

PERFORMANCE



SUCCESS FACTOR
MARKET PROXIMITY

PROXIMITY TO THE CUSTOMER

KAISER PREMIER is
the new US member of
the KAISER Group

INNOVATION CAPABILITY AND VALUES

Interview with Markus Kaiser discussing strategy and entrepreneurship.



SEWER CLEANING IN EGYPT

Maneuverable, high-performance vehicles for Egypt's metropolises.



THE WORLD'S STEEPEST FUNICULAR

Endurance test for the S12 Allroad mobile walking excavator.



KAISER IN FIGURES



has 55 years of experience in the manufacture of sewer cleaning vehicles

has almost 35 years of experience in water recycling technology

has been manufacturing walking excavators for 53 years



KAISER VEHICLES ARE USED:

- > on all continents
- > in 116 countries
- > in well over 1,000 cities



As a manufacturer of vehicles for sewer cleaning and industrial disposal, KAISER is the only company in the industry that operates with a truly international base.

NETWORK 100

distributors & service partners worldwide

KAISER celebrates its 105th birthday in 2018



The history of KAISER is one of innovations and inventions. For over 100 years, this tradition has continually given rise to technical improvements or entirely new products.

DEAR READERS



You are now holding our customer magazine, PERFORMANCE, in your hands. I am delighted to present the current issue, which is based on a new editorial concept and design. We see the magazine as an informational medium – for our valued customers, partners and for our employees at our various sites. In order to reach our target groups, we would like to present our topics, which can be very complex, in a more understandable and attractive format.

In PERFORMANCE, we introduce you to KAISER innovations and projects around the globe. We also provide you with the latest news from our various sites. In this first issue, we focus on the most recent member of the KAISER family: KAISER PREMIER, our US based company located in Fort Morgan, Colorado.

I hope you enjoy the magazine and wish you happy reading,

Markus Kaiser

PS: Please let us know what you think about the new PERFORMANCE magazine. We welcome your feedback: marketing@kaiser.li

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INNOVATION AND ENTREPRENEURSHIP

Markus Kaiser, CEO and principal shareholder of KAISER AG, is the third generation of the Kaiser family to head the company. To mark the relaunch of the customer magazine, the PERFORMANCE editorial team spoke with him about the company's values and strategy.



KAISER AG has had its roots in Schaanwald, Liechtenstein, since 1913. Under the stewardship of Markus Kaiser, the company has in recent years significantly expanded its global market position through internationalization and a series of major technologies.

PERFORMANCE: Where does this capacity to innovate and constantly set new trends come from?

MARKUS KAISER "Our innovation capability can undoubtedly be attributed in part to our origins and our very small domestic market. Successful exports are a fundamental prerequisite for the positive development of an industrial enterprise based in Liechtenstein. You can only achieve that through technical differentiation; it's almost impossible through cost leadership. For KAISER AG and for Liechtenstein in general as a location, setting innovative milestones is a must. It's virtually a part of our DNA. The leading position that we now hold is based on different factors. Up until 2008, KAISER's growth under my stewardship was primarily organic. Then we began to systematically look for acquisition opportunities. In line with our strategy, we took over companies with strong regional roots. A close relationship with the customer, established products and our own production plays a major role in securing success in a market. While we consistently utilize synergies, the local role and responsibility of the individual sites is retained. They are full-fledged standalone business units and operate on an entrepreneurial basis. This is where we differ

KAISER'S 105-YEAR HISTORY

"Our history gives us the necessary self-confidence and a value base. But you still have to work continually for tomorrow's success."

from conventional corporate structures. In the field of industrial disposal and sewer cleaning, we are the first and truly international company with local manufacturing sites. That's a special feature. Our acquisitions are not so much about size or economies of scale – with a view to better purchasing conditions, for instance. We're much more interested in local proximity to our end customer to better understand and service their needs, ultimately strengthening of our market position.

PERFORMANCE: Do you have a particular recipe for developing innovations?

MARKUS KAISER "In our case, the inspiration for innovations comes from different sources: from customer relationships as well as through systematic development work in-house. We utilize the edge we have in

PERFORMANCE COUNTS – that's really true and it's my aspiration, and also ours as a company. We have a good fit between 'collegial spirit' and performance.

Markus Kaiser, CEO and principal shareholder of KAISER AG

PERFORMANCE: Customers frequently cite the quality of the products and precisely customer proximity as the reasons for choosing KAISER. How do you safeguard those factors?

MARKUS KAISER "We're specialized in vehicles and construction machines with highly sophisticated technology for niche markets, in other words in moderate numbers. We're very focused on both sectors in which we operate. That's where our core competencies lie. KAISER is very much geared to the individual customer and we're very effective and efficient at putting that into practice in our processes. Where we differ from other manufacturers is that we simultaneously pursue two directions of travel: On the one hand, we jointly develop specific products by working with our customers; on the other hand, we constantly work on new solutions with a long-term horizon in mind.

terms of international experience and our significantly more solid grounding in comparison with our competitors. Our innovations are developed alongside our acquisition activities. The two things are mutually beneficial: The know-how and the experience that is present at one site can also make sense in adapted form elsewhere. In my opinion, fast organizational learning in an international context, plays a key role and has been one of the major success factors of recent years."

PERFORMANCE: The KAISER Group has seen strong expansion as a result of the company acquisitions in recent years. What are the plans for the future?

MARKUS KAISER "Yes, we have acquired several sites internationally, but we're still a medium-sized enterprise: big enough to work professionally – in the sense of being able to 'integrate technical progress and innovation more easily' – and small enough to continue working together as a very focused team. Common sense as well as reasonable pragmatism, remain key elements in our day-to-day working relationships. Our industry doesn't have the sort of volume that would justify corporate structures. Employees and customers know one another – that creates an added value for customers. That's very important for us as a family business. As a result, we have been able to successfully 'export' our business model with its focus on customer proximity and innovation – irrespective of the size of the new market. Our customers and employees are happy about that."

ENTREPRENEURSHIP AND WILLINGNESS TO TAKE RISKS

"As a family business entrepreneur, certainly something I'm more conscious of – there's always a personal risk involved too. But a reasonable level of risk is all part of successful entrepreneurship."

INNOVATION

"Being technology leader in our sectors is the aspiration and the benchmark we set ourselves."

Professional project implementation is our daily routine, but you also need strategic development for tomorrow. The balance between the two results in the best solution for the customer. And that's also what they expect from us."



