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PCB e-Learning
Platform

OCCUPATIONAL HEALTH AND SAFETY IN PCB MANAGEMENT

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OCCUPATIONAL HEALTH AND SAFETY IN PCB MANAGEMENT

Promoting safety and health measures is important for workers and those coming in contact with dielectric oils in PCB-contaminated equipment or materials.

This is done through the general principles of:

- Prevention,
- Assessment,
- Risk management.

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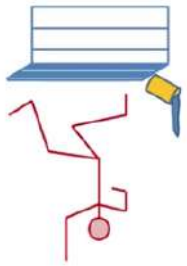
OCCUPATIONAL HEALTH AND SAFETY IN PCB MANAGEMENT

PREVENTIVE MEASURES

ACCIDENT PREVENTION

+ SAFETY

- WORK ACCIDENTS



RISK EVALUATION

- Electrocution
- Falls
- Poisoning
- Fire
- Hits

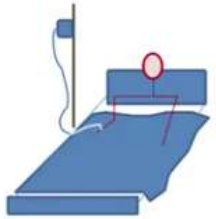
PREVENTION PLANS

- Procedures
- Equipment
- Infrastructure
- Training

DISEASE PREVENTION

+ OCCUPATIONAL HYGIENE

- DISEASES



RISK EVALUATION

- Chloracne
- Hepatic Injury
- Cancer
- Brain Injury
- More…

PREVENTION PLANS

- Procedures
- Equipment
- Infrastructure
- Training

OCCUPATIONAL HEALTH AND SAFETY IN PCB MANAGEMENT

CONTINGENCY AND EMERGENCY RESPONSE

AVOID HUMAN, MATERIAL AND ENVIRONMENTAL DAMAGE

DISASTER

DISASTER RESPONSE

Image source: Fiação de poste pega fogo na Rua Costa Gama no bairro Primavera, em Arapiraca. 7segundos.com.br

RISK EVALUATION	EMERGENCY PLANS
• Fire • Spills • Flood • Natural Disasters	• Procedures • Equipment • Infrastructure • Training • Citizen Information

PREVENTION AND EMERGENCY PLANS

GENERAL PRINCIPLES

PREVENTION PLANS

Prevention plans should be designed based on risk analysis. They include training, inspections, audits, drills and events on awareness.

EMERGENCY PLANS

Emergency plans are needed for an unpredictable emergency response.

