

SUCCESS STORY

ANDRITZ thickening solutions
for beneficiating oxidized ore
in the DRC



SEPARATION

HIGH-TECH AND EFFICIENCY FOR COPPER/COBALT PRODUCTION

STATE-OF-THE-ART COUNTER-CURRENT
DECANTATION SYSTEM

ANDRITZ

ENGINEERED SUCCESS

The challenge

Start beneficiating oxide ore alongside sulfide ore

Much of today's consumer technology, from smart-phones to electric cars, relies on cobalt, and 60% of the world's reserves of this sought-after element are located in the Democratic Republic of the Congo (DRC). The former Katanga province in the DRC's southwest is particularly rich in cobalt and copper, and this is where Norinco International, an incorporated company affiliated to China North Industries Corporation, operates an ore production facility called Comika.

In the mining industry, beneficiation increases the value of the ore by removing the gangue minerals, i.e. the worthless material mixed in with the desired substance. In 2018, Comika was already beneficiating sulfide ore and moving into oxide ore. Unlike sulfide

ore, the beneficiation of oxide ore involves acid leaching, where the copper is liberated by the addition of sulfuric acid.

The liquor, commonly known as PLS (pregnant leach solution), is an acidic, metal-laden liquid that needs to be clarified – or beneficiated – to separate the leached copper. A thickener, or multiple thickeners in a train, dewater this PLS. Norinco was looking for the most cost-effective thickener solution incorporating the latest separation technology and knew that it had to include counter-current decantation (CCD). As the name implies, CCD works by sending water in the opposite direction to the solids – a simple and effective way of using the laws of physics to optimize performance.



ANDRITZ flat thickeners

Our solution

Flat CCD thickeners with state-of-the-art dilution system

Just two months after the first meeting, ANDRITZ presented the solution: a unique CCD circuit consisting of five flat thickeners paired with an external dilution system, capable of handling flow rates of between 2,800 and 15,000 m³ per hour, as well as a paste thickener. In-house software Metris Digital Twin (powered by IDEAS) was used to model the technology and prove that it could achieve the required recovery rates. The new and improved ANDRITZ inter-stage mixing and dilution system for CCD circuits was the ideal fit as it helps to reduce the footprint, consequently

cutting CAPEX while maintaining low operating costs. The innovative paste-thickener design facilitates highly clarified liquid recovery as well as allowing maximum underflow densities. At the DRC Comika plant, the system has eliminated the need for needle tanks and inter-stage transfer pumps as it provides high levels of closed-circuit dilution to counteract the negative effects of surging underflow pumps. What's more, gravity feeding of the wash liquor and the pumped underflow into the inter-stage mixing tank ensure highly effective washing of the PLS.

Results

Maximum efficiency thanks to a sophisticated set-up

The technical know-how was never in question as ANDRITZ has references in oxide ore applications along with ample data demonstrating the effectiveness of the CCD thickeners. And yet the actual results since production of the first batch of copper cathode in July 2020 are still impressive. Civil costs have been slashed by around 20% without any additional power consumption thanks to the unique ANDRITZ flat CCD design and superior technology. Five transfer pumps

have become redundant, estimated at around 75 kW each. The hydrometallurgy plant is achieving outstanding recovery rates of more than 95% of the PLS due in part to the newly improved feedwell that reduces turbulence by using guide fins for enhanced flocculation. The robust technology promises less downtime and 95% availability based on a detailed lifecycle calculation of all mechanical components that guarantees 100,000 hours of operation or longer if necessary.

"My heartfelt thanks goes to ANDRITZ for the high-end solid/liquid separation equipment provided for the oxidized ore beneficiation line of the Comika phase II project! We look forward to working with you to draw a blueprint on the hot land of the Congo (DRC), promoting the cooperation to be deep and practical, moving steadily and further onwards, building a better Africa and creating a better future."

ZHAN DEGUANG

Chairman and General Manager of COMIKA SAS



WHAT'S YOUR SEPARATION CHALLENGE?

ANDRITZ Separation is the world's leading separation specialist with the broadest technology portfolio and more than 2,000 specialists in 40 countries. For more than 150 years, we have been a driving force in the evolution of separation solutions and services for industries ranging from environment to food, chemicals, and mining & minerals. As the OEM for many of the world's leading brands, we have the solutions and services to transform your business to meet tomorrow's changing demands – wherever you are and whatever your separation challenge. **Ask your separation specialist!**

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