

Small Engines

The Inside Facts on Chippers and Shredders

*James B. Wills, Jr., Associate Professor
Agricultural Engineering*

Introduction

In 1991, more than 200 million tons of garbage were disposed of in the United States. This figure compares to 80 million tons of garbage disposed of in 1960. Thirty thousand landfills were open in the United States in 1960. Today, less than 6,000 landfills are operating, with half of those expected to close in the next five years. Twenty percent of the total waste disposed of in landfills is comprised of lawn debris such as leaves, tree limbs, prunings and grass clippings. This amounts to 40 million tons of lawn waste per year!

Currently, 48 of 50 states have enacted some form of yard waste restrictions. Fifteen states have enacted legislation banning yard wastes from landfills. Ten states have established goals for recycling and overall reduction of wastes. Ten additional states have significant voluntary recycling programs. Tennessee is presently in this last group of states. The remaining states have some voluntary recycling programs.

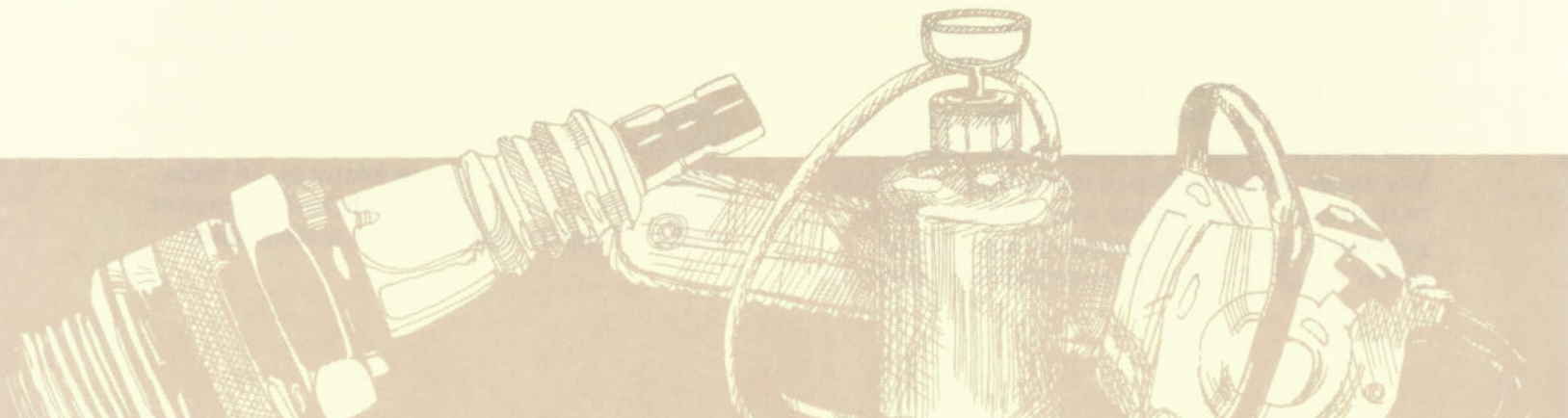
In the very near future, many homeowners may have few options with regard to disposal of yard wastes. Two excellent choices homeowners

do have are to convert yard wastes into mulch or compost. About one-third of all household wastes are compostable. Burning, bagging and hauling yard wastes can be a chore of the past. By purchasing or renting a shredder or chipper, homeowners can convert yard wastes into usable mulch, compost and fertilizer.

What Are Chippers and Shredders?

Chippers and shredders are machines that grind and chop tree limbs, leaves and twigs into small pieces. Pieces vary from about 3/8 inch long to about 2 inches long, depending on the machine. Chippers and shredders are powered by gasoline engines or electric motors. Gasoline engine models usually run from three to eight horsepower in the homeowner-size range. Electric models run from about one-half to five horsepower equivalent in the homeowner-size range.

Shredders are normally used for tree leaves and small limbs or twigs. Chippers are typically used to chop tree limbs up to about 3 or 4 inches in diameter. Shredders are usually powered by an electric motor, due to the smaller power re-



quirement, while chippers are normally powered by gasoline engines which can supply more power than small electric motors. Gasoline engine models are more portable than electric models, since the length of the power cord and extension cords are not limiting factors. Some manufacturers offer a combination machine that is both a shredder and a chipper. Many homeowners will find the combination model the most versatile for their needs.