KAISER LIECHTENSTEIN



KAISER MORO MORO KAISER COMPONENTS ITALY



KAISER EUR-MARK FINLAND



KAISER PREMIER USA



KAISER SLOVAKIA



KAISER AUSTRIA



Typical Hydrovac application: working with water and vacuum

COMBINING STRENGTHS TO BENEFIT THE CUSTOMER

Since June 2017, KAISER PREMIER, a subsidiary of KAISER AG based in Colorado, has been directly responsible for taking care of customers in the North American market – with a specialist team, market-specific products and local production. Customers benefit from the synergies generated at the US site.

“ The KAISER PREMIER team is honored and excited to be part of such a strong company.
Dan Weber, CEO, KAISER PREMIER

As was the case prior to the takeover by KAISER in 2017, KAISER PREMIER will continue to focus on hydrovac vehicles – i.e. vacuum excavation trucks, which are particularly well suited to removing soils to locate underground utilities thanks to their non-destructive and cost-effective method of operation. The success of the independent US subsidiary, which is integrated into the KAISER Group, is confirmation of this strategy: An essential part of the mobile high-performance hydro excavators on the US market

come from KAISER PREMIER, formerly known as PREMIER Oilfield Equipment.
Rugged, reliable and highly productive
In response to continuing demand, the company is expanding the tried-and-tested hydrovac product line for its customers. North America's aging underground utilities need replacing. KAISER PREMIER products have earned themselves a solid reputation, and for good reason: Distributors and end users alike value the rugged reliability and high productivity of the hydrovac vehicles.

An essential part of high-performance vacuum excavators in the USA are from KAISER PREMIER, formerly known as PREMIER Oilfield Equipment.

New vision for the Colorado site

Alongside a strong market position for hydrovac vehicles, KAISER also attaches top priority to achieving a leading position for recycling sewer cleaning vehicles in the North American market. KAISER draws on the Group's entire know-how in the area of sewer cleaning and vehicle technology for this development. As the only company in the industry that operates globally, KAISER endeavors to apply its wealth of experience and synergies to generate clear regional value add for its customers.

Identifying and addressing market needs

The North American market is currently experiencing strong changes. There is increasing customer demand for recycling vehicles for sewer cleaning applications. Today, efficiency and – also as a result of regional water shortages – minimum fresh water consumption are major factors influencing the decision to purchase. KAISER is a technological leader as well as international market leader for this type of vehicle. The manufacturer is many years ahead of US competitors in terms of technology.

A comprehensive, proven network of authorized distributors providing responsive part and service support rounds off the portfolio. Customers can either purchase vehicles and spare parts direct or through selected regional partners – with several service locations. In addition, KAISER PREMIER offers the option of renting vehicles for temporary deployment. This is of particular interest to customers who only require a vehicle for a limited time period.



AquaStar: Leading recycling technology now also available in the USA



CV-200: Rugged and powerful hydrovac
Urban X: Flexible deployment, particularly when working in tight spaces.



“Technical solutions are shaped by regional preferences. The differences between Europe and North America are reflected in the lifestyle and the infrastructure, and also in the special-purpose vehicles. In the USA, the classic long-hood trucks are the norm, whereas in Europe the cab-over-engine design is more common. That’s why we combine our technological edge with market proximity – and create innovations that really benefit North American customers.”

Daniel Laubscher, Head of Engineering, KAISER Group

The acquisition of the US company has also enabled KAISER to intensify its collaboration with North American customers. Having a local presence means greater flexibility in addressing individual customer needs; a major benefit for American customers: The product is manufactured locally and suitably adapted and optimized in line with market requirements – a long-term commitment to the production facility in Fort Morgan in the centrally located state of Colorado.

KAISER is pleased to have all the US employees on board with their valuable skills and experience. CEO Dan Weber is making a strong contribution to the success of the US-based operation thanks to his long track record in the industry. He previously

headed the biggest vacuum truck rental company in the US for sewer cleaning and industrial disposal vehicles, a post he held for 15 years. Excellent leadership qualities and an innovative, market-oriented approach are the attributes that set Dan Weber apart.

Revolutionary technology for North America

The acquisition by KAISER AG opens up the opportunity for further models to use the pioneering water recycling technology. North American customers benefit from an unprecedented level of productivity in sewer cleaning – for example, through the introduction of a recycling vehicle from the successful KAISER AquaStar series. —

WHAT IS A HYDROVAC?

The term commonly used in North America denotes a vacuum excavation truck offering a non-destructive and therefore cost-effective method of vacuuming up a wide range of debris from places that are in some cases difficult to access without damaging pipes, cables or other sensitive installations. It works with water and vacuum, using water pressure to loosen up the soil, which is then vacuumed up.

THE GREAT ADVANTAGE OF THIS VEHICLE:

It can rapidly locate and excavate utilities of all kinds carefully and safely.

Hydrovacs from KAISER PREMIER

CV Series Hydrovac

Rugged design and unprecedented performance are the hallmarks of this hydrovac series, offering high-pressure water and vacuum technology for deployments under the toughest conditions. User-friendly construction for use in difficult terrain combined with maximum availability and straightforward maintenance.

Urban X Hydrovac

A compact and versatile Hydrovac for use in urban environments, which offers a high level of flexibility especially for deployments in tight spaces. Operates with air, water or a patented combination of the two.



“KAISER’s technological experience, our focus on performance and the strategic approach in the market add up to a promising vision for us and our customers. What we have jointly accomplished in the months since the acquisition is remarkable.”
Dan Weber, CEO, KAISER PREMIER



USA



Foundation:	Premier Oilfield Equipment in 2012 Acquisition by KAISER in June 2017
CEO:	Dan Weber
Products:	Urban X, CV-Series, AquaStar (new, made in the USA)
Production area:	8,800 m ² production area within 11 ha
Location:	Fort Morgan, Colorado (USA), roughly 130 km northeast of Denver, the capital of Colorado

Benefits of AquaStar WT

- > Based on the tried-and-tested AquaStar concept
- > Can be used as recycler, fresh water combination vehicle or mobile treatment system
- > Minimum use of flocculant – only the recycled water is treated
- > The recyclable debris is retained and can be treated and used as before
- > Low disposal costs
- > Automated treatment process



FLOCCULATION: TOP-GRADE WASTE-WATER TREATMENT

The flocculation process enables the treatment of wastewater – but with significant qualitative differences over purely mechanical filtering. Flocculation works as follows: Flocculants are added to water that has already undergone pretreatment, causing solid particles to clump together and separate from the water.



On the roads, debris occurs in the form of tire abrasion and grit as well as pollutants such as hydrocarbons and heavy metals. These substances are collected in storm drains, which largely prevent them from entering water bodies. To ensure that these drains work properly, regular maintenance is required in the form of emptying and cleaning.

The KAISER AquaStar WT is a high-performance vehicle for the emptying and treatment of storm drains. The sludge deposits are vacuumed out of the drain, dewatered on the vehicle, and the treated water returned to the drain. This means that the separation of solids and liquids is performed on site. Only the AquaStar WT treatment system offers the efficiency to ensure such low levels of treated sludge.