PREVENTION AND EMERGENCY PLANS

SECURITY INSTRUMENTS

- I. PROCEDURES
- II. EQUIPMENT
- III. INFRASTRUCTURE
- IV. TRAINING

PREVENTION AND EMERGENCY PLANS

SECURITY INSTRUMENTS I. PROCEDURES

I. PROCEDURES

II. EQUIPMENT

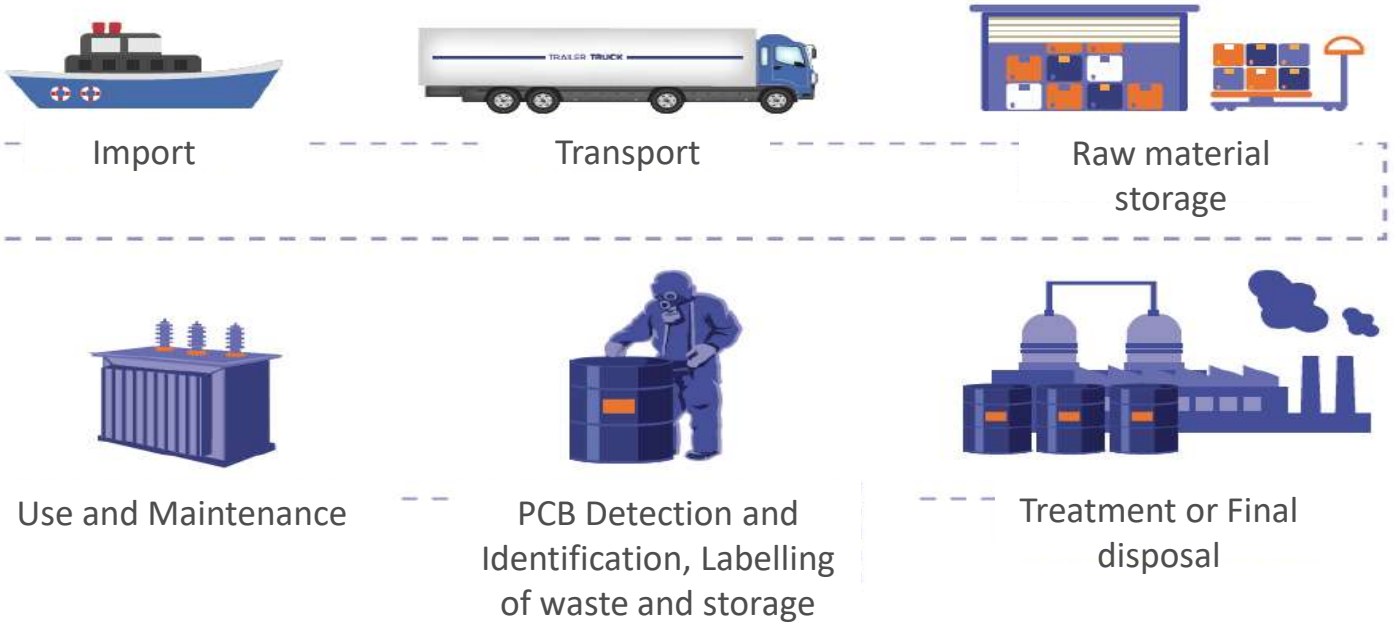
III. INFRASTRUCTURE

IV. TRAINING

Image source: istockhphoto.com

PREVENTION AND EMERGENCY PLANS

PROCEDURES DURING THE LIFE CYCLE OF PCB DIELECTRIC OILS



Each phase of the life cycle of PCB oil and equipment must follow the guidelines to prevent accidents, such as:

- ❑ Procedures to prevent accident and diseases,
- ❑ Equipment to protect the workers,
- ❑ Infrastructure according to the needs of protection against the PCB stocks, and
- ❑ Training of the workers to manage PCB equipment.

PREVENTION AND EMERGENCY PLANS

PROCEDURES DURING THE LIFE CYCLE OF PCB DIELECTRIC OILS

- Use only in intact and non-leaking equipment and only in areas where the risk from environmental release can be minimized and quickly remedied.
- Not use in equipment in areas associated with the production or processing of food or feed.
- When used in populated areas, including schools and hospitals, all reasonable measures to protect from electrical failure which could result in a fire, and regular inspection of equipment for leaks.

PREVENTION AND EMERGENCY PLANS

IMPORT OF DIELECTRIC OIL

- Countries will monitor the prohibition on the import, and nationalization of dielectric oil and equipment containing PCB-contaminated dielectric oil at any concentration.
- Importing equipment or materials that may contain PCBs must been PCB screened or having a valid PCB's Certificate.

Imported dielectric oils must have a Material Safety Datasheet (MSDS) or Safety Data Sheet (SDS).

Workforce needs specific instruction and training, to minimize possible accidents.

PREVENTION AND EMERGENCY PLANS

GROUND TRANSPORT OF DIELECTRIC OIL

- Vehicles dedicated to the transport of hazardous materials and wastes must comply with the guidelines of current environmental and safety regulations.

Imported dielectric oils must have a Material Safety Datasheet (MSDS) or Safety Data Sheet (SDS).

Workforce needs specific instruction and training, to minimize possible accidents.

PREVENTION AND EMERGENCY PLANS

GROUND TRANSPORT OF DIELECTRIC OIL

All drivers transporting dielectric oils on land must comply with the following recommendations .

- The driver must be in optimal physical condition; they should not be fatigued, experience problems with vision, work or family stress, and so forth...
- The driver must know the route and road signs throughout the mobilization pathway.
- The driver must respect other drivers, cyclists and pedestrians and respect all speed limits imposed by traffic law.
- The driver must perform timely maintenance of the vehicle.
- The carrier must be trained to act in cases of an emergency.
- All carriers shall have official authorization and operating permits.
- The operational vehicle must be handled by at least 2 trained persons, being only the driver and the driver's assistant.

