

GHH
SOLID AS A ROCK

Member of

GROUP



SOLID AS A ROCK

... since 1964

The beginning of GHH dates back to the eponymous ironworks „Gutehoffnungshütte“ which started its operations in 1782 in Oberhausen. Together with the St. Antony works of 1758 and the „Neu-Essen“ works this was the hour of birth of the Ruhr area as an iron manufacturing center.

In 1808 all three ironworks were merged under the iron works trade union and merchant business Jacoby, Haniel & Huysen (JHH).

As of 1820 JHH concentrated more and more on the construction of machines and manufactured steam engines, steamships, locomotives, railway tracks and bridges. As from 1854 various ore and coal mines were added and incorporated into the group of companies. In 1873 the former commercial partnership was transformed into the „Aktienverein für Bergbau und Hüttenbetrieb“ (share association for mining and steelworks operations), „Gutehoffnungshütte“ (GHH) and also got into the steel production from 1870. In 1920 GHH took over the Augsburg-Nürnberg (M.A.N.) machine works thus doubling the workforce.

After several group demergers and outsourcings of business segments which had taken place after the end of the Second World War a new group of companies emerged under the name of GHH Sterkrade AG.

In the end of the 1980s GHH was finally reorganized under the name of the previous subsidiary company MAN and the head office was relocated from Oberhausen to Munich.

The company divisions which had remained in Oberhausen were doing business under the name of MAN Gutehoffnungshütte. Divisions such as the vehicle construction, the wheel set production line, the screw-type compressor fabrication were sold, have, however, partly still the acronym GHH in their name.

In 1995 the „mining and tunnelling vehicles“ division finally became GHH Fahrzeuge GmbH which was taken over by the family-run Schmidt Kranz Holding in 1999. In 2004 there was the establishment of a joint venture of GHH Mine Machines RSA increasing the product footprint significantly. Since 2005 the head office has been in Gelsenkirchen, Germany.

Thanks to the partnership with Mine Master in Poland, which started in 2006, GHH added to its product portfolio drilling and bolting equipment as well as production rigs. GHH Fahrzeuge GmbH together with Mine Master and GHH Mining Machines, together with all their partners, have now successfully formed the GHH Group, creating a comprehensive Product Portfolio and becoming a total solution provider to customers.





GHH Group develops and manufactures load haul dumpers (LHDs), articulated dump trucks, drill rigs, bolters, production drills, scalers and utility vehicles for both mining and tunneling applications.

The special purpose vehicles are manufactured to customer's specifications for different requirements, whether it is for soft or hard rock applications.

Our products support mining houses and contractors worldwide in the loading and haulage of base metals, precious metals, minerals and other commodities.

In civil projects our products are used for the construction of road, railway and hydropower tunnels.

GHH has a strong, established footprint in Germany, South Africa and Zimbabwe with focused expansion into Russia, India, Australia, South America as well as North America. The combination of GHH load haul dumpers and dump trucks have also proved themselves in global tunnel construction in the NATM tunneling as well as in heading small cross sections as for example for crosscuts, hydro power tunnels or safety galleries as well as for the construction of powerstation tunnels.

OUR EXPERIENCE IS YOUR ADVANTAGE

Consulting

Which vehicle specification and combination is the best one for your project?

Make use of our experience for your projects for developing new, or expanding existing, underground mines, for tunnelling or for pressure tunnels in hydropower projects.

Our strength is to support customers in:

- Vehicle selection according to mining method and application, desired carrying capacities, broken density, cross section of tunnel/drift, inclination, tramming distances, etc.
- Optimum loader and truck combination selection
- Technical drawings of the loading and passing situations of vehicles and vehicle combinations
- Cycle times observation in consideration of mining method, tramming distance, inclination, loading and unloading times including optimization of the number of used vehicles
- Vehicle equipment depending on legal and project-related frame work: varied tier/stage engines, diesel particle filter, air-conditioning or fire extinguishing system, use of special oils, relevant quick fill systems, bucket type and size, aggressive water, ventilation rate, remote control, tele remote, autonomous driving and data transfer



Engineering

We deliver customized solutions, such as application specific vehicle designs.

In addition, we offer special cabins and modifications for operators, as well as engine variants, with focus on safety and ergonomics as key design principles.

Engineering works on application specific propulsion designs, like hydrostatic and hydrodynamic drive trains, to best suit our customers operations, while maximizing efficiencies. Simultaneously we are partnering with industry leaders in the field of data acquisition and analytics to assist our customers in bringing their production to the next level.

Furthermore, GHH modifies vehicles for extreme conditions (corrosion, temperatures, water and gradients) and semi-autonomous operation. Based on GHH standard machines we design explosionproof versions for environments with methane hazard.

AN IMPORTANT COMPONENT FOR YOUR PROJECT – WE HAVE GOT VARIOUS SOLUTIONS

GHH Finance

We offer our vehicles with interesting financial facilities such as leasing, buyback or hire purchase. Please call us, together we will find the appropriate offer.

Leasing including services

GHH offers you off-balance leasing with lease terms which are especially tailored to your needs as well as the possibility of using different service packages. With a corresponding service package and the experience of the GHH service technicians or authorized GHH retailers you will optimize your vehicle utilization by minimizing downtimes.

We take care of the vehicle fleet's availability – you concentrate on the details of your project!

Used vehicles

GHH offers you used vehicles and dump trucks which have been checked and overhauled with the manufacturer's knowledge. You will find a survey of all available GHH dump trucks and LHDs on our homepage: www.ghh-fahrzeuge.de.

