High-performance additives enhance modern lubricants, boosting their effectiveness by improving base oil properties and extending machinery life.

help in assessing the effectiveness of the lubrication programme and making necessary adjustments to improve performance and reliability.

Together, advanced lubrication technology, a comprehensive lubrication management system, and diligent maintenance practices form the backbone of efficient and reliable operations in the cement industry, leading to enhanced productivity and reduced operational costs.

High performance additives

High-performance additives are essential components in modern lubricants, enhancing their functionality and effectiveness in demanding applications such as those found in the cement industry. These additives are chemical compounds formulated to improve various properties of the base oil, allowing the lubricants to meet specific performance requirements and extend the operational lifespan of machinery.

Lisa Marston, Regional Technical Service Engineer, Cortec Corporation, says, "Cortec has products that serve various needs in lubricating systems. One major category of products is oil additives with contact and vapour phase corrosion inhibitors that are designed to provide enhanced corrosion protection in addition to the lubricating oil itself during long term storage and intermittent operating conditions for gearboxes, steam turbines, pumps, etc. Cortec also offers greases that are formulated with vapour phase corrosion inhibitors, some of which are derived from renewable resources. Additionally, Cortec manufactures general purpose lubricants with corrosion inhibitors that can be used on valve bushings, fasteners, and packing glands, as a few examples. The addition of contact and vapour phase corrosion inhibitors in these products ensures consistent corrosion protection throughout the equipment, even when components may not be in direct contact with the lubricant."

- **Anti-wear additives:** These additives form a protective film on metal surfaces, reducing friction and preventing wear and tear under high-pressure conditions. This is crucial in extending the life of gears and bearings in cement machinery.
- **Extreme pressure (EP) additives:** EP additives are designed to provide additional protection under extreme load conditions. They react with metal surfaces to create a protective layer that prevents welding and scoring of metal parts, ensuring smooth operation in heavy-duty equipment.
- **Anti-oxidants:** These additives prevent the oxidation of the lubricant, which can lead to the

Properly managing used lubricants through stringent disposal and recycling practices minimises pollution, conserves resources and supports sustainability goals.

formation of sludge and varnish. By inhibiting oxidation, antioxidants help maintain the lubricant's viscosity and performance over extended periods, even in high-temperature environments.

- **Corrosion inhibitors:** Corrosion inhibitors protect metal surfaces from rust and corrosion caused by exposure to moisture and other corrosive agents. This is particularly important in the cement industry, where machinery is often exposed to harsh environmental conditions.
- **Detergents and dispersants:** These additives keep engines and machinery clean by preventing the formation of deposits and sludge. Detergents neutralise acids formed during the combustion process, while dispersants keep particles suspended in the lubricant, preventing them from clumping together and causing blockages.
- **Viscosity index improvers:** These additives help the lubricant maintain its viscosity across a wide temperature range. This ensures that the lubricant performs effectively in both high and low temperatures, providing consistent protection and performance.

By incorporating these high-performance additives, lubricants can deliver enhanced protection, efficiency and durability. In the cement industry, where equipment operates under extreme conditions, the use of such advanced lubricants is critical for maintaining operational efficiency, reducing downtime and prolonging the lifespan of expensive machinery.

Sustainability and lubrication

Sustainability has become a critical focus in the cement industry, including the realm of lubrication. Sustainable lubrication practices involve using high-performance, environmentally friendly lubricants, optimising lubricant usage, and ensuring proper disposal and recycling of used lubricants. These practices help minimise environmental impact, improve energy efficiency and reduce waste, aligning with global sustainability goals.

Proper disposal and recycling of used lubricants are essential for minimising environmental pollution and conserving resources. The cement industry, with its substantial lubricant usage, must implement robust procedures for handling used lubricants.

Used lubricants can contain harmful contaminants that pose environmental risks if not disposed of correctly. Cement plants should follow stringent regulations and guidelines for the safe disposal of used lubricants. This typically involves collecting the used lubricants in designated containers and ensuring they are handled by licensed waste management companies that specialise in hazardous waste disposal. These companies treat the used lubricants to neutralise harmful substances before safe disposal, preventing soil and water contamination.

> "Recycling used lubricants is an effective way to reduce environmental impact and promote sustainability."

Recycling used lubricants is an effective way to reduce environmental impact and promote sustainability. The recycling process involves collecting used lubricants and subjecting them to re-refining, which removes impurities and restores the lubricants to a usable state. Re-refined lubricants can perform comparably to new lubricants, making them a viable option for reuse in various applications.

The cement industry can contribute to lubricant recycling efforts by partnering with certified recycling facilities. These facilities use advanced technologies to clean and purify used lubricants, converting them into high-quality products that can re-enter the market. This not only reduces the demand for virgin lubricant production but also minimises waste and conserves natural resources.

Incorporating sustainable lubrication practices, including the proper disposal and recycling of used