Increasingly stricter statutory provisions

The conditions under which treated water may be fed into water bodies or into public sewerage systems are becoming increasingly more stringent. "In Switzerland, for example, the stipulated quality of water returned to catch basins was raised to such an extent in 2017 that wastewater treatment is now only possible with mobile waste treatment systems using flocculation technology," says Armin Cristelotti, KAISER sales manager in Switzerland. The water from sludge treated using conventional vacuum vehicles, where only coarse particles have been separated, does not meet the statutory requirements and therefore may no longer be fed into the drain. In contrast, mobile wastewater recycling using flocculation technology complies with requirements and is also highly efficient. On the one hand, the vehicles need extremely little fresh water and, on the other, this method is more environmentally friendly, safer and more cost-effective. Fewer trips are required to transport the compact, treated sludge.

How does flocculation work?

Mobile wastewater treatment systems already separate and collect a large part of the solid particles, and therefore the pollut-

FLOCCULATION

ants, during mechanical treatment. The final treatment stage using flocculation technology is only employed after this pretreatment.

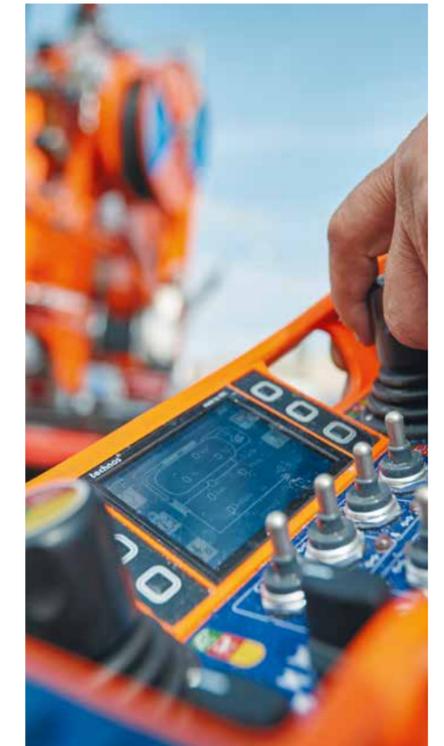
Two different processes are required. During preflocculation, also known as coagulation, a flocculant is added to destabilize the small particles. It is this stage of the process that ultimately determines the cloudiness of the treated water. The actual flocs are only formed in the main flocculation process, where the solids and pollutants are separated from the liquid by means of sedimentation. The KAISERtronic control system monitors the entire process, enabling the operator to concentrate on the actual cleaning operation.



Mobile wastewater recycling using flocculation technology is efficient and in line with statutory requirements.

Minimizing disposal costs and environmental impact

The KAISER AquaStar WT makes mobile treatment and disposal of sewer sludge using flocculation technology possible. KAISER has made this form of on-vehicle treatment suitable for industrial use. The mobile treatment system was specially developed for cleaning storm drain catch basins and designed to ensure that the cleaned water meets the strictest statutory criteria. The growing water shortage in many countries is leading to a trend towards tighter water protection.



Resource-efficient treatment

KAISER's declared goal of ensuring that waste water treatment minimizes the use of resources applies equally in the case of flocculation-based treatment. Flocculants are only used very sparingly and they are only mixed with a small residual proportion of the sludge – to ensure that as little as possible is contaminated. The sludge that is separated by mechanical cleaning remains completely unaffected by the chemical additives. This enables the ecological as well as cost-effective use of the recycling vehicle. "We have already filed a patent application for the innovative treatment process, because no other method minimizes the proportion of precipitant- or flocculant-contaminated sludge to such an extent. That significantly reduces environmental impact and cuts disposal costs," explains Viktor Häusle, head of development for municipal vehicles in Liechtenstein.

Great potential for a wide range of applications

The KAISER treatment process using flocculation also offers great possibilities for applications in other areas. This system makes sense wherever there is a need for polluted sludge to be vacuumed and the returned water has to comply with water protection regulations – whether it's for industrial operations or for cleaning tunnel cleaning water – the potential is huge. —



MANEUVERABLE SEWER CLEANING VEHICLES FOR EGYPT'S METROPOLISES

The huge growth – and the hectic construction boom and chaotic traffic situations that go with it – poses enormous challenges for the Egyptian cities of Cairo and Alexandria. This led to a need for maneuverable, high-performance vehicles to handle sewer cleaning operations.



Thanks to the G2 fleet, cities can respond to emergencies in the shortest possible time.



In order to enable sewer cleaning in the congested streets and narrow alleys of the Egyptian metropolis Cairo, KAISER MORO originally joined forces with local partner Triple Manufacturing Equipment Co. to manufacture the G1 fleet. KAISER MORO, with its many years of experience, provided support for development of the maneuverable and powerful two-axle truck.

The G1 series is equipped with KAISER MORO components, pumps and the system know-how, and is manufactured locally. These vehicles have become so successful that they are now used in all of Egypt's major cities. It is also thanks to these vehicles that it is possible to provide a rapid response to emergencies in these cities – that, in turn, has improved safety in recent years.

Torrential rainfall and severe traffic congestion

A similar tough challenge gave rise to the equally successful G2 fleet. Alexandria needed vehicles that could continue to perform efficient sewer cleaning in periods of sustained heavy rainfall and under even more chaotic traffic conditions. The name of the

solution was G2: These rugged and easily maneuvered vehicles impress not only with their technological features, but also with their very successful design – a major selling point for the tourist metropolis.

Today, Egyptian cities like Cairo and Alexandria benefit from vehicles that secure the functionality of the sewerage and storm water drainage systems – even at the more problematic times of the year. These vehicles have repeatedly put their efficiency to the test.

G4: Impressive fleet of custom vehicles already in operation

The G4 is based on the G1 and G2 series and has the capability to handle multifunctional operations in difficult environmental



conditions. The challenge for this project lay in the development of equipment that can vacuum up heavy sand at great depths and under water, which is a very frequent occurrence in Egypt. In addition, there had to be a high-performance nozzle system on board that can clean large drains and sewers that are full of grease, soap and heavy sludge. Egypt now has a striking fleet of G4 custom vehicles that are deployed on a daily basis and help municipalities to achieve better cleaning results for sewers and drains.

These examples clearly demonstrate what market-oriented solutions can look like when KAISER MORO acts as a full-system partner in collaboration with a regional partner. —

S12 IMPRESSES DURING CONSTRUCTION OF THE WORLD'S STEEPEST FUNICULAR

December 2017 saw the opening of a new funicular railway in the Stoos-Muotatal region in the Swiss canton of Schwyz. It is the steepest in the world for an installation of this kind. The company Vetsch Klosters AG was responsible for the construction work and installation of the concrete structures for the track. The construction company and the new S12 Allroad mobile walking excavator from KAISER successfully achieved top performance on site.