Hire

You can also hire the GHH dump trucks and LHDs which have stood the test of time in underground mining and tunnelling, so that you will be able to optimally organize your vehicle fleet for temporary projects. A quick availability, the bridging of peaks, a project-related vehicle feet are only few points in favor of a hired vehicle. The vehicles' adaption to your needs, a complete maintenance contract as well as the support of the GHH service team complete our offer. You will find all current information relating to our rental offer on our homepage.

Purchase with a buy-back option

This variant is especially interesting for long-term projects for which a further use of the vehicle is debatable; in other words: if you have a follow-up order you simply use the vehicle for this order.

If you do not need the vehicle any longer you return it to us at the residual value agreed.

Hence you are able to always tailor your vehicle feet to your requirements.



WE STAND BY YOUR SIDE RIGHT THROUGH THE PROJECT

Your satisfaction is our goal

„A machine which is out of order does not bring profit.“

To prevent this situation, we offer long term service contracts. These, for instance, include inspection or maintenance as well as overhaul. Additional service options can be agreed with you on an individual basis.

We support major customers with special service facilities, so that a 24/7 service and an immediate spare parts supply can be guaranteed.

You can rely on our customer service in Gelsenkirchen, as well as on the service offered from our subsidiaries and distributors worldwide, who guarantee satisfaction and fast service as well as spare parts supply. All repairs, modifications and assemblies are done through our GHH customer service network professionally on time, worldwide.

If it gets narrow in the shaft – we have the solution

If your new vehicle does not completely fit into the shaft, we offer you a disassembly of the machine at

your site, to “make it fit” for the transport, or we already deliver the vehicle in parts ex works to your mine: The assembly of the vehicle will be done by our own employees or by the trained employees of our partners.

GHH training academy. Our education concept.

The availability and economic efficiency of our vehicles is dependent on the qualification of your operation and maintenance personnel. For this reason we offer you a proven training concept, if necessary also at your site. At our production site in Gelsenkirchen our trainers are fully supported by our specialists of the different departments. For practical training we provide our own testing yard.

On-site trainings are compact and time efficient, ideally they can be combined with real operation conditions. Of course, all training contents are adapted and certified to your needs.



OUR SERVICE



THE BIRTHPLACE OF YOUR VEHICLES

The production is the central point on which many threads converge and from which many depart. Here your vehicle is built which had been judged as marketable by the sales department before and which was designed by the engineering department and entered into the booking system by the order processing department.

Now your vehicle is going to be built by us – an important moment, not only for you.

We at GHH Fahrzeuge are in the position to manufacture vehicles in small units and specifically tailored to the individual customer. Our staff in the production, however, does not only make sure to build a high-quality custom-made vehicle but also to repair your vehicle fleet and to maintain it.

In doing so quality and customer satisfaction are always in the focus of our acting.



OUR PRODUCTION SHOP

HOME-GROWN TMMS FOR AFRICA AND BEYOND

GHH Mining Machines has a range of trackless mobile machines (TMMs) designed and manufactured locally in Boksburg, South Africa. These machines include low profile and narrow vein loaders predominantly for the smaller mining applications.

Local and international footprint

For the past seven years, GHH Mining Machines has been manufacturing machines locally, and supplying them to mines across the country and beyond the borders branching out further into Africa. Before then GHH Mining Machines was selling trackless machines built and assembled at factories in Germany, the United States, Poland and Botswana. They also specialise in rebuilding machines and repairing components. GHHMM has an established footprint in southern Africa, with representatives in Zimbabwe and Botswana providing comprehensive aftermarket service.

Local content and machine portfolio

GHHMM manufactures machines that are tailor made to suit site and customer specifications. The company strives to include local content as far as possible. This

includes labour, steel, welding, assembling of frames, machine engineering works tyres and rims among others. Wherever possible, GHHMM will outsource certain specialised processes to locally based companies. Some specialised components have to be imported as they are not manufactured anywhere in South Africa.

The machines manufactured at GHHMM are part of a considerably larger product portfolio of underground mining and construction equipment. GHHMM takes a lot of pride in its mission statement: "To develop products that will deliver the lowest cost per ton for customers."

Highly sophisticated

Through its well-founded reputation in the industry, GHHMM has been able to establish relationships with exclusive technology partners made up of numerous industry leaders throughout the world. This allows GHHMM to offer the market and clients the latest cutting-edge innovation and product development.

An aspect that makes GHHMM stand out from competitors is their versatility that allows them to manufacture machines with varying technology requirements. On





the one hand, GHMM can offer highly sophisticated technology while on the other hand, the local manufacturer's capabilities allow it to produce basic machines with the standard technological requirements, which are easy to maintain, easy to operate and comply with stringent mine safety requirements.

After sales services and compliance

GHMM has impeccable after sales service which ensures that clients are not left out in the cold should they need assistance with their machines. The machine is supplied and looked after for its life in the field. All branches are fully equipped with spare parts and 24-hour field services personnel. Another aspect of support is training where GHMM will provide training which includes technical, operator and component training.

Machines manufactured at GHMM are compliant with ISO:9001, ISO:14001 and ISO:18001. In addition, the machines also have the European CE mark. This means there is no compromise on quality during manufacturing. Quality standards of the machines produced in South Africa are on par with those produced in Germany.

Through collaboration with both the client and its international partners, GHMM engineers comprehensive, tailor-made solutions with their constantly expanding suite of mechanised mining equipment and their full range of well-established support services, for underground mines across the globe.



