Understanding \nLubrication Failures

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A severe consultant in the field of lubrication, I’ve had discussions with hundreds if not thousands of maintenance professionals about the type and frequencies of the lubrication-related failures they experience. A disturbingly large percentage of the time I am told that they don’t really experience many lubrication-related failures. This response always prompts another question: What is a lubrication-related failure? To those who think they have none or few, a lubrication-related failure is usually defined as one that occurs when a machine has no oil in it or someone puts the wrong oil in it. I would suggest that most manufacturers experience many lubrication-related failures and merely misclassify them. In fact, many failures are not even recorded as such because the problems were diagnosed and repaired before the machine ceased to function. In my opinion, any time a machine or component does not achieve maximum service life, a failure has occurred.

Consider the following example: A man buys a new car and drives it for a year without any problems. Then, after only 10,000 miles, the engine begins making an unusual sound. The man drives the car to the dealer for an inspection, and the mechanic informs him that the engine is irreparably damaged and he must replace the engine or buy a new car. Did the car fail? It could be argued that because the car was still functioning that it didn’t fail. On the other hand, the engine is being replaced after only 5 to 10% of its expected service life. According to an industry expert, as few as 10% of bearings ever reach their life before failing or being replaced. By definition, 90% of all lubricated components and determine if you are truly getting the maximum life from these assets. A more narrowly focused study was performed at the National Research Council of Canada in conjunction with the Society of Tribologists and Lubrication Engineers to determine the predominant wear mechanisms in wear-related failures of lubricated machinery. The study examined 3,722 failures across several industries, including pulp and paper, mining, forestry, transportation, and power generation. The results of this study indicate that the number-one cause of machine wear is lubricant contamination. (Figure 3)

Figure 1

Figure 2

Slightly used workhorse

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To understand why so many failures are in fact related to lubrication, or more accurately, poor lubrication, one must look at typical root causes of failure. In an MIT study on “loss of usefulness” in machinery, it was determined that 50% of lost machine life was caused by mechanical wear, and an additional 20% was lost due to corrosion of machine surfaces. The mitigation of mechanical wear and corrosion are two of the primary functions of a lubricant. (Figures 1 and 2)

For those readers that still don’t believe they experience lubrication-related failures, I would recommend that you take a critical look at the mean time between failures (or replacements) for common lubricated components and determine if you are truly getting the maximum life from these assets.