OIL MIST MAKES OIL ANALYSIS UNNECESSARY

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Good news! America has the most productive workforce in the world, which was announced on Labor Day, 2003. This isn't by accident. It is because of the continued development and deployment of innovation and automation. There are several factors which have driven this, the least of which is the desire to not only survive but to excel in private enterprise. In addition there is national pride, desire to be the best, rising energy costs, increasing dependence on foreign oil, international terrorism (9-11), GATT, NAFTA, international economic downturn, etc.

All of these pressures have driven industry to do more with less. Let's focus on our process industries, for example. The shrinking of profit margins and the demand by investors for a good returns on their investments have driven plants to reduce manpower, employ the latest proven technologies (automation), reduce maintenance and operating costs, improve asset availability (increase machinery reliability), reduce inventories, etc.

The use of computer power has forever changed the way we do our work. Tons of data are almost instantly converted to information and that information is distributed around the world at virtually the speed of light. Our process controls have gone from hands on, to three mode controls, to cascaded controls, to feed forward controls, to modular systems with function block controls, and to auto-tune controls. The human interface with controls is minimal and is virtually reduced to responding to error messages and alarms.

The process industry has implemented CMMS and similar systems throughout their plants. They have gone from voice generated work requests to fully integrated, online, real time, computerized work control systems that have the ability to analyze data, handle planning, scheduling, requisitioning, purchasing, wage time keeping for employees and contractors, invoicing, stores management, and much more.

Plant Engineering and maintenance have changed drastically as well. We have seen the organizations go through centralization to decentralization and back again on numerous occasions. We have seen innovations like breakdown maintenance (fire fighting), preventive maintenance (time based), predictive maintenance (condition based, and proactive maintenance (reliability centered). We have seen a number of maintenance approaches, the latest of which is Lean Manufacturing.

With Lean Manufacturing, there are no “safety stocks”. This makes manufacturing operations vulnerable. Therefore, equipment malfunctions are intolerable. The vulnerability is offset by considerations such as maintainability, reliability, affordability, supportability, testability, availability, and producibility. In short, machinery must be available when needed and it must be capable of operating to its design on a consistent basis.

One of the largest noticeable changes in process plants is the reduced numbers of personnel. There were once large staffs of operators, large maintenance forces of specialized technicians, and a very large specialized support staff that included reliability engineers and lubricators. All of the large staffs have been dramatically reduced and the specialty support staffs have all but disappeared.

To capsulate, American industry has undergone some profound changes over the last century. We are still undergoing changes and will continue to do so. The demands for improved performance increase which results in the necessity to reduce operating costs. The fastest and easiest way to do that is to reduce manpower. Notice that I didn’t say manpower requirements because they remain long after the staff reduction. Productivity is up and that is because of extensive use of automation.

In any case, we, as a country, have not fully taken advantage of automation to the extent that we can. The whole area of lubrication remains an unchartered frontier for many industries and plants. Some are still performing the lubrication function pretty much as it was done at the beginning of the industrial revolution. Once, it was a dedicated lubricator who performed did this work and served no other function. For many plants, it is now the maintenance technician or the operator. Neither has the inclination to pull away from their high priority jobs to do the lowly job of lubrication, in spite of the myriad of machinery failures due to improper, over, or under lubrication.

Oil mist lubrication technology was developed in Europe in 1938 for high speed spindles for the machining industry. Grease would not work and oil would cause the bearing to run too hot. Since that time, oil mist has been perfected and employed in large console systems that can service up to 80 pumps with rolling element bearings, as far as 180 meters radially from the console. The operator need only to check for any possible alarms, full the oil reservoir on a infrequent basis, and routinely survey his machinery for abnormalities. A full 47% of his previously lubrication duties are relieved as observed by one international refinery.

Oil mist generators have no moving parts and are therefore inherently reliable. The mist is generated by instrument air in a vortex generator. The consoles require only to be serviced on a 4-6 month basis. The oil mist itself is one part oil and 200,000 parts air. The droplets are 1-3 microns in size which are suspende in air. Oil mist is far below the lean limits of flammability, is not a VOC, and is

below the TLV for oil. The oil mist operates at 20" water column pressure which excludes inhalation of contaminants.

Closed loop technology is now available that captures virtually all of the oil mist. Hermetic, magnetic seals are now available that contain oil mist very effectively .

When used as a pure mist, no liquid oil level is required in the bearing chamber. The oil mist which resembles a thin wisp of smoke is all that is required. There over 20,000 pumps in American refineries on pure oil mist lubrication. There are probably that many more in foreign refineries. Therefore, the empirical evidence of oil mist's superior performance is well documented.

The benefits of oil mist are as follows:

1. 90% reduction in bearing failures when used in its pure form
2. 75% reduction of gear box failures that are in contaminated service, such as cooling tower or dusty service
3. 35% reduction in seal failures
4. 15º C reduction in bearing temperatures
5. 47% reduction in manpower requirements to lubricate
    a. No sump to watch
    b. Levels don't need to be maintained
    c. No oil to analyze
    d. No oil to change
    e. Oil cans not needed
6. The right amount of fresh, clean oil is fed to the bearing at the right time
7. Contaminants are not recycled through the bearing as in splash lubrication
8. Closed loop systems have virtually no emissions
9. Pressure prevents the introduction of airborne contaminants
10. Contaminant particles normally found in new oil do not go to the bearings.

Oil analysis is a very effective tool for predictive/proactive maintenance when splash lubrication is used. However, oil mist is significantly superior to splash lubrication and has no oil to analyze. The elimination of the total cost to operate an oil analysis program is just another economic justification for oil mist lubrication.