



Services from a Single Source  
Slag management  
In-plant logistics  
Production support



**ThyssenKrupp**  
MillServices & Systems GmbH  
Emschertalstraße 12, 46149 Oberhausen, Germany  
Phone +49 (0) 208-65605-0 · Fax +49 (0) 208-65605-100  
www.tkmss.com · tkms.info@thyssenkrupp.com



**ThyssenKrupp MillServices & Systems**  
InPlant Competence



# Slag management

## Your by-product, our challenge

For us, slag is a valuable resource that can be converted into economically and ecologically sensible and beneficial products.

It occurs in nearly all metallurgical processes. Nowadays, the important thing is to find smart uses for products that are made from slag and in strong demand by the market. Instead of simply dumping it onto landfill sites we turn it into premium products used in road and path construction, landscaping, hydraulic engineering, fertilizers for agriculture and grades used in the cement industry. Not to forget the slag that is rich in metals and recycled at the production plant.

Our strategy for efficient slag management comprises a coordinated line-up of services embracing the entire production process and closely tailored to the needs of our customers at their various locations. We supply specific solutions, from product transport to marketing.

### Product development and quality assurance

Our product development and expansion efforts aim at creating sales markets and addressing customer needs by providing the finest aggregates and building material blends from the varieties of steel mill slag. We capitalize on years of expert knowledge and work closely with private research institutes and universities in developing new and innovative products while complying with the relevant engineering and environmental standards. Our own laboratory in Duisburg is fitted out with extensive facilities for conducting research and tests even up to pilot-plant scale.



### Quality control and laboratory

Today's high-standards of aggregate pre-suppose comprehensive quality assurance and monitoring. As part of our own in-plant production control, the laboratories in Duisburg and Brandenburg a. d. Havel analyze and assess the required quality parameters for the various TKMSS products. Our in-plant production control system ensures high quality standards and includes a regular review of the technical requirements, obtaining, preparing and screening samples according to existing standards. It ensures that qualified specialist staff is always available. Both laboratories conduct a variety of tests and analyses on natural and synthetic aggregates in accordance with national and European standards and regulations. TKMSS voluntarily submits itself to the strict requirements of the RAL quality assurance system to document the fact that its blast furnace slag products are classifiable as "high quality."

### Transport solutions

With our own dedicated vehicles we move the slag on time and efficiently from your production shop to the slag beds and, after cooling, to the temporary storage site and our processing plants. With our own efficient logistics system we ensure that the vehicles containing the slag are always at the right place at the right time. The big metal-producing works have very high haulage volumes. Bulk goods movements must be meticulously coordinated with each other, which is why we use our own TESS (Transport Efficiency Support System) for challenging assignments which, if required, can be interlocked with your own programs. All important data – such as loading location, destination, number and type of load – is coded. You can input transport instructions online into TESS; these are then checked by one of our dispatchers and after briefing the driver, the consignment is sent on its way.



### In daily operation:

- Slag carriers
- TECO dumpers
- Heavy-duty dumpers
- Tipper trailers
- Skip loaders
- 4-axle loaders
- Silo trucks

Leave fleet management to us. Our vehicles are ready for use and in prime condition!



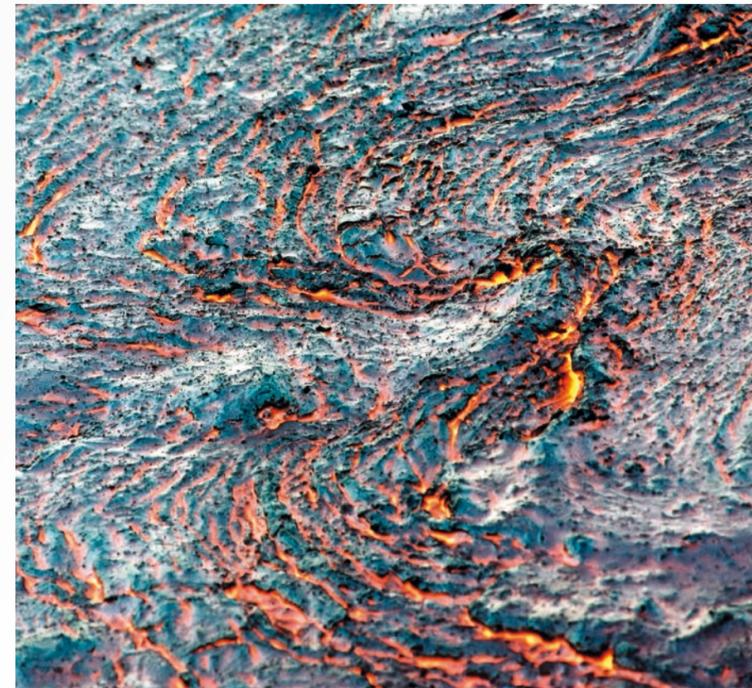
# Slag management

## All-in instead of individual solutions



### Slag bed management

Our highly efficient bed management system results from the expertise accumulated by our specialists over decades. Through precise timing and control of the quantity and quality of the slag, the physical characteristics of the finished products as required by the end-user can be adjusted. Our experience and development work in bed design and slag management have generated premium products which are recognized as meeting ultimate standards. Particular importance is attached to compliance with constantly changing environmental requirements. With the deployment of heavy plant such as bed excavators and shovel loaders with the right attachments we can ensure the efficient handling of complex slag grades. Together with our customers we have also developed innovative techniques for the residual discharge and cleaning of the ladles.



