Best Practices in Wood Waste Recycling

Air Density Separators

Material: Wood Waste

Issue: *Recovered wood waste frequently contains non-wood contaminants that escape traditional contaminant removal systems. These pervasive contaminants might be a problem for the end user's manufacturing process. Furthermore, they devalue the marketability of the resulting feedstocks. Screening techniques might not be effective because of dimensional similarities with the acceptable product. Manual sorting techniques might be ineffective and labor extensive. To produce the cleanest product, a processing facility must maintain a series of contaminant removal systems that are capable of effectively removing the contaminants.*

Best Practice: This Best Practice recommends the use of equipment that separates materials according to differences in density. This type of equipment is typically referred to as an "air density separator" or an "air knife." The air density separators are effective at removing heavier (e.g., rocks, metals, glass) or lighter (e.g., paper, light plastic, Styrofoam®) materials than the recovered wood waste material. The equipment could also sort materials according to differences in particle size using air resistance characteristics.

An air density separator is typically preceded in the process by a pre-screening equipment that removes over-sized wood and contaminants, as well as, fine materials. The equipment could reduce sorting errors based on the size-related differences in air resistance by restricting the size-range of materials delivered to the air density separator.

When the wood waste material enters the air density separator, a high velocity vacuum pulls the light-weight wood materials away from the heavier rock and metals. The heavy materials then fall into a reject conveyor. The remaining material is transferred to a discharge conveyor. This discharge conveyor could be equipped with an air exhaust system that pulls the paper, light plastic, and Styrofoam® off of the wood waste and into a cyclone and dust control system. The resulting material becomes free of the relatively heavy and light contaminants. Operators could adjust the air volume to compensate for periodic variations in the characteristics of the material flow. For example, the operator could increase the volume of air flow when processing wet material to compensate for increased "stickiness."

Air density separators are also available in a vibrating design. The vibrating models combine the pre-screening and air classification functions.

Implementation: Air density separators could be integrated into new and existing wood waste processing facilities. An operator should consider the following issues in selecting an air density separator:

Operational. The effectiveness, compatibility with other process equipment, and capability to handle targeted production throughput are a few operational issues to consider. Air density separators should be sized to handle the types and volumes of wood waste processed at a given facility by working with the equipment vendor. In general, the air density separator should be located downstream from the primary size-reduction and size-screening equipment to maximize the removal of contaminants. Air density separation equipment must be engineered to match the feedstock and volume requirements of the specific installation.

Capital Costs. Capital costs vary depending on the throughput capacity and additional features.

Maintenance. The operation of air density separators requires light maintenance. They have a few moving parts and are virtually jam proof.

Safety Consideration. Air density separators can create dust problems. Therefore, they require pollution control devices to clean the exhaust air.

Benefits: Air density separation produces a cleaner wood waste from feedstock that could command a higher price on the market. In addition, manufacturers would be able to use a greater percentage of the recovered wood waste in their process instead relative to their use of conventional wood fiber.

Application Site: Processing Facility.

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

References:

1. Duraquip. Equipment brochure.
2. General Kinematics. Equipment brochure.
3. Gilmore, Larry. Duraquip. Tualatin, Oregon.
4. Musschoot, Albert, Raymond Sherman, and William Guptail. American Society of Mechanical Engineers. "*Vibrating Process Equipment for Resource Recovery.*" Proceedings from National Waste Processing Conference. 1992.
5. Sherman, Raymond. General Kinematics. Barrington, Illinois.
6. Smith, David. CE/Western Engineering, Inc. Albany, Oregon.

See *Appendix* for an Equipment Manufacturers List.

Issue Date / Update: March 1997