Oil Removal Helps Steel Mills Improve the Bottom Line

OILSKIMMERS, INC.
OSI ENVIRONMENTAL

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WHITE PAPER

Remove Oil, Reduce Costs

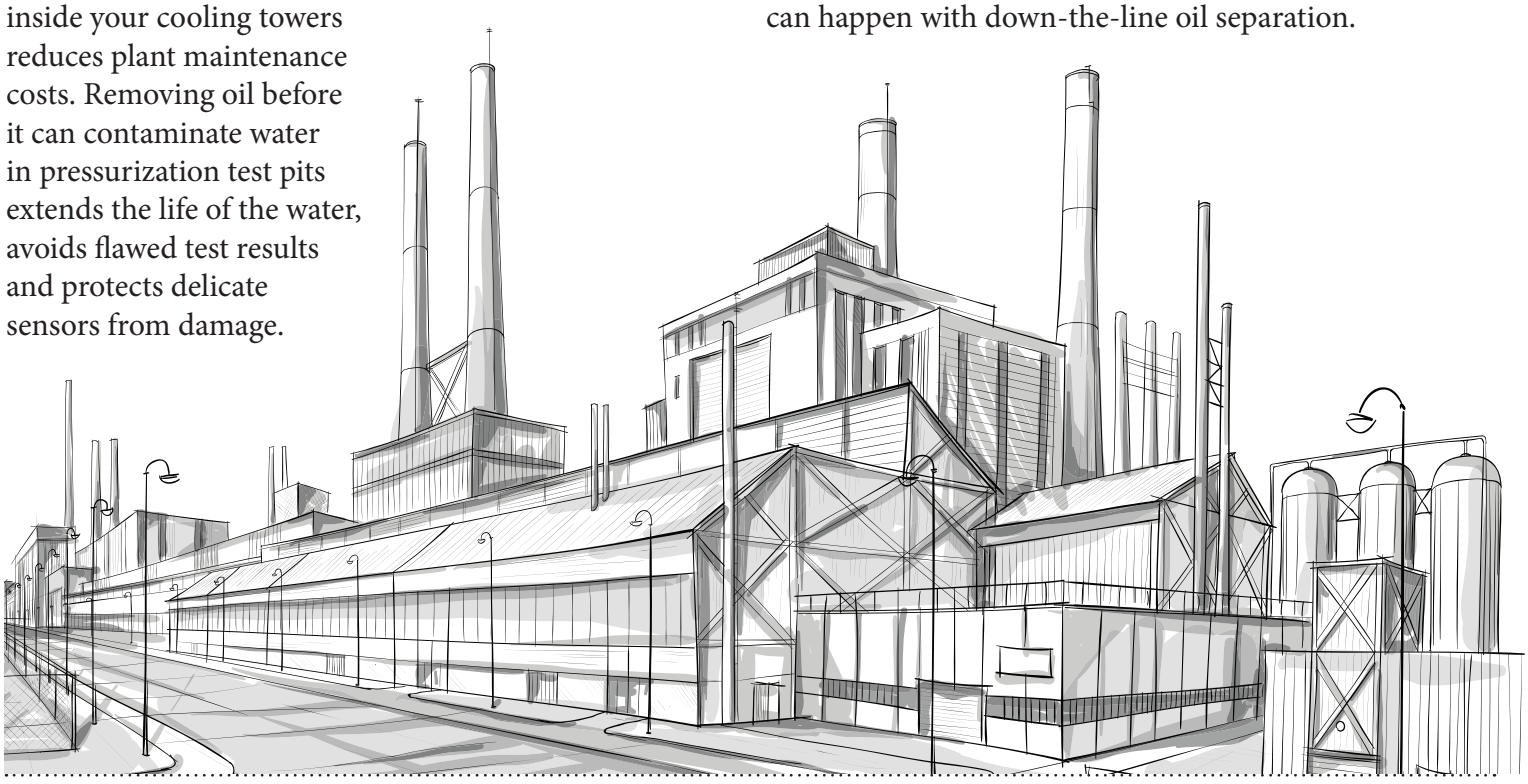
Whether you're a mill manager, a maintenance manager, a process engineer or a supervisor involved with making sure things run smoothly, waterborne oil is an ongoing consideration. Effectively removing oil from water not only helps your plant run better overall – it makes good business sense. And, it can pay off in many ways.

Remove the oil before it causes trouble

Preventing oil from deteriorating your coolant fluid reduces your water consumption and also trims waste-water treatment fees. Keeping lubricant and hydraulic fluid residues from collecting on production machinery and filtration systems – and even the product itself – avoids expensive repairs, costly production delays and rework. Capturing tramp oil before it takes up residence inside your cooling towers reduces plant maintenance costs. Removing oil before it can contaminate water in pressurization test pits extends the life of the water, avoids flawed test results and protects delicate sensors from damage.