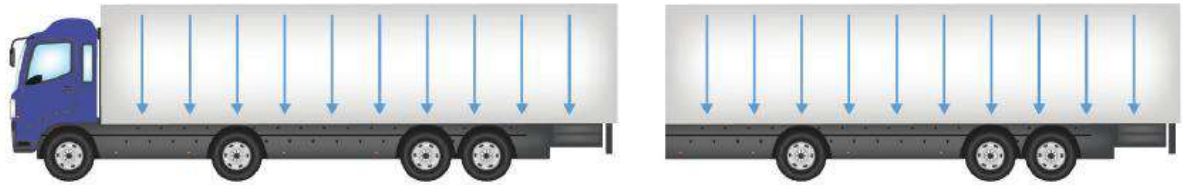
PREVENTION AND EMERGENCY PLANS

GROUND TRANSPORT OF DIELECTRIC OIL

LOADING AND UNLOADING

- Check the correct condition and operation of the vehicle.
- Check the safety sheets (MSDS) or Safety Data Sheet (SDS).
- Perform a physical inspection of the cargo load.
- The container must be ventilated for at least 15 minutes before loading or unloading.

STACKING



WEIGHT BALANCE

PREVENTION AND EMERGENCY PLANS

MEDICAL SURVEILLANCE

- Occupational and clinical history.
- Vision and hearing tests.
- Medical examination of urine, lungs, liver and blood enzymes.
- PCB concentration levels.

Perform an initial medical examination, at the beginning of work or project.

Perform an annual medical examination

Take a medical examination at the end of work or project.

Workers exposed to high PCB concentrations must immediately take another medical examination.

PREVENTION AND EMERGENCY PLANS

PERSONAL HYGIENE

- Remove contaminated personal protective equipment (PPE) in such a way that no skin has contact dielectric oils. Clothes used to work with dielectric oil should be washed at work in order to avoid cross-contamination at home.
- Wash both hands thoroughly with soap and water.
- Abstain from smoking, drinking and eating while handling dielectric oils and equipment.

PREVENTION AND EMERGENCY PLANS

SAMPLING IN ENERGIZED TRANSFORMERS

1. Sampling shall be carried out between two trained technicians.
2. Only use personal protective equipment (do not wear accessories, such as metal rings or watches).
3. Maintain distances greater than the minimum allowed.
4. Only use insulated tools.
5. Do not sample in environment conditions of extreme humidity.
6. Use a tray to catch potential oil drips.
7. Properly label the bottle: use the bottle only for activities it is intended for.
8. Take the sample from the valve located at the bottom of the equipment (30 mL in an amber bottle).
9. Close the bottle and clean up any spilled liquids on the floor or valve.
10. Any contaminated material used, is now considered as hazardous waste. Therefore, they must be stored and eliminated in accordance with the country's legal and environmental guidelines.

PREVENTION AND EMERGENCY PLANS

SAMPLING IN OFF-SERVICE TRANSFORMERS

1. Sampling shall be carried out between two trained technicians.
2. Only use personal protective equipment (do not wear accessories, such as metal rings or watches).
3. For sampling, all criteria from numbers "6“ to "11“ as described in-prior will be followed.
4. For equipment that does not have a lower valve, they may have a valve or cap on top.
   In this case the sample should be removed with a long plastic pipette or with a syringe and hose that reaches at least half the body of the equipment.

