



HANDLING AND DISPOSAL OF HAZARDOUS MATERIALS AT CONSTRUCTION SITE

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The Hazardous Wastes (Management & Handling) Rules 1989 were notified by the Ministry of Environment and Forest, Government of India, under the provision of the Environment (Protection) Act 1986. The Maharashtra Pollution Control Board has developed various guidelines for transportation and disposal of hazardous wastes.

Hazardous waste has been defined in Rule 3 of Hazardous Wastes (Management & Handling) Amendment Rules, 2003 coming into force with effect from 20 May 2003 as any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances.¹

Manufacturers of products generating hazardous waste materials are required to provide detailed directions for handling and disposal of these products. These instructions are in the form of “Material Safety Data Sheets” (MSDS). MSDS for each product/material should be referred to for handling, storage and usage specifications.

Precautionary steps for handling and disposal are necessary for the following reasons

- Protection for the laborers
- Protection for other materials, products, equipments etc. on site
- Water, Air and Soil Contamination

General instructions for handling & disposal of Hazardous waste

1. Labeling all Hazardous products and waste as ‘Hazardous materials’ in local and other preferred languages should be incorporated as a general practice.
2. All waste classified as hazardous should be isolated and stored as per the Hazardous waste management Rules or as per the MSDS provided by the manufacturer.
3. Locations should be identified on the construction site to store the used/scrap wastes and the items should be segregated and stored in the bins accordingly.
4. After filling up the scrap disposal form and certification from the Engineer/ Manager of the department, the waste is to be handed over to the authorized agency for disposal.
5. Fire Extinguisher should be accessible.
6. Emergency exit to be marked clearly and should be devoid of any obstructions.

In addition to the hazardous materials, following items used for application of hazardous chemicals should also be properly disposed

- Cotton Hosiery gloves/ Criss cross gloves
- Arm Guards
- Corrugated /Thermocol Scrap

¹ Central Pollution Control Board, <http://mpcb.mah.nic.in/images/NationalPolicy.pdf>

- Plastic and glassware.

Following is a list of most commonly found toxicants, contaminants on a building construction site and certain guidelines for their handling and disposal. (NOTE: The MSDS for each product should be strictly adhered for each of these materials.)

1. Asbestos products² – insulation, tiles etc

To effectively handle asbestos products several elements need to be considered. Site Engineers and building owners must:

- Keep an up-to-date inventory of all asbestos-containing materials on the site/building
- Ensure that all asbestos-containing materials are clearly identified.
- Conduct a risk assessment of the potential for exposure to any of the asbestos-containing materials.
- Develop safe work procedures, including the correct use of personal protective equipment, for workers who may work near asbestos-containing materials
- Instruct all workers who could be exposed in all aspects of the asbestos handling precautions.
- Make manufacturers' manuals and instructions available to workers
- Prepare written work procedures specific to each job site and make them available to all workers required to follow the procedures.
- Ensure that work is carried out under the supervision of experienced and qualified supervisors along with the uses of appropriate safety equipments.
- Keep accurate and complete records regarding asbestos management.
- Handling and disposal of the asbestos products should be as per instructions and procedures marked in the manufacturers manual.
- Any asbestos containing building component should be clearly identified and information should be given to the building residents/manager.
- All asbestos products for disposal should be kept in a separate marked covered bin and given to authorized agency for disposal.

2. Fuels and Heating oils and other volatile / flammable liquids such as coolants, grease etc

Prevention of diesel spillage at the time of charging diesel in to the drums, also at the time of maintenance and cleaning work.

- Only 200 liters of diesel should be charged into the drum instead of filling it upto the top of the drum.
- The drum caps should be closed tightly to avoid spillage during conveying of drums.

² Asbestos Safe Work Practices for Handling
(http://www.worksafebc.com/publications/health_and_safety_information/by_topic/assets/pdf/asbestos.pdf)

- Vessels should be kept under the equipments for collection of leaked diesel during maintenance of vehicles, heavy machinery and generators etc.
- Inspect the vehicle/machinery for any leakage at the beginning of the shift. If any leakage is found, call auto-shop personnel for repairing.
- Send the vehicle to auto-shop for regular preventive maintenance.