WORLD CLASS EQUIPMENT FOR DRILLING AND BOLTING

With years of experience

The company's origin dates back to the early 70's. Mine Master is based at the old "Lena" copper ore mine that closed when the deposit was exhausted in 1972. On these premises the company Zakład Urządzeń Górniczych "Lena" ("Lena" Mining Facilities Works) belonging to the state owned KGHM „Polska Miedź” S.A. copper mines was established and within two years engineers and technicians had constructed their first twin boom pneumatic drilling rig designed for the non-ferrous metal ore mining industry.

Later in 1993 a joint venture between KGHM Polska Miedź S.A. and Boart Longyear was established to improve the position of the company in the supply of equipment to a wider mining market. Then in 1999 upon taking over 100% of shares by Boart Longyear the name was also changed to Boart Longyear Ltd.

However in August 2006 Boart Longyear Ltd. was sold off by its owner to the management of the company plus a corporate shareholder – the company GHH Fahrzeuge GmbH a well known manufacturer of loading and haulage machines for mining and tunneling industries. This new company was called Mine Master Ltd. and continues to specialize in the production and supply of drilling and roof-bolting rigs together with the supply of loading and haulage machines produced by our German shareholder. This enables us to offer our customers a full package of machines necessary for the performance of mining and tunneling works.

Our company policy offers a close co-operation with future users of our products and allows us to provide them machines which will fulfill their expectations by being designed for use in specific working conditions.



MINE MASTER



Our greatest strength and asset lies in our employees. They reflect on the quality of services we provide and are specialists in their field at all structural levels in the company. Combining the three elements: individual goals, goals of the company and teamwork, with which we can guarantee our development and customer satisfaction. The experience of our employees and constant upgrading of their qualifications allows us to improve our products and their quality resulting in improved equipment productivity.



SERVICE-ORIENTED, FAST AND RELIABLE

It is our ultimate ambition to ensure a high availability of your GHH vehicles for mining and tunnelling.

In order to reach this target we offer you a wide and well-assorted range of original spare parts for GHH vehicles from our central warehouse in Gelsenkirchen.

Alternatively, for reducing delivery times our customers may access to our decentralized spare parts warehouses in Russia (3x), Poland, India, China, Chile, USA and South Africa for covering their global demand. This network is complemented by the well-assorted spare parts warehouses of our worldwide dealer network.

The stockpiling of our spare parts warehouses is based in equal measure on our long-term market knowledge and product knowledge respectively as well as on the current demand situation. Our scheduling and the downstream logistics conception are accordingly targeted to provide our customers the required spare parts within the shortest possible time and to supply them according to the individual requirements. For this purpose we keep a variety of logistics solutions at hand for you, from the pickup via over-night distributors, forwarding agents, airfreight and sea freight to courier service.

It is a pleasure for us to support your own prevention measures with special spare parts suggestions for the individual operational conditions of our machines. Working with GHH comes along with an initial stock proposal to guarantee best in class availability right from the start.

For constructions sites we offer our customers furthermore the stockpiling of selected spare parts directly on site.

Our spare parts catalogues include all parts to be serviced as well as repair parts which are required for a smooth operation. With these catalogues and by means of our electronic spare parts book (eDokS) you can always quickly and safely identify the required spare part and order it from us.

Besides a personal support by our staff in the spare parts service we also offer our customers the possibility of requesting the availability of spare parts online as well as placing spare parts orders online (24/7). Please contact us at spares@ghh-fahrzeuge.de if you also want to make use of this option in future. Or alternatively contact us on +49 209 38907 0.



OUR SPARE PARTS SERVICE



YOUR KEY TO A LONG SERVICE LIFE OF YOUR GHH PRODUCTS

We also offer our customers of course a wide range of original spare parts.

In many decades of close cooperation we have been installing components of well-known manufacturers into our vehicles.

Original replacement parts are quickly and straightforward available for you directly from our spare parts warehouse. We do not only offer our customers the delivery of replacement parts but also a repair service.

Our multilingual staff in the spare parts departments is at your disposal at any time for inquiries or further information – also per call-back.

For spare parts inquiries or orders please directly contact our spare parts staff or send an e-mail to spares@ghh-fahrzeuge.de.

We are looking forward to be of help and to bringing forward our common projects.



OUR ORIGINAL SPARE PARTS

SUPER LOW PROFILE LHD (SLP)



GHH Group has the largest portfolio of „super low profile“ – LHDs (SLP), with capacities ranging between 3 and 14 tons.

The long-term experience of GHH in low profile applications in the platinum and chrome mines in Southern Africa and Zimbabwe as well as in European potash mines is reflected in the design of our vehicles.

Our vehicles are optimized for such special conditions and enable a highly efficient selective extraction in low profile room-and-pillar mining. Also in this range safety and serviceability are major topics the design department of GHH takes care of.

TYPE, STANDARD	PAYLOAD	BUCKET CAPACITY	WIDTH (AT CABIN)	HEIGHT (AT CABIN)	POWER
SLP-3H**	4.000 kg	1,2 m ³	2.413 mm	1.700 - 1.900 mm	100 kW
SLP-5	5.000 kg	1,6 – 2,5 m ³	2.330 mm	1.500 – 1.700 mm	104 kW
SLP-5FP*	5.000 kg	2,5 m ³	2.330 mm	1.500 – 1.700 mm	92 kW
SLP-6	5.750 kg	2,2 – 2,7 m ³	2.662 mm	1.600 – 1.800 mm	104 kW
SLP-8	7.500 kg	2,8 – 5,3 m ³	3.034 mm	1.550 – 1.850 mm	178 kW
SLP-10	10.000 kg	4,0 – 5,5 m ³	2.700 mm	2.000 mm	190 kW
SLP-14**	14.000 kg	8,5 – 9,7 m ³	3.680 mm	1.880 mm	265 kW

*flameproof / permissible **hydrostatic drive train

DIESEL LHD



GHH Diesel LHDs are custom designed to operate in the narrow vein and midseam mass mining operations. They are efficiently compact with an optimal operator's position. The lateral arrangement of the operator seat guarantees optimal views for forward and backward tramming. The capacities of the GHH LHDs are ranging between 1 to 21 tons. The LHDs are globally used in underground mining, in tunneling, hydro-power and other civil construction projects.