The right oil removal equipment gets results

The steel manufacturing environment poses its own unique set of challenges to oil removal. It's a high capital, continuous process that's tough on equipment and uses large amounts of water. Oil collection tanks and pumps that are integrated with typical industrial wastewater systems make sense in certain applications, but they have notable drawbacks in steel mills. Complications can happen with down-the-line oil separation.



Also, having to make mechanical repairs to pumping systems can lead to production delays and ratchet up costs. At the cooling stage of steel production alone, if oil is not removed continuously, a thick layer of oily foam can form. It doesn't take long for chips and grit to add to that suspension, wreaking havoc on filters.

Throw in regulatory compliance along with these wastewater treatment issues, and the importance of carefully comparing oil removal methods becomes obvious. The investment you make in the equipment can affect many outcomes and costs.

Not all methods of waste oil removal achieve positive results equally, though. And not all methods save you from headaches caused by mechanical breakdowns, product quality trouble, and even environmental and workplace safety concerns.

Every time you pump it, plunge it or move it, oil is being converted from large oil droplets to smaller oil droplets, and that makes separating the waste oil from water a more difficult process. But if you remove waste oil closest to the source, you get oil in larger droplets – before it can be pumped, dropped into a pond or in some other way "emulsified." Emulsified oil is inherently more difficult and costly to remove.

It's easier and more efficient to skim oil than to pump oily water from tank to tank.

As a first step, whether it's steel making or any other industry, removing waste oil as close to the point of contamination can prevent more costly problems down the road.

Oil Skimmer Basics

The best way to remove oil in industrial situations continues to be a challenge to many companies because there are many different types of oil removal methods to consider. Drum and disc skimmers, vacuum trucks and belt skimmers all have their place. Let's examine the differences in the way oil skimmers work, and in particular, compare how they work in steel mills.

"Fixed skimmers," used commonly in cooling and cleaning processes, include disk and drum oil skimmers. These types work by submerging the lower edge of a revolving drum or disc that collects oil on the water surface. The oil is then carried to a scraper that dispenses the waste into a trough or tank. These fixed skimmers are effective – to a point. One drawback is that they don't collect all the oil; they tend to deposit a certain amount of oil and other contaminants back into the water. Another drawback is that fluctuations in the water level increase inefficiencies relative to the fixed position of the disk or drum; the water level must be monitored closely to ensure contact with the skimmer. Another disadvantage is that their submerged parts are prone to needing upkeep and repair. Finally, they have inflexible mounting designs that limit placement, as well as access.

Belt skimmers are another fixed position oil removal method. They have a revolving strip, or belt, that picks up oil as it contacts the water surface. Because the narrow belt width limits the amount of oil that can be removed efficiently, belt skimmers are not appropriate for many steel mill skimming applications.

"Fuzzy" rope skimmers, used in some applications, are not fixed and they work continuously, but the fuzzy rope fiber is a magnet for steel scale, chips and other debris in the water, which limits their efficiency and useful life. Rope skimmers require frequent monitoring for rope fiber deterioration, knots and oversaturation, and the water level must be checked regularly. If the water level is too low, the skimmer cannot do its job. Also, the submerged pulleys have to be removed for maintenance and repair, which can mean taking plant personnel off other assignments to attend to them.

Oil Skimmer Basics - Continued

In general, fixed oil skimmers do not deal well with debris. Outdoors, leaves, sticks and plastic cups blown into mill scale pits and ponds become lodged against the skimmer like a dam, interrupting the oil removal process. Clearing an oily mass of debris is cumbersome and time consuming than planned.

This particular problem is avoided entirely by using a floating tube type skimmer, which employs a smooth, custom-engineered tube that is sized to properly fit the tank. The tube snakes around the water, collecting oil while moving the debris aside. The oil is scraped off the tube and collected, and the clean tube returns to the water surface to continuously remove more oil.

If need be, a tube skimmer can be placed high above the pit, and it will be able to skim effectively and carry the oil up, whatever vertical distance is required – 20 feet, 40 feet – even as high as 60 feet above the water surface. The tube skimmer can operate just as effectively if it is mounted near the surface of the water.

Tube skimmers work automatically with little or no supervision, indoors and out, picking up oil and fine particles and extending coolant and filter life cost effectively.

Designed to be extremely rugged machines, tube skimmers have no submerged mechanical parts. Not only do they function continuously unattended, but they do so even in the harshest environments. And since they are fairly easily retrofitted to suit a particular application, tube skimmers stand out as an especially versatile solution for waste oil removal in steel mills.

Another common oil removal solution for lagoons and pits is vacuum truck service. By its nature, a vacuum truck provides periodic oil removal. The oil builds up constantly in between visits. You have to schedule the vacuum truck service and, over time, the rate can vary and the costs mount up. In addition, a fair amount of water is picked up by the vacuum along with the oil. In essence, you are paying a lot to remove water, not just oil. So, if you have been considering oil reclamation, this may not be the best method of removal.

