Report Information from ProQuest

April 05 2017 02:17

Table of contents

Solid residues generation and management at Canadian pulp and paper mills in 1994 and 1995 [National survey]

Author: Reid, I D

Abstract (Abstract): The results of the 1994 and 1995 Paprican surveys are consistent with previous studies of solid residue generation at US mills [1], Quebec mills [2,3], and western Canadian mills [4]. The mean rate of solid residue generation per unit of production, excluding wood and bark used as fuel, was 104 kg/t at Canadian mills in 1994, compared to 162 kg/t at US mills in 1989 [1]. It should not be concluded that Canadian mills produce less waste than American mills; individual mills in Canada and the US showed much greater variations in this ratio than the difference between the national averages.
The ultimate objective of this work is better management of the solid residues from pulp and paper manufacture. Our approach is to regard the residues as potential resources rather than wastes. Bark and waste wood are good fuels, and many pulp and paper mills burn them to provide process energy. Sludges are also burned at many mills, but this may be more waste disposal than energy generation. Depending on the moisture and ash content of the sludges, dewatering and combustion may consume more energy than it releases. Scrap metal cannot be reused within a mill, but it can be fed into the metal recycling system of the local community. To estimate the amounts of residues from pulp and paper manufacture that are now under-utilized and available for use by means other than combustion, I have summed the materials presently going to landfills and half the sludge presently being burned, Fig. 9. By this calculation, 3.1 Mt/a of residues are available. Developing markets for these residues is the subject of ongoing research at Paprican.
Abstract: Dealing with solid residues is widely considered to be a growing problem for the pulp and paper industry but until recently there were no quantitative data on the amounts of solid residues produced in Canada or the ways in which these residues are managed. Paprican surveyed Canadian mills about generation and disposition of 19 types of solid residues at the end of 1994 and again at the end of 1995. Total solid residues production was 6.4 Mt/a. Of this total, 47% was wood and bark used tot fuel, 12% was wood and bark not used as fuel, 23% was sludge, 12% was inorganic and 6% was in a miscellaneous category. Most woody residues and over one-third of the sludges were burned; the unburned residues were mostly landfilled. Land application, composting and recycling were minor outlets for the residues.

Full text: Survey quantifies level of solid residue produced in Canada
Solid residues are generally considered to be a mounting problem for the Canadian pulp and paper industry. In the past, many mills have deposited their solid residues in landfills, but obtaining permits to establish new landfills has become a difficult and lengthy process. The extensive measures required to contain leachates from modern landfills, frequently coupled with longer hauling distances, have substantially increased the cost of landfilling. Implementation of secondary treatment of wastewaters and increased use of recycled paper over the last few years have increased the amounts of sludge generated by mills' effluent treatment systems. Secondary sludges are difficult to dewater, and deinking sludges often have high ash content, both of which are impediments to combustion of these sludges, an increasingly popular option for primary sludge.
The combination of decreasing availability and increasing costs of landfilling and the increased production of sludges is pushing mills to search for new ways to deal with their solid residues. In response to this problem, Paprican has established a team to study options for solid residue management. The first step in this study was to examine current practice and problems, but there were no quantitative data available on the amounts of solid

residues produced across Canada or on the ways in which they are managed.

Table I. Residue categories

Wood and Bark

Bark

Wood waste (logyard debris, woodroom rejects)

Chip screen fines

Sludges

Combined sludge

Sludge from primary clarifier or settling basin

Deinking sludge

Secondary sludge

Sludge dredged from ASB

Intake water treatment sludge

Inorganics

Lime mud

Grits and green liquor dregs

Precipitator ash bleed from recovery boiler

Fly ash from power boiler

Grate ash from power boiler

Miscellaneous

Pulping rejects -- knots

Pulping rejects -- screen room rejects

Sodium sesquisulfate bleed from CIO[Symbol Not Transcribed] generators

Metal waste

General refuse (office and cafeteria waste, packing material, cores, etc.)

Methods

We distributed a questionnaire asking about the production and management of 19 types of solid residues to Canadian pulp and paper mills in December 1994. In January 1996, we distributed a second, slightly modified questionnaire asking about their 1995 operations. The categories of residues included in the second questionnaire are listed in Table I, and the residue management options in Table II. The residue categories were grouped into four major types as shown in Table I.

Results

Ninety-three mills, accounting for 85% of Canadian pulp and paper production, responded to the 1994 survey, and 55 mills, accounting for 52% of total national production, answered the 1995 survey. The mills which provided information are representative of both the regional and product type diversity of the Canadian pulp and paper industry. Details of the survey findings have been compiled into two reports available from the Pulp and Paper Research Institute of Canada (Paprican) [5,6]. The present article summarizes their results.

Residue generation: Total solid residue generation, extrapolated to the entire Canadian industry, was 5.6 million tonnes (Mr) in 1994 and 7.1 Mt in 1995. Almost half of these residues were wood and bark that were burned as fuel at the mills, Fig. 1. Unburned wood and bark accounted for another 12%, as did the inorganic residues. Sludges were 23% of the total, and the miscellaneous category contained the remaining 6 %.

Table II. Residue management options.