The world's steepest funicular in figures

EXCAVATION VOLUME: 69,000 m³

EMBANKMENTS/FILLS: 20,500 m³

TERRAIN SLOPE: 70 – 90%

MAX. TRACK GRADE: 110%

KAISER EXCAVATORS USED: Two S12s, one S10 and one S1 mobile walking excavator



At 110 percent, the track grade on the new connection up to the mountain village of Stoos sets a record as the steepest funicular worldwide. For the preparation work, such as forest clearance and rock slope stabilization, as well as when building the funicular track itself, Vetsch Klosters AG used KAISER's new S12 Allroad mobile walking excavator. Before work on the track could even begin, extensive rock removal and stabilizing work had to be carried out. The excavator showed itself to be ideal for this and other excavation work as well as for the laying of roller-compacted concrete underneath the track elements.



Exceptionally mobile all-rounder

The maneuverability of the S12 Allroad immediately becomes apparent when working in restricted spaces or in places that are difficult to access. For this reason, Vetsch deployed two S12 Allroad vehicles for the construction work on the track, for example. The two KAISER excavators lifted 6.5-ton track elements to then place them precisely in their defined positions. These compact machines were even able to drive into the uppermost tunnel where, despite the narrow space available, they raised and moved the heavy slabs. "The mobility of these machines is perfect, especially as compared to those that can only walk. It's ideal that you can still drive on an incline of up to 70 percent – without traction chains. For us, that kind of mobility is decisive," explains Roger Vetsch, owner and CEO of Vetsch Klosters AG. The high mobility of the KAISER walking excavator

was also a huge advantage when building the track. When used in combination with the KS90 rope winch and the KS100A unwinding device, the mobile walking excavator can move easily and securely in steep and slippery terrain without damaging the ground. In the case of the drilling work for the rock anchors, the excavator stands on the track but movements are performed on the tires. "The S12 Allroad can be so stably positioned in the terrain that we only used the rope for assistance when driving," explains Walter Roth, the construction equipment operator deployed by Vetsch. Alongside the regular work, the mobile walking excavator was also used to clear the excavation waste, which was sent out of the tunnel through a pipe and into an adjacent gully, and transport it down the mountainside in the shortest time possible.

One excavator does the work of four

The S12 Allroad also demonstrated its great versatility when it came to the foundation work for the bridge near the lower terminal of the funicular. Within an area of roughly 8 x 5 m, just about every construction method there is in the field of specialized foundation engineering had to be used. From temporary support of the construction pit, excavation, shotcrete application, the installation of temporary self-drilling anchors and 16-meter-long micropiles for the foundations through to drilling to a depth of up to 30 m for the strand anchors and inclinometers. "Normally, this kind of work can only be done with heavy tracked machines. That's because an excavator needs high performance and the appropriate self-weight to operate the kind of drill rig used here. The S12 Allroad has all that and is nonetheless compact and more maneuverable than normal excavators," says Roger Vetsch and adds: "For this work, we really would have needed three drilling machines – none of them would have been terrain capable – and one excavator. But we did it all with one machine. You won't find anything equal to the KAISER mobile walking

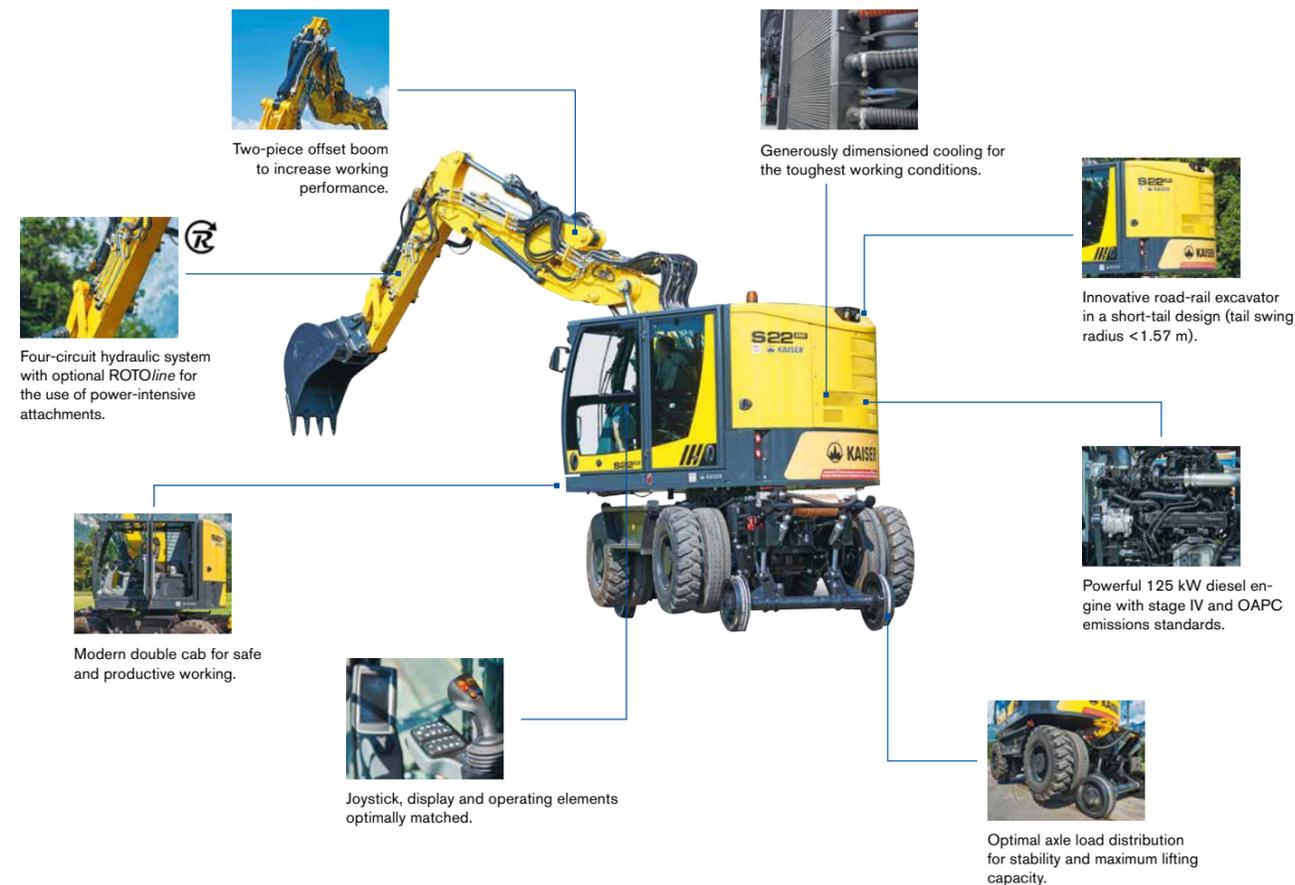
excavators in a hurry." That also explains why Vetsch Klosters AG has no less than three S12 Allroad mobile walking excavators from KAISER: "The excavators make you very flexible. It also gives experienced operators a lot of variety when they can do so many different jobs with these machines. A KAISER machine takes all that work in its stride," says Roger Vetsch. Walter Roth sums up his attitude to the equipment: "The excavator has to be very reliable when you're using such heavy attachments. Only then can I put my total trust in the machine."

