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Evaluation of methods for sorting CCA-treated wood

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Abstract

Construction and demolition (C&D) wood frequently contains treated wood including wood treated with chromated copper arsenate (CCA). Many recycling options for such wood require that the product be essentially free of preservative chemicals. The objectives of this study were to document the characteristics of the wood waste stream and to evaluate the effectiveness of sorting methods for identifying treated wood. Sorting methods evaluated included visual sorting and visual sorting augmented with the use of PAN indicator stain and/or hand-held X-ray fluorescence (XRF) units. Experiments were conducted on two types of construction and demolition (C&D) wood: source separated loads containing only C&D wood and wood hand-picked from commingled loads of general C&D waste. Results showed that 77% of the treated wood was CCA-treated. For uncontaminated piles (<1% treated wood) of source separated C&D wood, visual sorting was found to effectively remove the small amounts of treated wood present. For piles of source separated wood that were contaminated (~50% treated wood), visual sorts were not accurate and benefited from augmented sorting using PAN indicator stain. The handheld XRF devices were found to be effective for sorting commingled C&D wood, as PAN indicator stain was not as effective due to the excessive amount of surface dirt associated with commingled wood waste. Visual sorting of source separated wood was estimated to cost between US$21 to US$96 per metric ton. These costs depended upon the amount of treated wood and whether or not augmentation with PAN indicator was necessary. Visual sorting augmented with hand-held XRF units was estimated at US$113 per metric ton. The bulk of these costs were associated with labor. Future efforts should focus on reducing labor costs by mounting automated XRF units on conveyor systems.
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1. Introduction

Preservative-treated wood is frequently found at wood recycling facilities and, if not removed, can serve as a source of contamination (Solo-Gabriele and Townsend, 1999; Tolaymat et al., 2000; Townsend et al., 2003, 2005; Kearley et al., 2005). Preservative-treated wood can be broadly separated into two general categories: oilborne preservatives and waterborne preservatives. Oilborne preservatives use an oil or organic solvent as the carrier solution during the pressure treatment process, whereas waterborne preservatives are dissolved in water that then serves as the carrier. Oilborne preservatives, such as creosote and pentachlorophenol, are traditionally used for industrial applications such as utility poles and railroad ties. Because of their large dimensions, wood treated with oilborne preservatives can be readily identified and removed from the waste stream. The focus of the current study was on sorting wood treated with waterborne preservatives, which typically contain metals as their active ingredients. Waterborne wood preservatives have been used to treat both industrial products and products used in residential areas, such as lumber, timbers, and plywood. As a result, this portion of treated wood can be easily mixed with wood that is untreated when disposed given the large amount of untreated wood also used for residential applications. One primary challenge for recycling C&D wood is thus identifying and sorting out waterborne preservative-treated lumber, timbers, and plywood.

Currently several different types of waterborne preservatives are used for treating dimensional wood (Stook et al.,

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