

Technology Brief

WOOD WASTE SIZE REDUCTION TECHNOLOGY STUDY

The critical steps in processing wood waste for recovery are size reduction and contaminant removal. Recent developments in processing technologies have allowed the penetration of some wood waste into feedstock markets for high value fiber products, including pulp and paper, and panelboard applications. However, a significant portion of the wood waste processed for recycling does not adequately meet the needs of the mills consuming that fiber. This technology brief describes an examination of engineered size reduction strategies that may improve the market opportunities for recovered wood waste in high value fiber products.

Background

Many of the recoverable wood streams have significantly different attributes from the whole log sources used in traditional chip production. These main differences include the presence of foreign or non-wood contaminants, and often substantially lower moisture content of recovered wood sources. The ramifications of such attributes and other considerations provide criteria for the design and selection of size reduction technologies.

Size reduction technologies for processing recovered wood wastes for recycling use in fiber market applications must be designed to produce fiber particles that meet specific manufacturing requirements. In the forest products industry, most manufactured fiber applications, including both paper and wood, are designed to begin with a virgin chip, which has consistent geometry, length and width, and surface texture. Size reduced chunks of recovered wood waste are commonly referred to as chips, but often have very different characteristics than virgin chip.

Key Words

Materials: Wood Waste.

Technologies: Primary and secondary size reduction equipment; screening and separation equipment.

Applications: Pulp and paper, panelboard applications.

Market Goals: To process wood waste to a higher quality, more marketable chip product.

Abstract: An examination of engineered size reduction screening strategies uncover viable technologies to produce a chip from waste wood that can be used in high value fiber.

Size Reduction and Screening Equipment Assessment

Research on primary size reduction equipment alternatives, and screening and separation technologies, reveals a number of important advantages and disadvantages associated with each type of equipment. Results for each type of equipment are detailed in the full report.

Chippers, hogs, and hybrid reduction equipment are the principal size reduction alternatives available to wood waste processors. Hogs tend to sacrifice cutting surface tolerances for durability of equipment because recycled wood typically contains embedded metals or inorganic grit which must be freed by grinding.

Chippers provide the cutting surface tolerances required to produce feedstocks for higher-value applications, but incur increased maintenance and equipment costs due to contamination. In addition, typical in-feed designs do not allow adequate chip orientation control necessary to



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achieve a consistent cutting angle. These limitations currently make chippers infeasible as primary size reduction equipment for wood waste.

In contrasting and assessing these major categories and specific types of size reduction equipment, it is clear that ongoing innovation in equipment design is needed. A number of current alternatives are now available which may allow processors to balance these attributes to achieve high quality reduction in an economically viable manner.

End-User Survey

Interviews were conducted for the purpose of identifying end-use sizing specifications for value-added fiber applications, and to assess common reservations toward secondary fiber.

Fiber procurement managers pointed to quality concerns as the principal reason for their limited consumption of recovered wood fiber. Chief among quality concerns was the physical disparities of processed wood waste from typical virgin wood chips. These experts generally agreed that market opportunities for recovered wood fiber in high-value fiber products will continue to grow as long-term supply of virgin chip tightens. They emphasized the need to diminish the gap in geometry attributes between recovered and virgin wood chips, while maintaining a price discount relative to virgin chips.

Production Testing

Following assembly of initial data on the types of size reduction equipment available, several samples of processed fiber were gathered. Six production tests were designed and executed with the assistance of Northwest wood processors to assess individual operating parameters. The overriding objective of this research was to identify those control parameters with the greater influence on the ability to high grade currently low value wood waste materials. The full report describes the

sampling procedures, overall testing objectives, and the details of the six tests.

Conclusions

The equipment assessment, end-user surveys, and production test results indicate that chipping and hybrid reduction technologies offer the greatest potential for processors to bring product closer to the quality of virgin wood chips. Ultimately, incorporating specific changes into processing operations will develop a more stable market position within the framework of market demand for chips from residuals.

The two technical barriers that are inhibiting the use of such size reduction technologies include: chipper knives that wear or break too frequently with contaminants in recovered wood, and, feeding methodology to control the workpiece while it is being chipped.

Effectively meeting higher value application requirements might be achieved in wood waste processing by using a combination of modified tooling, modified in-feed mechanisms, or secondary size reduction steps.

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For More Information

For a copy of the report, *Wood Waste Size Reduction Technology Study (CDL-97-3)*, use the CWC Publication Order Form. For more information call CWC at (206) 443-7746, email info@cw.org, or visit the CWC Internet Website at www.cw.org.

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