

Lukas Steiner, Wikov Industry, with interview by Peter Edwards, Global Cement Magazine

Refurbishment pays off: Gear renovation with Wikov

The question of whether to invest in new, used or refurbished equipment accompanies us throughout both our private and professional lives. Everyone knows what 'new' and 'used' mean, but 'refurbished' can be trickier to define. 'Refurbished' can mean different things depending on where you buy and the calibre of the chosen supplier, so it's important to perform appropriate due diligence before shelling out your hard-earned cash. The term 'refurbished' can also be a synonym for 'low-cost' and, to a certain extent, it is. It is a low cost way to achieve equal performance as offered by a brand new installation, including for gears in the cement sector.

The increasingly clear effects of global warming has caused many of us to focus on our individual consumption and protection of the environment. By doing so, many have discovered that it is not always necessary to spend and consume more but rather to seek ways to make use of old things, while also spending less money. The recent situation with Covid-19 only helps to accelerate changes in our way of thinking, towards refurbishment.

However, different suppliers will define 'refurbishment' in different ways. As a well-recognised manufacturer of gearboxes for the cement sector,

Wikov would first of all suggest that clients seek out suppliers that have a detailed understanding of the manufacturing process from A to Z. Designing gearboxes and providing service to the equipment is a good prerequisite for repairing existing equipment.

Indeed, the refurbishment of used and obsolete gearboxes at Wikov has a long tradition and it became one of the key product lines within the company. Its refurbishment centre is within its Pilsen factory in the Czech Republic, close to the German border. Although repairs of gearboxes from various industrial applications are carried out, repairs of large gearboxes from cement applications are more frequent. Wikov performs repairs of any gearbox type, helical, bevel-helical, planetary or side drives. The majority of the gearboxes received for a repair or upgrade from the cement sector are drives for vertical mills or side drives for ball mills and kilns.

Right: Wikov always seeks to reuse parts where possible. The images show a single stage parallel shaft gearbox for a ball mill drive for which Wikov found a solution to reuse a worn-out double gearing wheel. This saved costs for the customer, which would normally have had to invest in a new gear.



Refurbishment in real life

After receipt at the Pilsen workshop, the gearbox to be renovated is stripped and visually inspected for completeness or missing parts by Wikov's eight member team. This typically takes 1-2 weeks. The inspection report defines the parts that will be reused and those that must be replaced or further processed through production.

After accepting the offer by the customer and receipt of their order, Wikov orders materials, bearings and other parts that have long delivery times. Before these are received, it performs reverse engineering for parts that must be replaced. This makes use of the waiting time for reverse-engineering and reduces the delivery time of the refurbished gearbox to the end user.

When the materials arrive, the team starts production, which normally lasts about three months. During this time, all cleaning of the gearbox parts and the necessary repairs will be carried out.

After all manufactured, repaired and purchased parts are reassembled, the equipment is tested and preparation for shipment can begin.

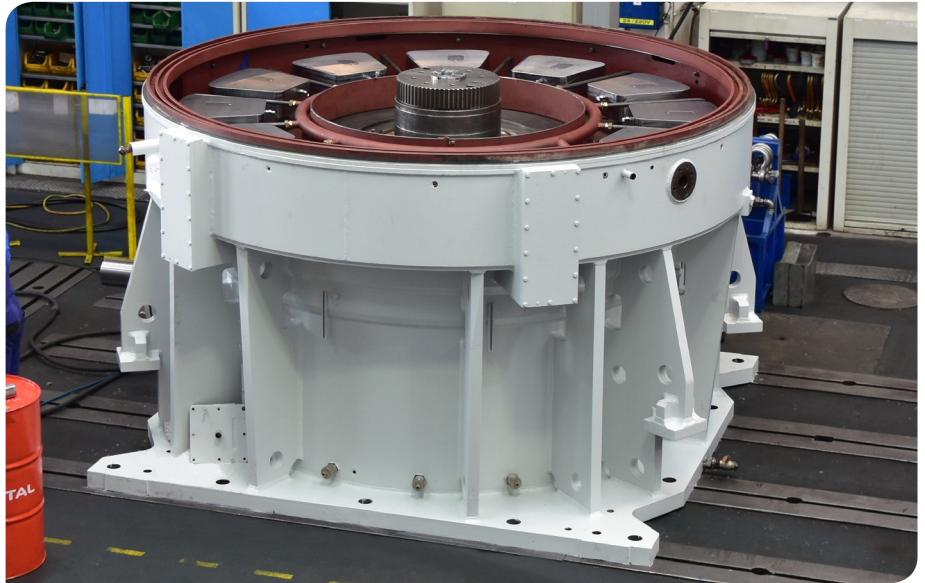
Special attention is paid to the gears, the most important components of a gearbox. Even if a visual check of a gear is satisfactory Wikov will perform non-destructive tests (NDT), mostly by magnetic particle inspections (MPI). If the test confirms that the gear is in acceptable condition, it will be reused. If a repair is required and feasible, Wikov will always repair it to maintain cost effectiveness. Cleaning is an integrated part of the process for every gearbox. After assembly the refurbished gearbox is checked for quality by means of final testing. The holistic approach to gearbox refurbishment, deeply rooted in Wikov's large gearbox expertise, sets it apart from general engineering firms that may offer such services.

