

TAKRAF[®]



SCRAPER RECLAIMER TECHNOLOGY

Optimal solutions for bulk material handling

Innovation out of tradition – It pays to talk to a specialist!

TAKRAF Group, through its established and well-known brands, TAKRAF and DELKOR, provides innovative technological solutions to the mining and associated industries. We leverage our experience, acquired over more than a century, to provide equipment, systems and services that best satisfy our clients' mining, comminution, material handling, liquid/solid separation and beneficiation requirements. Owners and operators around the world trust our engineered solutions to lower the total cost of ownership and reduce environmental impact by improving efficiency with safe and reliable equipment. For sustainable solutions backed by expert service you can rely on TAKRAF Group. Visit us at www.takraf.com.

We at TAKRAF Group are committed to environmental and social sustainability in all our business interactions and have adopted a Zero Harm approach under our global safety promise.

Our continuously expanding reference list demonstrates that owners and operators around the world are confident that TAKRAF Group provides the most suitable solution to their unique project requirements. We assist our clients in overcoming the most complicated challenges in transforming the resource industry towards a sustainable future. We focus on specific areas that are critical for reliable and sustainable operations, as it is here where we best support our clients with innovative solutions that save energy, lower environmental impact and meet or exceed operational requirements.

Our TAKRAF brand portfolio is recognized as the world's leading technology provider when it comes to run-of-mine and bulk material handling. Our other focus area is liquid/solid separation, where we capitalize on our global DELKOR brand and its track record of thousands of successful installations.

We leverage our global organization and aggregate our extensive expertise by offering a unique combination of both application experience and product based knowledge. Clients therefore benefit from direct technical discussions with our local specialists, who are able to draw upon this expertise and provide the most suitable local solution and service that enhances safety, improves sustainability, decreases costs and increases efficiency.

Our commitment is summarized by:

Safety | Reliability | Innovation | Sustainability

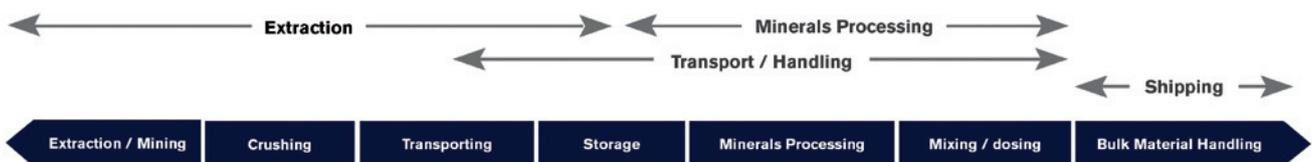


Photo above: Portal reclaimer in a phosphate product storage facility boasting a 51.7 m rail span and a 2,000 t/h capacity
 Photo cover page: Stacker with a 2,000 t/h capacity and two portal reclaimers with 64.5 m rail-gauges and 3,000 t/h capacities (single boom) at a large coal mine

Our Competence in Scraper Reclaiming Technology

- Decades of experience in successfully building and commissioning scraper reclaimers
- Proven and reliable equipment solutions based on profound know-how
- Excellent track record with around 400 successful reference projects globally
- Vast expertise in handling various kinds of bulk material such as coal, lignite, iron ore, bauxite, zinc ore, kimberlite, potash, phosphate, rock salt, urea, pet coke, slag, clinker, gypsum or limestone
- Strong global network for local technical support and site services

Our Product Portfolio

Machines:

- Bridge-type scraper reclaimers
- Portal and semi-portal scraper reclaimers
- Cantilever scraper reclaimers
- Combined stackers/scraper reclaimers
- Circular blending beds with bridge-type scraper reclaimers
- Circular storages with cantilever, semi-portal or full-portal scraper reclaimers

Technical features:

- Portal reclaimers: Rail gauges up to 70 m and capacities up to 6,000 t/h
- Bridge reclaimers: Rail gauges up to 60 m and capacities up to 2,500 t/h
- Circular storage facilities: Storage capacities up to 350,000 m³ with diameters up to 150 m
- Blending beds: With up to 400 layers blending ratios of up to 10:1

TAKRAF offers a variety of solutions that cater to your exact needs. This ranges from single machines to integrated systems and complete turn-key projects.

Unique Features:

TAKRAF scraper reclaimers leverage the company's significant experience in this field and are built upon a proven technology platform boasting tremendous operational reliability.

Their robust design and use of quality components ensures both low operational and maintenance costs and an extended product life. Our scraper reclaimers are also able to operate in a full automatic mode.

Storage solutions with TAKRAF scraper reclaimers fulfill even most stringent environmental requirements. They are perfect for indoor applications, have low energy consumption and stand for low dust emission due their operation methods and for gentle treatment of bulk products. They meet today's demands for noise emission. Their option for full automatic operation ensures that on the scraper reclaimer itself respectively in the storage area there is no need for installation of permanent working places.



Fig. 1: Combined stacker/reclaimer for iron ore with capacities of 1,500 t/h stacking and 1,500 t/h reclaiming

BUFFER STORAGE

Twin boom portal reclaimers are high capacity machines which are usually employed in operations where high volumes of bulk material are being handled.

