

KIROW

STEEL MILL

XL SAFETY



MAXIMUM SAFETY AND RELIABILITY. KIROW TRANSPORTERS SET STANDARDS.

XL SAFETY

It is not without reason that operational safety in transport logistics at steelworks is a top priority. Only if transport systems work safely and reliably under extreme conditions can they really be economical. Rationalising things just to cut costs in that area is ill-advised. It is essential that the safety of workers and equipment can be guaranteed even under time pressure and that mistakes that can lead to accidents are practically excluded.

That is why Kirow places special emphasis on the interplay between people and machinery in the steelworks environment. The control concept used for Kirow transporters almost completely eliminates the possibility of incorrect operation from the outset. For example, load-lifting functions are electronically monitored. We can develop customised safety packages to support our customers' drivers. Kirow transporters are known for their safe operation.

RELIABILITY IS THE BASIS OF SENSIBLE ACTION

A plant standstill is an extremely critical situation for any steelworks operator, especially in view of the potential costs it can incur. It is right not to compromise when it comes to the durability and reliability of transporters that work under extremely tough three-shift conditions for 24 hours a day, 365 days a year.

We are aware of this responsibility. To us, it begins with a highly conservative vehicle frame design and encompasses the exclusive use of top-class components that have already proven themselves over years in numerous steelworks applications. Kirow transporters have demonstrated their worth in practice and earned themselves a reputation for outstanding reliability over past decades among numerous big-name customers. The first ever transporter, delivered in 1997, is still busy doing its rounds with its original steel structure.

TECHNICAL PARTNERSHIP FROM THE OUTSET

A fair and lasting partnership begins long before contracts are signed.

Together with you, our experts can draw up tailor-made solutions to meet your needs. We will gladly examine the vehicle interfaces particular to your steelworks and apply their practical knowledge in identifying solutions which we have gathered over the course of hundreds of applications. And we keep on developing with every new project and with all of our customers. Custom concepts do not necessarily contradict the process of standardisation using proven components; rather this approach is proof of our far-reaching knowledge.

During the offer phase our experts will assist you by making suggestions about your driving routes and pick-up positions and the tipping situation at the dumping area, as well as providing conceptual advice about slag pots.

And of course we are available to our customers for help and advice once we have delivered our product. Whether you need our experts to identify a fault quickly or you need spare parts, vehicle inspections, after-sale training and coaching, or you require a repair service – we are always on call.



↑ The Slag Taurus: safety comes first!

SLAG TRANSPORT.

SLAG TAURUS – SAFETY FIRST AND FOREMOST.

→ SLAG TAURUS

The Slag Taurus is the market leader in the field of slag transport. Its properties and features speak for themselves:

ABSOLUTE SAFETY

We have redefined safety in slag transport with our KISS (Kirow Integrated Safety System).

- A tough, reliable industrial control unit monitors the vehicle's functions centrally and effectively prevents incorrect operation.
- A colour graphic display shows the latest vehicle status and provides information on functions that are available or currently blocked.
- A load display informs the driver of the current load situation.
- An active overload protection system protects the driver and vehicle under critical loads.

Comprehensive safety packages such as camera systems and fire-extinguishing equipment make the Slag Taurus even safer.

RELIABILITY

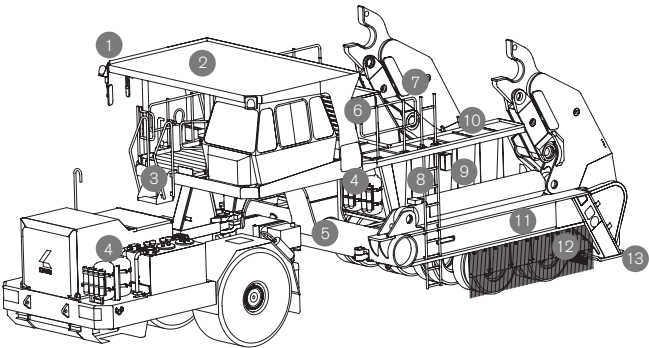
The Slag Taurus is extremely fail-safe, field-tested and reliable – even after years of use, on account of its high level of standardisation. Its durability is legendary and numerous customers have demonstrated that by reordering.