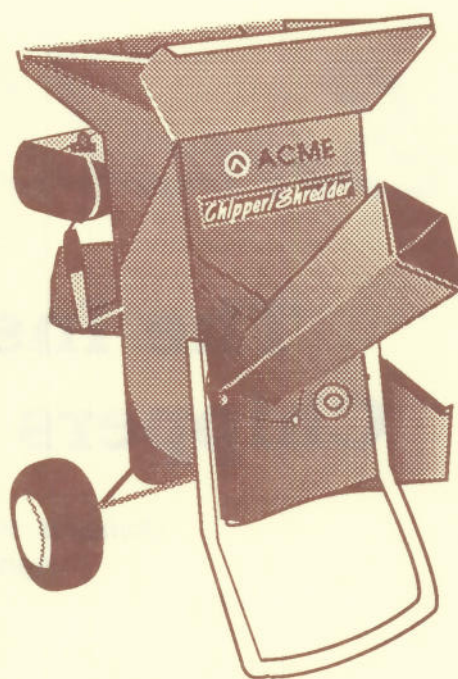
Selecting a Chipper/Shredder

Homeowners contemplating purchase of a chipper or shredder can answer a few questions which will help form a decision on what type and size of shredder to buy.

1. Will you shred leaves only?
2. Will you chip tree limbs only?
3. Will you be chipping and shredding?
4. What is the largest diameter size limbs you will be chipping? ___ inches
5. Will you be close to an electrical power supply that would be convenient for powering your chipper/shredder?
6. Is portability an important feature to you regardless of electrical power proximity?
7. Will you be using your chipper/shredder frequently or only occasionally?

If you plan to shred leaves and small residues only, you need a shredder and not a chipper. Shredders cost less and are usually much lighter in weight than chippers or combination machines. Shredders are usually powered by a small electric motor. Shredders with electric motors larger than 1/2 horsepower (10-12 amps) will require extension cords with wire sizes larger than 16-gauge wire. Extension cords with wire sizes larger than 16 or 14-gauge will be hard to find and will cost considerably more than standard duty (16-gauge) cords. The length of the cord also affects the wire size needed. Make sure you use an appropriate size cord when using electric shredders.

If you will be chipping tree limbs only, then you need a chipper. Chippers in the homeowner-size range will handle tree limbs up to 3 inches in diameter. Chippers are usually powered by gasoline engines in the three-to-eight horsepower range. Three to four-horsepower sizes are



suggested for small-to-average size suburban properties. Five-to-eight horsepower models are recommended for medium-to-large properties.

Three to four horsepower chippers will handle tree limbs up to 2 inches in diameter. Five-to-eight horsepower chippers will handle 3-inch diameter limbs. If you do not want to be limited by electrical cords, you should consider purchasing a gasoline engine-powered model. If you don't mind keeping up with electrical cords and want a quieter machine, then you may want to opt for an electric model. Generally, the gasoline-powered models will be available in more powerful sizes than electrical models. Five-to-eight horsepower electric motors are expensive and require large gauge wiring to supply electricity without damage to the electric motor.

If you plan to do both chipping and shredding, a chipper/shredder would be the logical choice.

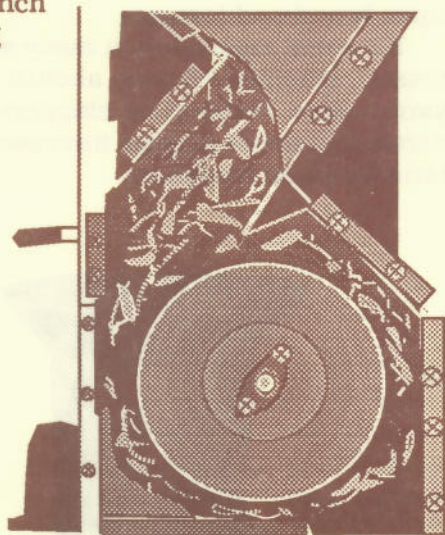
How Chippers and Shredders Work

Some models of shredders use a nylon-filament string as a blade. These machines do a good job of shredding leaves. Some models of shredders use steel flails mounted on a rotating shaft. The number of flails varies with the size and power of the machine. Larger machines will have more flails and more power. Eight-horsepower models may have as many as 16 flails, compared to four flails for a three-horsepower model. Chippers normally use a steel blade

mounted on a steel flywheel to chip limbs. Turning at a high rate of speed, chippers can make several slices per second on a limb. The chips may pass through a screen before they exit the machine. If the chips are too big to pass through the screen, they are continually chopped until they are small enough to pass through the screen. You can select chip size on some chippers by changing screens with different size openings. Manufacturers offer several screens whereby three/eights inch to 2-inch long chips are possible by using appropriate screen sizes.

