Best Practices in Wood Waste Recycling

Shredding Equipment

Material: Wood Waste

Issue: *In addition to contaminant removal and screening, size reduction is one of the key processes in preparing recovered wood waste for a variety of commodity feedstock and specialty product markets. There are several types of equipment that processors can use to size reduce. Each type of equipment varies with respect to the forms of wood waste it can effectively handle and production quality. Selection of the appropriate size reduction equipment for a given facility requires consideration of the unique processing capabilities of the machine. Appropriately sized reduction equipment is necessary for processors to convert wood waste materials into the highest value products attainable from the raw material.*

Best Practice: This Best Practice recommends using shredding equipment to reduce the size of specific wood waste to make finished product of a particular quality range. Shredders work on the same rotary principle as hogs or grinders or both. They are made up of a series of blunt blades or knives fixed in rows to a rotor which passes between slots in a fixed anvil or between fixed blades on an opposing rotor. Wood waste is forced through the slots by the blades and is then torn or shredded into smaller pieces. The size of these pieces can be regulated by adjusting the gap between blades. Because shredders do not require cutting or pounding, less maintenance is needed.

Shredding equipment typically operates at lower speeds (less than 20 RPM) than conventional hogging equipment, relying on high torque ratios to provide reduction forces. Hydraulic systems can apply variable force with tremendous pull-through strength, making them appropriate for mixed feed materials. High speed shredders function more like hammer mills used in secondary size reduction. The capacity of a shredder is primarily limited only by the low speed, physical size of the shredder, and the type of wood waste being processed. Most shredders are rated for capacities by their manufacturer and may be sized to meet any volume requirement.

Shredders are capable of handling almost any type of wood waste materials, including landclearing stumps and wood, prunings; pallets and crates, construction lumber trim, panelboards, demolition waste, and secondary wood waste. Shredders are also relatively unfazed by contaminants as compared to chippers. Small rock and metal contaminants, plastic, glass, and other foreign materials will pass through the machine without causing any major maintenance problems. Operators should note that shredding high quality, clean wood waste will not maximize the market value of the recovered material due to the geometry of the finished product.

Shredders are best suited for producing hogged fuel, mulch, compost amendments, soil amendments, bulking agents, and products for other low quality applications. The shredder will produce fewer fines than hogs, although size consistency and production of overs may be a problem.

Implementation: Shredding equipment is readily available from new and used equipment vendors. The primary issues that an operator should consider in the selection of a piece of size reduction equipment are discussed below:

Operational. The equipment should be carefully sized to handle a volume greater than the anticipated tonnage throughput of the plant. Working with an equipment vendor, size reduction equipment can be sized to handle the types and volumes of wood waste processed at a given facility. Operators should consider both raw material and end product issues to ensure that the machine will perform satisfactorily. Capability to meet feedstock specifications, consistency of output production, and durability/reliability of the equipment are all critical concerns. Operators should test on several types and brands of size reduction equipment with the anticipated wood waste material to verify the production of a satisfactory product.

Cost. Size reduction equipment is among the most expensive equipment at a processing facility. In general, more expensive equipment is necessary when processing larger throughput capacity and higher product quality. As a result, it is critical to match the equipment size to targeted throughput and equipment style to the raw material and targeted end product.

Maintenance. Size reduction equipment is vulnerable to wear from the abrasive properties of the wood material itself and any non-wood contaminants present in the feedstock. In quality machinery, most of the common wear surfaces are replaceable. The shredding equipment should be equipped with shear pins on the impact surface so that damage is reduced in the event that a large hard contaminant gets into the machine.

Safety. Most quality size reduction equipment is adequately fitted with guards to avoid flying debris. Proper training is essential to operating any size reduction equipment safely. Management must reinforce the dangerous consequences of removing/disarming any safety features; unjamming or repairing any equipment without a full shut down of power and safety switches; or violating established danger zones or instructions of safety spotters.

Benefits: Properly selected size reduction equipment will convert wood waste into the highest value products attainable from the raw material.

Application Site: Processing Facility.

Contact: For more information about this Best Practice, contact CWC (206) 443-7746, e-mail info@cwc.org.

References:

1. Lyman, Mark. West Salem Machinery. Salem, OR.
2. “Recovery I”; Robert H. Brickner; C&D Debris Recycling; Resource Recycling; November 1996.
3. SSI Shredding Systems, Inc. Wilsonville, OR.
4. Yeasting, John. Re-Sourcing Assoc. Seattle, WA.

(See Appendix for an Equipment Manufacturer’s List.)

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