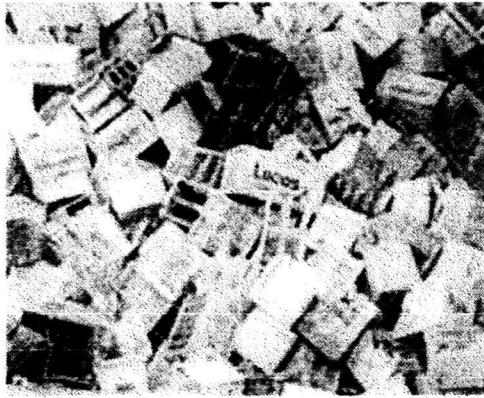


**Technical Guidelines
on
Management of
Used Lead Acid Batteries**



**Central Environmental Authority
August 2005**

Ministry of Environment and Natural Resources

Technical Guidelines
on
Management of
Used Lead Acid Batteries

Prepared by

**Hazardous Waste Management Unit
Pollution Control Division
Central Environmental Authority
104, Denzil Kobekaduwa Mawatha
Battaramulla
Sri Lanka
Tel 0094 11 2872263
Fax 0094 11 2872605**

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Message from the Chairman CEA

Lead acid batteries are widely used in Sri Lanka for various purposes; the largest application is as a power supply for vehicles. It is estimated that around 1.5 million vehicles ply on the roads in the country and almost all of these vehicles are powered with lead acid batteries.

Safe handling of used lead acid batteries is an important requisite as improper handling could lead to serious environmental and health damage due to the Sulphuric Acid Electrolyte and Lead present in the batteries. This is particularly important in carrying out secondary activities such as recycling and reconditioning of lead acid batteries.

It is my belief that the current technical guidelines would fill a long felt need and help manage used lead acid batteries in an environmentally sound manner.

I take this opportunity to appreciate the services rendered by the Officers attached to the Hazardous Waste Management Unit of the Central Environmental Authority who initiated this activity and the members of the Technical Expert Committee for their valuable contribution in developing these guidelines.

Tilak Ranaviraja
Chairman
Central Environmental Authority

Message from the Director General -CEA

With the massive increase in importation of vehicles into the country during the past few decades, a parallel increase in the use of lead-acid batteries has been observed as most of the vehicles are powered with them. This has resulted in the escalation of the number of centres which handle such batteries, particularly in terms of reconditioning and recycling.

Recycling and reconditioning of Lead-acid batteries is an activity which could cause a significant threat to human health and the environment, if not properly managed, due to the hazardous nature of the chemicals involved.

There are laws and regulations to control high polluting activities such as recycling of Lead- acid batteries to ensure that the necessary environmental and health safeguards are adopted. Battery recycling industry involves a series of intermediary management activities such as collection, stacking, and reconditioning for several instances and these activities are carried out in the form of small and medium scale businesses.

The Central Environmental Authority (CEA) commenced the collection of information on ventures in the form of an island-wide survey in collaboration with the Divisional Environmental Officers (DEOs) in 2005. This survey revealed that about 2000 such facilities exist in Sri Lanka. In addition to this, out-dated batteries are collected, transported and stored mostly at these places.

The objective of these guidelines is to ensure the public protection and to minimize the cumulative impact on the environment. I look forward to your institutional cooperation to achieve this goal through adherence to these guidelines.

Ramani Ellepola
Actg. Director General
Central Environmental Authority

Acknowledgement

Preliminary Script

Mrs H P S Jayasekara

Asst. Director, Hazardous Waste Management Unit, CEA

Technical Expert Committee

Mrs Ramani Ellepola,

Actg. Director General, CEA (Chair Person)

Dr Ajith de Alwis, Senior Lecturer, University of Moratuwa

*Mr. Sena Peiris - Director, National Cleaner Production Centre,
Colombo 02*

*Mr. Viraj Perera- Asst Secretary, Ministry of Provincial Councils &
Local Government*

*Mr. R M Bandara, General Manager, Associated Battery
Manufacturing Ltd. Ratmalana.*

*Mr. K H Muthukuda Arachchi, Deputy Director General, Pollution
Control Division, CEA*

Mr. M J J Fernando -

Director, Hazardous Waste Management Unit, CEA

Mr. A Rajarathnam -

Dy Director, Hazardous Waste Management Unit, CEA

Supporting Technical Staff

Ms S S Ariyaratna, Senior Environmental Officer, HWM, CEA

Mrs. W Ranasinghe, Divisional Environmental Officer, CEA

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Annex II - Format of the Registration form for Lead Acid Battery collectors

Technical Guidelines on reconditioning and transportation of Used Lead Acid Batteries

1. Introduction

Lead acid batteries are widely used for automotive and stationary purposes in Sri Lanka. It is estimated that about 1.5 million vehicles population in Sri Lanka. Almost all of these vehicles are powered with lead acid batteries. The lifetime of the batteries vary with the brand and the usage. The sizes and the capacities are dependent on the purpose for which they are used. The batteries are mainly classified in to five categories, such as automobile, generic, industrial, motive and special.

