

# MIXING IT UP

Preparing chemical spray batches in a large-volume tank saves time and improves worker productivity.

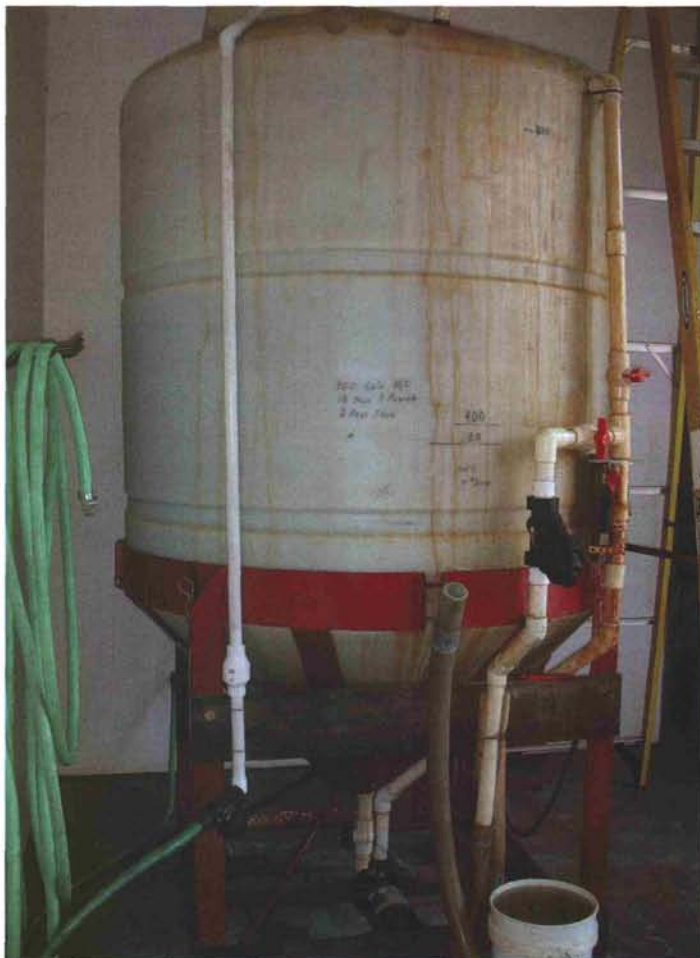
BY PATRICK O'BRIEN, CHRIS HARTWIGER, JOHN FOY, AND TODD LOWE

**H**ow do you apply pesticides and fertilizers if you are a golf course superintendent faced with double tee times at #1 and #10 tees at 7 a.m. every day? In the popular resort area of Myrtle Beach, S.C., most golfers want to play 36 holes daily, and to maximize revenues, golf courses in this area schedule tee times as soon after sunrise as possible. More tee times mean more revenue.

The challenge facing golf course superintendent Bob Graunke, CGCS, and his staff at Tidewater Golf Club is to keep the golf course in top condition without reducing the number of early morning tee times. Tidewater received the "Best New Course" award in 1990, and it is known for excellence in both layout and conditioning. With 40,000 rounds played annually at Tidewater, staying ahead of golfers on days when fertilizer or pesticides are scheduled to be applied makes this a difficult challenge to overcome. The installation of a large-volume mixing tank has reduced the amount of time required to mix and load spray solutions at the maintenance facility. This time savings gives the maintenance staff just the head start they need to stay ahead of golfers and overcome this challenge.

## MIXING AND LOADING SPRAY TANKS TAKES A LONG TIME

Few golfers realize that more than one hour may be required to mix and load



The construction of a large-volume mixing tank offers several advantages to the staff at Tidewater. The bottom line, though, is that it saves time and helps the spray technician stay ahead of golfers.

products into a spray tank. Usually, product mixing and loading occurs in the spray tank at the chemical storage area. This time can be longer if the applicator must mix up a second or third batch and reload the spray tank. It is difficult for the spray technician to stay ahead of play under the best of circumstances, but it's impossible with golfers teeing off at both the #1 and #10 tees just after sunrise.

