

## Waste Electric and Electronic Equipment: overview of a sorting process and refuse characterization

Ramon R. Silva\*, Marco Aurélio S. de Castro

### Abstract

In the work reported here, we investigate the type of Waste Electric and Electronic Equipment (WEEE) that is destined to a selective collection program, as well as WEEE management practices and infrastructure of an ecopoint. Once WEEE is not dismantled in the ecopoint, future developments of the research must include an assessment of the enterprises that open and separate materials and components from such appliances.

### Key words:

Solid waste, Waste Electric and Electronic Equipment, Recycling.

### Introduction

Waste Electric and Electronic Equipment (WEEE) management requires collection, dismantling and testing the components, in order to determine which ones are to be reused or recycled (CASTRO; SCHALCH, 2016). Inadequate procedures for material separation may liberate toxic elements to water, soil and air (CASTRO, 2014). Waste pickers play an important role in Brazilian waste management practices, even though waste picking is still performed in a non-professional way. Failures in WEEE sorting that cause recyclable parts to be mixed with refuse, and sent to landfill; storing on open areas cause the materials to be mixed and also exposed to (and damaged by) rainfall (CASTRO; SCHALCH, 2016).

The lack of bibliographical references on how WEEE is managed by cooperatives of waste pickers and the evaluation of their management practices and the refuse generated motivated the work reported here.

### Results and Discussion

The research is being conducted through bibliographical research and case studies on ecopoints in Limeira, São Paulo, Brazil. The research revealed the potential risks of inadequate WEEE management; it revealed that the Brazilian Solid Waste Policy does not present a clear definition of WEEE it only states that such waste must be managed through a Reverse Logistics System, in order to recover components for reuse or materials for recycling.

Five people work in the visited ecopoint, all of them have only practical experience. According to the responsible, several types of waste are received, such as plastics, aluminum and cardboard, but lamps and other WEEE are sent to the ecopoint. Several appliances were observed in the ecopoint, namely CRT monitors; examples are shown in Figure 1.

In the ecopoint, the waste is separated by material, stored and sold to people who then resell them to specialized enterprises. The pickers receive support through the payment of water and energy bills and the maintenance of bins for refuse, which is periodically sent to landfill.

Figure 1. WEEE found in ecopoints in Limeira



### Conclusions

A significant amount of WEE is sent to the ecopoint. Lack of proper infrastructure was perceived, as there was no weather protection for the sorted materials and no protection equipment for face and hands, which may expose workers to health risks, specially when managing CRT monitors. The amount of WEEE refuse must be investigated by visiting the enterprises that actually dismantle and sell the components.

### Acknowledgement

We appreciate the financial support of CNPq.

BRASIL. Federal Law no. 12.305, August 2<sup>nd</sup>, 2010. Institutes the Solid Waste National Policy. <[www.planalto.gov.br/ccivil\\_03/\\_ato2007-2010/2010/lei/l12.305.htm](http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12.305.htm)>. Last accessed on Nov, 21<sup>th</sup>, 2017.

CASTRO, M. A. S. Diagnóstico da gestão de Resíduos de Equipamentos Eletroeletrônicos e proposta de modelo em um contexto de Green Supply chain Management. PhD Thesis. São Carlos School of Engineering. 326 p. 2014.

CASTRO, M.A.S.; SCHALCH, V. Caracterização de rejeitos gerados na triagem de Resíduos de Equipamentos Eletroeletrônicos: subsídios para gestão e gerenciamento. In: XIII Congresso Nacional de Meio Ambiente, 2016, Poços de Caldas. Anais, 2016. v. 8. <[www.meioambientepocos.com.br/anais-2016/index.php](http://www.meioambientepocos.com.br/anais-2016/index.php)>. Last accessed on Jan 2<sup>nd</sup>, 2017.