Waste Management in Construction Sector

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LEARNING OUTCOMES

• Understand objectives behind Waste Management;
• Understand Integrated Waste Management System;
• Identify different classifications and types of waste;
• Describe waste segregation, storage and disposal requirements;
• Understand methods of contributing to an organization’s environmental performance;
• Describe reporting requirements.
OBJECTIVES OF WASTE MANAGEMENT

• Reduce / Mitigate environmental impact;
• Comply with laws and regulations;
• Comply with ISO 14001:2015 Environmental Management System;
• Implement company Environment and Sustainability Policies;
• Comply with Client/Project Environmental Requirements;
• Contribute positively towards sustainability.
REDUCE ENVIRONMENTAL IMPACT
CONTRIBUTE TO SUSTAINABILITY

Sustainability means using natural resources in a manner that guarantees future generations have enough and these natural resources are not fully consumed.
Waste is classified into two categories:

- Hazardous Waste;
- Non-Hazardous Waste.
HAZARDOUS WASTE

Waste exhibiting one or more of the following properties:

- Flammability, Toxicity, Corrosivity, or Reactivity;
- Require special handling, storage, use and disposal precautions.
OFFICE HAZARDOUS WASTE
SITE HAZARDOUS WASTE
SITE HAZARDOUS WASTE
NON-HAZARDOUS WASTE

Waste that do not require special handling and disposal precautions.

• This includes:
  – Project Office Non-Hazardous Waste;
  – Construction Non-Hazardous Waste.
OFFICE NON-HAZARDOUS WASTE

Waste that do not require special handling and disposal precautions and are produced domestically.
PROJECT SITE NON-HAZARDOUS WASTE

• Includes:
  – Concrete Debris: Concrete chipping, concrete testing, backup concrete from mixers, demolition;
  – Asphalt: Demolition of roads;
  – Steel Scrap: Reinforcement bars, buckets and barrels, steel strips from packaging, steel pipes;
  – Metal Scrap: Binding wire, HVAC duct sections, cable trays, aluminum sheets;
  – Wood Scrap: Timber, plywood, formwork, crates, plates;
  – Tile waste;
PROJECT SITE NON-HAZARDOUS WASTE

• Includes:
  – Cardboard: Bituminous sheet rolls, packaging and storage boxes;
  – Saw Dust from carpentry yard;
  – Gypsum Board / partition board waste;
  – Cement bags.
  – Plastic: Polythene, pipes, warning mesh, safety cones, plastic buckets, tarpaulin;
  – Paper: Laminated paper sheets (bitumen membranes), packaging.
INTEGRATED WASTE MANAGEMENT (IWM)

• Requires the waste producer to assess the potential for waste and put in place processes and procedures to eliminate and control the waste.
• Requires the organization to establish targets and put all efforts in place to achieve these targets.
• Includes the 5 R principles: Rethink, Repair, Reduce, Reuse, Recycle.
COMPANY RESOURCES

• Organization’s need to invest in the provision of resources, in order to meet its targets and objectives related to waste management.

• These include the following:
  – Provision of dedicated waste storage areas;
  – Provision of recycling bins;
  – Provision of employee awareness training;
  – Contracts with waste service providers.
ELEMENTS OF IWM

• The following elements of the Integrated Waste Management are discussed in the following slides:
  
  – Waste Planning;
  – Waste Sorting;
  – Waste Storage;
  – 5 R Principles and examples of each;
  – Waste Collection and Disposal;
  – Reporting.
PLANNING STAGES

The following elements are considered, during the planning phase of establishing an Integrated Waste Management system:

- Consider types of waste that will be produced at the site and office;
- Estimate the volume of each type of waste;
- Research waste providers / facilities capable of handling these types of waste;
- Provide collection / sorting units capable of accommodating the estimated waste volumes;
- Ensure Employees are properly trained in order to separate the waste and achieve organizational targets;
- Plan for suitable collection and disposal of the collected waste;
- Produce reporting forms and procedures.
WASTE SORTING

• Separate Hazardous and Non-Hazardous Waste.
• Separate all non-hazardous waste by type.
• Never mix any reusable / recyclable waste with food waste.
• Any material containing trace of food waste is non-recyclable. For example, a juice plastic bottle with juice still inside. Traces of food and drink have to be rinsed off.
• Components of one product might need further separation (e.g. water bottle).
• Do not know how to segregate? Simply Ask!
WASTE SORTING

- Mixing waste for disposal makes it almost impossible to meet the organization’s waste management targets.
- The temporary mixing of waste on sites should be avoided as it becomes difficult to separate at a later date.
WASTE STORAGE

- Waste receptacles are to be provided within the project site and offices for collection by waste type.
- Waste storage areas must be of a suitable size to contain all the produced waste quantities.
- Cardboard boxes are made flat and collected in the store room.
- Each employee can keep a reuse box for paper at their desks.
- Employees should be required to utilize waste bins and keep them in good condition.
- Never mix waste.
- Do not leave waste in corridors to block movement.
SITE WASTE COLLECTION AREA