In the summer of 1999, Mr. Graunke assigned his four college interns a project to construct a large-volume mixing

tank. This tank would allow the staff to premix and store overnight the entire quantity of spray solution needed for the job the following day. Sprayer loading time would be reduced and the staff would have a much better chance to make the application ahead of golfers. The interns had read about a golf course in Arizona that built a large chemical mixing tank, so they inquired to learn more about it. With some working knowledge of this innovative idea, the interns constructed the batch mixing tank over the summer months, and this project ultimately produced a valuable tool at Tidewater. All building materials were obtained from local agricultural and farm supply stores at a cost of less than \$2,000.

## BUILDING THE MIXING TANK

A cone-shaped 1,000-gallon polypropylene agricultural tank is the key component. This

tank shape promotes better water circulation. The tank sits above ground, mounted to 0.25-inch steel angle iron. A steel strip is wrapped around the middle of the tank, and it is welded to the angle-iron base. Two-inch PVC-pipe fill and discharge lines allow for rapid filling of the tank with water and transferring solution to the sprayer. Backflow prevention devices are in place on both the fill and discharge lines.

Agitation of the solution is created in the tank by a 1 HP Jacuzzi pump and



an air compressor. The Jacuzzi pump circulates the solution out from the bottom of the tank through a PVC pipe along the side of the tank and back into the top of the tank. Agitation with the Jacuzzi pump is sufficient to mix most products.

A screen located inside the tank above the Jacuzzi pump filters the solution coming from the tank to this pump. Because of the screening device, the Jacuzzi pump has not had to be replaced, but union joint couplers with ball valves to turn off the water were installed at the Jacuzzi pump to make pump replacement fast and easy, if necessary.

The air compressor significantly increases agitation, and it is used for difficult-to-mix products. The air compressor sits adjacent to the tank on a wheeled cart. Three air jets at the end of the air line from the compressor tie in to the mixing tank just above the Jacuzzi screen. These jets are activated by turning on the air compressor.

On both the fill and discharge lines, in-line filters are installed to screen out any particles that might clog sprayer nozzles. Mr. Graunke reports that nozzles rarely clog.

A lift is used for staging fertilizers and pesticides that will be emptied into the top of the tank. The sprayer is filled with solution at a rate of 30 gallons per minute, and a 150-gallon sprayer is filled in just 5 minutes. The staff at Tidewater reports that the final blended solution is always of high quality, regardless of the quantity prepared.

At Tidewater, most mixing occurs in the afternoon prior to the application, and 30 to 40 minutes is required to prepare most solutions. The entire spray solution needed to spray the targeted areas is made at one time, and this has turned out to be a big time saver at Tidewater. Continuous activation of the Jacuzzi pump keeps the solution in suspension until it is loaded into the sprayer. When the spray applicator arrives, the solution is ready to be loaded directly into the sprayer. After

the 5-minute loading time, the applicator is off to the golf course and can stay ahead of the golfers. If a weather delay occurs, the solution can remain in the tank, and it can be mixed continuously with the Jacuzzi pump.

### SAFETY FIRST

Safety issues were considered prior to construction. The mixing tank is located in the pesticide storage building, and only the assistant superintendent or spray technician performs chemical mixing and filling operations. All electrical devices connected to the Jacuzzi pump and air compressor have no-fault grounding and low 110-volt requirements.

### CONCLUSION

Maintenance workers are being asked to do more work on the golf course before play begins. Overcoming these challenges will be on the minds of more turf managers in the future, allowing golf courses to maximize revenues and not interrupt golfers. Spraying the golf course is always a challenge, but this innovative idea may help reduce the time it takes to complete this routine operation.

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### STEP-BY-STEP GUIDE TO FILLING THE MIXING TANK AT TIDEWATER

- Fill the tank with irrigation water just short of the desired water level.
- Turn on the Jacuzzi pump and air compressor (if needed) to agitate the water.
- Bring products into the chemical storage area on the lift and elevate the lift to the top of the tank.
- Add products into the top of the mixing tank.
- Adjust water level in the tank to the desired final volume.
- Remove the lift from the batch mixing tank area.
- Let the products blend with the water with maximum agitation for 10 to 15 minutes.
- If the product will sit overnight, keep the Jacuzzi pump running, but turn off the air compressor.
- Prior to filling the spray tank, turn off the agitating devices.
- Point the hose into the sprayer and turn on the discharge valve.
- Fill the spray tank to the desired capacity.



In-line filters are installed in both the tank's fill and discharge lines. Plugged nozzles in the sprayer are a thing of the past.