Top safety standards at the construction site

The safety requirements are extremely high for special deployments like these. Everything has to comply with the statutory provisions and be precisely documented from the start. Health and safety plays a very important role. "As a contractor, you have to be aware of how much there is to do to ensure that nothing goes wrong and everything goes exactly to plan. The S12 Allroad meets the safety standards in every respect and, just like the attachments, has all the declarations of conformity. We've been working with KAISER for over 40 years now and we've already done the craziest things, but this project really tops it all. Our choice of machine was perfect," says Roger Vetsch in conclusion. —

S12 Allroad Applications

- › Drilling work
- › Gully clearance, removal of excavation waste
- › Earthworks, slope removal
- › Application of roller-compacted concrete
- › Track construction
- › (Bridge) foundations
- › Lifting, transporting and positioning of track elements



SHORTER TRACK POSSESSION TIMES THANKS TO THE S22^{RR}

The S22 railroad excavator is a universal dual-mode machine. Its high-powered engine enables the optimal use of ballast tampers, ballast brushes and other power-intensive attachments. Its greatest advantage: a very short tail swing radius, which means the excavator can continue working without affecting trains that pass alongside on an adjacent track.

As a stress-free means of transport that avoids today's traffic congestion, rail travel is growing in popularity worldwide. However, railroad tracks require reliable maintenance and this can normally only be carried out when no trains are running.

The goal of every rail operator is therefore to cut maintenance times to a minimum. This is precisely where the S22^{RR} excavator comes in: With its outstanding hydraulic performance and high stability, this machine can do the required work

in record time with only minimal restrictions for train services. This is because the S22^{RR} is a short-tail excavator that does not interfere with the adjacent track thanks to its short tail swing radius. The railroad excavator can be equipped with

many attachments and is ideally suited for deployment on or alongside the track.

Projects and traffic have to flow

The distance between parallel tracks is often so narrow that there is rarely enough room to deploy maintenance machinery without having to interrupt train operations. "When you work with a conventional excavator, its tail swings into the clearance envelope of the adjacent track," explains René Geiger, head of development at KAISER's excavator division. In order to mitigate this problem, KAISER developed the S22^{RR} in collaboration with MBA. The limited tail swing radius of 1.57 meters means that the operator does not have to vacate his working position when a train runs alongside on the adjacent track. "Work can continue without repositioning the machine. That saves time, effort and costs," says René Geiger.

Successful product launch

The new S22^{RR} excavator was originally designed to comply with the strict specifica-

tions and regulations of the Swiss railroad sector. Contractors increasingly stipulate a short-tail machine in order to satisfy the high safety standards for track construction sites. The short-tail design guarantees that a train running on a parallel track can pass without risk. As an experienced supplier of construction machines with specific expertise in the railroad sector, MBA AG is responsible for distribution in Switzerland. The S22^{RR} achieved very good sales results immediately after market launch – despite the fact that customers were yet to experience the machine in practice. "That's highly unusual in the industry, but demonstrates the strong relationship between KAISER and MBA, and attests to the trust that customers place in the experience of these two companies," says Roman Baschera, CEO of MBA AG. Market proximity and the many years of experience of both companies with efficient, high-performance and versatile products played a key role in the development of the S22 railroad excavator and in establishing its position in the market. —

Facts about the S22^{RR}

- > Powerful and nonetheless quiet railroad excavator (for deployment on and alongside the track)
- > ROTOline hydraulic system ensures the right pressure and volume (between 50 and 350 bar and max. 190 l/min)
- > Final Tier 4/Stage IV-compliant John Deere PowerTech PSS engine 4.5L with 125 kW (168 PS), Stage V emissions certification, diesel particulate filter
- > Compact, with short tail swing radius (1.57 m)
- > Simple changeover to narrow gauge
- > Length: 8 m (with retracted boom), width: 2.55 m, digging depth: 4.8 m
- > Flexible, can be used in combination with attachments





PERFORMANCE AND MULTIFUNCTIONALITY

With the Hercules, KAISER offers the most high-performance material blower on the market. At the same time, talented allrounder Cerberus scores as a versatile high-performance vacuum vehicle. Like their mythological namesakes, both vehicles have a reputation for strength and reliability.



Hercules is a Finn. Not, of course, the Greek hero, but Hercules, the dry vacuum vehicle with blow ejector system that was developed in Finland by KAISER EUR-MARK. Like its namesake, Hercules stands for tremendous power, which in the vehicle's case is down to a screw compressor that delivers an air flow of over 7,000 m³/h. With a constant overpressure of up to 2 bars, this vehicle can efficiently move dry materials such as gravel or granulate – even upwards – in the shortest time possible. That makes Hercules the most high-performance material blower on the market.

Cerberus is based on a modular concept that includes options to extend its application range. Like the three-headed dog of the same name, there are three aspects to this vehicle: The high-performance vacuum truck designed by KAISER MORO can be extended to include wet suction and suction excavation functions – the three capabilities symbolized by the three heads of the Cerberus logo. With a maximum air flow rate of 16,500 m³/h and a vacuum of 93 percent in the twin-boost version, Cerberus is comparable to a suction excavator and its low-noise design makes it ideally suited for use in urban environments.

