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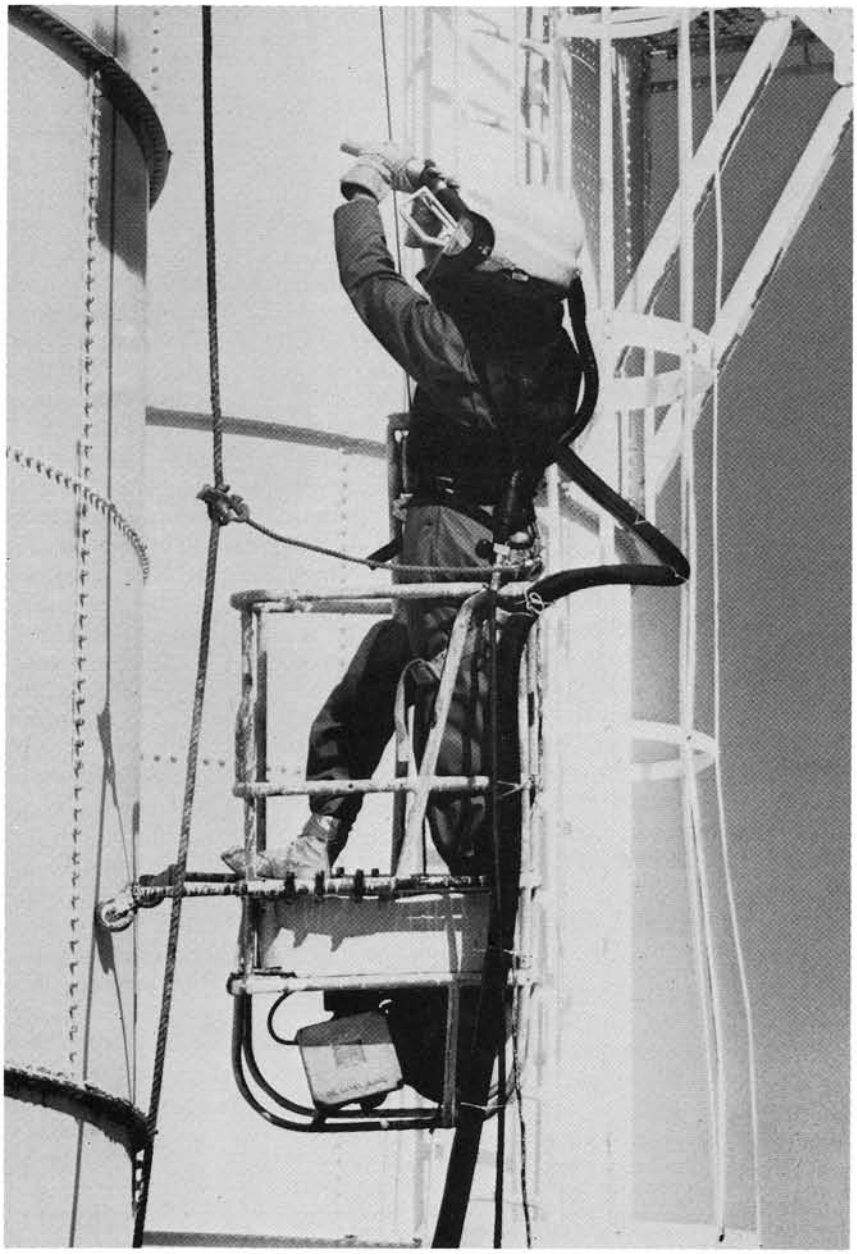
Masters of Maintenance

BY ROBERT LOWES



Treating the equipment right will keep you ready, aiming, and firing.
Photo courtesy E.D. Bullard Co.

A sharp ax outchops a dull ax.

The same principle applies to abrasive blasting equipment. Take care of it properly, and it will remove old paint more efficiently than the same equipment that's been abused and neglected.

Simple enough. But more's at stake than production. Sloppy contractors can set up premature coating failure by blasting structural steel with abrasives tainted by water and oil. Poor equipment upkeep also puts your employees at risk —abrasive blasting is not child's play. Ask anyone who's taken his flesh off the bone with steel grit travelling hundreds of miles an hour.

PWC interviewed contractors, manufacturers, and abrasive blasting consultant A. B. "Willy" Williams to come up with two dozen tips on how to treat your equipment right. Your equipment will return the favor by earning more money for you.