### Marketing in the best interests of the customer

We've taken a hard look at the potential uses of, and hence requirements to be met by, our products. Constant contact with our customers, public agencies and authorities has ensured ready market acceptance for our products.

Markets we address with our products:

- Road and path construction, landscaping
- Horticulture, sports grounds
- Hydraulic engineering

We will advise you on site and accompany you to meetings with the authorities to explain the applications of, and obtain approvals for, our slag products. Our products are an excellent substitute for natural stones such as diabase, basalt or greywacke and hence an invaluable contribution to the conservation of natural resources. All the slag grades we produce and market comply with the relevant environmental regulations, standards and technical supply conditions for the respective aggregates.



### Processing

- Blast furnace slag
- LD converter slag
- Electric arc furnace slag
- Stainless steel slag
- Other types of metallurgical slag

Different types of slag from differing sources of production are separately stored before and after processing (according to grain size). With our wide-ranging plant, we are able to provide quality products to customer requirements and delivery conditions, while of course maintaining a consistently high quality. Our processing activities extend far beyond existing standards applied to the separation of the metal constituents and the crushing and screening into various grain fractions. In the separation of ferrous materials we focus on purity and hence conserving the inherent value of the recycled materials.



### Landfill management

Landfill management is also part of our portfolio. For our customer ThyssenKrupp Steel Europe, we provide these services on the Wehofen landfill in Duisburg.

Our portfolio of services comprises:

- Environmentally compatible placement of inert waste on the landfill site in accordance with legal requirements
- Landfill profiling in accordance with technical requirements using modern GPS systems
- Operation of various plants e.g. crushing and screening equipment for processing soils and construction waste mixes
- Disposal of building materials on the slag heap and landfill site
- Sweeping paved roads on the landfill site
- Spraying unpaved roads and landfill areas with a water tanker to minimize dust

# In-plant logistics

## Leave your logistics to us!

Leave your logistics to us and you'll save not only the capital-intensive investment costs but also a lot of headaches since our vehicles are always in prime condition and ready for use. Whether you need to haul bulk or heavy goods with special vehicles, liquid slag or you require courier services and personnel transport services, we offer a complete package of in-plant transport logistics.

Modern IT-supported control systems guarantee the required equipment availability by the required deadline. They help reduce the number of vehicles in operation and minimize empty journeys, downtimes and breakdowns.

Through the Internet we can provide customers with 24-hour online access to the required logistics information, including performance management and monthly accounting. This means for example, that when transporting personnel on your works site, we can guarantee that everyone will be picked up and driven to their destination within 10 minutes after receipt of your instructions.

Logistics data relating to bulk goods and heavy goods haulage such as location, loading, transport requests is accessible at all times. Third-party trucks are registered at the works entrance and tracked until they leave the site. By pooling transport functions and fleet management from a single source, vehicles and workshop capacities can be optimized for a high level of availability and operating dependability yet lowest-possible costs.



### Bulk and general cargo haulage

We can handle the complete bulk and general cargo haulage for our customers: liquid and solid slag, lump slag, coarse and fine grains, coal/coke, ores, dusts and sludges, production scrap, hot and cold slabs and coils. Logistics data such as location, loading and transport instructions are recorded immediately and retrievable at any time. The customer's loading and unloading units are closely integrated into the supply chain as well as with our own handling equipment.



### Heavy-load haulage

These services cover the movement of heavy, oversized components and machinery, usually between a production plant and the workshops. Heavy-load haulage, sometimes escorted, requires a high degree of precision, care, punctuality. Our staff is specially trained for these assignments while the haulage equipment selected for a particular job ensures smooth and trouble-free operation.



### Fleet maintenance

Our extensive and varied vehicle and plant fleet is serviced and maintained in our own workshops or with the assistance of authorized service specialists. Hence the vehicles are always available at the right time for maximized efficiency. In the case of third-party vehicles – often only used inside the plant – we can provide the necessary support facilities including regular inspections. In this way we can keep costs under control.



## Production support

### Letting you concentrate on core business

You want to focus fully on your customers and continuously increase production quality, quantity and effectiveness? Download on to us all the ancillary chores of your production process.

Our production support services range from the provision of manpower via cleaning work and making available specialty vehicles to taking over entire processes such as the mechanical scarfing of steel slabs.

In this way, you can focus on what matters most and generate savings potentials by enhanced equipment utilization, more efficient plant and machinery deployment or improved processes.