To Prevent Fire/ spillages during unloading of Diesel

- To Prevent Fire/ spillages during unloading of Diesel tanker, tanker should be sent to the unloading tank, after verification of quantity, leakage etc
- The truck driver should remove all the stoves and other inflammable materials
- Usage of Cell phones/ Mobile phones to be avoided
- All the hosepipes should be free of any leakages.
- The unloading would be done in presence of stores person.
- Any spilled diesel is to be covered with sand immediately.
- In case of fire/spillage the Fire & safety department should be informed.
- In case of heavy leakage of diesel the Security department should be notified.

3. Centering oil, formwork oil

Prevention of oil spillage at the time of oiling of machinery or metal works on construction site.

- All vessels used for oil collection/ storage should be appropriately secured to avoid spillage.
- Vessels should be kept under the equipments for collection of leaked oil during maintenance of equipments or during time of greasing of metal works during construction.
- Any spilled oil is to be covered with sand immediately.
- In case of fire/spillage the Fire & safety department should be informed.
- In case of heavy leakage of oil the Security department should be notified.
- It is the primary responsibility of the site engineer to ensure that these procedures are adhered to. Mop cloths or other materials used for cleaning up or wiping during oil and diesel works should be disposed off as per procedures given in hazardous materials disposal.

4. Tar and Tar products (bitumen, felt, water proofing compounds etc.)³

- Wear personal protective equipment & clothes (hardhat, gloves, goggles, earmuffs, etc.), as appropriate.
- Avoid any kind of contacts with the materials.
- Switch off all electric cables leading to the work area
- Wear respiratory protection and gloves while working.
- Wear the chemical goggles when using, applying or handling chemical liquids or powders from containers labeled "Caustic" or "Corrosive."
- When handling hot tar, wear clothing made of cotton or non-synthetic fibers. Wear long sleeve shirts, long pants and gloves.
- Do not smoke or eat while performing tar work.
- Prevent spillage on the ground and other surfaces.
- Disposal - All tar and tar products for disposal should be kept in a separate marked covered bin and give to authorized agency for disposal.

5. Wood Dust ⁴

- Avoid any kind of exposure to certain types of wood dust (from chemically treated wood).
- As chemicals in the wood or chemicals created in the wood by bacteria, fungi, or moulds can create health problems hence care should be taken while working.
- Respiratory protective equipment and gloves should be used which fits well.
- All woodworkers should have access to respiratory protection and appropriately designed ventilation systems.
- No flammable chemicals should be stored near the working place.
- Fire extinguishers should be kept at the working place

6. Lead containing products⁵

- Wear respiratory protection and gloves while working.
- Respirator filters should be changed whenever it is noticed that there is an increase in breathing resistance.
- To prevent skin irritation, always wash your face and respirator face piece whenever you leave the work area and especially at the end of every shift.
- Reduce your chances of swallowing or inhaling lead hence do not eat, drink or sleep near the working place.

³ **Dictionary of Toxins**, (<http://www.budgetartmaterials.com/diofto.html>)

⁴ **Workplace Health and Safety Bulletin Health Effects From Exposure To Wood Dust**

(<http://www3.gov.ab.ca/hre/whs/publications/pdf/ch045.pdf>)

⁵ **Paint, Preparation and Existing Paint Safety**

(<http://www.seemydesign.com/livingroom/considerthis/safety/paint.htm>)

- Disposal – Segregate lead containing products for disposal in a separate bin and give to authorized agency for disposal

7. Chemical⁶ admixtures, sealants, adhesives solvents etc.:

- Wear safety shoes with non-skid soles.
- Wear long-sleeve shirts and protect hands with protective gloves and appropriate eye protection.
- Every worker should use respiratory protective equipment during working with chemical admixture products, sealants, adhesives, solvents etc.
- Avoid any kind of skin contact with the chemicals used.
- Wash well with soap and warm water or use special cleansers, especially after direct contact with chemicals, and before drinking and eating.
- Install effective exhaust ventilation to prevent air contamination; add local exhaust ventilation if necessary.
- Do not inhale or smell the chemicals when the cans are opened.
- Disposal of containers of chemical products, materials applied with chemical products etc should be done by segregating and collecting these separately as hazardous waste. These should then be given to an authorized agency for disposal.
- These materials should never be burnt.

