

Tips for Solving Maintenance Problems

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These winning suggestions from readers participating in Plant Engineering's "Fifth Annual Tips & Tricks Contest" will save you time, money, aggravation, and effort

RON HOLZHAUER, Managing Editor

Time-conserving, money-saving, aggravation-avoiding ideas for solving typical plant engineering maintenance problems deserve to be shared with others in the profession. This idea-exchange philosophy serves as the basic tenet for PLANT ENGI-

NEERING magazine's "Fifth Annual Tips & Tricks Contest," which was announced in the April 8 issue. Readers submitted over 70 maintenance tips for consideration by the contest review committee

Contributors of the 14 maintenance tips selected for publication in this article receive a \$100 honorarium and a stainless steel wall plaque in recognition of their efforts.

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Playing Catch

Problem: Maintenance personnel working on ladders or roofs, in holes, or at other hard-to-reach areas usually have a ground assistant for safety reasons and to pass parts or material. Transferring small parts in these situations is usually difficult, and success often depends on the dexterity of both parties.

Solution: Cut a 2-in. slot in a tennis ball. Squeeze the ball and insert the small parts. The assistant gently tosses the ball easily and safely to his coworker.

Contributor: Frank Cortez, Electrical and Instrumentation Technician, Big Three Industries, Sulphur, LA

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Tuning in for Electrical Noise

Problem: Identifying electrical line noise sources and finding circuits in older, often remodeled, facilities is often difficult without expensive testing equipment. Is there an easier way?

Solution: Take a plug-in radio, set to the AM band, and tune off channel. Sources of electrical noise on the same circuit are heard when they are on. Each noise-inducing load has its own distinctive sound.

The "radio meter" determined that the



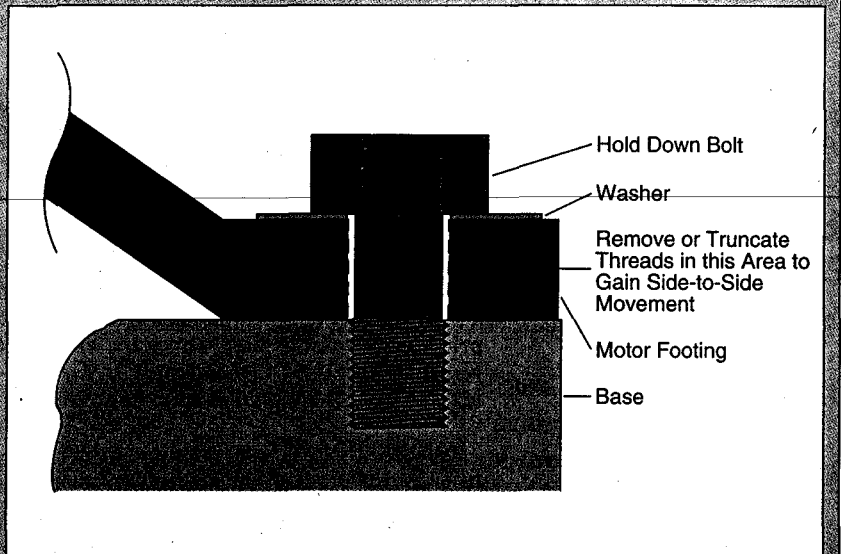
Grinding Gains Clearance

Problem: Smaller motors are frequently mounted to their bases using bolts with little or no shoulder. Frequently, alignment problems occur.

Solution: Motor footings are not tapped for these hold-down bolts, making the threads in this portion of the bolt unnecessary. Partially or entirely removing threads in this section of the bolt gains side-to-side clearance to facilitate coupling alignment.

Cutting or grinding the thread in the footing area is essentially the same as using a reduced-shoulder bolt.

Contributor: George W. Brown, Maintenance Crew Leader, Power and Utilities Dept., Dow Corning Corp., Midland, MI



cause of a computer screen flicker was an electric heater on a shared circuit in a different room by moving to different outlets. The radio also traced the problem circuit's routing and identified loads on that circuit.

Contributor: Gregory Brodrick, CPE, Director of Engineering, TEXO Corp., Cincinnati, OH

Making Mess, Cleaning Same

Problem: Over time, lift trucks produce a sticky residue on the floor. Is there an alternative to using chemicals and scrubbing?

Solution: Spread a small amount of oil-base floor sweeping compound in the worse areas. Normal lift truck traffic cleans the sticky residue off the floor. At the end of the day, simply sweep the compound and the floor looks like new. Repeat as required.

Contributor: Jeff DeFoor, Maintenance Supervisor, Carriage Industries Dye Div., Calhoun, GA

Getting a Look-See

Problem: It is imperative to know that an adequate amount of oil is delivered in a splash-type lubricated gear reducer. Instrumentation is available, but how can lubrication performance be verified?