The batteries may be classified as:

Automotive - those batteries used as the main energy source for starting, lighting and ignition (SLI batteries) in vehicles such as cars, trucks, tractors, motorcycles, boats, planes, etc.;

Generic - batteries used in portable tools and devices, domestic alarm systems, emergency lights, etc.;

Industrial - batteries for stationary applications such as telecommunications, electrical power stations, uninterrupted power supplies or no-breaks, load leveling, alarm and security systems, general industrial use and starting of diesel motors;

Motive - batteries used to transport loads or people: fork lift trucks, golf carts, luggage transportation in airports, wheelchairs, electric cars, buses, etc.;

Special - batteries used in specific scientific, medical or military applications,

and those that are integrated in electric-electronic circuits and batteries containing lead used in other purposes which are not specified above.

In the above five, the automotive and the motive are the two types of lead- acid batteries that require more attention to the proper management when it is clean for the secondary purposes such as recycling, reconditioning etc.,

Life time of a battery

The battery life is defined as the period of time in which a battery is capable of being recharged and retain the charge. Under ideal conditions, an automobile battery can last up to six years. Once the battery is no longer capable of being recharged or cannot retain its charge properly, its lifetime reaches its end and it becomes a “used battery” and used for recycling of materials.

Before reaching the recycle plant, used batteries are being reconditioned as a small and medium scale business in Sri Lanka. The Central Environmental Authority (CEA) started collecting information of these ventures in the form of an island-wide survey in collaboration with its network of Regional Offices and the Divisional Environmental Officers

(DEOs) attached to Local Authorities and Divisional Secretariats through out the island. After analysing the results of the Survey it was revealed that there are about 2000 such facilities exist in Sri Lanka. Out-dated batteries are collected, transported, stored and reconditioned mostly at those places.

While it is required to carry out this reconditioning process giving due consideration for the environmentally sound management of lead wastes, some control measures must be attended to at these points in order to avoid accidents that may produce human and/or environmental damage.

2. Guidelines

2.1 Guidelines to be followed by users

1. All users should handover their outdated batteries only to the registered dealers/ collectors or to the licensed recyclers by the CEA.
2. Outdated batteries should not be disposed of /battery contents drained to the environment.
3. Leaking batteries should be handed over to the registered collector/dealer immediately. Necessary precautions should be made to prevent the skin contact with the liquid and cover the leaking battery with appropriate cover during handling and transportation.

2.2 Guidelines to be followed at collection points:

With the exception of a few dry batteries that may arrive at the collecting point, almost all used batteries will retain its sulphuric acid electrolyte. The drainage of this liquid may pose several threats to human health and to the environment:

- (a) it contains high lead levels, as soluble ions and particulate forms;
- (b) its acidity is very high and may cause burns and damage if accidentally spilled;
- (c) it requires special acid-resistant containers for storage;
- (d) its drainage requires workers to be protected with suitable Personal Protection Equipments in order to minimize any risk of injury , etc.

Thus, battery drainage may be considered a potentially hazardous activity that demands, not only special tools, containers and safety equipment, but also trained personnel.

- Therefore it is recommended that batteries should not be drained to the environment at all stages at collection points and electrolyte should be collect to an acid resistant container.
- Non reusable electrolyte should not be drained at collection points and the used battery should send

to the recyclers **with the electrolyte** where the treatment facilities are available.

- Collectors should register at the CEA and should display a symbol as depicted in the Annex 1. The Sample registration form given in the Annexure II should be used for registration with the CEA
- The collected out dated batteries should be handed over to the licensed recyclers.

2.3 Guidelines regarding storage at collection points:

The ideal place to store used lead-acid batteries is inside a acid-resistant container that may be simply sealed and used as the transport container as well minimizing the risk of an accidental spillage. However, this is not often the case and the following brief storage guidelines should be adhered to:

- Leaking batteries, i.e. those spilling electrolyte, must be stored inside acid-resistant containers
- The storage place must be sheltered from rain and other water sources, be equipped with a water collection system, and also, if possible, away from heat sources;
- The storage place must have a ground cover, preferably acid resistant concrete or any other acid-resistant material, that may retain any leakage and

direct it to a collecting container from where it can be removed afterwards;

- The storage place must have an exhaust ventilation system, or simply a fast air renovation, in order to avoid hazardous gas accumulation;
- The storage place must have a restricted access and be identified as a hazardous material storage area;
- Even after creating a protected storage place, a collection point should not store a large number of used batteries and must not be considered as a permanent storage place. Nevertheless, storing large amounts of used batteries, or for too much time, increases the risk of accidental spillage or leakage and this must be avoided.¹

¹Battery spillage may be a very common source of environmental contamination as well as human health injuries since the electrolyte is not only a strongly corrosive solution but also a good carrier of soluble lead and lead particulates. Therefore, if this solution spills in an unprotected area, it may contaminate the soil or injure workers. Besides, after spilling on unprotected soil, the soil itself becomes a source of lead dust once the solution evaporates and the lead becomes incorporated into soil particles which may be blown by wind or raised by vehicle transit.