LIFE-CYCLE COSTS

Investment costs make up only a small part of life-cycle costs when considering a purchase. Operating costs throughout a vehicle's lifespan are much more important to consider.

That is why, we feel, quality pays off in the long run. Our Caterpillar articulated steering is an example of the kind of reliability that reduces life-cycle costs. It has a service life of more than 20,000 non-stop hours.

With a conservatively designed load-bearing structure, components with high service lives, high spare-part and service availability and low operating and repair costs (therefore high productivity) – the Slag Taurus pays for itself within just a few years of use. Unbeatably low life-cycle costs have been achieved because the Slag Taurus focuses on safety and reliability.



Slag Taurus: selected safety features

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| 1. Comprehensive lighting and warning lamps | 7. Numerous protective covers |
| 2. Large protection canopy | 8. Emergency descent ladder |
| 3. Ergonomic ascents and railings | 9. Camera systems |
| 4. Fire-extinguishing systems / extinguishers | 10. Preparation for refractory lining |
| 5. Emergency hydraulic linkage | 11. Protected pipes |
| 6. Rear side of protection canopy featuring wire-reinforced glass, louvre windows and escape route | 12. Chain guard for rear axle |
| | 13. Encapsulated outriggers |



↑ The Slag Taurus P



↑ The Slag Taurus U with U-frame steel structure

MOBILE PIG IRON TRANSPORT.

SPACE-SAVING AND EFFICIENT –

THE NEW WAY OF TRANSPORTING PIG IRON.

→ MULTI MOVER M AND Y

Kirow's mobile pig-iron handling system minimises investment, operation and energy costs while providing maximum flexibility.

MOBILITY FACILITATES UNIQUE WORKING METHODS

Kirow's mobile pig-iron handling system is the most efficient method of transporting pig iron from blast furnace to converter.

It consists of:

- Three rubber-tyred Multi Mover M units for transporting complete pig-iron ladles from the blast furnace to the converter.
- A compact Multi Mover Y mobile ladle crane for cooling the pig iron near the blast furnace.
- A concrete plate which connects blast furnace and converter

Controlled remotely, the Multi Movers simply drive across the concrete plate to the converter. This system requires minimal space – no more complex rail systems for transport cars or ladle cranes.

PROVEN SYSTEM FEATURING HIGH RELIABILITY AND SAFETY

Kirow's mobile pig-iron handling system has been running in three-shift operation for many years at TKCSA and Posco Krakatau.

Top-level components, ingenious heat protection and generously designed steel structures and machinery for non-stop operation are what guarantee its reliability. Its drive and control systems are designed redundantly so that in the unlikely event of a drive or controller failure, the vehicle can keep moving.

As with all Kirow transporters, the operator's safety has been placed first during the vehicle's development. The Multi Mover, for instance, is supplied with overload protection and a fire-extinguishing system.

LOW INVESTMENT COSTS, HIGHER FLEXIBILITY

More benefits: unbeatably low investment costs for vehicles and ladle crane compared with the numerous torpedo cars required and an inflexible stationary ladle crane; a cost-effective concrete plate as opposed to costly tracks for cars and crane; and much less space required.

Approximately 70% was saved on investment costs in the TKCSA and Posco Krakatau projects.

Upgrades are easier and cheaper – especially compared with rail-bound transport systems.

UNBEATABLY LOW OPERATING AND MAINTENANCE COSTS

The pig iron in the ladles transported by the Multi Movers is much hotter when put into the converter than it is coming off a rail-bound system. That means significantly less energy has to be put into the pig iron for the production of steel.

That in turn means lower energy costs in the steel-making process because completely full pig-iron ladles can be driven directly and by the shortest route from the blast furnace to the converter. The time-consuming decanting process required for torpedo cars is eliminated. Transport times using mobile equipment are also much less than for moving, shunting and servicing the pig iron in torpedo cars on a rail network.