PREVENTION AND EMERGENCY PLANS

SECURITY INSTRUMENTS II. PROTECTION EQUIPMENT

I. PROCEDURES

II. EQUIPMENT

III. INFRASTRUCTURE

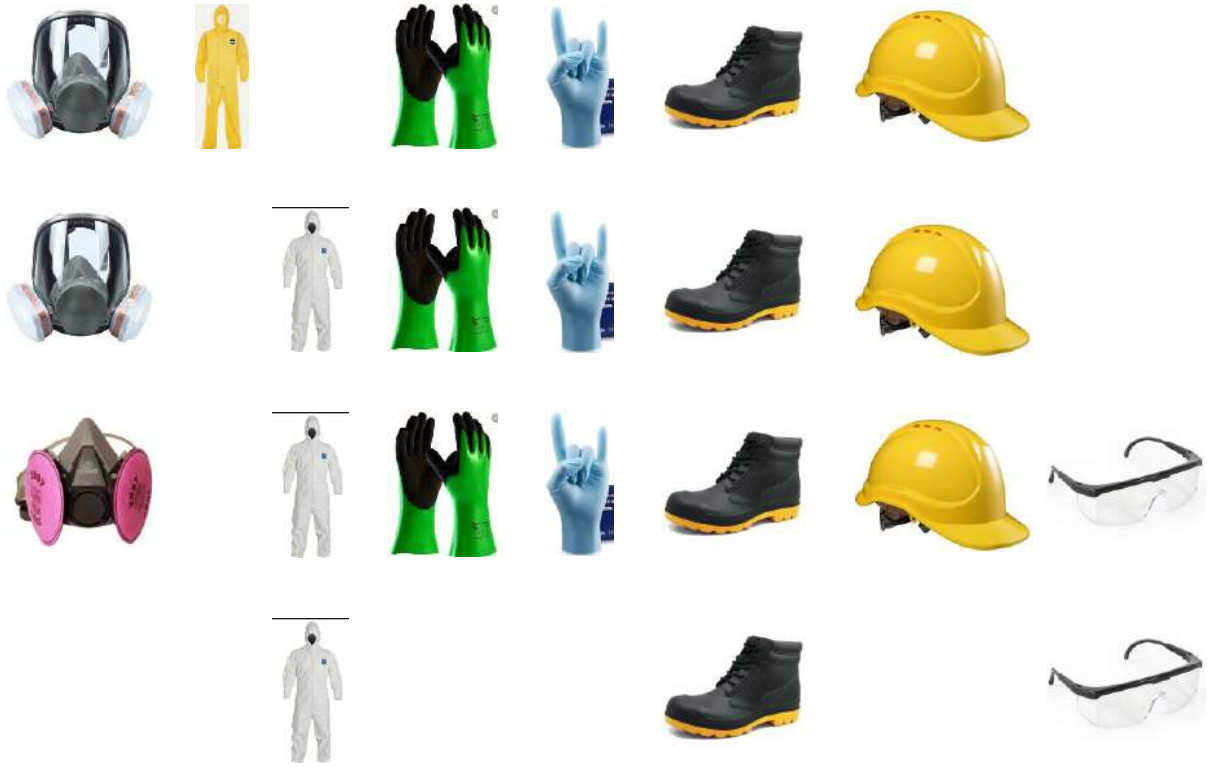
IV. TRAINING

Image source: istockhphoto.com

PREVENTION AND EMERGENCY PLANS

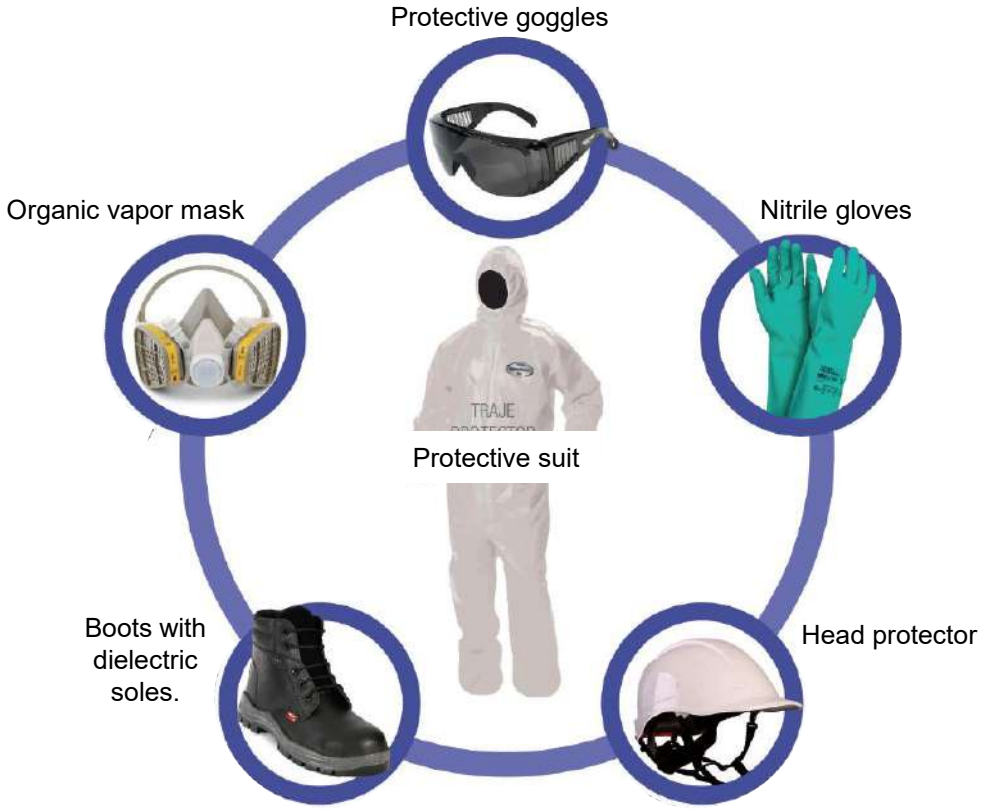
INDIVIDUAL PROTECTION

A	Higher level of personal protection (high concentration of PCBs)
B	High level of respiratory protection, (little potential for contact of PCBs with the skin)
C	Non-high respiratory hazard, (PCB concentrations are expected to be above acceptable levels)
D	No respiratory risk (Probably minor contact damage to PCBs)



