves according to the rise or fall of the air pressure
- EXHAUST PORT
 - The final exit point in the pump
- USES
 - HIGH PRESSURE SPRAY OPERATIONS
 - Aquatic treatments
 - Treating surfaces of bodies of water
 - Treating weeds in a canal from a faraway distance
 - Treating treetops or heavy brush areas

Slide 3.3 – Uses

- HIGH PRESSURE SPRAY OPERATIONS
 - Aquatic treatments
 - Treating surfaces of bodies of water
 - Treating weeds in a canal from a faraway distance
 - Treating treetops or heavy brush areas

Slide 4.1 – Course Completion

Congratulations, you have completed the centrifugal & diaphragm pump fundamentals lesson.
Please click complete lesson to receive credit.