Warehouse Waste Management

Humanitarian operations generate waste that, if neglected, can cause harm to the very people humanitarians seek to assist. This document outlines best practices for managing end-of-life items in warehouses, with a focus on used packaging, office and maintenance waste, and damaged or expired stocks. Strategies should be tailored to the warehouse's specific function, strategic location[1] and the types of waste generated.

Initial considerations

Before trying to manage warehouse waste, it is essential to prevent its generation at the source. These are some best practices to prevent the accumulation of waste at a warehouse:

Apply the first in, first out rule. Identify stock[2] nearing its expiration date and prioritize its distribution or donation.

Avoid over-ordering commodities by collaborating closely with Programme and Procurement to ensure forecasting considers current warehouse stock levels.

Relocate items that are no longer useful to areas where they are needed, and salvage damaged items that can still be utilized.

Incorporate a backup power system, to prevent temperature-sensitive products from going to waste. If possible, power this with renewable energy.

Ensure the warehouse meets standards[3] and undergoes regular maintenance to prevent stock from spoiling, getting infected, damaged and/or lost.

Remember: Establish your waste management system to systematically measure, manage and monitor your warehouse waste following the basic steps outlined in the WREC Coalition's Waste Management Cheat Sheet. Make sure you have an adequate space for storing and repairing end-of-life items, and quarantine damaged/expired stocks to ensure their proper management.

End-of-life: Management Options

Warehouses contain a diverse range of items, each requiring specific guidelines to ensure their correct storage, utilisation, and proper end-of-life management. Below are some good warehouse management practices for the reduction and proper management of waste[4].

[1] Global Logistics Cluster, Logistics Operations Guide (LOG) - Warehousing strategies
[2] Global Logistics Cluster, Logistics Operations Guide (LOG) – Inventory Planning and Management
[3] Global Logistics Cluster, Logistics Operations Guide (LOG) - Facilities Management
[4] Waste management practices outlined are in line with the waste hierarchy principals which prioritize the recovery of waste as a resource and minimize waste disposal. Open burning and open disposal are not recommended practices to manage waste.

End-of-Life Items

Type of material	Examples	What to do with them
1. Used/excess packaging materials 	Tertiary and secondary packaging: • Cardboards boxes • Woven bags • Jute bags • Plastic films • Pallets (wood or plastic) • Plastic straps	1. Identify excess packaging materials and notify Programme and Procurement to reduce packaging in future orders. 2. Store used packaging by type (e.g. flatten cardboard[5] separated from jute bags and plastics) in a dry area using a shed, tarpaulin or shipping container. 3. Repair and reuse[6] used packaging materials such as broken pallets and jute and woven bags. 4. Repurpose pallets[7], cardboards boxes[8] [9], internally or by a local enterprise or community initiative. 5. Choose the best re-used and/or recycling option according to your office's capacities and the availability of local recycling resources (i.e. sell to local recycling companies[10] [11] [12], give to existing community/NGO initiatives[13], engage the informal recycling sector[14], etc.).
2. Primary packaging and harmful end-of-life relief items 	• Emergency food trays • Laminated plastic sachets • Broken solar lamps	1. In contexts where it can be challenging to repair, recycle or dispose safely of used packaging; end-of-life items and/or relief items before or after distribution, plan reverse logistics[15] schemes. 2. Return these items to the warehouse and send them to recycle or treatment facilities utilising your logistics transportation capacity (e.g. instead of trucks returning empty, seek reverse logistics solutions).
3. Organic waste 	Organic items: • Kitchen Food waste • Premises' scrap vegetation (clippings, leaves, branches, etc.)	1. If the warehouse shares premises with a canteen(s), make sure to store organic material in a dry, clean, separated and segregated area. 2. Adopt composting practices[16] and/or turn organic waste items into energy through anaerobic digestion[17]. 3. If in-house composting/bio-digestion is not possible, contact the municipality / service provider[11] for regular collection and management.

[5] One cardboard box takes up the same volume than 6 flattened cardboard boxes.
[6] Options for humanitarian packaging reuse, repurposing, and recycling (Joint Initiative, 2023)
[7] Repurpose of wooden pallets (ICRC, 2022)
[8] Fillers from shredded cardboards (ICRC, 2021)
[9] Turning cardboard into new materials: eco-Briquets (MSF, Darfur)
[10] Recycling plastic pallets initiative (WFP, Kenya)
[11] WREC Waste management facilities mapping (logcluster.org) (WREC)
[12] WREC case study: Circular Economy in WFP's storage facilities in Yemen (WREC, 2023)
[13] Recycling bags into construction and shelter materials (NGOF, DSK, VERC, CARE, 2022, Cox's Bazar)
[14] WREC case study: The Role of Scrap Dealers in Cox's Bazar to support humanitarian response and reduce environmental impact (WREC, 2023)
[15] WREC Reverse Logistics Cheat Sheet (WREC, 2024)
[16] Compost methods (WASH partners, Cox's Bazar, Bangladesh)
[17] Biogas system to treat organic waste (Refugee camps in Zimbabwe)