- In the case of such accidental spillage there should be a sufficient floor washing system which direct the washed water to a separate container and dispose only after the neutralization/ dilution.
- Periodical checking/ monitoring schedule should be available in order to track any leakages/ spillages.

2.4 Guidelines on transportation of used batteries

Used lead-acid batteries must be considered as hazardous waste when transport is needed. Again, the main problem associated with battery transport is the electrolyte, which may leak from used batteries, requiring control measures in order to minimize the risk of spillage and define the specific actions to be taken in event of an accident:

Regardless of the means of transport being used vehicle, trains etc, used lead-acid batteries must be transported inside sealed containers due the risk of leakage, which may be high even if the batteries are appropriately transported in upright position.

The transport may displace the batteries from their original positions, including eventual box breakages or turning them upside down, which will certainly leak the electrolyte content, thus making necessary to provide a shock resistant and acid resistant sealed container.

- Containers must be well packed and they should not be allowed to be moved while being transported. Therefore, they must be bound, shrink wrapped or stacked properly to avoid this problem;
- The vehicle should be identified with symbols in accordance with the Guidelines for the Implementation of Hazardous Waste Management Regulations issued by CEA.
- A minimum set of equipment necessary to combat any simple spillage or leakage problems should be provided and the transport team trained on how to use it;
- Transportation should be carried out during the minimal traffic time;
- People dealing with hazardous wastes should always be trained in emergency procedures, including fire, spilling, etc. and how to contact emergency response teams (the Current telephone Number is 111). Besides this, they should be aware of the specific kind of hazardous material is being transported and how to deal with it;
- Personal protection equipment should be provided for the transport team and they should be trained in the use of the equipment, in case of any accident;

- If possible, hazardous waste transport should always choose routes that minimize the risk of possible accidents or other specific problems. This is made possible if they follow a certain predefined path, time and restrict themselves to a known schedule.
- All transporters should obtain a licence for Transportation of Hazardous Waste from the CEA.

The points above mentioned are not an extensive list. Much more specific training and instructions could and, in fact, should be provided to transport teams, since the transport may involve, or pass through, heavily urbanized areas or other sensitive locations that could be strongly affected by the effects of spillage in the event of an accident.

2.5 Guidelines on Recycling of used batteries

- Batteries received from collectors and other sources should be stored in accordance to the Section 2.2 Guidelines regarding storage at collection points.
- Dismantling of batteries should be carried out in a sheltered area and it must have a ground cover, preferably acid resistant concrete or any other acid-resistant material that may retain any leakage and direct it to a collecting sump which is connected to the treatment plant.

- Proper personal protection equipments should be provided to the workers.
- All the industries dealt with Battery manufacturing/ recycling or any other approved activities should obtain Environmental Protection Licence (EPL) in accordance with the provisions contained in the National Environmental Act (NEA) No. 47 of 1980 and its subsequent amendments and the relevant regulations made there under and should conform to the National Environmental Quality Standards prescribed therein.
- In no instance Scrap lead acid batteries should be imported into the country.

Reference:

1. Technical Guidelines for the environmentally sound management of waste lead- acid batteries, Basel Convention series/SBC/No/2003/9.
2. MTH&CA – Ministry of Transport, Highways and Civil Aviation

ANNEX 01



Registration Number: 0000000

The Symbol to be displayed at the registered collection points.

ANNEX II

Lead Acid Battery collectors
Registration form

For office use only
No.

1. General Information

- 1.1 Name of the
Place/ company :
- 1.2 Address:
- 1.3 Contact person
- 1.4 Tel:
- 1.5 Province
- 1.6 District
- 1.7 Local Authority

2. Details of the service:

- 1. No of out dated Batteries collected per month:
- 2. No. of other activities carried out in the same premises:

		put a tick	Amount
1.	Selling- New batteries		
2.	Recharging		
3.	Cleaning		
4.	Other (please specify)		

3. What do you do with the end of life batteries?

Send to a recycler	
Send to an intermediate collector	
Other (pl specify)	

If so,

Their Name/s and Address/es:

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.....

.....

.....

4. Transportation frequency:

5. Name of the Transporter and Vehicle No:

Signature

Date

Please submit following documents with the application

1. Business registration
2. Trade licence