

Lukas Steiner, Wikov Industry

Field experience with Wikov in Northern Africa

When Al-Takamol Cement required a replacement gearbox for one of its cement ball mills, it approached Wikov. The gearbox manufacturing company implemented a side-drive solution with Separate Lubrication System (SLS).

The Al-Takamol Cement plant produced its first cement in 2010. It has two horizontal ball mills for cement, both driven by a lateral gear drive (LGD), side drives positioned at 40° under the mill. Shortly after commissioning, the plant started to suffer from intermittent high levels of vibrations in cement mill II. While this was clearly problematic, the main concern was oil contamination. This had led to increasingly frequent maintenance and expensive oil changes. The oil volume per lateral gearbox is around 900L, replacement of which costs US\$7000.

A long-term relationship between plant manager Mr Alsayed Sultan and the owner of Elraise, a technology supplier to cement plants in the Middle East and North Africa, gave rise to a recommendation that Wikov's Separate Lubrication System (SLS) for side drive gearboxes could provide a solution to the continued vibration and contamination issues.

"We were a bit reluctant to replace the leading brand gearbox we were using with a unit from Wikov," says Aly Afifi, Senior Preventative Maintenance Manager at Al-Takamol Cement. "However, the technical solution seemed to be sophisticated and we felt guaranteed by support from both Elraise and Wikov. What made us place the order was a visit

to a cement plant in Turkey that had used Wikov gearboxes with an SLS for many years. Its testimonial and seeing the side drives in real life assured us of a right choice." The new lateral gearbox was installed on cement mill II in the summer of 2018.

The essence of the gearbox is the SLS, which divides gearbox internals like gears and bearings from the outlet pinions that are in direct contact with a girth gear. The SLS blocks the transmission of cement dust from the girth gear to the gearbox internals. This is unlike conventional side drive gearboxes that are open in the direction of the rim. These are easily contaminated by cement dust, which leads to rapid wear of the gears and bearings. This is costly and time-consuming to rectify, with associated loss of production. Seals, which have been shown to deteriorate rapidly, do not provide suitable protection.

In contrast, the closed and sealed design of the replacement Wikov gearboxes reduces the risk of contamination. This doubles the lifetime of the gearbox internals. Regular inspection of the gearbox oil gauge shows the great clarity of the oil, unlike with the previous gearbox.

"With the Wikov gearbox we only cleaned filters once at the start," continues Afifi. "Now, having operated the lateral gearbox for over a year, we can

Profile: Al-Takamol Cement plant

Owned by: ASEC Cement (51%), Sudanese National Pension Fund (49%)

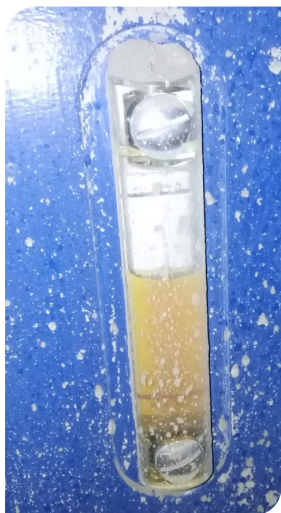
Location: Atbara, River Nile, Sudan - 320km North of Khartoum

Commissioned: 2010

Capacity (Clinker / Cement): 1.45Mt/yr / 1.6Mt/yr

As well as being technologically advanced, the Al-Takamol Cement plant is located in a remote area that was dictated by the location of high-quality limestone reserves. While the reserves give the company an advantage in the local market, the limited infrastructure was a challenge. Al-Takamol had to work with pontoons across the River Nile to construct the plant, before work on a bridge was completed. It also built 15km of roads to connect the plant to the national road network, as well as a 42MW captive power plant.






confirm that we have not had to perform an oil change or service the gearbox internals. This is indeed a maintenance-free solution that very clearly saves us money.” Afifi further notes that the company does not have to pay extreme attention to the sealing of the rim guard either.

How it works

The lubricating system of the lateral gear drive uses two independent lubricating units. The oil from the girth gear space is drained to a tank of the girth gear’s lubricating system and the oil from the separated inner space of the gearbox is drained to the second lubricating unit. Each circuit uses (or can use) a different oil grade. High quality synthetic oil for the gearbox itself makes sense in this case as it does not get degraded by external pollution. By maintaining its original properties, the oil helps to increase gearbox efficiency and reduces energy costs.

Al-Takamol Cement performs regular condition monitoring of the mills, which includes analysis of the drives. The acceleration values of around 0.1G/s and velocity of 1.0-2.5mm/s measured on cement mill II demonstrate smooth running of the new gearbox with vibration values well below limits. It has to be taken into account that the gearbox behaviour in terms of vibrations is still influenced by the original girth gear that has been used since 2010.

The new lateral gear drive at Al-Takamol’s plant has adopted the technical solution of the high speed shaft from the side drive. What the maintenance team likes about the shaft is the possibility to turn it around to double its lifetime before it is completely worn-out. Afifi highlighted the ease of removing the shaft. This makes the service work much more straightforward. This feature was not part of the earlier competitor’s design. Additionally, the total cost of ownership (TCO) is sometimes used to divert the attention of potential buyers from the high purchase price of a piece of equipment. However, in this case of a properly-designed gearbox, this is not the case. Not only the operational expenditure of the gearbox but also the initial investment makes Wikov’s side drive with the SLS highly attractive for end-users and the lifetime cost motivates to select this solution. 

Above left: Oil contamination is no longer an issue with the SLS from Wikov.

Above centre: Newly-installed Wikov side drive gearbox with SLS.

Above right: The original gearbox, installed in 2010.

Below: Schematic of a Wikov side drive with SLS showing key features of the gear unit.