The featured scraper reclaimer (fig. 4) is equipped with a drag trough for each reclaimer boom and has an average reclaiming capacity exceeding 3,000 t/h. The machine has a rail gauge of 52 m and serves a coal storage with a width of 45 m and a length of 435 m. It is part of a turn-key project including a stacker, a conveyor system and a railcar loading station.

A growing trend within the industry is for more and more bulk storages requiring to be covered either due to tightening of environmental regulations or because of the need to protect the material against adverse weather conditions.

TAKRAF's indoor portal scraper reclaimers, as shown in fig. 2 and fig. 5, are the appropriate functional and economic response to meeting these requirements.

These machines are well suited for operation in covered storage facilities or sheds. Furthermore, our machine's design, e.g. with regards to boom arrangement or shovel design, takes into account the specific characteristics of the material to be reclaimed.

For more than 20 years, the circular buffer storage facility featured under fig. 3 is reliably handling an abrasive slag material.

Feeding of the storage facility is as per the coneshell method and is accomplished via a slewing stacker with a capacity of 1,000 t/h. Reclaiming of the stockpile is accomplished from the inner slope of the pile by a cantilever reclaimer. Scraper blades guide the slag material to the central chute being the link between the scraper reclaimer and the outgoing conveyor.

If equipped with outer ring walls, circular storage facilities provide maximum storage capacity whilst using the least amount of space.

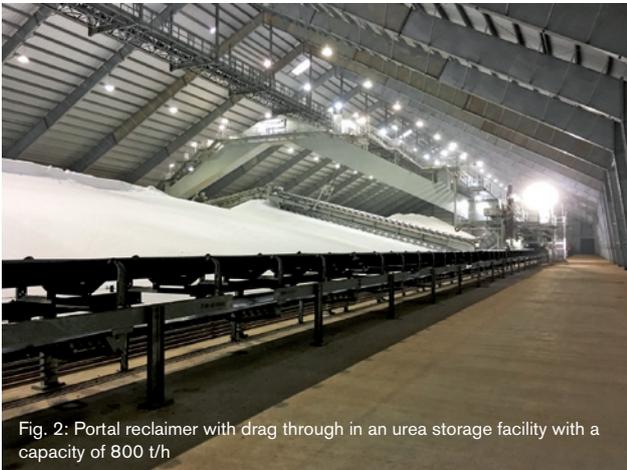


Fig. 2: Portal reclaimer with drag through in an urea storage facility with a capacity of 800 t/h



Fig. 3: Circular stacker / reclaimer for slag material



Fig. 4: Twin boom portal reclaimer for coal



Fig. 5: Portal reclaimer for sulfur with a rail span of 55.5m and a capacity of 1,500 t/h

BLENDING STORAGE FACILITIES

Whether it's for the optimal homogenizing of different qualities within a pile or the ensuring of uniform grain size distribution for further processing, TAKRAF's bridge type scraper reclaimers - in combination with appropriate stacking method - are able to achieve optimal blending results.

Material is reclaimed from the front side of the pile where an almost full-pile facing harrow loosens material from all pile sections. This ensures that material from all pile sections then slides smoothly to the bottom of the pile and into the scraper shovels.

Our featured machine in fig. 7 is operating in a copper refinery and handling copper concentrate. The machine boasts a reclaiming capacity of 400 t/h and a rail gauge of 30 m.

Twin-harrow bridge reclaimers operate between two piles in longitudinal blending beds and work in both directions. While the first pile is being stacked, the scraper reclaimer empties the second pile and vice versa. The harrows are driven hydraulically.



Fig. 6: High capacity circular blending bed for ROM coal



Fig. 7: Double harrow bridge reclaimer in copper refinery

The circular blending bed for Run-of-Mine (ROM) coal shown in fig. 6 below boasts a stacking capacity of 3,300 t/h and reclaims 2,300 t/h. The diameter of the rail is 120 m.

A conveyor feeds coal through a chute on top of the central column to the slewing and luffing stacker for piling in layers using the chevcon method. The stacker operates 360° in an endless mode and the bridge type scraper reclaimer follows the stacker in a 360° endless mode as well.

This arrangement combines excellent homogenizing capabilities with easy continuous stockpile management without end cones.

TAKRAF's semi-portal reclaimers as shown in fig. 8 are also available with large spans and for high reclaiming capacities. Semi-portal reclaimers represent compact solutions for covered bulk storage facilities and allow for box operation with various bulk material types.

When semi-portal reclaimers are installed, as a pair or a quartet, in a bulk storage facility with several boxes of varying bulk material, then the simultaneous reclaiming and blending on downstream conveyors is also possible.

This blending method is gaining increasing popularity for coal-fired power plants or the blending of iron ore for steel plants for various reasons, including: reduced footprint, increased machine redundancy and increased flexibility stemming from the ability to blend from the various boxes as mentioned previously.



Fig. 8: Semi-portal reclaimer for iron ore and additives, capacity 1,500 t/h

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