Landfill (company-owned)

Landfill (public)

Combustion

Land Application

Composting
External Recycling
Sewering
The breakdown of the individual residue categories in the 1995 data is shown in Fig. 2.
Because many mills started up activated sludge wastewater treatment plants during 1995, we expected an increase in secondary sludge production. Figure 3 shows that secondary sludge increased from 234 kt/a at the beginning of 1995 to 315 kt/a at the end of the year. This figure will probably increase further as the activated sludge plants operate continuously.
Residue management: Combustion and landfilling were the dominant options for solid residue management, Fig. 4. Of the landfilled residues, 87% goes to private landfills (accepting wastes only from the mill) instead of public landfills. Other management options, such as land application, composting, and recycling, account for only 4% of the residues.
-- Wood and bark: Most woody residues bark, woodwaste, and chip screen fineswere burned, Fig. 5. The unburned woody residues were mostly landfilled.
Sludges
Half the sludges were landfilled, and over a third were burned, Fig. 6. Significant fractions of the sludges, especially combined primary and secondary sludge, and deinking sludge, were land applied or composted.
-- Inorganic residues: Almost 90% of the inorganic residues were landfilled, and most of the remainder was sewered, so that the insoluble portion would appear in the mill's primary sludge, Fig. 7. Land application was a minor use for fly ash.
-- Miscellaneous: Miscellaneous residues were also predominantly landfilled, Fig. 8. Some knots and screen rejects were burned, waste metal was recycled, and sesquisulfate from ClO[Symbol Not Transcribed] generators was sewered.
Discussion
The results of the 1994 and 1995 Paprican surveys are consistent with previous studies of solid residue generation at US mills [1], Quebec mills [2,3], and western Canadian mills [4]. The mean rate of solid residue generation per unit of production, excluding wood and bark used as fuel, was 104 kg/t at Canadian mills in 1994, compared to 162 kg/t at US mills in 1989 [1]. It should not be concluded that Canadian mills produce less waste than American mills; individual mills in Canada and the US showed much greater variations in this ratio than the difference between the national averages.
Two surveys of Quebec mills sponsored by the Quebec Forest Industry Association [2,3] reported results similar to the responses from Quebec mills to the Paprican surveys. A survey of sludge handling at 29 western Canadian mills [4] also agrees with the corresponding parts of the Paprican surveys. In addition to confirming the results of the other studies, the Paprican surveys provide a more comprehensive picture of solid residue generation in the entire Canadian industry.
The ultimate objective of this work is better management of the solid residues from pulp and paper manufacture. Our approach is to regard the residues as potential resources rather than wastes. Bark and waste wood are good fuels, and many pulp and paper mills burn them to provide process energy. Sludges are also burned at many mills, but this may be more waste disposal than energy generation. Depending on the moisture and ash content of the sludges, dewatering and combustion may consume more energy than it releases. Scrap metal cannot be reused within a mill, but it can be fed into the metal recycling system of the local community. To estimate the amounts of residues from pulp and paper manufacture that are now under-utilized and available for use by means other than combustion, I have summed the materials presently going to landfills and half the sludge presently being burned, Fig. 9. By this calculation, 3.1 Mt/a of residues are available. Developing markets for these residues is the subject of ongoing research at Paprican.
References

1. NCASI. Solid waste management and disposal practices in the U.S. paper industry. NCASI Technical Bulletin 641: 1-27 (1992).
2. Simons, H.A. Ltd. Etude sur la gestion des boues. SteFoy: Quebec Forest Industries Association (1991).
3. Lavallee, H.-C. Rapport Synthese. Campagne de Caracterisation des Residus. Ste-Foy, QC: Quebec Forest Industries Association (1996).
4. Pickell, J.. Wunderlich, R. Sludge disposal:
current practices and future options. Pulp Pap Can 96(9): T300-306 (September 1995).
5. Reid, I. Solid residues generation and management by Canadian pulp and paper mills in 1994. Miscellaneous Report 326: 1-45, Pointe Claire. QC: Paprican (1996).
6. Reid, I. Solid residues generation and management by Canadian pulp and paper mills in 1995. Miscellaneous Report 352:1-39, Pointe Claire, QC: Paprican. (1997).
Abstract: Dealing with solid residues is widely considered to be a growing problem for the pulp and paper industry but until recently there were no quantitative data on the amounts of solid residues produced in Canada or the ways in which these residues are managed. Paprican surveyed Canadian mills about generation and disposition of 19 types of solid residues at the end of 1994 and again at the end of 1995. Total solid residues production was 6.4 Mt/a. Of this total, 47% was wood and bark used tot fuel, 12% was wood and bark not used as fuel, 23% was sludge, 12% was inorganic and 6% was in a miscellaneous category. Most woody residues and over one-third of the sludges were burned; the unburned residues were mostly landfilled. Land application, composting and recycling were minor outlets for the residues.
Reference: Reid, I.D. Solid residues generation and management at Canadian pulp and paper mills in 1994 and 1995. Pulp Paper Can 99 (4): T109-112 (April 1998). Paper presented at the 83rd Annual Meeting of the Technical Section. CPPA, in Montreal, QC, on January 28 to January 31, 1995. Not to be reproduced without permission. Manuscript received November 13, 1996. Revised manuscript approved for publication by the Review Panel, November 6, 1997.
Keywords: Residues, Solid Wastes, Canada, Surveys, Wood Waste, Bark, Sludge, Management, Production, Waste Disposal, Mills, Factories.

Subject: Pulp & paper mills; Waste; Pulp & paper industry; Statistics;

Classification: 9172: Canada

Publication title: Pulp & Paper Canada; Westmount

Volume: 99

Issue: 4

Pages: 49

Number of pages: 0

Publication year: 1998

Publication date: Apr 1998

Year: 1998

Publisher: Business Information Group

Place of publication: Westmount

Country of publication: Canada

Publication subject: Forests And Forestry--Lumber And Wood, Paper And Pulp

ISSN: 03164004

Source type: Trade Journals

Language of publication: English

Document type: PERIODICAL

Document feature: Illustrations; Graphs; Tables; References

ProQuest document ID: 232782074

Document URL:
http://ezproxy.viu.ca/login?url=http://search.proquest.com/docview/232782074?accountid=12246

Last updated: 2012-01-28

Database: Canadian Business & Current Affairs Database
