Department of Transportation
Hazardous Material Regulations
General Awareness, Safety & Security Training

For: University of Dayton Hazmat Employees

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Overview

- Hazardous materials are substances or materials with the potential to cause injury or harm to people, property, or the environment when transported in commerce.

- Hazmat Employees:
  - Employed on a full-time, part time, or temporary basis by a hazmat employer who directly affects hazardous materials transportation safety.
    - Loads, unloads, or handles hazardous materials
    - Prepares hazardous materials for transportation
    - Operates a vehicle used to transport hazardous materials

- As a hazmat employee, you need to be knowledgeable of how these materials must be packaged and familiar with the required markings, labels, and/or placards that must be applied to hazardous materials shipments to ensure their safe transportation in commerce.
Overview

Topic 1 — Hazardous Materials Table
Topic 2 — Hazard classes
Topic 3 — Packaging
Topic 4 — Marking, labeling, and Placarding
Topic 5 — Shipping papers
Topic 6 — Hazmat Safety
Topic 7 — Emergency Response
Topic 8 — Hazmat Security
The Hazardous Materials Regulations (HMR)

- DOT is responsible for developing and issuing the HMR. The regulations govern the transportation of hazardous materials in interstate, intrastate, and foreign commerce. DOT carries out this responsibility through the Pipeline and Hazardous Materials Safety Administration (PHMSA).
The Hazardous Materials Regulations (HMR)

- Authority to enforce the HMR is delegated to various agencies within DOT, including PHMSA, FMCSA, FAA, and FRA. The HMR establish standards to promote the safe transport of hazardous materials. These standards include:
  - classification;
  - hazard communication;
  - emergency response information;
  - packaging;
  - training of hazmat employees;
  - transportation; and
  - incident reporting.
Training Requirements

- The HMR prescribe the training requirements applicable to all hazmat employees who perform work functions subject to the HMR. The requirements include initial training as well as periodic recurrent training of hazmat employees to ensure they maintain the required knowledge and skill sets. These requirements are found in Part 172, Subpart H of the HMR.

- The specific areas of training that must be addressed are:
  - general awareness/familiarization;
  - function-specific;
  - safety;
  - security awareness
Hazardous Materials Table (HMT)

- The Hazardous Materials Table is a list of hazardous materials in alphabetical order by proper shipping name. The process of complying with the HMR centers on the Hazardous Materials Table § 172.101.
Hazard Classes
Class 1 - Explosives

- This placard or label is used to designate explosive materials, specifically Class 1.1, 1.2 and 1.3 explosives. Explosives that belong to classes 1.4, 1.5 and 1.6 will have that specified, with the class designation replacing the exploding ball. This placard is required when transporting ANY quantity of a Class 1.1, 1.2 or 1.3 explosive, or over 1001 lbs of a Class 1.4 or 1.5 explosive.
Class 2- Gases

- These placards and labels are used to designate compressed gases. Given the diverse chemical properties of compressed gases, this class is subdivided into flammable gases (Class 2.1), nonflammable gases or oxygen (Class 2.2) and poisonous gases (Class 2.3). This placard is required when transporting over 1001 lbs of Class 2.1 or 2.2, or when transporting ANY quantity of poisonous (Class 2.3) gas.
Class 3- Flammable Liquids

- This is the label or placard used to designate flammable liquids. Certain common flammable liquids have their own placards, where the name of the material (such as gasoline and fuel oil) replaces the word "FLAMMABLE". Also, materials that fit the definition of a combustible material, have the word "COMBUSTIBLE" replacing the word "FLAMMABLE". This placard is required when transporting over 1001 lbs of flammable materials.
Class 4- Flammable Solids, Spontaneously Combustible Materials, Dangerous When Wet

The below placards and labels are used to indicate the cargo contains flammable solids (Class 4.1), materials that are pyrophoric (i.e., ignite in the presence of oxygen) (Class 4.2), and those that react adversely when exposed to water (or humidity!) (Class 4.3). These placards are required when transporting over 1001 lbs of Class 4.1 or 4.2 materials, or when transporting ANY quantity of a water reactive material (Class 4.3).
Class 5- Oxidizers & Organic Peroxides

- This placard or label is used to designate a cargo that contains oxidizing materials (Class 5.1). In addition, this class contains materials that are classified as organic peroxides (Class 5.2), and in that case the label would read "ORGANIC PEROXIDES" rather than "OXIDIZER".