■ Compressors

1. Fuel your compressors with diesel, not abrasives and water.

Sharp tips for everlasting blasting equipment from Those Who Know

Many contractors have a fuel company supply them with 55-gallon drums of diesel fuel for their compressors. Then an employee fills up the compressors from the drums. All too often, he doesn't put the drum lids on tight, allowing the fuel to become contaminated with water and abrasive, said Johnny Johnson, vice president of production for Irvin H. Whitehouse & Sons in Louisville, KY. Johnson said his company dispenses with the drums and simply has the fuel company fill up the compressors directly — and cleanly.

2. ***Check your compressor's oil daily.*** Sounds simple, but people have to be reminded to check their car's oil, too. Too little oil can destroy a compressor — and instead of renting the machine, you could be paying for it.

3. ***Inspect your filters at least weekly.*** A dirty filter, said Willy Williams, can translate into a pressure drop of 5 psi, which in turn can lower productivity by 10 to 15 percent. "It could mean thousands of dollars a week," he said.

■ AIR LINES

4. ***Examine couplings for gasket leaks.*** You can use three senses to make this inspection, said Williams. One, run your hands around the coupling to feel for escaping air. Two, look for water bubbles caused by condensation in the air line. Also, look at the ground underneath to see if it's been blown clean. Three, listen for a hiss — large leaks are noisy.

A few grains of sand in this fitting can produce a leak and dissipate your valuable air pressure, Williams said. "Take a rag and wipe the coupling seat, or blow it out with air."

A new coupling gasket costs less than a dollar. A quarter-inch air leak, however, can cost you more than $30 a day in wasted compressed air.

■ MOISTURE CONTROL

You want dry abrasive in a blast pot; wet abrasive won't flow easily, or not at all. But air that comes out of a compressor is moist. If moisture gets into the blast pot, the abrasive becomes cakey and clogs up the abrasive metering valve. The operator has to "choke" the system with a surge of air and blow out the clog. "There's more time lost in that than anything else," lamented Don Robertson, vice president of Courtney & Co. in Texas City, TX.

5. ***Blow out the moisture.*** Willy Williams, author of *The Abrasive Blast Cleaning Handbook*, prescribes this ritual. After you've got your compressor up and running at the start of the day, close the compressor outlet valve and disconnect the air line from the moisture separator mounted on the inlet pipe of the blast pot. Then, open the compressor's outlet valve slightly and blow out any water, oils, or vapors in the air line before reattaching it to the moisture separator.

6. ***Tend your after-coolers.*** These devices between the compressor and the blast pot cool down compressed air to remove water. They must be drained regularly, and their filters need frequent inspection, too.

7. ***Clean the air-line moisture separator filter daily.*** The moisture separator is the last line of defense against water and oil from the air compressor that threaten to enter the pot. Willy Williams said one way to monitor this filter is to install inlet and outlet pressure gauges on the separator. If the outlet pressure gauge registers a drop of 5 psi or higher, the separator filter is dirty and needs to be cleaned or replaced.

8. ***If the moisture separator has a manual drain, empty it at least daily.*** Willy Williams recommends draining a manual moisture trap every time it's shut down on a job — for instance, while the tender is reloading. He said you might as well leave it permanently cracked open.

■ BLAST POTS

9. ***Twice a day, clean the abrasive trap screen and empty the abrasive trap in front of the bleed-off valve.*** The bleed-off valve, hooked up to the deadman control on the blast nozzle, exhausts air from the blast pot to depressurize it. The screen and abrasive trap are designed to keep abrasive from exiting the machine along with the air. A dirty screen or a full abrasive trap will lengthen the time it takes the blast pot to depressurize, said Tom Geer, technical service manager for Clemco Industries. Geer advises that you clean the screen at least twice a day. The same goes for emptying the abrasive trap.

Consider the consequences if your pot doesn't depressurize immediately. An operator releases the lever on his deadman control and starts to lay down his blast hose, expecting the abrasive to stop shooting out. But the abrasive still keeps coming — and the operator blasts his leg.

