Operating a Power Trowel

Pressure on the handlebars controls the machine, and the angle of the blades controls the finish

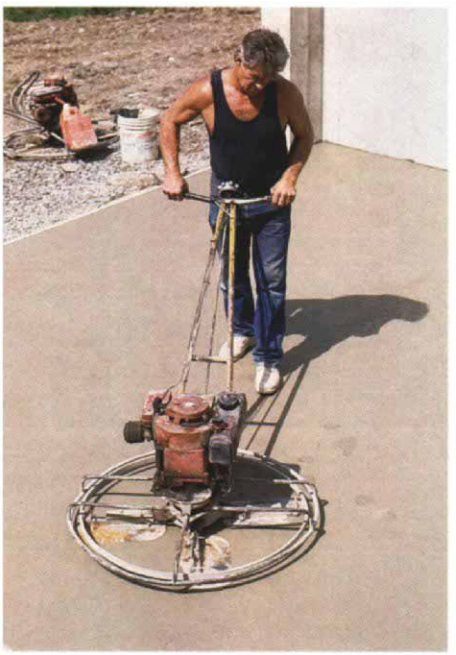
by John M. Schnittker

I'll never forget the first time I used a power trowel. It was a big machine with a 48-in. dia. blade and a 12-hp engine. Luckily, plenty of experienced help was around to repair the damage done when the machine led me into an area of concrete that was still too wet to finish. What a mess. My short lesson taught me that you must know what you're doing before you use a power trowel. Here, I'll offer a few tips on operating the machine.

Opting for a power trowel—A power trowel, also called a troweling machine or rotary float, is a motor-driven concrete-finishing machine with revolving blades that smooth, flatten and compact a concrete slab (photo right). These tools are usually found on large concrete jobs. Most crews I've worked with used power trowels to finish slabs over 2,000 sq. ft.; for smaller pours, kneeboards and hand trowels were used. Still, the speed of a power trowel might be right for a smaller job, especially if you've got a small crew, or if you're pouring in hot weather or with a rainy forecast. And because a power trowel saves time on the finishing phase, it eliminates the temptation to add more water to the concrete during the pour, which makes for a better quality job. The relatively low rental cost of a power trowel in my area (between $40 and $60 per day) is easily offset by labor and time savings, tilting the balance toward a power trowel as an alternative to hand finishing.

A power trowel will not decrease the effort expended on placing, screeding and bull floating concrete. The machine saves time and effort only after the concrete is placed and leveled. A power trowel can float or finish 1,000 sq. ft. in about 20 minutes: about as fast as three or four good concrete finishers working on kneeboards.

Hand finishing still required—Basic concrete hand-finishing skills are still required, however, because a power trowel cannot finish flush against forms, get into corners or finish around recessed floor drains. So if you've never finished a concrete slab by hand, don't run out and rent a power trowel just yet. Practice hand finishing a few small pours—say between 250 sq. ft. and 500 sq. ft.—to ensure that you possess the necessary skills before you move up to power troweling. Besides, if the machine were to break down, your experience hand finishing concrete could save the day. Alternatively, consider renting a backup machine. Either way, make sure the machine starts at the rental yard before you bring it on site.



Note the footprints. **This 36-in. power trowel has four rotating combination blades that float and finish a concrete slab. The operator walks backward and erases his footprints with the machine.**

Learning the controls—The best power trowel for a beginner is also the smallest and lightest: a 5-hp, 36-in. machine fitted with combination float/trowel blades. This machine is more manageable than the powerful 42-in. and 48-in. power trowels, and it produces a smooth, hard finish perfectly acceptable in residential and light commercial applications. However, if a glasslike, burnished finish is desired, a larger, more powerful machine fitted with longer, narrower trowel blades will be needed.

Familiarize yourself with the controls before you begin finishing operations. The throttle, the blade-pitch control knob and the safety shutoff switch are on the handlebars. The throttle lever is on the right handlebar. The blade-pitch control knob is in the center of the handlebar. Turning the knob increases or decreases the pitch of the blades. Slight tension should always be maintained on this knob, even when the blades are flat, as they are during the floating operation.

Most power trowels have a safety shutoff switch that automatically turns off the machine when the handlebars are released. If the handlebars are released while the blades are turning, the blades will stop turning, and the rest of the machine—engine and handlebars—will start rotating. The safety switch shuts off the machine within one-quarter revolution; however, momentum and the disengaged clutch allow the handle to spin around a few times before everything comes to a stop.