In discussion: Peter Matejka, Head of Gear Refurbishment

Peter Matejka has been Head of the Refurbishment Department at Wikov since 2019. Prior to this he joined the company as a design engineer for seven years. He earlier worked with Wikov during his university studies.

Global Cement (GC): How important are drive / gear renovations in the cement sector compared to other sectors you serve?

Peter Matejka (PM): Refurbishments for end-users in the cement industry are one of our most important sectors, because in most cases these are huge gearboxes of up to 50t. We specialise in these and have the relevant cranes, machine tools, know-how, especially



the research and development department and production, all under one roof.

GC: What are most common drive / gear failures and how can plants avoid them?

PM: In most cases we see regular operational wear after many years of operation. This includes gears that are damaged by pitting, worn-out bearings, etc. In many cases, however, the gearboxes show signs of unsuitable construction, when the gearbox is not sufficiently dimensioned for its application and operation conditions in the real world. This means that it cannot handle large shocks and other disturbances, resulting in broken teeth, for example. Other times, there are obvious signs of overloading of the gearbox by the end-user. Avoiding these errors is quite simple. It is about providing detailed and sufficient input information to the supplier of a new gearbox or refurbishment services. A selection of the gearbox supplier plays an important role in the life of the gearbox too. There should be no need to mention that following and keeping the operating manuals is essential for long trouble-free operation.

GC: How do you proceed when one or more components of the gearbox delivered for refurbishment are actually missing?

PM: It depends on the particular case but we can usually find a solution. If only one part is missing, Wikov will design a new part based on the parameters of its counterpart(s). Should more parts be missing, the design department becomes involved. In such cases, customer cooperation is essential to provide operation parameters for the drive. This will ensure that the missing parts can be replaced with parts that are capable of performing as the client requires.

Above: A 2100kW vertical roller mill gearbox for an overseas customer after an overhaul at Wikov's factory in Pilsen.



Above: Nevzat Oezcan, General Manager Flender Customer Service (left) and Antonín Růžička, Managing Director of Wikov (right) after signing the contract of cooperation in 2019.

GC: In which regions are cement sector gear retrofits most common at present?

PM: For our company it is the Middle East, Russia, Northern Africa and Mexico, as well as other markets. This is most likely because cement plants in these markets already have positive experience with our brand. Don't forget that Wikov, formerly Škoda, was well established in many 'eastern' regions and developing markets in the past. However, refurbishment applies to any cement plant in any country because it is cost efficient or, in the case of breakdown, a fast way to get equipment back up and running.

GC: Product warranty is important to any customer. It can be a powerful argument in favour of new equipment. What is Wikov's response?

PM: Wikov provides a warranty for all of the items that are a part of the repair, mainly parts and labour. Where we see a critical point is the *installation* of the gearbox once it is refurbished. Incorrect gearbox alignment leads to failures further down the line. Therefore, we recommend that customers install and commission the gearbox with the assistance of Wikov's engineers to ensure smooth operation of their equipment.

GC: What differentiates a Wikov refurbishment from those of other companies?

PM: Firstly, we aim to satisfy our customers through our individual approach and finding a solution that brings them savings. This is not a mere proclamation, it is our mindset. For example, if there is a part that is only partly worn, other suppliers may simply make a new one. However, we will always look for ways to utilise it. This saves money for the customer, while of course maintaining the necessary mechanical properties of the part for reliable operation.

Secondly, we are not afraid of repairing or upgrading gearboxes from other brands and provide warranty for such repairs. Final testing of a refurbished gearbox is automatically included in

the production process. Third, Wikov is used to customising its own gearboxes for individual clients. This means we rarely reject enquiries. Fourth, Wikov has a strong background as a manufacturer of gearboxes, with complete machine tools, know-how, designing capability, test benches and so forth.

GC: What are the cost benefits of upgrading, as compared to buying new components?

PM: If it is repairable or usable, we do not replace it with a new part, but we professionally repair it or remanufacture it. In case of large diameter gears or pinions we can save tens of thousands of Euros for our customers. For example, we recently refurbished a single-stage parallel shaft gearbox with a double gearing for a horizontal ball mill drive. During the gearbox inspection, we found out that a large gear wheel ($\varnothing = 2500\text{mm}$) had extensive pitting on the meshing side of the toothing. This could no longer be repaired, as the defects were so deep that they cannot be removed by grinding. The customer did not want to invest in a brand new gear wheel. So we decided to turn the gear, which, while maintaining the same direction of rotation, brought the other, undamaged, side of the gear into mesh. We measured the gear and made a new pinion for it exactly to the required dimensions.

GC: Since 2019, Wikov has a partnership with Flender for multi-brand gearbox refurbishment. What does it mean in practice?

PM: Flender is a very well established gearbox brand with a global presence and large customer portfolio. Wikov has decent experience with customised gearbox design, repairs including reverse-engineering of other brand gearboxes, plus available capacity. The advantages of both brands have been combined to repair any other brand's gearboxes.

GC: How has the coronavirus pandemic changed how you operate? Is there more focus on renovations due to a lack of capex?

PM: Several previously-agreed projects have been cancelled or postponed by our customers due to the Covid-19 situation but it will not affect us so much during 2020. We will wait to see what 2021 brings. Due to a lack of capital and a certain reticence in the sector to invest in new machines, we expect that there will be a greater demand for repairs in 2021. From this point of view my department may benefit from this 'crisis'.

GC: Thank you for your time.

PM: You are very welcome.

