



Best Practices in Wood Waste Recycling

Hogging or Grinding Equipment

Material: Wood Waste

Issue: A key process in preparing recovered wood waste for commodity feedstock and specialty products is to remove contaminants and reduce its screening size. Each equipment type varies concerning the forms of wood waste it can effectively handle and its production quality.

Best Practice: Hogging (Grinding) Equipment Types. Hogging equipment's horsepower, physical hog size, and the wood waste type it processes set the limits for its throughput capacity.

Hammer Hog: A hammer hog operates by pulverizing wood with either swinging or fixed “hammers.” It then forces material through heavy steel sizing grates. The size of the grate openings determines the resulting product size, available in interchangeable size ranges adjustable down to very small particles (fines). The fixed hammers achieve force at the cutting surface because they attach to the rotor mass. The swinging hammers, because of their ability to apply variable force, tend to have greater tolerance for large, hard contaminants. Thus, they require less maintenance, although hammers and grates require regular maintenance. Hammer hogs are available with vertical or horizontal in-feed configurations. The horizontal in-feed typically features a powered feed mechanism.

Mass Rotor Hog: This machine is a newer variety of primary reduction hog. The mass rotor hog consists of a heavy shaft that has, mounted at an angle, thick solid steel plates that have replaceable wear bars. The great mass of the cutting piece provides for high-energy size reduction.

Hammer Mill: The hammer mill works like a hammer hog, except that it operates at a higher speed of revolutions per minute and better processes smaller-sized waste wood. Generally, the mill secondarily reduces to provide a finely ground, uniformly sized particle.

Tub Grinder: A tub grinder consists of a round hopper (the tub) positioned above a horizontal rotor fitted with fixed hammers. Wood waste, including large stumps and logs, is loaded into the tub, which may range up to fourteen feet in diameter. The hammers pulverize the wood waste against an anvil, force it through the sizing grates, and discharge it onto a conveyor. The tub must be kept full to avoid the sudden and dangerous ejection of wood fragments into the air. A tub grinder typically requires a cover to contain flying debris or maintenance of a large safety zone to keep operating personnel clear.

Raw Material Types. Hogs and tub grinders can handle almost any wood waste, including landclearing stumps and wood, prunings, pallets and crates, construction lumber trim, panel-boards, demolition waste, and secondary wood waste. Hogs are also relatively indifferent to contaminants; small rock and metal contaminants, plastic, glass, and other foreign materials can pass through the machine without causing major maintenance problems.

End-Product Types. A hogged product is generally a coarse, multi-sided, frayed wood particle. The wood-products industry does not consider this particle wood *chipped* wood. Hogs produce a particular size distribution, depending upon the feedstock and the grate size used, over which the operator has limited control. Using screening equipment for size classification allows the operator to achieve the particular size required by end users. Hog applications include the following: production of hogged fuel, mulch, compost and soil amendments, bulking agents, and products for other low-quality applications and composite panel-board feedstock.

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Using Hogs in Two-Stage Processing. Also, hogging equipment use is during the first stage of a two-stage size reduction. In this configuration, the hog produces coarse chunks of wood, which are without hard contaminants, then directed to a re-chipper or hammermill for secondary processing. This set-up is capable of producing more consistent and higher-quality products that provides better geometry and contaminant removal than single-stage reduction.

Implementation: Following are selections to consider when choosing hogging or grinding equipment.

Operations: Working with equipment vendors, the plant operators should carefully size the equipment for throughput wood waste to handle a volume greater than the anticipated tonnage. Operators should consider both raw material and end-product issues to ensure that the machine will perform satisfactorily. Critical concerns include the capability of the output product to meet feedstock specifications, consistent output production, and keeping durable or reliable equipment. Operators should consider running trials on several types and brands of size-reduction equipment using samples of the anticipated wood waste to verify satisfactory production.

Cost: Size-reduction equipment requires more capital investment than other equipment at a processing facility. Generally, this equipment becomes more expensive as throughput capacity and product quality increases.

Maintenance: Size-reduction equipment experiences wear from the abrasive properties of the waste wood and contaminants present within it. In quality machinery, the design of most of the common-wear surfaces allows replacement. Equip the impact surface of all size-reduction equipment with shearing pins. Shearing pins help reduce damage if a large, hard contaminant enters the machine.

Safety: To avoid the ejection of flying debris, most quality size-reduction equipment has adequately fitted guards. These guards function well, except for tub grinders. Tub grinders are notorious for ejecting material and require carefully operation and a continuously full hopper to minimize this danger. Proper training is essential to teach proper safety procedures. To reinforce avoidance of prohibited behaviors requires training on the following: removal of or disarming safety features; unjamming or repair of equipment without power shutdown; or violation of established danger zones or instructions of spotters.

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

Application Site: This Best Practice applies to wood-waste processing facilities.

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

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