10. ***Eliminate valve leaks immediately.*** A small leak doesn't stay small in a blast pot. That's because the pressurized abrasive inside will blast it into a bigger leak, destroying components like O-rings, washers, and castings. In a worst-case

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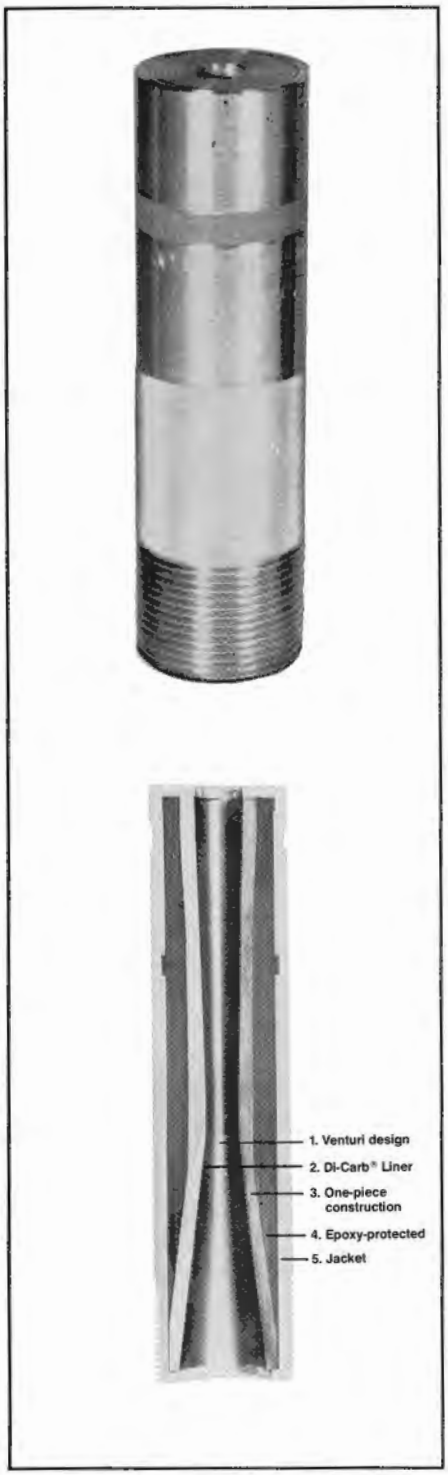
scenario — like a leaky pop-up valve — escaping abrasive can destroy the pot's steel structure and force you to pitch it.

Another source of leaks is the bleed-off valve, closed when the pot is pressurized. When it leaks, the grit doesn't flow properly into the blast-air stream below the metering valve, and you may not get enough grit coming out of your nozzle, said Craig Fring, technical service supervisor for Empire Abrasive Equipment Corp.



11. ***Depressurize the blast pot before you turn off the compressor.*** If you turn off the compressor — or let it run out of fuel — before you depressurize certain blast pots, an interesting thing happens. Your abrasive will start screaming toward the compressor, possibly contaminating it, said Williams. This backflow also can contaminate and damage the deadman control system.

12. ***Keep 'em covered when idle.*** Letting an open-top blast pot sit under the stars overnight without a cover is just inviting trouble. "The first time you think it won't rain, it does," said Whitehouse's Johnny Johnson. Even if you store your blast pots under a roof, they still need a lid. All it takes to stop the flow of abrasive is a cigarette butt, Willy Williams said. He listed other oddities that find their way into uncovered blast pots: blasting gloves, wrenches, dead rats, and once, a four-foot rattlesnake. Removing this junk — or wet abrasive, for that matter — can eat up several manhours. "That $40 investment for a cover would pay for itself many times over," Williams writes in his handbook.

If you don't have a lid, said Johnson, stuff wadded-up bags in the top of the pot, cover them with plastic, and wire it down.

13. ***Empty the blast pot at the end of the season — if not the end of the day.*** Here's the problem. A load of abrasive in an idle blast pot will collect moisture, become cakey, and refuse to flow when you turn your system on. Steel grit will rust, producing flakes that can clog up an abrasive metering valve.

Everyone agrees that you should clean out the pot before you store it during the off-season. Manufacturers recommend that you also empty the pot at the end of a shift. Not all contractors adhere to that regimen, although they recognize the wisdom in it. Johnny Johnson says the only way he'll keep abrasive in a pot overnight is if it's completely full. The warmth of the abrasive, he said, retards condensation.

