CARWASH

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

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CASE STUDY:

“How to handle used tires”

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1. INTRODUCTION

This document aims at presenting shortly the tire industry in EU and basic management practices for handling of used tires.

There are three critical issues confronting the tire recycling industries in the EU today: 1/ Tyre sourcing for expansion; 2/ Sustainability and reach compliance, and 3/ The availability of new markets and continued interest and cooperation.

<table>
<thead>
<tr>
<th>1992: 12 Member States</th>
<th>2015: 28 Member States plus Norway</th>
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<tbody>
<tr>
<td>+2,000,000 tonnes of tyres were permanently removed per year from passenger cars, utility vehicles and trucks - and defined as waste – but off-road tires were not</td>
<td>Annual arisings grew to +3,200,000 tonnes, with an additional +100,000 tonnes from off-road-vehicles</td>
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<td>+65% of discarded tyres were disposed in landfills</td>
<td>As manufacturing and sales patterns have changed, larger quantities of tyres are imported from outside of the EU – estimated at more than ±30% of EU tyres are imported from non-EU producers</td>
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<td>A goal was proposed of 65% sustainable treatment by 2000</td>
<td>The lingering recession impacted both sales and arisings</td>
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Table 1. Tire recycling in the EU

Sources: Adapted by Shulman, V. Tyre Recycling: The EU Experience, [available at: http://static1.1.sqscdn.com/static/f/1426334/26973659/1460726749247/05-04+Shulman+EU+Tire+Recycling.pdf?token=s6K6xioSCcrBPv4oKQVtBCUe9s%3D]

A variety of tire management systems operate in the EU. While the systems vary, they successfully collect significant quantities of tires for use or treatment – approaching 90%. Data indicate that + 40% of tires collected are subsequently treated to attain material outputs, an equal amount is used for energy. The remaining are retreaded (+7%) - or exported (+11) – up from less than 4% in recent years.

2. OBJECTIVE

The objective of the present document is to describe how to manage (collection and storage) ELTs, namely:

- to present the basic concepts related to used tyres management.
- to provide systematised information about the types for tyres valorisation.
- to describe the basic management practices for used tyres collection and storage.

This case study can be used by owners and managers of waste management sites, managers and staff in companies dealing with tires of different types, and people who are interested in the issues of used tires management.
3. BASIC CONCEPTS

Five waste streams were identified as ‘specified wastes (to) cease to be a waste’. Each requires specific criteria to be prepared: aggregates, paper, glass, metal, tires, and textiles (Letcher and Vallero, 2011: 300).

Tires are defined as ‘waste’ from the time they are permanently removed from vehicles. As waste, they become the responsibility of the tyre producers – who determine their potential disposal route. According to Basel Convention (UNEP, 1999), a waste tyre is considered a hazardous material and is included in Annexure 1 of the hazardous material, because it contains about 1.5% by weight of hazardous substances.

Tire management is incorporated into EU waste legislation under the concept of ‘producer responsibility’. The legislation is transposed at Member State level for implementation.

There are four basic management systems for used tyres: 1/ Producer responsibility: legal responsibility for 100% of tires that arise; 2/ Multiple responsibility: more than one entity with legal responsibility for tire management; 3/ Negotiated responsibility: legal responsibility for only a specified percentage of tires (often below 100%); 4/ Free market: no legally defined responsibility for tyre management. Different adaptations exist as well as any combinations of the above.

End-of-Life Tire (ELT) is a tire that can no longer be used for its original purpose; all tires including passenger car, truck, airplane, agricultural, 2-wheel & off-road tires result in ELTs; however, most ELTs result from car and truck tires.

ELT-derived products include reclaimed rubber, shredded tires, ground and powdered rubber, char, oil, steel cord, textiles, etc.

Used tyres include retreadable tires, second hand tires, exportable tires, and ELTs.

ELT management is the process beginning at point when a Used Tire is designated as an ELT up to its supply to an ELT recycling or recovery company.
4. MANAGEMENT PRACTICES FOR USED TYRES HANDLING

4.1 What type of tire valorisation can you apply?

Tire recycling is unique comparing to other recycling sectors. 1/ It is among the smallest waste streams; 2/ Tires are essentially homogeneous; 3/ There is an interim treatment, retreading, which can extend the on-road life of a tire; 4/ Recycling outputs are not used to produce the same or similar products as the original but have become strategic materials in over 50 different market sectors; 5/ under EU legislation, tires, tire pieces, and recycling residues cannot be placed in landfills, compelling the development of new options for valorisation (Letcher and Vallero, 2011: 300).