The mobile system also has very low maintenance costs. Short distances on a strong concrete plate compare very positively indeed with the cost of servicing a high-maintenance rail network.

All this makes the Kirow mobile pig-iron handling system a future-proof investment.

Road beats rail!



↗ A Multi Mover Y transferring a pig-iron ladle to the Multi Mover M

PALLET LOGISTICS.

VERSATILITY AND EFFICIENCY

FOR LOW TRANSPORT COSTS.

Transport tasks in steelworks can be very diverse. Scrap, slabs, sheet metal, coils and rods all need to be moved safely and quickly. And none of that can be allowed to impede the operation of the steelworks.

This is precisely where pallet logistics come in. Using pallets enables loading to take place without the vehicle being present. Pallets that match all the different kinds of goods being loaded can all be moved around using just one transporter. To choose a Kirow pallet system is to opt for flexible, future-proof logistics.

We have a choice of two types of vehicle. Firstly, there is the Kirow Multi Mover whose modular design makes it suitable for heavy loads of over 200 tonnes and, secondly, there is the Kirow Multi Flexus which can be used in many different ways for loads of up to 200 tonnes.

→ MULTI MOVER

THE MULTI MOVER IS THE IDEAL SYSTEM WHEN MAXIMUM MANOEUVRABILITY IS REQUIRED IN SMALL SPACES.

BOGIE STEERING FOR MANOEUVRABILITY

The Kirow Multi Mover is equipped with fully steerable bogies making it extremely manoeuvrable, even when space is tight.

MOBILITY

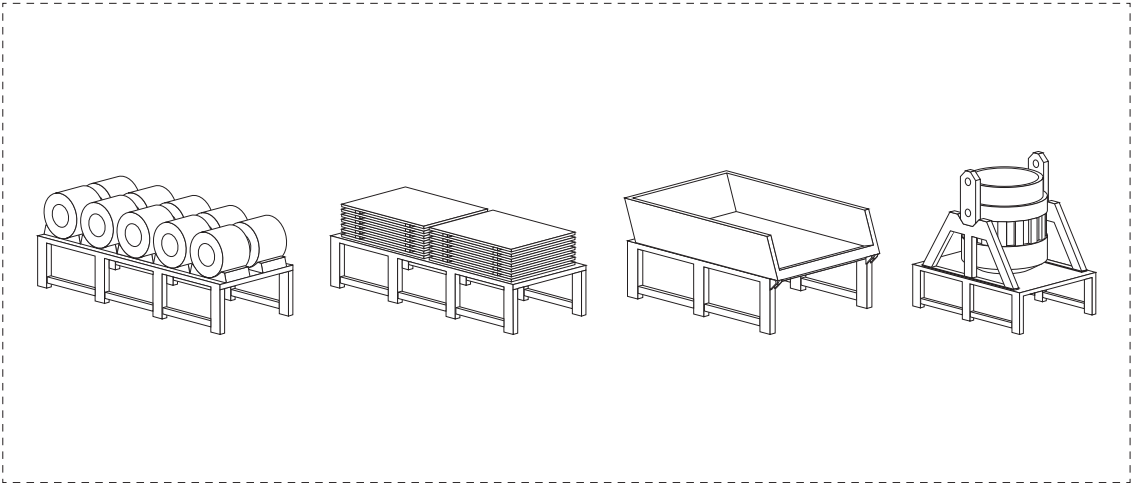
Pendulum axles, hydraulic axle load compensation as well as multiple, independently driven bogies facilitate safe operation even on difficult terrain. Uneven surfaces, such as those commonly encountered in scrap and storage yards, are mastered with ease by the Kirow Multi Mover and its big earth mover or super-elastic solid tyres.

THE SYSTEM FOR HIGH LOAD DENSITIES

The Multi Mover is extremely compact considering how much it can carry. For example, a 280-tonner has only four axle lines which makes it exceedingly short and therefore suited to high load densities. This guarantees you maximum handling performance.