4. Electric and electronic waste (e-waste) 	E-waste: • Generators • Solar equipment • Lightbulbs (incl. fluorescent) • IT hardware • Cables *Please note that these are primarily hazardous wastes and require careful handling.*	1. Procure equipment with long-lasting or energy efficient models (refrigerators, air conditioners, etc.) and follow the manufacturer's maintenance recommendations (including preventative maintenance). 2. When equipment has reached its end-of-life, repair and/or refurbish items instead of disposing them. 3. When refurbishment is not possible, contact an external authorized company to dismantle, separate components, and safely handle the hazardous parts and lubricants/gasses [18]. 4. Recycling electric and electronic waste in a neighboring country may be an option if no facilities are available in-country.[19] However, it may be time-consuming, and costly due to international regulations. Consult local recyclers or customs for details.
5. Construction /dismantling / maintenance infrastructure items 	• Wood • Bricks • Metal • Mortar • Unprocessed rocks • Sand • Soil • Ferrous and non-ferrous metals • Timber • Paints • Varnish	1. Sort materials by type (e.g. bricks, timber, metals, tiles, etc. 2. Separate hazardous materials (e.g. oils, paints, chemicals, pesticides) from non-hazardous materials. Note some non-hazardous materials can become hazardous during demolition (e.g. when bamboo or bricks are impregnated with used oil). All hazardous items must be treated by a specialized company[18]. 3. For non-hazardous materials, reuse them for further construction (e.g. broken bricks, tiles and soil for refilling, wood for sockets or door frameworks, etc.). 4. Contact local companies[18] for recycling and/or reusing valuable segregated construction material in projects like soil refilling or road construction. 5. For items that cannot be reused internally and/or recycled, explore the existence of local infrastructure for safe disposal[18].
6. Fleet or Material handling equipment (MHE) waste	• Tires • Engine oil • Used fuel • Filters • Lubricants • Batteries • Refrigerants *Sometimes warehouses share*	1. Procure durable fleet or material handling equipment components (MHE) (i.e. high-quality oil and filters). Follow recommended maintenance and eco-driving practices to reduce breakdowns and waste[20]. 2. Store all end-of-life fleet and MHE components segregated in labelled containers away from sunlight, rain and moisture[21, 22]. 3. Repurpose vehicle parts like tires into wall protectors[23], pots and/or tables. 4. Where possible, return old batteries, tires, and

[18] WREC Waste management facilities mapping (logcluster.org) (WREC)
[19] Basel Convention – country profiles (UNEP)
[20] WREC - How to make your fleet more circular and environmentally sustainable (WREC, 2024)
[21] Vehicle waste management Standards Operations Procedures SOP (ICRC)
[22] Safe management of hazardous waste in WFP workshops (WFP)
[23] Tires disposal vision – repurposing tires into chairs, and protection cover layers in the parking area for the vehicles (ICRC, Yemen, 2023)

	*premises with vehicle maintenance workshops.*	refrigerant gases to the supplier when purchasing new items. Do involve Procurement colleagues in take-back schemes discussions so they can become standard operating procedures. 5. Identify certified companies[24] who can recycle/treat engine oil, batteries, tires, filters, lubricants, etc. *Please note that these are primarily hazardous wastes and require careful handling.*

Damaged and expired stock items:

Type of material	Examples	What to do with them
7. Damaged items 	• Food items • Medicines • Hygiene items • Non-food items	1. Identify and clearly mark damaged stocks (caused by age, mishandling and/or defect). 2. Assess the extent of the damage. If the item is still usable, consider repair and/or refurbishment (for equipment). For items with damaged outer packaging, repack them into new cartons or bags as required to maintain the product's safety. 3. Separate unusable items into a 'quarantine' area and determine the next steps, such as returning to the supplier, animal feeding, recycling/composting[24], energy value recovery, and/or proper disposal as per local regulations[25].
8. Expired items 	• Medicines items • Food items • Hygiene items	1. Monitor perishable items and prioritize FEFO (First Expired/First Out) for items nearing their 6-month expiration, using the oldest first to reduce waste. 2. Flag items with expiration dates less than three months and communicate them to Programme Managers to ensure they are utilized[26]. 3. Segregate expired items from the rest of the stock and proceed to proper disposal. For food, consider animal feeding; and for medicines, check if suppliers can take them back. 4. Expired items must be disposed of in accordance with local regulations and available recycling/treatment[24] options, consulting the Ministry of Health for guidance on medical item disposal.

WREC Coalition HelpDesk

For further details on type of waste and management options in humanitarian settings, please see Quick guide and the Waste Management Cheatsheet. If you have questions, contact our HelpDesk: Global.WREC@wfp.org.

[24] WREC Waste management facilities mapping (logcluster.org) (WREC)
[25] Note: many countries have strict rules for animal feed and use of expired human foods to be donated for animal consumption. Make sure to follow your country's government regulations closely and consult with the Ministry of Agriculture (or similar) in every case to ensure local legal compliance.
[26] Logistics Cluster – Physical storage guidelines