PREVENTION AND EMERGENCY PLANS

INDIVIDUAL PROTECTION



PREVENTION AND EMERGENCY PLANS

WASTE CONTAINERS WITH PCBS

- Electrical appliances filled with dielectric oil must be on spill trays containing at least 110% of the liquid volume of the equipment.
- Small electrical appliances that are in good condition can be on pallets. Those in poor condition must be drained before being placed on pallets.
- Liquids will be stored in steel barrels with a double-hole lid.

PREVENTION AND EMERGENCY PLANS

LABELS

PREVENTION AND EMERGENCY PLANS

LABELS

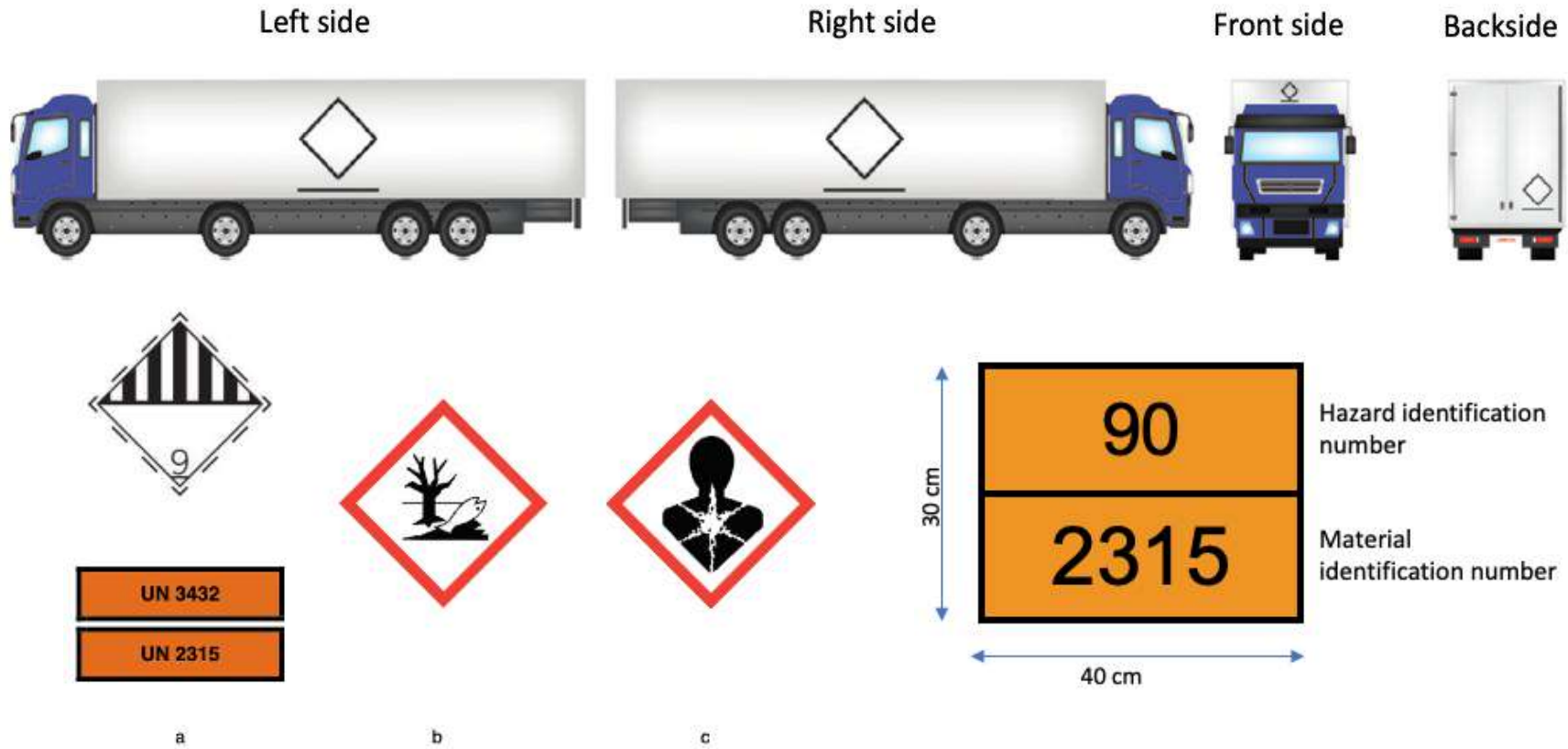
Dot regulations.
For any type of land or marine container.

