

Double Trouble: Hydraulic Lubrication Woes

Air and bubbles, or fluid aeration and cavitation, can cause numerous problems in a hydraulic and lubrication oil system. You should be attentive to abnormal noise, poor component response due to spongy behavior of aerated fluids, and high fluid temperature as signs of poor lubricant health. So says Dave Garner, the strategic marketing manager for lubricants for Dow Corning Molykote. "By carefully monitoring lubricant health and safeguarding against the possible causes of aeration and cavitation, costly repairs can be avoided and lubricant life significantly extended." Following is advice on avoiding this troublesome pair.

Aeration

"Aeration occurs when air contaminates the hydraulic fluid," explains Garner. "Symptoms include foaming of the fluid, erratic actuator movements, and a banging or knocking noise when it compresses and decompresses as it circulates through the system." To prevent problems from aeration, consider these three steps.

• Because air usually enters the hydraulic system through the pump's inlet, ensure that the pump inlet lines are in good conditions and all the clamps and fittings are tight.

• Because flexible intake hoses can age and become porous, it is essential to replace them regularly.

• Aeration accelerates degradation of the hydraulic fluid, which in turn can cause overheating and burning of the seals. Regularly check the condition of the pump shaft seal and, when leaking, replace it.

Cavitation

"Cavitation occurs when the pressure acting in a fluid is below the saturation pressure of a dissolved gas in the fluid," says Garner. "This causes the absolute pressure in that part of the circuit to fall below the vapor pressure of the hydraulic fluid, which results in the formation of vapor cavities within the fluid. When these cavities encounter a region of higher pressure, they will collapse. Depending on the load pressure of the hydraulic pump, this can cause broad, high-frequency vibrations, noise, material damage, and degradation of the oil leading to mechanical failure of the system components."

He offers the following advice to prevent problems from cavitation.

• Cavitation commonly occurs at the hydraulic pump, where a clogged inlet strainer or restricted intake line can cause the fluid to vaporize. Check the inlet strainer filter on a regular basis to make sure it's not clogged.

• Operating a hydraulic system above 180°F (82°C) should be avoided because it can damage seals and accelerate degradation of the hydraulic fluid.

• Hydraulic systems dissipate heat through the fluid reservoir; therefore, the reservoir fluid level should be monitored and maintained at the correct level.

• To prevent damage caused by high temperatures, a fluid temperature alarm should be installed and all high-temperature indications investigated and rectified immediately.

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