Hercules: moving more material at greater speed

Anyone who wants more speed when distributing gravel on roofs, for example, or general time and cost savings when moving materials will find a reliable partner in Hercules. KAISER has incorporated the most efficient pump on the market and suitably adapted the vehicle for this purpose. "We have various vehicles in our fleet, but none of them works as fast and reliably as the Hercules," explains Karl Schmitter, CEO of Karl Schmitter Transport AG. Maintenance requirements are also low as the power transmission is direct, without a drive belt. The Hercules can summon up its power under the most arduous conditions. It is designed for temperatures as low as -30 °C

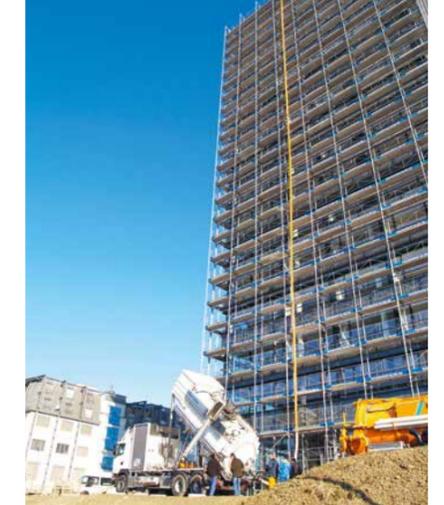
but is also heat-resistant and noise-insulated. Just like the mythological Hercules, who proved his skills by accomplishing the twelve labors, the KAISER vehicle shows its great talent in a wide range of operations. Alongside its different applications as a material blower, it has also been designed for vacuum and cleaning jobs.

Cerberus, the user-friendly allrounder

The Cerberus is a true allrounder. Two separate suction lines for dry and wet materials offer the greatest possible flexibility for suction, excavation and repair work of all kinds. Operation and maintenance are particularly straightforward: Counter-current compressed air jets clean the filter bags, and automatic filter chamber cleaning enables work to continue without interruption. A high-tipping mechanism allows the loaded material to be discharged into containers or big bags without any problem. The Cerberus can be extended to include a fully hydraulic, articulated four-segment excavation arm and a blow ejector with an overpressure of up to 1.2 bar.

The benefits come into their own in the field

Customers who have been impressed by the



The Hercules offers faster roof graveling plus time and cost savings when moving materials.

capabilities of the Cerberus include SIDA, one of the biggest sewer cleaning operations in southern Italy. SIDA's CEO Francesco Butera explains why he opted for the Cerberus: "We're specialized in the really tough jobs. The Cerberus gives us solutions for a wide range of applications and is simple to operate into the bargain. It combines multifunctionality with user-friendliness." The company uses the vehicle primarily for deployments where standard equipment is inadequate: such as cleaning biogas installations (ATEX) or clearing up in the aftermath of accidents or flooding.

Deployment options open up new perspectives

KAISER's experts draw on the specialist know-how of the entire group when developing vehicles. This combines in-depth knowledge gained in the area of vacuum and high-pressure technology with the wealth of expertise in vehicle construction and special-purpose vehicles. This broad base of experience makes KAISER unique in the industry and also guarantees impressive solutions in the field of dry vacuum vehicles. It goes without saying that all of KAISER's product groups are committed to the same high quality benchmark. —

Hercules KAISER EUR-MARK

- > Screw compressor with air flow rate of 7,260 m³/h and a constant overpressure of 2 bar or
- > Positive displacement lobe pump with a max. air flow rate of 9,000 m³/h and an overpressure of 1 bar
- > Suction boom with a reach of 6,750 mm, 8" suction hose*
- > Noise-insulated
- > Designed for temperatures down to -30 °C
- > High-tipping system*
- > PED, ADR*

*optional

Cerberus KAISER MORO

- > Dry suction, wet suction, suction excavation
- > Air flow rate of 6,000 m³/h, 10,500 m³/h or 16,500 m³/h in the twin-boost version
- > Two separate filter lines for dry and wet materials*
- > Fully hydraulic, articulated four-segment excavation arm*
- > Noise-insulated
- > Blow ejector with max. 1.2 bar*
- > High-tipping system*
- > PED, ADR, ATEX*



WATER RECYCLING IS BECOMING MORE IMPORTANT WORLDWIDE

Water is one of our most precious resources. That is why there is also a growing interest in sewer cleaning with water recycling. Statutory requirements are increasingly being introduced which seek to standardize professional and sustainable sewer cleaning with water recycling.

Most industrialized nations have a very high standard of sewerage systems and infrastructures. And many newly industrialized countries have already begun to introduce comparable sewerage systems in their metropolises. Fast-growing cities mean increasing environmental problems and that makes efficient, resource-conserving sewer cleaning all the more important.

The problem with conventional sewer cleaning without recycling is the high water consumption it involves. Example: Jetting operations based on average performance consume 300 liters of water per minute. Assuming a daily jetting period of five hours, this gives over 24,000,000 liters per vehicle a year. In addition to the enormous consumption of resources, there are the very high costs of fresh water to consider.

The goal is to minimize the high volumes of drinking water used for sewer cleaning while simultaneously increasing the efficiency of the vehicles. This is only possible if a reliable water recycling system is used.

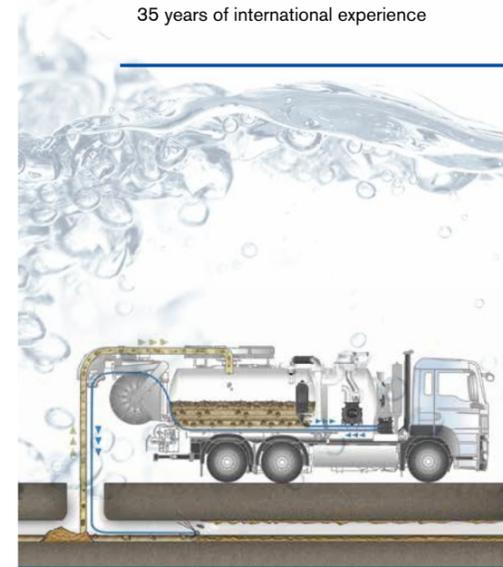
Convincing technology
Growing numbers of newly industrialized countries are starting to recognize the significant benefits that KAISER technology brings.

Benefits of KAISER recycling

- › Robust system with high efficiency, even under the toughest conditions
- › High vehicle payload thanks to low system weight
- › Simple handling and reduced cleaning requirements due to simplicity of the system
- › Proven KAISER recycling technology – almost 35 years of international experience



Efficient technology and simple operation are persuasive selling points not only in newly industrialized countries like here in Dhaka, Bangladesh, but also in industrialized nations.



How does water recycling work?

In the case of water recycling, the sewer jetting operation and the vacuuming of deposits are combined into one continuous process thanks to the simultaneous water treatment. The collected material in the form of solids and wastewater is vacuumed up and undergoes a treatment process directly on the vehicle. The solids are separated and the treated water obtained can be used again for high-pressure sewer cleaning. The treatment process utilizes the physical differences between solids and liquids. The key elements here are the higher density (sedimentation) and the size of the particles (filtration). All the components of the recycling system and the high-pressure pump have been developed by KAISER in-house – and are optimally designed for their purpose. The combination of these technologies, which have been tried and tested over decades, has given rise to the creation of an extremely robust and efficient water recycling system. The simplicity of the design makes the system easy to operate and less time-consuming to clean as well as enabling a high vehicle payload.