Solution: Most steel-housed reducers have inspection ports at strategic locations. The

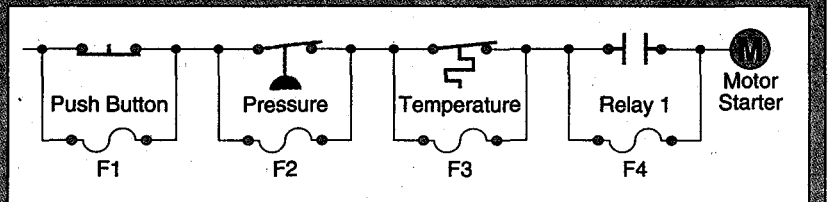
Searching for the Guilty One

Problem: A control circuit contains multiple pilot devices, such as stop buttons, pressure switches, and thermostats, or control relay contacts. Each, if opened, causes the power output relay or motor starter to drop out. Unexplained sporadic dropouts are occurring. How do you know which device is responsible?

Solution: Temporarily install a fuseholder for small glass fuses (assuming a 110v control circuit) across each pilot device contact.

while all contacts are closed. (Because the circuit is energized, appropriate safety cautions should be practiced.) Install a low-ampere fuse (significantly lower than the control circuit fuse) in each fuseholder. The next time an unexplained dropout occurs, check the fuses. A blown fuse tells you which pilot device contact opened.

Contributor: Mark Reser, Maintenance Supervisor, Bockert Air, Inc., N. Ridge Hill, OH



ports are normally closed and sealed by bolted and gasketed metal plate covers and must be removed for inspection of the internal workings.

Replace the metal plates with transparent and gasketed inspection port covers made of 1/2-in. Plexiglas or crown/tempered glass to facilitate checking for adequate lubrication and gearing operation. Even if specific internal components are not visible, a technician quickly develops a sense of normal operating conditions.

Vacuum devices help repair leaking hydraulic storage tanks and unplug clogged drains

The solution also provides a cross-check on lubrication sight glass and oil level indicators, which give false readings when clogged with dirt or wear particles.

Contributor: Jeffrey A. Lazar, CPE, Senior Maintenance Engineer, Bethlehem Steel, Bethlehem, PA

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Welding without Draining

Problem: A leak develops near the base of a hydraulic oil tank. If the tank is not drained prior to repair, the fluid normally forces its way into the weld causing failure. Can the leak be welded without draining the tank?

Solution: Attach a vacuum hose to the filler and plug all other openings. The vacuum action pulls the weld into the crack. The procedure is applicable to hydraulic oil tanks only.

Contributor: James Richard, President, Richard Septic Systems, Inc., Torrington, CT

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Refilling Batteries

Problem: Is there a clean and safe way to efficiently refill batteries?

Solution: Purchase a 1-gal. plastic garden/tree sprayer. Shorten the sprayer wand by angle cutting the tube to the desired length. The hand valve produces a smooth steady flow into the batteries. The sprayer is safe, inexpensive, flexible, noncorrosive, and cannot short the batteries. (Pressurize the sprayer

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Finding Faults

Problem: Commercially-available ground-fault detector relays do an excellent job of protecting power systems against high-level faults. However, they must be set at a relatively high level to prevent nuisance trips. Therefore, the devices do not detect low-level faults, which can flow undetected for months and cause considerable damage.

Solution: Build your own ground-fault indicator. The simple and inexpensive device shown in the drawing indicates a ground fault any time the three lamps are not burning with equal intensity.

Contributor: William C. Tope, Plant Electrical Engineer, The Gerstenslager Co., Wooster, OH

only enough to create water flow.)

Contributor: R. Scott Green, Electronic Electrician, OSRAM Sylvania, Warren, PA

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Unplugging Drains

Problem: A sink, floor, or plumbing drain is plugged. Is there an alternative to plungers, chemicals, or trap removal?

Solution: Use a wet-dry shop vacuum. Put the vacuum line over the drain, cover the overflow, and turn on the machine. Up comes the blockage. Keep air freshener handy, since the problem is often a stinky mess.

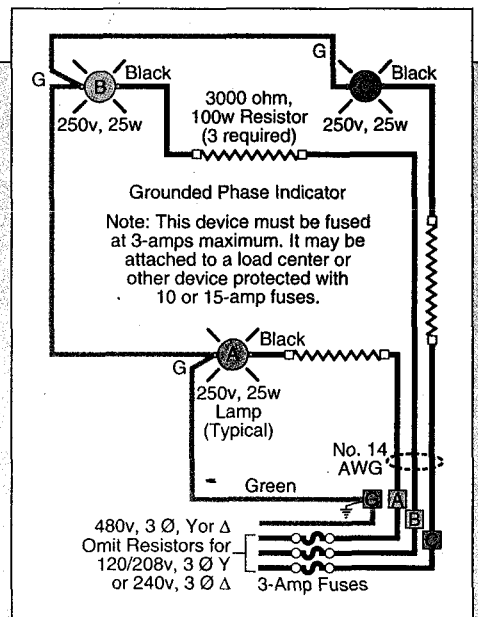
Contributor: Len Woleslagle, Small Tube Products, Inc., Altoona, PA

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Greasing the Zerks

Problem: Greasing zerks is often a difficult and hazardous task because they are all-to-often located in limited access areas. Positioning also leads to neglect in some cases. How can you minimize the time and risk while ensuring that all zerks are greased?