The „plain-tech“ LHDs are characterized by robustness and the „high-tech“ LHDs additionally by our efficient hydrostatic drive train (EDS) combined with best in class exhaust after treatment. The LF-14 and LF-8 are now also available in Stage 5. Safety, ergonomics and maintainability are some of the key features of our design.

TYPE, STANDARD	PAYLOAD	BUCKET CAPACITY	WIDTH (AT CABIN)	HEIGHT (AT CABIN)	POWER
XLH05D #	1.000 kg	0,59 m ³	1,165 mm	1.808 - 2.008 mm	72.4 kW
XLH12D #	2.000 kg	1,2 m ³	1,372 mm	1.900 - 2.060 mm	72.4 kW
LF-3	3.500 kg	1,5 m ³	1.588 mm	1.600 mm	70 kW
LF-5	4.500 kg	1,9 – 2,4 m ³	1.765 mm	2.200 mm	129 kW
LF-6	6.000 kg	2,1 – 3,5 m ³	1.950 mm	2.300 mm	129 kW
LF-7	7.000 kg	2,4 – 4,0 m ³	2.150 mm	2.200 mm	164 kW
LF-8	8.000 kg	2,8 – 6,0 m ³	2.675 mm	1.850 mm	173 kW
LF-10	10.000 kg	4,0 – 5,5 m ³	2.600 mm	2.300 mm	200 kW
LF-10Ex*	10.000 kg	4,0 – 5,5 m ³	2.600 mm	2.390 mm	205 kW
LF-12H**	12.000 kg	8,7 m ³	3.224 mm	2.300 - 2.723 mm	265 kW
LF-14	14.000 kg	5,7 – 9,0 m ³	2.660 mm	2.550 mm	285 kW
LF-19H**	19.000 kg	12,9 m ³	3.090 mm	2.300 – 2.875 mm	360 kW
LF-21H**	21.000 kg	10,5 – 14 m ³	3.090 mm	2.300 - 2.875 mm	375 kW

*flameproof / permissible ** hydrostatic drive train #Designed and manufactured by Overprime

ELECTRIC LHD



GHH offers electric LHD with capacities up to 19 tons. Furthermore, all electric LHDs are equipped with an active drum control which ensures an orderly winding, whereby a long service life of the cable is reached due to low tensile forces.

The electric LHD offer particular advantages in underground applications through its emission-free drive and are therefore especially suitable for projects where ventilation is critical. Further advantages of the electric LHDs result from a low noise level.

A constant torque and the resulting dynamics allow for more efficient loading of the muck pile. Furthermore, economic benefits result from a high reliability and a

long life span of the drive components. This means fewer spare parts and lower maintenance costs and hence lower overall operating costs.

The electric LHDs of GHH Group are equipped with the proven hydrostatic Efficient Drive System (EDS), which ideally complements to the electric motor running at a constant speed due to its continuous variable transmission.

In connection with an intelligent monitoring system efficiencies are increased and consequently power consumption is reduced significantly. Minimized brake and tire wear as well as simple maintainability are main characteristics of this LHD class.

TYPE, STANDARD	PAYLOAD	BUCKET CAPACITY	WIDTH (AT CABIN)	HEIGHT (AT CABIN)	POWER
LF-18HE	18.000 kg	12,2 m ³	3.470mm	2.750 mm	250 kW
LF-19EB	19.000 kg	12,9 m ³	3.350 mm	2.850 mm	320 kW

UNDERGROUND DUMP TRUCKS



GHH Group manufactures articulated dump trucks for mining and tunneling with capacities from 20 to 45 tons, and bowl sizes from 6 to 24m³. Our vehicles are characterized by their compact dimensions, higher comfort and better maneuverability with a swivel hinge. The vehicles have an excellent power to weight ratio to ensure high speeds even in high gradients. The particularly basic and robust design of the vehicles ensures a long service life at low operating costs.

For optimal ease of operation the MK-A20 have lateral operator seats, the MK-A35 has a bi-directional cabin in

order to move the vehicle faster and more comfortable in both directions.

