

Construction & Demolition Landfills and Wood Pallets-What's Happening in the U.S.

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Editor's Note: This is the second in a two-part series. It discusses pallet disposal in construction and demolition sites. The first part ran in our February, 1997 issue, page 50.

We estimate that 38.6 million pallets went through Construction and Demolition landfill gates in 1995. About 15 percent of these were recovered, but to low or no revenue uses. About 1/3 would not accept pallets as-is.

In total, we estimate that 223.6 million pallets were taken to Municipal Solid Waste and Construction and Demolition landfills in 1995. Only 37.9 million pallets were recovered

and not landfilled.

MANY WANT TO KNOW

How many pallets are ending up in landfills? Are any being recovered? This is the second of two articles on landfill disposal of wood pallets in the United States that help to answer these and other questions dealing with the fate of pallets. In the first article we described the situation at municipal solid waste (MSW) landfills. In this article we will focus on construction and demolition (C&D) landfills. We also provide a summary of the total landfill picture (combined information from our C&D and MSW studies) at the end

of this article. The study was conducted by the Center for Forest Products Marketing in cooperation with the USDA Forest Service Southern Research Station unit, both at Virginia Tech. This is one of several industrial tracking studies conducted by the Center for Forest Products Marketing. This study is also part of an overall pallet repair and recycling research program for the Southern Research Station conducted in conjunction with Virginia Tech's Department of Wood Science and Forest Products.

A HISTORY OF SURVEYING

Industry surveys are a specialty of

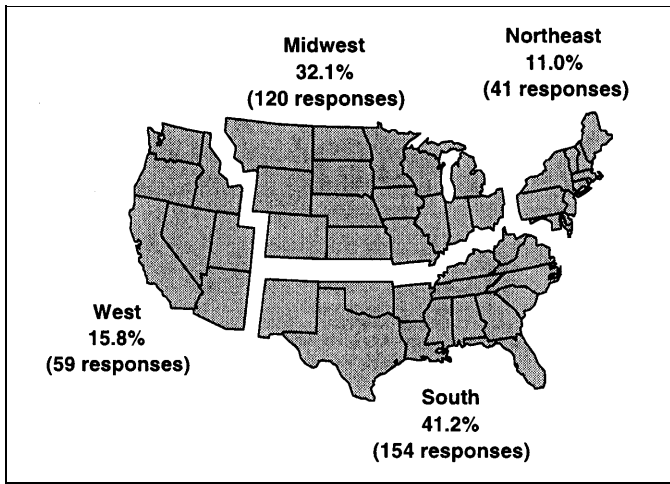


Figure 1. Number of C&D landfills providing data by region.

the Center for Forest Products Marketing. Recent surveys include material use by pallet, furniture, and cabinet manufacturers along with pallet repair and recycling. The Center has been estimating the volumes of wood materials used and quantities of wood pallets repaired and recycled by the pallet and container industry in the US since 1992.

Each year a large number of new wood pallets are manufactured using approximately 40% of the hardwood lumber produced in the US. Every year the pallet and container industry receives a significant quantity of wood pallets for repair or recycling.

In addition, many pallets end up in landfills, rendering these natural resource useless. Prior to our study, no information was available regarding the number of pallets reaching US landfills for landfilling as-is and for recycling.

Since we are interested in wood pallets, we concentrate on pallet waste received and recovered at C&D landfills. However, we do estimate the total quantity of all types of waste, wood waste, and pallet waste received at these landfills in 1995. In addition, this report contains the amount of yard/wood waste and pallet waste received for recycling in 1995 and the various uses of recovered pallets.

RESPONSE RATE WAS GOOD

Following a thorough pre-test and pilot-test, a questionnaire was mailed in March 1996 to 850 randomly selected C&D facilities in the US (excluding Alaska and Hawaii). After adjusting, the response rate for the study was 40%.

Figure 1 illustrates the number and percentage of responses received from each region. The number of responses received from the Midwest, Northeast, South, and West regions was 120 (32.1% of the total responses), 41 (11.0%), 154 (41.2%), and 59 (15.8%), respectively. The number of responses received from each region corresponds well to the number of licensed C&D landfills in each region. In 1995, the number of C&D landfills in the Midwest, Northeast, South, and West was 400 (27.9% of the total landfills in the US), 220 (15.3%), 700 (48.7%), and 116 (8.1%), respectively. We estimated that there were a total of 1,436 state licensed C&D landfills in operation when the survey was conducted.