Solution: Replace the zerks with a copper or steel tube fitting. Add a length of tubing sufficiently long to exit the confined space. Put another fitting and a zerk at the exit end and attach to a solid surface. Purge air from the line with grease before attaching tube fittings at the bearing end. Greasing becomes a



Applying heat to a small sample of hydraulic fluid determines whether it is contaminated with water

Removing Broken Bolts

Problem: Broken bolts, studs, and screws are one of the most common maintenance problems encountered and generate a number of tips each year. Here are two approaches for removing the broken pieces.

Solution 1: Make a crosscut as deep as practical on the face of the broken fastener with a hacksaw blade or thin metal cutting wheel. Use a screwdriver with a blade no wider than the diameter of the fastener to unscrew the piece. For rusted or stubborn cases, heat may be applied with a small torch tip to the screw, base metal, or both.

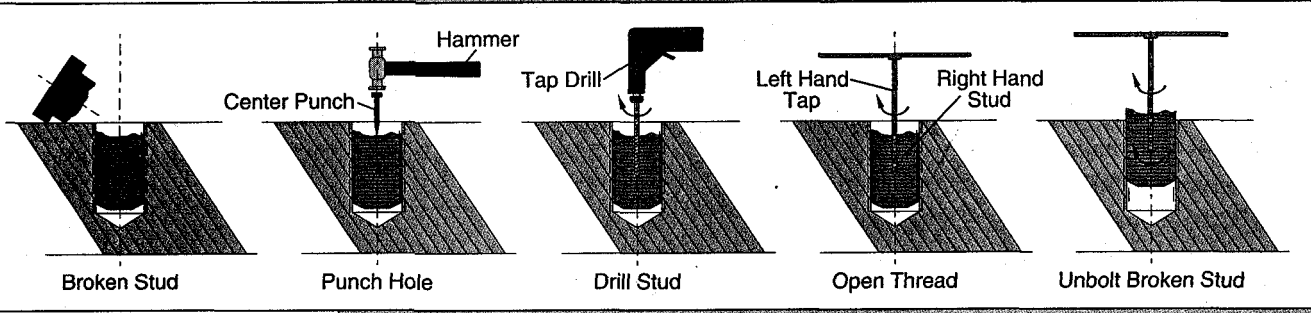
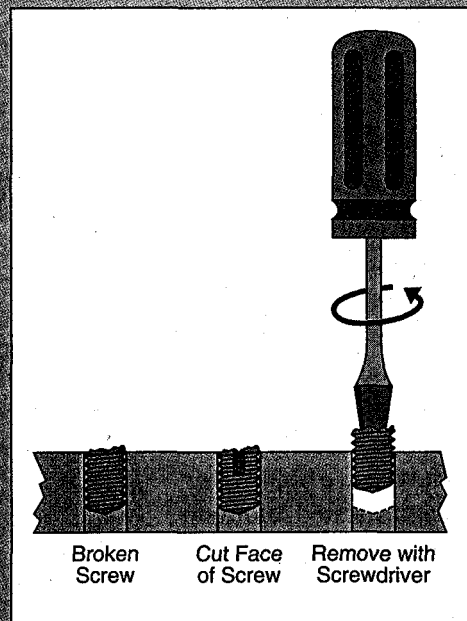
The method usually leaves a score in the piece that the fastener was removed from, but the mark is well worth the time saved or cost of replacement.

Contributor: Robert A. Stanley, Plant Engineer, Jasper Wyman & Son, Millbridge, ME

Solution 2: Tap a little dent at the center of the broken surface with a center punch and light hammer. Place a bit in the dent and drill a hole. If the bolt or stud is a right hand thread, use a left hand tap. Carefully tap the drilled hole. As torque on the tap increases,

the stud unbolts driven by the handle of the tap.

Contributor: Abdallah Abou-Haidar, Du Pont Chemicals, Orange, TX



matter of simply walking down the line.

Contributor: Ron Powell, Demco Inc., Cooper Industries, Oklahoma City, OK

Burning Finds Water

Problem: Is there a simple procedure for discovering if your hydraulic fluid is contaminated with water?

Solution: Take a half teaspoon of hydraulic fluid and heat with a cigarette lighter. Within 30 sec, if water is present, the fluid boils and air bubbles rise to the top. No bubbles, no problem.

A hotplate is another testing choice. Put a few drops on the heated surface. If water is present, the fluid sizzles and dances around.

Contributor: Ronald Gould, Advance Lifts, Inc., St. Charles, IL

For more information . . .

A 12-p reprint booklet, "A Better Way: Some Tips and Tricks of the Trade," includes all the winning maintenance suggestions from the first four contests. Price is \$4. To order call 1-800-523-9654. . . Ron Holzhauser, Managing Editor, 708-390-2668

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