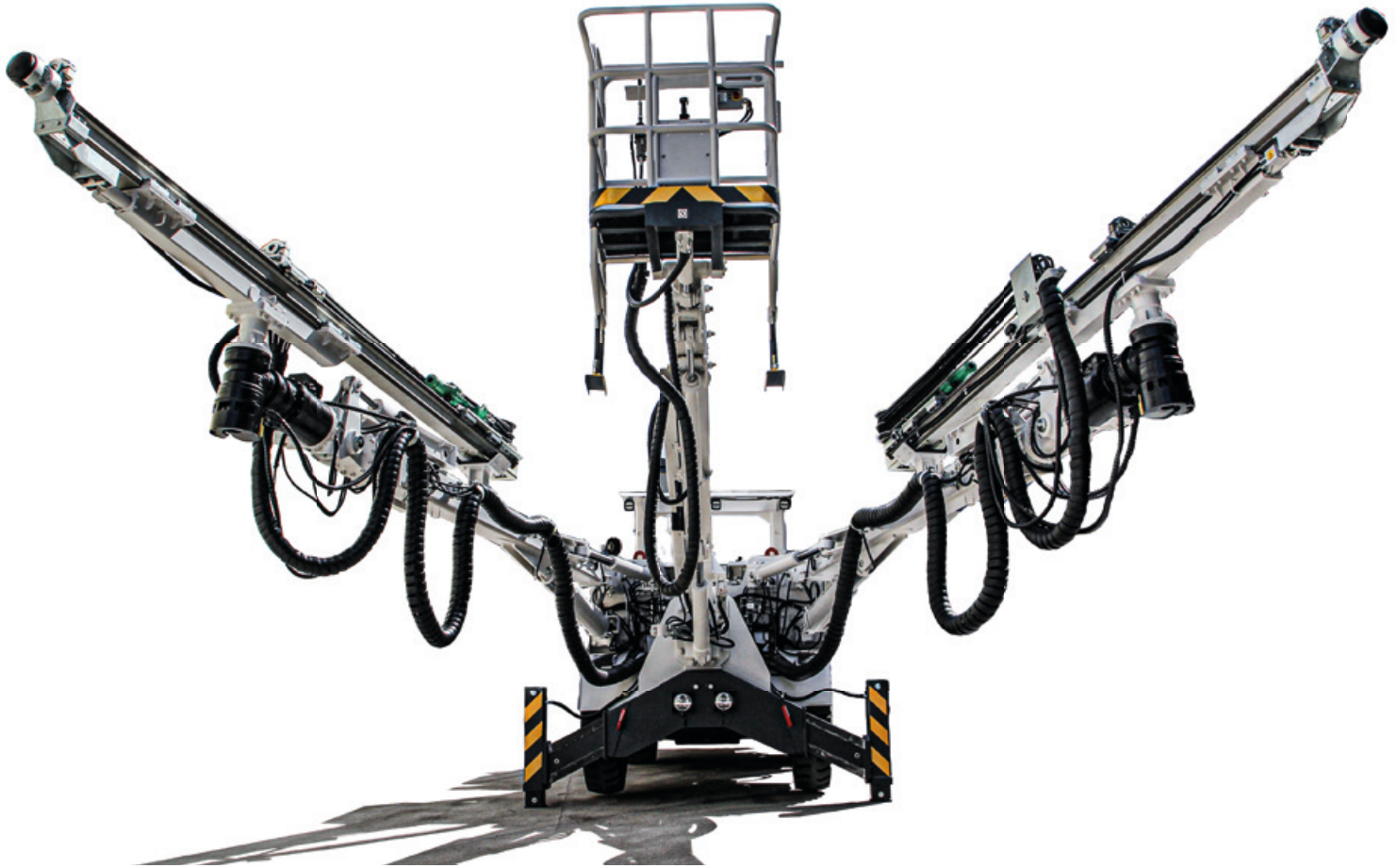
Thus, time-consuming maneuvers may be avoided. For high productivity our dump trucks may be combined optimally with GHH LHDs.

In addition to the standard Tier 3 engine, the GHH Truck offering now boasts Tier 4, Stage 5 engine packages to support industry drive towards environmental and operator friendly working environments.

TYPE, STANDARD	PAYLOAD	BOWL CAPACITY	WIDTH (AT BODY)	HEIGHT (ABOVE CABIN)	POWER
MK-A20*	20.000 kg	6 – 12,5 m ³	2.200 mm	2.555 mm	194 - 209 kW
SK-A30*	30.000 kg	21,5 m ³	3.200 mm	2.897 mm	300 - 320 kW
MK-A35*	35.000 kg	13 - 23,0 m ³	3.200 mm	2.897 mm	300 - 320 kW
MK-42**	42.000 kg	19 - 23,0 m ³	3.060 mm	2.696 mm	450 - 460 kW

*Tier 3, Tier 4, Stage 5 **Also available in 45 tons

FACE DRILLS



Mine Master offers a wide range of self-propelled drilling rigs suitable for various heights and width of headings. Plus a range of optional features that allow the machines to be operated under various exploitation conditions.

Operator's safety and protective canopies complying with requirements of FOPS/ ROPS, are basic features of our rigs while other features improve reliability and availability allowing our machines to be efficient and productive.

TYPE, STANDARD	LENGTH [M]	WIDTH [M]	HEIGHT [M]	WEIGHT [T]	NO. OF BOOM	MAX. COVERAGE [M²]	MINIMUM WIDTH OF HEADING FOR TRAMMING @ 90° [M]	DRIFTER	POWER SOURCE TRAMMING / WORKING	APPLICATION
FM 1.4/ FLP1400-1B	12,3	2,4	1,4	14,9	1	63	3,9	rotary- percussive	diesel / electric	hard rock / non-flameproof
FM 1.7	13,8	2,4	1,7	21	1	67	4,5			
FM 1.7L	13	2,4	1,65	19,5	1	66	3,85			
FM 1.7LE	12,5	2,4	1,65	19,5	1	66	3,85			
FM 1.7D	13	2,4	1,9	21	1	56	4,5			
FM 1.7R	13,4	2,4	1,7	21	1	67	4,5	rotary		soft rock / non-flameproof
FM 1.8RS	16	2,4	1,8	24	1	56	5			Ex / flameproof
FM 2.1	10,2	1,35	2,1	13	1	25	2,6	rotary- percussive	diesel / electric	hard rock / non-flameproof
FM 2.3-1B	12,7	2	2,3	17,5	1	56	3,5			
FM 2.3	12,7	2	2,3	23,8	2	67	4			
FM 2.3L	12	2	2,3	19	2	45	4			
FM 2.8MPD	14,5	2,5	2,8	30	2	65	5			
FM 3.0 Mk3	15,9	2,5	3	35	2+1	102	6,4			



Roof support in mining excavations and tunnels by means of roof-bolting is one of the applications that can be achieved by machines manufactured by our company.