Fire 'er up—Make sure the machine has been filled with the proper amount of fuel and oil before you place it on the slab. Spilling gasoline or oil on a concrete slab will cause discoloration and deterioration. Refueling, if required, should take place off the slab and between passes (each time you use the machine with a progressively higher blade pitch is called a "pass") after the machine has cooled down.

A power trowel is big and heavy, and it takes two people to tote one around. The machine is carried by the handlebars and by the housing around the blades, so you should never start the machine until it's been placed on the slab.

Many power trowels now have a centrifugal clutch, which allows the machine to be started and idled; blade engagement occurs as the throttle is opened. Also, most machines operate at blade speeds of 60 rpm to 150 rpm; the faster the speed, the smoother the finish. Sufficient throttle must be given to ensure full clutch engagement because a partially engaged clutch damages the machine. Older machines may be fitted with a mechanical clutch that is engaged by the operator. Like the safety shutoff switch found on new machines, a mechanical clutch disengages the blades when the handlebars are released.

Steered with handlebars—A few tips should keep you from repeating my first-time experience. At least half throttle should be applied when you are ready to start troweling. And low pitch angles on the blades are essential while getting a feel for the machine. You might consider practicing on a cured concrete slab that's been wetted down. A garage floor with a smooth, hard finish will do nicely, but a driveway with a coarse or a broomed finish will not: A rough surface might damage the blades.

Steering the power trowel is the interesting part (drawing right). With the machine running and the blades perfectly level, the machine stays put. Lift the handlebars up, and the machine moves to the left; push the handlebars down, and the machine moves to the right. Moving forward or backward is achieved with a slight twist of the handlebars. A twist to the left causes the machine to move forward; a twist to the right causes it to move backward.

If you find yourself wrestling the machine, you're overcontrolling it. Try to steer the machine with less effort. Even with low pitch angles on its blades, a power trowel responds to very light, almost fingertip pressure. After a few tries you should be comfortable controlling the machine.

The ease of control also depends on the slab itself because a bumpy slab causes the machine to jump and change speeds. Proper screeding and bull floating prior to finishing are always critical, regardless of whether you plan to finish the slab by hand or with a machine. A power trowel will not compensate for a poorly prepared slab.

Floating and troweling—It generally takes three passes with a power trowel to get a smooth, hard finish on a concrete slab. A fourth pass may be desired to attain a smoother, harder finish. If you're finishing a garage slab, remember that the floor gets wet and oily, so a glassy finish could invite accidents.