Most shredders and chippers will reduce the volume of material chipped or shredded to about one fifth of its original volume.

Five bushels of leaves will shred to a volume of approximately one bushel. Some manufacturers claim a 10-to-1 volume reduction, but 5-to-1 is more common.



Safety With Chippers and Shredders

Chippers and shredders are certified by the Outdoor Power Equipment Institute (OPEI) if the machine meets its safety standards. Buying a machine with the OPEI label assures you the machine has safety features not found on unlabeled machines. Be sure to obtain and read a copy of the owner's manual before using a chipper/shredder. Important operating and safety instructions will be found in the manual. Some important safety features to look for when evaluating a particular machine are:

1. Intake chute or hopper - The chute should be large enough to accommodate the materials you will be feeding into the machine, but you don't want your hand or arm to come into contact with the rotating cutters. Some manufacturers offer a tamping device to push material into the machine. The tamper keeps body parts away from the cutting parts of the machine. Small

chutes which are too small for hands or arms to get into the machine may be too small for adequate feeding of limbs and other material into the machine.

2. Eye protection - Chips and shredded material may be blown back through the feed chute as you use the machine. Always wear eye protection while using a chipper or shredder. Some manufacturers include a pair of safety goggles with the machine when you buy it.

3. Machine portability - Some of the heavier machines can cause back injuries while moving the machine from one location to another. Some machines weigh as much as 280 pounds, which can make moving difficult for one person. Obtain assistance when moving machines or employ proper lifting techniques to reduce risk of back injury.

4. Noise - Most machines, especially the gasoline engine-powered models, make considerable noise while chipping and shredding. You will need to wear some type of approved hearing protection, as sounds can reach 100 decibels or more during operation.

5. Vibration - Most machines will tend to vibrate the limbs and branches as they are chipped and shredded. You will probably want to wear work gloves while using the machine.

6. Discharge chute - Material is usually ejected from the machine with some force after it has been chipped or shredded. Be sure to wear eye protection and suitable clothing when working near the discharge chute. Better yet, cut off the machine when removing clippings from the discharge area.

Servicing Chippers and Shredders

Very little servicing is required with electrical powered shredders and chippers. Electric motors require very little maintenance when properly used. The shredder or chipper powered by the motor will usually require maintenance in the form of lubrication, adjustment and rotation or replacement of blades or flails.

Gasoline-engine powered shredders and chippers will require routine maintenance on the engine as well as the shredder. Maintenance on an engine includes changing oil and maintaining oil levels, servicing the air cleaner and servicing the fuel system.

When purchasing a shredder/chipper, look for ease of maintenance on each model. Blades

or flails should be relatively easy to change without major disassembly of the machine to get to the blades. Is the starter handle easy to get to and to pull? Are special tools needed to work on the machine?

Rental of Chippers and Shredders

If you need a shredder or chipper for only a short time infrequently, you may wish to consider rental of a shredder from a local rental company. You may have one or more neighbors who can use the machine for their needs and will share in the rental cost. Typical rental charges for a chipper/shredder are about \$30 to \$50 for one day. If you need a chipper/shredder frequently, you may decide that purchase is the best option for you.

Purchasing Chipper and Shredders

If you decide to purchase a chipper or a shredder, you will find several models on the market currently. Prices for small electric leaf shredders start at about \$100 and range up to about \$300. Prices for electric chippers and shredders range from about \$300 to \$400. Prices for gasoline engine-powered chippers and shredders start at about \$400 for the smaller three-horsepower sizes and range to about \$1400 for eight-horsepower models, depending upon brand and features.

If current legislation in many states is successful, landfills will soon abolish disposal of yard wastes. Demand for chippers and shredders could result in price increases in the short term for these machines.



leaf shredder



SP268N-3M-1/93 (Rep) E12-2015-00-049-93

A State Partner in the Cooperative Extension System

The Agricultural Extension Service offers its programs to all eligible persons regardless of race, color, national origin, sex, age or handicap and is an Equal Opportunity Employer. COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS The University of Tennessee Institute of Agriculture, U.S. Department of Agriculture, and county governments cooperating in furtherance of Acts of May 8 and June 30, 1914. Agricultural Extension Service
Billy G. Hicks, Dean