Best Practices in Glass Recycling

Small-Scale Glass Processing Costs

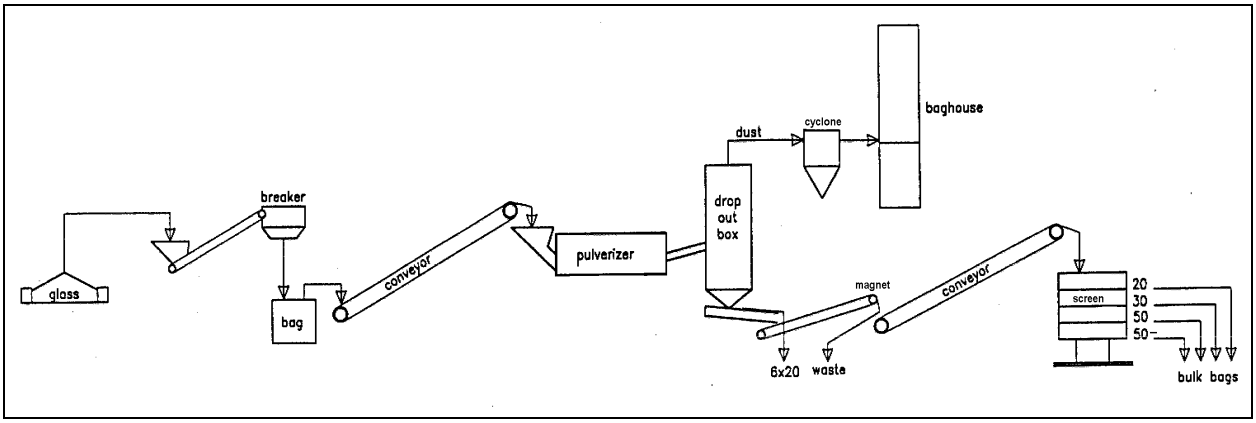
Material: Recycled Glass

Issue: *Most glass processing in the United States is done by large-scale beneficiation plants that process glass for container or fiberglass manufacturers. Most large beneficiation plants have been in operation long enough to have a good understanding of their processing costs and to make informed capital investment decisions. However, knowledge of operating costs for smaller-scale glass processing systems is much more limited.*

Best Practice: A logical sequence of steps to developing an economic model for glass processing might be the following:

1. Determine the volume and availability of local recycled glass. The volume figure should take into account current generation and collection, and the potential for improved collection. Availability should take into account current recycled glass dealers and the current local market value.
2. Determine the specifications to which the glass must be processed to access secondary markets. As far as possible, this should include informed estimates of the size of the markets and the value-processed glass may have in those markets. There are some small-scale systems on the market now that include the ability to pulverize glass to sand size. Producing finer gradations opens the door to potentially higher value market applications.
3. Determine the equipment components that will achieve the level of processing required to generate specification processed glass. Always confirm equipment manufacturers' claims with interviews of existing users and processing trials.
4. Build a conservative cost model for processing, and match the model with potential market values and available volumes of glass.

The diagram below illustrates a possible system for producing fine grades of recycled glass.



The following categories of costs should be considered when evaluating a prospective processing system.

- Capital Costs, Production Costs
- Selling, General, and Administrative Costs

Capital Costs Capital costs include fixed equipment costs (see *Fine Sizing Recycled Glass* Best Practice) and site costs, including mechanical and electrical installation. Small scale crushers (1-5 tons per hour) for producing glass sand may cost anywhere from $10,000 to $40,000 or more. The most basic glass processing system includes only a feed hopper and crushing mechanism. However, for most applications, ancillary equipment is required. Ancillary equipment includes dryers (see *Drying Technologies for Glass Processing* Best Practice), screens (see *Screening Technologies for Glass Processing* Best Practice), and conveyors (see *Conveyor Technologies for Glass Processing* Best Practice).

Production Costs Production costs include the costs of labor, building and equipment rental, utilities, gasoline, oil, maintenance and supplies, and the cost of dust and debris disposal. Special consideration should be given to the following:

- Care should be taken when choosing to make production labor a component of variable cost. Continuous labor is typically required to perform maintenance tasks and replace parts, line feedstock, change dust collector barrels, move bulk bags of product, and weigh the product.
- Gasoline, oil, lubrication, and rental costs should be calculated for a forklift (for moving the product and bins) and bobcat loader (for loading feedstock onto the infeed conveyor) or other machinery used in operations.
- Building rental costs should be based on the floor space required for equipment as well as the space required to stockpile materials.

Selling, General & Administrative Costs Selling, general, and administrative costs include management, office expenses, insurance, taxes, and commissions. Opening up markets for innovative materials has proven repeatedly to be more difficult then processors have anticipated. The cost and time required for marketing should be carefully evaluated. Again, these items are a combination of fixed and variable costs, and will depend on the targeted level of operations.

Implementation: Estimating costs for small-scale glass processing is difficult because there are few successful installations from which to develop models. Great care should be taken in matching costs against realistic market values. Average processing cost per ton, depending on sizing and cleanliness required, ranges from about $20 to $50 per ton, including amortized capital costs. The *Glass Processing Spreadsheet* Best Practice contains an example spreadsheet and formulas for duplicating the spreadsheet.

Benefits: If the full costs of glass processing are not accounted for in initial estimates, the feasibility analysis and break-even production levels can be misjudged. This best practice can not anticipate all costs involved in a glass processing operation, but rather serves as a guideline for model-building.

Application Sites: Glass processing facilities

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

References:

Small Scale Recycled Glass-to-Fines Processing System, Rpt GL-96-3, Clean Washington Center, 1996.

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