Placards are required when transporting over 1001 lbs of oxidizers or organic peroxides.
Class 6- Poisons & Infectious Materials

- This class contains poisonous liquids that are designated as inhalation hazards. If the material is toxic, but not an inhalation hazard it is placed in Class 6.1. Materials in these classes may NOT be transported in the same cargo as foodstuffs, feed, or any other edible substances intended for humans or animals.

In addition to the POISON label, packages of 110 gallon capacity or less, and that are recognized as "inhalation hazards", must also be marked "INHALATION HAZARD".

Placarding is required when transporting ANY quantity of Class 6.1 (Inhalation hazard zone A & B only) material, and when transporting over 1001 lbs of a Class 6 material.
Class 7- Radioactive

- This label is required on all radioactive materials and equipment. Packages containing radioactive species must be clearly labeled with 2 labels on opposite sides of the package. This class is divided into 3 divisions - I, II and III. Placarding is required on ANY quantity of radioactive material rated as III; it is not required on materials rated as I or II.
Class 8- Corrosives

- This placard/label is used to designate any corrosive liquid. Placarding is required whenever the quantity exceeds 1001 lbs of a corrosive liquid.
Class 9- Misc

- Class 9 materials are those that have not been placed in a hazard class, but may still pose some degree of danger in transport. Placarding is not required for materials that are not classified. However, you may placard a material that presents a hazard during transport and weighs more than 1001 lbs.
Dangerous

- This applies to placarding only and is required when 1001 lbs or more of material is transported and it is composed of 2 or more hazard categories. It will replace the specific placards for the individual classes. An exception is when one single class in a multiple class transport exceeds 5000 lbs, in which case the placard for the large load class must be displayed.
ORM-D: Other Regulated Material

- These are materials that pose a lesser risk in transportation when packaged according to specific paragraphs of the HMR and can be reclassified as ORM-D. Consumer commodities fall within this class.
Packaging

- All hazardous materials to be transported in commerce must be appropriately packaged to ensure the hazardous material is not released during transportation.
- Metal non-DOT specification tanks constructed of 12 gauge aluminum steel conforming with requirements for DOT specification UN31A or UN31B intermediate bulk container.
- Must not exceed 119 gallons
Marking, Labeling, Placarding

- Hazard warning information is required to be communicated on all packages in which hazardous materials are being transported. Hazardous materials must be marked, labeled, and placarded, as required.
Marking

- **Requirements for Non-Bulk Packaging** Unless otherwise provided in the HMR, all non-bulk packaging must contain the following markings:
  - Proper shipping name (PSN);
  - Identification number or ID No.; and
  - Consignee or consignor name and address.
- Additional markings, such as listed below, may be required. These markings may pertain to the hazardous material, packaging, or mode of shipment. They include:
  - Technical name;
  - DOT-SP;
  - Limited quantities;
  - ORM-D;
  - Radioactive Materials;
  - Orientation Arrows;
  - Inhalation Hazards;
  - Explosives;
  - Marine pollutants;
  - Infectious substances;
  - Hazardous substances; and
  - Keep Away from Heat
Marking