OILS

SOLIDS

PREVENTION AND EMERGENCY PLANS

LABELLING



Labeling of containers and wastes with PCBs

PREVENTION AND EMERGENCY PLANS

SECURITY INSTRUMENTS III. INFRASTRUCTURE

I. PROCEDURES

II. EQUIPMENT

III. INFRASTRUCTURE

IV. TRAINING

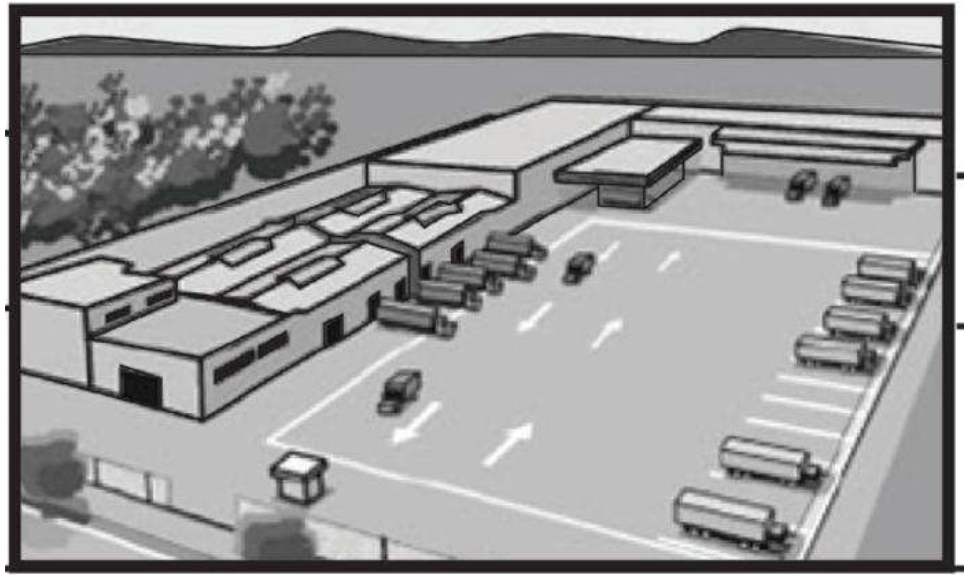
PREVENTION AND EMERGENCY PLANS

STORAGE

THE EXTERNAL PART OF THE WAREHOUSE

Located away from: residential areas, schools, hospitals, commercial areas, industries that manufacture or process food for man or animals, rivers, wells, canals, or lakes.

- Isolated from sources of heat and ignition.
- Warehouses have a dressing room, sanitary facilities, eye showers, wardrobes for PPE, absorbent material and disposable clothing.



- All danger signs are installed in highly visible places and forms.
- Access restricted to unauthorized persons.
- Easily accessible for transport vehicles, and especially firefighters.
- Non-flood risk area