Self-propelled bolting rigs featuring various parameters depending on the height of the roof and hardness of rock are manufactured to tailor individual clients applications.

TYPE, STANDARD	LENGTH [M]	WIDTH [M]	HEIGHT [M]	WEIGHT [T]	MAX. BOLTING HEIGHT	OPERATION	MINIMUM WIDTH OF HEADING FOR TRAMMING @ 90° [M]	DRIFTER	POWER SOURCE TRAMMING / WORKING	APPLICATION
RM 1.4	10,5	2,4	1,4	18,4	3,3	on the left side of the boom	4,5	rotary with dust collection	diesel / electric	non-flameproof
RLP1400-1B	10,1	2,4	1,4	19,7	3		4,5	rotary-percussive		
RM 1.7	11,3	2,4	1,7	19,5	4		4,5	rotary with dust collection		
RM 1.8AWK	13,9	2,4	1,8	22,4	7,5	from operator's compartment	4,9	rotary-percussive		Ex / flameproof
RM 2.3AWK	11,3	2	2,4	20,5	8,3		4			
RM 2.6 ATEX	14	2,4	2,6	28	7,5		4,5	rotary-percussive or rotary		
RM 2.3	12,7	2,6	2,3	29,7	9	on the left side of the boom / from operator's compartment	4,5	rotary-percussive		non-flameproof
RM 2.0 SWKB	6,5	1,4	2,1	13	4	on both sides of the boom	2,4	rotary with dust collection or water flushing	electric	Ex / flameproof

LONGHOLE/PRODUCTION DRILLS



For underground production drilling Mine Master offers a range of long hole drilling rigs in configurations suitable for the required work in mines. To adapt to specific working conditions the machines can be offered with variable setups of the working unit featuring different feed lengths and drifter parameters. For easy operation the customer can choose between mechanized or manual rod handling. In some models traditional control systems from the operator's stand are supported by a bluetooth remote control panel to improve safety as well as precision and efficiency of drilling.

A self-propelled Production Master 2.3 long hole drill rig is designed for drilling parallel upholes and downholes as well as fans and rings in vertical or inclined planes. A top-hammer system gives the possibility of drilling in a range of 64-165 mm holes depending on the configuration. Easy to use positioning system offers drilling in required directions. The machine has a very good stability for fast tramming even in tough road conditions. Remote control panel is included for easy operation and drilling accuracy

TYPE, STANDARD	LENGTH [M]	WIDTH [M]	HEIGHT [M]	WEIGHT [T]	MAX. DEPTH OF DRILLING [M]	CONTROL SYSTEM	MINIMUM WIDTH OF HEADING FOR TRAMMING @ 90° [M]	DRIFTER	POWER SOURCE TRAMMING / WORKING	ROD HANDLING METHOD
PM 2.1	10,2	1,4	2,1	12,0	20,0	direct from operator's stand	2,85	20kW class	diesel / electric	manual with helper
PM 2.3	9,2-9,6	2,0	2,7	23,0	32,0	from operator's stand or remote via bluetooth	3,6	30kW class		rod magazine
PM 2.3M	11,7	2,0	2,3	20,6	20,0	direct from operator's stand	3,5	20kW class		manual with helper

ROCK TOOLS



Mine Master is a provider of tools for use in mining, quarries and civil engineering works. We provide the highest quality tools supplied by manufacturers recognized worldwide.

The tools offered are made from the highest quality TC and stainless steel materials. In our offer you will find button bits, which, due to the chemical composition and shape of tungsten carbide can be used in all geological conditions in mines and quarries. You will also find drill rods and shank adaptors with a superior life service.

We also offer down the hole (DTH) hammers with very good characteristics and performance of work as well as excellent durability and great reliability.



Standard underground tools:

- Button bits - tapered & threaded (Ø 30 – 127 mm)
- Tapered rods (l - 1830 – 3100 mm)
- Extension rods (l - 2400 – 4915 mm)
- Tunneling rods m/f (l - 2400 – 4310 mm)
- Couplings
- Shanks adapters – for many type of rock drills
- Reaming equipment

Standard quarrying tools:

- Button bits (Ø 76 – 127mm)
- DTH button bits (Ø 90 – fi 200 mm)
- DTH hammers (3" – 8")
- Tube rods / drilling pipes
- Extension rodsIntegral drill steels
- Shank adapters
- Tapered rods and bits

SCALER



Based on standard LHDs GHH also offers shearing scalers to prepare the roof for subsequent roof support. The highly efficient working principle of our shearing scalers is combined with the proven hydrostatic drive train EDS, which allows for sensitive roof and side wall scaling as well as quick reversing.

The cabins comply with the highest safety requirements and are designed for an extremely high load and provide an excellent overview in all working conditions – in particular at the scaling tool. The intelligent scaling safety system protects both the operator and machine during operation.