9. Paints⁷, pigments, dyes and primers⁸:

- Wear safety shoes with non-skid soles.
- Wear long-sleeve shirts and protect hands with protective gloves and appropriate eye protection.
- Every worker should use respiratory protective equipment during working with chemical admixture products, sealants, adhesives, solvents etc.
- Avoid any kind of skin contact with the chemicals used.
- Lead-based paint should be avoided completely.
- Wash well with soap and warm water or use special cleansers, especially after direct contact with paints, pigments, etc., and before drinking and eating.
- Do not inhale or smell the chemicals when the cans are opened.
- Disposal of containers of paints, pigments, dyes and primers, other products used for its application, or any other products applied with these products should be done by segregating and collecting these separately as hazardous waste. These should then be given to an authorized agency for disposal.

⁶ . Human Resources Development Canada, Occupational Safety and Health HAND'S OFF
(<http://www.worksafesask.ca/files/hrdc/handsen.htm>)

⁷ Paint, Preparation and Existing Paint Safety
(<http://www.seemydesign.com/livingroom/considerthis/safety/paint.htm>)

⁸ Dictionary of Toxins (<http://www.budgetartmaterials.com/diofto.html>)

10. Carbon black⁹:

- Wear long-sleeve shirts and protect hands with protective gloves and appropriate eye protection.
- Contain and isolate areas where carbon black is used or exposed.
- Reduce your chances of swallowing or inhaling the carbon black by avoiding eating,, drinking or sleeping near the working place.
- Avoid overexposure to the materials.
- Every worker should use respiratory protective equipment.
- Disposal should be done by collecting it separately as a hazardous material and giving to a authorized agent for disposal.

11. Pesticides:

- Handling of these chemicals should be done as specified by the manufacturer. Disposal of safety equipment used for these operations and other hazardous waste should be done as per the below guidelines:

12. Tarpaulin:

Tarpaulin sheet is generally inert as a product with no emission as such. However, it should be used properly and be kept away from very high temperature which could result in the sheet emitting toxic fumes due to melting of the material. It should be fully recycled and reused. Recycling will involve proper ventilation of the work place, personal protective equipments, emergency preparedness, proper working knowledge, guidelines about the process and supervision of an expert.

13. Explosives and related products and equipment used in excavations:

- These should be used under expert supervision and as per instructions from the manufacturer.
- Explosives and related products should be stored in a safe and secured manner.
- Disposal: The waste generated from use of explosives should be separated and collected separately as hazardous waste or as per manufacturers instructions. These should then be given to an authorized agency for disposal.

14.Product packaging (cement bags, cartons, containers, plastic covers etc.)

- Collect all product packaging material at a designated area.
- Reuse & recycle to the extent possible the product packaging material.
- Handover the packaging material to proper recycling agents or Municipal authority for recycling or proper disposal.

15. Plastics, Acrylics, Silica, PVC

- Collect all Unwanted / Broken plastic parts and Non Biodegradable material at the appropriate areas.
- Collect the scrap in the appropriate bins with list of all scrap parts.
- Handover the scrap material to proper recycling agents or municipal authority.

