JAKE BRAKE®
Jacobs Vehicle Equipment Company

Service Letter

Service Letter No. 414
October, 1994

SUBJECT: Field Cleaning Procedure

MODELS AFFECTED: 349A

Jacobs has determined that many of the performance difficulties encountered on the Model 349A engine brake can be attributed to debris remaining inside the housing after initial assembly. In many cases, proper performance can be restored by thoroughly cleaning the inside cavities of the housing.

The procedure below should be followed. Be sure to have the Model 349A Installation Manual (P/N 018312) and Maintenance Manual (P/N 018151) on hand when following this procedure.

1. Verify that the customer is experiencing an actual performance problem (connect an accurate manifold pressure gage, which can be read in 1 psi or smaller increments, to the intake manifold). An average Model 349A should develop about 17 PSI boost during braking under load at a steady 2100 RPM. If the boost reading is less than 15 PSI (12 PSI on a 460-horsepower engine), proceed to step 2. If the boost is greater than 15 (or 12) PSI, the engine brake is functioning properly.
2. Verify that the boost pressure during full load acceleration is up to standard (consult your engine performance specification, or call your Caterpillar dealer). Review the fuel mileage history with the operator. If either of these items is suspect, look for engine problems as outlined in the engine service manual. If the engine is running as expected, continue to step 3.
3. Remove the valve covers and measure and record the slave piston lash and trigger settings on each cylinder, making sure that the settings are as specified in the Model 349A Installation Manual. If any setting is out by more than 0.003", set correctly and test for braking performance improvement. If there is no improvement or if all of the settings are correct, proceed to step 4.
4. Remove both housings. Disassemble the following components from the housings per the Model 349A Maintenance Manual: control valves, check valves, master pistons, delay pistons and slave pistons. **Only** after removing the check valves, remove the plenum end caps and 3/8" pipe plugs located at the sides and rear of the housings. Do not remove any of the smaller 1/16" pipe plugs from the housings.

⚠ WARNING

DO NOT REMOVE THE PLENUM CAP OR THE THREE 3/8" PIPE PLUGS FROM THE HOUSING WITHOUT FIRST REMOVING THE CHECK VALVES. THE PLENUM IS UNDER HIGH PRESSURE AND PERSONAL INJURY MAY RESULT IF THE PROPER PROCEDURES ARE NOT FOLLOWED.

5. Place the housings in a cleaning solvent tank with clean fluid with the bottom side of the housings up. The fluid should flow in through the plenum end cap at one end of the housing and out through the check valve bores on top of the housing. A wire brush may be used inside the plenum to further insure debris removal, but the housings should be thoroughly rinsed after using the brush. Allow the housings to dry thoroughly.

(continued)

6. Using a cleaning nozzle, blow pressurized air through the plenum to ensure that no debris remains stuck to the inside surfaces of the housings.

⚠ WARNING

WEAR PROPER EYE PROTECTION WHEN USING PRESSURIZED AIR. DIRECT THE AIR AWAY FROM YOURSELF AND ANY OTHER PEOPLE.

7. Repeat steps 5 and 6.
8. Inspect all components. Replace any components which are cracked, broken or have scratches which can be detected with a fingernail. Clean the remainder of the components in the solvent tank.
9. Replace the control valves and control valve springs with new parts following the instructions in the maintenance manual.

⚠ CAUTION

BE SURE TO USE A THREADLOCKER WHERE INDICATED IN THE MAINTENANCE AND INSTALLATION MANUALS. BE SURE THAT ALL COMPONENTS ARE TIGHTENED TO THE SPECIFIED TORQUE VALUE.

10. If the check valve seating surfaces have scratches which can be detected with a fingernail, replace them following the procedures in the maintenance manual. Be sure to use the check valve assemblies, P/N 019957, when replacing the check valves.
11. Install the trigger assembliies, using new trigger caps (P/N 016709) per Jacobs Service Letter No. 398.
12. Install the delay piston assembly using a light coating of clean engine oil on the piston. If the delay piston cap has a copper ring, the copper ring must be replaced (P/N 016861). Use Loctite 271 (not 242 as specified in the maintenance manual) and tighten the cap to the specified torque value. Be sure to allow the thread locking compound to cure as specified by the manufacturer.
13. Install the plenum end caps and 3/8" pipe plugs. Be sure to use a thread locking compound on these components (Loctite 271 or equivalent). Tighten the plenum end caps to 65 lbft. (88 N•m) of torque. Tighten the 3/8" pipe plugs to 35 lbft. (47 N•m) of torque.
14. Install the solenoid, control valve, master piston and slave piston assemblies per the maintenance manual. Use a light coating of clean engine oil before installing these components in the bore.
15. Install the housing assemblies on the engine per the installation manual. Use extra care in setting the slave piston lash and trigger travel. Be sure that the trigger setting gage is calibrated before using.
16. Retest the retarding performance and check boost pressure. If there is still no improvement in performance, consult your Jacobs Warehouse Distributor for additional technical support.