#### Finishing services

There is a multitude of downstream jobs we can handle. In the production of steel, vast quantities of slabs, billets, sheets, coils are turned out daily and they all need some kind of downstream finishing. We can eliminate surface blemishes by mechanical or manual flame scarfing, we can take over cold mechanical machining, the slitting and cutting-to-length of starting materials or processes such as resizing and forming. Jobs such as these can only be partly automated and they presuppose in-depth knowledge of the material and the downstream production stages. Steel is our specialty and so we can draw on the enormous experience of our specially trained staff. Cost savings and enhanced flexibility will increase your competitiveness.



#### Our finishing services

- Mechanical and manual flame scarfing
- Slab firing and trimming
- Customized treatment of blooms and billets
- Slitting and cutting-to-length
- Cold mechanical treatment
- Surface treatments

#### Refractory waste and re-lining

To protect sensitive plant from molten iron and steel, the furnaces, vessels and runners are clad with refractory or wear linings. The careful selection of the reusable bricks, mortar, gunning materials and the precise execution of the work extend the life of these linings. We are always available to help, from mechanical or manual removal of refractory waste to the installation of the lining or choice of materials. Teaming with specialist firms we can come up with improvement potentials based on wear patterns and operating cycles.



#### Refractory waste and linings

- Converters
- Electric furnaces
- Torpedo ladles
- Various types of ladles
- Runners
- Containers and pot carriers

# Production support

## For more efficiency and flexibility



### Scrap and skull processing

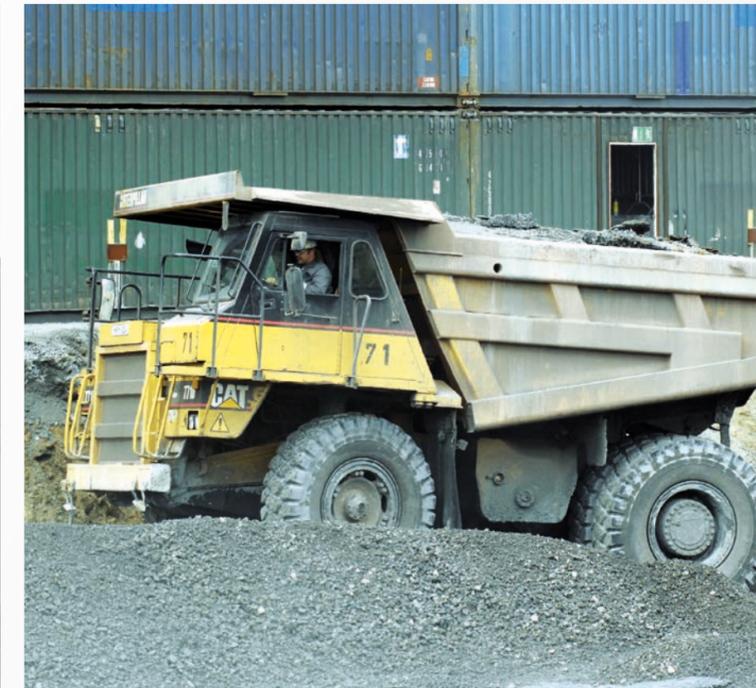
We can arrange for the professional processing of scrap for it to be recycled in electric arc furnaces and converters, we can handle the manual processing of slag skulls with lances by using firing hoods, the mechanical crushing of skulls and the collection and in-plant heavy haulage of scrap and skulls in special containers.

#### Our equipment pool for skull processing:

- Cat 980 with power grapple for handling small skulls, fired skull pieces and runners
- CAT 988 for moving large skulls (up to 30 tonnes) to temporary storage or under the firing hood
- Excavator and other equipment with magnet and ball for removing slag residue from the skulls and for loading skulls ready for charging
- Mobile or stationary firing hoods incl. extraction unit for the fragmentation of skulls to the prescribed charging size of 1500 x 500 x 500 mm using a combustion tube

#### Materials

- Tundish skulls
- Pit skulls
- Converter mouth skulls
- Ladle skulls
- Pig iron desulphurization skulls



### Provision of plant and personnel

We can provide qualified personnel and equipment (with or without operators), on a one-off, regular or permanent basis. Our personnel can work under our or your instructions – security officers, crane operators, forklift drivers, cleaners. Just ask! We can also take over the running and management of vehicle fleets for enhanced flexibility and cost savings especially on larger sites.

#### Provision of personnel

- Equipment operators
- Crane operators
- Metalworkers and electricians
- Mechanics

#### Provision of equipment

- Transporters
- Excavators
- Wheel loaders
- Forklifts



### Mechanical and manual cleaning

Efficient production conditions entail very many associated activities either directly at the production line or nearby. We can provide the equipment you need, for cleaning a converter vessel, clearing out a basement, cleaning conveyor systems, filters, production areas and roads, paths and other outdoor areas. We can take care of everything: from the port through production to dispatch. Dedicated excavators, GPS-controlled sweepers and our skilled staff will keep your production up and running.

- Sweepers for roads, paths, and production shops
- Manual plant cleaning