TOTAL WASTE AT C&D LANDFILLS

On average, 29.3 thousand tons of waste were received at each C&D landfill in 1995. Landfills in the South accepted more waste, on average, than landfills in any other region. An average Southern C&D landfill accepted 36.5 thousand tons of waste, while an average landfill in the West, Northeast, and Midwest regions accepted 28.8 thousand tons, 13.7 thousand tons, and 25.7 thousand tons of waste in 1995, respectively.

We estimate that a total of approximately 42.2 million tons of waste (all types) were received at C&D facilities in the US. Figure 2 provides the breakdown by region. The South received the greatest amount of waste, approximately 25.6 million tons or 60.6% of the total waste received in 1995.

TIPPING FEES

Nationwide, the average tipping fee at C&D landfills was \$24.20 per ton. However, tipping fees are quite variable among and even within regions. Landfills in the Northeast region assessed a higher tipping fee (\$49.20/ton) than landfills in any other region. The average tipping fee in the Midwest (\$19.80/ton) was lower than that of any other region. The tipping fees in the South and West were \$22.50 and \$20.60 per ton of waste, respectively. Within a region, tipping fees were almost always lower for pallets delivered for processing rather than landfilling as-is.

WOOD WASTE

In 1995, wood waste accounted for 37.8% of the total waste received at C&D landfills in the US. In other words, almost 16 million tons of wood waste went to C&D landfills in 1995. Wood waste includes not only pallets but boxes, dunge, packaging, yard trimmings and other non-industrial wood discards. Again, landfills in the South received the greatest amounts, approximately 62% of the estimated 16 million tons of wood waste. Next, the Midwest region accounted for approximately 30% of the total wood waste received in 1995. The Northeast and West regions received the least amount of wood waste, 4% and 3.9% of the total, respectively. However, the regions differed less in terms of the percentage of waste that was wood. Approximately 46% of the waste received in the Midwest was wood waste and

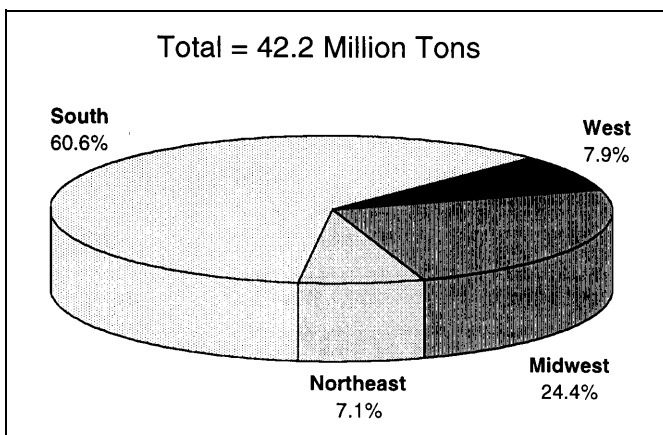


Figure 2. Estimated total amount of waste received at C&D landfills in 1995 by region.

TABLE 1. Percentage of C&D landfills accepting wood pallets for landfilling as-is and percentage operating a wood/yard waste recycling facility: 1995

	% accepting wood pallets as-is	% operating a waste recycling facility
Midwest	70.8%	25.0%
Northeast	48.8%	46.3%
South	70.8%	36.4%
West	62.7%	27.1%
United States	67.1%	32.4%

landfills operated a recycling facility. In addition, 5.7% of the respondents nationwide indicated that they have plans to operate a wood/yard waste processing facility within the next two years. This suggests increasing interest in recycling of wood/yard waste, primarily to save landfill space and secondarily to reuse the wood.

Landfills that have a recycling facil-

TABLE 2. Estimated quantity of wood pallet material landfilled at C&D facilities in the contiguous United States by region: 1995

	Midwest	Northeast	South	West	United States
Est. quantity of wood pallet material landfilled (thousand tons)	136.3	56.9	677.5	28.0	898.8
Pallet material, % of total waste landfilled (%)	1.3	1.9	2.6	0.8	2.1
Pallet material, % of the total <u>wood</u> waste landfilled (%)	2.9	8.9	6.8	4.6	5.6

38.9% of waste in the South was wood waste. In the Northeast and West regions wood waste accounted for 21.3% and 18.4% of the total waste received in those regions, respectively.

