CAR WASH

CAR WORKSHOPS: A SERIOUS GAME APPROACH TO MANAGING WASTE CONSIDERED HAZARDOUS

Grant agreement no: 2014--1-ES01-KA202-004483
KA2-2014 – Cooperation for innovation and the exchange of good practices

Co-funded by the Erasmus+ Programme of the European Union

IO6-BEST PRACTICE:
“Correct handling, storage and transport of used batteries”

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein"
1. INTRODUCTION (Around half a page)

This section briefly specifies the purpose of the best practice and what content will be developed.

The purpose of this guide is to provide staff and owners of vehicle maintenance, repair and service workshops, in order to correct bad habits with regards to used batteries, and to guide for implementation of good environmental practices in the company.

This document lists risks and dangers arising from handling, storage and transportation of used batteries, as well as recommendations for prevent accidents causing damage to human health and the environment.

The components of used batteries are considered hazardous waste, so these should be treated with special care during handling, storage and transportation. Here are some guidelines for that these processes are carried out in the safest way both for environmentally as for human health.

2. BASICS CONCEPT (Max. 1 page)

This section describes the most important concepts one needs to know for understanding the best practice and its context. Here you need to include the definition of the basic concepts and/or terminology. If considered relevant include pictures of graphics.

Battery: A device that stores chemical energy to be released later in the form of electricity.

Kinds of batteries: There are two kind batteries, primary batteries and secondary batteries.

Primary batteries are disposable; their cargo is irreversible as alkaline batteries. Secondary batteries are rechargeable. Within this classification are lead-acid batteries, rechargeable lithium, nickel-cadmium and nickel-metal hydride.

Lead-acid batteries:
The lead-acid batteries are composed basically of the following materials: plastic, lead and internal liquid electrolyte plates, as follows:

- Box of plastic resistant, usually polyethylene. The material of the housing may also be metal or synthetic rubber.
- Internal lead plates, positive and negative. The positive electrode (cathode) is usually made of pure lead dioxide structurally integrated to a metal grid. The negative electrode (anode) is a grid of lead metal with one or more basic additives (antimony, calcium, arsenic, copper, tin, strontium, aluminum, selenium, etc.).
- Separators are porous plates of synthetic material, although it is common find it manufactured of polyethylene, PVC and fiberglass.
- The plates are immersed in a liquid electrolyte compound of 35% sulfuric acid and 65% water. The electrolyte is the medium in which chemical reactions were produced that generate electric accumulative power and do that electrons circulate establishing a current flow.
- By means of the positive and negative terminals (lead) the battery circuit is connected to car, and by them circulates the currents originated in the cells, which are interconnected with bridges and linkers.
3. CONTENT: CORRECT HANDLING, STORAGE AND TRANSPORT OF USED BATTERIES (Max 3 pag)

This section describes the content of good practice (tips, cautions, improvements...) for implementing the practice in the company.

Issues that are to be included here (if deemed relevant) are:

- Risks related to the hazardous waste and its handling
- Precautions to be taken
- Implementing or carrying out the activity

The components of a used battery make this a residue considered dangerous to be treated with special care during handling, storage and transportation. Here are some guidelines for that these processes are carried out in the safest way both occupational as environmentally.

3.1 Risks of handling of used batteries

Risks of fire and explosion in contact of sulfuric acid with bases, fuels, oxidizers, reducing agents and water.
Risk of explosion of the battery brings closer to any object in ignition.

The explosion of a battery causes the violent projection of both the hard parts as the liquid it contains, usually produce wounds in the face and eyes.
Risk arising from the manual handling of the battery and the transfer of sulfuric acid. When handling the battery may fall on the feet, furthermore of the blow, can produce spilling acid that can cause burns.

Risks Environmental for spill of acids of the battery, for lead smelting by craft techniques and improper disposal of slag that were generated in the smelting, are sources potentially polluting for floor and for water.

Precautions when handling used batteries

- Never bring any flame or spark to the battery.
- Do not smoke.
- Do not leave tools or metal objects on the battery.
- When replace a battery, disconnect first the negative (ground).
- Keep the cargo and discharging area of the battery well ventilated.
- Never add pure sulfuric acid to the electrolyte, it must be diluted.
- Never pour water on the acid to dilute it.

When acid is handled or battery is manipulated, you should use the following protective clothing:

- Colourless glasses or screens
- Gloves, boots and rubber apron.
- Antacid clothing, which does not develop static charges.

When handling batteries should be especially careful not to hit any of its parts, it can generate cracks in the box to allow the output of acid.

### 3.2 Precautions during storage of used batteries

Storage of batteries should be performed as follows:

- If the battery leaks, it must be stored in special containers, resistant to acidic conditions.
- The storage must be tightly covered, in order to prevent entry of rain and other external sources of water.
- This place must have water collection systems (perimeter channels closed) and should be away from heat sources.
- Preferably, the floors shall be surfaced with a material resistant to acids. Where possible these should be concrete, in order to retain any spillage produced during storage.
- Have on hand absorbent material for possible spills.
- During storage, should ensure proper ventilation, with a quick air recirculation to avoid accumulation of gases within the enclosure or storage area.
- Store access should be restricted by means of signaling, where indicated that inside there are hazardous materials.
- Do not keep these wastes stored for more than 6 months.

### 3.3 How to carrying out the transportation of used batteries

When transporting batteries should pay special attention to possible spills acid (electrolyte), for drop of batteries or holes in the plastic boxes.
To make transportation safe process battery should consider the following recommendations:

- Verification checklist to ensure optimum operating conditions of the vehicle, state inspection of cargo in order to identify possible leaks and material compatibility.
- Knowledge of safety and emergency cards of transported items and bring the updated list of emergency phone.
- No smoking in the vehicle at any time and carry no batteries or derived from these in trucks or containers transporting products for human or animal use.
- Maintain and review two dry chemical extinguishers.
- The driver of the transport vehicle must be vigilant throughout the transport operation, loading and unloading, and checking the charge status.
- Report any incident / accident that arise during transport to the company, to competent authorities.
- Perform contingency plan for emergency management that addresses the threats, vulnerabilities and risks, in order to instruct drivers and customers about the danger of the material transport and safety measures that must be at transporting batteries in case to present a contingency.
- In case of spillage, perform cleanup actions, storage, transportation to the site of use or disposal of the material and items used during the action.
- In case of leakage, if possible try to stop it before contaminating a water source; no operation if no personal protection equipment or no help.

Additionally below a list is presented with the elements necessary for the transport and handling of this type of waste:

- If the battery leaks, it must be stored in special containers, resistant to acidic conditions.
- 2 dry chemical extinguishers, in good condition.
- Safety glasses.
- Ergonomic belt.
- Rubber gloves, PVC or neoprene.
- Lantern.
- First-aid kit.
- Protective clothing: overalls, rubber boots with steel toe, rubber apron, mask with cartridge for acid fumes or chemicals.
- Collection and cleaning equipment: shovel, bucket, sand, sawdust, lime.

4. RECALL (Around half a page)

In this section the most important aspects of the best practice are highlighted. Be aware it is not a complete summary of the best practice but a magnifying glass on the most important issues.