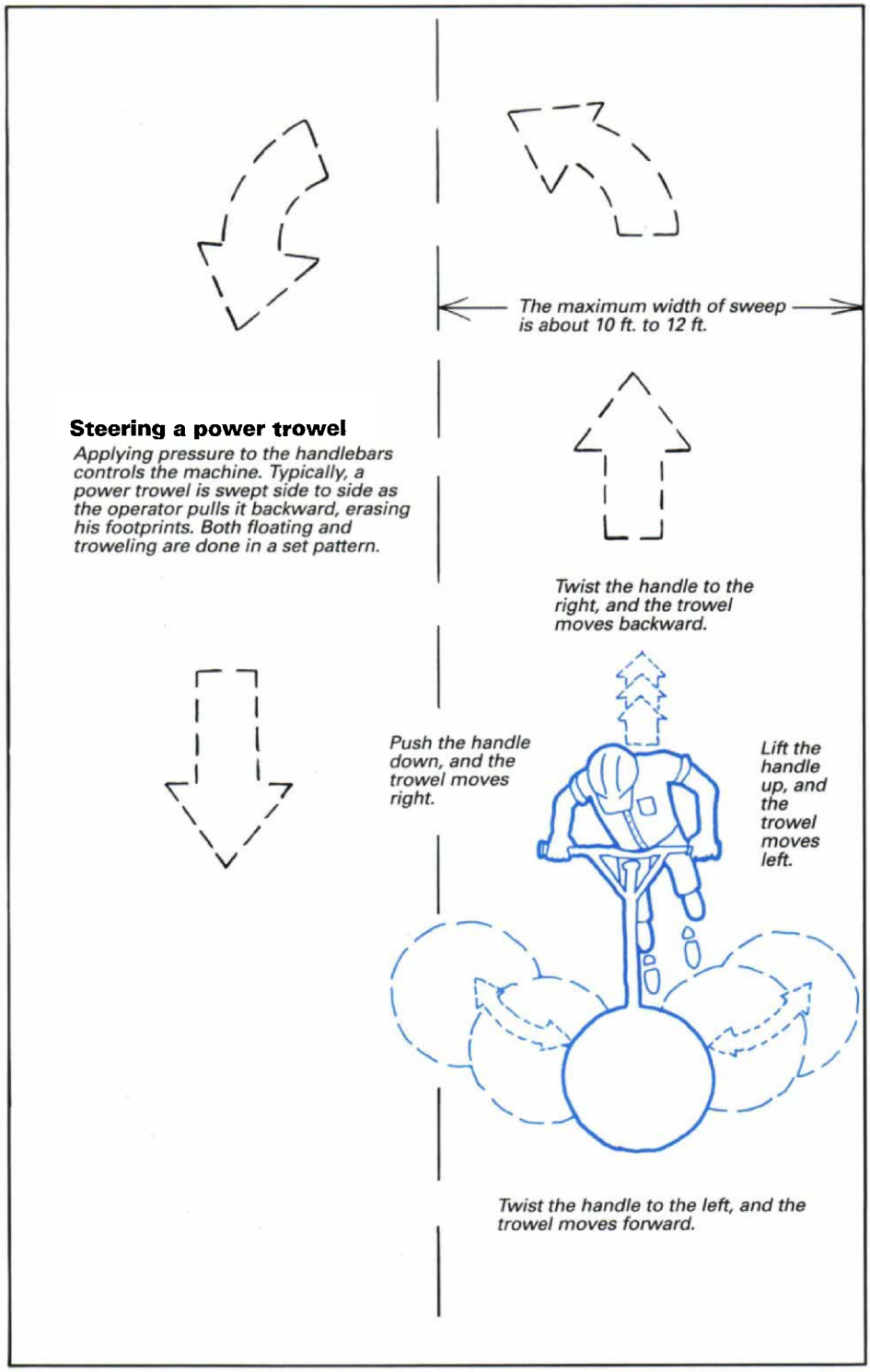
The first pass over the concrete is the floating pass and is accomplished with the blades set nearly flat, up to a couple of degrees. Floating can begin when the concrete has set up to the point where the machine and the operator leave only a slight depression on the surface of the slab—just the same as if you were going to finish the slab working from kneeboards with hand tools. The primary purpose of floating is to smooth the surface of the concrete. Small bumps are cut down, and small holes are filled with repeated passes over an uneven area. Floating should end once the concrete is smooth and flat.

Often, beginners overfloat the slab. Impressed by their first-time efforts, they decide to go over the concrete again while it is still in the wet, working stage. Overfloating pulls additional fines and excessive water to the surface and may result in hairline cracks or fractures after the concrete has completely set up. Try to allow the concrete to harden following a single floating pass.

The second pass is really the start of the troweling operation. You can tell when the slab is ready for the second pass by working the edges with a hand trowel. Once the concrete accepts a smoother finish, power troweling can begin.

With a 36-in. machine, there's no need to change the blades; the combination blades are designed for floating and troweling. Bigger machines have trowel blades; float blades clip onto the trowel blades and must be removed before the troweling operation begins.

For the second pass, turn the blade-pitch control knob so that the blades are set at about 5°. Pitching the blades upward puts more pressure on the slab. As you increase the pitch of the blades, the finish becomes smoother, and the machine is more responsive to operator input.



Steering a power trowel

Applying pressure to the handlebars controls the machine. Typically, a power trowel is swept side to side as the operator pulls it backward, erasing his footprints. Both floating and troweling are done in a set pattern.

Drawing: Mary Twellmann

Subsequent passes over the concrete occur with increasing pitch angles (10° to 20°) and depend on how smooth and hard a finish you desire.

Both floating and troweling should be done with a set pattern. Generally, the power trowel is swept right to left and left to right while moving backward. A single right-to-left sweep covers 10 ft. or 12 ft. and takes approximately 15 seconds. The operator walks backward, troweling out his footprints and checking that the area behind him is sufficiently hard for floating or troweling. How quickly you move backward depends on how much you overlap previously troweled areas. I like to overlap approximately 50% of the sweep (18 in. on a 36-in. machine), which results in the power trowel going over the slab twice during a given pass. Forward movement of the power trowel occurs when working the machine into a comer or when making repeated back-and-forth passes to smooth out an area during floating. □

John M. Schnittker is a resident of Fort Collins, *Colo. Photo by Rich Ziegner.*