WOOD PALLET WASTE

Are wood pallets accepted at C&D landfills for landfilling as-is (i.e., without processing such as grinding)? If so, what percentage of landfills accept wood pallets for landfilling as-is? What was the quantity of wood pallets landfilled as-is in 1995?

Currently some 67% of C&D landfills accept wood pallets for landfilling. However, almost one-third of C&D landfills have a wood or yard waste facility where pallet waste could be recycled. **Table 1** provides the percentage of C&D operations that accepted wood pallets in 1995 for landfilling. In the Northeast, only 49% of landfills accepted wood pallets for landfilling. In contrast, almost 71% of landfills in the Midwest and South accepted wood pallets for landfilling. We were also interested in knowing the quantity of wood pallets received at landfills that were actually landfilled. We estimate that, in 1995, approximately 899 thousand tons of pallet material were landfilled at C&D facilities in the US (Table 2). This equals 2.1% of the total C&D waste and 5.6% of total C&D wood waste landfilled in the US. If we assume that each pallet weighs 55 lb., approximately 32.7 million wood pallets were landfilled at C&D facilities in the US during 1995.

C&D facilities in the South

landfilled the largest quantity of wood pallet material (i.e., 677.5 thousand tons). This amounts to 75.4% of the total wood pallet material landfilled in the US. The Midwest region landfilled the second largest quantity of wood pallet material, 15.2% or 136.3 thousand tons.

In the South, pallet material accounted for 2.6% of total waste landfilled. In the Northeast, Midwest, and Western regions, wood pallet material accounted for 1.9%, 1.3%, and 0.8% of the total C&D waste landfilled, respectively. However, in terms of wood pallets as a percentage of total wood waste landfilled, the Northeast emerged as the top region with 8.9% of its wood waste being pallet waste. In the South, pallet waste was 6.8% of the total wood waste landfilled at C&D facilities.

C&D LANDFILL RECYCLING AND TIPPING FEES

Nationwide, almost one-third (32.4% to be exact) of the responding C&D landfills operated a wood/yard waste recycling facility (**Table 1**). In the Northeast, more than 46% of the

ity are either banning the landfilling of wood pallets or providing incentives (in terms of lower tipping fees) to bring pallets to the wood recycling facilities. Landfills that have a recycling facility generally charge a higher tipping fee for landfilling wood pallets than for disposing of the pallets at the recycling facility. Among landfills with recycling facilities, the average tipping fee for wood pallets landfilled as-is was \$29 per ton, while the fee for wood pallets that came to recycling facilities was \$22.20 per ton (**Table 3**). Landfills in the Western region provide the greatest incentive to recycle pallets in terms of a tipping fee differential of over \$30 per ton.

WOOD PALLET'S RECOVERED & RECYCLED

In 1995, 3.8 million tons of wood/yard waste were received for processing at C&D landfill facilities (Fig. 3). Of this total, 161.9 thousand tons (4.3%) were wood pallet material. Again, if we assume that a pallet that is received at a recycling facility weighs 55 pounds, 5.9 million pallets were processed at C&D processing facili-

TABLE 3. Regional mean tipping fees for wood pallets at C&D landfills in the contiguous United States that operate wood/yard waste processing facilities: 1995

	Tipping fee (\$/ton)	
	At landfill for landfilling as-is	At wood/yard waste processing facility
Midwest	19.70	14.50
Northeast	46.00	33.38
South	27.10	23.77
West	42.60	11.50
United States	29.00	22.20