EACH SKIP HAS PICTORIAL SIGNAGE TO SPECIFY WASTE TYPE. (COMMON LANGUAGES ALSO USED).
NON-HAZARDOUS WASTE STORAGE

- Cover waste skips.
- Properly label waste skips.
- Inspect skips daily.
- Do not leave loose waste around site.
- Transfer waste in a timely manner between site and the waste storage area.
- Do not store mixed waste together.
NON-HAZARDOUS WASTE STORAGE

• Properly stack materials to maximize ability to reuse them and prevent safety hazards.
HAZARDOUS WASTE STORAGE

Must be:

- Stored in leak proof containers with proper labeling and hazard signs;
- Shall be stored in accordance with MSDS & MSDS sheets should be available at all points of storage;
- Always kept under cover to prevent producing contaminated water shall it rain;
- Stored away from sources of ignition;
- Tightly sealed and stored away from food;
- Handled by trained persons;
- Transported by licensed waste hauliers to treatment or disposal facilities;
- Inventory of hazardous waste is required to be maintained
HAZARDOUS WASTE STORAGE

- Compatibility assessments shall be done to determine reactions between waste types and segregation requirements;
- Hazardous waste shall be stored in impermeable units / skips with cover and proper labelling.
- Best practice is placing the skip on an impermeable surface such as concrete hard standing.
5 R PRINCIPLES

- RETHINK.
- REPAIR.
- REDUCE.
- REUSE.
- RECYCLE.

Are strategies to manage waste and reduce the overall negative impacts to the environment.
RETHINK

• It requires commitment from each individual to rethink their behaviors and actions.

• If you care about giving your children a future at the same standard you live in now, think about the natural resources you are leaving them today.

• Think about eliminating the need to produce waste:
  – For example get your food in a reusable container;
  – Or donate unneeded items rather than disposing them, surely someone needs them somewhere!

• Think about waste with lower environmental impacts.
  – For example paper cups rather than polystyrene cups.
REPAIR

- 80% of Electronic devices are functional on disposal, however, we are just too lazy too fix them.
- Electronic waste are the most polluting domestic waste. (Chemicals → soil → ground water → sea → animals → humans)
- Repairing electronics means less pollution going to the environment from discarded items.
- If repair is not possible, donate Electronic devices at e-waste locations.
- Same principle can be applied to a wide variety of items such as tyres, wood planks (de-nailing for reuse), office furniture, vehicle batteries.
If waste is inevitable, try to reduce the amount you produce:

- Buy reusable containers rather than disposable ones;
- Reduce the amount of food waste;
- Try buying items with no packaging;
- Reduce non-recyclable waste like polystyrene and glass;
- Reduce printing and use of ink;
- Bulk materials vs. smaller containers;
- Paper clips vs. staples;
- Coffee tumblers.
Site teams shall reduce the waste produced through their activities:

- Reduce the amount of concrete backup to reduce the amount of wash out;
- Reduce the amount of steel reinforcement cutting onsite by ordering correct dimensions from supplier, where applicable;
- Request manufacturers to reduce the packaging of non-fragile materials;
- Reduce non recyclable waste like polystyrene and glass;
- Separate recyclables and non recyclables to reduce risk of non-recyclable waste.
REUSE - OFFICE

• Store reusable materials separately and label them as reusable.
• Some examples of reuse in the office:
  – Get your lunch in reusable containers;
  – Collect single sided print outs for reuse as drafts and notes;
  – Reuse empty containers;
  – Reuse cardboard boxes for storage;
  – Reuse plastic binding spirals for new documents.
REUSE - SITE

• Store reusable materials separately and label them as reusable.

• Some examples of reuse onsite:
  – Wooden pallets for material storage and transport;
  – Backup concrete to extend hard standing around site offices;
  – Polythene and hessian cloth for concrete curing;
  – Cardboard boxes for storage;
  – Cut reinforcement for use with barricades and site marking.
Recycling means processing what is usually considered waste to become a new material.

Recycling reduces:
- Pollution from extraction and manufacture of raw materials;
- Amount of waste going to landfill;
- Marine and environmental pollution.

Recycling requires proper separation of waste according to type.

Materials separated at source are then transferred to a licensed / authorized recycling facility.