Any operator using a vehicle with water recycling saves huge amounts of water and can work for hours with the “on-board water”. Therefore, eliminating time-consuming traffic jams and long trips to refill with fresh water. This saves fuel and prolongs the effective deployment time at the sewer. Furthermore, the material to be disposed of has a higher percentage of solid particles thanks to the dewatering effect. As a result, the efficiency of the vehicle is increased and the burden on the dump site is reduced.

Water recycling in Hungary

During a very difficult project in Hungary, for example, KAISER was the only supplier who was able to impress with a successful demonstration of water recycling: “While the first competitor took one look at the test section after opening the manhole cover and said water recycling couldn’t be done, the second gave up after 20 minutes because the filter was completely blocked up. Our rugged vehicles have a higher level of availability because the pump system is unaffected by dirty water,” says Volker Stark, regional sales manager for municipal vehicles at KAISER AG. He adds: “Not long after that, we received an order for a vehicle from the city council.”

Internationally successful under the toughest conditions

In places like Mumbai in India, the sewerage infrastructure has long been overwhelmed

by the number of users. Despite the existence of a major sewerage system, there is no preventive maintenance and sewers are not cleared out until they are well and truly blocked. Garbage and sludge also clog up the open sewers, which were designed to handle heavy rains. Another problem is that sewer cleaning is still frequently performed manually and without professional protective equipment. “In Central Europe, we clean the sewers by jetting; in cities like these, however, proper earthworks are required. That can only be done with really strong machines. Another critical factor is the high volume of traffic, complete with waiting times and jams – that’s where our recycling vehicles are a major advantage,” explains Volker Stark, regional sales manager for municipal vehicles at KAISER AG. He adds: “Our customers can rely on our many years of experience and our proven technology. We’re experts in a field that is growing in importance around the globe.”

In Dhaka, Bangladesh, for instance, the significantly greater ease of waste disposal motivated the customer’s recent decision to purchase another EcoCombi. But newly industrialized countries are not the only ones to be impressed by the efficient technology and simple operation of KAISER’s recycling vehicles. America is another example of a market that is experiencing strong demand. ■



KAISER draws on solid research and development resources within the Group covering a wide range of technological competencies.

THE ROLE OF TECHNOLOGY AT KAISER

Research and development naturally plays a central role at KAISER. A high level of innovation and technological individuality are defining features of the company's products. This is partly attributable to the strategic decision to ensure the availability of all key competencies within the company.

With a significantly higher number of development and design engineers than other competitors in the industry worldwide, KAISER has the resources to cover research, development and design work in a wide range of technological speciality areas.

The company's innovative products, technologies and services are developed by our expert engineers. New ways of optimizing the existing product portfolio and adapting it in line with customer wishes are constantly being sought out. In the area of custom-built vehicles, the ability to accommodate customer needs and understand specific applications is

crucial. This explains the success with which mobile walking excavators, the pumps developed in-house and other components from KAISER have claimed their rightful place in the world market. Today, KAISER's vehicles for sewer cleaning and industrial disposal lead the field and their performance capability remains unrivaled.

Maintaining and expanding a technological lead

KAISER's engineering department is organized on a decentralized basis. Five sites have their own engineering departments, which are in turn linked to production facilities. This structure

makes it possible to ensure customer proximity and understand regional requirements. At the same time, KAISER customers also benefit from the company's international dimension. The wide range of know-how and the in-depth experience of its specialists are instrumental in generating significant synergies and many innovative ideas. This is one of KAISER's USPs: No other supplier has a global presence. Regular contact such as video conferences, face-to-face meetings are particularly important for know-how transfer within the Group. For this reason, the specialists work in teams that are put in place for specific projects or spend time at other sites for intensive collaboration.



"The work of the 'Göttis' ensures that we can offer a maximum of individual support in the project business and every vehicle is a unique solution based on tried-and-tested technology."

Daniel Laubscher, Head of Engineering, KAISER Group



The "Götti" as technical customer adviser.

Globally active and successful

KAISER began its life as a small workshop in 1913. Today, we see an industrial enterprise that operates globally and has sites in Liechtenstein, Italy, Finland, Austria, Slovakia and the United States. KAISER occupies a leading position in the world market and therefore boasts a greater presence than ever before. KAISER vehicles are currently deployed in over 1,000 cities worldwide. They are used with great success in typical European markets for sewer cleaning and industrial disposal such as in Switzerland. They are also used in industrial mega-cities like Shenzhen, China, as well as in newly industrialized countries. KAISER has been manufacturing mobile walking excavators for

over 50 years and is also a leading global player in this sector. Whether it's on steep mountain slopes, in large metropolises or in marshlands – the mobile walking excavators are used for a wide range of jobs and guarantee top mobility and stability in every situation.

Maximizing the fulfillment of customer needs

A special feature of implementing customer contracts is the "Götti" principle, which is only found at KAISER. A "Götti", the Swiss-German word for Godfather, is responsible for the project relating to the specific contract. He takes charge of the technical planning and accompanies

the entire implementation process – from the inquiry through to delivery of the vehicle and beyond. "Göttis" are more than just engineers with a high degree of specialist know-how. They are technical advisers to the customers and develop a customer-specific solution. In addition, they accompany the complete production process and make sure that everything complies with the appropriate standards. Daniel Laubscher, head of the engineering and development department for the KAISER Group, explains the role as follows: "The work of the 'Göttis' ensures that we can offer maximum of individual support in the project business and every vehicle is a unique solution that is based on tried-and-tested technology."



STRONG TOGETHER

KAISER gains international experience, while maintaining its regional roots. On the following pages, KAISER provides insights into its individual companies and their latest developments.

KAISER PREMIER is now the fourth company to have been set up or acquired by KAISER AG in the past decade. 2008 saw the opening of an additional production site in Slovakia. Scandinavian market leader EUR-MARK was taken over in 2011 and the well-established Italian company, MORO, was acquired in 2014.

Past experience shows that growth through acquisition has substantially strengthened KAISER AG in many areas, particularly in terms of international market position and innovation capability. The affiliated companies, each with its own regional product and market focus, have enabled KAISER AG to position itself on a broader base. In turn, the integrated businesses have made significant gains in dynamics and their development has been driven forward by major investments. At the same time, the emphasis continues to be placed on customer proximity.



New construction and refurbishment work brings a completely new look.