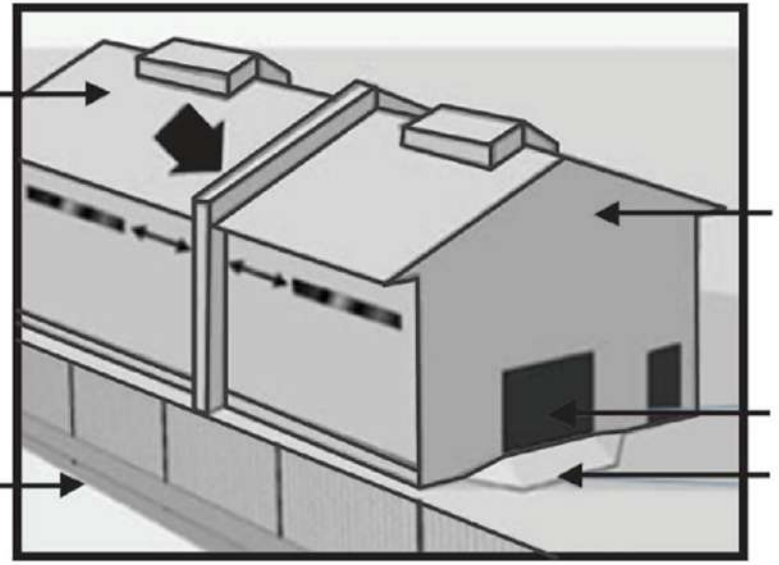
PREVENTION AND EMERGENCY PLANS

STORAGE

THE STORAGE BUILDING

Roof must avoid the direct incidence of solar radiation and water ingress.

Security fence and concrete railing around the perimeter of the warehouse.



Concrete walls, solid structure, fireproof, and ceiling.

Concrete floor, no drainage, cracks, painted with epoxy paint.

Access ramp.

PREVENTION AND EMERGENCY PLANS

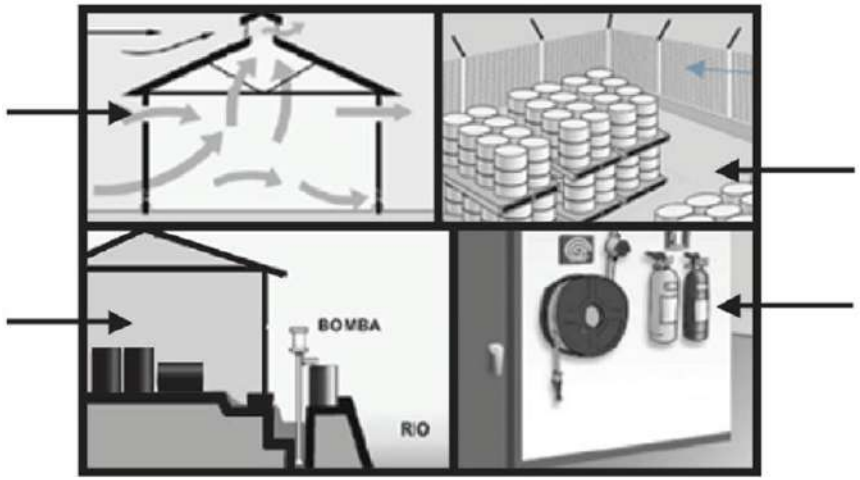
STORAGE

THE INTERNAL PART OF THE WAREHOUSE

Warehouse will be one-story and will have interior aisles suitable for transportation.

Ventilation to avoid the accumulation of vapors.

Buckets capable of storing at least 110% of the volume of the dielectric oil, in case of equipment in operation is not stored



Stored products at 1 meter from the perimeter walls.

Warehouse has 10 lb capacity extinguishers with chemical powder, CO2, water or regular type foam.

PREVENTION AND EMERGENCY PLANS

COLLECTIVE PROTECTION

- Fire prevention: Proper design of the place that stores easily burning substances
- Installation of a fire detection system
- Firefighting facility
- Sign the way for local evacuation
- Special measures for installations at risk of explosion
- To signal the existence of risks and measures to be taken, and to determine the location of devices, safety equipment, other measures of protection and the types of signalling.

PREVENTION AND EMERGENCY PLANS

TRIAINIG FOR MANAGEMENT OF DIELECTRIC OILS

IV. TRAINING

I. PROCEDURES

II. EQUIPMENT

III. INFRASTRUCTURE

IV. TRAINING

Image source: istockhphoto.com

PREVENTION AND EMERGENCY PLANS

TRAINING – MINIMUM CONTENT

- Properties and features of PCBs.
- PCB identification and screening.
- Storage and labelling requirements for PCBs.
- Precautions for transporting PCBs.
- Reporting requirements in PCB transport.
- Emergency plans and personal emergency protective equipment.
- Emergency response procedures.

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END OF OCCUPATIONAL HEALTH AND SAFETY IN PCB MANAGEMENT

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