TYPE, STANDARD	MAX. SCALING HEIGHT	WIDTH (AT CABIN)	HEIGHT (AT CABIN)	POWER
LF-7.6HB	4000 - 7.850 mm	3.387 mm	1.700 - 3.300 mm	180 kW
LF-20HB	9000 - 11.000 mm	3.387 mm	2.530 mm	300 kW

HEAVY DUTY ELECTRIC VEHICLES

INNOVATIVE HEAVY DUTY 4X4 VEHICLE TEMBO 4X4 SOLUTIONS



**100% ELECTRIC
VEHICLES FOR MINING**

IMPROVED WORKING CONDITIONS

- Zero emissions
- Less noise
- Less vehicle heat

COST SAVINGS

- Low maintenance cost
- Low operational cost
- Lower ventilation cost
- No need of expensive fuel infrastructure
- Less downtime

MORE COMFORTABLE DRIVING EXPERIENCE

- Smooth acceleration
- Accelerates gradually
- Better weight distribution
- No engine noise

TYPE	CAPACITY	RANGE (KM)	POWER (KW)	CHARGE TIMES	RECUPERATION
	2 - 13 people	80 (28,4kWh) / 160 (56,8kWh)	Continuous: 65 Max: 110	1P: 2,5hr from 20% to 80% 3P: 1hour	Up to 22kW

GHH UTILITY VEHICLES

GHH Branded Titan Makina Utility vehicles were founded in 1997 in Ankara, Turkey, with the aim of manufacturing construction machines for infrastructure construction and underground metal mining sectors that can compete with international brands in terms of quality and technology.

Titan Makina is the solution partner of reputable domestic and international companies for tunnelling, underground mining and dam projects with its other machines in the product range, Personnel Carrier, ANFO Charging Truck, Crane Truck, Scissor Lift and Concrete Paver.

ARTICULATED

BAC2x350



ANFO Charger Truck

BMP2x3



Scissor Lift

BVK05



Crane Truck

BPT24



Personnel Carrier

AC500



ANFO Charger Truck

BIA100



Fuel and Lube Truck

MODEL	DESCRIPTION	CAPACITY	WIDTH	HEIGHT
BAC2x250	ANFO Charger Truck	2x250 lt	2.000 mm	2.415 mm
BMP2x3	Scissor Lift	1500 kg	2.000 mm	2.600 mm
BVK05	Crane Truck	2,4 ton	2.000 mm	2.500 mm
JM2	Underground Drilling Rig	-	2.330 mm	3.200 mm (canopy up)
BPT24	Personnel Carrier	24 people	2.400 mm	2.550 mm
BIS20	Concrete Spraying Machine	30 m3/h	2.300 mm	2.550 mm
BYM4.5	Concrete Transport Machine	4,5 m3	2.000 mm	2.400 mm
BYM6	Concrete Transport Machine	5,6 m3	2.300 mm	2.645 mm

The company has been qualified for ISO 9001, ISO 14001, OHSAS 18001 quality certificates and all machine types in the product range has TÜV SÜD approved CE certificates.

We deliver customized solutions, such as application specific machine designs.

- We offer special cabins and modifications for operators, as well as engine variants, with focus on safety and ergonomics as key design principles.
- We do modifications according to application requirements.

RIGID

MP2X3



Scissor Lift

SP1500



Basket Boom Truck

EC2x350



ANFO Charger Truck

DK16



Dumper Truck

VK10



Crane Truck

PT16



Personnel Carrier

MODEL	DESCRIPTION	CAPACITY	WIDTH	HEIGHT
PT16	Personnel Carrier	16 people	2.300 mm	2.950 mm
DK16	Dumper Truck	12.000 kg	2.400 mm	2.950 mm
SP1500	Basket Boom Truck	800 kg	2.400 mm	2.950 mm
VK10	Crane Truck	4.200 kg	2.400 mm	2.950 mm
MP2x3	Scissor Lift	1.500 kg	2.400 mm	2.800 mm
AC500	ANFO Charger	2x500 l	2.400 mm	2.950 mm
EC2x350	Emulsion Charger	2x350 l	2.400 mm	2.850 mm
IS26	Concrete Spraying Machine	34 m ³ /h	2.400 mm	3.000 mm
IS21	Concrete Spraying Machine	34 m ³ /h	2.000 mm	2.800 mm
IS5	Concrete Spraying Machine	10 m ³ /h	1.916 mm	1.981 mm
TM05	Concrete Transport Machine	5 m ³	2.400 mm	2.950 mm
YTM05	Concrete Transport Machine	5 m ³	2.400 mm	2.950 mm

GHH UTILITY VEHICLES

CONCRETE SPRAYING

GHH Concrete Spraying Machine is manufactured to spray shotcrete concrete (wet spraying concrete) in tunnels, underground mines, construction areas and in open space to every surface within its spraying range. The machine is 4-wheel-drive and has power shift automatic transmission. The operator cabin is designed for the convenience of the operator with ergonomic operator's seat and wheel, adjustable seat belt, beacon lamp, controllers for all driving controls, optional air conditioning and wide line of sight. The manipulator is designed

by TITAN and consists of a vertical arm, the main arm and telescopic extension. It can rotate 270 degrees and can be controlled remotely. The GHH Concrete Spraying Machine is designed with safety, ergonomics and ease of maintainability in mind.

After completing research and product development activities serial production started in 2010 of IS26 – IS21 Concrete Spraying Machines and TM05 Concrete Mixers and has been the market leader since then.



TYPE	CHASSIS TYPE	VERTICAL AND HORIZONTAL SPRAYING REACH	CAPACITY	WIDTH	HEIGHT
IS26	Rigid	13,2 m - 10,2 m	34 m ³ /h	2.400 mm	3.000 mm
IS21	Rigid	9,2 m - 7,2 m	34 m ³ /h	2.000 mm	2.800 mm
IS5	Trailer Mounted	-	10 m ³ /h	1.916 mm	1.981 mm
OMP30	Trailer Mounted	8,25 m – 9,00 m	30 l/min – 30 bar	1.050 mm	1.320 mm
BIS20	Articulated	8,25 m – 9,00 m	30 m ³ /h	2.300 mm	2.550 mm

*IS5 trailer mounted for manual concrete spraying.