CUSTOMER-SPECIFIC SOLUTIONS

The Multi Mover component modules consist of bogies, power pack and over- and under-floor cabins, all of which are configured according to customers' requirements, giving them tailor-made solutions for their transport jobs. At the same time, they can enjoy the benefits of a modular system, such as proven technology and fast spare-parts availability.



↑ Pallet system means flexible applications



↑ Multi Mover M transporting a scrap basket



↑ Multi Mover M transporting flat material

→ MULTI FLEXUS

TWO VERSIONS FOR MAXIMUM FLEXIBILITY

Multi Flexus is an articulated steering vehicle concept with hydromechanical drive. Its logistical advantage is, as with the Multi Mover, that loading can take place independently of the vehicle.

The Multi Flexus F transports pallets that can be picked up from below. It can handle applications involving skips for scrap, semi-finished products such as slabs, sheet metal and coils, as well as ladle transport. It can also be used to carry plant components such as a newly delivered tundish.

The Multi Flexus D transports smaller loads and is unbeatable in its flexibility. Scrap transport in chutes and skips, tinder, slurry, coils, slab end pieces, filter dust, waste containers – these are but a few examples of applications. Ladles and flat pallets are lifted directly off the floor and are extremely economical to manufacture as well as immensely versatile. And of course, the Multi Flexus D also has a tipping system.

MULTIPLE USES – EXTENDABLE SYSTEM

Because the Multi Flexus comes in various different versions, there are many different ways you can use it to fulfil all of your transport tasks.

It is easy to change and extend your transport activities if you have a Multi Flexus. This system can be extended quickly, easily and cheaply while retaining the same pallet and ladle interface dimensions.

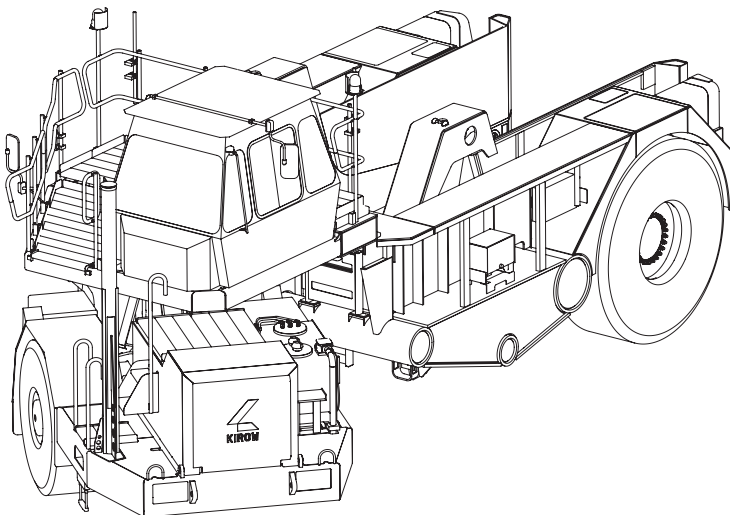
THE POWER TO PERFORM IN SMALL SPACES

An example: a Multi Flexus F can replace three conventional trucks for the transport of scrap while requiring fewer people to drive it. Its handling capacity is also much greater, since the vehicle does not have to wait until it is loaded.

Conventional truck and trailer systems are much less flexible. There are drawbacks in manoeuvring, such as poor rear visibility, as well as inconvenient waiting while trailers are changed and services such as hydraulics and electrics are connected.

PROVEN TECHNOLOGY FROM THE SLAG TAURUS

The technology that has been proving itself for years in the Slag Taurus is also used in the Multi Flexus. A prime mover with hydromechanical drive, articulated steering with an extremely long service life, strong steel construction giving the vehicle extra durability – all of these feature in the Multi Flexus as well, making it a genuine Kirow through and through.





Multi Flexus F driving in beneath a skip



Multi Flexus D tipping heavy scrap

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