Best Practices in Wood Waste Recycling

Chipping 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 employ to accomplish size reduction. Each type of equipment varies with respect to the forms of wood waste it can effectively handle and the quality of the product it produces. Selection and utilization of the appropriate size-reduction equipment allows processors to convert wood waste into the highest value products attainable from the raw material.*

Best Practice: This Best Practice recommends using chipping equipment for size-reduction of specific forms of wood waste to produce finished product of a particular quality.

Types of Chipping Equipment.
Disc Chipper: A disc chipper consists of a series of embedded knives arranged around a large steel 'disc.' As the disc rotates, the knives pass a fixed anvil directly at the chipper's infeed. Disc chippers can have either vertical or horizontal infeeds. The number, position, and bevel of the knives and anvil are critical to the size and quality of the chips produced, as well as the chipping speed.

Drum Chipper: A drum chipper consists of a series of knives evenly spaced around a large rotor. The knives chip the wood waste as they pass over a steel anvil at the chipper's infeed. Drum chippers allow greater control over the sizing of the finished product. The amount of oversized chips can be controlled by placing a basket screen on the bottom of the drum. This eliminates the need to screen chips before shipping to the end-user. Drum chippers produce a more consistent chip. For best results, samples of the raw material should be tested with different chippers to determine which equipment produces the most desirable results.

Types of Raw Material. Chippers are capable of processing any type of wood waste that is free of hard contaminants such as rock and metal. Since hard contaminants are difficult to restrict from many wood waste supplies, only the cleanest or most heavily sorted supplies are appropriate for chipping.

Types of End-Products. Chippers produce very high quality chips suitable for pulp and paper, and panelboard production.

Implementation: Issues to consider in selecting a size-reduction equipment are: operational issues, capital cost, maintenance, and safety.

Operational. Operators should consider both raw material and end-product issues to ensure that machinery performs satisfactorily. Capability of the output product to meet feedstock specifications, consistency of output production, and durability/reliability of the equipment are all critical concerns. Operators should test several types and brands of size-reduction equipment using samples of anticipated wood waste to verify the production of a satisfactory product. Disc chippers can be configured in two main orientations: horizontal

feed or gravity feed. Waste wood chippers that use horizontal feed often lose chip quality because of the mixed orientation of material going in (unless fed with a vibrating conveyor that orients the material). The motion of small wood in the throat of this type of chipper also contributes to poor chip quality compared to the chipping of larger wood. Gravity feed or drop spout chippers have been extensively used to chip short pulp wood because of the higher chip quality and reduced fines. In this configuration, the chipper is fitted with a spout that approaches the disc at an angle of about 38 to 42 degrees from the vertical plane.

Cost. Size-reduction equipment is among the most expensive equipment at a processing facility. In general, the equipment becomes more expensive with increases in throughput capacity and increases in 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 wears from the abrasive properties of the wood material itself and any non-wood contaminants present in the feedstock. In chipping equipment, the sensitive knives are replaceable but require regular sharpening. The presence of unavoidable hard contaminants in the raw material supply restricts the use of chippers due to excessive wear and the resulting maintenance. All size-reduction equipment should be equipped with shear pins on the impact surface so that damage is reduced if a large hard contaminant gets into the machine. Chippers are generally protected by a metal detection system to stop the infeed conveyor in the presence of metal.

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

Benefits:

Properly selected size-reduction equipment will efficiently convert wood waste into the highest value products.

Application Site:

Processing Facility.

Contact:

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

References:

1. CAE Manufacturing; Vancouver, British Columbia, Canada.
2. Lyman, Mark. West Salem Machinery. Salem, OR.
3. Valon Kone Brunette. New Westminster, B.C., Canada.
4. Walsh, Dan. Northwest Wood and Fiber Recovery. Portland, OR.
5. Yeasting, John. Re-Sourcing Assoc. Seattle, WA.

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

Issue Date / Update: March 1997