*OMP30 is pre-mix mortar pump

CONCRETE TRANSPORT

GHH Concrete Transport Machine is manufactured to carry concrete in tunnels, underground mines and construction areas. The machine is designed for efficiency and conformity to hard operating conditions, and equipped with complete hydraulic and sensitive control

systems. The machine is 4-wheel-drive and has power shift automatic transmission. Automated and manual Fire suppression systems are available.



TYPE	CHASSIS TYPE	DRUM VOLUME	CONCRETE CAPACITY	WIDTH	HEIGHT
TM05	Rigid	7,3 m ³	5 m ³	2.400 mm	2.950 mm
YTM05	Rigid	6,25 m ³	5 m ³	2.400 mm	2.950 mm
BYM4.5	Articulated	5,6 m ³	4,5 m ³	2.000 mm	2.400 mm
BYM6	Articulated	7,6 m ³	5,6 m ³	2.300 mm	2.645 mm
BIS20	Articulated	8,25 m – 9,00 m	30 m ³ /h	2.300 mm	2.550 mm

GHH InSITE

TURNING DATA INTO REAL BUSINESS VALUE

Machine data is a conclusive source for information and process insights. Findings from machine data cannot be biased by subjective reporting or errors caused by manual documentation.

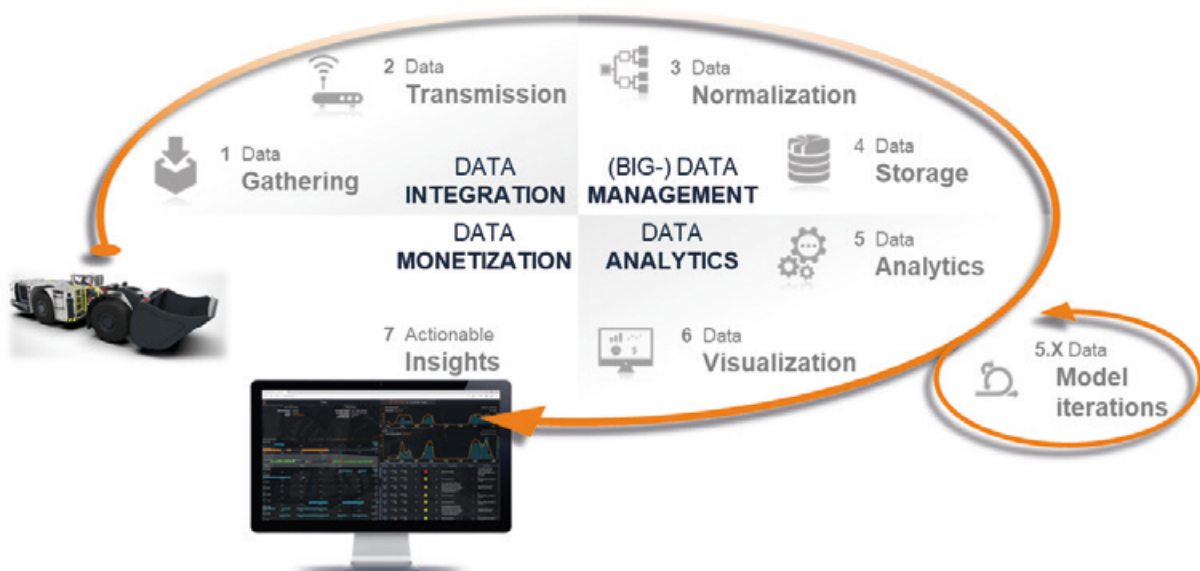
Accessing such data during the actual work process or close to real time by frequent transmission-events allows to gain an overview of machine activity, identify shortcomings in process efficiency and optimize the allocation of mobile equipment, as well as designate misuse of consumables.

The adoption of IT-solutions for data handling and analysis is most efficient when it involves and integrates different data-sources and processes throughout the industrial operation. Organizations can make the most of big data by aggregating information from different systems.

Smart industry applications can distill complicated and seemingly random information into powerful tools for analysis. For this, the targeted insights and scope of analysis need to be defined in order to design suitable algorithms.

Pre-Requisites for System Implementation

- Connective Infrastructure & Remote Access
- Ensure machine data transmission at least once a week
- Confirm that access points, such as WiFi Hotspots, are providing internet or intranet access
- Establish and provide a secured connection from the internet to the underground access points in the mine (usually IT department of the mine operator)
 - Such a connection (e.g. VPN) should be agreed upon mutually, as many options are possible.
- Make sure these access points are installed in the regular whereabouts of the machines for an assured periodic data transfer
- This enables remote commissioning, updating and trouble shooting possibilities, minimizing efforts for all stakeholders





GHH
SOLID AS A ROCK





GHH
SOLID AS A ROCK

GHH Fahrzeuge GmbH
Emscherstr. 53
45891 Gelsenkirchen
Germany

Tel: +49 (0) 209 38907-0
Fax: +49 (0) 209 38907-109

info@ghh-fahrzeuge.de
www.ghh-fahrzeuge.de

GHH Mining Machines
92 Kirschner Road
Boksburg, 1459
South Africa

Tel: +27 11 896 0600
Fax: +27 11 896 0605

sales@ghhmm.co.za, info@ghhmm.co.za
www.ghhmm.co.za

**mine
master**
Rigs for your needs

Mine Master Ltd.
ul. Dworcowa 27, Wilków
59-500 Złotoryja
Poland

Tel: +48 76 87 83 511
Fax: +48 76 87 84 101

info@minemaster.eu
www.minemaster.eu