THE COMPLETE DRY STACK TAILINGS SYSTEM
TAKRAF, a Tenova Group company, is an integrated solutions provider to the global mining, bulk material handling, minerals processing and beneficiation industries, offering innovative technological solutions as well as process and commodity knowledge along the industry value chains. With the integration of the well-known DELKOR and Tenova Advanced Technologies (formerly Bateman Advanced Technologies) brand of products into TAKRAF as specialized product lines, our portfolio for the minerals processing and beneficiation sectors has been considerably enhanced.

TAKRAF is a key supplier of equipment and systems for open pit mining and bulk handling, having provided hundreds of complete systems, as well as individual machines, to clients all over the world. Based upon more than a century of experience and know-how, the product range stretches from overburden removal, raw material extraction, conveying, processing, comminution, homogenizing, blending and storage to onward transport or shipment.

TAKRAF provides the full range of services, from project studies, planning, engineering and design to fabrication, supply, erection and commissioning, technical assistance, service and after-sales service for plants, systems and equipment. Its equipment has proved robust and reliable in adverse geological conditions, in extreme climates with temperatures down to minus 45°C, in dust, wind or extreme humidity, as well as in seismic zones and altitudes of up to 5,000 m above sea level or in underground applications.

TAKRAF has committed to both environmental and social sustainability in their business interactions and has adopted a Zero harm approach to safety under the SAFETY FIRST promise of the Tenova Group.
OUR APPROACH IN DRY STACK TAILINGS SYSTEMS

We strongly believe in a “systems” approach to the application of Dry Stack Tailings (DST) for tailings management. The design of a DST circuit is complex and requires a thorough understanding of all the unit processes involved. We, at TAKRAF and DELKOR, refer to our approach as “The Complete Dry Stack Tailings System” rather than the supply of individual units of equipment. The combination of the internationally recognized expertise of TAKRAF and DELKOR together makes us one of the very few global suppliers that is able to engineer and supply “The Complete DST System.” We believe that this single point of contact is a key criterion for the successful engineering, supply and construction of DST projects.

For DST, “the Complete System is definitely greater than the sum of its parts.”

The Complete DST System is generally comprised of the following five components:

- Thickening
- Filtration
- Transportation
- Stacking
- Geotechnical design of the stack (by other specialized entities)

Our iterative approach to DST design considerations, including residual moisture content in dewatered tailings, results in an optimized DST solution. Our solutions also incorporate both CAPEX and OPEX criteria, which meet our client’s specific project requirements. Our DST team of experts is also able to provide recommendations early on in the form of studies.

TAKRAF and DELKOR Equipment Comprising “The Complete Dry Stack Tailings System”

- DELKOR thickeners
- DELKOR pressure filters
- DELKOR horizontal belt filters
- Belt feeders and overland belt conveyors
- Tripper car
- Mobile stacking bridge
- Single and conventional spreaders

DRY STACK TAILINGS PROCESS FLOW:

TAKRAF offers a variety of solutions ranging from single machines to integrated systems and complete turn-key projects.

Technical Highlights:

**DELKOR Pressure Filters**

- Up to 33 m³/batch
- Faster opening and closing of plate pack
- Plate size up to 2400 mm x 2500 mm
- No complex load balancing

**Mobile Stacking Conveyor Bridges**

- Stacking length 500 m
- Transport up to 15,000 t/h
- Discharge boom outreach of up to 20 m
THICKENING

DELKOR takes its knowledge and experience of over 30 years providing thickeners for the mining industry, and applies it to the extreme mechanical and process requirements needed when dealing with high yield stress underflows. Thickening using DELKOR high compaction thickeners produces one of the highest concentration of solids in the industry. The DELKOR proprietary shear thinning system is designed to reduce the yield stress of the underflow slurry to improve pumpability; thus lowering the energy consumption and wear on the slurry pumps.

FILTRATION

DELKOR’s innovative filter press technology allows for shorter cycle times, higher throughput, availability and safety. This therefore renders the technology perfectly suitable for high capacity and heavy-duty applications such as concentrate and tailings dewatering for DST applications. Depending on the application and the filtration time, the most suitable DELKOR filter press technology (DELKOR FAST FP or DELKOR FP) is proposed.

A DELKOR FP filter press consists of a fabricated sidebar frame supporting a moving head and filter plates positioned between the head frame and moving head. The opening and closing cycles of the plate pack are carried out by a double-acting hydraulic cylinder, which is controlled by a hydraulic power unit.

A DELKOR FAST FP, which is preferable for easily filterable materials, consists of a fabricated sidebar frame. Compared with the DELKOR FP, the opening and closing of the plate pack is carried out by two synchronized non-reversible screws, while final compression of the plate pack is achieved using a pressurized cushion inflated with water at low pressure. Use of the cushion compensates for plate misalignment, resulting in reduced leakage and the use of the screws allows for shorter opening/closing of the filter press.
MOBILE STACKING BRIDGE SYSTEMS AND SPREADERS

TAKRAF’s mobile conveyor stacking bridge systems provide an efficient, reliable and easy to operate bulk material handling solution for transporting and storing filtered tailings. This method maximizes throughput to maintain plant uptime. By stacking compacted tailings, land requirements are reduced and the risk of catastrophic dam failures are minimized. Conventional tailings storage methods incur costs post-mine closeout due to maintenance; however, dry stack tailings can be rehabilitated concurrently with the mine and plant operations.

HORIZONTAL VACUUM BELT FILTERS

DELKOR horizontal vacuum belt filters are a possible alternative to filter presses for generating cake in a continuous operation.

DELKOR horizontal vacuum belt filters make use of most modern design capabilities and materials of construction to make it an efficient, reliable and cost effective solid/liquid separation unit able to withstand operating under the most arduous conditions. DELKOR’s continuous improvement approach has enabled us to simplify design for easy operation, yet all the wearing parts remain easily accessible for routine maintenance purposes.

Over the last 40 years, DELKOR has led the way in innovation and implementation of world class technology and remains the supplier of the world’s largest individual machine. More than 950 units have been supplied worldwide for wide range of applications exceeding total filtration area of 37,500 m². Improved design and wealth of experience has helped achieve on-line reliability in excess of 99.8 % in many plants.