■ Blast Hoses

14. ***Blow 'em out before you store 'em.*** Clemco's Tom Geer said moisture attacks the pure rubber lining found in many hoses. "Condensation from the compressor often has oils in it," he said, "so we're not just talking about water."

15. ***Don't hang 'em.*** For long-term storage, you shouldn't hang blast hoses on a wall, said Jerry Burbank Sr., vice president and superintendent for Hartman-Walsh Corp. in St. Louis. The weight of the hose pulling on itself could cause the portion at a suspension point to stretch and weaken — and possibly blow out. Instead, store them in loose coils on pallets. If they're just lying on the ground, they're more likely to collect moisture.

16. ***Watch where you drag 'em.*** When hauling a blast hose on a jobsite, don't drag it across sharp rocks and steel edges, lest you nick or cut it. That's asking for a future blow-out.

17. ***Cut 'em square.*** When you cut off a length of hose to attach to a nozzle, make sure the butt end is squared off, so the nozzle washer can rest securely against it. Otherwise, you'll subject the rear of the nozzle and its jacket to the blast stream — and wear them out faster.

18. ***Check for soft spots and leaks.*** Blast hoses wear out on the inside as well as the outside, due to the punishment of the abrasive stream. The inner tubing might be thinner at one spot, for example, because the blast operator didn't run his hose straight, but left some coils in it. The abrasive erodes the inner tubing where the hose curves. This degradation produces a soft spot in the hose that you can feel with your hand. Willy Williams said you can try the shoe test, too. Step on a piece of hose with the pressure off. If it collapses beneath you, assuming you're of average weight, it's ready to rupture. Replace it.

Couplings between sections of blast hose often spring leaks due to a worn gasket. It's hard to hear them while the abrasive is swooshing through the hose. However, you can spot them sometimes by a telltale absence of loose dirt beneath the hose. The escaping abrasive stream has swept the spot bare.

■ NOZZLES

19. ***Handle with care —they're surprisingly fragile.*** Blast nozzles, especially the traditional ones made of steel, look rugged, but their carbide inner linings are brittle. You can shatter this lining by using the nozzle like a hammer or rapping it against the inside of a water tank to send a signal to your pot tender. Even the tiniest crack gets reamed out by abrasive, and there goes a piece of equipment that costs as much as $400.

"They should be handled like a watch," said Willy Williams. "You don't take a good watch and throw it on the dresser. You place it on the dresser."

Here's another no-no: dropping a blast hose with the nozzle attached from a water tower or bridge at the end of the day. "The hose doesn't get hurt," said Bill Howard, director of engineering for Schmidt Mfg., "but you can ruin the nozzle that way."

20. ***Inspect nozzle washers and replace when necessary.*** This washer protects the rear of the nozzle and its jacket from the destructive abrasive stream. Empire's Craig Fring advises operators to unscrew the nozzle and check the washer for enlargement of its inside diameter. Check the nozzle and the jacket for signs of premature wear, too. The washer costs around $1. "Replacing a worn one is well worth the expense," said Fring.

21. ***Rotate nozzles a fraction of a turn each week to equalize wear and tear on the orifice.*** If the nozzle stays in the same position all the time, said Willy Williams, the blast stream can erode one particular portion of the orifice, creating a lopsided opening. "It doesn't produce a good round blast pattern," he said. "The abrasive would have a tendency to overaccumulate on one side, and the other side wouldn't get enough." Williams advises operators to turn the nozzle about one-fourth or one-eighth of a turn each week to avoid these poor blast patterns.

■ PARTICLE SEPARATORS

22. ***Don't let 'em sit around full of steel grit.*** Clean this piece of equipment out after a job. Otherwise, condensation will turn the grit into a rusty steel lump. When you turn on the machine for the next job, "you'll start blowing gear boxes and motor starters," said Gary Wildgoose, quality assurance manager for IPEC Advanced Systems.

■ DUST COLLECTORS

23. ***Check the filter on the dust collector that "air-washes" your recyclable steel grit.*** You can't separate recyclable steel grit from lead dust when the filter on an air-wash dust collector is clogged up, said Wildgoose. The result? You'll blast paint with a combination of grit and lead dust, reducing your productivity.

24. ***Keep unsealed bearings greased.*** Ungreased bearings will heat up and "seize," shutting down the dust collector and possibly the job. Check them every three or four days, said Wildgoose. "Too much grease is never a problem." ■