Buy a Chipper That Fits Your Needs

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AFTER YEARS of spending a lot of money, time and labor to trim trees, cut brush, load it onto a truck, haul truckloads a day to the landfill, pay the smiling man at the landfill gate five to fifteen dollars a load, you've had enough. You've decided to increase your productivity, cut your labor costs, and generally improve your tree maintenance operation by getting a brush chipper.

You've seen a few around on various jobs, talked to a number of owners and found out that a chipper can, conservatively, reduce five to eight truckloads of brush and branches to one truckload of chips; free as many as four men for other work assignments; provide a good bio-degradable substance for soil structuring, weed control, ground cover and mulch. Having a chipper is also an easy way of avoiding the ever-increasing watchfulness of the EPA, which frowns on burning brush after a job is completed.

Once the decision to acquire a chipper is made, dig out that equipment guide copy of WEEDS TREES AND TURF. Nearly all of the chipper manufacturers are listed in it, so are their addresses. Drop them each a short note asking for literature, specifications, and the name of your nearest dealer. As this information is received, another decision must be made — which chipper, which engine, what kind of equipment should be on it.

The brush chipper you buy should be sturdily constructed of materials that can take a beating day after day without fatigue. Whether it must operate on city streets or open rights-of-way for power lines, the stronger the construction the better. A good rule of thumb is to pick a unit which has been produced for over five years.

Starting from the ground up, wheels should be 15 inches in diameter, semi-drop center truck type, with 7:00 x 15, 6 or 8 ply tires. These will afford maximum service at minimum cost, and are standard equipment on most machines. The running gear; axle, springs, etc. should be able to carry at least an additional one third of the total machine weight, thus allowing ample capacity for rough service, e.g. potholes, curbs, washouts, gullies, stumps, etc.

The transport, or trailer frame, should consist of structural materials, and be fabricated in such a way as to provide rigid support for the cutting unit and the engine, while allowing the vulnerable engine oil pan, fuel tank and wiring to be completely protected by the trailer frame itself. (Many operators have successfully towed their chippers to the job site over hazardous terrain only to find that the fuel tank or oil pan was somehow punctured during the trip.) A high trailer-to-ground clearance will add extra protection and provide considerable maneuverability on uneven, rocky or stump-covered ground.

While small, four-cylinder engines once powered the majority of brush chippers, 300 cubic inch, 6-cylinder and 330 cubic inch, V-8 gasoline engines are now the most common source of a chipper's power.

The six-cylinder engine is most often used by tree services and utilities. Its good torque characteristics, fuel economy, and long life are important features to consider if the chipper is to be operated under general conditions.

The eight-cylinder engine is more commonly used for heavy-duty requirements. Land clearing, slash removal, large and medium-sized municipal operations often need the extra power and torque this engine provides in situations calling for removal of considerable volumes of large limbs and brush.

Because conditions vary, it is sometimes difficult to determine which engine is correct for a particular application. In many instances the dealer or manufacturer can offer valuable suggestions and assistance which could eliminate the inconvenience of having an overpowered chipper.

The device which performs the actual cutting or chipping of the wood is subject to a variety of names: cutting cylinder, rotor, cutting head, or chipping head. Most cutting cylinders are available in two basic widths, 12" and 16", but their diameters generally range from 11½" to 16". Chippers with 12" wide cutting cylinders are commonly used for light to medium maintenance work, and are usually powered by 300 cid 6-cylinder engines. The 16" wide cutting cylinder, when driven by a 6-cylinder engine, is ideal for light, medium, and some heavy work. When driven by a 330 cid V-8 engine, the 16" cutting cylinder is well-suited for removals and heavy trimming, as well as light pick-up work. A 12", 6-cylinder chipper should not be used to reduce 6-inch limbs, and, conversely, a 16", V-8 should not be used strictly to chip 2-4 inch branches. A little time spent analyzing the work to be performed will usually result in matching the machine to the general type of job.

