

# Initial Settings

## Compressor Air Pressure

The compressor has a regulator valve to adjust the air pressure that delivers powder to the nozzle. The control knob is pulled out and rotated clockwise to increase the delivery pressure and counterclockwise to reduce the pressure. For our trials, a pressure of about 40 psig worked best. Increasing the pressure may be desirable when conditions are very windy. If conditions are dry, the powder is more likely to bounce off the stump at pressures higher than 40 psig. Increasing the pressure will also reduce the angle of coverage slightly. If the pressure is too low, the powder tends to dribble out of the nozzle rather than being sprayed out.



Figure 18—Adjusting the air solenoid timer.

## Air Solenoid Timer

The air solenoid timer is the left-hand timer (looking at the opened electrical control box). Be sure that the mode indicator in the lower left-hand corner of the timer is set at “OS” (Figure 17). If not, turn the small cross near the indicator opening clockwise or counterclockwise until “OS” shows in the window. Make sure that the scale indicator in the lower part of the dial is showing seconds. If not, adjust the range screw in the lower left-hand corner clockwise or counterclockwise until the seconds setting appears. The timer dial itself is turned until the pointer is near the 2 setting (Figure 18). This timer needs to be on long enough so that all the powder is blown out of the delivery tube. It should not be on any longer than necessary or the compressor will not be able to keep up with the applicator. For our testing, the air solenoid valve was open about 3 seconds. Move the dial until the solenoid is on just long enough to clear the powder from the delivery tube.

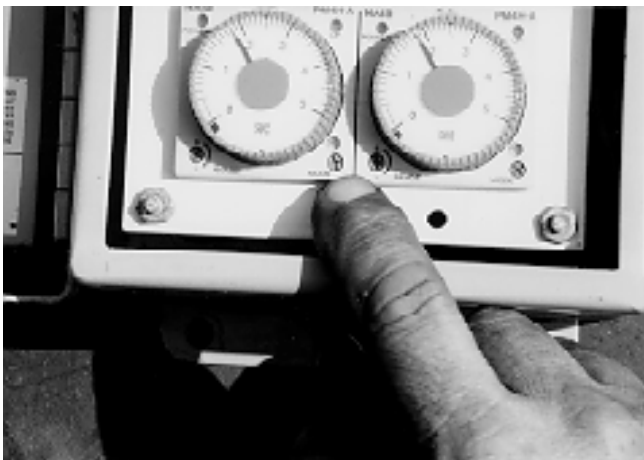


Figure 17—Location of mode and range adjustments.

## Applicator Metering Timer

The applicator metering timer is the right-hand timer (looking at the electrical box). Make sure that the mode is set to “OS” and that the range scale is set to seconds. If not, adjust as described above. This timer controls the amount of powder applied. If the dial is turned near the 1 setting, one powder measure is dropped into the delivery tube. If it is moved near the 2 setting (Figure 19), two measures of powder will be delivered. This is the setting we used for our tests and the one that will most likely be used. If more powder is needed for large stumps, the dial can be turned to near 3. Adjust the dial until just the right number of powder charges are delivered. Watch to make sure that the motor arm advances the metering wheel just the right number of openings.

**Note:** When the main power switch is turned on, both the air solenoid and the metering device will automatically go through one cycle.

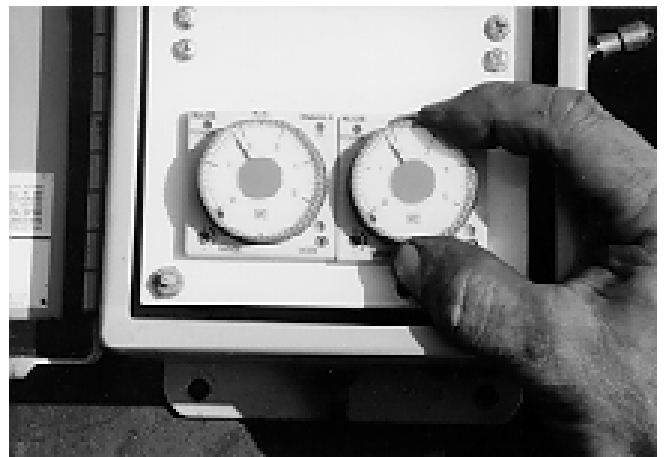


Figure 19—Adjusting the application metering timer.



