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

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CASE STUDIES:
“Correct location of the storage Area for hazardous waste”

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1. INTRODUCTION

The present case study relates the case of the company MERIDA S.L.L, con CIF- B-111111, company recently established with address in Merida. It is dedicated to the repair of cars with the following specialties: mechanical repair, sheet metal and paint, electronic and electrical repairs and of change tires.

The case describes the analysis of the company’s premises and the choice of location for the hazardous waste storage area before of beginning its activity.

2. OBJETIVE

The objective of this document is the study of premises of car workshop from Merida, for the correct choice for hazardous wastes storage area.

The aim of this study is avoid unnecessary risks and ensure the storage area is safe and in compliance with legislation.

3. BASIC CONCEPTS

Hazardous waste: waste having one or more of the hazardous characteristics listed below, as well as their packaging or containers:

   H1- Explosive
   H2- Oxidant
   H3- Highly flammable or combustible
   H4- Irritant
   H5- Harmful
   H6- Toxic
   H7- Carcinogenic
   H8- Corrosive
   H9- Infectious
   H10- Reproductive toxicant
   H11- Mutagenic
   H12- Waste which releases toxic or very toxic gases when in contact with air, water or acid
   H13- Sensitizing
   H14- Toxic for the environment
   H15- Waste capable, after disposal of yielding another substance by any means, for example a leachate, which possesses any of the characteristics listed above.

Hazardous wastes storage area: Temporary storage area for hazardous waste for final recollection by the authorized manager and arranged according to the legislation
4. TO TAKE INTO ACCOUNT WHEN SELECTING THE LOCATION

Three possible places were identified for the waste storage area on the workshop premises:

a) Zone B: Room in the front of the workshop.

b) Zone J: Uncovered patio for access to the workshop.

c) Zone F: Room inside the workshop, towards the back of the mechanic repair zone.

ZONE A: Cars reception area.
ZONE B: Possible hazardous waste storage area.
ZONE C: Change tires area.
ZONE D: Mechanical repairs and sheet metal and paint area.
ZONE E: Paint booth.
ZONE F: Possible hazardous wastes storage area.
ZONE G: Toilet and clothing area.
ZONE H: Toilet.
ZONE I: Uncovered patio, cars pick up area.
ZONE J: Possible hazardous wastes storage area.
ZONE K: Offices.
ZONE L: Electronic and electrical repairs area.
4.

4.1 The characteristics to take into account for the correct choice of the location of the hazardous waste storage area are:

a. Major risks in storage

The most common risks due to an incorrect storage of different types of hazardous waste next to each other

b. Fire and explosion risks:

Some of the stored waste can be flammable and explosive, for this, the storage tanks must placed away from electrical panel and from the electrical outlet.

c. Risks of the tank falling over or overturning:

These accidents can happen by human intervention or without it. When there is human intervention, it can be due to excessive piling or stacking, a incorrect positioning of the waste or a bad design of the storage area. Without human intervention breaking or falling of the shelf can occur.

These situations can cause physical injuries, open wounds, chemical burns and intoxications, often by inhalation. The evaporation of some flammable and volatile waste can generate an explosive atmosphere in the storage area.

d. Fragility in tanks:

Incorrect storage can cause a fragility of the storage tanks and this could cause leaks or accidental breakages causing dangerous reactions. The materials of the tanks may be degraded by atmospheric/meteorological conditions.

e. Increased risks for propriety of wastes stored:

An inappropriate storage can cause changes in the characteristics of the waste, this can occur due to:

✓ Humidity (hygroscopic products, concentrated, hydrolysable, release gases extremely flammable in contact with humidity with the alkaline metals and the hydrides).
✓ Heat (causes sublimation, peroxides, polymerization...)
✓ Cold (causes crystallised products, gelification, emulsions...)
✓ Light (cause peroxides, polymerization...)

f. Seniority and ageing

An excessive duration in the storage of the hazardous waste can lead to degradation or significant alteration, this can
cause changes in the properties reflected in its label. For this reason, it is important to have a hazardous waste inventory regularly. This inventory will analyze the kind of waste, the quantities stored, the frequency of Inbound and Outbound of waste into the storage area, and the date of storage.

4.2 General description of hazardous waste storage area.

The storage area for hazardous waste is intended for the temporary storage of waste produced in the car workshop until these are collected by the authorized hazardous waste manager. The warehouse must be designed for the volume and typology of stored waste. In general, in line with the needs of the authorized hazardous waste manager, it is recommended to locate it in an independent and accessible place.

a) Input Zone/Clean Zone

In this zone the personal protective equipment, the elements necessary for cleaning and collecting any spills, and the registry and documentation are located. This zone must have sufficient space for the maneuvering machinery without risks.

b) Storage Zone/dirty Zone

This zone is divided, if necessary, in function of the incompatibility between families of chemical products.

The storage area needs to have sufficient space for to enter with cargo handling equipment and vehicles, and the necessary handling of waste that they is connected to the water networks. This zone must be separated from manholes or sinks, and far from electrical panels and electrical outlets, or other types of ignition sources. It must not store flammable substances near toxics substances to avoid inflammation of wastes and create toxic vapors. It is therefore essential that this dirty Zone is roofed and has an Impermeable floor.

4.3 The basic principles for designing to hazardous wastes storage area:

✓ Adequate structural characteristics (entrances, procedures for circulating, adequate working surface).
✓ Sufficient ventilation
✓ High-security and non flagrant electricity installation
✓ Mechanical means for cargo-handling and transferring product.
✓ Adequate collective and individual protection equipment.
✓ The protection measures must prevent fire and its the spreading:

- Compartmentalization
- Detection
- Alarm that allows communication with the outside
- Extinction
- Sign posts, optical and acoustic indicators
- The means for control of leaks, spilling...
- Safety signage, evacuation and emergency.
- Adequately trained staff

4.4 General principles for hazardous waste storage:

The correct labeling of the hazardous waste received from repair car activity need to be verified before entering the storage area.

The waste must be stored depending on their incompatibility between families of chemical products. The big containers must placed in lower areas.

The floor of the storage area should not be use as storage for small containers or bowls.

Realise frequent Inspections of the storage area, remove the damaged tanks and change the lost and damaged labels

Remember: a tidy and cleared storage area is a safe storage area

5. DEFINITIVE CHOICE OF LOCATION OF STORAGE AREA FOR HAZARDOUS WASTES.

Taken into account all the indications and recommendation explained before, the choise of the storage are of Merida S.L.L. is based upon the following:

Zone B: Not considered adequate as the room is very narrow, and does not allow mobility of the machinery for cargo handling.

Zone J: Not considered adequate as it is not roofed; the area is exposed to weather conditions

Zone F: This area meets the required conditions for the hazardous waste storage but it contains a manhole, It is decided to close this manhole to avoid spillage into the sewage network.