All cutting cylinders have a number of removable knives to perform the task of chipping wood. The most widely used system consists of 4 knives, which are usually the full width of the cutting cylinder (straight knife system), and are held positively in place by 4 full-length wedges through which several high-strength bolts are put, to firmly draw the wedges against the knives on one side, and against the cylinder on the other, preventing their coming loose. At least two knife and wedge configurations include a back-up system utilizing a tapered knife which is wider at its bottom

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have been taken, you can apply some wound dressing — only to indicate that someone has treated the tree.

Too often people think that trees are so big and strong that they can withstand anything. Not so. The wounding of city trees is a serious problem now, and it will get no better unless something is done. One thing we can do is to develop sound tree-maintenance programs, using new information and new tools that have come from recent research on wounds and decay.

Selected References

The processes that lead to discoloration and decay within living trees are complex. Research is still being carried on to better our understanding of these processes. For more technical details, we suggest the following publications:

Shigo, A. L. 1967. Successions of organisms in discoloration and decay of wood. Int. Rev. For. Res. 2: 237-299. Academic Press, New York.

Shigo, A. L., and W. E. Hillis. 1973. Heartwood, discolored wood, and microorganisms in living trees. Annu. Rev. Phytopathol. 11: 197-222.

Shigo, A. L., and E. vH. Larson. 1969. A photo guide to the patterns of discoloration and decay in living northern hardwood trees. USDA For. Serv. Res. Pap. NE-127. 100 p., illus. Northeast. For. Exp. Stn., Upper Darby, Pa.

Shigo, A. L., and A. Shigo. 1974. Detection of discoloration and decay in living trees and utility poles. USDA For. Serv. Res. Pap. NE-294. 11 p., illus. Northeast. For. Exp. Stn., Upper Darby, Pa.

Shigo, A. L., and C. L. Wilson. 1971. Are wound dressings beneficial? Arborist's News 36: 85-88.

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and a wedge which matches the taper of the knife. As the wedge is drawn down by its bolts, the flat side of the knife is pushed against the cutting cylinder, and the tapered side is locked against the wedge with no means of escape. Most of the above systems are resharpenable, adjustable and easily changed. Adjustments after sharpening are usually made by increasing the height of two setscrews beneath each knife, until proper clearance from the cutting bar is obtained.

Several other knife systems are also offered. One uses 12 or 16 individual knives, firmly secured with wedges. This system places its knives in a staggered pattern around the cutting cylinder; the knives are sharpened on both ends and are easily changed. Another straight-knife design has V-grooves cut in the back of the knife which match grooves cut into the cutting cylinder. Gib screws, between the knife and opposite side of the knife slot, exert pressure upon the knife and grooves, which effectively prevents any knife movement under operating conditions. This system also provides for easy knife changing. When working with knives of any system, it should be understood that they be handled with a cautious attitude.

As previously mentioned, cutting cylinder diameters vary from 11½" to 16."The reason for these variances is power. Chipper engines deliver a pre-determined amount of power to the cutting cylinder through a V-belt drive, with very little difference among competing ma-

chines, since the same engine sizes are used by most chipper manufacturers.

Several machines on the market utilize a small diameter (11 ½") cutting cylinder, which does not, of itself, have enough weight to maintain the power required when chipping medium or large-size limbs. To increase this cutting cylinder's power, a large weight, called a flywheel, is attached to one end of the cutting cylinder's shaft. As the unit reaches its optimum operating speed, the flywheel acts as additional mass added to the cutting cylinder and supplies extra power to complete the chipping process.