## Lower Applicator Plate Adjustment Screws

At the bottom of the applicator assembly are three screws with locknuts. Adjust these screws so that the metering wheel turns freely. If daylight can be seen between the lower plate and the metering wheel, the screws need to be tightened until there is minimum clearance, but the plate is not

tight. As the machine warms and the plates get hot, they can expand and may cause the metering wheel to bind. The metering wheel should be checked occasionally to make sure it turns freely. If not, loosen the adjusting screws until some clearance can be seen. If the plate is too loose, an excessive amount of powder will blow out when the applicator is used. A minimal amount of powder will blow out when if the plate is adjusted properly.

## Sporax Preparation

Because the Sporax has to be distributed through a nozzle with relatively small holes (0.078 inches), the material needs to be screened before it is put in the applicator reservoir. The dye should be mixed with the borax before it is screened (Figures 20a and 20b). Otherwise, lumps of dye will plug the nozzle. When the borax/dye mixture has been passed through a window screen, plugging is not a problem.



Figure 20a—Prepare Sporax by screening the material before placing it into the applicator reservoir.



Figure 20b—Lumps formed in the Sporax after it was exposed to air. Sporax absorbs moisture from the air and forms lumps.

The borax/dye mixture must be kept dry. The powder reservoir is covered, but some moisture may leak in. Because the dye is activated by water, it will reveal any accumulation of moisture. Some blue dye could show up in the Tygon tubing, indicating moisture in the tube. That moisture may be brought into the tube by the compressed air or may be the result of a leak. Because of humidity, “bluing” is normal in the Tygon tubing.

Operation may be possible in rainy weather, but the equipment, especially the nozzle, will have to be cleaned periodically. Care will have to be taken while filling the powder reservoir to avoid letting moisture in. Moisture in the mechanism or in the powder will cause the metering device to plug up.

The required boron concentration on the stump is 0.063 grams per square inch. During one of the trials, a shower came through. Some participants were concerned that the borax might wash off. Analysis of stump samples showed that the reverse was true. The rain actually improved the uniformity of boron across the stump surface.

## Distribution

The Fog-jet nozzle provides uniform coverage if the holes remain unplugged. The pattern produces an 18-inch-diameter circle if the nozzle is 24 inches above the stump.

## Application Rate

Proper application of borax for larger stumps wastes some borax on smaller stumps. The rate used in these tests appears to be adequate. A double shot of powder (2.6 cubic inches) was used with the “revolver” metering mechanism. When borax is applied at that rate, the reservoir holds about enough borax for 4 hours of operation.

The application rate recommended on the Sporax label is 0.063 grams per square inch. We treated about 13 trees per pound of Sporax, an application rate of roughly 0.25 grams per square inch.

## Installation Time

The first installation on a feller-buncher may take a day. Once all the mounting hardware has been fabricated, only an hour or two is needed to install and remove the attachment.

## Library Card

Karsky, Dick. 1999. Dry borax applicator: operator's manual. Tech Rep. 9934-2812-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 30 p.

Describes installation and operation of a dry borax applicator designed by the Missoula Technology and Development Center. The applicator is attached to the back of the saw head of a feller-buncher. The applicator allows the operator to apply dry borax to a stump immediately after cutting a tree. Borax can reduce the incidence of annosum root rot, a fungus that spreads as spores land on freshly cut stumps.

Keywords: equipment, feller-bunchers, fellers, *Heterobasidion annosum*, root rots, Sporax

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Dick Karsky has a bachelor's degree in agricultural engineering from North Dakota State University and a master's degree in agricultural engineering from the University of Minnesota. He worked for Allis-Chalmers Manufacturing Co. and White Farm Equipment Co. before coming to the Missoula Technology and Development Center in 1977. He has worked on a variety of projects for the Engineering, Fire, and Reforestation and Nursery Programs.

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