- **Requirements for Bulk Packaging** Except as otherwise provided, all bulk packaging must bear the following marking:
  - Identification number or ID No.
  - When marked with the PSN, common name, or ID No., bulk packaging must remain marked when empty unless cleaned of residue and purged of vapors, refilled with a material requiring different markings, or refilled with a material requiring no markings to extent that residue is no longer present
  - There are additional marking requirements based on the type of bulk packaging and the hazardous materials they may contain. These include:
    - DOT-SP;
    - Portable tanks;
    - Cargo tanks;
    - Tank cars and multi-unit tank cars;
    - Other bulk packaging; and
    - Elevated Temperature Materials
  - Size of markings
    - Rail cars — width at least 6.0 mm (0.24 inch), height at least 100 mm (3.9 inches);
    - Portable tanks with capacities less than 3,785 L (1,000 gallons) and Intermediate Bulk Containers (IBCs) — width at least 4.0 mm (0.16 inch) and height at least 25 mm (1 inch); and
    - Cargo tanks and other bulk packaging — width at least 6.0 mm (0.24 inch) and height at least 50 mm (2.0 inches).
Labeling

- Except as specified, the HMR require packages of hazardous materials to be labeled with the appropriate hazard warning labels as depicted in Part 172, Subpart E of the HMR. These labels convey information about the hazardous material by use of:
  - color;
  - symbol;
  - text; and
  - hazard class number or division number
- The purpose of a label is to provide a hazard warning notice to both the general public and emergency responders and is required for hazardous materials meeting one or more of the hazard class definitions
Labeling

- All hazard warning labels must meet specifications pertaining to:
  - durability;
  - design;
  - size;
  - color; and
  - form identification.

- **Note:** With the exception of materials poisonous by inhalation, labels conforming to UN specifications may be used.
Placarding

- Placards are used to make the public aware of potential dangers of the product being transported and to alert emergency responders in the event of an incident or accidental release. As with labels, placards convey information about the hazardous material by use of:
  - color;
  - symbol;
  - text; and
  - hazard class number or division number.
- Placards may also display the ID number of the hazardous material.
Placarding (cont.)

- The following classes of hazardous materials require a placarded vehicle when transporting **ANY** quantity of:
  - Class 1.1, 1.2 or 1.3 – Explosives
  - Class 2.3 – Poisonous Gas
  - Class 4.3 – Water Reactive Material
  - Class 5.2 – Organic Peroxide, Type B
  - Class 6.1 – Poisons & Infectious Materials (Inhalation Hazard Zone A&B)
  - Class 7 – Radioactive Materials (Yellow III Label only)
Shipping Papers

- Hazardous Materials transported in commerce must be described in the shipping papers.
- Provides all who handle the material with basic description and detailed emergency response information in the event of an incident or release of material.
- Information from HAZMAT Table transferred to shipping papers.
Hazmat Safety

- This general awareness training gives you a basic understanding of the types of hazardous materials you may be asked to transport/handle and how to identify them.

- OSHA Hazcom requires UD to make you aware of any potential hazards you may be exposed to.
  - With hazardous materials, this is normally communicated with the SDS (Safety Data Sheet)
  - Information supplied in the SDS will assist you in segregating the materials if needed (i.e. separate flammables from oxidizers or strong acids from bases, etc.).

- Knowledge of the hazardous materials you are transporting/handling will help protect you, emergency responders and the public.
Emergency Response Information

- Public Safety (On campus)  
  - 937-229-2121
- Dayton Fire Department (On public roads around campus or to and from WPAFB)  
  - 911 or 937-333-3473
- CHEMTREC  
  - 1-800-242-9300
- Have the following information ready in the event of an emergency:  
  - Shipping Papers  
  - Material Safety Data Sheet(s)
Hazmat Security

• Read, understand and adhere to the University of Dayton, Department of Transportation Hazardous Materials Security Plan

• Hazardous materials, although used appropriately at UD can be transformed into a terrorist weapon if unauthorized personnel can gain access to them. Always be on your guard and secure hazardous materials to prevent unauthorized access.

• Never leave hazardous materials unattended in an unsecured area.

• Close and lock any vehicle containing hazardous materials anytime you are not with the vehicle.

• Never let anyone have access to these materials who does not have a legitimate reason to do so.
Conclusion

- Always treat hazardous materials with the respect they deserve and do your part in protecting yourself, others and the environment from the potential adverse affects of these materials.

- For a more in-depth understanding of the Hazardous Materials Regulations (HMR), additional DOT General Awareness, Safety, and Security training modules are available upon request.