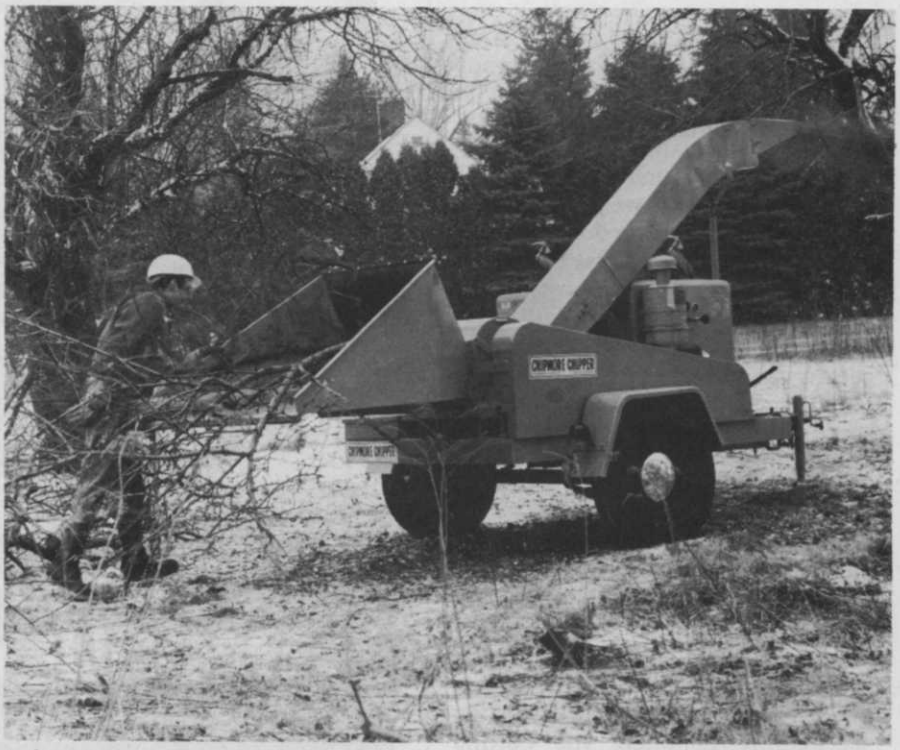
An alternative approach to the above method of construction is found on a number of chippers. Instead of having a small-diameter cutting cylinder and a flywheel, a larger diameter (14-16 inches) is used. The torque required to successfully complete the cutting process is within the cutting cylinder itself, thus accomplishing an objective — all of the weight needed for cutting is safely placed directly behind each knife, allowing maximum power from the engine with less recovery time, and maximum power usage because the full amount of weight required is behind each cut.

Wood, once it is chipped, must be removed from the chipper as quickly as possible to accommodate more wood being fed in. This phase of the operation is usually done in one of two ways — with a separate fan-type blower attachment, or by the integral blower action of the cutting cylinder itself. Most small-diameter cutting cylinders can discharge chips from medium diameter branches through their own integral speed, at a restricted distance, but require extra assistance with heavy foliage, small branches and large limbs due to a low peripheral speed. This extra assistance is usually supplied by a fan-type blower attached to the chipper shaft after the flywheel is mounted. The blower provides a considerable amount of air movement which aids the chip movement initiated by the cutting cylinder's rotation, and will, in most situations, eliminate chip build-up in the discharge chute.

Most large-diameter cutting cylinders have a high peripheral

speed, which imparts the actual mass, or weight, and speed of the cutting cylinder to the chip itself. Thus, for a few seconds, the chip has the same weight and speed of the cutting cylinder which creates an integral blower action. This power carries the chip out the discharge chute in most situations, whether large, medium or small material is fed into the chipper. A satisfactory discharge distance is obtained with the large-diameter cutting cylinder, while chip build-up in the discharge chute is held to a minimum. The most efficient means of discharge with a large cylinder is made with the use of a seal bar to provide maximum removal of chipped material.

Material to be reduced is introduced to the cutting cylinder by means of a feed chute located at the rear of the machine. Feed chutes are also referred to as feed tables, feed platforms or feed aprons, and are available in two configurations — straight and folding. The straight feed chute design is best suited for applications not requiring a great deal of maneuverability, such as



A chipper can, conservatively, reduce five to eight truckloads of brush and branches to one truckload of chips; free as many as four men for other work assignments; provide a good bio-degradable substance for soil structuring, weed control, ground cover and mulch. But purchasing an over-or-under-powered unit or one not heavy duty enough for your type of work can result in just as many negative aspects.

right-of-way maintenance, street trimming, or street pickup. The folding feed chute design has gained in popularity because it can be folded in half, creating an effective barrier against vandalism and urban trash accumulation in the feed area of a parked chipper. The folding feed chute, when closed, reduces the overall towing length of the chipper by about 30 inches, allowing for more maneuverability in tight areas.