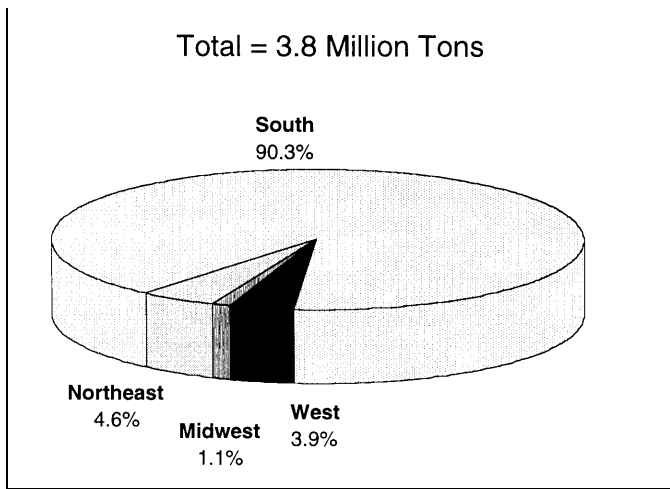


Figure 3. Estimated regional quantity and percentage of wood/yard waste received for processing at C&D landfills in 1995.

Figure 5 shows the percentage of pallets landfilled and recovered and the recovery uses.

Approximately 69% of the recyclers reported that they give away ground or chipped pallet material. Of the respondents who sell ground or chipped pallets, the average (mean) sale price was \$11.01 per ton and the median sale price was \$10.50.

THE TOTAL LANDFILL PICTURE

The combined totals (C&D and MSW) show that over 223 million pallets (6.14 million tons) passed through landfill gates in 1995. Only 17% (38 million pallets or 1.04 million tons) are being recovered, mainly to little or no revenue products. Landfill operators would welcome markets for pallets that would return some or more money to their facilities. Many have grinders and many more would add grinders if they could be assured of a decent market for ground pallet material.

TABLE 4. Quantity and percentage of pallet material recovered for various uses at C&D landfills in the contiguous United States that have a recovery facility: 1995

	Quantity recovered for each use (thousand tons)	Proportion recovered for each use (%)
Given away or sold as-is for reuse as pallets	20.2	12.5
Given away or sold as-is for fuel	1.4	0.9
Repaired at the facility	1.8	1.1
Ground or chipped for use as landfill cover	12.2	7.5
Ground or chipped for fuel	62.1	38.4
Ground or chipped for other uses ¹	52.8	32.6
Other uses	11.3	7.0
TOTAL	161.9	100

¹. e.g., mulch, animal bedding, compost, soil amendments, and furnish for particleboard

ties. The Southern region accounted for more than 77% of this wood pallet material. Figure 4 provides the quantity of wood pallet material recycled in each region.

When asked how the volume of wood pallets processed at wood/yard waste facilities has changed over the past two years, respondents were split; 19% reported an increase and 19% indicated a decrease. The average increase was 3.2% and the average decrease was 4.2%. In addition, 44% of the respondents indicated that the volume of pallets received for recycling has not changed over the past two years. Approximately 18% of the respondents reported that they have been operating the wood/yard waste recycling facility for fewer than two years and therefore could not comment on changes.

How was the pallet material used at the processing facilities? Grinding or chipping was the most common process used. Approximately 32.6% of the ground or chipped material was used for mulch, animal bedding, compost, soil amendment, and core material for particleboard. Around 7.5% of the reduced material was used as landfill or road cover. Another 38.4% was used for fuel. In addition, .9% of the pallet material was given away or sold as-is for fuel. In other words, 39.3% of the pallet material received for recycling was used for fuel. Approximately 12.5% of the pallet material was given away or sold for reuse as pallets, and 1.1% were repaired at the facility for reuse. Table 4 provides the percentage of pallet material used for various purposes.

SO WHAT MIGHT ALL OF THIS MEAN

It means that there is a large, little utilized, source of used pallets at US landfills. This resource could be a good source of material for:

- used pallets to repair
- replacement boards
- mulch material for coloring
- fuel pellet stock

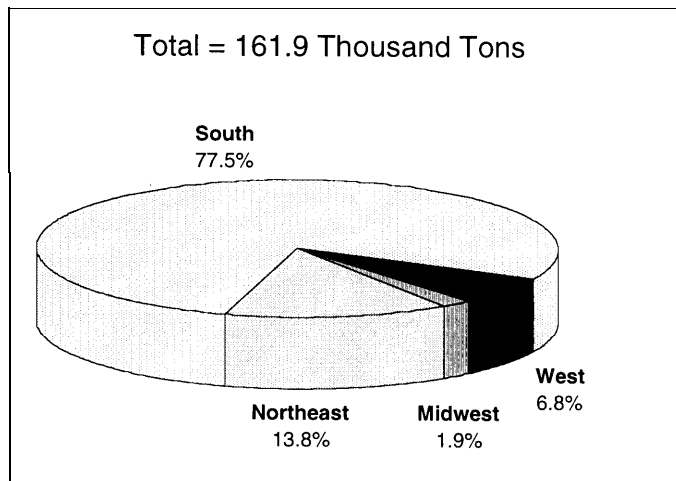


Figure 4. Estimated regional quantity and percentage of wood pallet material recovered at C&D facilities in 1995.