KAISER AG

LIECHTENSTEIN



New building at the headquarter

The corporate base of KAISER AG in Schaanwald, Liechtenstein, is undergoing some changes. The offices of the development and engineering department were expanded and more jobs created in 2017. Additional new construction and refurbishment work in 2018 will give the premises an entirely new look. New areas are to be created for vehicle handover, customer training and reception. Replacement of the building façade will complete the facelift. The second phase of the modernization project will see the creation of a parking garage and museum in 2019.



New product highlights

At this year's IFAT in May, the KAISER Group will be showcasing a series of new product highlights from the division for sewer cleaning and industrial disposal vehicles along with exciting further developments. The IFAT trade show in Munich continues to be the industry's leading international exhibition and provides an excellent platform for presenting yourself to a global audience.



In the construction machine sector, KAISER took part in several regional trade fairs and showcased special projects, such as a mobile walking excavator with rail capability, as well as existing products featuring the latest optimizations. Preparations are currently ongoing for Bauma 2019, the leading international trade show for construction machinery —

KAISER AG based in Schaanwald specializes in vehicles for sewer cleaning and industrial disposal, mobile walking excavators and road-rail excavators.

KAISER EUR-MARK

New sales and service center in Eslöv, Sweden

Expansion of the service network is a top priority for KAISER. That was the reason behind the new Eslöv service center, which opened in June 2017. As well as addressing the needs of Swedish customers, this service center is also perfectly placed to cater for Danish interests as it lies just 80 km from Copenhagen. Once again, the focus is on proximity to the customer and the local team has many years of experience in the industry.

Other news from KAISER EUR-MARK includes expansion at the main site in Nykarleby, Finland and the internal re-organization of production processes.

Product development NordicStar

With the latest product development, NordicStar, KAISER EUR-MARK relied on close collaboration within the KAISER Group. The NordicStar is a combination vehicle designed for Nordic winter conditions and based on the same principles as the AquaStar.



Design study 2017. The NordicStar is to be presented at IFAT 2018.

FINLAND



KAISER EUR-MARK

EUR-MARK's product portfolio primarily consists of combination vehicles for sewer cleaning – with water recycling as an option. Most of the models are equipped with special winter packages that allow deployment at temperatures as low as -30 °C. Another mainstay is the dry vacuum vehicle, Hercules, with rotary piston compressor technology.

KAISER MORO



Two new products

KAISER MORO recently presented two new products: Cerberus, a high-performance, multifunctional vacuum vehicle for dry and wet materials (report on page 18), and Elegance, a high-performance combination vehicle featuring outstanding design – now with the option of a KAISER water ring pump in the fresh water tank. At the same time, the MORO KAISER Components division is showing

very dynamic development, as borne out by the example in Egypt (report on page 12), where vehicles are providing excellent performance under particularly tough conditions. The proven business model here – a combination of KAISER MORO technology and the company's experience as system partner – guarantees success for OEMs worldwide.

ITALY



KAISER MORO

KAISER MORO's product portfolio is focused on two main areas: combination vehicles for sewer cleaning and the industrial disposal of dry and wet materials, and pumps and components. In the case of the latter, KAISER MORO has significantly expanded its position as strategic partner to international OEMs under the MORO KAISER Components brand. The basis for this success is the company's own broad range of vacuum pumps plus many other key components for sewer cleaning vehicles.

KAISER FAHRZEUGTECHNIK

AUSTRIA



Strong partner in the construction sector

KAISER Fahrzeugtechnik is becoming increasingly successful at establishing itself as a strong partner to customers in the construction sector. Building from a clear pole position in the Austrian market for mobile walking excavators and its close and long-standing contact with customers, KAISER successively expanded its range of construction machines through the addition of third-party products of well-known brands. Over the years, KAISER Fahrzeugtechnik has also significantly expanded its plant hire portfolio and currently has five hire centers. On the service side, customers are served not only by Nenzing but also by the company's own workshop in Kramsach, Tyrol.



KAISER FAHRZEUGTECHNIK

With the current product portfolio of mini/compact excavators, four-wheel dumpers, wheel loaders and tower cranes, KAISER is able to offer customers a wide range of third-party equipment in addition to mobile walking excavators.

KAISER

SLOVAKIA



Ten years of KAISER Eastern Europe

A decade has now passed since KAISER Eastern Europe went into production in February 2008. The company has enjoyed steady development and can look to the future with great confidence. The core team from the early days is still on board and the collaboration with KAISER AG continues to be excellent.

KAISER PREMIER USA



KAISER PREMIER product news

In February, KAISER PREMIER took part in WWETT 2018 in Indianapolis, the most important trade show for the industry in the US, where it successfully presented the company and the new US-made AquaStar. The entire team was delighted at the interest shown by visitors to the show and the many fascinating conversations that took place.



Trade show team at WWETT 2018

KAISER PREMIER

More about KAISER PREMIER can be found in our main feature on page 6.

KAISER EASTERN EUROPE

KAISER Eastern Europe manufactures numerous vehicle types from the KAISER Group. In addition to the manufacturing facility – which like the Liechtenstein plant, has a high level of in-house production – the company has its own sales and service department for sewer cleaning vehicles and mobile walking excavators.



105 YEARS OF KAISER

Josef Kaiser Jr. develops a special excavator for use in steep terrain, known as a walking excavator.



1965

The company develops its own KDU high-pressure pump. From this time on, core components developed in-house and technological autonomy are key factors in the evolution of the business.

1974

Presentation of the first sewer cleaning vehicle – a sludge vacuum vehicle.

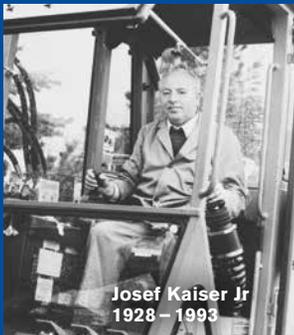
1963



1979 - 2000



KAISER succeeds in shaping the development of both sectors with a string of innovations. Examples include the first mobile walking excavator with all-wheel drive in 1979 and the use of a water recycling system for sewer cleaning vehicles in 1985.



Josef Kaiser Jr.
1928 – 1993

1950

Josef Kaiser Junior takes over management of the company. He initiates the transition from a small workshop operation to an industrial enterprise. Development of the company's own suction-pressure tanker. The "Kaiserfass" acquires a legendary reputation.



Products such as the S2 mobile walking excavator or KAISER AquaStar become industry benchmarks in terms of their efficiency.

1913-1955



In 1913, Josef Kaiser Senior files his first patent, which relates to a weaving loom. It was some time later that vehicles were to become a focus of the business. A large number of auto tractors are built up until 1955.



2005 - today

Markus Kaiser takes over operational management as CEO and principal shareholder. The company expands both through organic growth and through acquisitions – in 2011 with Eur-Mark in Finland, in 2014 with Moro in Italy, and in 2017 with Premier in the USA – to become global market leader.