Feed chute bottom, top and sides are required by OSHA to be designed to prevent operator contact with the cutting cylinder, knives, or blower blades under normal operating conditions. It is the equipment owner's responsibility to insure that his equipment is in good condition and compliance with these standards. It is the operator's responsibility to use the machine in accordance with national, state, and local safety standards, as well as the manufacturer's recommended operating methods.

Once the wood is past the feed chute, and through the cutting cylinder, it is exhausted by means of a discharge chute, which is available in two designs — straight or round. The straight discharge chute will place chips in one direction — straight ahead, but usually incorporates a deflector, or bonnet, at its far end to direct the chip flow up or down. Some straight chutes are available with an attachment for directing chip flow to the right or left as well.

Round discharge chutes are designed to allow the chip direction to be quickly and easily changed from straight ahead to any position within 360°. They also include an adjustable bonnet and the added feature of being adjustable for height, to allow for varying chip box heights when one chipper is used with several trucks.

All chippers' discharge chutes will plug up with material at one time or another, for a variety of reasons. The most common reasons are incorrect engine RPM (running too slow), worn throttle controls, improper engine governor and linkage maintenance, incorrect angle used when knives are sharpened, dull knives or worn cutting bar. Nevertheless, a plugged chute is an inconvenience, and most chipper manufacturers have made provisions for cleaning out their discharge chutes. Some chutes have hinges in the middle and can be folded back for cleanout. Others have an access door in the side which is simply opened to remove whatever has caused a problem. Access doors can also be used to inspect knife condition without having to use wrenches or other tools. In the interest of safety, it is strongly recommended that no maintenance work be performed on any chipper until the engine is shut off, key removed, and the cutting cylinder has come to a complete stop.

In the final analysis, it should be pointed out that all brush chippers will chip wood. It is, however, to the buyer's advantage that he be aware of the chipper which is best suited for his needs. There are high-production and low-production chippers; long-life and short-life chippers; and, of course, expensive chippers and less expensive chippers. Of the wide selection of brush chippers on the market today, the potential buyer can be assured of finding several makes which will prove to be inexpensive, low maintenance, long-life and high-production machines.

PROFILE *(from page 16)*

travel around the United States attending meetings, visiting member companies and collecting ideas for redistribution to the rest of the membership. I also stay on top of the Washington scene and represent our membership there.

Therefore our role is to see to it that our members are the most well informed, up-to-date individuals in the tree care industry. As a group we have impact. The more numbers we have the more weight we will carry. We want to up-grade our profession as an industry and we can better do this as a group than we can individually.

There are many facets to todays' successful commercial arborist. It is our intent to provide as much input to each facet of that commercial arborist as we can!

WTT. What do you feel would be the single most important step that the industry could take at this time?

A. Sadly enough, as technically proficient as we are and as astute as we are becoming as businessmen, there is one ingredient that is lacking; a professional image. We are as unprofessional a group of pseudo professionals as one would find anywhere. In the last sixteen months I have traveled close to 50,000 miles visiting tree companies in all parts of the country from Maine to Florida and West to California. I have seen good tree work coupled with poor business practices and good business practices coupled with poor tree work. I have seen abominable customer relations and amateur equipment. If I was an OSHA compliance officer I would have writers cramp. Our professional image either doesn't exist or has been so maligned by unprofessional practices that it is beyond recognition.

With only a few exceptions, I have yet to see a commercial tree care company that has really put it all together. Considering the volume of information that management receives from trade association affiliations, trade publications and other sources it really is shocking to witness some of the things that I have seen.

It is imperative, if we have any hope of creating and maintaining a professional image, that we upgrade our standards and meet those standards with suitable management and production practices. Good practices mean more sales and more profit. Professionalism is a void in our image that must be filled.