Maintaining Process Flexibility in Facility Design

Material: Wood Waste

Issue:. *The business dynamics of the wood waste recovery industry requires flexibility in the design and operation of a facility to respond to the daily fluctuating issues. Such issues include the variety of wood waste from the source generators, the types and level of contamination from the incoming wood waste, and the targeted end-use markets. Issues relating to the end-use markets pose the most challenge as both demand and prices tend to fluctuate significantly within each of the multiple end-use markets for wood waste derived feedstocks. Applying the appropriate processing technique depends on the type of wood waste (form, contaminants, etc.) and the targeted end-use market. The product quality specifications vary by end-use market or by end-user within that market. As a result, facilities become subjected to a number of fluctuating issues that alter the daily formula for a successful processing operation.*

Best Practice: This Best Practice recommends wood waste facilities remain flexible in their design and operations. The following design techniques provide the ability to respond to daily fluctuating markets and issues:

Multiple Process Lines and Surge Areas. Often, there are opportunities to divide a processing plant into individual processing lines that could operate independently of each other. Each line is dedicated to perform a specific wood waste processing function. For example, a processing system might consist of sorting, hogging, chipping, and screening lines. Depending on the type of wood waste raw material and the targeted end-product specifications, the material flow could be directed through the appropriate sequence and combination of stages that make up a process line. The increased independence of each line allows for surge areas (temporary material storage) between processing areas. The benefits of a multiple process line design include:

- Production of multiple end-products;
- Continuation of plant operations when equipment in another line is down for maintenance;
- Operation of extra shifts of certain lines to balance material flows and production demands; and
- Rotation of production schedules to focus on processing certain wood wastes or producing a certain grade of end-product. This technique streamlines the process and reduces operating costs.

Multiple Infeed Systems and System Bypasses. The ability to introduce new materials at different points in the system allows the facility to efficiently customize the process for specific wood waste raw materials and the targeted end-product specifications. For example, landclearing debris for the hogged fuel market could be directly loaded into the hog instead of passing through the sorting line. Similarly, clean, secondary manufacturing residuals could be loaded to the chipping equipment and bypass the sorting line. Also, the specifications for some end-products might not require extensive screening. Therefore, the screening equipment could be bypassed. These types of design techniques avoids unnecessary energy, labor, and other operating costs.

Multi-Purpose Equipment. Equipment with the ability to perform multiple functions offer the most flexibility and reduce the capital equipment costs. Examples of this type of equipment include: screens that convey material, as well as, segregate them by size; and rolling stock and rolling stock attachments that allow for loading, conveying, pre-processing, and storage segregation.

Mobile Conveyor Systems. Certain applications at a processing facility might be able to use mobile conveyor systems to increase flexibility. Portable conveyor systems with wheels can be temporarily moved and secured in place. Other conveyor systems pivot at one end so that the material flow can be redirected as necessary.

Mobile Processing Equipment and Systems. Vendors manufacture both mobile and stationary processing equipment. Mobile equipment offer the most flexibility in positioning equipment on the plant site and the capability to move from site to site, if necessary. Mobile size-reduction equipment generally have a lower maximum throughput capacity than the stationary equipment because of the weight restrictions on mobile equipment.

Spacious Processing Facility Site. One of the major limitations in designing a facility for maximum flexibility is the lack of available space. Space constraints reduce the design alternatives and require close coupling of processing lines, thus, reducing processing flexibility. A spacious site is important for allowing multiple line systems, future system reconfigurations, expansion projects, and material storage flexibility.

Implementation:

Flexible design techniques are best established during the initial construction. However, they could be easily implemented at existing facilities through retrofit projects.

Benefits:

Facilities that incorporate design techniques that optimizes flexibility would be better equipped to adapt to the prevailing raw material supply and end-market conditions. The ability to respond to the daily and periodic fluctuations in production demand affects the profitability of a processing facility.

Application Site:

Processing Facility.

Contact:

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

References:

1. International Resources Unlimited, Inc. Eugene, Oregon.

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