Consider take back recycling.
RECYCLABLES - OFFICE
<table>
<thead>
<tr>
<th>Recycle Code</th>
<th>Plastic Type</th>
<th>Common Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PETE (Polyethylene)</td>
<td>Soft drink bottles, mineral water, fruit juice containers and cooking oil</td>
</tr>
<tr>
<td>2</td>
<td>HDPE (High-density Polyethylene)</td>
<td>Milk jugs, cleaning agents, laundry detergents, bleaching agents, shampoo bottles, washing and shower soaps</td>
</tr>
<tr>
<td>3</td>
<td>PVC (Polyvinyl Chloride)</td>
<td>Trays for sweets, fruit, plastic packing (bubble foil) and food foils to wrap the foodstuff</td>
</tr>
<tr>
<td>4</td>
<td>LDPE (Low-density Polyethylene)</td>
<td>Crushed bottles, shopping bags, highly-resistant sacks and most of the wrappings</td>
</tr>
<tr>
<td>5</td>
<td>PP (Polypropylene)</td>
<td>Furniture, consumers, luggage, toys as well as bumpers, lining and external borders of the cars</td>
</tr>
<tr>
<td>6</td>
<td>PS (Polystyrene)</td>
<td>Toys, hard packing, refrigerator trays, cosmetic bags, costume jewellery, audio cassettes, CD cases, vending cups</td>
</tr>
<tr>
<td>7</td>
<td>OTHER (Other Plastics)</td>
<td>Other plastics, including acrylic, polycarbonate, polyactic fibers, nylon, fiberglass</td>
</tr>
</tbody>
</table>

An example of one type is a polycarbonate used for CD production and baby feeding bottles.
The largest amount of waste produced at the office is paper waste.

Paper is produced from trees.

Trees suck carbon dioxide from the air.

Less trees = more CO$_2$ = more climate change.

Recycling one ton of newspaper saves about 1 ton of wood.

Recycling 1 ton of printing or copier paper saves 2 tons of wood.

EPA claims 40% reduction in energy when paper is recycled versus paper made with unrecycled pulp.
Recycling Requirements:

- Remove staples, clips, binding and plastic from the papers before dropping them in the recycling bin;
- Do not recycle paper mixed with food waste;
- Do not mix cardboard with paper;
- Envelopes with plastic in them are not recyclable, unless plastic is removed;
- With our current recycler, post-it notes can be recycled;
- Shredded paper at the office are also sent for recycling with confidentiality of the papers preserved;
- Paper napkins and tissue are non-recyclable;
- Wax paper and laminated paper are non-recyclable.
CORRUGATED CARDBOARD

- They are flattened for reuse.
- Mills use old corrugated containers to make new shipping boxes, as well as recycled paperboard for product packaging (cereal boxes, shoe boxes, etc.).
METAL

• Are the most valuable of all recyclable materials.
• Can be recycled into a wide variety of products.
• There is no composting plant in Abu Dhabi, therefore food waste goes straight to landfill.
• Any container contaminated with food and drinks is considered non-recyclable.
• Try to reduce the amount of food waste you create at the office.
NON RECYCLABLES - OFFICE
RECYCLABLES - SITE
SAW DUST
PAPER AND CARDBOARD
PLASTIC
CONCRETE
CONCRETE

DO NOT MIX WITH OTHER WASTE
CONCRETE WASH OUT
MASONRY BLOCKS
STEEL AND METAL SCRAP
RECYCLABLE TIMBER AND WOOD
TYRES
There are some site items that are generally non-recyclable:

- Polystyrene / foam insulation; HVAC Duct insulation;
- Laminated / treated wood (plywood); Gypsum boards;
- Damaged PPE; Clearing waste;
- Concrete chipping waste; Soiled cement bags;
- Laminated paper (bitumenous sheets);
- Plastic safety net; Green Mesh;
- Geotextile material.
NON-RECYCLABLES
SEPTIC WASTE

- Septic waste shall be collected by permitted tankers.
- Spills must be avoided while being collected.
- Septic tanks shall be checked on a daily basis.
- Proper scheduling of collection shall be done to prevent overflowing.
- Septic waste shall be taken to approved sewage treatment facilities.
MEDICAL WASTE

- Are waste soiled with blood or containing human tissue. They also include waste that have a potential for infection.
- This includes soiled cotton, soiled bandages, needles, etc.
- They shall not be disposed with general waste.
- Medicines shall never be disposed in general waste bins, they need to be disposed as hazardous waste.
- Medical waste shall be collected in special yellow “biohazard” labelled puncture proof bags and within sealable bins.
- They shall be collected by a licensed waste provider and transferred to an authorized medical waste incineration facility.
COLLECTION AND DISPOSAL

• Permit to dispose of some waste types (hazardous / medical) may be required from relevant Authorities.
• Only authorized / licensed waste service providers can collect the waste.
• Only waste service providers from the same region can collect the waste (Abu Dhabi Requirements).
• They transfer the waste to approved recycling / treatment facilities.
COLLECTION AND DISPOSAL

• Each trip leaving the premises should be recorded in a Waste Transfer form in addition to any forms required by the competent authority (Waste Manifest).

• The amount of waste we produce is reported to the authority and you are required to reduce your waste (by weight) by 20% each year. – Failure to do so leads to penalties and possible trade license renewal issues.

• Concrete / asphalt waste shall be sent to an approved concrete / asphalt crushing facility and requires a stamped manifest from the crushing facility.
• As an organization, waste data is reported to the competent authority as part of Trade License renewal process.
• You are required to reduce waste volume by 20% each year. This can be achieved through recycling the waste.
• You are required to maintain all waste records, including photographs of implementation of your waste management system.
• You are required to monitor the implementation of the waste management system.
QUESTIONS?