EVALUATION OF THE PERFORMANCE OF THE DISC SCREENS INSTALLED AT THE CITY OF Ames, IOWA RESOURCE RECOVERY FACILITY

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One datum of interest seems to be missing from this otherwise comprehensive and well written paper.

What was the net effect of the disc screens on fuel energy delivered to the boilers per ton of refuse introduced into the system?

Discussion by

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The authors through this paper have made a significant contribution to the literature on the state of the art. While it is clear from their data that important improvements were made in several key areas, the fact that they added more than one step and reported the combined data makes it difficult to quantitatively assess the effectiveness of each step.

In order to do this it would have been necessary to characterize the feed and both products for each. In this case not only by size and composition but also by composition of each fraction.

Where it is possible to get this information, the common measures of step effectiveness [1] are: the grade or quality of the product, the recovery (or removal) rate of the particular component or components of interest, and the concentration ratio.

The relative importance of these measures depends on what it is desired to accomplish. If the product has a low value, recovery is often sacrificed to achieve product quality. Conversely, if the component of interest is valuable, recovery generally takes precedence over quality. Where large tonnages of low value components are being processed, and particularly in the early unit process steps, the concentration ratio is the most important measure of efficiency.

At Ames the objective of the first disc screen is to separate components that need further shredding, so the concentration ratio is probably the best measure of its effectiveness. The purpose of the second disc screen is to remove grit so the removal rate of this and other undesirables is the best measure of the screen’s efficiency. Similarly the indicator of primary interest with regard to the ADS might well be the grade or quality of the RDF produced.

While the unavailability of access to some of the flow streams has limited the data, the authors are to be congratulated for putting together a meaningful and helpful presentation.
REFERENCE


Discussion by

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There has been much emphasis placed in some circles on the need to refine RDF (refuse derived fuel) to a degree which will make it as easy as coal to handle and burn. The disc screens evaluated in the paper appear to be able to enhance the RDF quality although there was no mention of whether the reduced ash content of the RDF did, in fact, reduce boiler slagging.

The analysis of refuse composition and particle size for various material streams into and out of the disc screens is an extremely useful design tool. The work appears to have been carefully and thoughtfully done. The disc screens appear to be able to provide a reliable means whereby the quantity of material needing to be processed by a secondary shredder can be reduced, and control of the maximum particle size in the RDF could be achieved.

It is unfortunate that a mass balance for the disc screen operation was not obtainable. This type of information is essential when designing resource recovery facilities, since a large part of the revenue for an RDF project depends on the quantity of RDF produced as well as its heating value. It should be remembered that the boilers at Ames are relatively small in comparison to most new utility boilers. Newer utility boilers may be able to handle a less refined RDF with relative ease. The net heat from a large quantity of less refined RDF could be greater than for the correspondingly smaller quantity of highly refined RDF, thereby allowing greater heat recovery and revenue for a coarse RDF system. The quantity of rejected material from the coarse RDF process would be small, thereby extending landfill life and reducing the cost of landfill disposal.

The importance of the mass balance should not be overlooked. Every effort should be made to publish data about this. An overall mass flow for the entire plant, even if it were estimated, would help to show the actual effect of the disc screens on the project economics.

Discussion by

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The authors are to be commended for their preparation of a meaningful and well written paper. Although the installation and operation of the two stages of disc screening apparently meets design objectives, I would like to know a little more of the background for their selection. The authors do not indicate why disc screens were selected over trommels or other types of screens which have been used in MSW processing. Were there tests conducted to compare the performance of disc screens with trommels in performing the desired separations, and if so, what were the results? Some additional background on the selection of the screening system installed would be helpful.