The means of tire valorisation include (Shulman, 2016):

- Re-use and or export;
- Retreading;
- Material recycling including:
  - Civil engineering and construction applications;
  - Sport surfaces;
  - Surface transport applications;
New materials: devulc, micro, pyrolysis, compounds, etc.
- Environmental rehabilitation projects;
- Consumer and industrial products.

- Energy recovery for:
  - Co-incineration;
  - Cement kilns.

Each form of valorisation requires a consistent flow of input.

### 4.2 Determine your level in waste hierarchy.

The tendency in tire recycling industry is to use various methods higher in the waste hierarchy for years to reuse, recover or recycle waste tires (Figure 1) but these methods are inevitably more expensive than landfill disposal.

![Waste tire hierarchy](image)

*Figure 1. Waste tire hierarchy*

*Source: Evans and Evans, 2006: p. 1.*

*Note: Recycling processes were ordered from the least processing required (top) to the most required (bottom) due to energy consumed in processing.*

### 4.3 Establishing and organising your waste management site.

The ELTs management requires clear understanding of life cycle assessment (Figure 2).
There are four steps in ELTs management process (Figure 3).

During the first step tire user disposes used tires at authorised collection point, which may be a tire dealer or a designated collection point. At the start of the system, payment is required at this stage to fund the process. In both cases, the used tires owner is charged a disposal fee, which appears as a line item on their new tire invoice. Generally the buyer pays the fee when purchasing the new tire. The used tires, when it can no longer be used for its intended purpose, is designated as an ELT, and transferred/sold/bought by an authorized agent for beneficial use (i.e., not for landfill or dumping).

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**Figure 2. Decision logic for life cycle assessment**


**Figure 3. Management flow of ELTs**

During the second step, used tires are transported from the collection point and sorted into used tires or ELTs (according to standards to ensure the safe handling of the product). The companies are paid by the dealer/collection point (if free market model is in operation) to transport ELTs to the ELT sorter, processor or third party. A regulated storage/sorting facility is needed.

During the third step ELTs are sorted for processing. Processing companies shred and/or grind tires, i.e., they process ELTs for alternative energy for use by recovery companies, or they process ELTs as a secondary raw material for use by recycling companies.

During the final step, ELTs (whole or shredded) are either paid for or charged for (increasingly) by the recovery or recycling companies or third party, depending on local market conditions and legislation.

- Check if waste management license is needed.

Licensing of waste management sites in current years has required a good level of infrastructure with security to prevent intruders, impermeable flooring to storage areas and sealed drainage systems to prevent pollution, particularly in the event of a fire. The site must be managed by a person with an appropriate Certificate of Technical Competence.

Depending on the country, there are different permission regimes and licensing schemes. You have to check the legislation and legal documents which regulate these activities. You have to be aware about regulation bodies and authorities as well.

- Set up an administrative system which provides transparency, traceability and accountability.

You have to be able to operate suitable robust administrative systems to be able to account for all of the tyres that you have collected, received and dispatched. You have to demonstrate a high level of compliance with the legislation.

The responsibilities of each stakeholder must be clear and agreed by all throughout the design and implementation of an ELT management system. The cost transparency is assured by a separate line item on new tire invoice showing tire disposal fee.

- You need storage guidelines to prevent fire.
Storage must comply with specific environmental and safety guidelines (e.g., length of time of storage, volume and configuration of storage).

In USA, the Environment Agency’s End-of-Life Vehicle (ELV) Directive contains three paragraphs on the appropriate storage of for used tires:

“The ELV Directive requires: appropriate storage for used tires, including the prevention of fire hazards and excessive stockpiling.

“Tyres will need to be stored so that the risk of fire or spread is minimised. Unnecessary stockpiling of tires should be avoided. Generally, no more than 2 vehicle loads of tires should be stored.

“The local fire service may have its own requirements for the storage of tires and should be consulted by the operator.”

References:


Mahlangu, M. Waste Tyre Management Problems in South Africa and the Possible Opportunities that can be Created Through the Recycling Thereof. University of South Africa, April/May 2009.


5. APPENDIX

ON THE PHOTOS BELOW DIFFERENT ISSUES OF USED TIRES