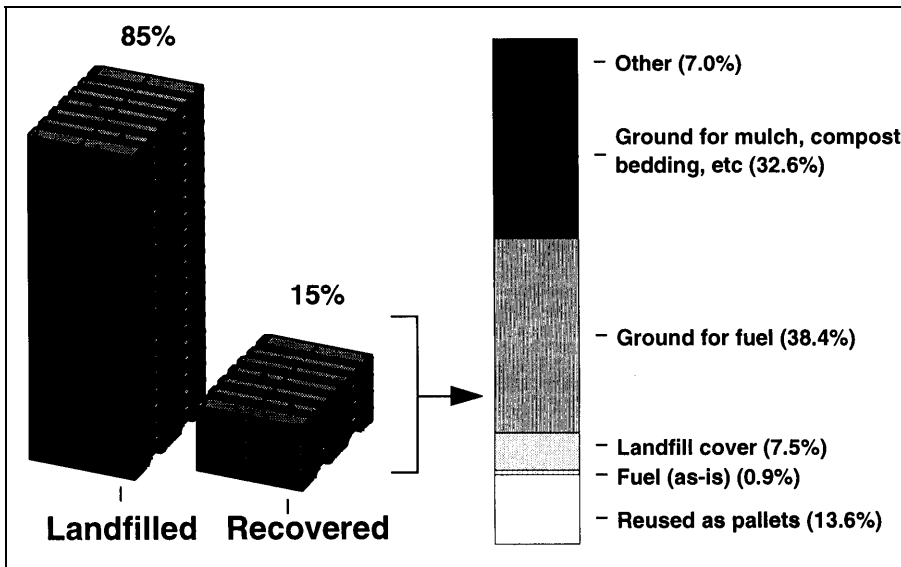


Figure 5. Landfilling and recovery of pallets at C&D facilities and uses for recovered pallets.

board products fiber
Use your imagination

ANOTHER THOUGHT THAT IS WORTH REPEATING

A substantial quantity of wood pallets are entering into the US landfills each year, thus rendering the valuable resource useless. Producers of wood pallet waste believe that it is more cost effective to send the used pallets into landfills than finding a recycler or putting them into use themselves. State agencies could provide some incentives to attract more recyclers into the area to utilize the currently underutilized wood and pallet material. In addition, they could provide some incentives for the producers of wood pallet waste so that it would be cost effective for them to take the pallets to recycling facilities rather than to landfills for landfilling.

SOME QUICK FACTS —

A survey of construction and demolition (C&D) landfills by the Center for Forest Products Marketing provided estimates of wood and pallet waste landfilled in 1995. Here are some of the study results.

- On average, C&D landfills charged \$24.20 for every ton of waste received for landfilling.
- Wood waste accounted for 37.8% of all types of waste received at C&D landfills in 1995.
- Of the wood waste landfilled, 899

thousand tons (i.e., 5.6%) was pallet material.

- Approximately 33% of C&D landfills reported that they do not accept wood pallets for landfilling as-is (i.e., without processing).

- Approximately 32% of C&D landfills operate at least one wood/yard waste processing facility.

- Approximately 161.9 thousand tons of wood pallet material was recovered at C&D facilities in 1995.

- Recovered pallet material was used for various purposes. Approximately 7.5% of the pallet material was ground or chipped for landfill cover and 38.4% for fuel. Another 32.6% of the pallet material was processed for use as mulch, animal bedding, composting, soil amendment, and material in particleboard.

- Approximately 78.5% of the recovered pallets were ground or chipped.

- Approximately 69% of the landfill operations gave away ground or chipped pallets. The rest of the respondents sold the ground or chipped material at an average price of \$11 per ton. ■

The Center for Forest Products Marketing can be reached by calling (540) 231-5876.