Even the most conscientious vacuum truck operators may pick up a lot of water, and even if they collect mostly oil, you'll have oil on the water again right after the truck leaves. For ongoing oil level removal, tube skimmers are an ideal solution as there is no continuous oil build up.

Conserve Water, Save Money

Across all manufacturing industries, the push for water conservation and recycling initiatives is escalating. Fees for inadequately treated water are increasing, too, as aging municipal sewage treatment plants struggle to process industrial effluent. Water consumption and water treatment issues are two big reasons for choosing the right oil removal method.

Producing one ton of steel, which is what the average automobile requires, can consume more than 75,000 gallons of water, according to the U.S. Environmental Protection Agency's 2008 Sector Performance Report.1 To put that in perspective, an Olympic swimming pool holds 660,000 gallons of water, so every 8.8 cars on the road requires the equivalent of an Olympic size pool of water to produce the steel alone. As big water consumers, steel mills are expected to recycle and reduce more than ever before, and they're making great strides.

NLMK Indiana, a mini-mill that is part of the NLMK Group, was using a vacuum truck service to remove oil from basins and a scale pit. This method, however, collected a lot of water along with the oil. The plant's water recycling rate needed improvement, as well. After the plant installed six Oil Skimmers, Inc. tube skimmers to remove oil, its water consumption decreased significantly. The Oil Skimmers, Inc. tube skimmers proved their value to the mill immediately.

Besides saving water, the tube skimmers cut NLMK's maintenance costs. "The tube skimmers can run continuously and with little attention. They are relatively maintenance-free, and they are certainly trouble free," Ehren Plew, NLMK's plant mechanical engineer says.

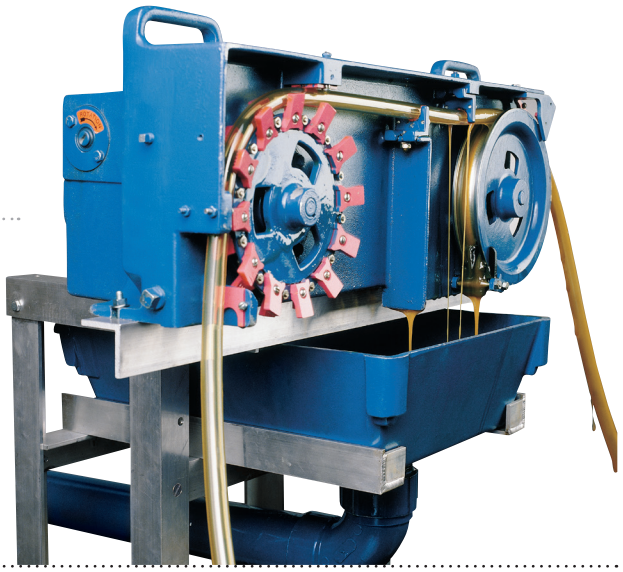
Selecting the right skimmer method and model for the application is critical when trying to lower water consumption. Tube skimmers have proven to be a cost effective solution for steel mills.

Reclaim Oil, Generate Revenue with Tube Skimmers

Mittal Steel Corporation's Lebanon, PA and Chicago plants have used Oil Skimmer, Inc.'s Model 6V to help meet wastewater disposal requirements. Both plants doubled the amount of oil they were removing and were able to create a new revenue stream by re-selling the oil to an oil recycling company.

A steel tube manufacturing company in Warren, Ohio, achieved similar results after it installed an automated Oil Skimmers, Inc. tube skimmer to lift tramp lubricating oil from a soluble-oil coolant tank. Before installing the tube skimmer, the 1,000-gallon tank had to be recharged once a month with a ratio of 100 gallons of soluble oil to 900 gallons of water.

Oil Skimmers, Inc.'s tube skimmer helped to eliminate the tramp oil contamination problem and removed 55 gallons of tramp oil per week, which the company then sold, resulting in thousands of dollars in annual profit. By reclaiming the tramp oil and the soluble oil, the company achieved a return on its oil skimmer investment in a matter of months.



Conclusion

The competitive nature of steel making commands rigorous attention to a wide range of "externals," the variables that range from volatile global market conditions and fluctuating raw material prices to environmental standards and governmental regulations.

Steel plant productivity and profitability also depend on internal operations and capital investments, both of which have to be cost effective and efficient. If your investments lead to additional revenue streams, such as waste oil, so much the better.

Tube skimmers are designed with the unique and demanding needs of the steel industry in mind. They are rugged, durable and dependable machines. They offer the advantages of flexible installation options, unattended operations and low maintenance costs. Add the relatively fast return you can receive through waste oil reclamation sales, and the tube skimmer simply makes good business sense.

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