16. Compressed Gases / cylinders¹⁰:

Compressed gases can pose severe hazard. Therefore, the following measures must be taken:

- Site Engineer or supervisor must obtain a permit from the fire department that allows for the storage of compressed gases.
- Valve protection caps must be in place when compressed gas cylinders are transported, moved or stored.
- Close cylinder valves and replace valve covers when work is complete or when cylinders are empty or moved.
- Secure compressed gas cylinders in an upright position in a welding cart or to a solid object using chains, straps or rigid retaining bars. Secure compressed gas cylinders on an approved carrier while being transported.
- Keep cylinders at a safe distance or shielded from welding or cutting operations. Do not place cylinders where they can contact an electrical circuit.
- Keep oxygen and flammable gas regulators in proper working order and a wrench in position on the acetylene valve when in use. Separate oxygen and flammable gas cylinders by 20-feet or a 5-foot high fireproof barrier.
- If a leak develops in a cylinder and it cannot be immediately corrected, move the cylinder to a safe location outside the building.
- Use only approved spark igniters to light torches.
- Cylinders must not be taken into or stored in confined spaces, including gang boxes and office/storage trailers.
- Do not store hoses and regulators in unventilated or closed containers or areas
- Do not leave behind partially filled or empty cylinders. Always remove them from the site.
- Return the used and empty cylinders to the manufacturer for recycling.

17. H₂S emission¹¹:

- Personal precautions: Evacuate area. Eliminate ignition sources. Ensure adequate air ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

¹⁰ **COMPRESSED GAS CYLINDERS - Safety - Environmental & Safety,**
UNIVERSITY OPERATION SERVICES, (http://www.uos.harvard.edu/ehs/saf_compgascyl.shtml)

¹¹ **AIR LIQUIDE SAFETY DATA SHEET, HYDROGEN SULPHIDE**
(http://www.spezialgase.de/specialgasescatalog/sicherheitsdatenblaetter/reine_gase/073.pdf)

- Environmental precautions: Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous. Try to stop release.
- Clean up methods: Ventilate area. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated.
- Handling and storage: Ensure equipment is adequately earthed. Suck back of water into the container must be prevented. Purge air from system before introducing gas. Do not allow back feed into the container. Use only properly specified equipment, which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Keep away from ignition sources (including static discharges).
- Segregate from oxidant gases and other oxidants in store.
- Refer to supplier's container handling instructions. Keep container below 50°C in a well-ventilated place. Secure gas cylinder against overturning.
- Return the used and empty cylinders to the manufacturer for recycling.

18. - Fluorescent Lamps Intact and Crushed, Halogen Lamps, Arc Lamps, UV Lamps, High Pressure Sodium Lamps, , Neon Lamps, Incandescent Lamps.

- Collect all the above mentioned materials separately in properly marked bins.
- Handover the material to proper recycling agents or Municipal authority.

19. Mercury Containing Lamps and Tubes, Mercury Vapor Lamps , Mercury Containing Devices – Mercury switches, relays, regulators, thermostats, thermometers, manometers and debris containing mercury¹²

- First, builder should be encouraged to buy products that do not contain mercury. There are now several products on the market that can be used as substitutes to mercury.
- Make sure personnel are familiar with the proper cleanup procedures for handling a spill involving mercury.
- Do not place mercury-containing materials in waste receptacles for bio-hazardous waste because mercury will be released to the atmosphere when the bio-hazardous waste is incinerated.
- Collect all the mercury containing materials separately in properly marked bins.
- Handover the material to proper recycling agents or Municipal authority.

20. All types of Batteries

- Always wear goggles or a visor when working on batteries.
- Wherever possible, always use a properly designated, well ventilated area for charging.
- Remove any metallic items from hands, wrists and neck (rings, chains etc) before working on a battery.

¹² Medical Waste Pollution Prevention: Keeping Mercury Out of the Wastewater Stream
(<http://www.p2pays.org/ref/01/00790.htm>)

- Used Battery to be disposed of to the Authorized Battery Dealer
- 21. Electronic Ballasts, PCBs, Transformers, capacitors, switchgear, Lead Cable, Oil filled / gel filled cables.**
- Collect all the above mentioned materials separately in properly marked bins as per manufacturers instructions.
 - Handover the material to proper recycling agents or Municipal authority.
- 22. Electronic Waste– computer products, circuit boards, CRTs, electronic parts, solder dross, weld waste.**
- Collect all the above mentioned materials separately in properly marked bins as per manufacturers instructions.
 - Store them properly and prevent rusting of the components, so as to maintain its recycling value.
 - Handover the material to proper recycling agents or Municipal authority.